

Missouri Department of Transportation  
*Patrick K. McKenna, Director*

1.888.ASK MODOT (275.6636)

May 26, 2017

Dear Research Partner:

The Missouri Highways and Transportation Commission requests proposals from qualified organizations—namely private consultants, universities, and research organizations—to furnish professional services as described in the following request for proposal to be coordinated by the Research Unit of the Construction and Materials Division.

Please submit a proposal for project **TR201720** entitled, **“Evaluation of Rejuvenators and Surface Sealing Products to Extend Asphalt Pavement Life.”** Your submittal must include a work plan, the proposed project team and its background, and any related projects now active or recently completed by your firm. The project team must be led by a licensed professional engineer in the state of Missouri and the final report must be sealed, in accordance with the provisions of Chapter 327 RSMo.

The selection committee will use Qualification Based Selection. A “not to exceed” budget amount is included in the RFP to assist with the required scope, but budgets are not to be included with the proposal submissions, and will not be presented to the selection committee.

Please submit all proposals to the Research Administrator indicated in the attachment by **June 26, 2017 10:00 AM (CST)**. More information about project contracting in general can be found at: [www.modot.mo.gov/services/OR/orRFP.htm](http://www.modot.mo.gov/services/OR/orRFP.htm).

Sincerely,



Bill Stone  
Research Administrator  
Attachment



*Our mission is to provide a world-class transportation experience that delights our customers and promotes a prosperous Missouri.*

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

This document contains information and requirements for only this RFP. Submitters should review both this document and general Contracting Documents, which contain additional requirements for all research proposals and contracts. “Contracting Documents” are available on the MoDOT website at [www.modot.org/services/OR/orTemplates.htm](http://www.modot.org/services/OR/orTemplates.htm).

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# TR201720

## *Evaluation of Rejuvenators and Surface Sealing Products to Extend Asphalt Pavement Life*

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### Background

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When asphalt binder is exposed to oxygen and the sun’s ultraviolet rays, it begins to age and oxidize. This aging process leaves asphalt binders stiffer, less ductile, and with a lower temperature susceptibility compared to when the asphalt was initially placed.

Rejuvenators were introduced in the 1960s as a pavement preservation treatment to restore both physical and chemical properties of the aged asphalt binders in the field. The purpose of any rejuvenating product is to restore the aged asphalt binder as close to its original viscoelastic state as possible. The theory behind rejuvenators is that once the rejuvenator penetrates the surface of the oxidized pavement, the viscosity, flexibility, and brittleness of the aged binder can be restored, thereby extending the service life of the pavement.

Additionally, rejuvenating products can act as surface sealants, which minimize the effects of oxidation, moisture damage, and raveling. Thus, the evaluation study is extended to include surface sealing products as well. Rejuvenating products may also be utilized on longitudinal construction joints. They may mitigate deterioration by sealing and re-stabilizing the asphalt at the joint which can experience compaction, segregation, or raveling issues during the construction process.

A nationwide request for information (RFI) was previously conducted to determine how many products would be included and how many vendors were interested in conducting the described work for MoDOT. MoDOT will have conducted a thorough review on each product to ensure that all safety, health, and environmental concerns are identified and addressed. Each vendor will have supplied a sample of an undiluted product along with the

laboratory certifications, test methods, and testing criteria applicable to each product a minimum of 30 days before application. The undiluted sample will be tested and verified for the properties listed on the manufacturers' certification sheets.

## Objectives

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The objective of this investigation is to provide recommendations for creating a performance based specification for rejuvenating or surface sealing products that extend asphalt pavement life.

- The product evaluation should consider the effectiveness of softening the existing asphalt binder, improving the existing rheological properties (to make less brittle), and decreasing the permeability of the pavement.
- The product comparisons should outline the pros and cons including, but not limited to: testing results, cure time necessary before opening roadway to traffic, daily production rate, material and installation cost, material location, other economical limitations, application rate utilized and blotting materials utilized, if applicable.

This investigation focuses on asphalt based or other alternative products intended to seal, rejuvenate or stabilize asphalt pavement on two different product application categories.

- The first category is to be applied on mainline pavement and may utilize a blotter material, defined below.\* While restoring the characteristics of the age-hardened asphalt binder, the products shall maintain adequate friction, mix durability, and wear resistance of the mainline pavement.
- The second category is to be applied on longitudinal construction joints.

For the remainder of the document, the asphalt based rejuvenators and other alternative products will be referred to as "products." Likewise, the longitudinal construction joints will be referred to as "joint" or "joints."

\*The blotter material shall contain fine aggregate materials in accordance with Section 1002.3 of the Standard Specification with the following gradation requirements:

Sieve Size	% Passing
3/8"	100
#4	99
#8	61-69
#16	28-36
#30	11-19
#50	5-11
#100	5-9
#200	4-8

## Project Requirements

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Route N in St. Charles County has been selected for the mainline product(s) treatment application. Route 30 in Jefferson County and ~~Route 87 in Miller County~~ **Route 52 in Morgan County** have been selected for the joint product(s) treatment application. Project details of each route are provided as follows:

### Project for Applying Products for Mainline Treatments

Route N in St. Charles County

Location: Between Route Z and Route T

Total Length: approximately 12 miles

Current Treatment/Year: BP-1 in 2014

Designated MoDOT Contact Person for scheduling: Mitch Huskey

### Projects for Applying Products on Joint Treatments

Route 30 in Jefferson County

Location: Between Route B and the St. Louis County line

Total Length: approximately 11 miles

Current Treatment/Year: SP095CLP in 2012

Designated MoDOT Contact Person for scheduling: Mitch Huskey

~~Route 87 in Moniteau and Miller County~~

~~Location: Between Route 50 and Business Route 54~~

~~Total Length: approximately 19 miles~~

~~Current Treatment/Year: Surface Leveling Course in 2015~~

Designated MoDOT Contact Person for scheduling: Joe Moore

### **Route 52 in Morgan County**

**Location: Between Route 5, west Junction in Versailles to Aurora Street in Eldon**

**Total Length: approximately 17 miles**

**Current Treatment/Year: BP-1, currently under construction, let 10/21/2016**

Designated MoDOT Contact Person for scheduling: Joe Moore

Services provided by MoDOT:

- Traffic control for the extent of the project to be scheduled through designated person.
- Laboratory analysis on cores obtained on the project as well as testing and verification of vendor product samples collected by Offeror on site. All samples are to be submitted to Central Laboratory, Attn: Jeff Joens.

All samples obtained by Offeror should be documented precisely. This is necessary to ensure that the preceding coring does not conflict with initial coring. Permeability tests must be duplicated after product application. The results are only comparable if conducted in the exact initial location. For coring, the sampling location selected shall exclude areas with cracks,

maintenance patches, or other anomalies that may skew the results. In addition, coring shall not take place within a monitoring area (defined in Task 1). All locations where cores are obtained are to be filled and hand tamped with a cold mix patch material preapproved by the designated MoDOT contact.

Task descriptions are intended to provide guidance in development of the research. It is the responsibility of the Offeror to determine the best strategies to accomplish the research objectives.

### Task 1 – Work Plan

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A work plan will be developed which details implementation of the following tasks as well as the resources and schedule required to achieve the project’s objectives. The work plan will cover the two different product application categories: mainline treatments and joint treatments. The plan shall include a precise layout where each product will be applied for equivalent lengths, to be determined after the number of products is established (hereinafter referred to as “test section”). The Offeror will observe the test section for each product to further select a monitoring area within that section, of at least 500 feet in length. This monitoring area should be selected to represent a fair and consistent review of each product based on the profile, traffic, drainage, etc. of the selected route. A control section, where no treatment is applied, for each roadway should also be included. The length of the control section should be a minimum of 500 feet.

### Task 2a – Data Collection on Existing Pavement for Mainline Treatment

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The existing pavement characteristics will need to be collected prior to the application of any products. These characteristics include the following:

- For mainline treatments, the frictional properties of the pavement will need to be measured in accordance with ASTM E274 using FN40R skid equipment. A minimum of one friction test per 200 feet (not to exceed 10 per test section) are to be collected per test section, as well as the control section.
- Pavement coring will need to be performed by the Offeror in order to measure the existing binder characteristics of the pavement.

Route N (for the mainline treatment) will require 18 cores (a minimum of 6-inches deep), evenly distributed, from the middle of the lane for laboratory analysis. The diameter of the pavement cores need to be 6-inches to ensure there is enough material. The pre-application pavement cores should be submitted to Central Laboratory for the following tests:

- AASHTO M320 – Performance Graded Asphalt Binder
- AASHTO T 49 – Penetration
- AASHTO T 51 – Elastic Recovery

- AASHTO T 300 – Force Ductility Test of Asphalt Materials
- AASHTO T 315 – Dynamic Shear Rheometer (DSR)
- AASHTO T 350 – Multiple Stress Creep Recovery
- Field permeability shall also be measured in at least three locations per test section. Field permeability will be measured in accordance with MoDOT TM 83.
- An electronic distress survey will need to be performed for the monitoring areas of each test section and the control section. The distress survey and measurements should follow the FHWA Distress Identification Manual, Publication No. FHWA-RD-03-031.
- Wear resistance of the mainline for each test section should be documented (photos, etc.) and rated using the PASER manual.

#### Task 2b – Data Collection on Existing Pavement for Joint Treatment

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The required testing for products used on joints will be mainly focused on reducing permeability, increasing density, and mitigating further deterioration of the joint. The existing pavement characteristics will need to be collected prior to the application of any products. These characteristics include the following:

- A modified electronic distress survey will need to be performed that focuses on a 2-foot wide strip surrounding the joint. The joint width should be measured once every 25 feet. The distress survey and measurements should follow the FHWA Distress Identification Manual, Publication No. FHWA-RD-03-031.
- At least three field permeability tests in accordance with MODOT TM 83 will be run adjacent to the joint for each test section and the control section.
- For products that are clear, paint stripe retroreflectivity will need to be measured prior to application per test method MODOT TM 80.

#### Task 3 – Product Application

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Field monitoring during application will be essential for a successful investigation. Each product may have different application procedures, including but not limited to: rates, handling, and storage. The following items for each product should be monitored and documented during the application process:

- Field sampling by the Offeror should also include the collection of one gallon of each diluted product in a plastic jug. The sample should be submitted to Central Laboratory for testing to verify the amount by which the product was diluted.

- The application rate determined by the product vendor for optimizing their product's performance shall be verified and recorded.
- Obtain pictures and video of the application operation for each product.
- Document how the vendor applies the product, ease of application, how it can be purchased and if it can be applied by internal staffing.
- Verify with vendor field representative the information submitted on the form regarding shelf life, storage requirements, cost and special equipment/processes required for product installation.

#### Task 4 – Post Application Investigation

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After the application of each product, a period of at least 30 days should pass prior to any post application data collection.

- For mainline treatments, friction data should be collected with the same procedure as the preliminary application initially after 7 days but within 30 days (with close observation of vehicle performance passing through in the interim) and additionally at a frequency of 6 months, one year and two years.
- After a term of one year, pavement coring will need to include six 6-inch cores (a minimum of 6-inches deep) per product for the mainline application category. The post-application pavement cores should be submitted for testing using the same suite of tests as the pre-application pavement cores.
- Field permeability will be measured with the same procedure as during the pre-application testing for both categories at a frequency of 30 days, 6 months, one year and two years.
- A post application electronic distress survey will need to be performed with the same procedure for both categories as the preliminary application at a frequency of 30 days, 6 months, one year and two years.
- Wear resistance of the mainline for each test section should be documented with the same procedure as the preliminary application at a frequency of 30 days, 6 months, one year and two years.
- Paint stripe retroreflectivity will need to be measured prior to any traffic driving on the surface after application of any clear products, followed up with a 30 day measurement if any concerns arise based on communication with designated MoDOT staff.

#### Project Deliverables

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For report and plan templates and forms, see: [www.modot.org/services/OR/orTemplates.htm](http://www.modot.org/services/OR/orTemplates.htm)

**Email Communications:** E-mail and phone communications between the Principal Investigator(s) and MoDOT contacts as necessary are required to provide on-going updates of progress throughout the project.

**Quarterly Reports:** Quarterly reports should be submitted throughout the project on the last day of March, June, September and December. The quarterly reports are not intended to replace any additional correspondence between the research team and MoDOT needed to keep the project moving. Please refer to template on the website.

**Draft Final Report and Research Summary:** These drafts should be final products except for revisions based on MoDOT's review. The details of the final report will be further discussed with the Research project manager as the project evolves. A final report must include a completed Technical Report Documentation page. Please refer to templates on the website.

**Final Report/Final Research Summary:** After MoDOT's review is complete and documents have been edited to MoDOT's satisfaction, final documents should be submitted as Word and PDF documents (unless otherwise instructed). Please refer to summary template on the website.

**Post Application Reports:** The first report should include the summary of the initial findings and 30 day test results for each product applied. **All friction data collected is to be communicated to the designated MoDOT contact person within 48 hours of findings.** Additional post application report summaries will be necessary after each of the specified investigation periods (six months, one year, and two years). The final report should reflect the overall performance and evaluate the effectiveness of each product in achieving the project's goals through the evaluation period. Additionally, a recommendation of future use of these products and guidance in developing a performance based specification for applying on Missouri roadways is desired. All documents should be submitted as Word or PDF document attachments (unless otherwise instructed).

## **Project Schedule**

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The following is an estimate of the project timeline or information on key dates within the project, presuming the project starts August 1, 2017. Proposals need to include a work plan with a proposed timeline. For a sample of a work plan template, see link below. Changes to our estimated project timeline below will be considered, however, timeline extensions cannot be guaranteed. The project timeline will be discussed and finalized during the kick off meeting.

For report templates and forms, see: [www.modot.org/services/OR/orTemplates.htm](http://www.modot.org/services/OR/orTemplates.htm).



<b>Date</b>	<b>Milestone</b>
August 7, 2017	A kick off meeting with MoDOT will be scheduled to discuss project requirements and deliverables. The dates of key milestones and deliverables will be determined from this meeting.
September 29, 2017	Products should all be applied. Quarterly report due.
October 27, 2017	30 day testing to be performed.
November 10, 2017	30 day Post-Application Summary Report due.
December 29, 2017	Quarterly report due.
March 30, 2018	Quarterly report due. 6 month testing to be performed.
April 13, 2018	6 month Post-Application Summary Report due.
September 28, 2018	1 Year Post-Application coring to be performed.
October 12, 2018	1 Year Post-Application Summary Report due.
December 31, 2018	Quarterly report due.
March 29, 2019	Quarterly report due.
June 28, 2019	Quarterly report due.
October 11, 2019	2 Year Post-Application Summary Report due.
November 1, 2019	Draft final report and draft summary report are due. The draft documents shall be submitted to MoDOT approximately one month prior to the final report.
December 2, 2019	Final report and summary report are due. The final documents shall be due approximately one month before the end of the contract. This is to allow all billing to be completed prior to the end of the project.
December 31, 2019	Final invoice due.
January 31, 2020	Contract ends.

## Special Notes

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Project budget is not to exceed \$200,000. A budget is not to be included in the proposal, but will be required for the contract and must be within this limit. For a sample Budget template, see link below.

For report templates and forms, see: [www.modot.org/services/OR/orTemplates.htm](http://www.modot.org/services/OR/orTemplates.htm).

## RFP Requirements

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- “Contracting Documents” provide further details and links to the required forms. They are available at: [www.modot.org/services/OR/orTemplates.htm](http://www.modot.org/services/OR/orTemplates.htm)
  - **Organization’s Project Experience:** The proposal must clearly identify the Organization’s experience in offering the services requested in this RFP during the past three (3) years. The description should include a list of the agencies which your organization has served during this time period or currently serves. Please highlight any work you have done with other state agencies or local governments.
  - **Team Member Experience:** Please list all team members (including subcontractors) proposed to work on the project. Attach licenses, certifications and resumes for key personnel.
  - **Organization’s Client References:** Proposals should indicate the name, title, and telephone number of at least three clients within the past three years.
- Proposals must be no more than 10 pages with a font size no less than 11 points. This length limit **does not include** the Proposal Submission Form, Organization’s Project Experience, Team Member Experience, Organization’s Client References and optional cover letter (if included, one page maximum).
- Proposals must be submitted as one combined PDF document. The submission should **only include the required documents** organized in the following order: 1) Proposal Submission Form; 2) Cover Letter (Optional; 1 page maximum); 3) Body of Proposal (including work plan); 4) Organization’s Project Experience; 5) Team Member Experience; and 6) Organization’s Client References.
- The Offeror must respond to this RFP by submitting all the information required herein for its proposal to be evaluated and considered for award. Failure to submit all the required information shall be deemed sufficient cause for disqualification of a proposal from consideration.
- Proposals will be evaluated by an agency and stakeholder team with knowledge and backgrounds in relevant areas for this project. Selection of the successful Offeror will be based on the Offeror’s demonstrated knowledge in the required areas, the merit of the proposed methods and approach in achieving the desired goals, the experience and

qualifications of the team, the plan for ensuring implementation of results, and the adequacy and availability of team members to complete the work in a timely manner.

- Correct proposal submission is one of the evaluation criteria. If submission instructions in this section are not followed, the **Offeror risks an automatic 10 point deduction (out of 100 total points)** when points are awarded during the Proposal Evaluation Process.

### RFP Schedule

This document constitutes an RFP from qualified organizations to conduct the TR201720 Evaluation of Rejuvenators and Surface Sealing Products to Extend Asphalt Pavement Life study for the MHTC and Missouri Department of Transportation (MoDOT). MHTC reserves the right to reject any and all proposals for any reason whatsoever.

The following RFP Schedule of Events represents MoDOT’s best estimate of the schedule that shall be followed. The time of day for the following events shall be between 7:30 am and 4:00 pm, Central Standard Time unless otherwise noted. MoDOT reserves the right at its sole discretion to expand this schedule, as it deems necessary, without any notification except for the deadline date for submitting a proposal. Time is of the essence for responding to the RFP within the submission deadlines.

The following timeline must be met for a proposal to be accepted.

Date	Action
May 26, 2017	MoDOT posts RFP to the website: <a href="http://www.modot.mo.gov/services/OR/orRFP.htm">www.modot.mo.gov/services/OR/orRFP.htm</a>
June 6, 2017 10:00 AM (CST)	Written comments or questions must be submitted to <a href="mailto:MoDOTResearchRFP@modot.mo.gov">MoDOTResearchRFP@modot.mo.gov</a>
June 12, 2017	MoDOT will post responses publicly on the website: <a href="http://www.modot.mo.gov/services/OR/orRFP.htm">www.modot.mo.gov/services/OR/orRFP.htm</a>
June 26, 2017 10:00 AM (CST)	Submission deadline for proposals.
July 10, 2017	MoDOT will notify submitters about project selection, or if needed, about interviews to finalize selection.

## Contracting Requirements

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- The successful team will be required to complete additional documentation and enter into a contract such as a “Standard Research Agreement” or “Task Order.” Applicants should be aware of these additional needs so contracting can proceed in a timely manner.
- As part of the eAgreements process, MoDOT uses an electronic signature tool, DocuSign, for signing agreements electronically. All parties of the agreement must agree to sign electronically in order to utilize the electronic signature option. If your proposal is selected, you will be informed about how to obtain your credentials for electronic signatures (including how to become a MoDOT vendor if you are not already).
- Standard contracts, forms, attachment templates and additional information are available from the Research Administrator or the website:  
[www.modot.org/services/OR/orTemplates.htm](http://www.modot.org/services/OR/orTemplates.htm)

## Proposal Submission

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**Submission Deadline:** Proposals must be emailed by **10:00 AM (Central Standard Time)** according to email time stamp by the submission date in the RFP Schedule to the Research Administrator’s attention (William Stone) at: [MoDOTResearchRFP@modot.mo.gov](mailto:MoDOTResearchRFP@modot.mo.gov). Please reference the project title since more than one RFP may be due at one time. **Electronic proposals are required.**

**Submission Confirmation:** You will receive an email confirmation after your proposal has been received. If you do not receive such a confirmation by **12noon (Central Standard Time) on the day of the deadline**, please contact us at [MoDOTResearchRFP@modot.mo.gov](mailto:MoDOTResearchRFP@modot.mo.gov) as soon as possible. Your submission should not be considered received until you have received your email confirmation.