



Economies, Efficiencies & Innovations

Reported Savings: 2010 to 2015

Michigan Department of Transportation

Year	Estimated Annual Savings for State	Estimated Annual Savings to Others
Cumulative 2010 to Present	\$596,518,867	\$25,856,978
2010	\$87,057,957	Not counted
2011	\$71,357,957	Not counted
2012	\$86,251,290	Not counted
2013	\$79,718,920	\$13,294,988
2014	\$166,172,066	\$10,698,988
2015	\$105,960,677	\$1,863,002
2016		
2017		
2018		
2019		
2020		
<i>Data last updated March 9, 2016</i>		

2015 Economies, Efficiencies & Innovations Quantified Savings



Description	Office or Region	Innovation Category	Initial Year of Savings	Savings Expiration Year	Estimated Annual Savings for State	Estimated Annual Savings to Others
<p>AADT Map Process Shifted from PDF to GIS Based Interactive Maps - Annual traffic volume (AADT) maps have been provided in .PDF format. Staff substituted an interactive Geographic Information System (GIS) application, reduced staff time to provide the information by 90% from 400 hours to 40 hours.</p>	Planning	Asset Mgt. & Planning	2015	2020	\$12,000	
<p>GIS Map Service - Staff implemented a State of Michigan Geographic Information System (GIS) Map service in 2015 allowing public access to multiple years of traffic volume estimates, improving access and reducing staff time spent on data requests.</p>	Planning	Asset Mgt. & Planning	2015	2020	\$5,000	
<p>Rapid Chloride Test Kit - Field analysis of chloride in reinforced concrete is a five minute test with accuracy comparable to the AASHTO T260 laboratory test. Quick determination of chloride content allows quick assessment of issues related to reinforcement corrosion. Typically samples sent to lab cost \$100 each with a two week turnaround. This method has a unit cost of \$10. Ten to 15 samples are typically taken for a chloride distribution map for each structure investigated. At least three structural investigations per year are anticipated for 2016-2020. (2015 savings: 3 structures x 10 samples x \$90 = \$2700)</p>	Statewide	Bridges & Structures	2015	2020	\$2,700	

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<p>Salt Reporting - Began using a salt reporting schedule created by a Maintenance Superintendent. By tracking salt usage monthly, how much salt was used per winter storm event can be known. This helps track remaining stored salt levels. This system also makes it possible to determine the rate of salt being applied so adjustments can be made to stay in alignment with required/recommended usage.</p>	Bay Region	Highway Maintenance	2015	2020	\$1,000,000	
<p>Bay Region Communications - Using smart phones for email, text, camera and internet provide faster maintenance response.</p>	Bay Region	Highway Maintenance	2014	2020	\$12,000	
<p>Bike Map e-Store - Over 600 map requests at \$5 each generated annual savings from not contracting map mailing services. Additionally, processing time has been cut from 6 weeks to less than 1 week (2-4 day turnaround).</p>	Statewide	Non-Motorized	2014	2020	\$18,000	
<p>Bridge Repairs - Fabricated a float to allow riprap installation in scour areas of culverts or small bridges. Riprap prevents debris from falling into the water and can be loaded into the float on the road, put into the river with a crane truck and floated into the culvert/bridge. When the float is above the scoured location, a ripcord can be pulled that drops the riprap into place.</p>	Bay Region	Bridges & Structures	2014	2020	\$900,000	

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Building Utility Usage - From May 2013, graphs were displayed showing utility usage at multiple facilities to readily track all utility usage and alert staff to spikes in usage.	Bay Region	Other	2014	2020	\$1,200	
Concrete "Take-Off" Calculator - A spreadsheet was developed to convert concrete pay items from a proposal into concrete volumes for different mixes. Concrete volumes are useful in planning lot size and testing quantities. Conversion from individual pay quantities requires reference of different standard plans and special details, hand calculating each pay item in turn. Approximately \$2,500 will be saved in meeting preparation during a construction season.	Statewide	Highway Design	2014	2020	\$2,500	
Concrete Patch Drilling - Concrete pin drill with three drills instead of just one cuts drilling time in half, allowing maintenance crews to complete work sooner and reducing the cost of repairs.	Statewide	Highway Maintenance	2014	2020	\$12,000	
E-Mail Pre-Production Meetings - Pre-production meetings for small quantity jobs are held using e-mail to contact interested parties and solicit comments. Comments are then synthesized into final minutes and distributed. The method saves time and transportation costs to MDOT and contractors and suppliers.	Statewide	Highway Maintenance	2014	2020	\$2,300	

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<p>Energy Savings - Installed LED lights in many facilities and all signals to reduce overall energy usage and costs. Additionally, LED lights require re-lamping approximately every seven or eight years instead of annually.</p>	Bay Region	Highway Maintenance	2014	2020	\$500	
<p>E-Poke system for Winter Maintenance on Zilwaukee Bridge - Formerly the Zilwaukee Bridge had only one truck available for de-icing. Now a second truck equipped to apply material allows for a spare truck if one goes down or use of both to complete the application in half the time.</p>	Bay Region	Highway Maintenance	2014	2020	\$50,000	
<p>Inter-Agency Catch Basin Crews - During Summer 2014, maintenance coordinators at TSC's partnered with staff from county road commissions and municipalities for catch basin cleanout. Compared to prior years with private vendors, the new method was more cost effective and provided a higher quality outcome.</p>	North Region	Highway Maintenance	2014	2020	\$15,000	
<p>Mobile Office Technician - Doing Office Tech from the field using mobile devices allows more time on site with inspectors, giving guidance and being familiar with the projects being reported.</p>	Bay Region	Highway Maintenance	2014	2020	\$6,000	

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<p>Online Utility and Right of Way Permitting Using the Construction Permit System (CPS) - MDOT transitioned from permitting via paper/postal to permitting exclusively online. Monetary savings are mostly related to time processing via paper and preparing mail related to permits.</p>	Statewide	Other	2014	2020	\$3,000	
<p>Performance Based Rest Area Contract - Developed a performance-based rest area maintenance contract for Topinabee and Hebron rest areas which pays the contractor a fixed amount to maintain the facilities, then measures their performance against set condition standards. If standards are not met, the contractor is penalized. Savings were over 15%.</p>	North Region	Highway Maintenance	2014	2020	\$18,000	
<p>Pothole Patching Mix - Purchased asphalt recycler to recycle broken asphalt during winter months when asphalt plant is closed. Allows maintenance crews to apply a hot mix during the cold weather months and spend less time fixing pot holes.</p>	Statewide	Highway Maintenance	2014	2020	\$4,000	
<p>Premixing Salt - Premixing salt with boost allows salt to work faster, reducing the time it takes to clean up winter storm events. Prewetting salt also reduces the amount of salt needed and helps keep salt from scattering out of lanes.</p>	Statewide	Highway Maintenance	2014	2020	\$36,500	

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Reorganization - Lease savings from closure of eight facilities in 2011.	Statewide	Other	2014	2020	\$547,963	
Restructure STF - MDOT restructured the State Trunkline Fund (STF) refunding bond deal to obtain a lower interest rate on debt. The new rate saved over 16% or \$9.4 million. The debt service savings was front loaded in FY 13 at \$2.6 million and just over \$810,000 debt service savings from FY14 through FY22.	Statewide	Finance & Contracts	2014	2020	\$90,000	
Utility Usage - Bay Region disconnected one phone and one fax line in 2014.	Bay Region	Other	2014	2020	\$1,613	
Adobe Connect - For Web meetings, training and webinars to reduce travel expenses.	Statewide	Other	2013	2020	\$818,510	
ITS Device Asset Management Database - ITS assets (19,000+) were added to a central database used for project planning, work order creation and tracking, device inventory and device maintenance. The database can be accessed by Traffic Operations Center staff, maintenance personnel, and MDOT. Annual savings estimates are based on decreased time creating work orders, faster response time to work orders, and decreased time creating system reports.	Statewide	Asset Mgt. & Planning	2013	2020	\$120,000	

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<p>Maintenance Decision Support System (MDSS) - MDSS enables better informed decisions before and during winter weather. The combination of sensors mounted on winter maintenance vehicles relay information to a software program that gives employees accurate data about road conditions in real time, increasing efficiency of salting and plowing.</p>	Statewide	Highway Maintenance	2013	2020	\$100,000	
<p>Recycling Scrap Metal - The scrap metal salvage program has saved \$343,000 in five years.</p>	Statewide	Highway Maintenance	2013	2020	\$86,000	
<p>Tow Plows - New snow removal equipment and technique in which an additional plow is attached to the side of a plow truck to almost double cleared area per pass. This saves trucks, staffing and fuel.</p>	Statewide	Highway Maintenance	2013	2020	\$200,000	
<p>Freeway Lighting Rebates - MDOT participates in utility plans that provide incentive rebates for reducing energy costs on lighting replacement projects. Rebates are based on the difference costs between existing lighting and light emitting diodes (LED). LED bulbs also last much longer than the existing light fixtures.</p>	Statewide	Highway Design	2012	2020	\$13,333	
<p>Snowplow Speed - MDOT is revising snowplow speed guidelines to improve snow removal and de-icing, which is expected to save \$13 million annually.</p>	Statewide	Highway Maintenance	2012	2020	\$13,000,000	

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GPS Unit - Purchased a Geographic Positioning System unit to facilitate wetland delineation, locate new tree plantings and evaluate noxious weed spraying.	Bay Region	Environmental	2014	2018	\$8,000	
Skype - Used <i>Skype</i> and <i>Facetime</i> for out of state candidate interviews. This worked much better than standard phone interviews as a face could be placed with the answers.	Bay Region	Other	2014	2018		\$2,000
Smart Phone Apps - Using a smart phone application to collect locations of invasive species into a Geographic Information System file. The spray crew will use this inventory to seek the most effective way of treating invasive plants. This also allows spray crews to monitor the effects of treatment and find the most effective treatments for each species.	Bay Region	Environmental	2014	2018	\$2,500	
Tracking Spreadsheet - An <i>Excel</i> spreadsheet to monitor planned and actual milestone dates for all projects requiring right of way. Used at status meetings to give a visual aid when discussing projects.	Bay Region	Real Estate	2014	2018	\$12,000	
State Trunkline Funds (STF) Bond Refinancing - Refinanced \$64.5 million in STF bonds to achieve savings of \$14.8 million over remaining life of the bonds based on present day value.	Statewide	Finance & Contracts	2016	2016	\$14,765,709	

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Digitizing 1992-2006 CPM Proposals and storing in ProjectWise - For quicker access to the project information.	Highways	Asset Mgt. & Planning	2015	2016	\$750	
Freeway Lighting P3: A public-private partnership contract (15 years) for upgrading and maintaining freeway lighting in the Detroit tri-county area was finalized. The lighting/fixture upgrade portion of the contract will result in an overall savings to MDOT of approximately \$13 million. The freeway lighting system will be improved over a 2 year period. Operations and maintenance responsibility will remain with the contractor and commence after improvements are complete and continue for the remaining 13 years.	Highways	Finance & Contracts	2015	2016	\$13,000,000	
Adopt-A-Highway (AAH) - Seven landfills are currently serving MDOT Southwest Region's AAH program at no cost. The overall savings of this practice is estimated at \$14,145 each year (which varies from season to season).	Southwest Region	Highway Maintenance	2014	2016	\$14,145	

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<p>Loader/Grader - A loader outfitted with a plow and wing to determine if this equipment combination can push open closed roadways and bench snow during intense snow events. If proven effective, when no longer repairable MDOT's fleet of grader's with plows and 12' blades can be turned in for salvage/sale and be replaced with this equipment.</p>	Southwest Region	Other	2013	2016	\$100,000	
<p>Property Damage Reclamation Process (PDRP) - Created in 2007, enables MDOT to search the Michigan State Police <i>Traffic Crash Reporting System</i> (TCRS) for crashes on state trunklines with potential damage. At the time TCRS was accessible only to MDOT. In 2012 a Web based program enabled MDOT and Contract Local Agencies to work within the system. Operation Field Services (OFS) hired a second Coordinator to increase processing claims. By 2013, PDRP was the focus of lost potential reimbursement, leading to an increase of damage costs returned and submitted to Finance. Performance measures and training for MDOT Regions and Local Agencies has provided better understanding of the importance of PDRP and increased reimbursement returns.</p>	Statewide	Asset Mgt. & Planning	2013	2016	\$5,115,192	\$1,300,000

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<p>Asset Management Lite - An iPad application was downloaded to store location data and photos of tree removal sites. From this, a spreadsheet or other format can be provided to direct users to locational information.</p>	University Region	Highway Maintenance	2015	2015	\$50,000	
<p>AVL & Maintenance Decision Support System (MDSS) - Tools allow improved maintenance decision making for MDOT direct garages and plow truck operators. Sharing AVL salt speed compliance reports yields increased salting efficiency of about 5% from start of FY2015 winter through the year for direct force garages. Non-quantified savings include ability to more accurately plan for or reduce overtime based on MDSS forecasts.</p>	Statewide	Highway Maintenance	2015	2015	\$375,000	
<p>Bike Map e-Store - Per order savings due to switch from contracted map mailing service to e-store on almost 900 individual map requests contract costs. Processing time was also cut from six weeks to a two to four day turnaround.</p>	Planning	Non-Motorized	2015	2015	\$4,500	

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Carpool Lot Partnership - MDOT partnered with <i>Meijer Corp.</i> to add additional lots to the carpool lot agreement. Each store will provide parking for up to 50 commuters and save the department approximately \$300,000 in construction and real estate costs.	Statewide	Highway Operations	2015	2015	\$900,000	
Complete Streets Advisory Council - Eliminated unnecessary meetings with concurrence of the committee and chair.	Planning	Other	2015	2015	\$17,000	6,000
Comprehensive Transportation Fund (CTF) Bond Refinancing - Refinanced \$32.8 million of CTF bonds to achieve savings of \$4.7 million based on present day value over remaining life of bonds.	Statewide	Finance & Contracts	2015	2015	\$4,711,020	
Cross Boundary Construction Engineering - Cadillac TSC provided full construction management (engineering, inspection, testing) on an M-115 project in the Bay Region Mt. Pleasant TSC area. Collaborative effort built the project with minimal contractual/bureaucratic issues. This was the first project managed by an office from another region.	North Region	Highway Maintenance	2015	2015	\$30,000	
Deployed 2 Modified Superior Region Style Salt Spreaders	University Region	Highway Maintenance	2015	2015	\$10,000	
Deployed 5 Dual Wing Winter Maintenance Trucks	University Region	Highway Maintenance	2015	2015	\$25,000	

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Deployed 6 Tow Plows	University Region	Highway Maintenance	2015	2015	\$90,000	
Deployed 8 Zero Velocity Salt Spreaders	University Region	Highway Maintenance	2015	2015	\$39,000	
Detailed Bridge Inspection for High Load Hit - Measuring deformation of damaged beams (out of plane bending, flange bending, and under clearance) using LIDAR on the freeway shoulder in lieu of hand measurements and associated lane	Metro Region	Highway Maintenance	2015	2015	\$7,200	
Detroit Project and MCD Fellowship - Public private partnership for vacant land blight removal and workforce development project in Detroit	Metro Region	Other	2015	2015		31,000
Digitizing 1991-2005 PMS Video Tapes - Internally instead of contractor/consultant.	Highways	Asset Mgt. & Planning	2015	2015	\$95,000	
Epoxy Injection M-95 Over Menominee River - MDOT crew epoxy injected existing delaminated areas on bridge deck in lieu of concrete deck overlay. Per IowaDOT, epoxy injection structurally bonds concrete areas. Projected to defer need for a deck overlay or deck replacement for 5 to 10 years. Bridge was opened to traffic earlier due to elimination of cure times for a concrete overlay.	Superior Region	Bridges & Structures	2015	2015	\$200,000	

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Extending oil change intervals on newer fleet vehicles: Piloted at St. Ignace garage but not yet approved for widespread implementation by Fleet Team in Lansing.	Superior Region	Highway Maintenance	2015	2015	\$3,400	
Federal Emergency Mgt. Agency (FEMA) Homeland Security Grant Program Urban Area Security Initiative - Grant instead of state funds used to purchase portable generator to maintain pump house operations during power outages. [Safety & Security Administration]	University Region	Highway Safety	2015	2015	\$80,000	
Federal Emergency Mgt. Agency (FEMA) Homeland Security Grant Program Urban Area Security Initiative - Grant instead of state funds used to purchase traffic signal modules to coordinate signal timing during emergencies. [Safety & Security Administration]	University Region	Highway Safety	2015	2015	\$48,490	
Freeway Lighting Panel and Energy Invoice Inventory - Use of ArcGIS to determine MDOT Freeway lighting inventory	Metro Region	Asset Mgt. & Planning	2015	2015	\$1,560	

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<p>Geotechnical Investigations for Signal & Strain Pole Foundations - Give experienced soils crews latitude to vary the depth of soil on-site exploration allows sufficient data to be gathered. Improves productivity and minimizes data on which to perform quality assurance, store and manage while providing safe facilities for driving public. Savings are realized over a several months where many test hole depths were reduced.</p>	Metro Region	Highway Design	2015	2015	\$15,000	
<p>GPS Location of Concrete Patch Repair Projects - Global Positioning System (GPS) unit was used to identify location and fix type for all bidders as documentation. Low bidder was 9.25% below engineer estimate and indicated GPS information was very useful for estimating the cost/maintenance of traffic and a contributing factor to the lower bid.</p>	Metro Region	Highway Maintenance	2015	2015	\$117,000	
<p>Grant Application Completeness Verification - Implemented validations in MDOT Grant System to require certain document types be added before allowing application submission. Time of MDOT grant coordinator, Metropolitan Planning Organization and Michigan Fitness Foundation Grant Coordinator is saved in verifying all requirements are met so further applicant contact is not required.</p>	Statewide	Finance & Contracts	2015	2015	\$5,280	\$1,980

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Ground Penetrating Radar & Falling Weight Deflectometer - Equipment used to assist detection of voids under pavement.	Highways	Other	2015	2015	\$1,000	
Ground Penetrating Radar and Falling Weight Deflectometer Vehicle - First year of using both combined into one unit.	Highways	Other	2015	2015	\$2,500	
Implementation of Mechanistic-Empirical (ME) Pavement Design - For reconstruct designs. ME is the latest generation of pavement design methodologies. It utilizes the theories of mechanics of materials to predict a pavement's response to load. This is then correlated into accumulated damage over the design life and results in predicted distresses over time. Climatic conditions are taken into account through the material properties of constituent pavement layers. Finally, the models used to predict distresses are calibrated using observed distress amounts (the empirical portion of the name).	Highways	Highway Design	2015	2015	\$290,000	
I-94/I-69 Interchange - After reviewing actual site conditions, it was determined that one retaining wall could be redesigned from a 40 foot tall, pile supported wall to a shorter spread footing supported slope wall.	Metro Region	Highway Construction	2015	2015	\$2,000,000	

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Improved Drainage Structure Adjustment - Using core drill to remove hot mix asphalt and replace with concrete. Savings to utility companies \$500/Structure.	Southwest Region	Highway Maintenance	2015	2015		\$500
Interchange Swath Mowing - Alternative mowing method piloted for M-10/I-696/Telegraph interchange limits mowing to 15 foot swaths to promote green structure and habitats for pollinators, improve erosion control and reduce mowing cost.	Metro Region	Highway Maintenance	2015	2015	\$8,800	
Longitudinal Joint Repairs - Various new longitudinal joint repairs have been researched/utilized to improve ride quality and minimize impacts to driving public. Significant cost saving over mill and fill method is reported. As yet unable to calculate savings in user delay costs.	Metro Region	Highway Maintenance	2015	2015	\$44,761	
Magnetic Garage Door Switch - To automatically turn furnace off when garage doors are open.	Southwest Region	Other	2015	2015	\$65,520	

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<p>Mio-Vision Technology - Asset Mgt. Div. Data Collection & Analysis Section used <i>Mio-Vision</i> units to record vehicle classification and intersection turning movement data using a camera sensor. Data is transmitted back to <i>Mio-Vision</i> which processes and returns a formatted file. Units allow one person to perform seven class counts for same cost as the one traditional class count.</p>	Statewide	Asset Mgt. & Planning	2015	2015	\$170,000	
<p>Mobile Mechanic - Adrian and Brighton</p>	University Region	Highway Maintenance	2015	2015	\$59,000	
<p>Non-Routine Use of YDMP Staff - The <i>Youth Development and Mentoring Program</i> (YDMP) has been used to perform activities not conforming to any other maintenance activity. YDMP staff planted and watered up to 15,000 trees for windbreaks, scaped growth and sealed downspouts.</p>	North Region	Highway Maintenance	2015	2015	\$25,000	
<p>Nontrunkline Federal-Aid (NTFA) Program Network - The NTFA annual road network maintenance minimizing the number of studies/type of equipment needed to meet the federal requirement. Approximately 100 locations annually. Data Inventory & Integration Division saved MDOT \$15,000.</p>	Statewide	Asset Mgt. & Planning	2015	2015	\$15,000	

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Paperless Transportation Economic Development Fund Categories A (TEDA) and F (TEDF) Grants and Applications - Replacement of paper files with data stored in MDOT Grant System and eventually <i>ProjectWise</i> .	Statewide	Finance & Contracts	2015	2015	\$3,630	
Pavement Historical Database - Add mapping functions.	Highways	Asset Mgt. & Planning	2015	2015	\$500	
Pavement Historical Database (PHD) - Creation of spreadsheet form assisting users with data entry into the PHD.	Highways	Asset Mgt. & Planning	2015	2015	\$2,000	
Personal Protective Equipment (PPE) Pack for Visitors/Occasional Use - A drawstring bag containing hard hat, clear and tinted safety glasses, Class 2 economy safety vest and ear plugs. PPE Pack costs \$10 less per pack than using customized MDOT PPE, is ready for use/distribution and a convenient way to transport/store PPE. Regions & Business areas (12) x estimated visitors/limited field contact (30 ea.) x \$10 savings = \$3,600 [Safety & Security Administration]	Statewide	Highway Safety	2015	2015	\$3,600	
Plan Quantity Spreadsheet - A live link between plan sheets and <i>Web Trnsport</i> reducing errors and saving one hour of University Region staff time on each plan sheet with quantities.	University Region	Highway Construction	2015	2015	\$250,000	

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Plan Quantity Spreadsheet - A live link between plan sheets and <i>Web Trnsport</i> reducing errors and saving one hour of Southwest Region staff time on each plan sheet with quantities.	Southwest Region	Highway Construction	2015	2015	\$250,000	
Real Estate Consent Forms Reduction - Combining forms to save time on data entry, processing and communication.	Metro Region	Real Estate	2015	2015	\$20,000	
Remote Witness of Cylinder Breaks - Use of Skype at out-of-state fabrication facilities saves time and travel expenses.	Statewide	Bridges & Structures	2015	2015	\$20,000	
Review/Evaluate Verizon Services & Equipment - Discontinued use of data card and/or implemented other options. [Safety & Security Administration]	Statewide	Other	2015	2015	\$720	
Robotic Linear Traverse - 3D printed parts and open source software to replace Linear Traverse machine used to conduct Hardened Air Testing on concrete.	Highways	Other	2015	2015	\$17,000	
Snap-Tite Culvert Lining - Lining for corrugated metal pipe (CMP) researched and considered for when field condition does not allow conventional cured-in-placed felt liner. Snap-Tite lining restored structural integrity of severely deteriorated CMP and eliminated costly removal and replacement.	Metro Region	Highway Maintenance	2015	2015	\$14,857	

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Stationing YDMP Staff in County Road Commission Offices - Stationing Youth Development & Mentoring Program (YDMP) staff remotely limits driving for participants, easing recruitment of economically disadvantaged youth. Also provides accountability by having the youth in contact with Contact Maintenance staff on the same trunklines.	North Region	Highway Maintenance	2015	2015	\$140,000	
Tagged Overhead Sign Cleaning and Replacement Project	Metro Region	Highway Maintenance	2015	2015	\$12,500	
Telecommuting and Video Conference: Proactive use of <i>Lync</i> , <i>GoToMeeting</i> , <i>Skype</i> and <i>Adobe Connect</i> for in/external attendee and remote meetings between Lansing, contractors and MDOT facilities allowed travel time and wage savings.	Superior Region	Other	2015	2015	\$309,106	
Tracking Transportation Economic Development Fund Categories A (TEDA) pre-1200 Direct Grant Status in MGS - Tracking all grants in MDOT Grant System (MGS) eliminates maintenance of separate spreadsheets as all data on outstanding grants will be obtained from a Business Objects Report. It also saves staff time researching the status of direct grants each time a question arises. Using MGS, all staff have access to the status and tracking will be consistent for all direct grants.	Statewide	Finance & Contracts	2015	2015	\$1,980	

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<p>Transportation Economic Development Fund Categories A (TEDA) and F (TEDF) Use of MGS - Use of MDOT Grant System (MGS) Direct Grant Worksheet to communicate Non-Direct Grants to Local Agency Programs (LAP) skips creation of an Excel spreadsheet. Formalizing coordination meeting process creates uniformity from Grant Coordinators in dealing with local agencies to ensure relevant and consistent information is provided. Using MGS to LAP saves creating a separate document to transmit information and ensures LAP has the most current information.</p>	Statewide	Finance & Contracts	2015	2015	\$954	
<p>US-131 Muskegon River Bridge Rehabilitation Project - Pier modifications, flat jack installation and harped external post-tensioning were used to strengthen the bridge and extend service life. Flat jacks and harped post-tensioning were first use by MDOT.</p>	Grand Region	Bridges & Structures	2015	2015	\$35,000,000	
<p>Use of LCPtracker - Decrease payroll oversight time</p>	Statewide	Highway Construction	2015	2015	\$210,934	\$155,033.78
<p>Used Container Files and Multiple View Plan Sheets - On I-275 Inlay saved an estimated 10% PE cost for Design Squad.</p>	Metro Region	Highway Design	2015	2015	\$46,500	

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Video Conferencing Technology - At meetings in Upper Peninsula to minimize travel for non-MDOT participants.	Planning	Non-Motorized	2015	2015	\$0	30,000
Video Conferencing Technology - Staff meetings held simultaneously for both offices.	Southwest Region	Other	2015	2015	\$1,200	
Volunteer Workers - <i>Volunteer Southwest Michigan</i> provides court-ordered community service volunteers. Volunteers who assist full time equivalent laborers with cleaning and outdoor projects save the department man-hours equal to a 720 hour State Worker position.	Southwest Region	Highway Operations	2015	2015	\$7,200	
Weekly Construction Report - Eliminate dual transcriptions of lane closure entries in LCAR/ <i>MiDrive</i> by pulling data from Southeast Michigan Traffic Operations Center Lane Closure and Restrictions (LCAR) database in a format that works for both users. Saving of 6-10 hours per week.	Metro Region	Highway Operations	2015	2015	\$7,010	
Accelerated Innovation Deployment (AID) Demonstrations - Used AID grant funding for a bridge slide and diverging diamond interchange. FHWA AID demonstration funding is an incentive for eligible entities to accelerate implementation and adoption of innovation in highway transportation. MDOT received \$1,000,000 in both 2014 and 2015.	Highways	Finance & Contracts	2014	2015	\$1,000,000	

2015 Economies, Efficiencies & Innovations Quantified Savings



Description	Office or Region	Innovation Category	Initial Year of Savings	Savings Expiration Year	Estimated Annual Savings for State	Estimated Annual Savings to Others
<p>ADA Ramp Design Tool - Developed a spreadsheet to perform the repetitive calculations of grades and slopes when designing an Americans with Disabilities Act (ADA) ramp. The spreadsheet provides a quick calculation and visual output that allows the designer to see where the design does not meet current specifications.</p>	Statewide	Non-Motorized	2014	2015	\$100,000	\$100,000
<p>Aircraft Registration Payment Website - Implementation of the Office of Aeronautics online aircraft registration payment website allows aircraft owners to renew registration. Minimizing mail or phone payments annually saves approximately 80 hours of staff time. Lock box fees have been eliminated and mailing costs reduced. Customers save with reduced costs of mailing checks.</p>	Statewide	Aviation & Airports	2014	2015	\$4,000	\$1,500
<p>e-Construction/Tablets - More than 600 managers, inspectors, materials staff and others using e-construction techniques and tablet computers have reduced costs, materials and time.</p>	Statewide	Highway Maintenance	2014	2015	\$21,430,000	
<p>High Speed salting - Staff currently prototyping MDOT designed equipment in-house. Piloted process during winter of 2014/2015. Accurately places salt in travel lane at high speeds. Approximately 30% salt savings.</p>	Superior Region	Highway Maintenance	2014	2015	\$50,000	

2015 Economies, Efficiencies & Innovations Quantified Savings



Description	Office or Region	Innovation Category	Initial Year of Savings	Savings Expiration Year	Estimated Annual Savings for State	Estimated Annual Savings to Others
<p>Pothole Patching - Use of asphalt instead of cold patch when asphalt plant is open. Hot mix lasts longer than cold patch and is about half the price. This reduces number of times crews are on the roadway applying material in traffic and frees them for other duties.</p>	Statewide	Highway Maintenance	2014	2015	\$4,000	
<p>Salt Boxes with Auger - Using salt boxes in trucks with an auger rather than flight chain for more accurate salting. Increases ability to place appropriate amount of salt in needed areas.</p>	Bay Region	Highway Maintenance	2014	2015	\$100,000	
<p>Single Set of Plans for Alternate Pavement Bid (APB) Projects - Standard procedure for APB projects creates two sets of plans, one for each pavement type. A single set of plans was created for the US-127 reconstruction project north of Jackson. Saved development time and resulted in a smaller, more concise set of plans.</p>	University Region	Highway Design	2014	2015	\$50,000	

2015 Economies, Efficiencies & Innovations Quantified Savings



Description	Office or Region	Innovation Category	Initial Year of Savings	Savings Expiration Year	Estimated Annual Savings for State	Estimated Annual Savings to Others
<p>Tungsten Underbody Blades instead of Steel Blades - Four truck were retrofitted with tungsten underbody blades that last 3 times longer and only need to be replaced every 3 years, unlike the 9' steel wing blades, which require replacement approximately 3 times per year. Other variants include recycling and reusing center blade plows from trucks as wing-blade spares for other snowplows.</p>	Southwest Region	Other	2014	2015	\$3,948	
<p>Interactive Communication & Meetings - Using applications like <i>Google Earth</i> during meetings improves speed, accuracy and communications during meetings. Also saves on paper costs and reduces field time.</p>	Statewide	Other	2013	2015	\$660,000	

2015 Economies, Efficiencies & Innovations Quantified Savings



Description	Office or Region	Innovation Category	Initial Year of Savings	Savings Expiration Year	Estimated Annual Savings for State	Estimated Annual Savings to Others
<p>MPOs Use of the MGS - Metropolitan Planning Organizations (MPO) used the MDOT Grant System (MGS) for their Transportation Alternatives Program (TAP) application and review process. This eliminated development of a separate application or system for TAP applications and tracking of key fields required for federal reporting. Use of one application also saves applicants from filling out separate MDOT and MPO applications for TAP funds. Also allows for MDOT technical reviewers to comment on constructability factors for MPO TAP applications. Having TAP data in one location makes federal reporting more efficient.</p>	Statewide	Finance & Contracts	2013	2015	\$3,300	\$980
<p>Office Space Consolidation - Cancellation of two leases in the Lansing area. (Lansing TSC \$242,847, Photolab \$486,667)</p>	University Region	Other	2013	2015	\$729,514	
<p>Paperless Communication of Grant Awards to Applicants - E-mail templates were developed in MDOT Grant System (MGS) to eliminate grant awards being sent via U.S. Mail. The templates pull key data from the grant in MGS to reduce errors and help ensure consistent communication.</p>	Statewide	Finance & Contracts	2013	2015	\$11,019	

2015 Economies, Efficiencies & Innovations Quantified Savings



Description	Office or Region	Innovation Category	Initial Year of Savings	Savings Expiration Year	Estimated Annual Savings for State	Estimated Annual Savings to Others
<p>Rural Freeway Mowing - Implemented a three-year mowing/spraying method for the I-75 corridor for low and high-growth areas leading to a \$40,000 annual reduction.</p>	North Region	Highway Maintenance	2013	2015	\$40,000	
<p>TAP Coordination with SEMCOG - Shared services between MDOT and Southeast Michigan Council of Governments (SEMCOG) regarding Transportation Alternatives Program (TAP) pre-application meetings and phone calls, educational sessions, application review and project selection. Collaboration eliminates the possibility of two separate TAP funding programs serving Southeast Michigan causing inefficiencies amongst local agencies applying to both sources for TAP funds. MDOT and SEMCOG also occasionally co-fund TAP projects allowing each agency to more widely distribute their TAP funds and the community to the maximize federal funding.</p>	Metro Region	Finance & Contracts	2013	2015	\$2,808	\$35,008

2015 Economies, Efficiencies & Innovations Quantified Savings



Description	Office or Region	Innovation Category	Initial Year of Savings	Savings Expiration Year	Estimated Annual Savings for State	Estimated Annual Savings to Others
<p>TAP Grant Status Meetings - Bi-monthly meetings held with the grant coordinators, MDOT Local Agency Programs Unit (LAP), and Metropolitan Planning Organization (MPO) to review status of all unobligated grants. This addition to the Transportation Alternatives Program (TAP) grant process has improved the TAP obligation/reimbursement rate for Michigan. Result is Michigan communities see positive safety and mobility impacts of investments sooner. MDOT Grant Coordinator and MPOs get updates on project status all at once rather than at different times for each project. It also fosters group awareness of issues local agencies may encounter during design and provides a venue for problem solving and barrier busting, thus improving customer service.</p>	Statewide	Finance & Contracts	2013	2015	\$7,135	\$900

2015 Economies, Efficiencies & Innovations Quantified Savings



Description	Office or Region	Innovation Category	Initial Year of Savings	Savings Expiration Year	Estimated Annual Savings for State	Estimated Annual Savings to Others
<p>Non-Trunkline Federal Aid Program (NTFA) Agency Coordination - The NTFA Program of the Data Inventory & Integration Division, is an <i>a cross-agency</i> traffic data collection program created to meet the requirements of FHWA's <i>Highways Performance Monitoring System</i> (HPMS) set in 2010, which directs that each state must report count based Annual Average Daily Traffic (AADT) on all federal aid eligible roads. Coordinating with local agencies to collect/report AADTs has saved MDOT \$1,461,150 and Local Agencies \$1,188,600 over the past six years (6 Year collection cost = \$2,649,750).</p>	Statewide	Asset Mgt. & Planning	2010	2015	\$243,525	\$198,100

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	Add Sufficiency Data to Pavement Historical Database (PHD) - To improve efficiency of data access.	Highways	Asset Mgt. & Planning
2015	Add Texting Option for Traffic Incident Notifications Subscribers - Previously email was the only notification option.	Grand Region	Highway Operations
2015	Annual Friction Data - Reported to regions in a graphical format for ease of use.	Highways	Asset Mgt. & Planning
2015	Approach Area Calculation Spreadsheet - Approximation method for measuring approach quantities. 100 person hour savings at Marshall TSG.	Southwest Region	Highway Design
2015	ArcSDE Security - Created new user groups for the Arc Spatial Database Engine (SDE) to increase security of enterprise data.	Planning	Asset Mgt. & Planning
2015	AURORA Project Seasonal Weight Restrictions Demonstration - Collection of Road Weather Information System (RWIS) data. Utilization of various models to determine reliable prediction of frost depth. Freight Movement savings to be determined.	Superior Region	Highway Operations
2015	Bridge Approach Projects for Design Unit Single Sheet Bridge Approach Projects - When plan sets are put together there are usually many sheets generated. Make plan sheets, removal sheets, profile sheets and various details to provide contractor with enough information to construct the project. Combine everything into one sheet. The information provided is exactly the same except everything is now in one location.	Grand Region	Highway Design
2015	Bridge Maintenance Innovations: Telemetric stream gauge to monitor flow depth during high flow events. Improved Scour Monitoring. Developed a Bridge Emergency Guidance Document, Improved emergency response for bridge hits.	Southwest Region	Bridges & Structures
2015	Cable Barrier Maintenance Gap: With a <i>Maintenance Gap</i> cable section, a shorter run of cable barrier is anchored between an entire bridge as a stand-alone section. For inspections, the short run of cable can be lowered to perform the work.	Grand Region	Highway Maintenance
2015	CE and PE Estimating Tool - New spreadsheet tool to assist project managers in estimating costs for preliminary (PE) and construction (CE) engineering.	North Region	Highway Design
2015	Combined Installation - Combine installation of enhanced roadside delineation with programmed/scheduled freeway signing upgrade project. Savings would be in maintenance of traffic, mobilization and bid letting cost.	Southwest Region	Highway Operations

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	Combined Installation - Combine installation of enhanced roadside delineation with programmed/scheduled freeway signing upgrade project. Savings would be in maintenance of traffic, mobilization and bid letting cost. Per pilot in Southwest Region, will become statewide in FY2017. Savings will accrue from one letting instead of two, maintenance of traffic and mobilization.	Highways	Highway Design
2015	Construction Documentation - Proposed as an alternative to <i>Adobe</i> due to toolsets and robust capability specifically tailored to the construction industry.	Metro Region	Highway Construction
2015	Construction Innovations - Used traffic detection system for total closure on freeway project to increase safety and reduce traffic delays. 100% of construction projects completed with <i>E-Construction</i> . Precast bridge elements on all bridge projects for 2015 to reduce construction schedule and Increase quality. Utilized Dispute Review Board Process for two projects to reduce construction claims. Design-Build for I-94 BL Exit 92 interchange project and bridge/Ramp rental specification reduced construction time by 51 calendar days.	Southwest Region	Highway Construction
2015	Construction Pay Item Automation - Automated approach to gathering pay item quantities in the field utilizing modern survey equipment. The model for this is to direct outputs to the accounting system that construction uses to improve efficiency of how quantities are gathered and submitted for payment. This effort would also capture geospatial data to be utilized in other MDOT divisions from a corridor incident management perspective.	Metro Region	Highway Construction
2015	Consultant <i>ProjectWise</i> Document File Submittal and Management - Consultants previously submitted documents/deliverables to MDOT by File Transfer Protocol (FTP), mail, e-mail or in person. Consultants can now submit deliverables directly into <i>ProjectWise</i> and participate in electronic milestone reviews and file sharing. All parties now use/reference the same file(s), eliminating the risk of contention, error or omission from multiple documents. This generates savings to MDOT and consultants, as well as improving efficiency, effectiveness and project collaboration.	Highways	Highway Design

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	Co-Op Committee - Team to help improve/enhance the experience of Co-Op students. Developed a one week training period with all students together to receive all required training. Also set up educational field trips for students. Departure surveys sent to students and supervisors to improve the program.	North Region	Other
2015	Corrugated Metal Pipe Culvert Band Socket Extender - A 5/8" diameter socket was cut in half and welded a 12" long metal pipe extension to make a culvert band socket extender. This tool allows for a bolt to go through the hollow pipe extension so an impact drill can tighten the bolts, speeding up the process of putting culvert bands together.	North Region	Highway Maintenance
2015	Cracking Index Method - An installed grid system to measure expansion due to alkali-silica reactivity and other mechanisms in structures and pavements. Designed to allow regions to schedule repairs where most needed and monitor expansion.	Statewide	Other
2015	Culvert Inventory - Provided access to data through a collection application. Inspections use this Geographic Information System app instead of paper collection and manual entry.	Southwest Region	Asset Mgt. & Planning
2015	Cured-in-Place Culvert Linings - Long-term repairs being completed on four 8 foot diameter corrugated metal pipes with very little impact to traffic and mobility; Both culvert structures currently rated in serious condition and will improve to good condition after project completion.	Grand Region	Highway Maintenance
2015	Customer Service Contact Cards: For distribution to the public, Looking like a standard MDOT business card, it includes the office phone number with corresponding counties.	Superior Region	Other
2015	Design Plan and Proposal Boilerplate - Pilot initiative stores common information from plans/proposals as <i>boilerplate</i> for reference instead of publishing/storing it in every contract. If implemented will generate cumulative savings in server storage costs as the retention period is indefinite. The outcome also realizes increased efficiency in contract development and mitigates error, omission and inconsistency in contract language. First test letting of 24 project occurred in November 2015, saving \$112 (100 gigabytes at \$1.12/gig) of storage space in first month. Cumulative savings over 30 years for this single letting would be \$40,320 assuming no change in the cost of storage.	Highways	Finance & Contracts

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	Development Guide Wiki - Ongoing effort to convert design procedures, standards, and guidance to <i>Wiki</i> content rich environment to allow linking between documents and provision of real time documentation of changes without additional effort. Users receive notification of changes through watch/list.	Highways	Highway Design
2015	Digital Pen - Device to convert handwritten input into digital data. MDOT is using the digital pen for milestone reviews to capture comments from parties involved on a single set of documents. This ensures all review comments and notes are maintained in a single electronic file versus multiple files manually compiled by the project designer/manager. MDOT also mandated all comments must be received prior to the milestone meeting ensuring focus on major issues and resulting in shorter review meetings.	Highways	Highway Design
2015	Digitizing Aggregate Files - Scanning historical records to enhance efficiency and better service future data searches.	Highways	Other
2015	Dilemma Zone Detection - Pilot of a new type of vehicle detection for traffic signals at the intersection of M-33 and M-55 in Ogemaw County. A video camera detects the presence of vehicles at the stop bar. A radar unit detects the speed of vehicles approaching the other stop bar. The detector enables programming the traffic signal controller to hold off the yellow phase by a couple of seconds. Since the Dilemma Zone Detection was installed, there have been no recorded angle crashes. Results from this implementation have been shared with staff throughout the department.	North Region	Highway Operations
2015	Dilemma Zone Detection - Radar in both directions of US-2 at South Hill Rd. intersection in Gladstone will detect vehicles in dilemma zone. Signal timing will be altered to allow vehicles to proceed through intersection before side street gets a green indication. Senator Casperson was involved in the preliminary discussions.	Superior Region	Highway Operations
2015	Diverging Diamond Interchange Guide - Guide will assist in design and operations of this new interchange type with fewer conflict points, better sight distance, improved driver understanding/operating through interchange and near impossibility to enter a ramp the wrong way. When this interchange type is viable for the circumstances, it has a direct cost benefit as well as a safety cost benefit.	Highways	Highway Design

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	Electronic Consultant Invoicing - Consultant invoices are now submitted, reviewed and routed (using workflows) in <i>ProjectWise</i> for approval and initiation of payment. Savings realized by system document management resulting in more efficient payment processing.	Highways	Finance & Contracts
2015	Electronic Processing & Signatures - Processing all mileage or travel logs for MDOT trucks electronically, with electronic signatures.	Southwest Region	Other
2015	Enhanced Delineation Special Provisions - Special provisions have been modified to define specific application for statewide uniformity of enhanced delineation to address run off roadway crashes. The Special Provision update provides options for selection of delineation type. Social and economic savings realized through reduced number of crashes.	Highways	Highway Safety
2015	Enhanced Freeway Delineators - Designed 3" x 12" aluminum panels with Type IX sheeting to be used as delineators. New delineators were placed on existing posts along I-75 in Gaylord area as a pilot. New panels are more durable and provide much better reflectivity than plastic buttons. <i>Youth Development and Mentoring Program</i> funding and employees were used to replace all plastic buttons on I-75 and US-127 within the Gaylord TSC area. A new Special Provision has been developed for the delineator panel. MDOT is considering moving entirely to this design.	North Region	Highway Operations
2015	Established Requirements for Portable Plants - Using reclaimed asphalt pavement (RAP) with no established RAP stockpile.	Highways	Highway Construction
2015	Extending Oil Change Intervals on Newer Fleet Vehicles - Piloted at St. Ignace garage. Not yet approved for widespread implementation by Lansing Fleet Team. Projected annual material savings at St. Ignace garage = \$1822, labor savings = \$1581.	Superior Region	Highway Maintenance
2015	Field Implementation of Magnetic Imaging Tomography (MIT) Scan - T2 pavement thickness measurement device on the I-75 Monroe County reconstruction project.	Highways	Finance & Contracts
2015	Fine Tooth Milling - To eliminate rutting prior to placing chip seal in lieu of microsurface. Use eliminates rutting, is significantly more cost effective and allows more flexibility in surface repairs like chip seal.	North Region	Highway Construction
2015	Fix Price Variable Scope Bidding: Used on our hot mix asphalt crack treatment and concrete joint reseal projects.	Grand Region	Highway Maintenance

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	Flexible Non-Cementitious Hot Applied Resin Joint - Repair material for partial-depth repair of concrete pavements.	Statewide	Highway Construction
2015	Freeway Lighting Data - Provided contractor access to MDOT data through a mobile Geographic Information System application. Provided quick field reference for contractors to gather data on supplies and equipment needed for replacement without direct inspection of each individual light.	Grand Region	Highway Maintenance
2015	Freeway Lighting Other Efficiencies - New methods of converting to light emitting diode (LED) freeway fixtures while reusing poles and towers. Reuse of poles and towers is a significant cost savings and results from advances in performance and lighting patterns of LED fixtures.	Statewide	Highway Design
2015	Geographic Information System (GIS) Map Service - Staff implemented an MDOT GIS Map service, allowing staff easy access to Climate Vulnerability data for 2050 and 2100 as it relates to bridges, culverts and pavement under extreme heat and precipitation events.	Planning	Asset Mgt. & Planning
2015	Geospatial Underground Infrastructure Data Exchange (GUIDE) - MDOT used a 2015 \$100,000 FHWA <i>State Transportation Innovation Council</i> (STIC) grant for Phase 2 of this initiative. Phase 2 will better define attributes to collect for underground utilities and how to manage data through geographic information systems. Studies have shown that for every dollar invested on location of underground utilities \$4 are saved in future design and construction activities.	Highways	Highway Design
2015	Graffiti Maintenance Contract - Provided Taylor Transportation Service Center with a Geographic Information System (GIS) map/database for their performance based contract. MDOT staff and contractors use a GIS collection application to collect tagged locations and record cleaning jobs. GIS dashboard allows staff to track contractor performance as data is collected.	Metro Region	Highway Maintenance
2015	Herbicide Applications: Use <i>ArcGIS Live Maps</i> and global positioning equipment to avoid previously mapped <i>no spray</i> areas and reduce errors in spraying. Use of <i>IPads</i> to forecast wind direction and plan daily routes.	Superior Region	Highway Maintenance
2015	High Performance Concrete - Use of Grade DM concrete.	Statewide	Highway Construction

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	High Speed Salting - MDOT staff prototyping department designed equipment in-house, Piloted process during winter 2014-2015. Accurately places salt in travel lane at high speeds; Approximately 30% salt savings or \$50,000 during pilot period (labor, salt).	Superior Region	Highway Maintenance
2015	HMA Paving Operations Certification - Changed from perpetual to a five year certification to ensure up to date training on hot mix asphalt (HMA) practices for those involved with HMA products.	Highways	Highway Construction
2015	Hot-Applied Mastic - For repair of longitudinal joints in asphalt pavements with wider joint openings.	Statewide	Highway Construction
2015	Huron Service Area - Developing the first <i>virtual MDOT office</i> . Border adjustments of the Regional Prosperity Initiative provide the opportunity to implement a new way of providing customer service. Transportation services normally done by residents visiting a brick and mortar office will now see MDOT go to the customer, local governments and field location on the road or bridge to solve issues. This will expand MDOT use of mobile information technology tools in the field, keeping staff connected to databases and web links in other locations. High performing field staff responsible for multiple transportation services in a geographic area, working independently is the new operational model. Working out of a vehicle, alternative office or home can be a way to provide transportation services more efficiently than a conventional direct office supervision model.	Bay Region	Other
2015	I-75 & 3 Mile Rd. Carpool Lot, Sault Ste. Marie - Public Private Partnership with <i>Meijer</i> . Elimination of an existing facility. Will provide more spaces. MDOT Cost to relocate = \$30,000.	Superior Region	Asset Mgt. & Planning
2015	I-75 MDSS Salt Application Analysis - Analyses to compare Maintenance Decision Support System (MDSS) recommended applications to actual are still being evaluated.	Superior Region	Highway Maintenance
2015	I-94 & US-24 (Telegraph Road) Sound Wall - Due to limited right-of-way, access limitations and the delicate nature of removing deteriorated concrete on top posts, the contractor built special baskets that hang from the panels for access. Project is also one of the first which recoats previously painted concrete coating. MDOT staff worked with <i>Sherwin Williams</i> to create optimal method of applying the coating and conditioner to ensure long lasting results.	Metro Region	Highway Maintenance

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	I-94 Corridor Evaluation - Multi-agency team reviewed the I-94 corridor from Indiana State Line to US-127 in response to the 193 vehicle crash on January 9, 2015. The review identified statewide and regional safety and operational efforts to address concerns and minimize the recurrence of such crashes. Savings realized through reduction of social and economic impacts of crashes.	Statewide	Highway Safety
2015	I-94/I-69 Interchange - The use of expanded polystyrene (EPS) blocks and low density cellular concrete as engineered fills at the bridge abutments and carbon fiber post tensioning cables for the I-94 bridges over Lapeer. Carbon fiber cables are stronger than traditional steel, allowing increased post tensioning force and reducing potential for transverse cracking in the bridge deck. Using non-corrosive carbon fiber, post tensioning ducts do not need be filled with grout which allows re-tensioning as needed. After letting, the MDOT construction team continued to look for improved ways to build the project.	Metro Region	Highway Construction
2015	I-96 Cascade Divergent Diamond interchange - First MDOT one in design, second one in operation. First in West Michigan.	Grand Region	Highway Operations
2015	I-96 over at Sand Creek - Articulated concrete block (ACB) scour mitigation placed on four scour critical interstate bridges.	Grand Region	Bridges & Structures
2015	Implementation of New Local Agency Acceptance Specification on National Highway System Routes - Improves quality by strengthening testing and sampling requirements for hot mix asphalt and by revising tolerance limits and penalty structure.	Highways	Highway Construction
2015	Infrared (IR) Illuminators on Environmental Sensor Station (ESS) towers: Use in lieu of 500 W lights for night imagery. IR illuminators were installed on ESS towers constructed in 2013, and ESS towers to be installed in 2016 will also be equipped with IR illuminators. This saves energy, addresses complaints about lights bothering nearby residents and eliminates a source of distraction to drivers.	Superior Region	Highway Design
2015	Innovation Web Site - Created an internal Web page where staff are encouraged to submit their innovations.	North Region	Other
2015	Installation of Motion Sensors for Lighting at 24-7 Welcome Center Bathrooms - Savings to be determined.	Superior Region	Other

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	Installation of Type A Nuclear Density Gauge Storage Box - For F-150 Super Cab trucks.	Grand Region	Other
2015	Interactive ADA Curb Ramp Transition Plan - Creation of an interactive Americans with Disabilities Act (ADA) Curb Ramp Transition Plan using Geographic Information System technology met FHWA and Attorney General requirements for providing data on future intersection enhancements based on the Five Year Transportation Program.	Highways	Asset Mgt. & Planning
2015	J Band - Hot-applied 18 inch wide membrane treatment for longitudinal joints installed between leveling and top course. Absorbs into the matrix of the top course, increasing the density of the asphalt mixture against moisture intrusion.	Statewide	Highway Construction
2015	Lane Mile Inventory to Road Asset Inventory - To add additional attributes from the retiring <i>Sufficiency</i> data collection.	Planning	Asset Mgt. & Planning
2015	Laser Based Pavement Texture Measuring Device	Highways	Asset Mgt. & Planning
2015	LED Freeway Lighting - Installed light emitting diode lighting along US-131.	Grand Region	Highway Maintenance
2015	Light Emitting Diode Fixtures for High Mast Tower Lights - Installed at interchange; monitoring light levels and cost impact to determine wider application.	Grand Region	Highway Maintenance
2015	Liquid Emulsion to Save Time and Money - Saginaw West Side Garage is using AMS Seal SP (liquid emulsion) from <i>Michigan Paving & Materials Co.</i> to save time and money when chip sealing cracks and potholes with the <i>Rosco</i> machine. AMS Seal SP is purchased in cardboard totes of 320 gallons weighing 2700 pounds. As long as temperatures remain above freezing, the totes can be stored at the garage. Totes stay warm for four days and are usable for months after purchase. Product allows filling the <i>Rosco</i> machine at the garage by lifting the tote with a loader, attaching a fill line and draining the product into the machine. Typically 2-4 totes are purchased at a time depending on work load. Storing products on-site decreases travel time to obtain product and increases productivity of staff and equipment.	Bay Region	Highway Maintenance

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	Longitudinal Joint Density Spreadsheet - Alpena TSC created a spreadsheet to calculate the payment and compare MDOT and contractor results for the longitudinal joint given their lab tested joint density results. Significant time savings over calculation by hand.	North Region	Highway Construction
2015	Low Tracking Bond Coat Specification - Low tracking bond coat sets faster and tracks less resulting in more efficient operations and less unsightly tracking of tack off the project site.	Statewide	Highway Construction
2015	M-1 (Woodward Avenue) Light Rail Project - Used low profile barrier curb to intermittently add median sections in center left-turn lane at pedestrian crossings to enhance pedestrian safety. Use of LIDAR/photogrammetric survey and three dimensional mapping of facilities during design that is updated with potholing and construction information to mitigate risks of subsurface conflicts and coordinate third party utility relocations. Utility relocations are staged with road/rail work when practical. M-1 RAIL board members represent major stakeholders along corridor, so most communications are performed by the M-1 RAIL team. This has been very efficient/effective as they provide additional resources and are in tune with local businesses and neighborhoods. New signals will be connected with fiber and controllers have intelligent transportation system (ITS) capabilities for future expansion. These will tie into the backbone at I-75 and I-94. Oversight by Federal Transit (FTA) and Highway (FHWA) Administrations of federal funds resulted in a <i>One DOT</i> agreement between federal agencies. Contract is structured to address different requirements for the streetcar and MDOT scopes of work. Due to the unique funding structure and impacts of the streetcar facilities, M-1 RAIL is the lead contracting agency for the overall project with strong MDOT participation and oversight.	Metro Region	Highway Construction
2015	M-11 Roundabout - Partnership with City of Walker to reduce speed and improve safety and level of service.	Grand Region	Highway Operations
2015	M-14 & I-275 - To assist in identifying locations for pavement warranty work, concrete patch repairs were recorded using Global Positioning System equipment prior to hot mix asphalt overlay on M-14 lanes and ramps. Restricting ramp/road rehabilitation to nights and weekends reduced overall impact to the public.	Metro Region	Highway Maintenance

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	M-33/M-55 Traffic Signal Dilemma Zone Project (Gaylord TSC) - Low-cost enhanced signal detection system designed to reduce angle crashes from drivers running red light. Location on high crash list for severe angle crashes; Since installation in February 2015, no angle crashes recorded.	North Region	Highway Safety
2015	M-44 Driveway Assist Device - Used instead of a direction detour for reconstruction portion of the project. Allowed provision of two-way access through work zone.	Grand Region	Highway Maintenance
2015	Maintenance & Operations - Pilot showing snow plows locations on <i>MiDrive</i> . Region Fleet Team working to develop new y-chute/zero velocity salt distribution system to save time/money. Joined Western Michigan University to install/study temporary pedestrian signing in roadbed to increase pedestrian safety.	Southwest Region	Highway Maintenance
2015	Map Billboard Applications - Billboard applications are geographically located so inspectors can review all applications while in the area. 8 person hours/week savings.	Southwest Region	Asset Mgt. & Planning
2015	Map Wetland & Environmental Reviews - Wetland and Environmental reviews are mapped and completed jointly with Billboard applications. 8 person hours/week savings.	Southwest Region	Asset Mgt. & Planning
2015	Mapping Capabilities - Developing/Piloting enhancements in both <i>Construction Permitting System</i> and <i>Adopt-A-Highway</i> software for mapping and tracking.	Grand Region	Highway Maintenance
2015	Material Tagging Procedures - Reduce loss of tagging and resampling as well as E-metals Lab testing procedures to eliminate form work and duplication of efforts. Expedites sample turn around time.	Statewide	Bridges & Structures
2015	Michigan Maintenance Rating System - Provided access to system data through a mobile Geographic Information System application. Staff are able to update segment performance data in the field that directly populates the database. Eliminates paper collection and manual input.	Highways	Highway Maintenance
2015	Microsurfacing Repair - Of longitudinal joints in asphalt pavements.	Statewide	Highway Construction
2015	Mobile Advanced Road Weather Information System (MARWIS) - Used for collecting road and temperature data to predict when to apply salt. Savings to be determined.	Superior Region	Highway Maintenance
2015	Modified Pavement Milling Specification - New specification allows maintaining traffic on a milled surface and reduces user delay costs.	Highways	Highway Construction

**2015 Economies, Efficiencies & Innovations
Unquantified Savings**



Year	Description	Office or Region	Innovation Category
2015	North Country Trail - Partnered with the MDNR to provide construction engineering and inspection for their project between Hart and Montague.	Grand Region	Non-Motorized
2015	On-Line Access to American Society for Testing and Materials Procedures - Provided department wide access to guidance materials and search engine.	Statewide	Highway Construction
2015	Organization - Created <i>flags</i> by cutting manila folders. When giving paperwork to Kalamazoo Transportation Service Center staff, flag includes date materials given on. Flag is placed upright in file box to tag materials pending return.	Southwest Region	Other

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	<p>Pavement Data Collection Unit -</p> <ul style="list-style-type: none"> ● Designed and substantially developed further automation for receipt and logic-checking of sensor data file from vendor. ● Implemented <i>PaveMaPP</i> functionality to include <i>Divided Route?</i>, <i>Latest Job Number</i>, and <i>Latest Job Work Type</i> columns to output of the annual Pavement Condition File (Remaining Service Life RSL) report. ● Designed and implemented <i>segment-length-check</i> warning message for Quality Assurance (QA) Officer within the <i>PaveMaPP</i> Collection Review module. ● Prepared scope and other tasks to implement consolidation of all Highway Performance Management System (HPMS) required pavement surface condition measurement for non-trunkline segments within our single-vendor contract. ● Leveraged <i>Pavement Surface Evaluation and Rating</i> (PASER) data collected on trunkline ramps to support initial draft 2015 RSL estimations ● Redesigned/Improved user-interface screens for <i>PaveMaPP</i>'s Latest and Historical Condition Data Reports allowing users to more easily create multiple-location inputs. ● Initiated concept-to-pilot development for mobile-device app. that would allow users to retrieve latest surface condition data per segment they are driving upon in field. ● Recommended timely leveraging of Transportation Asset Management System (TAMS) project's straight-line diagram software functionality for display/access of various pavement data (including collected imagery). ● Developed concepts for leveraging database-query capabilities within <i>PaveMaPP</i> system to enhance distress survey data QA process by scanning/checking incoming data as a whole dataset per each distress type and by total-quantity comparisons to prior survey data. 	Planning	Asset Mgt. & Planning
2015	<p>Pavement Marking Data Logging System - Third party device for waterborne markings installed on pavement marking vehicles to record Global Positioning System, pavement and environmental data along with user input on project. Grand Region is piloting the same device for spray thermo markings. Cost savings realized through more efficient data collection, enhanced accuracy of warehoused data and expected outcome of improved bid prices.</p>	Statewide	Asset Mgt. & Planning

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	Pavement Marking Special Provisions - Special Provisions have been modified to provide specific pay items for turning guide lines, recessing markings, roundabout arrows and specific material types to ensure uniformity. Cost savings through improved bid prices and reduced number of contract modifications during construction phase.	Statewide	Highway Design
2015	Pavement Markings - Requiring layout of the pavement markings in intersections (turn skips on radius) using Global Positioning System coordinates and not laying them out by hand or tape measures.	Southwest Region	Highway Construction
2015	Penetrating Surface Sealers - For joint treatment of concrete pavements. Technology was demonstrated via capital preventive maintenance project.	Statewide	Highway Construction
2015	Posting Maintenance Activities to Local Social Media Accounts - Traverse City Transportation Service Center worked with counties and cities to have them post trunkline maintenance activities to their local <i>Facebook</i> and <i>Twitter</i> accounts.	North Region	Highway Maintenance
2015	Provide Digital Temperature Data Loggers - To University, North and Superior Regions materials quality assurance labs for use in concrete test cylinder storage tanks.	Highways	Highway Construction
2015	Public Access to ArcGIS Online Page - Select datasets can be viewed, mapped and overlaid to support decision making in an intuitive web browser environment.	Statewide	Asset Mgt. & Planning
2015	Public Open Data Portal - Created to allow the public to download MDOT Geographic Information System data in several formats. Released in conjunction with Center for Shared Solutions and Michigan Department of Natural Resources.	Statewide	Asset Mgt. & Planning
2015	QR Codes for Traffic Signals - Quick Response (QR) codes link a user to a location on <i>ProjectWise</i> , providing a centralized location for signal information, improving efficiency and eliminating confusion. QR Codes ensure information being utilized is the most current. This allows field staff to instantly access information via tablet or from <i>ProjectWise</i> . This has been shared with Region and Lansing Traffic and Safety.	North Region	Highway Operations
2015	Rapid 1 - Durable concrete which opens to traffic within eight hours.	Statewide	Highway Construction
2015	Reduce Printing, Various Tasks & Meetings - For large reports/plan reviews, print one copy and share with all staff for commenting. See comments of others speeds review. Saves money on printing costs.	Southwest Region	Other

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	Reference Information Documents (RID) - RID are digital design data required for final plans that include 3D models from design to construction. RID are reviewed/updated at milestones of a project. Data is for informational purposes only. RID mitigates construction risk by more detailed investigation during design. RID allow contractors to produce digital data for Automated Machine Guidance (AMG) for stringless paving, grading, excavation and staking with less effort. Additional cost savings accrue from data transfers and more efficient construction techniques. Industry studies show 30% savings in construction of projects with earthwork.	Highways	Highway Design
2015	Region Wide Maintenance Garage Maps - Responsibility maps showing intersecting roads, townships, freeway mile markers and emergency routes for each garage.	Southwest Region	Highway Operations
2015	Regressed Air Voids to 3% in Field for All Mixes - Results in more asphalt in mixes, reduces surface cracking and increases pavement performance.	Highways	Highway Construction
2015	Request for Action (RFA) Process - To prioritize/coordinate bridge repairs, RFA allows consistent evaluation and decision making to efficiently dedicate resources such as Statewide Bridge Repair Crew, Emergency Temporary Support Budget and Special Needs Contract.	Statewide	Bridges & Structures
2015	Rest Area Light Emitting Diode Replacement Parking Lot Lighting - Significant annual energy savings.	Grand Region	Highway Maintenance
2015	Road Safety Audit (RSA) - Instead of contracting the audit out, performed by Traffic & Safety staff, not necessarily from the local office. Savings of \$20,000/each RSA.	Southwest Region	Highway Safety
2015	Road Safety Audits (RSA) : Statewide guidance developed to expand use of RSA beyond safety projects. An RSA is a formal safety performance examination of existing/future road or bridge project by an independent, multi-disciplinary team. RSA contribute to road safety by providing a fresh, unbiased assessment of the road feature to identify potential safety issues and solutions in support of the <i>Toward Zero Deaths</i> initiative. Cost savings are realized through early identification of problems during project design rather during or after construction. Additional savings realized through reduced serious injuries and fatalities and their social and economic impact.	Highways	Highway Safety

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	Road Weather Information System (RWIS) - Relocating RWIS sub-probes from lane to shoulder on all new installations is anticipated to reduce number of new sensors needed due to mill and resurface projects.	Superior Region	Highway Design
2015	Rural Intersection Collision Avoidance System (RICAS) combined with Rural Intersection Warning System (RIWS) - Located in a valley with limited sight distance and ability to change road geometry while exhibiting a pattern of serious and fatal crashes, US-31 and Intertown Road south of Petoskey was selected as a candidate for RICAS and RIWS implementation. First RICAS location in the state. Believed to be among first combination installation in U.S. System detects Intertown Road vehicles approaching intersection and US-131 traffic that has slowed or stopped to make a turn. System triggers flashing beacon on signs 800 feet on either end of the intersection, warning drivers to Watch for Traffic ahead. System is in operation and being observed. Estimate to fix geometric issues \$2-4 million. Cost for RIWS/RICAS installation less than \$50,000.	North Region	Highway Safety
2015	Screening Tool for Vibration Sensitive Soils - Vibrations from pile driving operations can damage underground utilities or cause settlement in foundations of nearby structures. In MDOT research project OR10-046, researchers developed a simpler and more accurate method for estimating vibration dissipation as distance from pile driving increases and predicting where ground settlement will occur. A software tool was developed to identify troublesome sites and avoid damage to nearby structures.	Highways	Other
2015	Service Area RSL vs. 5 year Program Map - Map showing Remaining Service Life (RSL) of all state roadways overlaid with the 5 year program to identify areas with no programmed projects.	Southwest Region	Asset Mgt. & Planning
2015	Shoulder Gravel Spreader - Rigged a corrugated plastic pipe from the dump truck to spread gravel on the shoulder where needed. The truck was set up to spread salt on the centerline. This modification helped transfer the shoulder gravel where it was needed behind the hot mix asphalt shoulder.	North Region	Highway Maintenance

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	Solar Power Continuous Count Stations (CCS) Pilot: Equipped seven CCS locations with solar panels, batteries and controllers to power internet protocol modems and monitoring equipment. Testing adaptability of equipment for locations throughout state. Saves on traditional power contracts, administrative costs, power drops, services calls during weather events and provides long term sustainability.	Planning	Asset Mgt. & Planning
2015	Speed Limit Assessment - Enhanced data collection and auto fill decision cells, coordinated with North and Southwest Regions.	Grand Region	Highway Safety
2015	Steel Reinforcement Calculations/Plan Sheet - Historically steel reinforcement calculations were manually tabulated and entered into <i>Microstation</i> . Utilizing <i>Visual Basic for Applications</i> , calculations are now entered directly into <i>Excel</i> , checked with a validation tool and transferred to the final plan sheet. This also automates the change management process. Savings are realized by mitigating risk of error or omission to be addressed as a contract modification during construction.	Bridge Design	Highway Design
2015	Super Air Meter - Participation in a national round-robin correlation study to de/refine operating procedures/specifications for measuring the quality of entrained air-void system in fresh concrete.	Highways	Highway Construction
2015	Superior Region SharePoint Page Upgrades - Includes links to innovation pages and other resources, Region dashboard; employee engagement tracking; Wildly Important Goals (WIG) and Sub-WIG information; Redesigned, user friendly, one-stop-shop.	Superior Region	Other
2015	Surface Resistivity Meter - Participation in a national round-robin correlation study to de/refine operating procedures/specifications for measuring the quality of entrained air-void system in fresh concrete.	Highways	Highway Construction
2015	Task Prioritization - Created a color coded and prominently labeled folder system to aid staff for different tasks.	Southwest Region	Other
2015	Thermal Bond - Hot-in-place rehabilitation of longitudinal joints in asphalt pavements.	Statewide	Highway Construction
2015	Thermal Imaging Camera - Technology for inspection during bridge construction used to ensure grouted ribs for the <i>Bridge in a Backpack</i> were fully filled. Without this device, risk of underfilling the grouted ribs increases, jeopardizing load carrying integrity of structure.	Highways	Highway Construction

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	Tow Plow: Being used on I-75 and sections of US-2 in Mackinac County. Fully implemented during Winter 2014 with cost savings of approximately 25% per year.	Superior Region	Highway Maintenance
2015	Toward Zero Deaths (TZD) Champions - TZD Champions have been identified in each region and are a standing item on the Traffic Safety Statewide Alignment Team agenda. Effort fosters opportunity for sharing successes/issues in order to promulgate TZD efforts. Cost savings will be realized through sharing of best practices, evaluating/updating traffic safety guidance/standards and reducing the social and economic impact of crashes.	Highways	Highway Safety
2015	Toward Zero Deaths (TZD) DMS Messaging Enhancement - In response to customer requests, beginning in February the weekly TZD Dynamic Message Sign (DMS) message will inform motorists how current traffic fatalities compare to last year's total. Publishing driving statistics changes driver behavior and savings will be realized by reducing the social and economic impact of crashes.	Statewide	Highway Safety
2015	Toward Zero Deaths (TZD) Implementation Plan - Embraced TZD with an implementation plan specifically addressing crash types and/or social issues contributing the most to traffic deaths in the region. TZD plan has four focus areas: Lane Departure, Angle Crashes at stop-controlled intersections, Local Roads and Public Education. The plan represents a shift in focus from addressing locations exhibiting high crash frequencies to addressing crash types that contribute the most to traffic fatalities. The region has shared this TZD plan with other areas of the state.	North Region	Highway Operations
2015	Toward Zero Deaths (TZD) Initiative - Developed and implementing a region-wide TZD strategy. Effort specifically geared to regional conditions and crash occurrences: trunkline lane departure crashes; trunkline angle crashes; local roads; public education.	North Region	Highway Safety
2015	Urban Chip sealing - Cadillac Transportation Service Center modified the chip sealing process in urban areas through staging and traffic control. The use of vacuum trucks, fog seal, 24 hour traffic regulators and staging made chip sealing in urban areas possible.	North Region	Highway Construction
2015	US-131 External Post Tensioning - On US-131 over the Muskegon River.	Grand Region	Highway Maintenance

2015 Economies, Efficiencies & Innovations Unquantified Savings



Year	Description	Office or Region	Innovation Category
2015	Use of Multiple Views for Generating Plan Sheets - Work done and displayed in one <i>container file</i> generates plan information for up to four, with potential expansion to eight, sheets. Saves time on sheet creation/labeling and reduces errors from redundant tasks.	Superior Region	Highway Design
2015	Utilize a Dash Cam - A dash cam can provide data that would otherwise take two people to collect in work zone inspections, operations at intersections or projects with new geometry, driver perspective data for signing and pavement markings. Reduces employee exposure to traffic/amount of time spent in traffic.	Southwest Region	Highway Operations
2015	Video Conferencing for Geotechnical Best Practice Meeting - Implemented Skype for Business for semiannual meetings with region soils engineers. Ability to share slides and allow presenters from remote locations adds value to information exchange.	Highways	Other
2015	Warranty Improvement Team - Statewide team reviews warranty audit findings and develops improvements to warranty program. These include form letters and timelines to insure timely completion of corrective action, revising the <i>Statewide Warranty Administration Database</i> user guide to be more comprehensive.	Highways	Highway Construction
2015	Waterproofing Structural Concrete Surfaces - A spray applied elastomeric membrane protocol was specified for the I-696 plaza bridge deck repair and rehabilitation project.	Statewide	Highway Construction
2015	Wing Plow - Use of wing plow in active lane of traffic. Placed additional <i>Superior Stick</i> lighting on wing at \$200 per installation. Will free up one plow truck for other routes. Allows plow trucks to include passing lanes and truck climbing lanes with one pass. Approximate average savings of 30% per route (saves one operator, truck and a full-route-run per winter event).	Superior Region	Highway Maintenance
2015	Winter Maintenance Truck Auger Cover - Equipment modification designed and fabricated in house changes the solid auger cover on the side delivery system allowing operators to see the augers are working correctly and material is being properly applied.	North Region	Highway Maintenance