



Research Programs

FFY 2020 AT-A-GLANCE

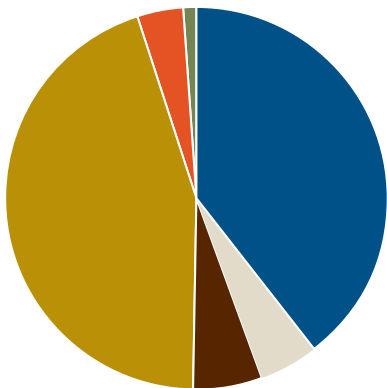
(October 1, 2019 - September 30, 2020)

The guiding mission of the Montana Department of Transportation (MDT) is to serve the public by providing a transportation system and services that emphasize quality, safety, cost-effectiveness, economic vitality, and sensitivity to the environment.

This publication provides an overview of research, development, and technology transfer activities for federal fiscal year (FFY) 2020 within MDT's Research Programs. These activities enhance MDT's ability to meet its mission and to deliver efficient and effective transportation services.

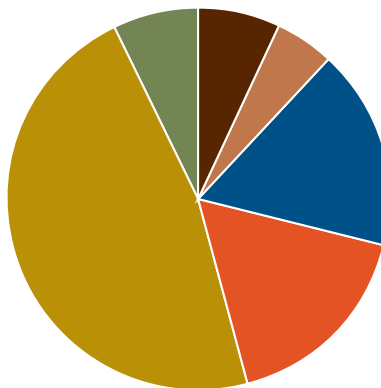
Summary of MDT Research Programs Expenditures

FFY 2020 Research Programs Expenditures by Funding Source
(includes pooled fund studies)



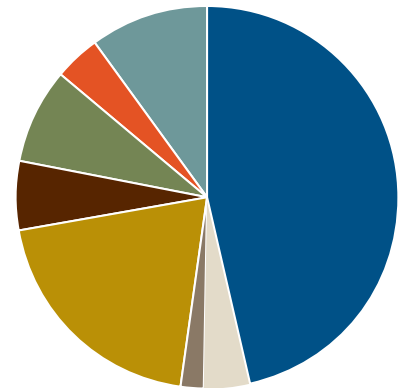
- FFY 2020 SPR-B Funds Total (80% or 100%) | 40%
- FFY 2020 SPR-A Funds Total (80% or 100%) | 5%
- FFY 2020 State Total (20%) | 6%
- FFY 2020 Other Federal Funds Total | 45%
- FFY 2020 Other State Funds Total | 4%
- FFY 2020 Consultant/Other Cost Share Total | 1%

FFY 2020 Research Programs Expenditures by Project Type



- AASHTO Technical Services Program | 7%
- LTAP | 5%
- NCHRP | 17%
- Pooled Funds | 17%
- Research Projects | 47%
- TRB Core Services Support | 7%

FFY 2020 Research Project Expenditures by Subject
(includes pooled fund studies)



- Bridge/Hydraulics | 47%
- Construction | 4%
- Environmental | 2%
- Geotechnical | 20%
- Maintenance | 6%
- Materials | 8%
- Safety | 4%
- Training/Technology Transfer | 10%

Bridge and Hydraulics Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2020 Expended
9696-700	Bridge Deck Cracking Evaluation	Wiss, Janney, Elstner and Associates	Callejas	8/6/19	12/31/20	\$226,977	\$185,092
9630-628	Concrete-Filled Steel Tube to Concrete Pile Cap Connections: Further Evaluation/Improvement of Analysis/Design Methodologies (Phase IV-V)	Montana State University	Callejas	7/10/18	9/30/22	\$256,000	\$30,986
9831-765	Development of Deterioration Curves for Bridge Elements in Montana	Montana State University	Callejas	8/5/19	1/31/22	\$83,000	\$22,595
9757-705	Evaluation of Thin Polymer Overlays for Bridge Decks	Wiss, Janney, Elstner and Associates	Callejas	1/22/20	3/31/23	\$83,000	\$40,601
9578-606	Feasibility of Non-Proprietary Ultra-High Performance Concrete (UHPC) for Use in Highway Bridges in Montana – Phase 2: Field Application	Montana State University	Callejas	3/20/18	12/31/20	\$162,000	\$30,545
9890-784	A Feasibility Study of Road Culvert Bridge Deck Deicing Using Geothermal Energy	Montana State University	Callejas	7/13/20	12/31/23	\$235,000	\$2,310
9790-727	Monitoring Streamflow Using Video Cameras	United States Geological Survey	Callejas	8/5/19	1/31/22	\$153,600	\$46,255
9353-511	Regional Regression Equations Based on Channel-Width Characteristics to Estimate Peak-Flow Frequencies at Ungauged Sites Using Data Through Water Year 2011	United States Geological Survey	Callejas	2/1/17	5/28/21	\$240,000	\$0
TBD	Exploration of UHPC Applications for Montana Bridges	TBD	Callejas	TBD	TBD	TBD	N/A
TBD	Feasibility of Non-Proprietary Ultra-High Performance Concrete (UHPC) for Use in Highway Bridges in Montana: Implementation	TBD	Callejas	TBD	TBD	TBD	N/A

Construction Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2020 Expended
9344-723	Effective Production Rate Estimation and Activity Sequencing Logics Using Construction Daily Work Report Data: Phase 2	Texas Transportation Institute	Sillick	6/7/19	12/31/20	\$50,000	\$39,880
TBD	Artificial Intelligence (AI) based Tool to Estimate Contract Time	TBD	Callejas	TBD	TBD	TBD	N/A

STATUS KEY: Active Completed Proposed

Environmental Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2020 Expended
9596-617	Testing Wildlife-Friendly Fencing Modifications to Manage Wildlife and Livestock Movements	University of Montana	Callejas	6/19/18	02/28/21	\$247,259	\$19,312
5896-423	MDT Wildlife Accommodations Process	N/A	Sillick	2/14/19	10/31/24	\$0	N/A
TBD	Effective Wildlife Fences through Better Functioning Barriers at Access Roads and Jump-Outs	TBD	deMontigny	TBD	TBD	TBD	N/A

Finance/Revenue Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2020 Expended
TBD	Economic Benefits of Improving Montana's Transportation Infrastructure	TBD	Callejas	TBD	TBD	TBD	N/A

Geotechnical Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2020 Expended
9564-602	Large-Scale Laboratory Testing of Geosynthetics in Roadway Applications	Montana State University	Callejas	2/21/18	12/31/20	\$450,073	\$150,801
9389-522	Guidelines for Chemically Stabilizing Problematic Soils	Boise State University	Callejas	4/21/17	2/29/20	\$168,808	\$23,552
9389-522	Guidelines for Chemically Stabilizing Problematic Soils	Sillick	Sillick	5/21/20	3/1/22	\$0	N/A

Information Services Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2020 Expended
TBD	Analyze Business Models for Implementation and Operation of a Statewide GNSS Real-Time Network	TBD	Callejas	TBD	TBD	TBD	N/A

Materials Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2020 Expended
9577-607	Alkali-Silica Reactivity in the State of Montana	Montana State University	Callejas	4/6/18	1/31/21	\$109,900	\$84,275

STATUS KEY: Active Completed Implementation Proposed

Safety Research Projects

Project Number	Title	Consultant	MDT Project Manager	Start Date	End Date	Total Cost	FFY 2020 Expended	
9679-699	Developing a Methodology for Safety Improvements on Low-Volume Roads in Montana	Montana State University	Callejas	2/15/19	3/31/21	\$134,877	\$29,086	
9832-766	Effectiveness of Highway Safety Public Education at Montana Motor Vehicle Registration Stations by Streaming a Variety of Safety Content	Montana State University	Callejas	3/15/20	10/31/21	\$240,656	\$27,072	
9891-785	Icy Road Forecast and Alert (IcyRoad): Validation and Refinement Using MDT RWIS Data	University of Montana	Callejas	7/13/20	3/31/22	\$84,000	\$14,919	
8882-309	Traffic Safety Culture Transportation Pooled Fund (TSC-TPF) Program – Phase 1	Montana State University	Sillick	10/1/14	9/30/22	\$1,194,000	\$156,841	
POOLED FUND 8882-309 SUBPROJECTS	8882-309-14	Guidance for Evaluating Traffic Safety Culture Strategies	Montana State University	Sillick	2/2019	2/2021	\$62,426	\$31,650
	8882-309-15	Guidance on Messaging to Avoid Reactance and Moral Disengagement	Montana State University	Sillick	2/2019	4/2021	\$149,378	\$91,641
	8882-309-16	Guidance to Promote Workplace Policies and Family Rules to Reduce Cell Phone Use While Driving and Promote Engaged Driving	Montana State University	Sillick	7/2019	6/2021	\$167,968	\$38,540
	8882-309-10	Key Information for DUIC Policy	Montana State University	Sillick	7/2018	10/2019	\$12,032	\$0
	8882-309-12	Proactive Traffic Safety: Empowering Behaviors to Reach our Shared Vision of Zero and Serious Injuries	Montana State University	Sillick	7/2018	10/2019	\$37,299	\$0
	8882-309-11	Traffic Safety Culture Primer	Montana State University	Sillick	7/2018	10/2019	\$50,447	\$0
	8882-444	Traffic Safety Culture Transportation Pooled Fund (TSC-TPF) Program – Phase 2	Montana State University	Sillick	10/1/19	9/30/24	\$1,430,000	\$27,083
9833-767	Use of Fluorescent Orange Delineators in Temporary Traffic Control Work Zones	Montana State University	Callejas	4/1/20	6/15/22	\$205,320	\$0	
	Safety Evaluation of Sinusoidal Centerline Rumble Strips	TBD	Callejas	TBD	TBD	TBD	N/A	

Annual Programs

Project Number	Title	MDT Contact	Start Date	End Date	FFY 2020 Cost
AASHTO TECHNICAL SERVICES PROGRAM					
7831	AASHTO Technical Services Program	Sillick	10/1/19	9/30/20	\$106,434
ADMINISTRATION					
8010	Administration and Conduct of Research	Sillick	10/1/19	9/30/20	\$317,605
8020	Administration and Conduct of Research	Sillick	10/1/19	9/30/20	\$39,209
8021	Administration and Conduct of Research	Sillick	10/1/19	9/30/20	\$80,112
9529-589	MDT Consultant Project Management	Sillick	6/1/19	6/30/20	\$148,374

STATUS KEY: Active Completed Proposed

Annual Programs (continued)

Project Number	Title	MDT Contact	Start Date	End Date	FFY 2020 Cost
LOCAL TECHNICAL ASSISTANCE PROGRAM					
2443-037	Montana Local Technical Assistance Program (LTAP)	Sillick	7/1/19	6/30/20	\$380,000
TRANSPORTATION RESEARCH BOARD SUPPORT					
TPF-5(450)	TRB Core Services	Sillick	10/1/19	9/30/20	\$109,301

Experimental Projects

All Experimental Projects are managed by Craig Abernathy or Jeremy Schneidt.

Pending Experimental Projects have not yet been constructed. Proposed Experimental Projects do not yet have a project assigned.

Project Number	Experimental Project Number	Title	Project Type	Technical Contact	Construction Year	End Date
IM 15-5(124)282	N/A	3/8" Asphalt Cement Mix Placement with No Chip Seal	Asphalt Concrete Pavement Evaluation	N/A	2017	2022
N/A	MT-17-04	Centerline Rumble Strip	Centerline Rumble Strip	Juelfs	2017	2023
STPP 6-1(156)99 STPP 6-1(154)109	MT-19-02	CRS-2P and CHFRS-2P Chip Seal Field Comparison	Chip Seal (CS) Performance	Dold	2019	TBD
IM 15-6(43)323 STPS 218-1(11)0	MT-18-03	Evaluation of Crafcoc Mastic One Hot Applied Sealant	Crack Seal and Pavement Repair	N/A	2020	TBD
UPPIP 1017(2)7 UPPIP 1029(4)	MT-18-03	Fiber Reinforced Asphalt Cement	Sasobit-Aramid Fiber Reinforced Asphalt Cement	N/A	2018	2023
NH 12-1(20)0 UPN 8762000	MT-15-01	Fog Seal Chip Retention Evaluation	Fog Seal on Chip Seal	N/A	2017	2022
IM 90-1(220)6	MT-18-02	Fog Seal Over Chip Seal Evaluation	Fog Seal on Chip Seal	N/A	2017	2022
NH 1-6(123)355	MT-18-05	High Float vs. Polymer Modified Emulsion Seal and Cover With and Without a Fog Seal	Fog Seal/Chip Seal Emulsion Comparison	N/A	2020	TBD
STPP86-1(55)10	MT-19-03	JOINTBOND Asphalt Joint Stabilizer	Centerline Joint Stabilizer Treatment	Murfitt	2019	TBD
STPP-NHTSA 3-3(23)6 STPP 9-1(20)40	N/A	Maintenance Asphalt Surface Treatments	Pavement Surface Treatments	Juelfs	2014	2021
STPP 87-1(11)0	MT-15-02	RoadDrain Geocomposite for Added Subsurface Drainage	Geocomposite Application	N/A	2016	2022
IM 90-1(215)0	N/A	Seal Coat Asphalt Emulsion (or Fog Seal Coating) Over Chip Seal for Improved Chip Retention Evaluation	Resurfacing – Seal and Cover	N/A	2015	2021
UPN 9370	MT-18-02	Sinusoidal Centerline Rumble Strip	Centerline Sinusoidal Rumble Strip	N/A	2018	2023
STPP 20-2(31)62	MT-20-03	SKAPS GT116N Nonwoven Textile Bond Breaker	Nonwoven Textile Bond Breaker CTB/PCCP	N/A	2020	TBD

STATUS KEY: Active Completed Proposed

Experimental Projects (continued)

Project Number	Experimental Project Number	Title	Project Type	Technical Contact	Construction Year	End Date
IM 90-1(205)59	MT-13-14	Sprayroq-SprayWall Polyurethane Applied Lining for Culvert Rehabilitation	Culvert Rehabilitation	N/A	2017	2022
STPP 17-1(10)11	MT-18-05	T15 Base One Soil Stabilization	Full-Reclamation Chemical Soil Stabilization	N/A	2018	2023
8978000 UPP 5201(24)	MT-17-03	TenCate Mirafi MPV400 Polypropylene Nonwoven Geotextile	Milled Overlay with Paving Fabric	N/A	2017	2022
NHIP-NHPBIP 8-4(66)86 STPP 6-1(126)57	MT-14-01	Electric Wildlife Deterrent Mat	Wildlife Crossing Structure	N/A	2020	TBD
STPP 86-1(27)0	MT-17-05	Nomaflex Concrete Joint Filler Evaluation	Concrete Expansion Joint	N/A	Pending 2021	TBD
UPN 7953	MT-18-07	Reflective Cracking in Cement-Treated Bases Minimization by Microcracking Evaluation	Cement Treated Base	N/A	Pending 2021	TBD
IM 94-6(59)193	MT-18-06	Surfacing In-Slope Treatment Evaluation	Topsoil Surfacing Comparison	N/A	Pending 2021	TBD
N/A	N/A	Expanded Polystyrene Geofoam Blocks as Lightweight Fill	N/A	N/A	N/A	N/A
N/A	N/A	Prefabricated Steel Truss/Bridge Deck System	N/A	N/A	N/A	N/A
N/A	N/A	Roundabout Striping Durability Trials	N/A	N/A	N/A	N/A
N/A	N/A	Texas Underseal with Added Scrub Seal	N/A	N/A	N/A	N/A
N/A	N/A	Weather-Activated Detection System	N/A	N/A	N/A	N/A
N/A	N/A	Yellow-Dyed Concrete Curbing to Replace Epoxy-Applied Curbing	N/A	N/A	N/A	N/A

Transportation Pooled Fund Studies

Project Number	Title	MDT TAC Member	Lead Agency	# of Partners	Start Date	End Date	Total MDT Commitment	FFY 2020 Expended
TPF-5(349)	Western Alliance for Quality Transportation Construction	Metcalfe	UT DOT	11	6/27/17	9/30/21	\$48,000	\$12,000
TPF-5(353)	Clear Roads Phase II	McBroom	MN DOT	36	1/1/17	12/30/21	\$125,000	\$25,000
TPF-5(376)	Northwest Passage Phase #4	McBroom	MN DOT	6	2018	2022	\$100,000	\$25,000
TPF-5(391)	Comprehensive Field Load Test and Geotechnical Investigation Program for Development of LRFD Recommendations of Driven Piles on Intermediate GeoMaterials	Helm	WY DOT	7	2/19/19	12/31/23	\$45,000	\$15,000
TPF-5(394)	Western Maintenance Partnership – Phase 3	McBroom	UT DOT	6	1/2019	6/2024	\$15,000	\$5,000

STATUS KEY: Active Completed Pending Proposed

Transportation Pooled Fund Studies (continued)

Project Number	Title	MDT TAC Member	Lead Agency	# of Partners	Start Date	End Date	Total MDT Commitment	FFY 2020 Expended
TPF-5(399)	Improve Pavement Surface Distress and Transverse Profile Data Collection and Analysis, Phase II	Padmos	FHWA	20	4/2019	9/2025	\$75,000	\$15,000
TPF-5(437)	Technology Transfer Concrete Consortium (FY20-FY24)	Needham	IA DOT	34	1/1/20	12/31/25	\$48,000	\$12,000
TPF-5(447)	Traffic Control Device (TCD) Consortium (3)	Brelin	FHWA	22	2/12/20	2/12/25	\$30,000	\$10,000
TPF-5(454)	Updating U.S. Precipitation Frequency Estimates for the Northwest	Hedstrom	FHWA	2	6/3/20	12/31/23	\$267,040	\$133,520

AASHTO Technical Services Programs

Title	MDT Contact	Annual MDT Funding
AASHTO Equipment Management Technical Services Program (EMTSP)	Kerttula	\$5,000
AASHTO Innovation Initiative (All) Technical Services Program	Sillick	\$6,000
AASHTO Load and Resistance Factor Design (LRFD) Bridges and Structures Specification Maintenance (LRFDSM) Technical Services Program	Brandenberger	\$15,000
AASHTO National Transportation Product Evaluation Program (NTPEP) Technical Services Program, includes AASHTO Product Evaluation List (APEL)	Metcalfe	\$20,000
AASHTO re:source (formerly AASHTO Materials Reference Laboratory (AMRL) Technical Services Program)	Metcalfe	\$20,000
AASHTO Technical Service Program to Develop AASHTO Materials Standards (DAMS)	Metcalfe	\$10,000
AASHTO Transportation System Preservation Technical Services Program (TSP2)	Padmos	\$20,000
AASHTOWare Project Data Analytics	Durbin	\$277,475

MDT Library

The MDT Library and technology transfer functions, managed by Bobbi deMontigny, are located within the Department's Research Programs to capture and make accessible transportation-related information, particularly that which relates to the needs of MDT staff.

Library Collection Analysis by Item Type

Item Type	Number of Items
Book	21,490
CD	396
Digital	8,944
DVD	257
Journal	1,110
Kit	20
Map	5
Media Equipment	10
OverDrive	359
Pamphlet	13
TOTAL	32,604

Library Circulation by Item Type

Item Type	Total Circulation
Book	167
CD	16
Interlibrary Loan Borrowed	25
Interlibrary Loan Lent	7
Media Equipment	12
OverDrive Audio & E-Books	283
TOTAL	510

Digital resources are not included in the circulation statistics. Please see the last page for the number of users accessing the library digitally.

STATUS KEY: Active Completed Proposed



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MDT

To view the MDT Research Programs Annual Reports, please visit the MDT website at www.mdt.mt.gov/research/annual_report.shtml.

RESEARCH PROJECTS

29

Active research contracts

6

Research reports

7

Number of new research projects in 2020

9

MDT-supported pooled fund studies

64

Active Technical Panel members

EXPERIMENTAL PROJECTS

17

Active experimental projects

2

Number of new experimental projects in 2020

LIBRARY

887

Unique library catalog visitors

1,114

Unique library catalog visits

2,065

Unique library catalog searches

624

Weekly distributions

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