LTRC Annual Research Program

Fiscal Year July 1, 2022 - June 30, 2023

FHWA Part B SPR Research Program
FAP Number SPR-0010(34)
&
FHWA Funded Research Program
&
FHWA LTAP Funded Program
&
FHWA STP Funded Program
&
Self-Generated Funded Research Program
&
Other DOTD Funded Projects

Conducted by:
Louisiana Department of Transportation and Development
Louisiana Transportation Research Center
In accordance with Louisiana R.S. 48.105
Which governs the creation and operation
Of the Louisiana Transportation Research Center

In cooperation with
United States Department of Transportation Federal Highway Administration
June 2022

LOUISIANA TRANSPORTATION RESEARCH CENTER
LTRC

Research, Technology Transfer, Education & Training

DOTD
LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

June 24, 2022

Mr. Charles W Bolinger
Division Administrator
Federal Highway Administration
5304 Flanders Drive, Suite A
Baton Rouge, LA 70808

Attention: Ms. Mary Stringfellow

RE: FY 2022-2023 Louisiana Transportation Research Center Annual Work Program

Dear Mr. Bolinger:

Enclosed please find the FY 2022-2023 Louisiana Transportation Research Center (LTRC) Annual Work Program for your review and approval. You will note that the program is divided into multiple sections reflecting all funding sources.

As delegated by the Secretary, Louisiana Department of Transportation and Development (LADOTD), I, Samuel B. Cooper, Jr., Director, Louisiana Transportation Research Center, of the State of Louisiana, do hereby certify, that the State is in compliance with all requirements of 23 U.S.C. 505 and its implementing regulations with respect to the research, development, and technology transfer program, and contemplate no changes in statutes, regulations, or administrative procedures which would affect such compliance.

If I can provide additional information, please advise.

Sincerely,

Samuel B. Cooper, Jr., Ph.D., P.E.
Director

cc: Mr. Chrisptopher P. Knotts, P.E.
Dr. Tyson Rupnow, P.E.

U.S. Department of Transportation
Federal Highway Administration

Louisiana Division Office

5304 Flanders Drive, Suite A
Baton Rouge, LA 70808
225.757.7600
225.757.7601 (fax)

June 27, 2022

In Reply Refer To:
HDA-LA

Shawn D. Wilson, Ph.D.
Secretary
Louisiana Department of Transportation
and Development
Baton Rouge, LA

Subject: State Planning & Research (SPR) Work Program Subpart B FY 2022-2023

Attention: Mr. Chris Knotts, LDOTD

Dear Dr. Wilson:

This letter provides approval of the Louisiana Transportation Research Center (LTRC) Statewide Planning and Research (SPR) Work Program Subpart B, for Fiscal Year (FY) 2022-2023.

A separate request from your Federal-aid section will be required to process the fiscal documents necessary to obligate the SPR & STP (STBG) funds for this Work Program. Should you have any questions regarding this matter, please contact me at (225) 757-7610.

Sincerely yours,

Mary M. Stringfellow
Program Delivery Team Leader

cc: Mr. Sam Cooper, LTRC
Mr. Tyson Rupnow, LTRC
Ms. Mary Leah Coco, LTRC
Ms. Mary Elliot Bergeron, LDOTD
Ms. Hong Zhang, LDOTD

Abbreviations and Acronyms

Funding

SPR	State Planning and Research
NCHRP	National Cooperative Highway Research Program
TRB	Transportation Research Board
IBRD	Innovative Bridge Research Deployment
LTAP	Local Technical Assistance Program
STP	State Transportation Program
NSF	National Science Foundation
TT-Fed	Transportation Trust – Federal
TT-State	Transportation Trust – State

Project Types

ADM	Administrative
RS	Research Support
GT	Geotechnical
P	Pavements
B	Bituminous
SA	Safety
SS	Special Studies
C	Concrete
ST	Structures
TT	Technology Transfer
LTAP	Local Technical Assistance Program
PF	Pooled Fund (Louisiana Lead)

Project Status

A	Active
P	Proposed
RFP	Request for Proposal
SIO	Statistical Internal Order

AAR	Alkali aggregate reaction
AASHTO	American Association of State Highway Transportation Officials
ACI	American Concrete Institute
ACR	Alkali-carbonate reaction
ACRP	Airport Cooperative Research Program
ADT	Average daily traffic
ALF	Accelerated loading facility
AMRL	Asphalt and Materials Reference Laboratory
ANFIS	adaptive neuro fuzzy inference system
ANN	Artificial neural network
AO	aromatic oils
APWA	American Public Works Association
ASCE	American Society of Civil Engineers
ASR	Alkali-silica reaction
ATR-FTIR	Fourier-Transformed infrared
BBR	Bending beam rheometer
CAD	Computer aided drafting
CCRL	Cement and Concrete Reference Laboratory
CE&I	Civil Engineering and Inspection
CIP	Cast in place
CTM	Circular track meter
CPT	concrete prism test
CPT	Cone penetrometer
CR	crumb rubber
CUTC	Council of University Transportation Centers
DCP	Dynamic cone penetrometer
DFT	Dynamic friction tester
DIC	Digital image correlation
DIGGS	Data Interchange for Geotechnical and Geo-Environmental Specialists
DOT	Department of Transportation
DOTD	Louisiana Department of Transportation and Development
DSR	Dynamic shear rheometer
ECC	Engineered cementitious composite
EMCRF	Engineering materials characterization and research facility
EPA	Environmental Protection Agency
ERDP	Engineering Resource Development Program
ETG	Expert task group
FE	Finite element
FHWA	Federal Highway Administration
FSS	Fully soften shear strength
FY	Fiscal year
GIS	Geographic information systems
GLTP	Geosynthetic load transfer platform
HCM	Highway Capacity Manual

HEMP	Hurricane Evacuation Modeling Package
HFA	Hydrated fly ash
HMA	Hot mixed asphalt
ICC	Internally cured concrete
IRI	International roughness index
IT	Information technology
ITS	Intelligent Transportation System
LA PMS	Louisiana Pavement Management System
LCA	Life-Cycle Assessment
LEO	Louisiana employees online
LIDAR	Light detection and radar
LL	Liquid limit
LMS	Learning management system
LPA	Local public agency
LPESA	Louisiana Parish Engineers and Supervisors Association
LRFD	Load and Resistance Factored Design
LRSP	Local Road Safety Program
LSO	Learning solution online
LSU	Louisiana State University
LTA	Long term aged
LTAP	Louisiana Technical Assistance Program
LTRC	Louisiana Transportation Research Center
LWST	Locked wheel skid trailer
LWT	Loaded wheel tester
MASH	Manual for Assessing Safety Hardware
MCPT	Miniature concrete prism test
MEPDG	Mechanistic Empirical Pavement Design Guide
MPO	Metropolitan planning organization
MRI	Major Research instrumentation
MTS	Materials Test Systems
NASA	National Aeronautics and Space Agency
NCAT	National Center for Asphalt Technology
NCHRP	National Cooperative Highway Research Program
NDT	Non-destructive testing
NHS	National highway system
NHTSA	National Highway Transportation Safety Administration
NNBF	Natural and Nature-Based Features
NSF	National Science Foundation
OGFC	Open graded friction course
OMC	Office of Multimodal Commerce
OTS	Office of technology services
PAV	Pressure aging vessel
PCC	Portland cement concrete
PCPT	Piezocone penetration test

PCR	Product category rule
PDH's	Professional development hours
PI	Performance index
PI	Principal Investigator
PL	Plastic limit
PMTS	Project management tracking system
PMS	Pavement management system
PRC	Project review committee
PRF	Pavement research facility
PSV	Polished stone value
QA	quality assurance
QC	quality control
RA	Research associate
RAP	Recycled asphalt pavement
RAS	Recycled asphalt shingles
RC	Reinforced concrete
RCC	roller compacted concrete
RH	relative humidity
RTFO	Rolling thin film oven
SARA	Saturates/Aromatics/Resins/Asphaltenes
SASHTO	Southeastern Association of State Highway and Transportation Officials
SBS	Styrene-Butadiene-Styrene
SCB	Semi-Circular Bend
SCPTu	Seismic Piezocone Penetration Testing
SHSP	Strategic Highway Safety Plan
SLR	Sea Level Rise
SMA	Stone matrix asphalt
SN	Skid number
SOP	Standard operating procedure
SPS	Sandwich plate system
SPT	Standard penetration test
SSRB	Louisiana Standard Specifications for Roads and Bridges
STC	Southeast Transportation Consortium
TA	Technical assistance
TIMED	Transportation Infrastructure Model for Economic Development
TLC-FID	Thin-layer Chromatography and Flame Ionization Detection
TRB	Transportation Research Board
TSR	Tensile strength ratio
TTEC	Transportation Training and Education Center
ULL	University of Louisiana-Lafayette
UTC	University Transportation Center
UTM	Universal testing machine
USGA	United States Geological Administration
VMT	Vehicle miles traveled

WIM	Weigh in motion
WMA	warm mix asphalt
XRD	X-ray diffraction
XRF	X-ray fluorescence

Table of Contents

FHWA SPR Work Program
Part B

FAP Number SPR-0010(34)

FHWA Funding

SPR Research Budget Recap	H#	Federal	State	Total
Administrative Budget	TBD	$735,824.00	$183,956.00	$919,780.00
Research Support Studies Budget	TBD	$1,381,618.40	$345,404.60	$1,727,023.00
Active Studies Budget	TBD	$3,963,697.60	$990,924.40	$4,954,622.00
Proposed Studies Budget	TBD	$1,741,741.60	$435,435.40	$2,177,177.00
Pooled Fund Lead State Studies Budget	TBD	$180,000.00	$0.00	$180,000.00
Total SPR Budget		**$8,002,881.60**	**$1,955,720.40**	**$9,958,602.00**

SPR External Collaboration Budget Recap	H#	Federal	State	Total
Pool Funded Studies	N/A	$200,000.00	$0.00	$200,000.00
TRB Correlations	N/A	$135,429.60	$33,857.40	$169,287.00
NCHRP	N/A	$958,157.00	$0.00	$958,157.00
Total SPR External Collaboration Budget		**$1,293,586.60**	**$33,857.40**	**$1,327,444.00**

FHWA Funding

LTAP Budget Recap	H#	Federal	State	Total
LTAP	TBD	$542,938.00	$150,000.00	$692,938.00
LTAP Program Total		$542,938.00	$150,000.00	$692,938.00

STP: Technology Transfer Program Budget Recap	H#	Federal	Total
Technology Transfer Program and Operations	TBD	$1,308,339	$1,308,339
Workforce Development Program	TBD	$7,059,933	$7,059,933
Student Support Programs	TBD	$210,000	$210,000
Total STP Budget		$8,578,272	$8,578,272

Other DOTD Sections Funding

Other DOTD Sections Budget Recap	H#	Federal	State	Total
Active Studies Budget	TBD	$63,325.60	$15,581.40	$77,907.00
Proposed Studies Budget	TBD	$379,989.00	$0.00	$379,989.00
Total Other DOTD Sections Budget		**$443,314.60**	**$15,581.40**	**$457,896.00**

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg (80% Federal / 20% State)

FISCAL_YEAR 2022-2023

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: Administrative (80% Federal / 20% State)													
SPR: TT-Fed/TT-Reg - 5	P	ADM	DOTLT1000433	23-1PM	$919,780	$919,780	LTRC	Tyson Rupnow	Program Management	7/1/2022	6/30/2023		C-2
					$919,780	**$919,780**	**ADMINISTRATIVE BUDGET TOTALS**						
Project Type: Research Support (80% Federal / 20% State)													
SPR: TT-Fed/TT-Reg - 5	P	RS	DOTLT1000436	23-1TTRI	$465,788	$465,788	LTRC	Tyson Rupnow	Technology Transfer and Research Implementation	7/1/2022	6/30/2023		C-3
SPR: TT-Fed/TT-Reg - 5	P	RS	DOTLT1000439	23-1TRS	$335,672	$335,672	LTRC	Tyson Rupnow	Technical Research Surveillance	7/1/2022	6/30/2023		C-4
SPR: TT-Fed/TT-Reg - 5	P	RS	DOTLT1000435	23-1TA	$456,861	$456,861	LTRC	Tyson Rupnow	Technical Assistance	7/1/2022	6/30/2023		C-5
SPR: TT-Fed/TT-Reg - 5	P	RS	DOTLT1000440	23-1SSR	$100,000	$100,000	LTRC	Tyson Rupnow	DOTD Staff Support for Research	7/1/2022	6/30/2023		C-6
SPR: TT-Fed/TT-Reg - 5	P	RS	DOTLT1000438	23-1NPE	$39,236	$39,236	LTRC	Tyson Rupnow	New Product Evaluation	7/1/2022	6/30/2023		C-7
SPR: TT-Fed/TT-Reg - 6	P	RS	DOTLT1000437	23-1EQM	$329,465	$329,465	LTRC	Tyson Rupnow	Equipment Management	7/1/2022	6/30/2023		C-8
					$1,727,023	**$1,727,023**	**RESEARCH SUPPORT BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg (80% Federal / 20% State)

FISCAL YEAR 2022-2023

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: Bituminous (80% Federal / 20% State)													
SPR: TT-Fed/TT-Reg - 5	A	B	DOTLT1000391	21-2B	$92,391	$326,936	LTRC	Louay Mohammad	Assessment of Long-Term Performance of Louisiana Asphalt Pavements	11/1/2020	10/31/2023		C-10
SPR: TT-Fed/TT-Reg - 5	A	B	DOTLT1000390	21-1B	$96,183	$299,944	LTRC	Louay Mohammad	Development of a Cyclic Semi-Circular Bend Test to Evaluate Asphalt Mixture Cracking Resistance at Intermediate Temperature.	1/1/2021	3/31/2023		C-11
SPR: TT-Fed/TT-Reg - 5	A	B	DOTLT1000374	20-4B	$95,000	$170,000	LTU	Nazimuddin Wasiuddin	Low and Intermediate Temperature Evaluation of Binders through Dynamic Shear Rheometer – Support Study	5/11/2020	5/10/2022	11/10/2022	C-12
SPR: TT-Fed/TT-Reg - 5	A	B	DOTLT1000345	20-3B	$20,000	$262,246	LTRC	Saman Salari	Low and Intermediate Temperature Evaluation of Binders through Dynamic Shear Rheometer	5/11/2020	5/10/2022	11/10/2022	C-13
SPR: TT-Fed/TT-Reg - 5	A	B	DOTLT1000195	17-4B	$0	$181,540	LTRC	Saman Salari	Development of a 4.75mm Asphalt Mixture Design	6/14/2017	6/13/2019	10/31/2022	C-14
SPR: TT-Fed/TT-Reg - 6	A	B	DOTLT1000386	21-6B	$16,071	$119,610	LSU	Mostafa Elseifi	A New Generation of Porous Asphalt Pavement - OGFC Support Study	9/1/2020	11/30/2022		C-15
SPR: TT-Fed/TT-Reg - 6	A	B	DOTLT1000385	21-5B	$9,700	$79,156	LTRC	Corey Mayeux	Improvement of Open-Graded Friction Course (OGFC) Performance and Durability through Materials, Design, and Maintenance	9/1/2020	11/30/2022		C-16
SPR: TT-Fed/TT-Reg - 6	A	B	DOTLT1000384	21-4B	$90,121	$203,393	LTRC	Louay Mohammad	Development of a Standard Practice for the Design of Durable Open-Graded Friction Course (OGFC) Mixtures with Epoxy Asphalt-Support Study	9/1/2020	11/30/2022		C-17
SPR: TT-Fed/TT-Reg - 6	A	B	DOTLT1000392	21-3B	$94,673	$249,609	LTRC	Louay Mohammad	Use of an Innovative Recycling Agent for Improving the Sustainability and Durability of Asphalt Pavements	2/1/2021	4/30/2023		C-18
SPR: TT-Fed/TT-Reg - 6	A	B	DOTLT1000328	20-1B	$1,000	$140,085	LTRC	Corey Mayeux	Evaluate Performance and Life Cycle Cost of Asphalt (8/18 Specifications)	8/19/2019	8/18/2022		C-19
SPR: TT-Fed/TT-Reg - 6	A	B	DOTLT1000321	19-4B	$88,984	$512,939	LTRC	Louay Mohammad	Implementation of Semi Circular Bend Test for QC/QA of Asphalt Mixtures	5/1/2019	4/30/2022	6/30/2023	C-20
SPR: TT-Fed/TT-Reg - 6	A	B	DOTLT1000275	19-2B	$89,356	$478,165	LTRC	Louay Mohammad	Development of a Moisture Sensitivity Test for Asphalt Mixtures	5/1/2019	4/30/2021	12/30/2023	C-21
SPR: TT-Fed/TT-Reg - 6	A	B	30000112	10-1EMCRF	$104,513	$20,501,630	LTRC	Louay Mohammad	Pavement Materials Research Using Special Equipment at the Engineering Materials Characterization Research Facility	7/1/2009	6/30/2015	6/30/2024	C-22
					$797,992	**$23,525,253**	**BITUMINOUS BUDGET TOTALS**						
Project Type: Concrete (80% Federal / 20% State)													
SPR: TT-Fed/TT-Reg - 6	A	C	DOTLT1000424	22-2C	$102,549	$205,097	LTRC	Jose Milla	Influence of Aggregate Gradation to Reduce Concrete's Permeability	1/17/2022	1/16/2024		C-23
SPR: TT-Fed/TT-Reg - 6	A	C	DOTLT1000422	22-1C	$102,549	$205,097	LTRC	Jose Milla	Influence of Internal Curing on Concrete's Permeability in Simulated Field Conditions	1/17/2022	1/16/2024		C-24
SPR: TT-Fed/TT-Reg - 6	A	C	DOTLT1000332	20-2C	$0	$120,969	LTRC	Jose Milla	Using the Portable XRF to identify/Verify Field Material Properties	10/1/2019	3/31/2021	11/30/2023	C-25
SPR: TT-Fed/TT-Reg - 6	A	C	DOTLT1000331	20-1C	$21,580	$162,768	LTRC	Jose Milla	Evaluation of the Miniature Concrete Prism Test (MCPT) for use in DOTD	10/1/2019	9/30/2022		C-26
					$226,678	**$693,931**	**CONCRETE BUDGET TOTALS**						

Project Type: Geotechnical (80% Federal / 20% State)

SPR: TT-Fed/TT-Reg - 5	A	GT	DOTLT1000393	21-2GT	$82,574	$185,539	LTRC	Gavin Gautreau	Geotechnical Database, Phase IV	3/1/2021	2/28/2023		C-27
SPR: TT-Fed/TT-Reg - 5	A	GT	DOTLT1000375	21-1GT	$55,800	$146,690	LTRC	Murad Abu-Farsakh	Internal friction angle of sands with high fines content	8/1/2020	7/31/2022		C-29
SPR: TT-Fed/TT-Reg - 5	A	GT	DOTLT1000346	20-3GT	$65,700	$300,302	LTRC	Murad Abu-Farsakh	Development of a Design Methodology for Geosynthetic Reinforced Pavement using Finite Element Numerical Modeling	5/1/2020	4/30/2023		C-31
SPR: TT-Fed/TT-Reg - 5	A	GT	DOTLT1000337	20-2GT	$83,922	$377,380	LTRC	Murad Abu-Farsakh	Instrumentation and Modeling of Geosynthetic Load Transfer Platform Performance	1/1/2020	6/30/2022	6/30/2023	C-32
SPR: TT-Fed/TT-Reg - 5	A	GT	DOTLT1000283	19-1GT	$29,850	$243,396	LTRC	Gavin Gautreau	Maintenance of Roadway Edge Drop-Off Utilizing Readily Available Materials	2/1/2019	4/30/2020	12/31/2022	C-34
SPR: TT-Fed/TT-Reg - 5	A	GT	DOTLT1000165	17-2GT	$25,290	$440,935	LTRC	Murad Abu-Farsakh	Update the Pile Design by CPT Software to Incorporate Newly Developed Pile-CPT Methods and Other Design Features	6/1/2017	5/31/2019	12/31/2022	C-35
SPR: TT-Fed/TT-Reg - 6	A	GT	30000111	10-1GERL	$156,277	$18,480,051	LTRC	Murad Abu-Farsakh	LTRC Support for Geotechnical Research at the Geotechnical Engineering Research Laboratory (GERL)	7/1/2010	6/30/2015	6/30/2024	C-37
					$499,413	**$20,174,293**	**GEOTECHNICAL BUDGET TOTALS**						

Project Type: Other (80% Federal / 20% State)

SPR: TT-Fed/TT-Reg - 5	A	Other	DOTLT1000215	18-1Other	$227,436	$1,895,149	LTRC	Adele Lee	LTRC Proposal for the Support of Software Development and GIS Applications in LTRC Research	7/1/2017	6/30/2020	6/30/2024	C-39
SPR: TT-Fed/TT-Reg - 5	A	Other	30000169	11-1AD	$306,412	$4,672,490	LTRC	Vijaya Gopu	Administration of LTRC External Funding Programs	1/1/2008	6/30/2009	6/30/2024	C-41
					$533,848	**$6,567,639**	**OTHER BUDGET TOTALS**						

Project Type: Pavements (80% Federal / 20% State)

SPR: TT-Fed/TT-Reg - 5	A	P	DOTLT1000431	22-1P	$78,205	$169,270	LTRC	Moses Akentuna	Performance Index Rating and Maintenance Cost Assignment for Ramps, Acceleration and Deceleration Lanes in Louisiana	4/1/2022	6/30/2024		C-43
SPR: TT-Fed/TT-Reg - 5	A	P	DOTLT1000376	21-1P	$85,800	$182,370	LTRC	Zhong Wu	Prediction of Road Conditions and Smoothness For Flexible and Rigid Pavements in Louisiana Using Neural Networks	8/1/2020	7/31/2022		C-44
SPR: TT-Fed/TT-Reg - 5	A	P	DOTLT1000216	18-1P	$22,000	$150,000	LTRC	Zhongjie Zhang	Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management	9/1/2017	8/31/2018	8/31/2022	C-45
SPR: TT-Fed/TT-Reg - 6	A	P	DOTLT1000387	21-2P	$10,000	$100,000	LTRC	Qiming Chen	Correlation of Rut Depths Measured by the Profilers of LTRC and DOTD PMS	11/16/2020	5/15/2022	11/15/2022	C-46
SPR: TT-Fed/TT-Reg - 6	A	P	DOTLT1000340	20-4P	$130,000	$402,068	LTRC	Zhong Wu	Assessment of DOTD's friction aggregate sources through laboratory and accelerated testing	1/1/2020	12/31/2022		C-47
SPR: TT-Fed/TT-Reg - 6	A	P	DOTLT1000272	19-2P	$27,000	$398,137	LTRC	Zhong Wu	Mechanistic Characterization of Asphalt Overlays for Pavement Rehabilitation and Preservation using Pavement ME Approach	8/1/2018	1/31/2021	10/31/2022	C-48
SPR: TT-Fed/TT-Reg - 6	A	P	DOTLT1000218	18-2P	$23,000	$210,000	LTRC	Qiming Chen	Mitigating Joint Reflective Cracks using Stone Interlayers: Case Study on Louisiana Highway 5, Desoto Parish	10/17/2017	10/16/2023		C-49
SPR: TT-Fed/TT-Reg - 6	A	P	30000141	10-1ALF	$479,200	$23,096,263	LTRC	Zhong Wu	Management and Operation of the Pavement Research Facility	7/1/2009	6/30/2015	6/30/2024	C-50
					$855,205	**$24,708,108**	**PAVEMENTS BUDGET TOTALS**						

Project Type: Safety (80% Federal / 20% State)

SPR: TT-Fed/TT-Reg - 5	A	SA	DOTLT1000425	22-1SA	$105,619	$171,926	LTRC	Elisabeta Mitran	Safety Effectiveness of Cable Median Barriers in Louisiana	1/1/2022	6/30/2023		C-52
SPR: TT-Fed/TT-Reg - 5	A	SA	DOTLT1000388	21-1SA	$66,334	$173,835	LSU	Helmut Schneider	Highway Safety culture Assessment through Louisiana's Regions	5/1/2021	4/30/2023		C-53
SPR: TT-Fed/TT-Reg - 5	A	SA	DOTLT1000373	20-3SA	$65,473	$99,623	LTRC	Hany Hassan	Minimum Intersection Illumination	5/1/2021	10/31/2022		C-54
SPR: TT-Fed/TT-Reg - 5	A	SA	DOTLT1000341	20-1SA	$39,927	$196,166	LTRC	Raju Thapa	Evaluation of Traffic Crash Characteristics on Elevated Sections of Interstates in Louisiana	8/3/2020	8/2/2022	12/31/2022	C-56
SPR: TT-Fed/TT-Reg - 6	A	SA	DOTLT1000297	19-3SA	$7,815	$298,932	UNO	Tara Tolford, MURP, AICP	Pedestrians and Bicyclists Count, Phase 2: Implementing and Applying Multimodal Demand Data	3/15/2019	3/14/2021	9/13/2022	C-57
					$285,168	**$940,482**	**SAFETY BUDGET TOTALS**						

Project Type: Special Studies (80% Federal / 20% State)

SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000430	22-5SS	$77,327	$123,936	LTRC	Ruijie "Rebecca" Bian	Analyzing Human Mobility for Active Transportation Planning in Louisiana	3/1/2022	8/31/2023		C-59
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000427	22-3SS	$54,222	$90,981	LTRC	Ruijie "Rebecca" Bian	Testing the Hurricane Evacuation Modeling Package (HEMP)	8/1/2022	1/31/2024		C-60
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000379	21-4SS	$10,294	$142,132	LTRC	Raju Thapa	Develop and Evaluate Performance Measures for Intelligent Transportation Systems (ITS) in Louisiana	8/1/2020	7/31/2022		C-61
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000378	21-3SS	$10,350	$197,212	LTRC	Raju Thapa	Evaluating Permitted/Protected versus Protected Left Turn Signals in Louisiana	8/1/2020	7/31/2022		C-62
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000347	20-2SS	$540,125	$1,620,375	University of Maryland	Michael Pack	Provision of Transportation Data Analytics to the Louisiana Department of Transportation and Development	5/14/2020	5/13/2023		C-63
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000325	19-5SS	$100,000	$398,400	LSU	Ruijie "Rebecca" Bian	Assessing the Economic Benefits of the TIMED Program	7/1/2019	6/30/2020	3/30/2023	C-64
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000280	19-1SS	$110,955	$1,446,751	ULL	Elisabeta Mitran	LTRC Proposal for the Support of Research and Development in Special Studies	7/1/2019	6/30/2021	6/30/2024	C-65
SPR: TT-Fed/TT-Reg - 5	A	SS	DOTLT1000281	19-1ITS	$105,960	$2,367,433	ULL	Raju Thapa	LTRC Proposal for the Support of Research and Development in ITS/Traffic	7/1/2019	6/30/2021	6/30/2024	C-66
SPR: TT-Fed/TT-Reg - 5	A	SS	30000125	10-1PLAN	$115,245	$9,723,832	LTRC	Ruijie "Rebecca" Bian	LTRC Proposal for the Support of Research and Development in Transportation Planning	7/1/2010	6/30/2015	6/30/2024	C-68
SPR: TT-Fed/TT-Reg - 6	A	SS	DOTLT1000377	21-2SS	$45,210	$159,112	LTRC	Ruijie "Rebecca" Bian	Evaluate the Impacts of Complete Street Policy in Louisiana	1/1/2021	12/31/2022		C-70
					$1,169,688	**$16,270,164**	**SPECIAL STUDIES BUDGET TOTALS**						

Project Type: Structures (80% Federal / 20% State)

SPR: TT-Fed/TT-Reg - 5	A	ST	DOTLT1000457	22-3ST	$130,703	$383,004	LSU	Murad Abu-Farsakh	Evaluation of Embedded Pile Resistance on Scour Critical Bridges	5/2/2022	5/1/2025		C-72
SPR: TT-Fed/TT-Reg - 5	A	ST	DOTLT1000428	22-2ST	$260,000	$460,000	Wiss, Janney, Elstner Associates, Inc.	Gareth Rees	Skew Detection System Replacement on Vertical Lift Bridges Phase 2	2/1/2022	12/31/2022		C-74
SPR: TT-Fed/TT-Reg - 5	A	ST	DOTLT1000342	20-1ST	$75,927	$139,927	LSU	Ayman Okeil	Developing The Load Distribution Formula for Louisiana Culverts	3/1/2020	8/31/2021	3/31/2023	C-75
SPR: TT-Fed/TT-Reg - 6	A	ST	DOTLT1000418	22-1ST	$0	$20,000	Texas A&M Transportation Institute (TTI)	Maysam Kiani	Investigating and Developing a MASH Compliant Contraflow Ramp Closure Gate	8/10/2021	1/9/2022	7/11/2022	C-76
					$466,630	**$1,002,931**	**STRUCTURES BUDGET TOTALS**						

Project Type: TIRE (80% Federal / 20% State)

SPR: TT-Fed/TT-Reg - 5	A	TIRE	DOTLT1000456	23-4TIRE	$30,000	$30,000	UNO	Guang Tian	Predicting VMT: Traditional Statistical Models vs. Machine Learning Approaches	7/1/2022	6/30/2023		C-77
SPR: TT-Fed/TT-Reg - 5	A	TIRE	DOTLT1000455	23-3TIRE	$30,000	$30,000	ULL	Tanvir Faisal	Design and development of architected cellular core structure to enhance the structural performance of SPS bridge decks	6/1/2022	6/30/2023		C-78
SPR: TT-Fed/TT-Reg - 5	A	TIRE	DOTLT1000454	23-2TIRE	$30,000	$30,000	McNeese University	Ahmed Abdel-Mohti	Exploratory Study on Improving Concrete Durability	7/1/2022	6/30/2023		C-79
SPR: TT-Fed/TT-Reg - 5	A	TIRE	DOTLT1000453	23-1TIRE	$30,000	$30,000	LSU	Ali Kazemian	3D Printed Transportation Infrastructure: Structural Behavior of Steel Fiber Reinforced Circular Elements	7/2/2022	6/30/2023		C-80
					$120,000	**$120,000**	**TIRE BUDGET TOTALS**						
					$4,954,622	**$94,002,801**	**SPR: TT-FED/TT-REG ACTIVE BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

SPR: TT-Fed/TT-Reg (80% Federal / 20% State)

FISCAL YEAR 2022-2023

Project Type: Bituminous (80% Federal / 20% State)

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
SPR: TT-Fed/TT-Reg - 5	P	B			$40,000	$85,000	LTRC	Louay Mohammad	Life-Cycle Assessment Framework for Pavements in Louisiana	7/1/2021	6/30/2023		C-82
SPR: TT-Fed/TT-Reg - 5	P	B			$32,000	$32,000	LTRC	Saman Salari	Literature study of IDEAL-CT and IDEAL-RT tests comparison with field performance and other balanced mix design tests.	11/1/2022	5/1/2023		C-83
SPR: TT-Fed/TT-Reg - 5	P	B			$77,000	$350,000	LTRC	Louay Mohammad	Performance Of Asphalt Pavements Containing Recycled Materials Under Accelerated Loading	1/1/2018	6/30/2020		C-84
SPR: TT-Fed/TT-Reg - 5	P	B			$58,740	$118,806	LTRC	Corey Mayeux	Preventing Milled Asphalt Pavement Failure during Construction on Narrow Roadways	1/1/2023	12/29/2023		C-85
SPR: TT-Fed/TT-Reg - 5	P	B			$80,000	$160,000	LTRC	Louay Mohammad	Support Study for Evaluation of Saturates/Aromatics/Resins/Asphaltenes (SARA) Fractionation of asphalt binders in Louisiana	7/1/2022	4/30/2024		C-86
SPR: TT-Fed/TT-Reg - 6	P	B			$34,703	$34,703	LTRC		Effect of Longitudinal Joint Construction and Density on Asphalt Pavement Performances	10/4/2021	5/20/2022		C-87
SPR: TT-Fed/TT-Reg - 6	P	B			$36,520	$170,491	LTRC	Mostafa Elseifi	Effect of Mineral Fillers on the Moisture Resistance and Performance of HMA	7/15/2021	4/30/2024		C-88
SPR: TT-Fed/TT-Reg - 6	P	B			$40,000	$85,000	LTRC	Louay Mohammad	Enhanced Interaction between Crumb Rubber Modifiers and Asphalt Binder to Improve Performance	7/1/2021	6/30/2023		C-89
SPR: TT-Fed/TT-Reg - 6	P	B			$102,000	$349,000	LTRC	Louay Mohammad	Enhancement of Mechanical Properties of Asphalt Cements and Asphalt Mixtures Containing Waste Plastic	7/1/2021	6/30/2023		C-90
SPR: TT-Fed/TT-Reg - 6	P	B			$40,000	$85,000	LTRC	Louay Mohammad	Enhancing Pavement Resiliency to Sea Level Rise Using Natural and Nature-Based Features in Louisiana	7/1/2021	6/30/2023		C-91
SPR: TT-Fed/TT-Reg - 6	P	B			$151,131	$155,131	LTRC	Louay Mohammad	Establishment of the Center for Sustainable Pavement Materials and Technologies	7/1/2021	6/30/2022		C-92
SPR: TT-Fed/TT-Reg - 6	P	B			$88,998	$155,410	LTRC	Corey Mayeux	Evaluation of Non-Destructive Test Pilot Projects	7/1/2022	7/1/2024		C-93
					$781,092	**$1,780,541**	**BITUMINOUS BUDGET TOTALS**						

Project Type: Geotechnical (80% Federal / 20% State)

SPR: TT-Fed/TT-Reg - 5	P	GT			$18,335	$50,000	LTRC	Murad Abu-Farsakh	Develop a Synthesis on the Application Of PCPT Technology for Geotechnical Engineering Design	10/2/2017			C-94
SPR: TT-Fed/TT-Reg - 5	P	GT			$82,728	$150,000	LTRC	Nick Ferguson	Field Evaluation of Geophysical Applications for DOTD	9/1/2022	8/31/2024		C-95
SPR: TT-Fed/TT-Reg - 5	P	GT			$35,643	$80,000	LTRC	Gavin Gautreau	Fully Softened Shear Strength at Low Stresses for Analysis & Design of Natural and Compacted Slopes	9/1/2022	9/1/2024		C-96
SPR: TT-Fed/TT-Reg - 5	P	GT			$27,720	$100,000	LTRC	Nick Ferguson	QA/QC Evaluation of Treated and Stabilized Soil Layers	1/1/2023	6/30/2024		C-97
SPR: TT-Fed/TT-Reg - 5	P	GT			$30,300	$200,000	LTRC	Murad Abu-Farsakh	Statewide Calibration of CPT Direct Design Methods Using Static Load Test Data	10/3/2022	9/30/2025		C-98
SPR: TT-Fed/TT-Reg - 5	P	GT			$30,000	$200,000	LTRC	Murad Abu-Farsakh	Use and Interpretation of Seismic Piezocone Penetration Testing (SCPTu) for Geotechnical Site Investigation	1/1/2018	12/31/2020		C-99
SPR: TT-Fed/TT-Reg - 6	P	GT			$75,285	$150,000	LTRC	Gavin Gautreau	LIDAR for Geotechnical Applications	3/1/2022	2/28/2024		C-100
					$300,011	**$930,000**	**GEOTECHNICAL BUDGET TOTALS**						

Project Type: Pavements (80% Federal / 20% State)

SPR: TT-Fed/TT-Reg - 6	P	P			$30,000	$200,000	LTRC	Zhong Wu	Evaluation of Louisiana Maintenance and Rehabilitation Treatment Decision Matrix for Cost-effective and Timely Pavement Preservation	1/1/2022	12/31/2023		C-101
SPR: TT-Fed/TT-Reg - 6	P	P			$95,000	$150,000	LTRC	Moses Akentuna	The quality control of longitudinal joint of asphalt pavement and its effect on pavement performance	7/1/2020	6/30/2024		C-102
					$125,000	**$350,000**	**PAVEMENTS BUDGET TOTALS**						

Project Type: Safety (80% Federal / 20% State)

SPR: TT-Fed/TT-Reg - 5	P	SA	DOTLT1000426	22-2SA	$80,000	$190,000			Evaluation of Louisiana's Systemic Safety Projects for Roadway Departures on Rural Curves	9/1/2021	8/31/2023		C-103
SPR: TT-Fed/TT-Reg - 5	P	SA	DOTLT1000344	20-2SA	$75,000	$175,000			Evaluation of Installed Low-Cost Safety Countermeasures for Reducing Severe Intersection Crash Types in Louisiana	11/1/2019	1/31/2023		C-104
SPR: TT-Fed/TT-Reg - 5	P	SA			$60,000	$175,000			Evaluating the Effectiveness of Crosswalk Striping Pattern at Signalized Intersections in Louisiana	1/2/2023	12/31/2024		C-105
SPR: TT-Fed/TT-Reg - 6	P	SA	DOTLT1000432	22-3SA	$90,000	$180,000			Development of Statewide Guidelines for Provision of Pedestrian Facilities on High Speed Arterials in Louisiana	12/1/2021	5/31/2023		C-106
					$305,000	**$720,000**	**SAFETY BUDGET TOTALS**						

Project Type: Special Studies (80% Federal / 20% State)

SPR: TT-Fed/TT-Reg - 5	P	SS	DOTLT1000458	23-1SS	$140,000	$150,000	LTRC	Raju Thapa	Safety and Traffic Operations at Cloverleaf Interchanges	1/1/2022	6/30/2023		C-107
SPR: TT-Fed/TT-Reg - 5	P	SS	DOTLT1000429	22-4SS	$112,511	$200,000			Economic Impact of Access Management Treatments	9/1/2021	2/28/2023		C-108
SPR: TT-Fed/TT-Reg - 5	P	SS			$80,000	$125,000			Best Practices for Maintenance of Control of Access Fencing	10/1/2021	12/31/2022		C-109
SPR: TT-Fed/TT-Reg - 5	P	SS			$70,000	$150,000	LTRC	Raju Thapa	Estimating HCM Default Parameters for Louisiana	1/1/2022	6/30/2023		C-110
SPR: TT-Fed/TT-Reg - 5	P	SS			$100,000	$200,000			Improved Incident Response through Coordinated, Interoperable Communications	7/1/2022	6/30/2024		C-111
SPR: TT-Fed/TT-Reg - 5	P	SS			$80,000	$150,000			Innovations in Pedestrian Counting Technology	12/1/2021	2/28/2023		C-112
SPR: TT-Fed/TT-Reg - 5	P	SS			$25,563	$50,000	LTRC	Adele Lee	Remote Sensing in Transportation and its Applicability at DOTD	2/1/2022	1/31/2024		C-113
					$608,074	**$1,025,000**	**SPECIAL STUDIES BUDGET TOTALS**						

Project Type: Structures (80% Federal / 20% State)

SPR: TT-Fed/TT-Reg - 6	P	ST			$58,000	$58,000	Texas A&M Transportation Institute (TTI)	William Williams	MASH TL-4 Engineering Analyses and Detailing of 36 Inches and 42 Inches High Median Barriers for DOTD	7/5/2022	1/5/2023		C-114
					$58,000	**$58,000**	**STRUCTURES BUDGET TOTALS**						
					$2,177,177	**$4,863,541**	**SPR: TT-FED/TT-REG PROPOSED BUDGET TOTALS**						

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: Pooled Fund (100% Federal)													
SPR: Pooled Fund: TT-Fed	P	PF		21-1PF	$180,000	$900,000	LTRC	Tyson Rupnow	Southeast Transportation Consortium - Phase II	7/1/2020	6/30/2025		C-116
					$180,000	**$900,000**	**SPR: POOLED FUND: TT-FED PROPOSED BUDGET TOTALS**						
					$180,000	**$900,000**	**POOLED FUND BUDGET TOTALS**						

FISCAL YEAR 2022-2023

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: LTAP (State = $150k / Federal = Remaining)													
LTAP: TT-Fed/TT-Reg	P	LTAP	DOTLT1000422	23-LTAP	$692,938	$692,938	LTRC	Steve Strength	Local Technical Assistance Program (LTAP)	7/1/2022	6/30/2023		D-118
					$692,938	**$692,938**	**LTAP BUDGET TOTALS**						
					$692,938	**$692,938**	**LTAP: TT-FED/TT-REG PROPOSED BUDGET TOTALS**						
Project Type: Technology Transfer and Training (100% Federal)													
STP: TT-Fed	A	TT	DOTLT1000278	19-TDSS	$225,000	$1,213,383	LTRC	Vijaya Gopu	Training and Development Support Services	7/1/2018	6/30/2021	6/30/2024	E-121
STP: TT-Fed	A	TT	30000241	10-4AD	$10,000	$100,000	LTRC	Tyson Rupnow	Technology Transfer & Research Implementation Support for Louisiana Universities	1/1/2010	12/31/2013	6/30/2025	E-123
STP: TT-Fed	A	TT	30000320	08-1TSQ	$417,608	$1,140,170	LTRC	MaryLeah Coco	Technology Transfer Program and Operations (LSU)	7/1/2015	6/30/2018	6/24/2024	E-124
					$652,608	**$2,453,553**	**TECHNOLOGY TRANSFER AND TRAINING BUDGET TOTALS**						
STP: TT-Fed	P	TT	DOTLT1000445	23-TTRF	$100,000	$100,000	LTRC	MaryLeah Coco	Technology Transfer Registration Fees	7/1/2022	6/30/2023		E-126
STP: TT-Fed	P	TT	DOTLT1000446	23-COOP	$200,000	$200,000	LTRC	MaryLeah Coco	DOTD CO-OP Program	7/1/2022	6/30/2023		E-127
STP: TT-Fed	P	TT	DOTLT1000444	23-2TT	$147,600	$147,600	LTRC	MaryLeah Coco	LTRC Student Worker Program	7/1/2022	6/30/2023		E-128
STP: TT-Fed	P	TT	DOTLT1000443	23-1WDC	$4,262,407	$4,262,407	LTRC	MaryLeah Coco	Workforce Development Contracts	7/1/2022	6/30/2023		E-129
STP: TT-Fed	P	TT	DOTLT1000441	23-1WD	$1,277,526	$1,277,526	LTRC	MaryLeah Coco	Workforce Development	7/1/2022	6/30/2023		E-132
STP: TT-Fed	P	TT	DOTLT1000448	23-1TT	$37,500	$37,500	LTRC	MaryLeah Coco	Technology Transfer and Assistance for Senior Project Courses	7/1/2022	6/30/2023		E-135
STP: TT-Fed	P	TT	DOTLT1000447	23-1TSQ	$380,631	$380,631	LTRC	MaryLeah Coco	Technology Transfer Program and Operations (DOTD)	7/1/2022	6/30/2023		E-136
STP: TT-Fed	P	TT	DOTLT1000450	23-1SWD	$1,520,000	$1,520,000	LTRC	MaryLeah Coco	DOTD Staff Support for Workforce Development	7/1/2022	6/3/2023		E-138
					$7,925,664	**$7,925,664**	**TECHNOLOGY TRANSFER AND TRAINING BUDGET TOTALS**						
					$8,578,272	**$10,379,217**	**STP: TT-FED ACTIVE BUDGET TOTALS**						

LTRC ANNUAL RESEARCH PROGRAM

Other DOTD Sections (%Federal - Varies / %State - Varies)

FISCAL YEAR 2022-2023

Funding	A/P	Project Type	SIO No.	Research No.	FY Budget	Total Cost	Agency	Principal Investigator	Project Title	Start Date	End Date	End Date (Rev)	Page No.
Project Type: Special Studies(%Federal - Varies / %State - Varies)													
Port Priority Program	A	SS	DOTLT1000419	22-2SS	$57,907	$86,862	ULL	Stephen Barnes	Economic Evaluation of Applications to the Port Construction and Development Priority Program	7/1/2021	6/30/2023		G-140
Pavement Management	A	SS	000	22-1SS	$20,000	$98,962	Texas A&M Transportation Institute (TTI)	Lubinda Walubita	Portable WIM Installation and Site-Specific Traffic Data Collection for DOTD	10/12/2020	1/11/2021	6/30/2022	G-142
Office of Multimodal Commerce	A	SS	DOTLT1000330	20-1SS	$0	$382,888	Moffatt & Nichol	Ricardo Cruz	The Future of the Louisiana Waterways Transportation System: A System Analysis and Plan to Move Commerce by Water	1/21/2020	4/20/2021	8/20/2022	G-143
					$77,907	**$568,712**	**SPECIAL STUDIES BUDGET TOTALS**						
					$77,907	**$568,712**	**OTHER DOTD SECTIONS ACTIVE BUDGET TOTALS**						
Project Type: Other(%Federal - Varies / %State - Varies)													
Safety	P	Other	DOTLT1000451	23-LRSP	$379,989	$379,989	LTRC	Steve Strength	Local Road Safety Program	7/1/2022	6/30/2023		G-145
					$379,989	**$379,989**	**OTHER BUDGET TOTALS**						
					$379,989	**$379,989**	**OTHER DOTD SECTIONS PROPOSED BUDGET TOTALS**						

FHWA
Part B SPR Funded
Research Program

ADMINISTRATIVE LINE ITEMS
AND
RESEARCH SUPPORT STUDIES

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**Program Management**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg – 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000433**	Project Start Date:		7/1/2022
Research Project Number:	23-1PM	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$919,780
	(revised)	
Est. Expended to Date		

FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$919,780**
Salaries		$919,780
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The purpose of this project is to provide for Louisiana Transportation Research Center (LTRC) executive staff salaries.

Objective(s): Employees charging to this line item include:
Tyson Rupnow, Associate Director, Research
Samuel B. Cooper, Jr., Director
Sheri Hughes, Administrative Assistant
Melissa Neyland, Administrative Assistant
Theresa Rankin, Administrative Specialist C
Kristina Kleinpeter, Accountant 3
Samuel Cooper, III, Engineer 7
Zhongjie (Doc) Zhang, Engineer 7
Julius Codjoe, Engineer 7

Expected Benefits: The project allows LTRC to adequately track administrative costs for management of the research program.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Research Program Administration

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Research Program Administration

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**Technology Transfer and Research Implementation**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000436**	Project Start Date:		7/1/2022
Research Project Number:	23-1TTRI	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$465,788	**Total**		**$465,788**
	(revised)				
Est. Expended to Date			Salaries		$465,788
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The purpose of this project is to document the technology transfer and research implementation efforts of research staff.

Objective(s): The objective is to document the various technology transfer and implementation efforts of the research staff including presentation of findings at seminars, preparation of journal articles, webinar presentations, etc.

Expected Benefits: Benefits of technology transfer and research implementation are unparalleled. By actively working to implement research results, the Department gains better products, processes, etc. Couple that with the various technology transfer activities the research staff are involved in, the transportation community at large has a resource to draw upon for Professional Development Hours (PDH's), etc.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

More than 42 papers were submitted for publication in various journals and/or presented at the TRB Annual Meeting. Additionally, numerous other papers, journal articles, and final reports were prepared and presented to various audiences (combination of hybrid, in-person, and virtual formats). Additionally many LTRC employees participate in the specification writing and/or re-writing process as a result of completed LTRC research.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Technology transfer and research implementation

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**Technical Research Surveillance**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000439**	Project Start Date:		7/1/2022
Research Project Number:	23-1TRS	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$335,672
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$335,672**
Salaries		$335,672
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Technical research surveillance is for administration of Louisiana Transportation Research Center (LTRC) research contracts by project engineers and participation on a wide variety of research panels.

Objective(s): The objectives of this project are to track employee effort spent on administrating contract research projects by our project engineers, participation on LTRC project and report review committees, and participation on/in external research activities and panels such as Transportation Research Board, Airport Cooperative Research Program (ACRP) NCHRP, FHWA Expert Task Group (ETG), etc.

Expected Benefits: Benefits include accurate tracking of employee effort to provide a variety of services such as panel participation. Nearly all LTRC engineers participate on at least on TRB committee with many also serving on one or more NCHRP Project Panels as well as other such as American Concrete Institute (ACI), ASTM, etc.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Nearly all LTRC engineers participate on at least one TRB Committee with many also serving on one or more NCHRP Panels.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Technical research surveillance

Title:	**Technical Assistance**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000435**	Project Start Date:		7/1/2022
Research Project Number:	23-1TA	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$456,861
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$456,861**
Salaries		$456,861
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Technical Assistance (TA) is any assistance provided by Louisiana Transportation Research Center (LTRC) research staff to others in the transportation community and/or the travelling public.

Objective(s): The objective of this project is to provide assistance on a variety of transportation topics to DOTD, local engineers, designers, materials suppliers, contractors, and the public.

Expected Benefits: Technical assistance allows for faster implementation and adoption of technologies, solutions to ongoing problems, and overall general relationship building. In fiscal year (FY) 21-22, LTRC engineers and staff responded to over 82 different TA requests ranging from peer review of papers to local government issues, to specialized testing.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

LTRC engineers and staff responded to over 82 technical assistance requests from private engineers, department personnel, and industry encompassing a wide variety of topics.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Technical assistance.

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**DOTD Staff Support for Research**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000440**	Project Start Date:		7/1/2022
Research Project Number:	23-1SSR	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$100,000
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$100,000**
Salaries		$100,000
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: This project is to provide a mechanism to show and document Louisiana Transportation Research Center (LTRC) staff support for research activities outside of LTRC, specifically University Transportation Center (UTC) support.

Objective(s): The objectives of this project are to document support for outside research entities activities that require matching monies where LTRC/DOTD use salaried employees time to meet that match.

Expected Benefits: Benefits of this project include meeting one of the legislative mandates for LTRC of Enhancing Higher Education and promoting interagency relationships between the Department/LTRC and our Louisiana Universities.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

In the last fiscal year, LTRC supported over 10 UTC projects for the TranSET Regional UTS held by LSU.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Staff support for outside research activities.

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**New Product Evaluation**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000438**	Project Start Date:		7/1/2022
Research Project Number:	23-1NPE	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$39,236
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$39,236**
Salaries		$39,236
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The purpose of this project is to evaluate new, or specialty, products or equipment for potential Department of Transportation and Development (DOTD) use.

Objective(s): The objective of this project is to identify and test potential / new special products for use in/on DOTD construction projects.

Expected Benefits: Adoption of new innovative equipment and products can lead to cost and/or time savings to the Department. Additionally other benefits such as longer service life, etc. can be realized. Last fiscal year the Louisiana Transportation Research Center evaluated 6 different new and innovative products for use.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

- Evaluation of Isocyanate Asphalt Additive
- RimRiser
- Catch Basin Risers
- Aquron 2000 Cure and Seal
- Pavix
- Pavix MCE

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Evaluate new products and equipment for potential DOTD use.

Title:	**Equipment Management**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000437**	Project Start Date:		7/1/2022
Research Project Number:	23-1EQM	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$329,465
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$329,465**
Salaries		$259,465
Consumable Supplies & Materials		
Equipment	(non-expendable)	$70,000
Travel		
Other		

BUDGET JUSTIFICATIONS

Equipment: This covers non-expendable equipment needed to cover routine maintenance of equipment including the following: purchase of replacement parts, installation of said parts, etc. for the asphalt geotechnical, and pavements research laboratories. Replacement parts do not exceed the $5,000 threshold for FHWA reporting guidelines.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The purpose of this project is to track the management of the many laboratories/facilities that the Louisiana Transportation Research Center oversees.

Objective(s): The objectives include the following: routine equipment repair/maintenance, small/hand tool replacement, and accreditation activities.

Expected Benefits: Properly functioning equipment and accredited facilities are expected when this project is underway.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Diagnoses of problems, maintenance, and calibrations of LWT test device
Design and fabrication of asphalt binder bond strength test according to AASHTO T361
Diagnoses of problems, maintenance, and calibrations MTSs and UTM testing devices.
Diagnoses of problems, maintenance, and calibrations of Moisture Induced Stress Tester
Diagnoses of problems, maintenance, and calibrations of Asphalt Analyzer
Developed specification and purchased NCAT Three Wheel Polisher
Developed specification and purchased two Mary Ann Sieve Shaker
Developed specification and purchased asphalt binder ductilometer and laboratory mixer
Developed specification and purchased Iatroscan TLC-FID for asphalt binder S.A.R.A. Analysis
Diagnoses of problems, maintenance, and calibrations of Troxler 5850 Superpave Gyratory Compactor
Maintained CCRL and AMRL Accreditation of the Laboratories
Completed routine maintenance on laboratory and field equipment as needed

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Equipment Management

FHWA
Part B SPR Funded
Research Program

CONTINUING RESEARCH

Title:	**Assessment of Long-Term Performance of Louisiana Asphalt Pavements**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000391**	Project Start Date:		11/1/2020
Research Project Number:	21-2B	Completion Date	(original)	10/31/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$326,936	**Total**		**$92,391**
	(revised)				
Est. Expended to Date		$72,054	Salaries		$90,891
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$55,000	Equipment	(non-expendable)	
	(revised)		Travel		$1,500
Est. FY Expenditure		$55,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Studies completed at LTRC identified effects of various factors (recycled and waste materials, and construction technologies and practices, etc.) on the performance of asphalt pavements. Thus, tracking and assessing the long-term performance of those pavements is essential to validate and/or revise specification recommendation in mixture design and construction practices.

Objective(s): The objective of this study is to evaluate the long-term performance of field projects of LTRC completed studies by comparing field rutting, cracking, patching, and smoothness data collected in the Louisiana pavement management system (LA PMS) to the performance predictions made from the laboratory measured performance parameters.

Expected Benefits: The long-term field performance data collected from this study will provide a link between laboratory mechanical properties and field performance of new technologies used. It is anticipated that the updated lab and field performance relationship will result in refined recommendations for mixture design and construction practices in Louisiana.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Completed literature review;
Task 2: Continued identification of field projects as per project factorial. COVID 19 pandemic delayed progress in this task.
Task 3: Continued familiarization with PMS content and acquisition of distress data,
Task 4: Continued analyzes of PMS distress data;
Task 5: Continued conduct field survey;

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 2: Continue identification of field projects as per project factorial.
Task 3: Continue acquisition of distress data,
Task 4: Continue analyzes of PMS distress data;
Task 5: Continued conduct field survey;
Task 6: Continue performing laboratory testing and analyses;

Title:	**Development of a Cyclic Semi-Circular Bend Test to Evaluate Asphalt Mixture Cracking Resistance at Intermediate Temperature.**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000390**	Project Start Date:		1/1/2021
Research Project Number:	21-1B	Completion Date	(original)	3/31/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$299,944	**Total**		**$96,183**
	(revised)				
Est. Expended to Date		$97,882	Salaries		$94,683
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$85,000	Equipment	(non-expendable)	
	(revised)		Travel		$1,500
Est. FY Expenditure		$85,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: DOTD asphalt specifications for roads and bridges require the use of Semi-Circular Bending test as a part of asphalt mixture design. SCB is conducted in a monotonic, displacement-controlled mode at intermediate temperature to assess asphalt mixture fatigue crack resistance. However, fatigue damage is essentially deterioration in material integrity as a result of repeated loading. Thus, monotonic loading may not realistically simulate the effects of traffic loading compared to cyclic loading.

Objective(s): The objectives of this study are to (1) acquire and set up a digital image correlation (DIC) system that is optimized for deformation and crack propagation measurements in asphalt mixture testing; and (2) develop a standard cyclic SCB test method coupled with the DIC technique for identification of fatigue crack propagation properties of asphalt concrete.

Expected Benefits: Findings from this research will improve reliability and fatigue prediction equation for fatigue cracking of asphalt mixtures in the Mechanistic-Empirical Pavement Design Guide (Pavement ME). Further, the developed cyclic SCB test procedure and analysis scheme will be a reliable and rigorous fatigue performance test in the phase of routine asphalt mixture design.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1 – Completed the conduct literature review;
Task 2 – Continued identification and collection of asphalt materials as per project experiment factorial.
Task 3 – continued set-up and familiarization processes of the DIC system. Training sessions with vendor were conducted
Task 4 – Continued Conduct of laboratory experiment as per project experiment factorial.
Task 5 - Continued development of analysis procedure from data of Task 4

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 4 – Continue Conduct of laboratory experiment as per project experiment factorial.
Task 5 – Continue development of analysis procedure from data of Task 3
Task 6 – Prepare the project final report

Title:	Low and Intermediate Temperature Evaluation of Binders through Dynamic Shear Rheometer – Support Study	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000374	Project Start Date:		5/11/2020
Research Project Number:	20-4B	Completion Date	(original)	5/10/2022
Research Agency:	LTU	Completion Date	(revised)	11/10/2022
Principal Investigator:	Nazimuddin Wasiuddin			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$170,000	**Total**		**$95,000**
	(revised)				
Est. Expended to Date		$75,000	Salaries		$84,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		$11,000
FY Funds	(original)	$75,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$50,000	Other		

BUDGET JUSTIFICATIONS

Supplies: The DSR uses liquid nitrogen which is $165/160L which runs about 2-3 weeks. Also, the cylinder rent is $350/year. PAV needs compressed air. Supplies include some accessories that need to be purchased often for DSR, RTFO, PAV and BBR. Regular lab supplies include solvents, paper towel, gloves etc. which cost about $100-$200/month.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Problem Statement: Determining the low and intermediate temperature characteristics of binders is critical to pavement performance. However, the use of these devices may not completely characterize binders with increased level of modification. Additionally, the time and numerous equipment requirements have a negative impact on the efficiency of material approval. In this study, new testing methods on asphalt binder will be investigated and compared with the currently specified methods.

Objective(s): Objective(s): The support study will evaluate the use of a SER (extensional rheometer) to determine the advanced characterization of low and intermediate behavior of asphalt binder as a potential replacement of standard ductility testing. This research will be performed on commonly used binders and additives used in the state of Louisiana, in order to introduce binder characterization methods for DOTD and reduce and/or replace current binder testing methods such as ductility.

Expected Benefits: Expected Benefits: The comparison between the results of these methods will determine the reliability of the new methods in order to replace the conventional methods and equipment. The evaluation of these tests will result in the ability of DOTD to screen and verify materials more efficiently and with fewer devices. The potential to improve testing results in less time will help the DOTD provide the reliability that the correct materials are being utilized.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Three different categories of tests were performed in this period: 1) PG76, PG70, PG64 of different sources were tested to find variation in force ductility. 2) Effect of sulfur on force ductility of SBS binders was tested. 3) Effect of SBS polymer types, specifically S/B ratio was tested. The data analyses were performed based on three hypotheses: 1) Binders with same PG grade but different modifications will show different performances. 2) Does sulfur increase SBS performance? 3) What is the effect of same SBS content with different S/B ratio?

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

The following activities will be performed during the next fiscal year.
1. Ductility after aging will be investigated through RTFO and PAV aging. Short-term aging will be in focus but long-term aging (1 and 2 PAV) will also be performed.
2. More binders will be added in the test factorial. All Louisiana DOTD binder sources will be included this time.
3. The correlation between ductility and other DSR parameters will be investigated.
4. DSR ductility specifications will be developed.
5. A final report will be prepared to be submitted by November 2022.

Title:	**Low and Intermediate Temperature Evaluation of Binders through Dynamic Shear Rheometer**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000345**	Project Start Date:		5/11/2020
Research Project Number:	20-3B	Completion Date	(original)	5/10/2022
Research Agency:	LTRC	Completion Date	(revised)	11/10/2022
Principal Investigator:	Saman Salari			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$262,246	**Total**		**$20,000**
	(revised)				
Est. Expended to Date		$140,853	Salaries		$20,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$74,853	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$77,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Researchers are trying to characterize asphalt binders with less equipment, more convenience and higher precision. This goal results in new applications which may replace Bending Beam Rheometer with Dynamic Shear Rheometer. This approach will reduce hours of sample preparation, reduce sample size significantly, and increase convenience.

Objective(s): Comparing Bending Beam Rheometer results to two different Dynamic Shear Rheometer results. Based on the results and process of testing, it may determine whether an alternative method can replace the Bending Beam Rheometer.

Expected Benefits: Application of Dynamic Shear Rheometer for low temperature testing will provide convenience, faster results, less material, higher precision, and possibly less variation to sample preparation.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

The following activities has been performed;
-Task 1: Comprehensive literature review for DSR methods and their potential to replace the low and intermediate testing equipment;
-Task 2: Gathering the commonly used binder materials for the study (around 50 samples gathered)
-Task 3: Binder testing with multiple equipment in order to be able to make a comparison with standard methods;
-Task 4: Repot has been started

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

The following activities will be performed;
-Task 1: Comprehensive literature review for DSR methods of low and intermediate testing equipment;
-Task 2: Binder testing with multiple equipment in order to be able to make a comparison with standard methods;
-Task 3: The results of the comparison will be gathered into a report

Title:	**Development of a 4.75mm Asphalt Mixture Design**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000195**	Project Start Date:		6/14/2017
Research Project Number:	17-4B	Completion Date	(original)	6/13/2019
Research Agency:	LTRC	Completion Date	(revised)	10/31/2022
Principal Investigator:	Saman Salari			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$140,674	**Total**		
	(revised)	$181,540			
Est. Expended to Date		$159,552	Salaries		
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: A mix design criteria for 4.75 mm Nominal maximum aggregate size mixtures is developed. The mechanical tests include the Loaded Wheel Track test, Semi-Circular Bend test, Dynamic Modulus and friction test. Local aggregates and asphalt cements evaluated to determine the most economical mix. The primary aggregate types that will be examined are gravel and limestone because of their prevalence in Louisiana. Asphalt binder grades include, PG 64-22, PG 76-22, and PG 82-22crm (Crumb rubber modified).

Objective(s): Task 1: literature review completed;
-Task 2: Mixture with Gravel and limestone has been tested for mechanical tests completed;
-Task 3: Report started; and
-Task 4: Majority of the Results have been analyzed.
-Task 5: Economical analysis was performed

Expected Benefits: Recommendations from this project will provide state agencies and contractors with better understanding of low aggregate size mixtures. This research will provide application for unusable low aggregates in the stockpiles.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

-Task 1: Analysis of the results of current tests are completed;
-Task 2: Economical analysis of 4.75 mm nominal maximum aggregate size mixtures has been performed.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

-Task 1: report will be submitted;
-Task 2: Friction polisher has been purchased and the mixtures will be tested for friction

Title:	A New Generation of Porous Asphalt Pavement - OGFC Support Study	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 6	Budget Category:	FHWA

SIO:	DOTLT1000386	Project Start Date:		9/1/2020
Research Project Number:	21-6B	Completion Date	(original)	11/30/2022
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Mostafa Elseifi			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$119,610	**Total**		**$16,071**
	(revised)				
Est. Expended to Date		$103,539	Salaries		$16,071
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$44,830	Equipment	(non-expendable)	
	(revised)	$50,000	Travel		
Est. FY Expenditure		$49,444	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: OGFC is typically designed and constructed with a large air void (AV) content (from 18 to 24%) to facilitate water drainage during rain events. In spite of these advantages, challenges reported by state agencies have seriously limited the use of OGFC. The most critical shortcomings of OGFC are its durability problems (raveling and stripping due to aging) and clogging of voids by dirt, which results in shorter service life and higher costs as compared to regular asphalt.

Objective(s): This study aims to develop a new generation of open-graded friction course that would provide superior durability performance and reduced surface water accumulation. To achieve this objective, the effects of WMA additives (chemical and organic additive), crumb rubber, and industrial fillers (i.e. Portland cement and fly ash) on the functional and mechanical properties of OGFC, was investigated. In addition, the cost-effectiveness of these modifications will be investigated.

Expected Benefits: This research will develop an implementation-ready new generation of OGFC that provides enhanced durability and life-time extension. In addition, it will develop a new generation of OGFC that ensures adequate infrastructure performance under all weather conditions. It will also improve pavement performance in the event of flooding by reducing surface water accumulation while facilitating drainage to the sides of the road.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

During fiscal year 2021-2022, researchers have completed a comprehensive experimental program that evaluated the laboratory performance (mechanistic and functional) of eight OGFC mixes. Results have been analyzed and conclusions were drawn on the suitability of these mixes.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

During fiscal year 2022-2023, researchers will complete the laboratory experimental program as well as evaluating the cost-effectiveness of the different mixes. This project will be completed during fiscal year 2022-2023.

Title:	**Improvement of Open-Graded Friction Course (OGFC) Performance and Durability through Materials, Design, and Maintenance**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000385**	Project Start Date:		9/1/2020
Research Project Number:	21-5B	Completion Date	(original)	11/30/2022
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Corey Mayeux			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$79,156	**Total**		**$9,700**
	(revised)				
Est. Expended to Date		$69,540	Salaries		$9,700
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$42,500	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$42,375	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Design of OGFC with extended life span would require innovative asphalt materials and a performance engineered mixture design procedure. DOTD specifications provide requirements on the physical properties of asphalt binders and aggregate for OGFC. In order to ensure OGFC durability, resistance to fatigue cracking and raveling should also be evaluated together with advanced modifiers and maintenance methods.

Objective(s): The objective of this research is to provide an implementable guideline on the design, performance, and maintenance of OGFC with extended service life to improve driving safety and cost-effectiveness. This will be accomplished through several different tasks. It will evaluate maintenance methods, alternative materials, and a new generation of permeable pavements with improved mechanical characteristics, and enhanced pavement performance by modifying the mixture with polymers and fibers.

Expected Benefits: In order to improve OGFC durability, research should take place on alternative materials and a performance engineered mixture design procedure. Guidelines or specifications could be recommended to extend the service life of OGFC. With the completion of this research, LTRC will provide guidelines or specifications on: maintenance of existing OGFC; the use of epoxy modified asphalt in OGFC mixtures; and performance engineered mixture design procedures to be used for OGFC pavements in Louisiana.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1-The literature review has progressed and is nearing completion.
Task 4-The support study to evaluate alternative materials is progressing.
Task 5-The support study to evaluate a new generation of permeable pavements has made progress.
Task 6-Development of a Standard Practice in the AASHTO Format and recommendations for DOTD Specifications has begun.
Task 7-A draft project report has begun and will continue to progress.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1-The literature review will be completed.
Task 4-The support study to evaluate alternative materials will be completed.
Task 5-The support study to evaluate a new generation of permeable pavements will be completed.
Task 6-Development of a Standard Practice in the AASHTO Format and recommendations for DOTD Specifications will be completed.
Task 7-A draft project report will be completed.

Title:	**Development of a Standard Practice for the Design of Durable Open-Graded Friction Course (OGFC) Mixtures with Epoxy Asphalt-Support Study**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000384**	Project Start Date:		9/1/2020
Research Project Number:	21-4B	Completion Date	(original)	11/30/2022
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$203,393	**Total**		**$90,121**
	(revised)				
Est. Expended to Date		$101,307	Salaries		$88,921
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$50,593	Equipment	(non-expendable)	
	(revised)		Travel		$1,200
Est. FY Expenditure		$50,593	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Open-graded friction course (OGFC) mixture is placed on asphalt pavement surfaces to increase safety with environmental benefits (reduce hydroplaning, splash and spray, noise, and increase friction resistance). However, high porosity raises concerns on the durability of OGFC as it reduces structural integrity of pavement. Thus, durability, resistance to fatigue cracking, and raveling of OGFC mixtures containing epoxy modified binders should be evaluated to ensure extended performance life.

Objective(s): The objective of this research is to develop a mixture design practice including comprehensive performance evaluation, based on the DOTD specifications, for epoxy modified open-graded asphalt mixture (OGFC) with the target service life of 15-20 years.

Expected Benefits: It is anticipated that the results of this study will provide recommendations on the design of durable OGFC using epoxy modified asphalt binders with the best cost effectiveness. Further, results will promote the use of sustainable technologies in Louisiana's flexible pavement construction.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Completed literature review
Task 2: Continued materials selection and acquisition (asphalt binders, epoxy asphalt, aggregates) as per proposal test factorial
Task 3: Continued determination of candidate optimum epoxy asphalt dilution rates based on performance as per proposal test factorial

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 2: Continue material selection and mixture design as per proposal test factorial
Task 3: Continue determination of candidate optimum epoxy asphalt dilution rates based on performance as per proposal test factorial
Task 4: Determine candidate optimum epoxy asphalt dilution rates based on life-cycle cost analysis
Task 5: Recyclability Evaluation of Epoxy Modified OGFC Mixtures as RAP
Task 6: Prepare the project final report

Title:	**Use of an Innovative Recycling Agent for Improving the Sustainability and Durability of Asphalt Pavements**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000392**	Project Start Date:		2/1/2021
Research Project Number:	21-3B	Completion Date	(original)	4/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$249,609	**Total**		**$94,673**
	(revised)				
Est. Expended to Date		$78,975	Salaries		$93,473
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$53,955	Equipment	(non-expendable)	
	(revised)		Travel		$1,200
Est. FY Expenditure		$53,955	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: There is an increasing need for improving the sustainability of asphalt pavement without compromising performance given the limited natural resources and budget allocation. One such approach is the use of recycled materials, such as reclaimed asphalt pavement (RAP) and recycled asphalt shingles (RAS), to substitute for part of the virgin materials. Use of an innovative rejuvenator has emerged as potential to modify the aged asphalt binders from RAP and RAS.

Objective(s): The objectives of this research are (1) Evaluate effectiveness of Lewis acids in increasing RAP percentage in asphalt mixtures; (2) Determine optimum dosage for Lewis acids catalyst; (3) Determine chemical and rheological performance of blends of RAP binders and virgin asphalts; and (4) Determine the mechanistic performance of asphalt mixtures containing high RAP contents and conventional mixtures.

Expected Benefits: Finding of this research will substantially promote the use of increased RAP in asphalt mixtures without compromising the performance against traffic and environmental loading. This research will benefit Louisiana as the state is planning to embrace sustainability and green technology for the benefits of low cost, clean environment, and energy. Further, results will promote the use of sustainable technologies in Louisiana's flexible pavement construction.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Completed literature review
Task 2: Continued material selection and collection as per experimental factorial
Task 3: Continued determination of the optimum dosage for each recycling agent.
Task 4: Continued validation of the optimum dosage using blends of RAP and virgin asphalts for each recycling agent as per experiential factorial.
Task 5: Validate the optimum dosage using asphalt mixture performance tests

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 2: Continue material selection and collection as per experimental factorial
Task 3: Continue determination of the optimum dosage for each recycling agent as per experimental factorial.
Task 4: Continue validation of the optimum dosage using blends of RAP and virgin asphalts for each recycling agent as per experiential factorial.
Task 5: Validate the optimum dosage using asphalt mixture performance tests
Task 6: Prepare the project final report

Title:	Evaluate Performance and Life Cycle Cost of Asphalt (8/18 Specifications)	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 6	Budget Category:	FHWA

SIO:	DOTLT1000328	Project Start Date:		8/19/2019
Research Project Number:	20-1B	Completion Date	(original)	8/18/2022
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Corey Mayeux			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$140,085	**Total**		**$1,000**
	(revised)				
Est. Expended to Date		$145,700	Salaries		$1,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$55,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$49,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: With the implementation of the new specification in the 2016 DOTD Standard Specifications for Roads and Bridges and revisions made in special provision 8/18, it would be beneficial to measure and evaluate the performance and life cycle costs for the asphalt pavements. A thorough analysis is also necessary to ensure that the changes made to the specification are resulting in overall improvements.

Objective(s): The objective of this research is to analyze and compare the performance of asphalt pavements constructed using specifications from the 2006 LA SSRB to pavements built under the 2016 LA SRB and its accompanying special provision 8/18. The project will evaluate the density, volumetric, and performance data for various pavement sections. A life cycle cost analysis will also be performed to determine if the specifications changes have resulted in an increased value.

Expected Benefits: In an effort to improve the performance and value of its asphalt roadways, DOTD has implemented changes to its asphalt pavement specification. It is important to ensure that these changes are resulting in improvements to pavement performance. Additionally, it would be beneficial to analyze and compare the life cycle costs to determine if the specification changes are resulting in an improved value.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1–Literature review completed.
Task 2–The experimental program is complete. All of the new asphalt mixtures have been identified for sample collection. All of the old asphalt mixtures have been identified for data collection.
Task 3–Data and asphalt sample collection completed.
Task 4-Laboratory testing will completed for all collected samples.
Task 5-Data analyses completed.
Task 6-Life-Cycle cost analysis completed.
Task 7-Project report nearing completion.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 7-Finalize project report

Title:	Implementation of Semi Circular Bend Test for QC/QA of Asphalt Mixtures	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 6	Budget Category:	FHWA

SIO:	DOTLT1000321	Project Start Date:		5/1/2019
Research Project Number:	19-4B	Completion Date	(original)	4/30/2022
Research Agency:	LTRC	Completion Date	(revised)	6/30/2023
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$512,939	**Total**		**$88,984**
	(revised)				
Est. Expended to Date		$351,393	Salaries		$87,784
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$110,000	Equipment	(non-expendable)	
	(revised)		Travel		$1,200
Est. FY Expenditure		$110,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The 2016 DOTD Specifications require a criterion for critical strain energy release rate, Jc, obtained from Semi Circular Bend (SCB) test as a part of its balanced asphalt mixture design. SCB test is performed on long term aged (LTA) compacted samples (5 days at 85°C). However, practices of QC/QA are time-sensitive. Thus, it is impractical to include LTA SCB samples during QC and QA testing.

Objective(s): The objective of this study is to develop a specification for implementation of the SCB test in field QC/QA phases of production and construction of asphalt mixtures. A scaling factor will be developed to predict LTA SCB Jc values from plant-produced unconditioned SCB Jc. In this process, the research team expects to explore and obtain a scaling model for Jc, a relationship between Jc and the aging state of the mixture that is tracked by a set of rheological and chemical aging indices.

Expected Benefits: The main product of this research will be an implementable specification for the use of the SCB test in QC/QA practices in the state of Louisiana. It is anticipated that findings will complement the current 2016 Louisiana DOTD Specifications for Roads and Bridges, and provide efficient proactive measures to ensure that mixtures are produced and compacted as expected for an extended service life against cracking.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 2: Continue identification of field projects. Study will be extended due to COVID-19 pandemic delays.
Task 3: Conduct laboratory experiments and perform data analysis.
Task 4: Developed SCB Jc scaling model
Task 5: Summited an interim report. Complete
Task 6: Continued validation of SCB Jc scaling model of Task 4.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 2: Continue identification of field projects
Task 3: Conduct laboratory experiments and perform data analysis.
Task 4: Continue update of the developed SCB Jc scaling model.
Task 6: Continue to Validate the proposed scaling model of Task 4
Task 7: Prepare and submit draft final report

Title:	Development of a Moisture Sensitivity Test for Asphalt Mixtures	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 6	Budget Category:	FHWA

SIO:	DOTLT1000275	Project Start Date:		5/1/2019
Research Project Number:	19-2B	Completion Date	(original)	4/30/2021
Research Agency:	LTRC	Completion Date	(revised)	12/30/2023
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$257,903	**Total**		**$89,356**
	(revised)	$478,165			
Est. Expended to Date		$292,035	Salaries		$87,856
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$87,000	Equipment	(non-expendable)	
	(revised)	$72,000	Travel		$1,500
Est. FY Expenditure		$72,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Moisture induced damage of asphalt mixtures is a significant distress affecting not only the long-term performance of asphalt pavements, but also the safety of traveling public. The modified Lottman test (AASHTO T283-Standard Method of Test for Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage) is one of the most widely used methods, which uses the tensile strength ratio (TSR) of moisture conditioned specimen to dry specimen to evaluate the moisture sensitivity.

Objective(s): Several studies indicated that the TSR is not a consistent and reliable indicator of moisture sensitivity of asphalt mixtures. Moreover, the moisture conditioning procedure of the modified Lottman test have been also criticized for the impracticality and incapability of simulating the moisture damage in field. The objective of this study is to develop a new standardized fracture mechanics-based laboratory test procedure to evaluate the moisture of asphalt mixtures.

Expected Benefits: Findings from this research will result in an improved laboratory test method for evaluation of asphalt mixture moisture damage. The best conditioning/ test combination will be recommended for consideration of implementation into the Louisiana Standard Specifications for Roads and Bridges. The use of the recommended moisture damage test method will improve the durability and long-term performance of Louisiana's asphalt pavements.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 2: Continued material selection and mixture design as per project experimental factorial
Task 3: Continued preparation of laboratory test specimens as per project experimental factorial
Task 4: Continued conduct of Laboratory tests as per project experimental factorial
Task 5: Continued conduct of data analysis. Preliminary results were published in refereed journals
Task 6: Evaluated candidate test procedures. Study will be extended to validate the proposed test method on mixtures containing various types of antistrip additives

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 3: Continue to prepare asphalt mixtures samples as proposed in the experimental factorial;
Task 4: Continue to conduct experiments on laboratory compacted mixtures; and
Task 5: Perform data Analysis
Continue to compile laboratory test data for subsequent data analysis.
Task 6: Evaluate candidate test procedures
Task 7: Prepare final report

Title:	Pavement Materials Research Using Special Equipment at the Engineering Materials Characterization Research Facility	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 6	Budget Category:	FHWA

SIO:	30000112	Project Start Date:		7/1/2009
Research Project Number:	10-1EMCRF	Completion Date	(original)	6/30/2015
Research Agency:	LTRC	Completion Date	(revised)	6/30/2024
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$345,000	**Total**		**$104,513**
	(revised)	$20,501,630			
Est. Expended to Date		$20,601,630	Salaries		$94,713
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$100,000	Equipment	(non-expendable)	
	(revised)		Travel		$4,900
Est. FY Expenditure		$100,000	Other		$4,900

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The Engineering Materials Characterization and Research Facility (EMCRF) provides a multi-disciplinary expertise and state-of-the-art research capabilities to assess the fundamental engineering properties of materials used in the transportation industry. EMCRF also explores innovative techniques for infrastructure preservation and rehabilitation with sustainable, resilient, and recyclable methods to have significant impact on longevity of our society.

Objective(s): The objectives of the facility are to maintain and advance state-of-the-art engineering pavement materials characterization and modeling research program at LTRC through identification and conduct of implementable research projects; initiate and/or participate in major research initiatives seeking external funding (UTC, etc.); Disseminate research findings; and develop and provide training for DOTD employees for implementing technology developed

Expected Benefits: Results of research conductus at EMCRF provides recommendations for implementations into DOTD's Specifications for Roads and Bridges to improve and solve materials, design, production, and construction specifications. EMCRF provides LTRC with an excellent position to pursue its quest for national and international excellence in research capability of all aspects of pavement materials.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Participated in the Louisiana DOTD Parts five and ten Specification Committee;
Developed and submitted proposals to NCHRP and FHWA;
Developed and presented tack coat seminar
Participated in several technical assistance projects.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Continue participation in the Louisiana DOTD Asphaltic Concrete Specification Committee;
Continue participation in technical assistance projects;
Develop and submit proposals for external funding; and
Conduct workshops and seminars.

Title:	Influence of Aggregate Gradation to Reduce Concrete's Permeability	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 6	Budget Category:	FHWA

SIO:	DOTLT1000424	Project Start Date:		1/17/2022
Research Project Number:	22-2C	Completion Date	(original)	1/16/2024
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Jose Milla			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$205,097	**Total**		**$102,549**
	(revised)				
Est. Expended to Date			Salaries		$102,549
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$25,637	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Aggregate gradation can often be overlooked in concrete mixture design to improve durability. In practice, most concrete producers tend to use the grading limits specified in ASTM C33, which happen to be too broad to guarantee optimum packing density. As such, there is a need to optimize aggregate gradations to increase durability. By maximizing the aggregate's packing density, concrete's cement demand can be reduced, resulting in less permeable concrete that can also minimize shrinkage

Objective(s): The objectives of this study are to: (1) measure the influence of aggregate gradation on concrete's permeability, and (2) optimize concrete mixture designs to meet strength, permeability, and workability criteria for construction

Expected Benefits: This study aims to optimize aggregate gradations to deliver high strength and durability without compromising workability. This research will provide guidance on achieving high quality concrete mixtures that achieve the best results with the lowest cement paste possible

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Literature review has begun
Task 2: Historical review of past approved mixture designs and their respective gradations has begun
Task 3: Aggregate gradation designs have been formulated, and are currently being tested for bulk density and void content in the aggregate

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 2: Complete the historical review of past approved mix designs within a 3-year window
Task 3: Select the aggregate gradations that will be used for concrete testing
Task 4: Start comparative testing of concrete specimens

Title:	**Influence of Internal Curing on Concrete's Permeability in Simulated Field Conditions**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000422**	Project Start Date:		1/17/2022
Research Project Number:	22-1C	Completion Date	(original)	1/16/2024
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Jose Milla			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$205,097	**Total**		**$102,549**
	(revised)				
Est. Expended to Date			Salaries		$102,549
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$25,637	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Most research conducted on surface resistivity requires strict sample conditioning, where specimens must remain in a 100% relative humidity (RH) condition from the moment of mold removal to testing time. This regime makes it difficult to observe the benefits of internal curing in situ, and as such, there is a need to quantify concrete's durability properties in more realistic conditions.

Objective(s): The objectives of this study are to: (1) Assess the influence of internal curing on concrete's transport properties in more realistic curing conditions, and (2) validate the results from surface resistivity with bulk diffusion testing.

Expected Benefits: This research will provide a better characterization of ICC in more realistic curing conditions. In addition, the inclusion of a bulk diffusion test will be beneficial to verify the results obtained from surface resistivity, thereby providing additional characterization of concrete's transport properties.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Literature review has begun

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 2: Sample preparation will begin. Currently, all the materials needed for preparing concrete mixtures and for bulk diffusion testing have been purchased.
Task 3: Begin comparative testing of fresh concrete properties, compressive strength, and preliminary surface resistivity and bulk diffusion readings

Title:	**Using the Portable XRF to identify/Verify Field Material Properties**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000332**	Project Start Date:		10/1/2019
Research Project Number:	20-2C	Completion Date	(original)	3/31/2021
Research Agency:	LTRC	Completion Date	(revised)	11/30/2023
Principal Investigator:	Jose Milla			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$82,419	**Total**		
	(revised)	$120,969			
Est. Expended to Date		$81,485	Salaries		
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$22,629	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$21,695	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Certain materials must be sent to the central laboratory for characterization to verify that the materials meet project specifications. This can be a labor-intensive and expensive operation, with test results often delayed and some materials only receiving minimal testing. Portable X-ray Fluorescence (XRF) and Fourier-Transform infrared (ATR-FTIR) units have been proposed to quickly determine some of these properties in the field on in-place materials without sampling delays.

Objective(s): The objectives of this study are to develop a methodology to apply a portable XRF and ATR FTIR to Louisiana's material needs, and to evaluate the efficiency of the portable devices to characterize relevant materials for acceptance.

Expected Benefits: If successful, the portable XRF and ATR FTIR spectroscopy devices will become a viable tool for rapid materials testing in the field use. The results of this research may also be used by other states to further the state of field verification of material quality and fingerprinting to improve quality assurance.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 3: Started evaluating portable XRF and ATR FTIR devices for field use

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 3: Continue evaluating portable XRF and ATR FTIR devices for field use
Task 4: Begin analyzing the collected data and compare results with benchtop XRF data

Title:	**Evaluation of the Miniature Concrete Prism Test (MCPT) for use in DOTD**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000331**	Project Start Date:		10/1/2019
Research Project Number:	20-1C	Completion Date	(original)	9/30/2022
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Jose Milla			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$162,768
	(revised)	
Est. Expended to Date		$141,188
FY 2021 - 2022 Budget		
FY Funds	(original)	$59,000
	(revised)	
Est. FY Expenditure		$35,608

Estimated 2022-2023 Budget		
Total		**$21,580**
Salaries		$21,580
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The miniature concrete prism test (MCPT) method was developed to accelerate the time required to conduct the concrete prism test (CPT) per ASTM C1293, which may take up to 2 years. The industry would like the DOTD to explore the suitability and feasibly of implementing the MCPT. In addition, information on testing performance is needed to determine the presence and/or the extent of any alkali-silica reaction (ASR) deterioration in concrete.

Objective(s): The objective of this study is to (1) Evaluate the suitability of the MCPT method to assess alkali-silica reactivity, and (2) determine the level of implementation and/or continued research required for adopting this test method

Expected Benefits: If successful, this research will provide a better tool for ASR characterization by reducing the required testing time from 1-2 years to 56 days, as well as provide guidance on the development of specifications to better address ASR in concrete. This will benefit both aggregate suppliers and DOTD in performing routine

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Continued literature review;
Task 2: Completed a survey to assess how stakeholders have mitigated or addressed ASR issues
Task 3: Completed preparing all mixes and began comparative testing for both MCPT and CPT methods. MCPT testing has been completed, while CPT testing is ongoing.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 4: The analysis of the test results should begin once CPT results are finalized.

Title:	**Geotechnical Database, Phase IV**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000393**	Project Start Date:		3/1/2021
Research Project Number:	21-2GT	Completion Date	(original)	2/28/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Gavin Gautreau			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$185,539	**Total**		**$82,574**
	(revised)				
Est. Expended to Date		$35,000	Salaries		$82,574
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$84,000	Equipment	(non-expendable)	
	(revised)	$35,000	Travel		
Est. FY Expenditure		$35,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Phase I GIS work is no longer supported by ArcGIS software, and DOTD document management software (Content Manager) is moving to newer (File.NET). Additionally, increased computing power has changed the expectations for how geotechnical data should be stored and utilized.
Geotechnical software, HoleBASE, an all-in-one enterprise database/data management solution, is now available to DOTD. Deep soil borings and cone penetrometer (CPT) data have not yet been incorporated into HoleBASE.

Objective(s): This project will research and assist with DOTD's implementation of OpenGround, the Cloud-based version of HoleBASE. The implementation of Data Interchange for Geotechnical and Geo-Environmental Specialists (DIGGS) is a DOTD goal. DIGGS allows collection and transfer of geotechnical data from others through the (XML-based) geospatial standard schema. DIGGS is also a goal of the Federal Highway Administration (FHWA) and the American Society of Civil Engineers (ASCE) Geo-Institute.

Expected Benefits: A robust, all-in-one database/mapping/management solution is the next step in growing our geotechnical database, enhancing design, and managing information about DOTD geotechnical assets.
- Increased efficiency – unified data (deep boring, CPT, shallow boring, DCP, pile load test);
- Fewer new borings/tests, where data already exists;
- Time savings in generating soil borings, figures, and design profiles.;
- Reduced data input errors;
- More streamlined laboratory test reporting process.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

The Bentley acquisition of HoleBASE has further advanced the project. Bentley has a new cloud-based version of HoleBASE called OpenGround. LTRC has access to this cloud server and has started adding historical PDF boring to the Database. Additional efforts have been made to incorporate/import old gINT files into the OpenGround database. Researchers created documents outlining the process steps for these uploads. OpenGround also allows for WMS mapping imports, which will allow layers (from Phase I) to be added to the OpenGround GIS database for geotechnical designers' reference. Researchers conduct frequent meetings with the Geotechnical section to review process and next steps. Each dataset (piles, CPT, boreholes, archived (.pdfs), active projects, etc.) has a different icon.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
The next category of uploads will be current files in the gINT/HoleBASE format to the OpenGround database. As all data is moved to the cloud it will allow further steps of filtering and analyses through HoleBASE/OpenGround tools by designers. Additional activities will include further coordination between the Geotechnical Design section and the Materials Laboratory regarding lab data, the borehole logs, analysis tools, and GIS reference layers.

Title:	Internal friction angle of sands with high fines content	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000375	Project Start Date:		8/1/2020
Research Project Number:	21-1GT	Completion Date	(original)	7/31/2022
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$146,690	**Total**		**$55,800**
	(revised)				
Est. Expended to Date		$155,000	Salaries		$55,800
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$84,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$99,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Several projects in Louisiana with piles driven in sands with high fines content have lower resistances than the design values from static β-method, resulting on longer piles than designed. This may be due to uncertainty in estimating the friction angle (ϕ) of sands with high fines content from in-situ, or potential reduction of interface friction angle (δ) due to presence of high fines content. There is a need to modify the in-situ test corrections of ϕ for sands with high fine contents.

Objective(s): The main objectives of this project are: a) Evaluate the effect of fines content on the internal friction angle, ϕ, of sand mixed with fines; b) Evaluate the effect of fines content on the interface friction angle, δ, between sand soils mixed with fines and piles; c) Determine the threshold of fines content beyond which the sand mixed with fines will behave like cohesive soils, and c) Develop a design method to calculate the ultimate capacity of piles driven into sand mixed with fine contents.

Expected Benefits: It is anticipated that this study will provide new/modified correlations and updated SPT/CPT charts and tables for accurate estimation of ϕ for sands with fines content. The research team will propose design guidance for piles driven in sand soils mixed with fines content to enhance the safety of pile foundations design for infrastructures. In addition, the finding will include guidelines on evaluating the threshold of fines contest beyond which the sand-fine mixture behave like cohesive soils.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Completed literature review relevant to the effect of fines content on the internal friction angle of sandy soils and the interface friction angle between sand-fine mixture and pile material.

Task 2: Collected soil material from three sites that contains high percent of silt for laboratory shear testing.
Conducted laboratory tests to characterize the soil parameters such as standard Proctor, gradation, maximum and minimum void ratios, liquid limit (LL), plastic limit (PL), etc.

Task 3: Conducted small-scale direct shear tests on sand soil mixed with four different soils with high percent of fines content (with three soils having high percent of silt) at different percentages and different moisture contents.

Task 4: Analyzed the performed small-scale and large-scale direct shear test results on sand soil mixed with different percent of fines with high silt.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
Task 2: Collect more soil material with high silt fines for the small- and large-direct shear laboratory tests. Continue laboratory testing to characterize the soil parameters of new collected soils, such as standard Proctor, gradation, maximum and minimum void ratios, liquid limit (LL), plastic limit (PL), etc. Task 3: Continue conducting small-scale direct shear tests on sand soil mixed with fines of high silt content at different percentages and different moisture contents. Task 4: Continue conducting large-scale interface direct shear tests between sand mixed with fines of high silt content and the concrete at different percentages and different moisture contents. Task 5: Continue analyzing the results of small-scale and large-scale direct shear tests. Work on developing regression models to estimate the shear strength parameters for sand mixed with fines of high silt content. Task 6: Work on evaluating the threshold of fines contest beyond Which the sand-fine mixture behave like cohesive soil. Task 7: Work on verifying the findings using project sites with piles driven in sand soils layers mixed with fines. Task 8: Prepare a draft report.

Title:	**Development of a Design Methodology for Geosynthetic Reinforced Pavement using Finite Element Numerical Modeling**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000346**	Project Start Date:		5/1/2020
Research Project Number:	20-3GT	Completion Date	(original)	4/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$300,302
	(revised)	
Est. Expended to Date		$192,000
FY 2021 - 2022 Budget		
FY Funds	(original)	$84,300
	(revised)	
Est. FY Expenditure		$90,000

Estimated 2022-2023 Budget		
Total		**$65,700**
Salaries		$63,700
Consumable Supplies & Materials		$2,000
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Pavements build over weak subgrade soils are often associated with construction difficulties, which poses challenge to pavement engineers. The current practice in Louisiana is to stabilize weak subgrades with cement/lime to create a working platform. Geosynthetics can offer a cost-effective alternative solution to this problem by reinforcing the pavement. Although the benefits of geosynthetics in pavements are recognized, the mechanism of reinforcement is still not fully understood.

Objective(s): Develop finite element models to simulate the performance of geosynthetic reinforced pavements built over subgrades of different strengths.
Evaluate the effect of different parameters on the benefits of geosynthetic reinforcement.
Study the effect of reinforcement properties for low, medium, and high volume traffic sections.
Develop a design method for geosynthetic-reinforced pavements within the mechanistic-empirical pavement design guide (MEPDG).

Expected Benefits: It is anticipated that the research team will develop a cost-effective design methodology that incorporates the benefits of geosynthetic reinforcement in flexible pavements within the context of MEPDG. The results will help the design engineers to select the proper parameters that enhance the geosynthetic benefits. This study will help accelerate the construction of pavements over weak and problematic subgrades, and reduce the cost of pavements construction in Louisiana.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1-Coompleted literature review relevant to experimental, analytical and finite element analysis of geosynthetic-reinforced pavements, and mechanistic-empirical pavement design guideline (MEPDG),
Task 2-Developed finite element numerical models to simulate the geosynthetic reinforcement of pavement sections built over soft and medium subgrade soils for low volume roads, and medium volume roads,
Task 3-Verified and calibrated the developed FE models using the results of in-box laboratory CPL tests, and the results of accelerated load tests conducted on geosynthetic-reinforced sections built at ALF site,
Task 4-Conducting finite element parametric study to evaluate the effect of different variables and parameters on the benefit of geosynthetic reinforcement of pavement built over built over soft and medium subgrade soils for low volume roads, and medium volume roads.
Task 6-Started developing design procedure based on mechanistic-empirical pavement design guide (MEPDG).

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 2-Continue developing finite element numerical models to simulate the geosynthetic-reinforced of pavement sections built over soft, medium and stiff subgrade soils for low, medium and high volume roads.
Task 2-Continue Verifying and calibrating the FE models using the results from in-box laboratory cyclic plate load tests, results of accelerated load tests conducted on geosynthetic-reinforced sections built at ALF site, and any case studies in literature.
Task 4-Continue conducting finite element parametric study to evaluate the effect of different variables and parameters on the benefit of geosynthetic reinforcement of pavement built over soft, medium and stiff subgrades for medium and high volume roads.
Task 6-Continue developing design procedure based on mechanistic-empirical pavement design guide (MEPDG).

Title:	Instrumentation and Modeling of Geosynthetic Load Transfer Platform Performance	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000337	Project Start Date:		1/1/2020
Research Project Number:	20-2GT	Completion Date	(original)	6/30/2022
Research Agency:	LTRC	Completion Date	(revised)	6/30/2023
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$300,331	**Total**		**$83,922**
	(revised)	$377,380			
Est. Expended to Date		$276,762	Salaries		$79,122
FY 2021 - 2022 Budget			Consumable Supplies & Materials		$4,800
FY Funds	(original)	$103,150	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$121,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Imposing significant embankment load over soft clay can cause bearing capacity failures, large settlement, lateral movement, and slope instability. Driven pile, drilled shafts or stone columns are commonly used in the construction of embankment on soft clay to improve the capability of soft clay. To reduce the cost by reducing the number of piles, geosynthetic reinforcement platform can be added below the embankment to work as load transfer platform to the pile caps.

Objective(s): The objectives of this study are: Monitor the short-term and long-term behavior of geosynthetic load transfer platforms (GLTP) in Louisiana; Evaluate and verify (or modify) important design factors and parameters for GLTP: load distribution (between the piles, geogrid, and soft soil), settlement, and lateral thrust; Conduct finite element parametric study to evaluate the effect of different variables and parameters on the performance of GLTPs; and Propose a design and construction guidance.

Expected Benefits: The use of GLTP technology beneath the embankment and above the supporting piles has shown evidence to be a cost-effective design in many projects in USA and the world. To realize the potential benefits of using GLTP for pile-supported embankments in Louisiana, DOTD plans to build GLTP for three bridge projects. It is anticipated that the DOTD design method for GLTP will be improved based on the collected data from field instrumentations, and hence reduce the cost.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Completed literature review on published works related to GLTP technology and its applications for approaching bridge embankment.

Task 3: Instrumented the GLTP at the first project site No. 2375, Amite River, Baton Rouge.

Task 4: Monitored the performance of the GLTP at the project site No. 2375, Amite River, Baton Rouge, during the construction of GLTP.

Task 6: Developed 2D finite element (FE) models to simulate the behavior of GLTP pile-supported embankment for the case of piles tip on dense sand soil. Started the FE modeling for the case of piles tip on stiff clay soil.

Task 7: Verified the FE models using measurements of field monitoring of fully instrumented GLTP on piles-supported embankment cases in literature.

Task 8: Conducted FE parametric study to evaluate the effect of different variables and parameters on the behavior of GLTP pile-supported embankments for the case of piles tip on dense sand. Started the FE parametric study for the case of piles tip on clay.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
Task 3: Purchase the instrumentation set for the GLTP project No. 1234, Port Allen Canal Bridge, LA 1. Wait for the contractor to start instrumenting the GLTP at the project site No. 1234. Task 4: Monitor the performance of the GLTP at the project site No. 2375, Amite River, Baton Rouge, during the construction of embankment. Task 5: Conduct load test using heavy weight trucks after the end of construction on of GLTP at the project site No. 2375, Amite River, Baton Rouge. Task 6: Continue developing FE models to simulate the behavior of GLTP pile-supported embankment for the cases of piles tip on stiff clay of different soil layering. Task 7:Continue verifying and calibrating the developed FE models using the measurements of field monitoring of fully instrumented load transfer platform in piles-supported embankments from literature, and the instrumented site at Amite River, Baton Rouge. Task 8: Continue conducting comprehensive FE parametric study to evaluate the effect of different variables and parameters on the behavior of GLTP pile-supported embankments, for the cases of piles tip on stiff clay of different soil layering. Task 9: Start the long-term monitoring of the performance of GLTP pile-supported embankment for the project site No. 2375, Amite River, Baton Rouge.

Title:	Maintenance of Roadway Edge Drop-Off Utilizing Readily Available Materials	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000283	Project Start Date:		2/1/2019
Research Project Number:	19-1GT	Completion Date	(original)	4/30/2020
Research Agency:	LTRC	Completion Date	(revised)	12/31/2022
Principal Investigator:	Gavin Gautreau			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$102,307
	(revised)	$243,396
Est. Expended to Date		$1
FY 2021 - 2022 Budget		
FY Funds	(original)	$60,000
	(revised)	$26,634
Est. FY Expenditure		$26,634

Estimated 2022-2023 Budget		
Total		**$29,850**
Salaries		$29,850
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: DOTD District 05 spent 55,000 man-hours and over 1 million dollars in 2016 attempting to maintain roadway edges along non-paved shoulders. Non-paved shoulders typically consist of a soil and aggregate that is routinely disturbed and lost under normal traffic conditions. The methods used to maintain non-paved shoulders statewide varies and performance has been undocumented. The performance of each varies and when poor, can create safety and maintenance issues.

Objective(s): This research will evaluate the effectiveness of different strategies like RAP, hydrated fly ash (HFA) and other alternatives as possible shoulder materials for reducing, and potentially eliminating, the edge drop-off safety issues within the state. This research will evaluate the application and performance of different alternatives, and develop a logical method to address problematic shoulder locations.

Expected Benefits: More stable shoulders (with no edge drop-off) creates a safer driving environment. Utilizing best practices with readily available materials and/or asphalt edge modifications will reduce maintenance costs and improve safety.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 2- Complete field and laboratory testing
Task 3- Analyze the performance of the mixtures, to find the best performers
Task 4- Analyze cost to find the best options for the Districts
Task 5- Recommended options will be presented in the report
Task 6- Prepare the Final Report and Technical Summary

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Complete and Submit the final report and submit to editing.

Title:	Update the Pile Design by CPT Software to Incorporate Newly Developed Pile-CPT Methods and Other Design Features	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000165	Project Start Date:		6/1/2017
Research Project Number:	17-2GT	Completion Date	(original)	5/31/2019
Research Agency:	LTRC	Completion Date	(revised)	12/31/2022
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$455,673	**Total**		**$25,290**
	(revised)	$440,935			
Est. Expended to Date		$412,362	Salaries		$25,290
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$40,525	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$36,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The accurate estimation of ultimate resistance of piles is necessary for safe design of deep foundations. The cone penetration test (CPT) has been effectively used for many geotechnical applications, including the estimation of pile resistance. A previous study was conducted at LTRC to identify the most appropriate CPT methods. Since then, new CPT methods have been developed, and many new pile load tests with electronic CPT data are now available that warrant re-evaluating the CPT-pile methods.

Objective(s): The objectives of this research project are: Evaluate the pile-CPT method(s) for use in Louisiana soils, and select, modify or develop a new pile-CPT method; Re-calibration the resistance factor (ϕ) for all selected pile-CPT methods; Update the Louisiana Pile Design-Cone Penetration Test (LPD-CPT) software to incorporate the newly selected pile-CPT prediction methods; and Update the "LPD-CPT" software to incorporate some aspects such as effect of scour and pile set-up empirical equations.

Expected Benefits: The use of CPT data to evaluate the pile capacity will help design engineers to find the best method for estimating the pile capacity with greater accuracy. This will result in reducing the number pile load tests, reduce number of piles/pile lengths, and hence significantly reduce the cost of bridge construction. Incorporating the CPT methods in the updated "LPD-CPT" software will help design engineers to predict the pile capacity efficiently and remove the possibility of manual calculation.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 5: Conducted reliability analyses for the 22 direct Pile CPT methods using modified first order second moment method (FOSM), first order reliability method (FORM), and Monte Carlo simulation method. Calibration of resistance factors was performed using a target reliability of 2.33. The efficiency was also calculated for the 22 direct Pile-CPT methods
Task 6: Implemented the top rated 8 Pile-CPT methods into the Louisiana Pile Design from Cone Penetration Tests (LPD-CPT) software. Modified and implemented the Schmertmann Pile-CPT method into LPD-CPT. Developed and implemented an optimized combined design method from top 8 Pile-CPT methods.
Task 7: The method proposed by FHWA for incorporating scour effect on the long-term pile capacity was adopted for the Pile-CPT methods, and was implemented into LPD-CPT program.
Task 8: The resistance factors for the top 8 Pile-CPT method were calibrated for use in designing of piles in Louisiana.
Task 9: Worked on upgrading and updating several features to the LPD-CPT software to be applicable for typical field design conditions of bridge piers with piles of different ground surface elevations across the channel, and for different design scenarios.
Task 10: Worked on cost benefit analysis.
Task 11: Started drafting the final report.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
Task 9: Continue upgrading and updating several features to the LPD-CPT software to be applicable for typical field design conditions of bridge piers with piles of different ground surface elevations across the channel, different water table conditions, different channel scour elevations, and for three design scenarios: no preboring piles case, piles with preboring (casing) case, and design of piles with channel scour. Critical evaluation of the LPD-CPT from an engineering standpoint to verify that the options to evaluate the scour and elevation changes are providing reasonable results. Task 10: Work on evaluating the cost benefit using the top-ranked direct Pile-CPT methods for design of driven piles. Task 11: Prepare the final report and user guide.

Title:	LTRC Support for Geotechnical Research at the Geotechnical Engineering Research Laboratory (GERL)	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 6	Budget Category:	FHWA

SIO:	30000111	Project Start Date:		7/1/2010
Research Project Number:	10-1GERL	Completion Date	(original)	6/30/2015
Research Agency:	LTRC	Completion Date	(revised)	6/30/2024
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$523,000
	(revised)	$18,480,051
Est. Expended to Date		$2,185,800
FY 2021 - 2022 Budget		
FY Funds	(original)	$166,838
	(revised)	
Est. FY Expenditure		$196,800

Estimated 2022-2023 Budget		
Total		**$156,277**
Salaries		$111,277
Consumable Supplies & Materials		$30,000
Equipment	(non-expendable)	
Travel		$15,000
Other		

BUDGET JUSTIFICATIONS

Supplies: Calibration of triaxial and shear test machines: $3,500.
Calibrated of in-situ test devises (Geogauge, LFWD, etc.): $2,000.
Maintenance and supplies for MTS testing machine: $3,000.
Desktop computers for two graduate students: 2 x $1500 = $3,000.
Annual license for PLAXIS 2D finite element software: $1,500.
Misc/Replacement parts for Humboldt testing devise: $2,500.
Triaxial, direct shear and consolidation tests parts (Dial Gauges, cables, molds, etc.): $4,000
Fixing the in-box cyclic plate load test (instruments, wires, cables, etc.): $4,000.
Pump filters, oil change, materials, etc. for Geotech Lab: $2,500.
General Laboratory supplies and materials: $4,000.Travel: Attend TRB Conference for PI and one RAs: 2 x $2500 = $5000
Attend TRB for one graduate student: $2000
Attend Geo Congress Conference: $3000
Attend Geo Congress for one graduate student: $2000
Attend Geosynthetics conference: $3000

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Transportation infrastructures in Louisiana, such as bridges and highways, are very essential for the state's residents and businessmen. Many challenges are facing the state to improve/modernize their transportation infrastructures that need to be identified, addressed and solved. Improving analysis, design, and construction of the geotechnical aspects of infrastructures is very vital. Therefore, problem statements and proposals need to be developed to solve the challenges.

Objective(s): The objectives of this study are: perform studies to meet the beneficiary requirements for geotechnical testing, technical assistance and research; advance the state-of-the-art in geotechnical research; maintain laboratory testing equipment; maintain in-situ testing devises and monitoring instruments, provide development, support and training of new and innovative techniques, and software for advancing transportation system, and develop problem statements and research proposals.

Expected Benefits: It is anticipated that improving and maintaining modern and safe infrastructures will have a direct impact toward improving the quality of life and boost healthy economic growth in Louisiana. The development of new methodologies for geotechnical infrastructure's analysis, design and construction will help improve the accuracy/reliability of design, accelerate construction, and reduce material/labor cost, resulting in safer and more cost-effective infrastructure design.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

- Developed potential ideas and problem statements for future LTRC research projects,
- Provided geotechnical testing support and technical assistance for DOTD,
- Provided guidance on improving the quality of laboratory testing,
- Developed research proposal on "Evaluation of Embedded Pile Resistance on Scour Critical Bridges",
- Published several technical papers and proceedings on findings of LTRC research projects,
- Attended several engineering workshops and conferences,
- Maintained laboratory testing equipment,
- Maintained in-situ testing devises and measuring/monitoring instruments,
- Maintained various software related to CPT application.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
- Provide geotechnical and geosynthetic testing support and technical assistance for DOTD, - Provide support and training for implementation of research results, - Develop research proposals and problem statements for future activities, - Develop research proposal on "Statewide Calibration of CPT Direct Design Methods Using Static Load Test Data", - Develop research proposal on "Use and Interpretation of Seismic Piezocone Penetration Testing (SCPTu) for Geotechnical Site Investigation", - Publish research findings on technical papers, proceedings and reports, - Maintain laboratory testing equipment, - Maintain in-situ testing devises and measuring/monitoring instruments, - Maintain and upgrade the various CPT software.

Title:	LTRC Proposal for the Support of Software Development and GIS Applications in LTRC Research	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000215	Project Start Date:		7/1/2017
Research Project Number:	18-1Other	Completion Date	(original)	6/30/2020
Research Agency:	LTRC	Completion Date	(revised)	6/30/2024
Principal Investigator:	Adele Lee			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$352,390	**Total**		**$227,436**
	(revised)	$1,895,149			
Est. Expended to Date		$649,553	Salaries		$210,496
FY 2021 - 2022 Budget			Consumable Supplies & Materials		$1,140
FY Funds	(original)	$220,712	Equipment	(non-expendable)	$2,000
	(revised)	$162,327	Travel		$9,500
Est. FY Expenditure		$151,186	Other		$4,300

BUDGET JUSTIFICATIONS

Travel: The $9,500 travel budget is for PI attendance at the following conferences:
-TRB $2,500
-AASHTO GIS-T $2,800
-ESRI User's Conference $3,000

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The purpose of this project is to provide a fiscal year structured resource allocation plan for transportation applications originally developed at Louisiana Transportation Research Center (LTRC).

Objective(s): The tasks will cover development, upgrading, implementation, and maintenance of customized software, relational databases, servers and GIS (Geographic Information Systems).

Expected Benefits: Provide IT and GIS solutions as applied research implemented into DOTD processes and procedures.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1- Project Management Tracking System corrected minor defects. Implemented FHWA budget submission compilation within PMTS, removed content manager links, LTRC admin queries for AWP submission checks, SQL database project status emails to Section 19 admin, changed PMTS emails to LSU relay email address. Began PMTS transition to OTS servers in development area including large programming effort to replace all Word and Excel functionality.
Task 1- Maintain databases, website virtual server, maintain all LTRC source code and software development environments.
Task 2- Customized software development for research project 17-2GT. Supported user functionality testing corrections.
Task 2- Rebuild software development environments after OTS re-image requirements. Backup of PMTS LSU virtual machine.
Task 3- Assisted LTRC IT personnel with COTS software installs, database backups, email server decommission, firewall and network issues. Provided software development requirements for network discussions/decisions between OTS and LSU ITS.
Task 4- Presented at 2022 AASHTO GIS-T conference.
Task 4- GIS expertise and activities supporting research projects 18-4GT, 20-1SS and 21-2GT.
Task 4- Served as LTRC liaison to Section 21 and System of Engagement. Activities to transfer LTRC GIS footprint from ArcGIS Online framework to System of Engagement Portal online framework. Attended ESRI User's Conference 2021 and completed ESRI training courses.
Task 4- Maintained GIS server, geodatabases and web services as well as ArcGIS Online web maps, 8 GIS web applications and a setup a Field Maps application.
Task 5- Managed graduate student programming for Concrete MTS checker source code upgrade, 17-2GT support and PMTS concept research. Setup graduate student laptop software development environment.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
Task 1- Project Management Tracking System correct defects and implement new capabilities Task 1- Maintain databases, website virtual server, all LTRC source code and software development environments. Task 1- PMTS server transition to OTS servers (development and production). Major reprogramming for some functionality. After full transition, maintain and advise OTS on updated requirements and issues. Task 1- Attend TRB 2023 conference. Task 2- Setup new development environment and upgrade the Visual Studio version for all LTRC development environments. Task 2- Customized software development for research project 17-2GT. Task 2- Customized software development and upgrade .NET framework for the Dynamic Cone Penetration (DCP) data processing. Task 4- GIS expertise and activities supporting research projects 18-4GT, 20-1SS, 21-2GT, and Geotechnical LiDAR. Task 4- Serve as LTRC liaison to Section 21 and System of Engagement. Activities to transfer LTRC GIS footprint from ArcGIS Online framework to System of Engagement Portal online framework. Attend AASHTO GIS-T 2023. Task 4- Maintain GIS server, geodatabases and web services as well as ArcGIS Online web maps, 8 GIS web applications and a Collector GIS fieldwork application. Task 5- Manage, assign and review graduate student source code programming that supports LTRC.

Title:	Administration of LTRC External Funding Programs	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	30000169	Project Start Date:		1/1/2008
Research Project Number:	11-1AD	Completion Date	(original)	6/30/2009
Research Agency:	LTRC	Completion Date	(revised)	6/30/2024
Principal Investigator:	Vijaya Gopu			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$211,428	**Total**		**$306,412**
	(revised)	$4,672,490			
Est. Expended to Date		$3,340,000	Salaries		$295,912
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$296,000	Equipment	(non-expendable)	
	(revised)		Travel		$10,500
Est. FY Expenditure		$275,000	Other		

BUDGET JUSTIFICATIONS

Travel: Problem Statement: Travel: TRB Annual Meeting (Airfare+Hotel+Meals) = $2,200
Council of University Transportation Centers (CUTC) Summer Meeting: $1,000
NSF Center for Integration of Composites in Infrastructure Adv.Board Meetings: $1,800
AASHTO (American Association of State Highway Transportation Officials) Bridge Committee Annual Meeting: $1,200
Allowance for other state DOT dissemination meetings: $3,800

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Enhance the external research funding at LTRC. This would require the new AD to:
Identify funding opportunities at the national, regional and state level in the broad area of transportation engineering, planning and management and organize single or multi-campus faculty teams/clusters – multi-disciplinary when needed -- that hold the most promise for being successful in attracting this competitive funding. Pursuit of these opportunities will be channeled through LTRC.

Objective(s): Objective(s): To cover administrative costs handled under contract to support the Louisiana Transportation Research Center (LTRC) research, development and technology transfer expansion funding program.

Expected Benefits: The efforts of this program will generate external funding for university faculty and support the research needs of DOTD.
Participation in national level research efforts and programs enhance the stature of LTRC and address the critical needs of the state departments of transportation.
Tasks carried out with support of external agencies -- NSF, FHWA, etc. -- enable workforce development in critical areas of the transportation sector.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

- Submitted a proposal to FHWA in collaboration with university and industry partners to advance bridge engineering education and practice. Proposal was recommended for funding but was not awarded due to budget constraints.
-Established collaboration with several consortiums to develop and submit proposals to the UTC program. Serving in a lead role for proposal development. LTRC will be a site in a few TIER 1 UTC proposals and two regional UTC proposals.
- Managed the TIRE program effectively.
-Facilitated LTRC sponsorship of inteRaCt webinar series. Webinars are attended by several hundred engineers across the nation.
-Chaired the Industrial Advisory Board meetings of the NSF Center for Integration of Composites in Infrastructure.
-Several on several NSF review panels

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
-Collaborate with colleagues at different universities to develop and submit proposals for TIER 1 and regional UTC awards. -Coordinate the LTRC UTC (University Transportation Center) site projects and the UTC support studies through their completion after gaining funding from the UTC program; -Disseminate the results of the NSF (National Science Foundation) project on field monitoring and measurement education. -Conduct the REU (Research Experience for Undergraduates) Summer program in 2022 and submit final report at conclusion of the program. Funding: -Continue coordination of TIRE program and TIRE projects; -Hold LTRC town-hall meetings at all state universities with engineering programs. -Coordinate submission of a revised NSF MRI (Major Research Instrumentation) proposal in this fiscal year -Explore opportunities for submitting proposals to advance bridge engineering education and practice. -Support LAPELS Board in its effort to promote professional registration of university faculty.

Title:	Performance Index Rating and Maintenance Cost Assignment for Ramps, Acceleration and Deceleration Lanes in Louisiana	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000431	Project Start Date:		4/1/2022
Research Project Number:	22-1P	Completion Date	(original)	6/30/2024
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Moses Akentuna			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$169,270	**Total**		**$78,205**
	(revised)				
Est. Expended to Date			Salaries		$60,879
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$35,015	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$36,341	Other		$17,326

BUDGET JUSTIFICATIONS

Other: The $17,326 "other expenses" item is for a one-month rental of specialized equipment (zero-speed profiler) for the proposed study.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Roughness is an important parameter for rating the overall condition of roadways. However, operational conditions on ramps, roundabouts, and other urban roadways make it difficult for modern inertial profilers to provide valid roughness values for these sections of roadways. Therefore, it is imperative to devise a means to accurately rate roughness for cost-effective maintenance of these sections of the highway system by road agencies.

Objective(s): (1) Ascertain any differences in international roughness (IRI) and performance index (PI) values of Louisiana DOTD's analysis lanes as compared to ramps, acceleration, or declaration lanes; (2) develop a framework for measuring and characterizing IRI and PI values for ramps, acceleration, and deceleration lanes; (3) and establish and provide guidelines to address additional treatment costs specific to ramps, acceleration, and deceleration lanes at the project and network levels.

Expected Benefits: Guidelines will be developed for measuring and characterizing IRI and PI values for ramps, acceleration, and deceleration lanes. Further, the research team intends to develop a framework for assigning maintenance trigger values and treatment costs for all components of the highway system. These guidelines will assist DOTD engineers to select cost-effective treatment methods for the prompt performance of maintenance activities on Louisiana roads.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1 – Conducted literature review.
Task 2 – Started developing a test plan for the proposed project.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 2 - Complete the development of the test plan for the proposed project.
Task 3 - Begin executing the proposed test plan.
Task 4 - Begin analyses of field and PMS data.

Title:	Prediction of Road Conditions and Smoothness For Flexible and Rigid Pavements in Louisiana Using Neural Networks	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000376	Project Start Date:		8/1/2020
Research Project Number:	21-1P	Completion Date	(original)	7/31/2022
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Zhong Wu			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$182,370	**Total**		**$85,800**
	(revised)				
Est. Expended to Date		$69,000	Salaries		$85,800
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$91,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$91,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The Department of Transportation and Development (DOTD) currently uses pavement performance curves in its treatment selection and budget planning. The performance curves, which are developed using a non-linear curve-fitting regression method, usually contain low R-squared values. To improve the prediction accuracy of pavement performance used in budget planning, there is an urgent need to build an artificial neural networks (ANN) based pavement performance prediction system for DOTD.

Objective(s): The objective of this study is to develop an artificial neural network application system that can be used to estimate future pavement performance indicators including pavement condition and smoothness parameters for Louisiana flexible and rigid pavements based on DOTD's Pavement Management System (PMS) database and other pavement related design information being collected. The developed ANN application can be expected to address both short-term and long-term pavement performance prediction.

Expected Benefits: It is anticipated that this study will provide DOTD two types of ANN-based prediction method which can be used to (1) obtain reliable short-term pavement performance index/indicators for the treatment selection and budget planning; and (2) predict long-term pavement condition and smoothness for newly-constructed pavement projects as well as roadway pavement segments currently not able to perform the pavement condition data collection.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Continued literature review on published work related ANN modeling and pavement performance prediction
Task 2: Data collection and preparation. Detailed pavement condition measurements for over 40,000 pavement segments in the interstate and national highway system (NHS) pavement network of DOTD were collected and complied. The collected pavement condition data was grouped based on the pavement type and functional class and further classified/prepared for the proposed performance modeling using the corresponding design traffics and project location/weather information.
Task 3: Various neural network modeling approaches including the deep learning, recurrent nets and adaptive neuro fuzzy inference system (ANFIS) were investigated. The ANN-based prediction models were developed for different pavement performance/distress indicators based on the historical PMS data collected during 2017 and 2020.
Task 4: Future pavement condition indicators including the percent cracking for asphalt and concrete pavements and the faulting for jointed concrete pavements were predicted for all DOTD's interstate and NHS pavement segments according to the federal NHS Pavement's Target and Baseline value requirements.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 4: Continue working on the model development for other pavement performance indicators considered.
Task 5: Development of Automated Prediction System
Task 6: Prepare the Final Report

Title:	**Exploration of Drone and Remote Sensing Technologies in Highway Embankment Monitoring and Management**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000216**	Project Start Date:		9/1/2017
Research Project Number:	18-1P	Completion Date	(original)	8/31/2018
Research Agency:	LTRC	Completion Date	(revised)	8/31/2022
Principal Investigator:	Zhongjie Zhang			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$50,000
	(revised)	$150,000
Est. Expended to Date		$115,000
FY 2021 - 2022 Budget		
FY Funds	(original)	$48,000
	(revised)	$32,000
Est. FY Expenditure		$30,000

Estimated 2022-2023 Budget		
Total		**$22,000**
Salaries		$22,000
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Many Louisiana highway embankments were built with high plastic soils due to historical reasons. Many of them have been experiencing surface sliding failures, which become a safety issue and cause traffic disruptions. Since no warning system is available for this type of failures, the Department of Transportation and Development (DOTD) can only respond to them after the fact with costly remediation.

Objective(s): Use remote sensing and drone technologies with proper sensors to detect soft spots on soil embankment surface.

Expected Benefits: A monitoring system for highway embankments will benefit the Department to take proactive maintenance measures to prevent surface sliding failures.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Continued the literature search and review on the applications of remote sensing and drone technologies in civil and geotechnical engineering.
Task 3: Selected field embankment testing sites.
Task 4: Data Collection. Have continued working with the aviation section of DOTD and use their drone to test our cameras and collect field testing images at DOTD's highway embankment sites.
Task 5: Processed and analyzed the collected data. The preliminary results are promising for identifying potential sliding sites and we will have more flying times to collect more image data.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1: Continue the literature search and review on the applications of remote sensing and drone technologies in civil and geotechnical engineering.
Task 4: Data Collection. We will continue our field testing flights and get more field images data, which will be correlated with moisture content on the ground surface.
Task 5: Process and analyze the collected data based on the entire experiment experience.
Task 6: Develop indicators for highway embankment safety in Louisiana if possible.
Task 7: Prepare final report.

Title:	Correlation of Rut Depths Measured by the Profilers of LTRC and DOTD PMS	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 6	Budget Category:	FHWA

SIO:	DOTLT1000387	Project Start Date:		11/16/2020
Research Project Number:	21-2P	Completion Date	(original)	5/15/2022
Research Agency:	LTRC	Completion Date	(revised)	11/15/2022
Principal Investigator:	Qiming Chen			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$100,000	**Total**		**$10,000**
	(revised)				
Est. Expended to Date		$76,700	Salaries		$10,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$61,540	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$57,500	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Louisiana Transportation Research Center (LTRC) currently owns a road profiler, which uses a 5-point rut bar system for pavement rut depth measurements. DOTD is currently using a scanning laser system to collect rut depth data for its Pavement Management System (PMS). The two systems result in some differences of calculated rut depths. LTRC data is often requested, together with PMS data, for pavement performance evaluation and pavement management activities support.

Objective(s): The objective of this research is to develop a correlation of rut depths measured with LTRC's profiler with a 5-point laser system and DOTD PMS's profiler with a scanning laser system. A Standard Operating Procedure (SOP) of pavement rutting data collection, compilation, and delivery by LTRC will be developed so that DOTD pavement engineers can use LTRC data together with PMS data to evaluate the pavement performance and conduct/support pavement management activities.

Expected Benefits: A good correlation can help better understand the rutting data collected by LTRC and the rutting data in the DOTD PMS. A SOP of pavement rutting data collection, compilation, and delivery by LTRC will be created for DOTD pavement engineers to use when LTRC data is needed, together with PMS data, for pavement performance evaluation and pavement management activities support. The SOP can also serve as a training document for DOTD and LTRC engineers/researchers.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Conduct Literature Review (95% complete)
Task 3: Collect Profile Data (Profile data were collected at 25 selected road sections)
Task 4: Perform Analysis of the Collected Data (The data collected from 25 selected road sections were being analyzed)

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1: Conduct Literature Review (continue working on literature review)
Task 4: Perform Analysis of the Collected Data (continue data analysis)
Task 5: Develop a Standard Operating Procedure
Task 6: Prepare the Final Report

Title:	Assessment of DOTD's friction aggregate sources through laboratory and accelerated testing	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 6	Budget Category:	FHWA

SIO:	DOTLT1000340	Project Start Date:		1/1/2020
Research Project Number:	20-4P	Completion Date	(original)	12/31/2022
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Zhong Wu			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$402,068	**Total**		**$130,000**
	(revised)				
Est. Expended to Date		$117,300	Salaries		$130,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$140,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$123,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Due to high variations in the aggregate production and shipments, it is common to get significantly different polished stone value (PSV) test results from a same aggregate source shipped in at a different time. Aggregate suppliers certainly have concerns when their product's PSV test results fail to meet DOTD's target. Therefore, there is an urgent need to formalize the use of aggregate friction testing to better utilize aggregates and achieve desirable skid values for the life of a pavement.

Objective(s): 1) Assess the PSV test variations in term of sources, shipment, and operators. 2) Evaluate a new aggregate friction testing procedure. 3) Determine the threshold friction design values for commonly-used wearing mixtures. 4) Validate and update a set of lab and field correlations of pavement surface friction characteristics measured and developed from projects of 09-2B and 12-5P.

Expected Benefits: A potential outcome of this project will provide DOTD a new and improved laboratory aggregate friction testing protocol that can be used for initial source approval as well as for predicting field friction performance.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1-Continued the literature review on the prediction of pavement surface friction characteristics based on dynamic friction tester (DFT), circular track meter (CTM) and other frictional parameters.
Task 2-Scheduling of DFT/CTM measurement training is ongoing. A steel mold used for aggregate sample preparation and a testing base setup in a three-wheel publishing device were obtained for the proposed laboratory coarse aggregate friction test.
Task 3-Five coarse aggregate sources were identified and 10~15 buckets of No. 78 materials have been collected from each selected aggregate source. Chemical composition and PSV tests were performed for all collected aggregates. Fabrication of aggregate ring samples and a new aggregate polishing test using a three-wheel polishing device have been started.
Task 4-The skid number (SN) of ten-plus selected asphalt pavement sites were collected using the locked wheel skid trailer (LWST) device. In addition, the pavement surface frictional characteristics using DFT and CTM devices were obtained on a dense-graded asphalt pavement site.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 2-Perform the training of DFT and CTM testing
Task 3-Identify additional coarse aggregate sources with different aggregate friction rating and perform laboratory tests including PSV, chemical composition and three-wheel polishing tests.
Task 4-Perform in situ pavement surface friction measurements using DFT/CTM and the locked wheel skid trailer (LWST). The selected asphalt pavement sites include pre-selected pavement test sections of 12-5P and newly selected sections with wearing course mixtures of stone matrix asphalt (SMA) and open-graded friction course (OGFC).
Task 5-Analyze the collected laboratory and field experimental results using the statistical method as well as pavement modeling.

Title:	Mechanistic Characterization of Asphalt Overlays for Pavement Rehabilitation and Preservation using Pavement ME Approach	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 6	Budget Category:	FHWA

SIO:	DOTLT1000272	Project Start Date:		8/1/2018
Research Project Number:	19-2P	Completion Date	(original)	1/31/2021
Research Agency:	LTRC	Completion Date	(revised)	10/31/2022
Principal Investigator:	Zhong Wu			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$319,442	**Total**		**$27,000**
	(revised)	$398,137			
Est. Expended to Date		$330,000	Salaries		$27,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$20,000	Equipment	(non-expendable)	
	(revised)	$72,000	Travel		
Est. FY Expenditure		$70,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: For a smooth transition from the 1993 AASHTO pavement design guide to the newly-developed Pavement ME Design for DOTD, there is a need to perform local-calibration of distress models for both pavement structural and preservation overlays in Louisiana. In addition, the pavement design engineers of DOTD have encountered several design issues in new asphalt and concrete pavement designs when using a previously-calibrated Pavement ME software.

Objective(s): 1) Address the existing Pavement ME's new pavement design issues encountered by the DOTD design engineers. 2) Evaluate the performance and existing trigger system of possible pavement preservation overlay strategies using Pavement ME. 3) Update local-calibration factors of Pavement ME and develop a set of optimum design inputs for both pavement rehabilitation and preservation asphalt overlays for DOTD implementation.

Expected Benefits: 1) A detailed implementation plan for Pavement ME's rehabilitation module with a set of updated, local calibration factors and Louisiana design inputs. 2) A set of recommended design inputs for pavement preservation overlay using the Pavement ME. 3) Solutions for the existing Pavement ME Design software issues currently encountered.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 4-Investigated the current design issues encountered by DOTD engineers;
Task 5-Analyzed the performance of structural overlays and updated related Distress/IRI Models' Local Calibrated design coefficients.
Task 6-Evaluated the performance and existing trigger system of possible preservation overlay strategies using the Pavement ME Design.
Task 7-Developed guidelines for DOTD to implement the Pavement ME in its daily pavement design by addressing the currently encountered design issues, providing local design input strategy, developing an analysis guide for using the Pavement ME software in the preservation overlay design.
Task 8-Prepared a final report and held a project committee meeting.
Task 9-Reviewed more Louisiana-specific pavement design inputs based on the current DOTD's pavement design practice.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 9-Continue identifying more Louisiana-specific pavement design inputs based on the current DOTD's pavement design practice.
Task 10-Review previously collected pavement condition measurements and insert more pavement performance data for new flexible and rigid pavement design in Louisiana.
Task 11-Perform a new local calibration of the Pavement ME Design Software version 2.6 (and later) for new flexible and rigid pavement design in Louisiana.
Task 12-Submit the final report and develop guidelines for DOTD's implementation.

Title:	**Mitigating Joint Reflective Cracks using Stone Interlayers: Case Study on Louisiana Highway 5, Desoto Parish**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000218**	Project Start Date:		10/17/2017
Research Project Number:	18-2P	Completion Date	(original)	10/16/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Qiming Chen			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$210,000	**Total**		**$23,000**
	(revised)				
Est. Expended to Date		$126,000	Salaries		$23,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$24,435	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$22,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Reflective cracking in AC overlays represents a serious challenge associated with pavement rehabilitation. In 2011, LTRC completed a study to evaluate and compare the performance of different crack control treatments in Louisiana for composite pavements. Stone interlayers were not one of the treatments discovered from a survey of DOTD engineers in the study and therefore were not evaluated.

Objective(s): The purpose of this project is to monitor the effectiveness of stone interlayers in composite pavements, determine the effect of stone depth in mitigating reflective cracks at the transverse and longitudinal joints, and measure the movement of the Portland cement concrete (PCC) transverse joints under traffic loading.

Expected Benefits: The results of the study may be used to recommend improved pavement design and preservation procedures.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Literature Review (85% complete)
Task 3: Data mining the Pavement Management Systems database (distress information has been partially collected from PMS)
Task 5: Interim Report (another set of instrumentation readings was taken)

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1: Literature Review (continue working on literature review)
Task 3: Data mining the Pavement Management Systems database (continue collecting distress information on the two projects identified from Task 2)
Task 5: Interim Report (Continue data analysis and start to write the report)

Title:	Management and Operation of the Pavement Research Facility	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 6	Budget Category:	FHWA

SIO:	30000141	Project Start Date:		7/1/2009
Research Project Number:	10-1ALF	Completion Date	(original)	6/30/2015
Research Agency:	LTRC	Completion Date	(revised)	6/30/2024
Principal Investigator:	Zhong Wu			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$1,730,000	**Total**		**$479,200**
	(revised)	$23,096,263			
Est. Expended to Date		$1,730,000	Salaries		$364,200
FY 2021 - 2022 Budget			Consumable Supplies & Materials		$100,000
FY Funds	(original)	$472,000	Equipment	(non-expendable)	
	(revised)		Travel		$10,000
Est. FY Expenditure		$472,000	Other		$5,000

BUDGET JUSTIFICATIONS

Supplies: The $100,000 budget will cover the routine maintenance supplies, mechanic repairing (parts and labor), and daily operational costs at the Pavement Research Facility. The following supplies and operational items are included in the budget:
Parts replacement and mechanic repairing of ALF, parts replacement and mechanic repairing of ATLaS30, building supplies, computer and software upgrade, steel braided cable, pillow block bearing, hydraulic oil filters, electrical solenoids, din cables/connector, electrical fuses, electrical cable 480v and 240v, pressure relief valve, cable lube spray, poly grease, lawn weed killer, mouse/snake traps, toiletries, wasp spray, gasoline, Scag and tractor maintenance. Travel: TRB Annual meeting (3 attendees) - $7,500
Attend a pavement conference (1 attendee) - $2,500

Other: The $5,000 cost will cover as-needed professional services including the move of ATLaS30 or ALF to new locations.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Pavement Research Facility (PRF) is a full-scale accelerated pavement research facility designed to determine in-situ true performance for different pavement structures and materials using two heavy vehicle simulator loading devices. The research purpose is to investigate economical and practical alternatives related to the current design and construction practices, and provide implementable pavement solutions for DOTD in solving issues in pavement structure, construction and materials.

Objective(s): The objective of this study is to provide for the management and operation structure at the PRF site in performing full scale accelerated pavement testing for DOTD. A manager and two operators will be funded in this facility. The scope of the work includes management of the facility, machine maintenance and operation, preparation of plans for individual experiments, construction, pavement instrumentation and accelerated pavement testing.

Expected Benefits: Research results obtained at PRF can lead directly to implementable recommendations for DOTD in terms of new pavement structure design, paving material selection and construction, better monitoring of statewide pavement performance and advanced analytical tools for pavement structure analysis. PRF provides LTRC with an excellent position to pursue its quest for national and international excellence in research capability in full-scale accelerated pavement testing.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

- Developed a final report for Louisiana Multi-functional Materials Group LLC (LAMG) on the performance evaluation of smart-sealant under accelerated pavement testing.
- Performed in situ tests on the engineered cementitious composite (ECC) sections using the falling weight deflectometer, dynamic friction tester and circular track meter.
- Continued loading on ECC sections for about 50,000 repetitions.
- PRF Research findings presented at a TRB Webinar on Concrete Overlay of Asphalt.
- Published several technical papers and proceedings on findings of LTRC research projects.
- Provided technical assistance to LTRC in pavement testing, instrumentation and equipment procurement.
- Resolved several ATLaS's mechanical and electrical issues in the device's control and loading system.
- DOTD built a survey boat storage structure at PRF.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
- Continue providing technical assistance to LTRC in pavement testing, instrumentation and equipment procurement. - Continue upgrading the ATLaS's control system. - Continue loading on ECC test sections. - Develop research proposals and problem statements for future activities. - Publish research findings on technical papers, proceedings and reports. - Maintain all PRF testing equipment - Work on the cable issue of ALF

Title:	Safety Effectiveness of Cable Median Barriers in Louisiana	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000425	Project Start Date:		1/1/2022
Research Project Number:	22-1SA	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Elisabeta Mitran			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$171,926
	(revised)	
Est. Expended to Date		$50,000
FY 2021 - 2022 Budget		
FY Funds	(original)	$90,000
	(revised)	$66,307
Est. FY Expenditure		$66,307

Estimated 2022-2023 Budget		
Total		**$105,619**
Salaries		$105,619
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: DOTD has been installing cable median barriers to prevent cross-median crashes and installed approximately 355 miles of cable barriers throughout the state as of May 2019. By the end of 2022, DOTD plans to install cable barriers along all interstate highways. Although cable barrier is a proven safety countermeasure, research is needed to evaluate and quantify the safety benefit of cable barriers in Louisiana to assess how well these countermeasures have met their expected purpose.

Objective(s): The goal of this project is to conduct a comprehensive safety evaluation of cable median barriers installed on Louisiana highways. The research will investigate safety effectiveness of cable median barriers and estimate the benefit-cost ratio of cable barriers.

Expected Benefits: The results of this research will provide DOTD with necessary information to evaluate whether cable barriers are successful safety treatments in Louisiana and to guide future applications. The cost-benefits analysis of these crash countermeasures can help DOTD to make better and more informed decisions and justify highway safety investments essential for the Louisiana Highway Safety Improvement Program.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1- Literature review was finalized.
Task 2 –Data Gathering and Verification was completed.
Task 3 –Crash Analysis is ongoing.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 3 – Finalize crash analysis.
Task 4 – Prepare and submit an interim report.
Task 5- Perform cable median barriers maintenance analysis.
Task 6 – Benefit and cost analysis.
Task 7 - Prepare and submit the final report.

Title:	Highway Safety culture Assessment through Louisiana's Regions	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000388	Project Start Date:		5/1/2021
Research Project Number:	21-1SA	Completion Date	(original)	4/30/2023
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Helmut Schneider			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$173,835	**Total**		**$66,334**
	(revised)				
Est. Expended to Date		$33,511	Salaries		$46,203
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$94,234	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$91,233	Other		$20,131

BUDGET JUSTIFICATIONS

Other: Professional Services Agreement for Project Consultant and F&A at 13%.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: For Louisiana to reach the goal of a 50% reduction in highway fatalities by the year 2030, individual behavior must change. Having a more complete understanding of behavior at multiple levels can generate useful and relevant insights into driving behavior and the traffic safety culture, which can inform future strategies and messaging and communication efforts. Beyond individual differences, as noted previously, we will seek to gain an understanding of traffic safety culture within Louisiana

Objective(s): The objective of this research is to use a mixed approach that combines quantitative survey methodology with qualitative methods (such as focus groups, case studies, participant observation, etc.) to get top-down and bottom-up insight into driving behavior, perceptions, attitudes, and beliefs about traffic safety. Additionally, this research will assess the state of knowledge/awareness about specific issues such as distracted driving and aggressive driving.

Expected Benefits: The results of this study may be used by DOTD, Louisiana Highway Safety Commission, Louisiana State Police, and other SHSP stakeholders to inform strategies and program development. Additionally, the results can be used for more effective media outreach, improving policies/programs/laws, and more effective enforcement of legislations. It is expected that findings from the study would benefit the broader transportation community in addressing matters related to human behavior.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1- Literature review
Task 2- Secondary data identification
Task 3 - Secondary data collection
Task 4 - Interim report
Task 5 - Survey design
Task 6 - Data collection for survey

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 7: Data Analysis of Survey Results
Task 8: Identification and Pilot Testing of Road Observation Sites
Task 9: Completion of Naturalistic Observations and Data Analysis
Task 10: Final Report Writing

Title:	Minimum Intersection Illumination	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000373	Project Start Date:		5/1/2021
Research Project Number:	20-3SA	Completion Date	(original)	10/31/2022
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Hany Hassan			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$99,623	**Total**		**$65,473**
	(revised)				
Est. Expended to Date		$37,580	Salaries		$65,473
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$34,150	Equipment	(non-expendable)	
	(revised)	$34,150	Travel		
Est. FY Expenditure		$29,550	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: According to NHTSA, higher rates of traffic crash fatalities are recorded during the night for all road users including drivers, pedestrians, and motorcyclists. This problem persists for both rural and urban locations where nighttime driving conditions results in more than 40% of fatal crashes. The main objective of the project is to examine whether Louisiana has traffic safety problem due to lack of lighting at its roundabouts and stop-controlled intersections, in rural and suburban areas.

Objective(s): The primary objective of this project is to examine whether Louisiana has a traffic safety problem due to lack of lighting at its intersections, particularly at roundabouts and stop-controlled intersections, at rural and suburban areas. Underlying this objective, this project aims also to determine which states have adopted a partial / full lighting policy, guidelines, or other potentially low-cost countermeasures for lighting their intersections.

Expected Benefits: The study outcome will improve understanding of the relationship between intersection lighting and traffic safety, especially for roundabouts and stop-controlled intersections in rural and suburban in Louisiana. Findings from crash data analysis, survey, driving simulator experiment and cost-benefit analysis will provide valuable insights regarding whether Louisiana has traffic safety problem due to lack of lighting at these intersections, and the low-cost countermeasures applied by other state

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Conducted literature review of recent studies that had similar scope as well as state DOT lighting guidelines.

Task 2: Developed national survey instrument that was sent through Qualtrics survey tool to professionals working at safety and lighting departments at state DOTs across the country (national wide). So, a total of 43 responses were received from 32 states.

Task 3: A total of 706 crashes at roundabouts and 5,011 crashes at stop-controlled intersections were analyzed using descriptive summary statistics, Poisson and negative binomial regression analysis and cross-sectional analysis to identify the main contributing factors that affect the occurrence and severity of nighttime crashes at roundabouts and stop-controlled intersections, at rural and suburban areas within Louisiana. The results showed that lighting is not the main significant factor for nighttime crashes occurrence for both roundabouts and stop-controlled intersections in Louisiana.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
Task 4: Design and undertake a driving simulator experiment to investigate if intersection's lighting has significant impact on the drivers' behavior and their ability to perform the driving task safely at intersections while accounting for the surrounding illumination and activities at intersections. This task will be conducted at LSU driving simulation lab, where a full-sized passenger car with the help of projectors and screens will be used to provide participants (drivers from Louisiana) a realistic setting in a controlled and safe environment. Cameras and sensors will be used to capture driver experience while going through different lighting scenarios such as no lighting, partial as well as various intersection settings including roundabouts, two-way and four-way stop controlled intersections. Task 5: Conduct cost-benefit analysis to evaluate the costs and benefits of providing partial or full lighting at roundabouts and stop-controlled intersections, at rural and suburban areas within Louisiana. The costs will include the implementation, operation and maintenance costs of street lightings while the benefits will include the expected reduction in number and severity of traffic crashes related to lighting conditions. Task 6: Submit the final report after successful completion of the above tasks. The report will document all the steps carried out to successfully answer the project objectives.

Title:	**Evaluation of Traffic Crash Characteristics on Elevated Sections of Interstates in Louisiana**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000341**	Project Start Date:		8/3/2020
Research Project Number:	20-1SA	Completion Date	(original)	8/2/2022
Research Agency:	LTRC	Completion Date	(revised)	12/31/2022
Principal Investigator:	Raju Thapa			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$196,166
	(revised)	
Est. Expended to Date		$152,622
FY 2021 - 2022 Budget		
FY Funds	(original)	$81,333
	(revised)	$83,625
Est. FY Expenditure		$83,625

Estimated 2022-2023 Budget		
Total		**$39,927**
Salaries		$35,367
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		$2,280
Other		$2,280

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Louisiana's elevated bridge sections have continued to experience high number of crashes, recording a yearly average of 247 crashes from 2015 to 2019.

Objective(s): The primary objective of this project is two-fold: first, to fully develop a video analytical software to classify and count vehicle stream, and have the capability of calculating vehicle speeds and/or headways; and secondly, to undertake crash analysis on selected elevated segments to look for characteristics of crashes, common issues, and similarities/differences in car and truck crashes.

Expected Benefits: It is anticipated that a software that can utilize publicly available traffic video streams could be used statewide to estimate traffic volumes and compliance with travel restrictions on not only elevated roadways, but all roadways with available video data. Knowing where and when the most serious violations occur would help law enforcement allocate resources to these hot spots.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1 Perform Literature Review – It was completed.
Task 2 Select Representative Sites – It was completed. Final sites were approved from the PRC members.
Task 3 Develop Video Analytical Tool – It was completed.
Task 4 Undertake Crash Analysis – It is still ongoing
Task 5 Compile Traffic Flow Parameters – It was completed.
Task 6 Undertake Targeted Analysis of Atchafalaya Basin Bridge - It is still ongoing
Task 7 Undertake Combined Analysis of All Sites - It is still ongoing

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 7 Undertake Combined Analysis of All Sites
Task 8 Submit Final Report

Title:	**Pedestrians and Bicyclists Count, Phase 2: Implementing and Applying Multimodal Demand Data**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000297**	Project Start Date:		3/15/2019
Research Project Number:	19-3SA	Completion Date	(original)	3/14/2021
Research Agency:	UNO	Completion Date	(revised)	9/13/2022
Principal Investigator:	Tara Tolford, MURP, AICP			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$240,704
	(revised)	$298,932
Est. Expended to Date		$269,980
FY 2021 - 2022 Budget		
FY Funds	(original)	$61,778
	(revised)	$87,371
Est. FY Expenditure		$87,371

Estimated 2022-2023 Budget		
Total		**$7,815**
Salaries		$7,565
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		$250
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The results of LTRC 16-4SA indicate that incremental development of systematic active transportation monitoring, feasible, scalable, and useful for planning and evaluation. Non-motorized traffic is more variable than motorized traffic so more data is required in order to make inferences or conduct statistical analyses of count and/or crash data. Long-duration counts are necessary to understand active transportation demand, track complete streets policy implementation, and evaluate safety impacts

Objective(s): To implement recommendations and address gaps in data availability by: 1)Install permanent counters at a set of pilot locations and collect one year of pedestrian and bicycle data representative of a variety of usage patterns and/or facility types, 2)Develop active transportation factor groups for Louisiana communities and preliminary expansion factors for adjusting short-duration multimodal counts, 3)Identify, support, and inform opportunities for coordinated local and MPO-led data collection.

Expected Benefits: This study advances preliminary feasibility research (LTRC 16-4SA), initiates permanent counts, pilots and refines protocols for planning, installing, and validating counters and classifying factor groups, advances methods for applying count data to solve active transportation planning and safety problems, and advances coordinated local and regional multimodal data collection in support of statewide Complete Streets policy implementation and performance measurement.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1 – Complete - additional resources were integrated into inventory as identified.
Task 2 – Complete - no additional short-duration counts completed during this fiscal year.
Task 3 – The final remaining permanent counters were installed and validated, and all counters and data outputs have been routinely monitored.
Task 4 – Work continued to advance data collection with local partners, and resources have been developed to support coordinated efforts, including a partnership with New Orleans RPC to provide guidance and resources for encouraging long-term data collection in RPC member parishes and to integrate short-duration counts into project feasibility/traffic studies moving forward.
Task 5 –Available count data for all locations was cleaned, compiled, and analyzed to identify temporal trends, potential demand drivers/factors, and preliminary expansion factors for calibration of short-duration counts and proxy demand data sources
Task 6 – A draft technical report was submitted to the PRC for review.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
Task 1 - Revisions to draft technical report will be made to literature review pending PRC feedback Task 2 - Complete - no additional short-duration counts anticipated Task 3 - Maintenance activities and monitoring for all count devices will be continued through project period of performance Task 4 - Follow up activities with RPC to advance local data collection are anticipated. Where needed, formal MOU with local partners will be executed to ensure data collection continuity beyond the period of this research. Task 5 - Following collection of 12+ months of data at all count locations, preliminary analysis will be recomputed to develop expansion factors for all locations. Additional analyses will be completed pending PRC review of draft technical report. Task 6 - Final technical report will be revised in accordance with PRC feedback and submitted for publication.

Title:	**Analyzing Human Mobility for Active Transportation Planning in Louisiana**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000430**	Project Start Date:		3/1/2022
Research Project Number:	22-5SS	Completion Date	(original)	8/31/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Ruijie "Rebecca" Bian			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$123,936
	(revised)	
Est. Expended to Date		$33,602
FY 2021 - 2022 Budget		
FY Funds	(original)	$39,000
	(revised)	$33,602
Est. FY Expenditure		$33,602

Estimated 2022-2023 Budget		
Total		**$77,327**
Salaries		$77,327
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Active transportation refers to any human-powered mode of transportation, such as walking and bicycling. Promoting active transportation for the benefits of current and future Louisiana residents is significant, in terms of improving chronic disease outcomes as well as mitigating traffic and safety impacts. The pandemic situation also calls our attention to provide more sustainable and resilient transportation infrastructure in response to public health crisis.

Objective(s): The proposed project would: (1) observe human mobility patterns in Louisiana and whether/how the patterns changed during COVID-19 and (2) develop an index showing hotspots needing active transportation infrastructures the most based on the observed mobility pattern.

Expected Benefits: The proposed research will be useful to future active transportation planning, project prioritization, and investment decisions. The proposed research approach is especially useful to states who have less active transportation infrastructure and where pedestrian/bicyclist count data are not sufficient.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

The project starts from March 2022. The research team has been working on the following tasks in this fiscal year.

Task 1: review active transportation demand planning methods. This task is expected to be completed partially by the end of June 2022 because it covers multiple topics and requires continuous inputs as the project is making progress.

Task 2: filter, clean, and enrich the mobility data. This task is expected to be completed by the end of June 2022.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1: review active transportation demand planning methods. Continuous input is needed from this review task.

Task 3: identify active transportation hot areas and trends. The task is expected to start from July 2022.

Task 4: present results visually to support decision-making. The task is expected to start from November 2022.

Task 5: collect feedback from stakeholders. The task is expected to start from January 2023.

Task 6: prepare the final report. The task is expected to be completed by the end of May 2023.

Title:	**Testing the Hurricane Evacuation Modeling Package (HEMP)**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000427**	Project Start Date:		8/1/2022
Research Project Number:	22-3SS	Completion Date	(original)	1/31/2024
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Ruijie "Rebecca" Bian			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$90,981
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	$62,000
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$54,222**
Salaries		$48,022
Consumable Supplies & Materials		$6,200
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Supplies: Supplies: The project needs to purchase two software license to test the package. One Academic TransCAD Single User License costs
$2,500 per year. One Academic TransModeler License also costs $2,500 per year. The PI will contact Caliper before purchase to confirm the price.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: LTRC has developed a computer package that allows estimation of evacuation traffic depending on storm characteristics and decisions made by Emergency Managers. It has been set up to operate in the New Orleans area and requires testing to validate its ability to replicate past storms. Testing of the computer package is necessary to determine the accuracy and usefulness of the package.

Objective(s): This project focuses on testing the developed Hurricane Evacuation Modeling Package (HEMP) in different storm scenarios and improving HEMP's performance. The objectives of this project include:
•Improve and validate prediction accuracy of the developed package
•Improve its fitness to actual emergency operations in Louisiana
•Improve its computation speed
•Explore enhancing HEMP's capabilities

Expected Benefits: A program that predicts the consequences of alternative management evacuation decisions allowing informed decision makings.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

A PRC meeting was held to discuss the research proposal. The research proposal was approved by PRC and the project is expected to start from August 2022.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

The PI will work on the following tasks as described in the proposal.

Task 1: Refine evacuation demand model application.

Task 2: Refine evacuation road network for simulation and operation.

Task 3: Improve simulation processing speed.

Task 4: Compare simulation results with actual traffic counts.

Title:	**Develop and Evaluate Performance Measures for Intelligent Transportation Systems (ITS) in Louisiana**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000379**	Project Start Date:		8/1/2020
Research Project Number:	21-4SS	Completion Date	(original)	7/31/2022
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Raju Thapa			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$142,132	**Total**		**$10,294**
	(revised)				
Est. Expended to Date		$127,165	Salaries		$6,874
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$71,066	Equipment	(non-expendable)	
	(revised)	$72,232	Travel		$2,280
Est. FY Expenditure		$72,232	Other		$1,140

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The Department of Transportation and Development (DOTD) established its ITS Program in 2000 and currently has various program areas. It is important that before Louisiana invests more resources to either expand or implement new ITS programs, DOTD should undertake a thorough study to demonstrate the benefits of its current ITS programs across transportation planning, traffic operation, safety, environmental quality and sustainability, and any other areas that can be evaluated.

Objective(s): The primary objective of this project is to develop a set of performance measures for each existing ITS application in Louisiana, and then collect data, evaluate and quantify the benefits achieved through their implementation across transportation planning, traffic operation, safety, environmental quality and sustainability, and any other areas that can be evaluated.

Expected Benefits: Potentially the results obtained from this study can lead to better assessments of the performance of DOTD's ITS applications on the field. The gap analysis will help DOTD recognize its shortfalls and provide the necessary information for policy makers to address any needs.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1. Perform Literature Review - The task was finalized.
Task 2. Evaluate Efficiency of Current ITS Performance Measures - The task was completed. A national survey was done as a part of this task.
Task 3. Develop Initial List of Performance Measures - The task was completed
Task 4. Undertake Stakeholder Workshop - The task was completed
Task 5. Develop Final List of Performance Measures - The task was completed
Task 6. Collect Data for Evaluation Study - The task was completed
Task 7. Undertake Data Analysis - The task is still ongoing
Task 8. Submit Final Report - The task is still ongoing

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 8. Submit Final Report

Title:	**Evaluating Permitted/Protected versus Protected Left Turn Signals in Louisiana**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000378**	Project Start Date:		8/1/2020
Research Project Number:	21-3SS	Completion Date	(original)	7/31/2022
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Raju Thapa			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$197,212
	(revised)	
Est. Expended to Date		$183,388
FY 2021 - 2022 Budget		
FY Funds	(original)	$84,746
	(revised)	$94,759
Est. FY Expenditure		$94,759

Estimated 2022-2023 Budget		
Total		**$10,350**
Salaries		$10,350
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The Department of Transportation and Development (DOTD) has its own traffic signal manual which sets guidance for protected only or permitted/protected left turn movements. In general, the safety benefits for protected only left turns are obviously higher than permitted/protected left turns but then delays for the former are also greater. There is the need to balance the safety benefits of an intersection configuration with its operational benefits.

Objective(s): The primary objective of this project is to study the safety and operation of existing signal intersections (protected only versus permitted/protected left turns versus permitted only but with left turn lanes) along with their geometric features, as described in the DOTD Traffic Signal Manual, with the view to develop guidance on when it is appropriate to install each signal type.

Expected Benefits: Potentially the results obtained from this study can lead to better assessments of where to implement permitted, permitted/protected, or protected only signals throughout the state. Installing the right kind of signal at Louisiana intersections may not only benefit travelers by reducing time delays and providing improved safety, but may additionally lead to a more efficient use of fossil fuels and reduced air pollution.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1. Perform Literature Review - It was finalized
Task 2. Administer a Survey of State DOTs - A national survey was conducted as a part of this task. It was completed.
Task 3. Develop a Population List of Signalized Intersections - It was completed.
Task 4. Agree on a Sample List of Signalized Intersections - It was completed.
Task 5. Collect Video Data and Geographical Features - It was completed.
Task 6. Analyze Video Data - It was completed.
Task 7. Undertake Safety Analysis - It was completed.
Task 8. Undertake Combined Analysis of All Sites - It was completed.
Task 9. Submit Final Report - Working on the final report.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 9. Submit Final Report - Working on the final report for the publication.

Title:	**Provision of Transportation Data Analytics to the Department of Transportation and Development**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000347**	Project Start Date:		5/14/2020
Research Project Number:	20-2SS	Completion Date	(original)	5/13/2023
Research Agency:	University of Maryland	Completion Date	(revised)	
Principal Investigator:	Michael Pack			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$1,620,375
	(revised)	
Est. Expended to Date		$1,080,250
FY 2021 - 2022 Budget		
FY Funds	(original)	$540,125
	(revised)	
Est. FY Expenditure		$540,125

Estimated 2022-2023 Budget		
Total		**$540,125**
Salaries		$540,125
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Project is to provide real-time situational awareness and historical analytics capabilities to the State of Louisiana

Objective(s): Provision of real-time speed data collected from mobile devices into the RITIS and Probe Data Analytics Platform

Expected Benefits: This will aid in real-time operations of the State's roadways in addition to project planning, prioritization, and research.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

1. Ingest probe data into probe data analytics tools - ongoing
2. Integrate agency and other third party data feeds into the RITIS platform - ongoing
3. Provide access to the base RITIS platform - ongoing
4. Provide access to probe data analytics add-on to RITIS - ongoing
5. Provide access to INRIX's Corridor Travel Times API and rights to XD/TMC data - ongoing
6. Provide training - ongoing
7. Encourage participation in the RITIS/PDA User Group - ongoing
8. Provide user accounts - ongoing

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Continue with the following:
1. Ingest probe data into probe data analytics tools
2. Integrate agency and other third party data feeds into the RITIS platform
3. Provide access to the base RITIS platform
4. Provide access to probe data analytics add-on to RITIS
5. Provide access to INRIX's Corridor Travel Times API and rights to XD/TMC data
6. Provide training
7. Encourage participation in the RITIS/PDA User Group
8. Provide user accounts

Title:	**Assessing the Economic Benefits of the TIMED Program**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000325**	Project Start Date:		7/1/2019
Research Project Number:	19-5SS	Completion Date	(original)	6/30/2020
Research Agency:	LSU	Completion Date	(revised)	3/30/2023
Principal Investigator:	Ruijie "Rebecca" Bian			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$125,490
	(revised)	$398,400
Est. Expended to Date		$261,509
FY 2021 - 2022 Budget		
FY Funds	(original)	$63,916
	(revised)	$56,787
Est. FY Expenditure		$56,787

Estimated 2022-2023 Budget		
Total		**$100,000**
Salaries		$100,000
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The TIMED program was designed to enhance economic development in Louisiana through investment in infrastructure. The program consisted of (16) capital improvement projects chosen by lawmakers in a package that included a four cent per gallon gas tax dedicated to funding the design and construction of the identified projects. Without being able to quantify economic benefits against a set of established criteria it is very difficult to prioritize projects from a list of needed improvements.

Objective(s): This proposed project plans to evaluate potential criteria to be used as surrogates for economic development. If direct criteria can be established all the better. The criteria will be evaluated against the (14) TIMED projects that have been completed to date to establish a baseline which can be compared against future projects being proposed to enhance economic development.

Expected Benefits: Establishing criteria for evaluating economic benefits can be used to aid decision-makers when determining the feasibility of undertaking projects identified as improving or creating economic development. In this way, proposed projects can be compared using actual data and analysis.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

The research team completed the five new tasks requested by the PRC.

Tasks 1, 2, and 3: The research team applied the methodology on the nine TIMED projects that were assessed in the first phase.

Task 4: Improved the accident rate estimations. The research team calculated statewide crash rates by a set of roadway types and conducted temporal modeling to predict future crash rates.

Task 5: Combined all cost and benefit calculations into a Workbook.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Expected to have a contract modification addressing additional requested work.

Title:	**LTRC Proposal for the Support of Research and Development in Special Studies**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**			**Budget Category:**	**FHWA**
SIO:	**DOTLT1000280**		Project Start Date:		7/1/2019
Research Project Number:	19-1SS		Completion Date	(original)	6/30/2021
Research Agency:	ULL		Completion Date	(revised)	6/30/2024
Principal Investigator:	Elisabeta Mitran				

BUDGET STATUS

Total Budget				**Estimated 2022-2023 Budget**		
Total Cost	(original)	$494,396		**Total**		**$110,955**
	(revised)	$1,446,751				
Est. Expended to Date		$356,000		Salaries		$94,955
FY 2021 - 2022 Budget				Consumable Supplies & Materials		$3,000
FY Funds	(original)	$126,711		Equipment	(non-expendable)	$3,000
	(revised)	$110,710		Travel		$10,000
Est. FY Expenditure		$110,710		Other		

BUDGET JUSTIFICATIONS

Travel: Travel: Travel:
- TRB annual meeting - $5,000 (2 attendees)
- Lifesavers Conference -$2,500
- GHSA - $2,500

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The focus of LTRC on highway safety-related research has increased over the past 10 years as Louisiana adopted the strategic vision “Destination Zero Deaths” and committed in 2009 to halve fatalities and severe injuries by 2030. The Louisiana Strategic Highway Safety Plan (SHSP) uses a comprehensive, data-driven, multidisciplinary approach to identify the most severe traffic safety problems and the most effective approaches to solve them.

Objective(s): The purpose of this project is to provide long-term professional assistance to the Department of Transportation and Development (DOTD) on the management and conduct O.D. research for special studies-related matters. Projects to be managed can include safety and other special studies, as necessary.

Expected Benefits: The benefits of this project include specialized technical expertise for the management of ongoing research program to investigate special studies questions, especially in the area of highway safety.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1. Plan, develop, and manage the assigned LTRC research work program in the special studies/safety is ongoing.
Task 2. Provide authoritative review of contract research in the area of special studies/safety. Task is ongoing.
Task 3. Coordinate efforts to disseminate and implement the research findings. Task is ongoing.
Task 4. Conduct transportation engineering research projects, as needed. This task is ongoing.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1. Continue to plan, develop, and manage the assigned LTRC research work program in the special studies/safety.
Task 2. Continue to provide authoritative review of contract research in the area of special studies/safety.
Task 3. Continue to coordinate efforts to disseminate and implement the research findings.
Task 4. Continue to conduct transportation engineering research projects, as needed.

Title:	**LTRC Proposal for the Support of Research and Development in ITS/Traffic**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000281**	Project Start Date:		7/1/2019
Research Project Number:	19-1ITS	Completion Date	(original)	6/30/2021
Research Agency:	ULL	Completion Date	(revised)	6/30/2024
Principal Investigator:	Raju Thapa			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$872,706
	(revised)	$2,367,433
Est. Expended to Date		$410,995
FY 2021 - 2022 Budget		
FY Funds	(original)	$97,980
	(revised)	$70,177
Est. FY Expenditure		$70,177

Estimated 2022-2023 Budget		
Total		**$105,960**
Salaries		
Consumable Supplies & Materials		$4,500
Equipment	(non-expendable)	$11,400
Travel		$18,240
Other		$71,820

BUDGET JUSTIFICATIONS

Equipment: Equipment: Equipment: ITS equipment (cameras, wireless services, counting devices, etc.) with an individual cost of an item not to exceed $5,000

Travel: The $18,240 travel budget is for the following conferences:
1. TRB (4 attendees) - $9,690
2. AHFE - $2,850
3. GRITS (2 attendees) - $3,420
4. ITE (2 attendees) - $2,280

Other: The $71,820 budget is for the following activities:
1. Deepmetrics - $5,120
2. INRIX NPMRDS data expansion - $39,900
3. SPSS - $1,200
4. Consultation - $15,600
5. Data Point - 10000

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: To conduct research for special studies-related matters, specifically for Intelligent Transportation System (ITS) and traffic engineering related topics.

Objective(s): The objective is to provide long-term professional assistance to DOTD on the management and conduct of research for special studies-related matters, specifically for ITS and traffic engineering related topics. No specific research documents will be produced from this project. However, each study identified under this project will have its own proposal developed, complete with objectives, scope of work, deliverables, and amount/resources required to undertake the study.

Expected Benefits: It would benefit all the designers, planners, decision makers, and stakeholders specially in DOTD's ITS and traffic engineering area.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Re-Evaluate the Vision of LTRC's Intelligent Transportation Systems (ITS) Laboratory and Re-Align with the Transportation Needs of LTRC and DOTD to Better Serve the Public - 25% complete.
Task 2: Develop Research Protocols and Initiatives - 25% complete.
Task 3: Strategically Plan Own Project Schedules and Quantity of Resources to Participate in Research Projects - 25% complete.
Task 4: Coordinate Information - 25% complete.
Task 5: Assume Leadership Roles in Forming and Maintaining Productive Working Relationships - 25% complete.
Task 6: Build and Maintain a Strong Research Program - 25% complete

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
Continue with Task 1: Re-Evaluate the Vision of LTRC's Intelligent Transportation Systems (ITS) Laboratory and Re-Align with the Transportation Needs of LTRC and DOTD to Better Serve the Public. Continue with Task 2: Develop Research Protocols and Initiatives Continue with Task 3: Strategically Plan Own Project Schedules and Quantity of Resources to Participate in Research Projects Continue with Task 4: Coordinate Information Continue with Task 5: Assume Leadership Roles in Forming and Maintaining Productive Working Relationships Continue with Task 6: Build and Maintain a Strong Research Program

Title:	LTRC Proposal for the Support of Research and Development in Transportation Planning	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	30000125	Project Start Date:		7/1/2010
Research Project Number:	10-1PLAN	Completion Date	(original)	6/30/2015
Research Agency:	LTRC	Completion Date	(revised)	6/30/2024
Principal Investigator:	Ruijie "Rebecca" Bian			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$358,462	**Total**		**$115,245**
	(revised)	$9,723,832			
Est. Expended to Date		$8,930,564	Salaries		$107,805
FY 2021 - 2022 Budget			Consumable Supplies & Materials		$1,240
FY Funds	(original)	$64,483	Equipment	(non-expendable)	
	(revised)	$59,218	Travel		$6,200
Est. FY Expenditure		$59,218	Other		

BUDGET JUSTIFICATIONS

Travel: Travel: The budget is for travel to the Transportation Research Board Annual meeting (~4 attendees).

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: This project provides long-term professional assistance to the Department of Transportation and Development on transportation planning and other matters. Research is conducted on topics from LTRC's research program, technical assistance requests from DOTD, and external research solicitations.

Objective(s): This project is to satisfy research needs and requirements from DOTD. This project also encourages graduate students to participate in the LTRC research program.

Expected Benefits: The research results and technical assistance are expected to facilitate DOTD's transportation planning activities. This project also affords LTRC the opportunity to support the enhancement of higher education.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Research activities. (1) Supervised a graduate student at LSU. (2) Presented at the Transportation Research Board Annual Meeting. (3) Published three journal articles within the fiscal year to date. (4) Developed two research proposals: "22-3SS: Testing the Hurricane Evacuation Modeling Package" and "22-5SS: Analyzing Human Mobility for Active Transportation Planning in Louisiana". (5) Finalized two final reports: "19-5SS: Assessing the Economic Development Benefits of the Transportation Investment Model for Economic Development (TIMED) Program" and "22-5SS: Determining the True Cost and Benefit for Collecting and Maintaining Non-Road and Non-Bridge Asset Data".

Task 2: Project management. Managed project "21-2SS: Evaluate the Impacts of Complete Streets Policy in Louisiana", 19-5SS, and 22-5SS.

Task 4: Service. (1) Served on Transportation Research Board Standing Committee on Disaster Response, Emergency Evacuations, and Business Continuity (AMR 20) for paper review coordination, session presiding, and liaison with other TRB committees. (2) Served on the Louisiana Complete Streets Advisory Council as a member. (3) Reviewed 31 journal articles in 2021. (4) Provided technical assistance to DOTD "Evaluate the use of Integrated Modeling for Road Condition Prediction (IMRCP) system in Louisiana"

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
Task 1: Research activities. Keep supervising students and publishing research results. Develop proposals for new projects.
Task 2: Project management. Keep managing projects 21-2SS, 22-3SS, and 22-5SS.
Task 3: Teaching. To be determined.
Task 4: Service. Continue serving on technical committees and professional societies.

Title:	Evaluate the Impacts of Complete Street Policy in Louisiana	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 6	Budget Category:	FHWA

SIO:	DOTLT1000377	Project Start Date:		1/1/2021
Research Project Number:	21-2SS	Completion Date	(original)	12/31/2022
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Ruijie "Rebecca" Bian			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$159,112	**Total**		**$45,210**
	(revised)				
Est. Expended to Date		$123,937	Salaries		$32,488
FY 2021 - 2022 Budget			Consumable Supplies & Materials		$155
FY Funds	(original)	$90,838	Equipment	(non-expendable)	
	(revised)	$94,153	Travel		
Est. FY Expenditure		$94,153	Other		$12,567

BUDGET JUSTIFICATIONS

Other: Other budget is for a sub-contract to a consultant. The breakout sheet is attached to the proposal

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Louisiana DOTD adopted the Complete Streets policy in 2010 and updated it in 2016. According to the updated version, "the intent of this policy is to . . . balance access, mobility, and safety needs" of all road users. State transportation agencies often struggle to meaningfully track and quantify implementation indicators, which makes it difficult to assess whether significant progress is being made toward the adopted policy goals or to evaluate return-on-investment.

Objective(s): The primary objective of this research project is to evaluate the impacts of the Complete Streets policy in Louisiana, including an assessment of changes made by DOTD to advance implementation of the policy, and a comprehensive review of impacts to project scoping, delivery, and outcomes to-date.

Expected Benefits: This research project will deliver a suite of recommendations for ongoing data collection and evaluation pertaining to the state's Complete Streets policy.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Completed project scoping and delivery evaluations. The results are included in the interim report and were submitted to the PRC for review.

Task 2: Completed reviewing current practices. First, the review of DOTD's current practices is included in the interim report and was submitted to the PRC for review. Second, the research team is working on reviewing best practices in the U.S. to answer several questions identified from the first study phase. The research team is expecting to complete this best practice review by the end of June 2022.

Task 3: Prepared an interim report and presented to the PRC in November 2021.

Task 4: Conducted disaggregate evaluations. 1) Data sources were identified and tested for each potential outcome indicator. 2) Existing sidewalks, bike lanes, and transit routes were mapped. 3) Five case study sites in Louisiana were selected with a purpose of covering a diverse body of projects. 4) Outcome evaluation methods were proposed based on available data sources and study site characteristics. The research team is working on finalizing the outcome evaluation results and expects to complete this task by the end of June 2022.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
Task 5: Explore linking outputs with outcomes through statistical methods. The task is expected to start from July 2022. Task 6: Prepare the final report. The research team keeps weekly meeting notes, works on journal publications, and will pull all the information together for the final report. The task is expected to be completed by October 2022.

Title:	Evaluation of Embedded Pile Resistance on Scour Critical Bridges	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000457	Project Start Date:		5/2/2022
Research Project Number:	22-3ST	Completion Date	(original)	5/1/2025
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$383,004	**Total**		**$130,703**
	(revised)				
Est. Expended to Date		$28,000	Salaries		$115,703
FY 2021 - 2022 Budget			Consumable Supplies & Materials		$2,500
FY Funds	(original)	$30,627	Equipment	(non-expendable)	$10,000
	(revised)		Travel		$2,500
Est. FY Expenditure		$28,000	Other		

BUDGET JUSTIFICATIONS

Equipment: $10,000 needed to buy license for PLAXIS 3D software and for a one year subscription

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Louisiana DOTD frequently evaluates channel geometry to determine if scour has impact on embedded foundation. In many cases, the resistance of embedded piles' estimated using nearby soil borings and on same static analysis methods used to design piles have shown that the pile resistance in many cases is less than the dead load reaction for the given pile. It is possible that the static equilibrium design methods are not adequate for this type of bridge evaluation that needs investigating.

Objective(s): Complete additional structural load tests to confirm whether a bridge is safe to traffic load.
Explore methods to evaluate the resistance of embedded piles for bridges subjected to critical scour.
Evaluate direct cone penetration test (CPT) methods to determine the best method for estimating the embedded pile resistance.
Incorporate the long-term effect of pile resistance (scour, setup).
Identify bridges that will be replaced to confirm the best method by loading pile prior to demolition.

Expected Benefits: A standardized method of estimating the geotechnical resistance of embedded piles will help provide a more rapid response in determining whether it is safe or not to load post a bridge after any scour event. This will help ensure the safety of bridges to vehicles and passengers prior to open the bridge to traffic, and help prioritize bridge replacement projects.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1- Started conducting literature review relevant to methods and techniques for evaluation of the current resistance of in-place piles for in-service bridges.

Task 2- Coordinate with DOTD geotechnical and bridge design sections to identify bridges with pile foundations for conducting proof load tests, as well as, identify possible bridges to be demolished to cut and conduct a single static pile load test.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
Task 1-Continue literature review relevant to methods and techniques for evaluation of the current resistance of in-place piles for in-service bridges subjected to critical scour. Task 2- Continue identifying bridges with critical scour to conduct additional proof load tests. Also, identify bridges to be demolished to cut and conduct a single static pile load test. Task 3- Perform CPT and seismic CPT tests through the bridge deck to obtain soil information as close as possible to the pile bent(s) in question, Task 4- Start analyzing the measurements from the field load tests and the in-situ data from CPT and seismic CPT tests. Task 5 - Start exploring different extrapolation techniques and finite element analysis to complete the load-settlement curves for the proof load tests.

Title:	Skew Detection System Replacement on Vertical Lift Bridges Phase 2	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000428		Project Start Date:		2/1/2022
Research Project Number:	22-2ST		Completion Date	(original)	12/31/2022
Research Agency:	Wiss, Janney, Elstner Associates, Inc.		Completion Date	(revised)	
Principal Investigator:	Gareth Rees				

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$460,000	**Total**		**$260,000**
	(revised)				
Est. Expended to Date		$6,000	Salaries		$155,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		$80,000
FY Funds	(original)	$200,000	Equipment	(non-expendable)	$25,000
	(revised)		Travel		
Est. FY Expenditure		$200,000	Other		

BUDGET JUSTIFICATIONS

Supplies: Marine Closure Coordination: $10,000
Installation: $40,000
Testing: $50,000
Equipment: Miscellaneous equipment: $25,000

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: For a tower drive vertical lift bridge, failure to maintain span longitudinal or transverse skew can lead to jamming of the movable span in its guides and, without adequate protection, can lead to a catastrophic bridge failure. Phase 1 of this study yielded some recommendations for the replacement of the differential selsyn used with new electric / electronic components.

Objective(s): The objective of this of this project is to: (1) analyze the control system and determine how to interface the encoder system into the existing electrical ladder logic (2) determine the scope of work required to implement the installation (3) perform the installation (4) calibrate and test the installation (5) provide support personnel and time for troubleshooting the installation for a period of 6 months.

Expected Benefits: A reliable skew detection system with replacement components readily available in the market.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1. 30% provide plans complete. 100% by end of fiscal year.
Task 2. Preliminary schedule in process. Will be completed by end of fiscal year.
Task 3. Coordinated with installation contractor.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 4 Adjust and calibrate the equipment to be able to correctly display skew as well as trip the electrical system when the bridge gets too far out of skew. DOTD engineers will be consulted and informed about how and why these adjustments are made. Provide the PRC Committee with written instructions detailing these adjustments for future use.

Title:	Developing The Load Distribution Formula for Louisiana Culverts	Project Status:	Ongoing

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000342	Project Start Date:		3/1/2020
Research Project Number:	20-1ST	Completion Date	(original)	8/31/2021
Research Agency:	LSU	Completion Date	(revised)	3/31/2023
Principal Investigator:	Ayman Okeil			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$99,989
	(revised)	$139,927
Est. Expended to Date		$15,000
FY 2021 - 2022 Budget		
FY Funds	(original)	$50,000
	(revised)	$50,000
Est. FY Expenditure		$49,000

Estimated 2022-2023 Budget		
Total		**$75,927**
Salaries		$70,927
Consumable Supplies & Materials		$4,500
Equipment	(non-expendable)	
Travel		$500
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: In Louisiana, the bridge inventory includes approximately 2,600 culverts where cast-in-place (CIP) reinforced concrete (RC) box culverts constitute a sizeable portion of the overall culvert inventory which must be load rated. Current load rating procedures for these culverts often yields unacceptable results though their performance is acceptable with no apparent cracking or deformation. Unacceptable rating implies load posting or expensive upgrade.

Objective(s): The objective of this study is to develop live load distribution formulas that can be used to represent the dimensions of the affected area over buried CIP reinforced concrete box culverts The proposed formulas will take into account Louisiana standard details for negative moment reinforcement at exterior corners. The reliability resulting from these study will be compared with AASHTO LRFD target β values.

Expected Benefits: The findings of this study will help DOTD make informed decisions about load rating and load posting of cast-in-place reinforced concrete box culverts. The newly developed formulas will take into account DOTD standard details that may not be within the scope of national projects such as NCHRP Project 15-54.
This project's findings are expected to alleviate a burden imposed on engineers who try to load rate LA culverts but cannot because of limitations of current procedures.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

A generic finite element model was developed for the purpose of analyzing cast-in-place box culverts. The model is parametric allowing the user to input key attributes (barrel width and height, slab and wall thicknesses, number of barrels) for mesh auto generation. Analyses are currently being conducted.
Task 1 Literature Search (98%)
Task 2 Review Current Analysis(100%)
Task 3 Parametric Study Plan(100%)
Task 4 Interim Report (75%)
Task 5 Conduct Parametric Study (75%)
Task 6 Data Analysis (25%)

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

The following tasks are expected to be conducted during FY 2022-23:
Task 5 Finish the remaining parts of the finite element (FE) analyses for the approved parametric study plan.
Task 6 Analyze results from parametric study and derive rational live load distribution equation.
Task 7 Establish the framework for reliability analysis and execute the reliability study using results from finite element analyses.
Task 8 Prepare draft final report, address PRC comments, and submit final report.
Task 9 Develop workshop to disseminate results.

Title:	**Investigating and Developing a MASH Compliant Contraflow Ramp Closure Gate**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000418**	Project Start Date:		8/10/2021
Research Project Number:	22-1ST	Completion Date	(original)	1/9/2022
Research Agency:	Texas A&M Transportation Institute (TTI)	Completion Date	(revised)	7/11/2022
Principal Investigator:	Maysam Kiani			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$20,000	**Total**		
	(revised)				
Est. Expended to Date		$9,784	Salaries		
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$20,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure		$9,784	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Problem Statement: The purpose of this research is to investigate the MASH crashworthiness of the DOTD ramp closure gate the Louisiana developed and installed.

Objective(s): Objective(s): The research objective is to investigate the Manual for Assessing Safety Hardware (MASH) crashworthiness of the DOTD ramp gate through and computer simulation. Using the current DOTD gate system as a model, this project would evaluate the design according to test numbers 60, 61, and 62 criteria.

Expected Benefits: Expected Benefits: This project will benefit the state of Louisiana as well as other members of the Roadside Safety Pooled Fund by providing crashworthiness assessment for a type of ramp closure gate. The design will be a valuable option which the members of the Roadside Safety Pooled Fund can implement when needed.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

The principal investigator (PI) has pre-sent his work and findings to the project review committee (PRC). Based on the findings, the device did not meet MASH Test Level 3 (TL3 Level 3). The speed used in the simulation appeared very excessive (62 mph on a ramp). Bridge Design contacted the FHWA on 3/28/2022 asking for allowance to consider testing a lower speeds since the assumption is the ramps would be closed in contraflow situations or in heavy rain events where the exit is flooded. As of yet, no reply has been received.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

1. If the FHWA declines the requests, the final report will be edited and published along with the technical summary. There will be no spending for the new FY 22-23.

2. If the FHW approves the request, the annual work sheet for the FY 22-23 will have to be revised and submitted since additional tasks, time and budget modifications will have to be approved.

Title:	**Predicting VMT: Traditional Statistical Models vs. Machine Learning Approaches**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000456**	Project Start Date:		7/1/2022
Research Project Number:	23-4TIRE	Completion Date	(original)	6/30/2023
Research Agency:	UNO	Completion Date	(revised)	
Principal Investigator:	Guang Tian			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$30,000	**Total**		**$30,000**
	(revised)				
Est. Expended to Date			Salaries		$29,112
FY 2021 - 2022 Budget			Consumable Supplies & Materials		$888
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: This project aims to provide transportation engineers, managers, planners, and policy makers with the right model of predicting vehicle mile traveled (VMT) to manage traffic congestion, plan future investments, control emissions, and address other issues.

Objective(s): The objective of this study will be to employ machine learning on VMT to test and systematically evaluate using a large multiregional database and compare the results against traditional statistical models.

Expected Benefits: Benefits of this research include a better predicative model of VMT compared to traditional statistical models.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Start the research project. Build models and evaluate their effectiveness. Complete the data analysis and prepare the final report.

Title:	**Design and development of architected cellular core structure to enhance the structural performance of SPS bridge decks**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**			**Budget Category:**	**FHWA**
SIO:	**DOTLT1000455**		Project Start Date:		6/1/2022
Research Project Number:	23-3TIRE		Completion Date	(original)	6/30/2023
Research Agency:	ULL		Completion Date	(revised)	
Principal Investigator:	Tanvir Faisal				

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$30,000	**Total**		**$30,000**
	(revised)				
Est. Expended to Date			Salaries		$15,708
FY 2021 - 2022 Budget			Consumable Supplies & Materials		$9,892
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$4,400

BUDGET JUSTIFICATIONS

Supplies: 9892 is for materials and supplies to fabricate and test a bridge deck.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Traditional repair and replacement techniques for bridge decks are expensive and time consuming. This project will investigate the use of Sandwich Plate System (SPS) bridge decks for new construction and repair.

Objective(s): This project will specifically investigate the design of the core materials with architected cellular structuring to provide higher bending stiffness, thus reducing weight. The structural performance of 2D lattice (honeycomb) structuring of differing cell geometry will be investigated.

Expected Benefits: Potential benefits include advancing the knowledge base of SPS deck configurations, materials, and architected cellular cores. This may lead to reduced thicknesses, weight and costs while maintaining or increasing the structural properties.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Start the project. Fabricate and test selected core configurations for SPS decks. Complete data analysis and prepare and publish the final report.

Title:	**Exploratory Study on Improving Concrete Durability**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000454**	Project Start Date:		7/1/2022
Research Project Number:	23-2TIRE	Completion Date	(original)	6/30/2023
Research Agency:	McNeese University	Completion Date	(revised)	
Principal Investigator:	Ahmed Abdel-Mohti			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$30,000
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$30,000**
Salaries		$25,000
Consumable Supplies & Materials		$3,500
Equipment	(non-expendable)	$1,500
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Eco-friendly concrete is important as well as durability. This project will investigate and monitor concrete containing agriculture residue, corn husk fiber, and compare it against those of concrete containing fiberglass fibers.

Objective(s): This study will focus on fresh and hardened characteristics of concrete containing corn husk fibers and control samples.

Expected Benefits: The expected benefits of this research project will be to make a determination as to the feasibility of agricultural byproducts such as corn husk fibers suitability in concrete as a structural or crack reducing fiber.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Start the project, make and test all specimens, and write the final report.

Title:	**3D Printed Transportation Infrastructure: Structural Behavior of Steel Fiber Reinforced Circular Elements**	**Project Status:**	**Ongoing**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000453**	Project Start Date:		7/2/2022
Research Project Number:	23-1TIRE	Completion Date	(original)	6/30/2023
Research Agency:	LSU	Completion Date	(revised)	
Principal Investigator:	Ali Kazemian			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$30,000
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$30,000**
Salaries		$25,840
Consumable Supplies & Materials		$4,160
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: This project will explore research on fabrication configurations and structural performance of circular concrete elements produced using "construction 3D printing" technology and self-reinforced printing materials.

Objective(s): The compressive strength, modulus of elasticity, and bearing capacity of three different 3D printed and hybrid configurations will be studied.

Expected Benefits: The results from this study will serve as preliminary data enabling more extensive future studies towards large-scale structural evaluation of 3D printed transportation infrastructure.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Start research project, complete all testing and analysis and write and publish final report.

FHWA
Part B SPR Funded
Research Program

PROPOSED RESEARCH

Title:	Life-Cycle Assessment Framework for Pavements in Louisiana	Project Status:	Proposed

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:		Project Start Date:		7/1/2021
Research Project Number:		Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$85,000	**Total**		**$40,000**
	(revised)				
Est. Expended to Date			Salaries		$40,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Principles of sustainability focus on goal of proactively bringing key environmental, social, and economic factors into decision-making process. Life-Cycle Assessment (LCA) is a technique used to analyze and quantify environmental impacts of a product, system, or process. LCA provides a comprehensive approach to evaluate total environmental burden of a product or process by examining all of the inputs and outputs over life cycle, from raw material production to end of life.

Objective(s): This research proposes to develop life-cycle assessment framework for asphalt mixtures and pavements in Louisiana, which will cover material production and initial construction, maintenance phase, in-service phase, and end-of-life phase.

Expected Benefits: The developed framework is expected to provide an immediately implementable guideline on the implementation of LCA for Louisiana pavements, which can help define pavement systems to support decision making regarding changes to policies and practices to reduce the impacts of pavements on humans and the environment, while identifying potential unintended negative consequences.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1: Conduct a comprehensive literature review on studies relevant to life-cycle assessment for pavements.
Task 2: Develop product category rule (PCR) for environmental production declaration used for asphalt mixtures.
Task 3. Develop a framework for performing an LCA specific to pavement systems along with guidance on the overall approach, methodology and system boundaries.

Title:	**Literature study of IDEAL-CT and IDEAL-RT tests comparison with field performance and other balanced mix design tests.**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		11/1/2022
Research Project Number:		Completion Date	(original)	5/1/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Saman Salari			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$32,000	**Total**		**$32,000**
	(revised)				
Est. Expended to Date			Salaries		$32,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Two new and convenient method has been developed to evaluate cracking and rutting behavior of asphalt mixtures. Proposed IDEAL-CT and IDEAL-RT developed over the simplicity idea and preliminary data shows high sensitivity and good correlations. Based on the essential need to investigate the balanced mixed design of mixtures, therefore, it has been proposed to study the current methods to determine their potentials.

Objective(s): The main purpose is to investigate the capabilities of IDEAL-CT and IDEAL-RT and their precision in evaluating the mixture performance.

Expected Benefits: It is expected that upon competition of this review the capabilities of the tests and their correlation to the field data will be determined and further decision can be made to research these methods further more.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

A comprehensive literature review will be conducted to study the effectiveness of IDEA-CT and IDEAL-RT in predicating the field performance of asphalt mixtures and comparisons will be made with currently used balance mix design tests.

Title:	**Performance Of Asphalt Pavements Containing Recycled Materials Under Accelerated Loading**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		1/1/2018
Research Project Number:		Completion Date	(original)	6/30/2020
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$350,000	**Total**		**$77,000**
	(revised)				
Est. Expended to Date			Salaries		$77,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$77,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Recycling of construction materials in flexible pavements is cost effective offers key element of sustainability in transportation infrastructure through reduction in use of virgin materials and eliminates needs for landfill areas. Reclaimed Asphalt Pavement (RAP) is commonly used because of its high compatibility with newly produced asphalt mixtures. Further, Reclaimed Asphalt Shingles (RAS) and waste plastics have become another promising candidate green construction material.

Objective(s): The objective of this research is to assess the applicability of “green” construction and performance alternatives such as RAS, increased amount of RAP, and waste plastics in Louisiana asphalt paving projects under accelerated loading.

Expected Benefits: Findings from this research results will be used to update asphalt mixture specifications in the Louisiana Specifications for Roads and Bridges. Further, results will promote the use of sustainable technologies in Louisiana’s flexible pavement construction

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1 – Conduct Literature review
Task 2 – Develop experimental factorial,
Task 3 – Perform laboratory asphalt mixture design and performance testing for mixtures to be used in Task 4
Task 4 – Prepare construction documents for construction of test lanes
Task 5 – Monitor construction of test lanes as per bid documents

Title:	**Preventing Milled Asphalt Pavement Failure during Construction on Narrow Roadways**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		1/1/2023
Research Project Number:		Completion Date	(original)	12/29/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Corey Mayeux			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$118,806	**Total**		**$58,740**
	(revised)				
Est. Expended to Date			Salaries		$58,740
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: When an asphalt pavement is milled beyond 2 inches, the remaining pavement may start to fail at the area adjacent to the travel lane. Often times this occurs due to crossover traffic on narrow roadways and leads to more patching than originally called for in construction plans.

Objective(s): The objective of this study is to research the best practices for situations where milled pavement could be adversely affected by traffic on narrow roadways.

Expected Benefits: This project could provide guidance to contractors on how to prevent pavement failure in milled pavements

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1 – Conducting Literature Review will begin
Task 2 – Observe roadways with potential problems and gather data

Title:	**Support Study for Evaluation of Saturates/Aromatics/Resins/Asphaltenes (SARA) Fractionation of asphalt binders in Louisiana**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2022
Research Project Number:		Completion Date	(original)	4/30/2024
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$160,000	**Total**		**$80,000**
	(revised)				
Est. Expended to Date			Salaries		$80,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: This study will be supporting LTRC 22-1B study to evaluate SARA fractions of asphalt binders in Louisiana. This study will establish the performances in the mix and compare the results with characteristics defined by SARA tests.

Objective(s): This study will assist in determining appropriate performance factor to evaluate characterization of asphalt binder fractions.

Expected Benefits: This study will show the performance of the mixture based on the SARA characterization and helps to evaluate different SARA methods based on performances

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

-Task 1: Literature review will be performed;
-Task 2: Asphalt binders will be collected from suppliers in Louisiana
-Task 3: Mixtures will be made and tested for performance ; and
-Task 4: Results of SARA will be analyzed and compared with performance of the mixture.

Title:	**Effect of Longitudinal Joint Construction and Density on Asphalt Pavement Performances**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		10/4/2021
Research Project Number:		Completion Date	(original)	5/20/2022
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$34,703	**Total**		**$34,703**
	(revised)				
Est. Expended to Date			Salaries		$34,703
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Longitudinal joints generally have lower density than the rest of the pavement due to the unconfined edge when the first lane is paved. DOTD specifications for longitudinal joint construction includes deviation in grade, offsetting joints vertically between lift, and offsetting top layer joints for two-lane highways and lane lines for multi-lane highways. However, none of these joint construction requirements are intended to address the performance requirement related to the joint density.

Objective(s): The objective of this project is to investigate the current best practices for constructing longitudinal joints on asphalt roadways throughout the country; this will include methods of improving density through construction methods and materials, and the utilization of rejuvenators, fog seals or other sealant methods to reduce the permeability and improve the performance of longitudinal joints.

Expected Benefits: It is expected that the findings of this research will provide information that can be used to decide if further investigation is needed. If there is a phase 2 of this project, the research may result in the modification of Louisiana Standard Specifications for Roads and Bridges to include asphalt longitudinal joint density specifications with payment adjustment schedules. Also, the results of this research will lead to improved pavement performance and extended pavement service life.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

None; the project has not started

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1 – Conducting Literature Review will begin and conclude.
Task 2 - Preparation of a draft project report will begin and conclude.

Title:	Effect of Mineral Fillers on the Moisture Resistance and Performance of HMA	Project Status:	Proposed

Funding Source:	SPR: TT-Fed/TT-Reg - 6	Budget Category:	FHWA

SIO:		Project Start Date:		5/1/2022
Research Project Number:		Completion Date	(original)	4/30/2024
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Mostafa Elseifi			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$170,491	**Total**		**$36,520**
	(revised)				
Est. Expended to Date			Salaries		$33,384
FY 2021 - 2022 Budget			Consumable Supplies & Materials		$3,136
FY Funds	(original)	$85,000	Equipment	(non-expendable)	
	(revised)	$36,520	Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: It has been reported that the addition of active fillers can have a positive effect on the rutting, moisture, and fatigue resistances of asphalt mixtures. Although numerous studies demonstrated the significant effects of fillers on the mixture performance, the current Superpave mix design adopted in Louisiana only includes general limits on the dust to binder ratio with limited gradation requirements on the fillers.

Objective(s): The main objectives of the proposed study are twofold: (1) to evaluate the effects of various types of inert and active fillers on the moisture resistance and laboratory performance of asphalt mixtures and (2) to propose change to the specifications to optimize the use of mineral fillers in hot-mix asphalt (HMA).

Expected Benefits: This study will conduct a comprehensive laboratory evaluation to identify the most promising fillers for enhanced mix durability and life-time extension. In addition, it will develop possible modifications to the current specifications for the acceptance of mineral fillers. It will also improve pavement performance by optimizing mix durability against major distresses including moisture damage.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1: Literature Review has begun.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1: Literature Review will continue.
Task 2: Materials Selection and Development of Test Factorial will begin.
Task 3: Evaluate the Physical and Chemical Characteristics of Mineral Fillers will begin.
Task 4: Design and Prepare Mastic and Asphalt Mixes will begin.
Task 5: Evaluate the Effects of Fillers on Asphalt Mastic and Mixture Performance will begin

Title:	**Enhanced Interaction between Crumb Rubber Modifiers and Asphalt Binder to Improve Performance**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2021
Research Project Number:		Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$85,000	**Total**		**$40,000**
	(revised)				
Est. Expended to Date			Salaries		$40,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Addition of crumb rubber (CR) particles to asphalt binders and asphalt mixtures is a sustainable construction technology that ensures waste tires are disposed of in an environmentally sustainable manner. Crumb rubber modifiers have been found to improve durability of asphalt pavements through increased rutting and cracking performance.

Objective(s): Objectives of this study are to identify thermally stable aromatic oils (AOs) for enhancement of interaction between CR particles and asphalt binder during CR modification of asphalt binders; (2) evaluate effects of CR type (ambient, cryogenic, proprietaries) and dosage rate on asphalt binder and mixture performance, and (3) evaluate effects of AO type and dosage rate on asphalt binder and mixture performance.

Expected Benefits: Findings from this research will offer incorporation of high contents of CR particles into asphalt binders and asphalt mixtures. This will reduce cost of highway construction and the adoption of sustainable construction practices to protect the environment.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1: Conduct Literature Review
Task 2: Develop a Statistically Based Laboratory Experiment
- Subtask 2.1: Chemical Characterization of CR Particles and Aromatic Oils
- Subtask 2.2: Asphalt binder Experiment (Base Asphalt binder + soaked [CR + AO])
  - Chemical, rheological, microstructural characterization
- Subtask 2.3: Asphalt Mixture Experiment
  - Characterization at high-, intermediate-, and Low-temperatures
  - Moisture susceptibility evaluation

Task 3. Perform Laboratory Experiment of Task 2

Title:	**Enhancement of Mechanical Properties of Asphalt Cements and Asphalt Mixtures Containing Waste Plastic**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2021
Research Project Number:		Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$349,000	**Total**		**$102,000**
	(revised)				
Est. Expended to Date			Salaries		$102,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: There is a growing interest in adoption of more sustainable technologies for road pavement design and construction in order to protect the environment and to provide other economic benefits. In 2017, US EPA reported that approximately 35.5M tons of waste plastic was generated, which represents over 100% increase in waste plastic generation in 27 years. Despite benefits obtained from waste plastics, there are many challenges associated with their use in asphalt pavements.

Objective(s): The objectives of the research are to (1) evaluate low-, intermediate- and high temperature properties of waste plastics in asphalt cements and asphalt mixtures; and (2) assess economic and environmental impacts, health and safety, and long-term durability associated with use of waste plastics materials in asphalt mixtures.

Expected Benefits: It is anticipated that results from this research will recommend revisions to Louisiana's asphalt specifications for incorporating waste plastics in asphalt cements and mixtures. Further, results will promote the use of sustainable technologies in Louisiana's flexible pavement construction.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1. Conduct Literature Review and Survey
Task 2- Develop Statistically Based Laboratory Experiment
Task 3- Develop Compatibilizers and Waste Plastic Experiment
Task 4- Perform Asphalt Cement Experiment

Title:	**Enhancing Pavement Resiliency to Sea Level Rise Using Natural and Nature-Based Features in Louisiana**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**		**Budget Category:**	**FHWA**	
SIO:			Project Start Date:		7/1/2021
Research Project Number:			Completion Date	(original)	6/30/2023
Research Agency:	LTRC		Completion Date	(revised)	
Principal Investigator:	Louay Mohammad				

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$85,000	**Total**		**$40,000**
	(revised)				
Est. Expended to Date			Salaries		$40,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Climate change and sea level rise (SLR) are significantly increasing risk of severe high tide flooding in many coastal and adjacent inland areas and exacerbating flood risk associated with hurricanes and coastal storms. Surface transportation systems in coastal areas, including roadway corridors, are becoming increasingly vulnerable to flooding, inundation and erosion. Inundation weakens pavement structure with varying degrees of structural deterioration that reduces pavements' service life.

Objective(s): The objective of this study is to evaluate the effectiveness of nature-based hybrid structures including dikes, wetlands and dunes incorporated with natural materials that are native to the area, with or without sheet piles, for reducing the impact of SLR and extreme events on roadways.

Expected Benefits: The developed practice is expected to provide an immediately implementable guideline on the design and construction of roads with the evaluated Natural and Nature-Based Features for achieving coastal roadways with enhanced resilience.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1: Conduct a comprehensive literature review on studies relevant to roadway damage caused by flooding events, and application of NNBF for improving the resilience of coastal roadways.
Task 2: Evaluate the effectiveness of nature-based hybrid structures such as dikes, wetlands and dunes incorporated with natural materials that are native to the area, with or without sheet piles.
Task 3: Quantify the frequency, magnitude and duration of inundation events with/without NNBF utilizing existing storm surge and wind wave models with flexible meshes.

Title:	**Establishment of the Center for Sustainable Pavement Materials and Technologies**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2021
Research Project Number:		Completion Date	(original)	6/30/2022
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Louay Mohammad			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$155,131	**Total**		**$151,131**
	(revised)				
Est. Expended to Date			Salaries		$151,131
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Climate change, and escalating costs of materials and energy provide motivation to explore innovative techniques for infrastructure preservation and rehabilitation with sustainable, resilient, and recyclable methods. Using recycled materials and sustainable alternatives methodologies can reduce energy consumption and greenhouse gas emission. Incorporating sustainable materials and technologies into transportation infrastructure will have a significant impact on longevity of our society.

Objective(s): The vision is to establish a multi-disciplinary research, education, and technology transfer center focused on evaluation and implementation of sustainable technologies in transportation industry. Interdisciplinary research will examine design, assessment, and repair for next generation of sustainable and resilience pavement infrastructure. Goals are to minimize non-renewable energy usage, reduce environmental impacts, and encourage use of emerging technologies including renewable energies.

Expected Benefits: To pursue the needs of DOTD to integrate cutting-edge cost-effective technologies and materials in current practices; place Louisiana on the leading edge of states in the area of transportation sustainability, resiliency, and provides LTRC with an excellent position to pursue its quest for national and international recognition in research capability of all aspects of sustainable, resilient, and recyclable pavement materials.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Establishment of the Center for Sustainable Pavement Materials and Technologies
Develop and submit proposals for external funding;
Continue participation in the Louisiana DOTD Asphaltic Concrete Specification Committee;
Continue participation in technical assistance projects;
Conduct research relevant to the Center theme and DOTD needs,
Develop and Promote effective Sustainable Pavement Technologies for managing and preserving the infrastructure, and
Conduct workshops and seminars.

Title:	**Evaluation of Non-Destructive Test Pilot Projects**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2022
Research Project Number:		Completion Date	(original)	7/1/2024
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Corey Mayeux			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$155,410	**Total**		**$88,998**
	(revised)				
Est. Expended to Date			Salaries		$88,998
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Due to demand for a safe, accurate, non-destructive density device, LTRC conducted field tests on core samples, non-nuclear and nuclear gauge methods to determine their effectiveness for quality assurance of HMA pavement. Based on the research results, the authors recommended the use of the nondestructive testing for both QC and QA testing. A pilot project is now underway to review non-destructive testing and LTRC would like to conduct research to evaluate the findings of the pilot project.

Objective(s): The objective of this research is to evaluate the non-destructive testing (NDT) pilot projects and specifications. Technicians from LTRC will use their own non-nuclear density gauges to take readings during the NDT Device Off-set Determination - Validation Day Procedures described in section 502.11.2 of the NDT pilot specification. The readings taken by the technicians can then compared to those taken by DOTD personnel, contractor reading and the actual core densities.

Expected Benefits: This research will analyze the data and help determine any possible problems with the non-destructive testing specification. Once these problems are addressed the specification can then be fully implemented.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1: Recording of non-destructive test readings from pilot projects will begin
Task 2: Data analysis will begin

Title:	**Develop a Synthesis on the Application Of PCPT Technology for Geotechnical Engineering Design**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		10/2/2017
Research Project Number:		Completion Date	(original)	
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$50,000	**Total**		**$18,335**
	(revised)				
Est. Expended to Date			Salaries		$18,335
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Although the DOTD engineers have been using the cone penetration tests (CPT) for many years, their use was limited to soil stratification to locate sand layer to tip the piles on, evaluate undrained shear strength, and estimating the pile capacity. The CPT have the potential to be extended to more geotechnical engineering applications in Louisiana (i.e., slope stability, embankment settlement, bearing capacity), which requires accurate evaluation of critical geotechnical design parameters.

Objective(s): The objective of this project is to synthesize various applications of CPT technology for geotechnical engineering analysis and design. This includes available methods/charts for evaluating soil classification; available correlations for estimating geotechnical design parameters for clay and sand; method for estimating total and rate of consolidation; methods for evaluating bearing capacity of shallow foundations; direct CPT methods for estimating the ultimate pile capacity; etc.

Expected Benefits: It is anticipated that at end of this study, the Louisiana DOTD will extend the use of CPT to more geotechnical applications, which will result in significant benefits in terms of reducing time, number of borings, and man labor, and hence reduce the cost of project. The CPT can provide fast and more accurate estimation of soil properties under in-situ stresses, drainage conditions and in-situ deposit orientation (anisotropy), which will result on safer design of infrastructures.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1: Start conducting comprehensive literature review on the use of cone and piezocone penetration tests (CPT and PCPT) technologies on various geotechnical engineering applications such as: evaluating the strength and consolidation properties of soils, evaluating pile resistance, evaluating embankment settlement, etc.
Task 2: Start evaluating and synthesizing the various applications of CPT/PCPT.

Title:	Field Evaluation of Geophysical Applications for DOTD	Project Status:	Proposed

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:		Project Start Date:		9/1/2022
Research Project Number:		Completion Date	(original)	8/31/2024
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Nick Ferguson			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$150,000	**Total**		**$82,728**
	(revised)				
Est. Expended to Date			Salaries		$32,728
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	$50,000
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Equipment: This project will evaluate specific technologies identified in 20-4GT to aid in the implementation of these beneficial technologies. The Electrical Resistivity device was determined to offer great returns the department through the insight the (ER) can provide between soil borings.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: This project is a follow up project to 20-4GT, which was a literature review synthesis on Geophysical Technologies that may offer the Department benefits.

Objective(s): This project will evaluate Geophysical technologies (the Electrical Resistivity device and others) to determine exact benefits and implementation needs for the Department.

Expected Benefits: Additional insight between soil borings and Cone Penetrometer Testing will benefit the department by providing more confidence in their designs. It may also reduce the number of soil borings (high cost and time) or identify areas of concern for more in-depth study. The additional information may reduce the cost of a foundation and or increase the confidence and safety of the design.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Acquire the geophysical field equipment and identify projects to conduct testing thereupon. The research will shadow the current process, then shift to how the device can be fully implemented within the Department.

Title:	**Fully Softened Shear Strength at Low Stresses for Analysis & Design of Natural and Compacted Slopes**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		9/1/2022
Research Project Number:		Completion Date	(original)	9/1/2024
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Gavin Gautreau			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$80,000	**Total**		**$35,643**
	(revised)				
Est. Expended to Date			Salaries		$35,643
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Natural and compacted slopes constructed with clay can soften over time. Louisiana has lots of clays and some are more problematic than others. Knowing how to design and account for the Fully Soften Shear Strength is important.

Objective(s): Define how FSS can be incorporated into DOTD design methodology and practice.

Expected Benefits: Awareness and accounting of/for FSS will help ensure that DOTD projects will endure and perform over their design lives and hopefully beyond.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Conduct laboratory tests that replicates properties of Louisiana clays to correlates field slope design and actual performance. The laboratory testing combined with literature review will define best practices for Louisiana clays and how designers account for FSS.

Title:	QA/QC Evaluation of Treated and Stabilized Soil Layers	Project Status:	Proposed

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:		Project Start Date:		1/1/2023
Research Project Number:		Completion Date	(original)	6/30/2024
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Nick Ferguson			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$100,000	**Total**		**$27,720**
	(revised)				
Est. Expended to Date			Salaries		$27,720
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: DOTD mixes various additives into soil to improve the performance of different pavement layers. The purpose of the additive may differ by layer and application percentage (and test method). The percentage can be based on a parish percentage, or possibly a cement curve where laboratory tests are conducted. However, when placed or mixed at the project site, verification is not performed to ensure that the appropriate amount was added, or that the design strength was achieved.

Objective(s): Research other agencies method of verifying these layer strengths in the field; and determine how DOTD compares against national standards and practices. Conduct testing to confirm whether Test Procedure Method TR 432, method A is an acceptable percentage, vs the percentages acquired from a full cement curve via TR 432's other methods. Determine methods to establish confidence that our design will be produced and achieved in the field.

Expected Benefits: Establish confidence in the design, and our design-life estimates. This will likely extend our limited construction dollars to their design, vs. unknown performance and additional repair dollars. It is often more cost effective to address a subgrade or base layer while exposed, vs. excavating and removing the surface layer to get back to the foundation layers after a premature failure.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Perform a literature review, develop a test matrix, and conduct laboratory and field data.

Title:	**Statewide Calibration of CPT Direct Design Methods Using Static Load Test Data**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		10/3/2022
Research Project Number:		Completion Date	(original)	9/30/2025
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$200,000	**Total**		**$30,300**
	(revised)				
Est. Expended to Date			Salaries		$30,300
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Louisiana was one of pioneering states to implement CPT technology for evaluating the pile resistance. The project (17-2GT) evaluated 22 direct CPT design methods using 80 concrete test piles with majority located in southeastern of state, although piles used throughout the state. Therefore, it is necessary to add more database with spatial state coverage. Also, there is a need to use piezocone penetration tests (CPTu) for evaluating CPTu methods and expand the implementation to other pile types.

Objective(s): Re-evaluate the CPT-based direct design methods and re-rank them as necessary using the updated database.
Evaluate available CPTu-based direct design methods and rank them.
Recalibrate resistance factors for use in LRFD pile foundation design.
Extend the use of existing direct design methods to include other pile types (pipe piles, helical piles, etc.).
Evaluate grouping the pile-CPT/CPTu into regions for regional evaluation and LRFD calibration.
Update the LPD-CPT software accordingly.

Expected Benefits: Supplementing traditional pile design with CPT/CPTu methods will save exploration costs and prevent overturns cost by providing more data and more reliable design methods. Incorporating CPT/CPTu design methods in “LPD-CPT” software will help design engineers to estimate pile resistance efficiently without need of manual calculation. The accurate evaluation of pile resistance by CPT/CPTu methods can result in significant reduction in construction cost of bridge foundations and infrastructures.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1: Perform literature review on CPT/CPTu direct pile design methods.
Task 2: Collect additional CPT/CPTu data at test pile and indicator pile sites.
Task 3: Collect pile load tests and corresponding CPT/CPTu for other pile types (pipe piles, helical piles, etc.), depending on available data.
Task 4: Start grouping the pile-CPT/CPTu into regions for regional evaluation and LRFD calibration.

Title:	**Use and Interpretation of Seismic Piezocone Penetration Testing (SCPTu) for Geotechnical Site Investigation**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		1/1/2018
Research Project Number:		Completion Date	(original)	12/31/2020
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Murad Abu-Farsakh			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$200,000	**Total**		**$30,000**
	(revised)				
Est. Expended to Date			Salaries		$30,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The piezocone penetration test (CPTu) is a preferred in-situ test for subsurface investigation. The addition of geophone to CPTu (SCPTu) will enhance the geotechnical investigation by providing four independent measurements: tip resistance, sleeve friction, pore water pressure, and shear wave velocity (Vs). The Vs can be used to evaluate small-strain shear modulus (Go), which is appropriate to analyses of foundation systems, retaining walls, and problems involving cyclic and seismic loadings.

Objective(s): The objective of this study are: identifying available methods to evaluate small-strain shear modulus (Go) and damping coefficient (C) from SCPTu; conducting SCPTu tests on selected sites; modify/develop models to evaluate Go and C for Louisiana soils; apply Go and C values to evaluate pile capacity using PDA and CAPWAP cases; develop load-deformation curves for selected test piles for comparison with measured data; and develop model to evaluate undrained shear strength (Su) from SCPTu data.

Expected Benefits: The proposed research project will help the DOTD to better evaluate the initial shear modulus (Go) and damping coefficient of subsurface soils for various design applications, such as the dynamic analysis of driven piles and the establishment of load deformation curves of piles. This is expected to result in cost effective and safer axial and lateral capacity design of piles.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1 - Conduct comprehensive literature review on the use of Seismic Piezocone Penetration Testing (SCPTu) for geotechnical engineering applications such as evaluating the static and dynamic soil properties, evaluate small-strain shear modulus (Go) and damping coefficient (C), evaluate the undrained shear strength, Su, establish pile load-deformation curve, etc.
Task 2 - Start collecting in-situ test data for selected sites using SCPTu,
Task 3 - Start collecting soil samples for laboratory testing to evaluate the Go and C from samples retrieved from soil borings of same sites.

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**LIDAR for Geotechnical Applications**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		3/1/2022
Research Project Number:		Completion Date	(original)	2/28/2024
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Gavin Gautreau			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$150,000	**Total**		**$75,285**
	(revised)				
Est. Expended to Date			Salaries		$75,285
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$10,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Light detection and radar (LIDAR) is a method for measuring distances. The data can be collected from drones and fixed wing airplanes. DOTD has begun collecting LIDAR on state highways. LIDAR data can be utilized for many purposes; the primary reasons are likely not geotechnical related. However, the data can be utilized for inventory purposes (Geotechnical Asset Management) and change detection of embankment slopes (inspections and problem identification).

Objective(s): Explore the utilization of LIDAR within DOTD and develop interfaces to tap into this data for geotechnical purposes. Recurring datasets of the same location could be compared to determine changing slopes. These large datasets may require Machine Learning or special software to open this data to the geotechnical section. Small scale drone-based LIDAR scans could be collected to supplement and define with more precision, problematic slopes that may be difficult, or hazardous, to access.

Expected Benefits: The proposed research would utilize an existing dataset within DOTD and provide a user interface for the Geotechnical Section to utilize this data for management of slopes and other geotechnical assets. More accurate location of soil boring elevations (from the office) would also be a benefit.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

The project is Proposed

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Begin work on the project.

Title:	**Evaluation of Louisiana Maintenance and Rehabilitation Treatment Decision Matrix for Cost-effective and Timely Pavement Preservation**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		1/1/2022
Research Project Number:		Completion Date	(original)	12/31/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Zhong Wu			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$200,000	**Total**		**$30,000**
	(revised)				
Est. Expended to Date			Salaries		$30,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Louisiana DOTD currently uses pavement condition index based decision matrix in its maintenance and rehabilitation treatment selection. However, some of the trigger index values adapted in the decision matrix table were developed from few projects with few years and log-miles of distress data. To ensure the optimum timing and cost-effective selection of various maintenance and rehabilitation treatments, there is a need to review, modify, and update the current decision matrix table adapted.

Objective(s): 1) Analyze PMS data and assess the optimum timing/cost-effectiveness for a number of treatment methods including thin overlays, microsurfacing, crack sealants, and in-depth stabilization. 2) Provide modification recommendations to the PMS decision matrix in order to ensure optimum timing and cost-effectiveness selection of treatment methods.

Expected Benefits: The study will provide the DOTD Pavement preservation and PMS office updated triggers and performance models for cost-effective and timely maintenance and rehabilitation of pavements. Results of the study will immediately be implementable by pavement preservation and PMS office

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

-Literature Review and data collection

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

- Continue the literature review including the state-of-the-practice of DOTD districts as related to thin overlays, in-depth stabilization, microsurfacing, and crack sealant.
- Project selection, data gathering/mining the pavement sections, historical records regarding the types and costs of maintenance and rehabilitation activities;
- Analyze the before and after treatment performance of selected pavement sections.

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**The quality control of longitudinal joint of asphalt pavement and its effect on pavement performance**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2020
Research Project Number:		Completion Date	(original)	6/30/2024
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Moses Akentuna			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$150,000	**Total**		**$95,000**
	(revised)				
Est. Expended to Date			Salaries		$95,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Deterioration of longitudinal joints in asphalt pavements is a major issue facing transportation agencies. Researchers have shown that the service life near a longitudinal joint can reduce by 36% due to low density and water intrusion. The current DOTD specification on longitudinal joints construction does not address the performance requirement related to the joint density. Therefore, it is imperative to propose a density requirement for longitudinal joints in Louisiana.

Objective(s): (1) Evaluate the effect of longitudinal joint construction and density on the performance of asphalt pavements in Louisiana. (2) Propose a longitudinal joint density requirement to be included in DOTD specification for asphalt pavement construction.

Expected Benefits: It is anticipated that the findings of this research will result in the modification of Louisiana Standard Specifications for Roads and Bridges to include asphalt longitudinal joint density specifications with payment adjustment schedules. Further, it is expected that the results of this research will lead to improved performance and extended pavement service life.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1-Start and complete conduct of literature review;
Task 2-Start and complete the development of a test plan for the proposed study;
Task 3-Start executing the proposed test plan;

Title:	**Evaluation of Louisiana's Systemic Safety Projects for Roadway Departures on Rural Curves**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**		**Budget Category:**		**FHWA**
SIO:	**DOTLT1000426**		Project Start Date:		9/1/2021
Research Project Number:	22-2SA		Completion Date	(original)	8/31/2023
Research Agency:			Completion Date	(revised)	
Principal Investigator:					

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$190,000	**Total**		**$80,000**
	(revised)				
Est. Expended to Date			Salaries		$80,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$90,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Louisiana DOTD applied a systemic safety approach to reduce roadway departure target crashes. The two-lane rural curves throughout the state were systemically selected for safety improvements through crash data analysis and risk factors identification using roadway characteristics. In order to understand if the systemic safety approach is effective we need to evaluate the effectiveness of installed low-cost countermeasures in decreasing target crashes.

Objective(s): The objective of this proposed research is to evaluate the effectiveness of systemic safety projects implemented on two-lane rural curves in Louisiana and to develop the methodology for evaluation of future systemic projects.

Expected Benefits: The findings of this study can benefit DOTD with future safety decision making to implement low-cost effective countermeasures on two-lane rural curves and in assessing the data needs to perform more systemic analyses. The results can be used to justify highway safety investments through systemic safety projects to improve safety in Louisiana.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

PRC meetings were held to develop the request for proposals (RFP) and review the received proposals. No selection has been made from this RFP.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

The activities will be determined based on the approved research proposal.

Title:	Evaluation of Installed Low-Cost Safety Countermeasures for Reducing Severe Intersection Crash Types in Louisiana	Project Status:	Proposed

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000344	Project Start Date:		11/1/2019
Research Project Number:	20-2SA	Completion Date	(original)	1/31/2023
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$175,000	**Total**		**$75,000**
	(revised)				
Est. Expended to Date			Salaries		$75,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$75,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: In recent years, DOTD has made significant progress in deploying various safety countermeasures at intersections across the state, however, despite these many safety countermeasures, intersection and intersection-related crashes sill make up 21% of all fatal crashes and almost 40% of all severe injury crashes. Therefore, there is a need to continue to implement cost effective countermeasures to reduce and prevent intersection vehicle crashes.

Objective(s): The objectives of this proposed research are to conduct a comprehensive crash data analysis to identify the risk factors that contribute to crashes at intersections and to investigate safety effectiveness of related countermeasures installed at intersections to reduce severe intersection crash types in Louisiana.

Expected Benefits: The results can be used by DOTD in implementing cost effective countermeasures, making better and more informed decisions, and justifying highway safety investments to improve highway safety in Louisiana. The results will benefit the Louisiana Strategic Highway Safety Plan (SHSP) Infrastructure and Operations Emphasis Area Team' efforts to reach the goal of reducing the roadway departure, intersection, and non-motorized user fatalities and severe injuries by 50% by 2030.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

The project has no accomplishments for this fiscal year as DOTD is still collecting information for the intersection database and it is not available yet for this project.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

The task activities will be determined based on the approved research proposal.

Title:	**Evaluating the Effectiveness of Crosswalk Striping Pattern at Signalized Intersections in Louisiana**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		1/2/2023
Research Project Number:		Completion Date	(original)	12/31/2024
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget		
Total Cost	(original)	$175,000
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$60,000**
Salaries		$60,000
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: To improve safety of pedestrians at intersections, various countermeasures have been installed in Louisiana. We need to understand the factors that contribute to pedestrian crashes at intersections, evaluate whether high-visibility crosswalks at signalized intersections are successful, cost-effective markings in reducing pedestrian-vehicle collisions compared with standard or no marked crosswalks, and understand how crosswalk marking patterns affect driver and pedestrian behavior.

Objective(s): The objective of this research is to evaluate the effectiveness of crosswalk striping pattern at signalized intersections in reducing pedestrian crashes in Louisiana. The purpose of this study is two-fold: (1) to evaluate the safety effectiveness of high-visibility crosswalks at signalized intersections versus standard or no crosswalk markings and (2) to evaluate driver and pedestrian behaviors at high-visibility crosswalks.

Expected Benefits: Installing high-visibility crosswalks is a relatively low-cost countermeasure, easy to implement, and has a better value over time as they are long-lasting and require less maintenance if installed properly. The results of this research will provide DOTD, Complete Streets Steering Group, and other safety partners with essential information to guide implementation of effective countermeasures to reduce and prevent pedestrian crashes in Louisiana.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Activities to be determined based on approved research proposal.

Title:	**Development of Statewide Guidelines for Provision of Pedestrian Facilities on High Speed Arterials in Louisiana**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000432**	Project Start Date:		12/1/2021
Research Project Number:	22-3SA	Completion Date	(original)	5/31/2023
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$180,000	**Total**		**$90,000**
	(revised)				
Est. Expended to Date			Salaries		$90,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$180,000	Equipment	(non-expendable)	
	(revised)	$10,000	Travel		
Est. FY Expenditure		$10,000	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The Department of Transportation and Development (DOTD) has expressed the need to have a system-wide solution that guides on provision of adequate pedestrian crossing facilities on the state's high speed arterials.

Objective(s): The objective of this project is develop a statewide guideline for provisions of pedestrian crossing facilities on high-speed arterials in Louisiana.

Expected Benefits: It is anticipated that this will lead to the development of a DOTD policy for implementing or excluding pedestrian crossing facilities on high speed urban arterials. With FHWA documenting that over 50% of all pedestrian fatalities and injuries occur on high-speed arterials, this guideline could have significant benefits in reducing pedestrian safety risks.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

A PRC meeting was held to develop the scope of work and the request for proposals.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

To be determined based on the approved research proposal.

Title:	Safety and Traffic Operations at Cloverleaf Interchanges	Project Status:	Proposed

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000458	Project Start Date:		1/1/2022
Research Project Number:	23-1SS	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Raju Thapa			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$150,000
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	$50,000
	(revised)	$10,000
Est. FY Expenditure		$10,000

Estimated 2022-2023 Budget		
Total		**$140,000**
Salaries		$140,000
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Cloverleaf and Diamond Interchanges are a few popular among the several interchange alternatives. However, the performance of both the interchange types from the perspective of safety and operation still needs more research.

Objective(s): Review crash data for a sample size of Cloverleaf Interchanges in Louisiana or the Southeast and review the traffic operation.
•Compare Traffic Volumes
•Compare location (Urban vs. Rural)
•Compare Geometry of the Interchange as well as the Interstate and cross street approaches
•Review external factors

Expected Benefits: Having a better understanding of cloverleaf performance vs. diamond Interchanges will provide research support for decision-makers and stakeholders.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Part of Task 1 - Literature Review is expected to be completed.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1 - Literature Review
Task 2 - Developing a population list of such interchanges
Task 3 - Develop a sample list
To be finalized after proposal has been developed.

Title:	Economic Impact of Access Management Treatments	Project Status:	Proposed

Funding Source:	SPR: TT-Fed/TT-Reg - 5	Budget Category:	FHWA

SIO:	DOTLT1000429	Project Start Date:		9/1/2021
Research Project Number:	22-4SS	Completion Date	(original)	2/28/2023
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget		
Total Cost	(original)	$200,000
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	$100,000
	(revised)	$15,000
Est. FY Expenditure		$15,000

Estimated 2022-2023 Budget		
Total		**$112,511**
Salaries		$112,511
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Access management strategies are used by transportation agencies to improve efficiency and safety on roadways. These treatments concentrate on location, spacing, entrances design, intersections, traffic signals, and median openings to minimize the conflict points. We need to assess the economic effect these projects to understand the impact on the economic development of region, to foster better communications at DOTD public meetings, and to convey the impact to adjacent businesses owners.

Objective(s): The overall goal of this research is to assess the economic impact of access management techniques on businesses in the corridor where such projects have been implemented in Louisiana. A secondary goal is to assess the perception of businesses near completed projects.

Expected Benefits: DOTD and other stakeholders can use the findings for more effective deployment of access management treatments in Louisiana to improve traffic flow and safety. The study will also provide support for improved communication at DOTD public meetings about implications of access management projects. This research will help clarify the impact of access management projects on traffic safety and the economic priorities of local businesses.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

A research proposal was approved by the PRC and a kick-off meeting with the research team was held.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1: Literature Review
Task 2: Identify and Collect Data
Task 3: Design Surveys
Task 4: Conduct Business Survey

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**Best Practices for Maintenance of Control of Access Fencing**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		10/1/2021
Research Project Number:		Completion Date	(original)	12/31/2022
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$125,000	**Total**		**$80,000**
	(revised)				
Est. Expended to Date			Salaries		$80,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$80,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Control of access fencing has been an ongoing maintenance issue for the department. This is especially true in High ADT urban areas where run off the road crashes into the fencing are common. It is common to have local governments request to replace the typical “ugly” fencing with ornamental fencing, or to remove it totally. There has been ongoing issues statewide where Districts are required to maintain or replace old fencing along the interstate system with limited or no budget to do so.

Objective(s): Research should be conducted to determine appropriate height requirements, and alternative practical and affordable alternatives that would require less maintenance that still deter pedestrian crossing (60” tall fencing). Are we as a state DOT required to provide control of access fencing or just to ensure control of access? Researchers would need to look into DOTD policies and national guidance at a minimum.

Expected Benefits: Implementation benefits include cost savings in terms of dollars and person power for maintenance of control of access fencing that is routinely hit and damaged.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

This is expected to be done as RFP but work has not started yet.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

The task activities will be determined based on the approved research proposal.

Title:	**Estimating HCM Default Parameters for Louisiana**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		1/1/2022
Research Project Number:		Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Raju Thapa			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$150,000	**Total**		**$70,000**
	(revised)				
Est. Expended to Date			Salaries		$70,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$50,000	Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The default values from Highway Capacity Manual are more generic and may not suit the local driving conditions. For example, there is a need of a headway defaults for different roadways that suit the local driving conditions for the traffic analysis

Objective(s): To evaluate few HCM default parameters like saturation flow rate, headway, percentage of heavy vehicles for the level of service, and peak-hour factor and check if the HCM default values are applicable in Louisiana.

Expected Benefits: The values found will be used to help improve traffic analysis in the state which ultimately would benefit all decision makers and stakeholders.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Project has not started yet

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1 – Literature Review
Task 2 – Make an inventory of HCM 2016 Default parameters
Task 3 – Organize a workshop to finalize the list of sensitive and essential parameters
Task 4 – Data collection on the finalized parameters
To be finalized after proposal has been developed.

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**Improved Incident Response through Coordinated, Interoperable Communications**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2022
Research Project Number:		Completion Date	(original)	6/30/2024
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget		
Total Cost	(original)	$200,000
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$100,000**
Salaries		$100,000
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Louisiana has been impacted by significant emergencies and adverse weather situations which severely impact roadways and efforts of first responders and emergency professionals. Insufficient communication has been identified as a hindrance in numerous after-action reviews, resulting in unsafe conditions and/or delays in response and/or recovery. This project would perform a functional analysis of a proprietary, interoperable, web-based communications platform (i.e., Mutualink system).

Objective(s): The objective of this research would be to test the various aspects of functionality of Mutualink system in real life applications. Verifying whether there is excessive lag, communication issues, implementation issues, different performance metrics at different locations throughout the state, or impractical or difficult to use interfaces would be an important factor in determining what benefits a system such as this would have on Louisiana's roadways.

Expected Benefits: This research would create an assessment of the system specifically to DOTD applications and determine whether it would bring additional performance for quicker incident management and safety from Louisiana's roadway. Between natural disasters and Louisiana's high rate of fatality incidents, the Mutualink system could be instrumental to saving Louisiana lives in the future.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Activities will be determined based on the approved research proposal

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**Innovations in Pedestrian Counting Technology**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		12/1/2021
Research Project Number:		Completion Date	(original)	2/28/2023
Research Agency:		Completion Date	(revised)	
Principal Investigator:				

BUDGET STATUS

Total Budget		
Total Cost	(original)	$150,000
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	$80,000
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$80,000**
Salaries		$80,000
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Recent developments in detection technology show the advantages of including AI functionality to improve performance of these detectors. The detection technology available for pedestrians has been lacking in part due to a much larger range of references, which would be classified as a person resulting in much higher rates of false and missed identifications. Recent improvements to technology could provide merit to DOTD for data collection and operations with regards to pedestrian movements.

Objective(s): This project would perform a functional analysis of the Hanwha Techwin Wisenet 7 series technology. Through the installation of cameras at highly pedestrian trafficked intersections or walkways, these devices could be researched to validate the performance of the pedestrian counting aspect. Video could be recorded of a sample and validated against metrics which the camera would output from its own identification and counting of pedestrians.

Expected Benefits: The results could be significant benefit to planning and operations, particularly the “Complete Streets” initiative and operations safety for pedestrians. The ability to quickly collect pedestrian data at a multitude of locations or warn a pedestrian about to step into a moving lane of traffic are two of the applicable uses of a reliable pedestrian monitoring system.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

This project has not yet started.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task activities will be determined based on the approved research proposal.

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**Remote Sensing in Transportation and its Applicability at DOTD**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 5**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		2/1/2022
Research Project Number:		Completion Date	(original)	1/31/2024
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Adele Lee			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$50,000	**Total**		**$25,563**
	(revised)				
Est. Expended to Date			Salaries		$25,563
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$24,107	Equipment	(non-expendable)	
	(revised)	$24,107	Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: DOTD collects LiDAR and aerial imagery for elevation surfaces and topographic mapping purposes. There are additional remote sensing dataset archives at USGS, ESA, and NASA with varying temporal scale and ground resolution (what level of detail can be realized on the earth's surface).
This project will provide an exploratory look into available datasets and applicability to DOTD work processes such as planning, operations, geotechnical asset management and emergency response.

Objective(s): Compile a list of relevant remote sensing datasets available at no or low cost identifying the resolution and sensor type. Research will include a comprehensive literature review of remote sensing use in the transportation industry in order to provide actionable guidance on which datasets and analysis techniques are most applicable to Louisiana environmental conditions.

Expected Benefits: This research will provide guidance on what remote sensing datasets and analysis techniques are scalable to DOTD sections and districts via identifying several pilot cases.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

To be determined based on the approved proposal which has yet to be developed.

Title:	**MASH TL-4 Engineering Analyses and Detailing of 36 Inches and 42 Inches High Median Barriers for DOTD**	**Project Status:**	**Proposed**

Funding Source:	**SPR: TT-Fed/TT-Reg - 6**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/5/2022
Research Project Number:		Completion Date	(original)	1/5/2023
Research Agency:	Texas A&M Transportation Institute (TTI)	Completion Date	(revised)	
Principal Investigator:	William Williams			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$58,000	**Total**		**$58,000**
	(revised)				
Est. Expended to Date			Salaries		$55,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		$3,000
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: A single slope median barrier is planned for several I-10 bridges in Louisiana. For this project both 36 inches high and 42 inches high single slope median barriers are being considered. Engineering strength calculations is required to determine if the proposed designs meet the strength and performance requirements of Manual for Assessing Safety Hardware (MASH) Test Level 4.

Objective(s): The purpose of this work is to performing engineering strength calculations to determine if the DOTD proposed designs for 2 (36-in. and 42-in.tall barriers with and without longitudinal open joints) meet the strength and performance requirements of MASH Test Level 4.

Expected Benefits: If the strength calculations the strength and performance requirements of MASH Test level 4, the proposed designs will be implemented on several I-10 bridges and there will be no need for several crash testing. This will save the State hundreds of thousands of dollars.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Task 1 perform MASH test Level 4 Strength analyses on 4 different barrier cases.
Task 2 Submit a final report.
Task 3 Give a presentation of work done, conclusion, and recommendations to the project review committee (PRC).

FHWA
Part B SPR Funded
Research Program

POOLED FUND
LOUISIANA
LEAD STATE RESEARCH

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**Southeast Transportation Consortium - Phase II**	**Project Status:**	**Proposed**

Funding Source:	**SPR: Pooled Fund: TT-Fed**	**Budget Category:**	**FHWA**

SIO:		Project Start Date:		7/1/2020
Research Project Number:	21-1PF	Completion Date	(original)	6/30/2025
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$900,000
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	$180,000
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$180,000**
Salaries		$150,000
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		$30,000
Other		

BUDGET JUSTIFICATIONS

Travel: Travel budget for 15 people to travel to meeting locations (locations vary) twice per year for the STC Meetings.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The current Southeast Transportation Consortium (STC) is nearing its second extension to round out 10 years of productive work. In that 10-year period at least 12 research products have been produced on a wide variety of topics of interest to the AASHTO Region 2 member states. Additionally, the technology transfer and idea sharing between the states has benefited all immensely.

Objective(s): (1) Discuss and screen potential research or synthesis projects; (2) Conduct research and synthesis studies; (3) Hold a multi-state peer exchange for up to five (5) STC member states on a topic of their choosing; (4) Communicate and disseminate research results and innovative practices through publications and other technology transfer activities;

Expected Benefits: Increased knowledge sharing as well as tackling common research interests between STC Member states.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Started the pooled fund project and started receiving monies.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Solicit problem statements, hold kickoff meeting, and fund problem statements.

FHWA
LTAP Funded Program

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**Local Technical Assistance Program (LTAP)**	**Project Status:**	**Proposed**

Funding Source:	**LTAP: TT-Fed/TT-Reg**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000422**	Project Start Date:		7/1/2022
Research Project Number:	23-LTAP	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Steve Strength			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$692,938
	(revised)	
Est. Expended to Date		

FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$692,938**
Salaries		$385,480
Consumable Supplies & Materials		$22,000
Equipment	(non-expendable)	$8,000
Travel		$68,000
Other		$209,458

BUDGET JUSTIFICATIONS

Supplies: Supplies necessary to conduct technology transfer and workforce development activities for the LA LTAP program. Supplies to be purchased for use only in research and technical activities.

Equipment: No individual item will exceed $5,000

Travel: -Travel for statewide delivery of required courses for the transportation community
-Travel for professional development
-Travel for both pre and post event management activities
-Travel for assistance with onsite course registration and management
-Travel for statewide specification meetings
-Travel for statewide meetings

Other: -Professional Services (Special Projects): $50,000
-Course material production (printing, copying, binding, etc.): $21,000
-Professional services (instructors): $100,000
-Professional services (LPA on Line/CBT Module): $38,458

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: LTRC's Local Technical Assistance Program (LTAP) stimulates the progressive transfer of highway technology through training, work force development and technical assistance. A cooperative effort of DOTD, FHWA and LSU, LTAP leverages the expertise and resources of these organizations for the benefit of local transportation and public works agencies.

Objective(s): To provide cost effective transfer of technology and workforce development opportunities to Louisiana's parish and municipality public transportation and public works agencies through training, technical assistance, and information dissemination.

Expected Benefits: LTAP offers training, technical assistance, newsletters, and a multimedia lending library.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

-Delivered 2 in-person offerings of "Roads Scholar #3: Drainage – The Key to Roads That Last" course [31 attendees]
-Delivered 8 in-person offerings of "Roads Scholar #5B: Creating a Safe Work Environment" course [148 attendees]
-Offered "Roads Scholar #13: Inspection of Local Bridges" in two parts: 1 virtual session [71 attendees] and 8 in-person classes [125 attendees]
-Delivered 7 in-person offerings of "Roads Scholar #7: Pavement Preservation & Road Surface Management" course [146 attendees]
-Delivered pilot and 8 in-person offerings of "Roads Scholar #6: Heavy Equipment Safety & Maintenance for Local Agencies" course [Estimated 255 attendees in March and April 2022]
-Delivered 8 in-person offerings of "Chainsaw Safety and Precision Felling" course [484 attendees]
-Delivered 10 in-person offerings of "Basics of Work Zone Safety with Basic Flagger Training" mini-workshop [250 attendees]
-Delivered Local Public Agency (LPA) training: 3 in-person offerings of "LPA Qualification Core Training" Estimated Estimated 75 attendees.], 2 offerings of the "LPA Project Delivery for the Responsible Charge" [Est. 50 attendees], and 3 offerings of "LPA Construction, Engineering, and Inspection (CE&I)" [Est. 75 attendees]
-Provided 4 offerings of "Introduction to Transportation Asset Management" and "Using PASER to Evaluate Your Roads" virtual on-demand courses
-Provided one-on-one technical assistance to local agencies (upon request) in support of implementing pavement preservation practices
-Organized and facilitated the Fall [124 attendees] and Spring conferences [Estimated 106 in April 2022] of the Louisiana Parish Engineers and Supervisors Association (LPESA)
-Delivered 5 webinars as part of the monthly "LPESA Virtual Showcase" series [68 attendees]; reorganized as a quarterly series and delivered 2 additional webinars [Estimated 40 attendees in April and May 2022.]
-Delivered 1 webinar of "Disaster Safety Training" [33 attendees], 1 webinar of "Basics of Pavement Preservation" [Estimated 32 attendees.], and 1 webinar of "Heavy Equipment Safety and Maintenance" jointly with the Louisiana chapter of APWA [Estimated 90 attendees.]
-Participated in the annual Police Jury Association of Louisiana (PJAL) Convention; organized and facilitated activities of LPESA; provided information on LTAP programs, training, and technical assistance
-Participated in the annual Louisiana Musical Association (LMA) Convention; provided information on LTAP programs, training, and technical assistance
-Hosted 4 virtual webinars of "SimCap Louisiana Educational Meetings" [Est. 120 attendees]
-Served as Implementation Team Leaders for the following EDC-6 initiatives: Crowdsourcing for Advancing Operations, Next-Generation TIM: Integrating Technology, Data, and Training, Strategic Workforce Development, and Targeted Overlay Pavement Solutions (TOPS)
-Presented at the 2021 NLTAPA Annual Conference, 2021 ITE Annual Meeting, 2021 GRITS Annual Meeting, 2021 DSITE Fall and Winter Meetings, 2022 TRB Annual Meeting, 2022 Louisiana Transportation Conference, 2022 SDITE Annual Meeting, among other professional meetings
-Produced and disseminated 4 quarterly "Technology Exchange" newsletters and 12 monthly "Local Connections" e-mail bulletins

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

-Revise content and deliver offerings of "Roads Scholar #4: Temporary Traffic Control" course [8 sessions]
-Revise content and deliver offerings of "Roads Scholar #14: Bridge Maintenance and Repair" course [8 sessions]
-Develop leadership program for local agencies, "Louisiana Leadership for the Locals"; pilot program; deliver first offering of the program statewide
-Revise content and deliver offerings of "Roads Scholar #8: Integrated Successful Supervision for Local Road Supervisors" course [8 sessions]; integrate into "Louisiana Leadership for the Locals" program
-Revise content and deliver offerings of "Roads Scholar #2: Maintenance of Asphalt Roads" course [8 sessions]
-Revise content and deliver offerings of "Tractor Mower Safety Training" course [12 sessions estimated]
-Deliver "Basics of Work Zone Safety with Basic Flagger" mini-workshops upon request [12 sessions estimated]
-Deliver "Roads Scholar #9: Signing from the Ground Up" course or mini-workshop [2 of each est.]
-Deliver series of Local Public Agency training workshops, involving the LPA Qualification Core Training, LPA Project Delivery for Responsible Charge Personnel, and LPA CE&I courses [2 series]
-Deliver offering of "Crowdsourcing for Advancing Transportation Operations" class (developed by EDC-6 effort) [1 session]
-Continue to provide technical assistance to local agencies in support of implementing pavement preservation practices
-Organize and facilitate the Fall and Spring conferences of LPESA
-Deliver webinars as part of the quarterly "LPESA Virtual Showcase" series [4 sessions estimated]
-Deliver joint webinars with the Louisiana Chapter of APWA [2 sessions]
-Host virtual webinars of "SimCap Louisiana Educational Meetings" [4 sessions]
-Support implementation and outreach activities associated with EDC-6 initiatives: Crowdsourcing for Advancing Operations, Next-Generation TIM: Integrating Technology, Data, and Training, Strategic Workforce Development, and TOPS
-Participate in FHWA EDC Summit sessions for EDC-7 Initiatives
-Promote FHWA, DOTD, and LTRC programs and initiatives to local agencies
-Provide technical resource speakers for activities of local and regional affiliates of partner organizations: APWA, LAM, ITE, and NLTAPA
-Support and present at the 2023 LTC Conference
-Produce and disseminate quarterly "Technology Exchange" newsletters [4 est.] and monthly "Local Connections" e-mail bulletins [12 est.]

FHWA
STP Funded
Technology Transfer & Education Program

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	Training and Development Support Services	Project Status:	Ongoing

Funding Source:	STP: TT-Fed	Budget Category:	FHWA

SIO:	DOTLT1000278	Project Start Date:		7/1/2018
Research Project Number:	19-TDSS	Completion Date	(original)	6/30/2021
Research Agency:	LTRC	Completion Date	(revised)	6/30/2024
Principal Investigator:	Vijaya Gopu			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$441,453	**Total**		**$225,000**
	(revised)	$1,213,383			
Est. Expended to Date		$1,359,383	Salaries		$210,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$147,288	Equipment	(non-expendable)	
	(revised)		Travel		$15,000
Est. FY Expenditure		$146,000	Other		

BUDGET JUSTIFICATIONS

Travel: -Travel for statewide delivery of required courses for the transportation community
-Travel for professional development
-Travel for both pre and post event management activities
-Travel for assistance with onsite course registration and management
-Travel for statewide specification meetings
-Travel for statewide meetings

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The Training and Development Support Services will be involved in the management of the Department of Transportation and Development's Structured Training Unit Learning Management System (LMS), which is a mandated system by the State of Louisiana Division of Administration.

Objective(s): This project will be responsible for coordinating and maintaining the LEO/LSO (Louisiana Employees Online/Learning Solution Online) system for the Technology Transfer and Training programs as well as other related training. The project will assist in implementing programs that are time sensitive and critical to the DOTD meeting the various training and program requirements.

Expected Benefits: Meet internal and external customer needs in order to provide time sensitive programs for the Department of Transportation and Development (DOTD).

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

-Worked with CPTP to schedule people who had not completed Louisiana Civil Service mandated supervisory training.
-Phase 2 of automation for DOTD's new Equipment Operator Certification Program (EOCP) completed.
-Made changes to DOTD webpages due to changes in DOTD Training policy.
-Coordinated a training day for field people with training delivered by DOTD personnel.
-Conducted multiple trainings for LTRC-DOTD personnel on using the current LMS
-Ongoing support on the statewide LMS system provided to LTRC personnel and DOTD personnel across the state.
-Coordinating efforts to standardize data
-Monitored and assisted with the meeting of training requirements for DOTD personnel. Statewide Yearly Training requirements (DOTD compliance with statewide training at 99.9%, Compliance with DOTD programs 98.5%).
-Helped with bringing LTRC into the OTS domain
-Setting up new computers for users in OTS environment
-Installation and configuration of new software for users
-Aided in acquisition and programming of new training laptops
-Preparation for conferences and meetings
-Involved with replacement of current EMS system
-Involved with moving current VM servers to OTS environment

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
-Continue all LEO IT support services for LTRC campus and employees. -Continue with implementation of DOTD's EOCP program – recommend program modifications, modify automation as needed. -Continue to work with Loss Prevention for record keeping required by the state. -Continue documenting procedures and developing best practices relating to training records. -Continue to monitor and assist in efforts to maintain a high level of compliance with required training. -Coordinate clean-up of training data and participate in migration to a new Learning Management System. -Assist in training LTRC Training personnel on the new LMS and develop training for DOTD employees.

Title:	**Technology Transfer & Research Implementation Support for Louisiana Universities**	**Project Status:**	**Ongoing**

Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**30000241**	Project Start Date:		1/1/2010
Research Project Number:	10-4AD	Completion Date	(original)	12/31/2013
Research Agency:	LTRC	Completion Date	(revised)	6/30/2025
Principal Investigator:	Tyson Rupnow			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$100,000	**Total**		**$10,000**
	(revised)				
Est. Expended to Date		$74,779	Salaries		
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$10,000	Equipment	(non-expendable)	
	(revised)	$1,000	Travel		$10,000
Est. FY Expenditure		$916	Other		

BUDGET JUSTIFICATIONS

Travel: Individual travel reimbursements to contract research professors to pay for food, lodging, and airfare to venues such as TRB to present results on ongoing and completed LTRC Research projects.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: Controlling travel to present research results is a significant issue with many of our external contracts wanting to attend conferences in exotic locations such as Italy, France, etc. This project was created over 10 years ago to combat that very spending issue.

Objective(s): The purpose of the project is to provide travel funds to university research principal investigators for dissemination of research results at various technology transfer events. Travel funds are dispersed on a case by case basis as it applies to providing a benefit to Louisiana.

Expected Benefits: The benefits of this project are twofold: (1) presentation of Louisiana Research promotes the excellent research work conducted and completed utilizing LTRC funds, and (2) other entities are able to view these presentations and ask questions and even adopt portions or all of the research product as well.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Sent 3 contract researchers to present upon findings of LTRC contract research projects.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Send contract researchers to present upon findings of LTRC contract research projects.

Title:	Technology Transfer Program and Operations (LSU)	Project Status:	Ongoing

Funding Source:	STP: TT-Fed	Budget Category:	FHWA

SIO:	30000320	Project Start Date:		7/1/2015
Research Project Number:	08-1TSQ	Completion Date	(original)	6/30/2018
Research Agency:	LTRC	Completion Date	(revised)	6/24/2024
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$361,546	**Total**		**$417,608**
	(revised)	$1,140,170			
Est. Expended to Date		$1,039,934	Salaries		$362,928
FY 2021 - 2022 Budget			Consumable Supplies & Materials		$17,360
FY Funds	(original)	$396,831	Equipment	(non-expendable)	$15,000
	(revised)		Travel		$11,160
Est. FY Expenditure		$335,000	Other		$11,160

BUDGET JUSTIFICATIONS

Supplies: Supplies necessary to conduct technology transfer and workforce development activities for the public information and media team.

Supplies to be purchased for use only in research and technical activities

Equipment: This budget item is comprised of various items all not to exceed $5,000 on an individual basis.

Travel: Travel for professional development
Travel for both pre and post event management activities
Travel for statewide photography and videography
Travel for statewide meetings

Other: Contracts for external technology transfer initiatives.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: This program is responsible for developing and maintaining publication design, graphic design, website, database maintenance, public relation press packages, Section 504 compliance, and editing of all media projects for the Louisiana Transportation Research Center and Department of Transportation and Development on a statewide level. In addition, this program is responsible for the production of all reports and production pieces for the Louisiana Legislature.

Objective(s): The objectives of this study are to: Disseminate information on new technologies and methodologies to the Louisiana Department of Transportation and Development (DOTD) and other transportation-oriented agencies; improve communications on technical, transportation-related issues between the department and other agencies; encourage implementation of new procedures and technologies; and disseminate information on transportation subjects to appropriate managers and engineers in the department.

Expected Benefits: Dissemination of technology transfer, training, and research initiatives to the transportation community as a whole.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS
-Published 4 Tech Today Newsletters -Created Adobe Spark articles to share on social media -Edited 11 Final Reports/Technical Summaries -Published 6 Project Capsules -Published 11 Final Reports/Technical Summaries -Published 1 Tech Assistance Report -Edited 2 training manuals -Created Road Design video scripts -Created watermark and report procedure update following new disclaimer requirements -Continued to apply accessibility requirements for all newly published work -Continued to implemented new Word template -Continued to maintain document information form for library liaison -Printed 10 TRB posters for LTRC participants at annual meeting -AASHTO Spring Meeting preparation and committee participation -Managed attendee, sponsorship and exhibitor registration for virtual LTC; managed online content creation; provided analytics for all participants -Redesigned LSU chapter of Phi Kappa Phi website; providing content management updates and social media support -Provided layout for DOTD Maintenance Field Guide (pocket manual, in progress) -Continued development of Project Manager' Manual interactive updates for DOTD -Developed new form for SASHTO scholarship application process -Created social media-friendly content for LTAP through Adobe Spark -Designed 4 issues of Technology Exchange -Provided web support for NSF project: Field Monitoring and Measurements (FMM) Education; redesigned final site for project completion -Working through backlog of document published prior to Oct. 2018 for accessibility issues -Created and managed 1 survey for section 19 -Compiled and produced LTRC annual report; added interactive features -Maintained regular posting of all LTRC publications on website and social media channels -Support for all Section 33 users managing the Registration Management System -Film and production of Deposition Techniques- Structured Training -Film production of SMT Trailer Mounted Attenuator Instructional Video- Structured Training -Film production of TRAC and RIDES Promotional Video- AASHTO -Film production of Field Monitoring Demo/SAM Module- VJ Gopu -Film and production of 2 DOTD Instructional videos -Film and production of 21 DOTD Public Informational videos -Film and production of 4 DOTD Innovations -Post production of 2022 LTC Virtual Conference- 35 virtual Zoom presentations -Post production of Engineering Ethics- Zoom Webinar by Norma Jean Mattei, VJ Gopu -Post production of video formatting and resizing per LEO standards -Post production for Training/Technology Transfer- 23 various training videos -Post production for 2 DOTD Public Informational Videos -Post production for LHSC Black History Month- Secretary Wilson interview -Event Photography GRITS -Event Photography TRAC and Rides- June/Dec -1,340 Subscribers on YouTube
FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
-Continue to prepare project capsules, and review draft final reports -Continue to provide Technology Transfer Manager comments for biannual reports -Continue to serve as ERDP engineer-of-record (e.g. interview panels, experience verification) -Continued web/graphics support in all current areas -Continued work on 508 accessibility issues for PDFs -Photograph all LTRC and DOTD events -Video all LTRC and DOTD events -Readily available for any special assistance requested from Secretary's office -2023 Louisiana Transportation Conference Planning -Continue training and support for online registration management system -Continue to edit and distribute project capsules, technical summaries, final reports and technical assistance reports -Publish 4 Tech Today newsletters -Continue to investigate and research planning and organizing virtual events

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**Technology Transfer Registration Fees**	**Project Status:**	**Proposed**

Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000445**	Project Start Date:		7/1/2022
Research Project Number:	23-TTRF	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$100,000
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$100,000**
Salaries		
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		$100,000

BUDGET JUSTIFICATIONS

Other: Statewide technology transfer and research activities related to workforce development.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: To provide cost effective transfer of technology and workforce development opportunities to Louisiana's parish and municipality and public works agencies through training, technical assistance, and information dissemination.

Objective(s): Strengthen the technology transfer, training, education, and other opportunities to Louisiana's parish and municipality and public works agencies.

Expected Benefits: Provide access to cost effective workforce development activities that will lead to better trained public works agencies.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Provided cost effective transfer of technology and workforce development opportunities to Louisiana's parish and municipality and public works agencies through training, technical assistance, and information dissemination.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Continue to provide cost effective transfer of technology and workforce development opportunities to Louisiana's parish and municipality and public works agencies through training, technical assistance, and information dissemination.

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**DOTD CO-OP Program**	**Project Status:**	**Proposed**

Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000446**	Project Start Date:		7/1/2022
Research Project Number:	23-COOP	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$200,000	**Total**		**$200,000**
	(revised)				
Est. Expended to Date			Salaries		$200,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The Department of Transportation and Development (DOTD) Co-Op program is a cooperative endeavor between the DOTD and Louisiana universities with accredited engineering programs, providing practical experience to junior and senior level undergraduates through part-time employment in public transportation engineering work.

Objective(s): This program is intended to enhance the educational process by providing opportunities for participants to explore their interest in transportation engineering through practical experience; provide opportunities for DOTD to evaluate participants of this program as potential employees; and enhance the educational process by providing opportunities for students to explore their interest in transportation engineering through practical experience.

Expected Benefits: Student will have the opportunity to work in their related career field. Increase the students' employability in their career field of engineering.
Increase the students' potential to advance within their career field.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

-16 undergraduate students participated in the Co-op program at various DOTD districts/sections.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

-Place approximately 15-16 students in various DOTD districts/sections across the state;
-Continue end of semester presentations in a face-to-face or virtual format;
-Retain students in the Co-op program each semester/quarter; and
-Attend/participate in engineering related career fairs held throughout the state of Louisiana

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**LTRC Student Worker Program**	**Project Status:**	**Proposed**

Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000444**	Project Start Date:		7/1/2022
Research Project Number:	23-2TT	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$147,600
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$147,600**
Salaries		$147,600
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: To pay salaries for undergraduate students employed to provide support in fulfilling necessary job tasks on various Louisiana Transportation Research Center (LTRC) projects.

Objective(s): Employee undergraduate students in the field of research, technology transfer, education, and training.

Expected Benefits: Offer undergraduate students employment experience in research, technology transfer, education, and training in state government, specifically transportation, that will expose them to public service opportunities post-graduation.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Thirty (30) undergraduate students were employed by LTRC to provide support in fulfilling necessary job tasks on various LTRC projects, research, technology transfer, training, and education initiatives.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Continue to pay for salaries for undergraduate students employed to provide support to various LTRC projects.

Title:	Workforce Development Contracts	Project Status:	Proposed

Funding Source:	STP: TT-Fed	Budget Category:	FHWA

SIO:	DOTLT1000443	Project Start Date:		7/1/2022
Research Project Number:	23-1WDC	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$4,262,407	**Total**		**$4,262,407**
	(revised)				
Est. Expended to Date			Salaries		$1,600,000
FY 2021 - 2022 Budget			Consumable Supplies & Materials		$110,000
FY Funds	(original)		Equipment	(non-expendable)	$125,000
	(revised)		Travel		$40,000
Est. FY Expenditure			Other		$2,387,407

BUDGET JUSTIFICATIONS

Supplies: Supplies to be purchased for use only in research and technical activities.

Equipment: Special purpose equipment to be purchased for use only in research and technical activities.
-$20K: Sound system upgrade in TTEC Reserved Spaces and LTRC Conference Room
-$35K: Updated Security Cameras in TTEC Reserved Spaces, LTRC Conference Room
-$70K: Lighting Upgrade for TTEC Auditorium

Software/Licensing:
-$850: Visix Support Renewal
-$11K: Articulate Subscription Renewal
-$5K: Adobe License Renewal
-$9K: Video conferencing software renewal
-$9K: Accruent/EMS Software renewal
-$34K: ASTM Standards
-$25K: IHS Engineering Workbench
-$5K: EOS.web

Travel: Travel for statewide delivery of required courses for the transportation community.
-Travel for professional development
-Travel for both pre and post conference management activities
-Travel for assistance with onsite course registration and management
-Travel for statewide district trainer meetings
-Travel for course facilitation

Other: Contracts for external workforce development initiatives.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The purpose of this study is to provide contractual services through federal, university, and private sector suppliers for continuing education, professional development, technical skills, software, leadership, management, and supervisory training. The scope of this project also includes providing individual registration fees for Department of Transportation and Development (DOTD) employees to attend workshops/courses/conferences.

Objective(s): Provide specialized support statewide to the DOTD as well as specialized services to departmental section heads in the delivery of training, creation of competency models, technology integration, technology transfer of technical and non-technical efforts, and special projects that represent a variety of stakeholders in Louisiana.

Expected Benefits: Develops a platform to share ideas. Promotes innovative technology implementation throughout the transportation community. Enhances collaboration between the state, local, federal, university, and transportation community partners.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS
-Held over 383 events with 2300 attendees; -Used EMS to schedule and report classes and attendee numbers for LTRC -A total of 15 undergraduate students participated in the Co-op program at various DOTD districts/sections throughout the School Year; -Hosted at the Transportation Training and Education Center (TTEC) end-of-the semester Co-op student presentations and video-conferenced in other DOTD areas in the fall and spring. Increased participation in attendance by advertising department wide, to universities, and with the LTRC Policy Committee; -Attended and participated in 10 career fairs; -Two (2) EI's carried over into the Engineer Resource Development Program (ERDP) from last FY rotated through various LA DOTD sections and districts throughout Louisiana. This number is low due to the COVID-19 pandemic; -One (1) EI successfully hired into DOTD: Section 25 – Bridge and Structural Design FHWA Grant awarded for $52,143.75; -Hosted one TRAC and RIDES workshops; -Attending the Louisiana Teachers Summit in New Orleans – TRAC&RIDES presentation -Added 334 new titles to the LTRC library online catalog and updated 633 titles; 508 compliances: updates were made to the LTRC Library web site to further improve accessibility and informed subscription vendors of LSU's accessibility compliance rules, in preparation of next year's renewals re LSU's review and requirements. -Renewed ASTM Standards -Renewed IHS Engineering Workbench -Renewed EOS.web -NTKN – National Transportation Knowledge Network (the regional TKNs were merged into the National TKN – LTRC Library was a member of ETKN (Eastern TKN) -SLA – Special Libraries Association, Transportation Division -TRB-AJE45 – Standing Committee on Information and Knowledge Management – Member -TRB-AJE15 – Standing Committee on Workforce Development and Organizational Excellence – Friend -TRB-E0006 – TRB Information Services Committee – Friend -TRB- E0006(1) – TRT (Transportation Research Thesaurus) – Member -Member of the AASHTO's TRAC and RIDES Program Committee -Held 10 NHI courses -Requested and informed employees of available NHI Webinars -Employees attended 129 individual registration events -Conduct, host, plan, and present at virtual/hybrid 2022 LTC – March 2022 in Baton Rouge, LA; -Submitted RFPs for meeting space, overnight rooms, food/beverage, etc. for the Transportation Safety Summit (DOTD Highway Safety) to be conducted in 2021 for about 350 attendees. (this summit will now be held virtually for 2021) -Drafted LTC Conference Planning guide -National and Louisiana Chapter of the Society of Government Meeting Professionals (SGMP) Member -2019 – 2021 Louisiana Chapter of the Society of Government Meeting Professional (SGMP) 1st Vice President -2019 – 2021 Louisiana Chapter of the Society of Government Meeting Professional (SGMP) 1st Vice President & Director -October 2021 – Present Louisiana Chapter of the Society of Government Meeting Professional (SGMP) Treasurer -Held Maintenance and Rehab of Historic Bridges course -Hosted the PE Review 2022 Workshop -Held training for Traffic Engineering Process & Report -Held training for Pile Dynamics (PDA) -Held AED/CPR – 4 classes -Held 2 Adobe 2- day classes -Held the PE Review 2021 Workshop – 12 days -Used the RMS for registration and tracking -Conduct Dynamic Friction Tester Training -Host Voegle Asphalt Milling and Paver Machines Workshop -Lighting Upgraded for the auditorium -Programmed for Computer Upgrade -Held 90 Uno Microsoft Office classes -Held 7 ArcGIS classes -Held 12 ATTSA classes -Held 11 mechanics classes -Held 6 CADD classes -Held 3 Truck Mounted Attenuator classes -Facilitated 7 Foundations of Leadership Development classes -Facilitated 4 Emotional Intelligence classes -Facilitated 5 Organizational Culture classes -Complete Competency Model for Section 82 -Begin Competency Model for Sections 24 and 30

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
-Place approximately 15-16 students in the Co-op program in various DOTD districts/sections across the state; -Continue end of semester Co-op presentations in a face-to-face or virtual format; -Retain students in the Co-op program each semester/quarter and summer; -Attend/participate in engineering related career fairs held throughout the state; -Hire approximately 5 - 8 engineering interns to participate in the ERDP; -Host one (1) TRAC and one (1) RIDES Workshop in December 2021; -Host a 2021 summer RIDES workshop -Continue to facilitate and host events at TTEC, approximately about 150 more -Continue additions to and updating of library materials into the online catalog; -Continue to monitor 508 Compliance pertaining to the LTRC Library page; -Continue to schedule and use EMS reporting for LTR -Continue to register employees for professional development trainings/workshops/conferences. -Continue to suggest and schedule NHI courses -Continue to offer NHI Webinars -RFP, negotiate and secure contract for meeting and exhibitor space for the 2023 and 2025 Louisiana Transportation Conference to be held in Baton Rouge, Louisiana. Approximately 1600 attendees;185 vendors -RFP, negotiate and secure contracts for overnight accommodations for the 2023 and 2025 Louisiana Transportation conference to be held in Baton Rouge, Louisiana. Locations TBD. Approximately 800 room nights. -Negotiate and secure assistance from Visit Baton Rouge to provide rental and transportation assistance for the 2023 and 2025 Louisiana Transportation Conference to be held in Baton Rouge, Louisiana. -Continue to update the LTRC Conference Planning Guide -Attend the Society of Government Meeting Professionals 2021 National Education Conference -Host Northwestern Traffic Transportation Eng Seminar 1 class -Host Northwestern Traffic Transportation Eng Seminar 2 class -Host Signcad software class -Host PE Review 2023 -Host Traffic Engineering Software Training class -Continue to deliver Leadership classes around the state as needed -Deliver Performance Management class; -Facilitate Managing Across Generations course; -Conduct, host, plan, and present at virtual/hybrid 2022 LTC -Begin preparations for the 2023 LTC in Baton Rouge, LA, March 2023 -Continue to offer UNO Microsoft Office courses; -Continue to offer GIS and CADD courses; -Continue to schedule Mechanics courses training; -Continue to suggest and conduct training through NHI and FHWA; -Submit RFP's as needed throughout the year (about 3 per year); -Fulfill individual registration requests; -Continue to offer and conduct courses as needed and/or requested; -Continue to write contracts/proposals for required and/or requested training as needed; -Request PO's as warranted; -Continue to use the RMS for course registration and tracking -Update student manual as needed; -Facilitate "Managing Across Generations"; -Complete course and offer Contract Negotiations Training; -Louisiana Transportation Conference (LTC) items; -Room Schedule Display TTEC 100,101,175,179,160, LTRC 128 -Interactive Touch Panel Display TTEC Lobby (Info Kiosk) -Lectern Upgrade -Visix Support Renewal -Articulate Subscription Renewal -Continue to facilitate Foundations of Leadership Development classes -Continue to facilitate Emotional Intelligence classes -Continue to facilitate Organizational Culture -Facilitate Transformational leadership classes -Facilitate Lunch n' Learn classes -Completely Competency Model for Section 80 -Begin/Complete Competency Model for 2 sections TBD -Complete Needs Assessment for DOTD STPs -Assist with planning, conducting, and hosting the DOTD New Supervisor Maintenance Academy -Verify data integrity for all trainings and learner tracked information -Successfully transfer all training information into the new LMS

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**Workforce Development**	**Project Status:**	**Proposed**

Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000441**	Project Start Date:		7/1/2022
Research Project Number:	23-1WD	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$1,277,526
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$1,277,526**
Salaries		$1,257,526
Consumable Supplies & Materials		$10,000
Equipment	(non-expendable)	
Travel		$10,000
Other		

BUDGET JUSTIFICATIONS

Supplies: Supplies for technology transfer activities - no single item to exceed $5,000Travel: Statewide travel for structure training program delivery.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The purpose of this study is to provide for the strategic planning, program development, and delivery management of the workforce development programs for the Department of Transportation and Development (DOTD) personnel. The scope of this study also includes the development, delivery, and administration of the Louisiana Transportation Research Center's (LTRC's) transportation outreach program.

Objective(s): Deliver structured training programs to Department of Transportation and Development (DOTD) personnel and other transportation partners statewide.

Expected Benefits: Expand the knowledge base of all employees and give employees a greater understanding of their responsibilities within their role within the organization while offering professional growth opportunities.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS
-Developed Historical Bridge WBT training course
-Developed ADA Inspector WBT course
-Developed Fundamentals of Negotiation Course
-Created negotiations for contract services training materials
-Revised Maintenance Tort Liability Training
-Created Maintenance Deposition Training
-Created Maintenance Academy Training Material
-Created training material for Safety Maintenance Academy
-Continue to revise the Survey Manuel's
-Continue to revise the Shallow Borings Manual
-Facilitated 6 Project Management training class (4/6 have been taught; next 2 will be taught April and June)
-Developed/created Stage 1 – Environmental Planning Project Delivery WBT course (actual completion date was December 15, 2021)
-Developed/created Stage 0 – Feasibility Project Delivery WBT (completion date is set for June 30th, 2022)
-Revised Aerial Lift
-Revised Asbestos Awareness
-Revised Asphalt Surface Maintenance
-Revised Backhoe Loader
-Revised Basic Flagging Refresher training course
-Revised Bucket Truck
-Revised Chain Saw Safety
-Revised Confined Spaces
-Revised Crane Safety
-Revised Electrocution Prevention
-Revised Excavator Safety
-Revised Fork Lift Safety
-Revised Front End Loader Safety
-Revised Hand & Power Tools
-Revised Hazardous Material Full Course
-Revised Heat Stress
-Revised Lock-Out/Tag-Out
-Revised Personal Fall Arrest
-Revised Rigging and Slinging
-Revised Scaffolding Safety
-Revised Skid Steer
-Revised Slips, Trips, and Falls
-Revised Tort Liability for Maintenance
-Revised Tractor Safety
-Revised Traffic Control Through Work Maintenance Area Course
-Revised Trenching & Shoring
-Revised Truck Mounted Boom Lift
-Added Driving Safety
-Added Office Safety
-Added Trenching and Shoring
-Added Work Zone Safety
-Completed Competency Model review for Sections 24 and 30
-Completed Introduction to Louisiana Highway Safety for LTAP
-Created Basic Flagging Refresher Training Course
-Created SMT TMA Video
-Created TMA Trailer Mounted Attenuator Video
-Facilitated (21) classes supporting Safety, Loss Prevention, Maintenance and Cybersecurity Awareness courses
-Facilitated 15 Cybersecurity Awareness training classes;
-Facilitated 6 Basic Flagging Classes
-Facilitated 8+ Traffic Control Through Work Maintenance Area
-Created new Driving Safety
-Created new Office Safety
-Created new Video Work Zone Safety
-Processed new certifications and re-certifications for Department and Non-Department employees
-Supported testing sessions at Headquarters and at TTEC

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
-Continue to revise the Survey Manuals
-Continue to revise the Shallow Borings Manual
-Develop Math for Construction Personnel 1 training course
-Continue to facilitate training courses as they appear in structured training programs
-Continue to conduct testing sessions at TTEC and Headquarters
-Content script and topical layout for Substance Abuse for Supervisors WBT
-Planning for Management Development Structured Training Program to become Leadership Development
-Initiate review and update of course programs in DTRN and LEO in preparation for changeover to new LMS
-Initiate review and update of all STPs
-Continue to support testing sessions at Headquarters and at TTEC
-Continue to support Technical Competency Model reviews
-Facilitate development of Crash Data training course
-Facilitate development of Louisiana Highway Safety course
-Continue to enter new tests into the Test.com system as they are created
-Continue to update tests in the Test.com system as revisions are needed
-Continue to manage the Construction Certification Program to include the collection of certification fees
-Continue to process new certifications for Department and Non-Department employees
-Continue to process new re-certifications for Department and Non-Department employees
-Continue to manage the Structured Training Program for the Department
-Participate in Needs Assessment Review of all Departmental Structured Training Programs (STPs)
-Review and update training manuals to ensure materials and formatting are up to date
-Review, recommend, and implement training revisions where necessary

Title:	Technology Transfer and Assistance for Senior Project Courses	Project Status:	Proposed

Funding Source:	STP: TT-Fed	Budget Category:	FHWA

SIO:	DOTLT1000448	Project Start Date:		7/1/2022
Research Project Number:	23-1TT	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$37,500	**Total**		**$37,500**
	(revised)				
Est. Expended to Date			Salaries		
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)		Equipment	(non-expendable)	
	(revised)		Travel		
Est. FY Expenditure			Other		$37,500

BUDGET JUSTIFICATIONS

Other: Items for research and technology transfer purposes only.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: To provide support for senior project engineering courses up to a maximum of $7,500/university/year.

Objective(s): Senior Design Projects allow students to sharpen learned engineering skills in a real-world environment. These include: problem analysis, design analysis, experimentation, use of leading CAD and analysis software, innovation, communication skills, and teamwork, often within an interdisciplinary team.

Expected Benefits: Through this senior design project, students will be exposed to products, engineering practices and culture, allowing them to assess the transferability of these skills into their future employability opportunities. This experience of collaborative problem solving, respectful interaction and coordination to achieve a shared goal allows engineers-to-be to develop important teamwork skills that are valued by employers.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Participation from two universities: Louisiana Tech University (1 project) and Southern University (1 project).

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Continue to provide technology transfer and assistance for senior project engineering courses.

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**Technology Transfer Program and Operations (DOTD)**	**Project Status:**	**Proposed**

Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000447**	Project Start Date:		7/1/2022
Research Project Number:	23-1TSQ	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$380,631
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$380,631**
Salaries		$380,631
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: This program is responsible for developing and maintaining publication design, graphic design, website, database maintenance, public relation press packages, Section 504 compliance, and editing of all media projects for the Louisiana Transportation Research Center and Department of Transportation and Development on a statewide level. In addition, this program is responsible for the production of all reports and production pieces for the Louisiana Legislature.

Objective(s): The objectives of this study are to: Disseminate information on new technologies and methodologies to the Department of Transportation and Development (DOTD) and other transportation-oriented agencies; improve communications on technical, transportation-related issues between the department
and other agencies; encourage implementation of new procedures and technologies; and disseminate information on transportation subjects to appropriate managers and engineers in the department.

Expected Benefits: Dissemination of technology transfer, training, and research initiatives to the transportation community as a whole.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS
-Published 4 Tech Today Newsletters -Created Adobe Spark articles to share on social media -Edited 11 Final Reports/Technical Summaries -Published 6 Project Capsules -Published 11 Final Reports/Technical Summaries -Published 1 Tech Assistance Report -Edited 2 training manuals -Created Road Design video scripts -Created watermark and report procedure update following new disclaimer requirements -Continued to apply accessibility requirements for all newly published work -Continued to implemented new Word template -Continued to maintain document information form for library liaison -Printed 10 TRB posters for LTRC participants at annual meeting -AASHTO Spring Meeting preparation and committee participation -Managed attendee, sponsorship and exhibitor registration for virtual LTC; managed online content creation; provided analytics for all participants -Redesigned LSU chapter of Phi Kappa Phi website; providing content management updates and social media support -Provided layout for DOTD Maintenance Field Guide (pocket manual, in progress) -Continued development of Project Manager' Manual interactive updates for DOTD -Developed new form for SASHTO scholarship application process -Created social media-friendly content for LTAP through Adobe Spark -Designed 4 issues of Technology Exchange -Provided web support for NSF project: Field Monitoring and Measurements (FMM) Education; redesigned final site for project completion -Working through backlog of document published prior to Oct. 2018 for accessibility issues -Created and managed 1 survey for section 19 -Compiled and produced LTRC annual report; added interactive features -Maintained regular posting of all LTRC publications on website and social media channels -Support for all Section 33 users managing the Registration Management System -Film and production of Deposition Techniques- Structured Training -Film production of SMT Trailer Mounted Attenuator Instructional Video- Structured Training -Film production of TRAC and RIDES Promotional Video- AASHTO -Film production of Field Monitoring Demo/SAM Module- VJ Gopu -Film and production of 2 DOTD Instructional videos -Film and production of 21 DOTD Public Informational videos -Film and production of 4 DOTD Innovations -Post production of 2022 LTC Virtual Conference- 35 virtual Zoom presentations -Post production of Engineering Ethics- Zoom Webinar by Norma Jean Mattei, VJ Gopu -Post production of video formatting and resizing per LEO standards -Post production for Training/Technology Transfer- 23 various training videos -Post production for 2 DOTD Public Informational Videos -Post production for LHSC Black History Month- Secretary Wilson interview -Event Photography GRITS -Event Photography TRAC and Rides- June/Dec -1,340 Subscribers on YouTube -Prepared 6 Draft Project Capsules -Provided Technical Review for 12 Final Reports -Provided Technology Transfer Manager comments for 58 biannual reports (period ending 6/30/21) -Provided Technology Transfer Manager comments for 58 biannual reports (period ending 12/31/21) -Served on interview panel for several ERDP applicants -Provided engineering experience verification for former ERDP interns seeking PE licensure
FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
-Continue to prepare project capsules, and review draft final reports -Continue to provide Technology Transfer Manager comments for biannual reports -Continue to serve as ERDP engineer-of-record (e.g. interview panels, experience verification) -Continued web/graphics support in all current areas -Continued work on 508 accessibility issues for PDFs -Photograph all LTRC and DOTD events -Video all LTRC and DOTD events -Readily available for any special assistance requested from Secretary's office -2023 Louisiana Transportation Conference Planning -Continue training and support for online registration management system -Continue to edit and distribute project capsules, technical summaries, final reports and technical assistance reports -Publish 4 Tech Today newsletters -Continue to investigate and research planning and organizing virtual events -Continue to prepare project capsules, and review draft final reports -Continue to provide Technology Transfer Manager comments for biannual reports -Continue to serve as ERDP engineer-of-record (e.g. interview panels, experience verification)

LTRC Annual Research Program
Fiscal Year 2022-2023

Title:	**DOTD Staff Support for Workforce Development**	**Project Status:**	**Proposed**

Funding Source:	**STP: TT-Fed**	**Budget Category:**	**FHWA**

SIO:	**DOTLT1000450**	Project Start Date:		7/1/2022
Research Project Number:	23-1SWD	Completion Date	(original)	6/3/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	MaryLeah Coco			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$1,520,000
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$1,520,000**
Salaries		$1,520,000
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The purpose of this study is to provide for the strategic planning, program development, and delivery management of the workforce development programs for the Department of Transportation and Development (DOTD) personnel by non-LTRC employees. This project will not be utilized by LTRC's Section 19 or 33.

Objective(s): Provide for the strategic planning, program development, and delivery management of the workforce development programs for the Department of Transportation and Development (DOTD) personnel by non-LTRC employees.

Expected Benefits: Development, implementation, and evaluation of human resource and organizational development initiatives for the Department of Transportation and Development (DOTD).

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

-Course development and delivery of Local Public Agency (LPA) training;
-DOTD employee structured training;
-Human Resources training, maintenance related training; and
-Meeting involvement related to DOTD's Transportation Training Curriculum Council.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

-Course development and delivery of Local Public Agency (LPA) training;
-DOTD employee structured training;
-Human Resources training, maintenance related training; and
-Meeting involvement related to DOTD's Transportation Training Curriculum Council.

Other DOTD Funded Projects

Title:	Economic Evaluation of Applications to the Port Construction and Development Priority Program	Project Status:	Ongoing

Funding Source:	Port Priority Program	Budget Category:	Other DOTD Sections

SIO:	DOTLT1000419	Project Start Date:		7/1/2021
Research Project Number:	22-2SS	Completion Date	(original)	6/30/2023
Research Agency:	ULL	Completion Date	(revised)	
Principal Investigator:	Stephen Barnes			

BUDGET STATUS

Total Budget			Estimated 2022-2023 Budget		
Total Cost	(original)	$86,862	**Total**		**$57,907**
	(revised)				
Est. Expended to Date		$21,716	Salaries		$57,907
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$43,140	Equipment	(non-expendable)	
	(revised)	$28,955	Travel		
Est. FY Expenditure		$28,955	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The Port Priority Program through DOTD must ensure the State of Louisiana is receiving the required minimum rate of return on the State's investment and the applicants are meeting the required benefit cost ratio. Economic evaluations of applications submitted to the Port Priority Program need to be performed by an economist with a doctorate degree in economics, knowledgeable of Louisiana laws, knowledgeable of Louisiana ports and their activities, and be familiar with the Port Priority Program.

Objective(s): The objective of this project is to perform research and analysis of Port Priority Program applications to ensure the State is receiving the required minimum rate of return on the State's investment.

Expected Benefits: These evaluations will ensure that all applications to the Port Priority Program are considered using a consistent set of metrics and methodology to help the State of Louisiana prioritize strategic investments in ports to help stimulate economic activity.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 1:Preliminary Meetings With Project-Sponsoring Ports 25%
All initial submissions included relevant information and DOTD staff were able to assist with gathering clarification where needed so that direct meetings were not needed for the previous round of applications.
Task 2: Preliminary Review of Applications 25%
All applications submitted for the September 2021 deadline were reviewed representing 3 of the expected 6 applications this fiscal year, or 25% of the 12 total submissions included in this scope of work
Task 3: Application Review Meetings 25%
Application review was completed and reviewed with DOTD staff for the 3 applications submitted for the September 2021 deadline.
Task 4: Theoretical Benefit-Cost Validity Check 25%
The benefit-cost estimates included in each application were reviewed for validity.
Task 5: Verification of Claims 25%
Key project information was verified using publicly available information and documentation supplied with applications
Task 6: Benefit-Cost Calculations 25%
Benefit-cost calculations were completed for all submissions.
Task 7: Development of Quarterly and Biannual Reports 25%
Quarterly reports for periods with applications for review were submitted and the biannual report is being submitted now.
Task 8: Presentations and Project Support 25%
PI has been available to answer questions from the department and to present findings as needed.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
Task 1: Preliminary Meetings With Project-Sponsoring Ports Preliminary meetings will be scheduled as needed with project-sponsoring ports. Task 2: Preliminary Review of Applications All future applications submitted to the program during the project period will be reviewed. Task 3: Application Review Meetings Meetings to discuss applications submitted to the program during the project period will be scheduled as needed. Task 4: Theoretical Benefit-Cost Validity Check All future applications submitted to the program during the project period will undergo a theoretical benefit-cost validity check. Task 5: Verification of Claims All future applications submitted to the program during the project period will have key claims verified by the PI. Task 6: Benefit-Cost Calculations Benefit-cost calculations will be completed for all future applications submitted to the program during the project period. Task 7: Development of Quarterly and Biannual Reports Quarterly reports will be completed during all quarters when applications are received and biannual reports will be completed for all future reporting periods. Task 8: Presentations and Project Support Future presentations and project support will occur as needed.

Title:	**Portable WIM Installation and Site-Specific Traffic Data Collection for DOTD**	**Project Status:**	**Ongoing**

Funding Source:	**Pavement Management**	**Budget Category:**	**Other DOTD Sections**

SIO:	**000**	Project Start Date:		10/12/2020
Research Project Number:	22-1SS	Completion Date	(original)	1/11/2021
Research Agency:	Texas A&M Transportation Institute (TTI)	Completion Date	(revised)	6/30/2022
Principal Investigator:	Lubinda Walubita			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$38,982
	(revised)	$98,962
Est. Expended to Date		$98,962
FY 2021 - 2022 Budget		
FY Funds	(original)	$33,444
	(revised)	$78,559
Est. FY Expenditure		$78,559

Estimated 2022-2023 Budget		
Total		**$20,000**
Salaries		$20,000
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: There is a need to install and test portable WIMs at specific DOTD traffic data collection sites

Objective(s): To install portable WIM at select location, collect data, and validate to test how applicable and efficient portable WIM data collection can be implemented in Louisiana.

Expected Benefits: Will assist with WIM data collection throughout the state.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task01: Procurement of Materials and Portable WIM Supplies: completed
Task02: Portable WIM Installation, Calibration, and Site Maintenance: ongoing
Task03: Traffic Measurements, Data Collection, and Site Management: ongoing
Task04: Traffic Data Processing, Analysis, and Documentation: ongoing
Project will be modified to increase budget and duration to allow for additional site testing.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

Continue with the following tasks at different sites:
Task02: Portable WIM Installation, Calibration, and Site Maintenance
Task03: Traffic Measurements, Data Collection, and Site Management
Task04: Traffic Data Processing, Analysis, and Documentation
Task05: Sensor Removal and Portable WIM Un-installation

Title:	**The Future of the Louisiana Waterways Transportation System: A System Analysis and Plan to Move Commerce by Water**	**Project Status:**	**Ongoing**

Funding Source:	**Office of Multimodal Commerce**	**Budget Category:**	**Other DOTD Sections**

SIO:	**DOTLT1000330**	Project Start Date:		1/21/2020
Research Project Number:	20-1SS	Completion Date	(original)	4/20/2021
Research Agency:	Moffatt & Nichol	Completion Date	(revised)	8/20/2022
Principal Investigator:	Ricardo Cruz			

BUDGET STATUS

Total Budget			**Estimated 2022-2023 Budget**		
Total Cost	(original)	$284,499	**Total**		
	(revised)	$382,888			
Est. Expended to Date		$246,316	Salaries		
FY 2021 - 2022 Budget			Consumable Supplies & Materials		
FY Funds	(original)	$5,103	Equipment	(non-expendable)	
	(revised)	$185,172	Travel		
Est. FY Expenditure		$136,572	Other		

BUDGET JUSTIFICATIONS

Budget amounts do not require justifications.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The purpose of this project is to provide DOTD Office of Multimodal Commerce (OMC) a means to plan for future development and investment. The OMC needs to develop a comprehensive, statewide waterways transportation system plan. In order to develop this plan, it is necessary to analyze and document the impact and importance of waterborne commerce on the State of Louisiana, its transportation system, and the nation.

Objective(s): The objective of this research is to (1) Identify the type and value of waterborne commerce, (2) Analyze and document the impact and importance of waterborne commerce, (3) Identify the improvements needed to achieve greater utilization of waterways, (4) Identify opportunities for alieving multimodal bottlenecks relative to waterways, (5) Develop a draft Waterways Transportation Plan that can be included in the Louisiana Statewide Transportation Plan.

Expected Benefits: In addition to a final report, the final deliverable will also include a draft of a Waterway Transportation Plan. A GIS platform provided that serves as a repository of spatial data, appropriate meta data, validated data sources and a system capable of serving the Department of Commerce for day to day operational waterway information. This data will be distribution to department agencies and public on demand.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

Task 6- Data management/GIS application, analysis and reporting - Developed Spatial database requirements, collected data and analysis of deliverable-based on data sources - short and long-term functionality. Developed data layers per research and data collection.
Task 7: Storyboard Additions and Data Updates Meetings. Developed Spatial database requirements.
Task 8: Storyboard Additions and Data Updates. Developed Spatial database requirements.
Task 9: ULL - Additional Reporting GIS Inputs to Plan. Set up requirements for ULL and develop an implementation plan. Implemented a plan to finalize PRC Report and the Draft Waterway Transportation Plan.
Task 10: Expand Data Sources, Webmap Additional Layers, Users Guide and Documentation Finalized related project documentation.
Task 11: Technical Coordination, QA/QC, Testing. Work closely with LADOT IT and PRC GIS contacts in the testing and implementation of a platform for deliverables and join with the DOTD GIS team in applying proper standards and protocols for the new system.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES
Task 12: PRC Review of Final Report -Write, review and submit the final report to PRC

LTRC Annual Research Program
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Title:	**Local Road Safety Program**	**Project Status:**	**Proposed**

Funding Source:	**Safety**	**Budget Category:**	**Other DOTD Sections**

SIO:	**DOTLT1000451**	Project Start Date:		7/1/2022
Research Project Number:	23-LRSP	Completion Date	(original)	6/30/2023
Research Agency:	LTRC	Completion Date	(revised)	
Principal Investigator:	Steve Strength			

BUDGET STATUS

Total Budget		
Total Cost	(original)	$379,989
	(revised)	
Est. Expended to Date		
FY 2021 - 2022 Budget		
FY Funds	(original)	
	(revised)	
Est. FY Expenditure		

Estimated 2022-2023 Budget		
Total		**$379,989**
Salaries		$307,458
Consumable Supplies & Materials		
Equipment	(non-expendable)	
Travel		
Other		$72,531

BUDGET JUSTIFICATIONS

Other: Contracts for Special Services for the Local Road Safety Program.

PROBLEM STATEMENT, OBJECTIVE(S) AND EXPECTED BENEFITS

Problem Statement: The purpose of the Louisiana Local Road Safety Program (LRSP) is to identify key safety needs and guide investment decisions to achieve reductions in fatalities and serious injuries on local rural public roadways.

Objective(s): To work in cooperation with the Department of Transportation and Development's (DOTD's) Highway Safety Office to implement and manage the Local Road Safety Program (LRSP)in addition to providing support to other statewide road safety initiatives at both the state and local levels.

Expected Benefits: The LRSP offers a proactive approach for local road agencies to address safety issues. The LRSP can show the public and policy makers that something is being done to systematically reduce severe crashes, thereby, building trust with local government officials, key stakeholders, and the general public.

FISCAL YEAR 2021 - 2022 ACCOMPLISHMENTS

-Continued to promote and facilitate implementation of parish level road safety plans. Currently there are 14 parishes and one tribe with completed plans and plans under development in 10 additional parishes, reviewed six of the new plans with LTAP providing technical assistance for both development and implementation.
-Managed the application submittal process of the Local Road Safety Program projects under the HSIP and conducted preliminary technical evaluation of applications, and tracked projects through project number assignment.
-Reviewed Local Road Safety Program's LRSP Project Application and Road Assessment forms and evaluation criteria, incorporating comments from the Local Road Safety Program team. Added a Pre- application form to expedite the process. Participated in ongoing LRSP process planning meetings with FHWA, DOTD Safety Section, and LRS Program personnel, producing a flow chart detailing each step of the current process with an eye towards streamlining.
-Promoted use of the LRSP pre-application form and the LRSP in presentations to LPESA, the LA Highway Safety Summit, Louisiana Transportation Conference, and nine virtual Highway Safety Roadshows as well as online and printed promotional materials published by LTAP. .
-Worked with local jurisdictions and regional entities to pre-screen safety issues. Processed 9 formal inquiries, four of which resulted in project pre-applications to date. Processed one application for 19 different roadways and obtained approval of the project selection committee to move forward.
-Participated on the review team for the 2022 SHSP Update including Infrastructure and operations and local road safety elements.
-Coordinated with DOTD Office of Safety to provide technical assistance and capacity building to the Regional Safety Coordinators and Coalitions and SHSP stakeholders, including on-site visits; participation in coalition meetings; RSA training, and other activities in the Strategic Highway Safety Plan and/or regional action plans;
-Provided information to stakeholders regarding training opportunities from AASHTO TC3; NHI; FHWA; ITE; TRB; etc.
-Assisted DOTD in implementing the Roadway Departure Plan for local roads including training and technical assistance to local users;
-Presented two Road Safety Assessment workshops upon request for Regional Safety Coalitions as part of the SHSP Strategic Plan.
-Developed and presented revised LTAP Roadway Departure Workshop (in cooperation with the FHWA Resource Center) for Local Agency road owners and safety coalition partners at 9 locations, including Statewide RwD Plan, FoRRRwD pillars of safety, and field data collection.
-Partnered with DOTD Safety Section to determine feasibility of systemic or system-wide safety projects using Fugro data; Louisiana Highway Safety Research Group analytical assistance; contract assistance, etc.;
-Continued to support SHSP and related Infrastructure and Operations initiatives, including serving as Statewide Emphasis Area co-chair, Work Zone Safety Task Force member, and Next Generation Traffic Incident Management EDC initiative co-leader. Also served on the Executive Committee of the TRCC, Board of Louisiana Operation Lifesaver, NLTAPA Safety Work Group, and NLTAPA Safety Circuit Riders Users Group.
-Continued participation as a core member of the team developing the new Road Safety 101 for Louisiana; and on safety related LTRC Research Advisory Teams
-Promoted Local Road Safety Program through special bulletins and announcements on a monthly basis providing curated lists of training programs and other resources, and partner group activities such as LPESA, ITE, and APWA. Co-sponsored display booth with coalition coordinators for Destination Zero Deaths at the LMA and PJAL Conventions and LPESA Conferences.
-Presented at Deep South and Southern District ITE Meetings on Speed Management and Proven Safety Countermeasures.

FISCAL YEAR 2022-2023 PROPOSED ACTIVITIES

-Continue to promote and facilitate implementation of parish level road safety plans in at least 6 additional parishes.
-Manage the application submittal process of the Local Road Safety Program Highway Safety Improvement Program projects, conduct preliminary technical evaluation of applications, and tracking of projects through assignment of H numbers;
-Coordinate with DOTD Office of Safety to provide technical assistance and capacity building to the Regional Safety Coordinators, Coalitions, and other SHSP stakeholders, including on-site visits; participation in coalition meetings; RSA training, and other activities in the Strategic Highway Safety Plan and/or regional action plans;
-Review and provide information to stakeholders regarding training opportunities from AASHTO TC3; NHI; FHWA; ITE; TRB; etc.
-Assist DOTD in implementing the Roadway Departure Plan for local roads including training and technical assistance to local users;
-Present up to 6 Road Safety Assessment workshops upon request for Regional Safety Coalitions as part of the SHSP Strategic Plan.
-Develop and present one series of Safety Related workshops at up to nine locations XXXXXed LTAP Roadway Departure Workshop (based on FHWA Resource Center and EDC content) for Local Agency road owners and safety coalition partners at 9 locations.
-Partner with DOTD Safety Section to improve accessibility and utilization of roadway data, including improved methods for Traffic Counts, feasibility of systemic or system-wide safety projects using Fugro data; Louisiana Highway Safety Research Group analytical assistance; contract assistance, etc.;
-Continue to support SHSP and related Infrastructure and Operations initiatives, including serving as Statewide Emphasis Area co-chair, Work Zone Safety Task Force member, and additional safety related EDC initiatives.
-Continue participation as a core member of the team developing the new Road Safety 101 course for Louisiana; and LTRC Safety – Related Research Advisory Teams.
-Promote Local Road Safety Program through special bulletins and announcements on a monthly basis providing curated lists of training programs and other resources, and through partner group activities such as LPESA, ITE, and APWA.
-Promote new Crash Data tools being developed by the DOTD Highway Safety Section to local agencies and regional stakeholders. Develop additional accompanying analysis tools for use by locals in developing and implementing their safety plans.
-Work with FHWA and NLTAPA to host and/or participate in two multi-state Peer Exchanges related to road safety.

LTRC Annual Research Program
Fiscal Year 2022-2023

	2021 RPIC PROBLEM STATEMENTS
Final Ranking	**PROBLEM STATEMENT TITLE**
1	Economic Impact of Access Management Treatments: Driveway Consolidation
2	Evaluation of Embedded Pile Resistance on Scour Critical Bridges
3	Best Practices for Maintenance of Control of Access Fencing
4	Improving the Performance of Concrete Expansion Joints in Pavements
5	Evaluation of Louisiana Maintenance and Rehabilitation Treatment Decision Matrix for Cost-effective and Timely Pavement Preservation
6	Statewide Calibration of CPT Direct Design Methods Using Static Load Test Data
7	Evaluation of Louisiana's Systemic Safety Projects for Roadway Departures on Rural Curves
8	HCM Default Parameters
9	Evaluating the Effectiveness of Crosswalk Striping Pattern at Signalized Intersections in Louisiana
10	Review of Bridge Deck Scupper Drains
11	Safety and Traffic Operations at Cloverleaf Interchanges
12	Effectiveness of Additives and Mix Design on the Moisture Resistance of Asphalt Mixtures
13	LIDAR for Geotechnical Applications

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14	Evaluation of the Chemical and Rheological Properties of Asphalt Binder from Various Sources
15	Improved Incident Response through Coordinated, Interoperable Communications
16	Recycled polycarbonate as a partial sand replacement in concrete
17	Performance Serviceability Rating and Maintenance Cost Assignment for Ramps, Acceleration and Deceleration Lanes in Louisiana
18	Natural and Nature-based Features as Coastal Protection for Transportation Infrastructure
19	Human Mobility during COVID-19 and Implications for Active Transportation Planning in Louisiana
20	Innovations in Pedestrian Counting Technology