Local Government Pavement Research, Development, and Implementation Organization in Several States

April 2017

A White Paper from the National Center for Sustainable Transportation

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National Center for Sustainable Transportation

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Local Government Pavement Research, Development, and Implementation Organization in Several States

EXECUTIVE SUMMARY

City and county governments bear responsibility for 80 percent of the roadway pavement lane-miles in California, which carry 45 percent of the vehicle miles traveled (VMT) in the state. California's local governments face a growing backlog of projects and need new approaches to reduce the costs of pavement preservation, maintenance, rehabilitation, and reconstruction while also minimizing environmental impacts. The majority of federal and state investments in pavement-related research, development, and implementation is focused on the problems and capabilities of state departments of transportation (DOTs), as is much of the national effort to provide professional outreach and training in pavement technology. Some of the information and new technologies supported by state and federal investment are very relevant to local governments, though this information is not making its way to cities and counties in a form they can easily adapt and use. Currently, California does not have a well-organized systematic approach for delivering technical content to local governments. Fortunately, several other states do and California can leverage and learn from the experience of those states to develop a systematic approach of its own.

This white paper presents the results of a survey administered by the University of California Pavement Research Center (UCPRC) exploring the successes, challenges, funding, and organizational structure of six centers in other states that share a similar mission to support the improvement of city and county pavement practices. Five of the six centers that participated in the survey are statewide centers located in Iowa, Minnesota, North Dakota, Ohio and Texas. The Regional Transportation Commission of Washoe County (RTC), the sixth center, is a regional center located in Nevada. These centers were selected as being the nation's most advanced based on an extensive internet search and discussions with key pavement professionals across the country.

The primary observations from the survey are these:

- Overall, these programs are successful in addressing local government pavement-related needs and are welcomed and appreciated by local agencies.
- Strong local agency involvement in governance, communication, research selection and research implementation is critical to ensure a successful program. Boards are usually dominated by local government officials, though in many cases they also include state officials, academic members, representatives from city and/or county membership organizations (e.g., League of Cities and Association of Counties), and sometimes industry representatives. It is also important to identify a local agency champion for every research project before the project begins. Identifying local champions for implementation has helped the Minnesota Local Road Research Board (LRRB) become

one of the most successful programs for leveraging research to address local needs. This approach is also strongly recommended by the Ohio Research Initiative for Locals (ORIL) program, which is currently being established. In Iowa, each research project has a designated project champion or technical expert as well as a Technical Advisory Committee comprised of stakeholders who are selected based on subject matter expertise. In addition, the Iowa Highway Research Board (IHRB) has a dedicated Secondary Road Research Engineer who is the primary liaison between the secondary road departments and the IHRB program.

- All of the organizations partner closely with universities and primarily use universities to provide technical content, except for the Minnesota program which also relies on the large Minnesota Department of Transportation (MnDOT) research effort. Programs also involve academic researchers and often the state DOT when identifying localities' needs, when translating these needs into research and development projects, and throughout the process to provide research management expertise.
- Three out of the five statewide programs interviewed are affiliated with state departments of transportation (DOTs). The state DOTs help with management of the program in some states and not in others.
- The major funding for these programs comes via the state DOTs or directly from the state with annual allocations determined by the state legislature. In these cases, the funding is usually from gas and/or road taxes. Washoe County is unique in that it levies its own local tax on gasoline for its pavement program, a part of which is used for research and development at the local state university.
- The programs were established with initial funding periods of two to five years. Future funding varies depending on a performance evaluation. Funding levels vary and are not closely correlated with population levels.
- The most common method of soliciting research ideas is through direct communication and submission of problems and/or ideas from local government agencies. Program staff or other members review the ideas submitted following protocols set by individual programs.
- Research products typically consist of technical reports, policy reports, specifications, guidelines, and pilot projects. Research products are often communicated back to local agencies through annual conferences as well as posted on each center's website. The number of conferences varies depending on the size of the participating local agencies. Although implementation of research products is a primary goal of such programs, the levels of implementation vary among the different states. The North Dakota consortium is primarily a training program and does not conduct research.

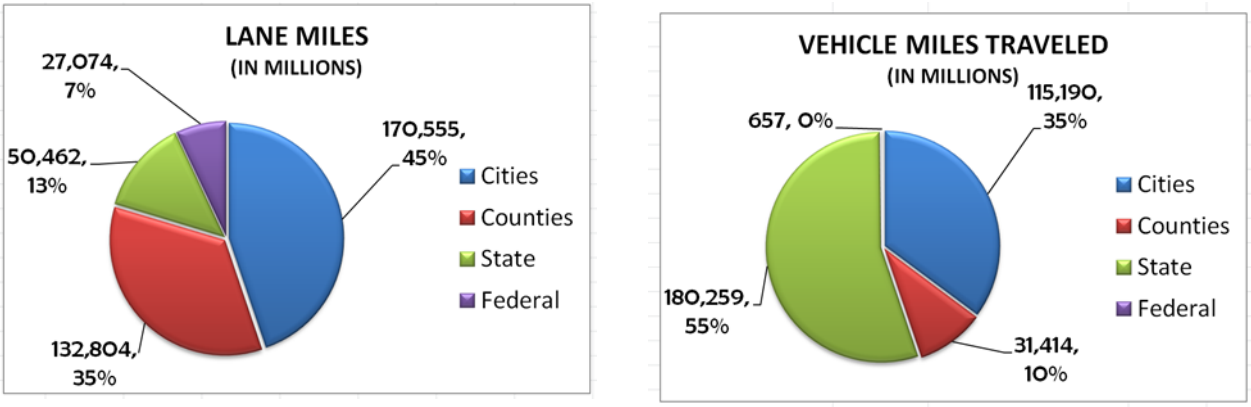
List of Selected Abbreviations

DOT	Department of Transportation
IHRB	Iowa Highway Research Board
LRRB	Local Road Research Board
LTAP	Local Technical Assistance Programs
MnDOT	Minnesota Department of Transportation
MPO	Metropolitan Planning Organization
NDLTAP	North Dakota Local Technical Assistance Program
ODOT	Ohio Department of Transportation
ORIL	Ohio Research Initiative for Locals
RFP	Requests for Proposal
RTC	Regional Transportation Commission
TLN	Transportation Learning Network
TTI	Texas Transportation Institute
TxDOT	Texas Department of Transportation
UCPRC	University of California Pavement Research Center
UGPTI	Upper Great Plains Transportation Institute
UNR	University of Nevada, Reno

Introduction

Background and Purpose

City and county governments bear responsibility for 80 percent of the roadway pavement lane-miles in California, which carry 45 percent of the vehicle miles traveled (VMT) in the state (Figure 1). While state and local funding cycles can make spending vary, it is estimated that California's local governments combined spending on pavement maintenance and rehabilitation (M&R) amounts to approximately 60 to 100 percent of what the California Department of Transportation (Caltrans) spends on the state highway system as a whole—an average of about $1 billion per year[1] over the past four years. About 95 percent of spending on pavements by both Caltrans and local governments in recent decades has been on M&R as opposed to construction of new streets, roads and highways.



(a) **(b)**

Figure 1. (a) Lane-miles of California public pavement by owner; (b) vehicle miles traveled on California public pavement by owner (plotted from data in Reference 1).

California local governments face a growing backlog of projects, and need new approaches to reduce the costs of pavement preservation, maintenance, rehabilitation, and reconstruction, while also minimizing environmental impacts. The majority of federal and state investments in pavement-related research, development, and implementation is focused on the problems and capabilities of state departments of transportation (DOTs), as is much of the national effort to provide professional outreach and training in pavement technology. Some of the information and new technologies supported by state and federal investment are very relevant to local governments, though this information is not making its way to cities and counties in a form they can easily interpret and use. Currently, California does not have a well-organized systematic approach for delivering technical content to local governments. Fortunately, several other states do, and California can leverage and learn from the experiences of those states regarding how to develop a systematic approach of its own.

[1] Caltrans State of the Pavement Report 2015

This white paper presents the results of a survey administered by the University of California Pavement Research Center (UCPRC) exploring the successes, challenges, funding, and organizational structure of six centers in other states that share a similar mission of supporting the improvement of city and county pavement practices. Five of the six centers that participated in the survey are state-wide centers and are located in the states of Iowa, Minnesota, North Dakota, Ohio and Texas. The remaining sixth center is a regional center run by the Washoe County Regional Transportation Commission which is a metropolitan planning organization (MPO) in Nevada. These centers were selected as being the most advanced based on an extensive internet search and discussions with key pavement professionals across the country. This white paper provides a summary of best practices in other states and recommendations for California to consider in establishing a similar center based on local government pavement needs.

Approach

The UCPRC research team performed the following tasks to develop this white paper:

1. Performed a web search for organizations in other states that deliver pavement technical content to local governments. Initial targets for the investigation were developed by the project team from their networks of state and local government pavement officials, researchers, and technology providers across the country.
2. Conducted telephone interviews with key individuals from the six most promising centers to learn more about how each center is governed, funded and operated, as well as to learn more about successes, challenges and lessons learned when establishing their programs and/or from their current operations. Five of the centers were identified from the web search as having more extensive programs than the standard Local Technical Assistance Programs (LTAP) run by most state DOTs. The five centers interviewed operate in the states of Iowa, Minnesota, Ohio, North Dakota, and Texas. The sixth center functions at a regional level in Washoe County, Nevada. Project researchers interviewed staff members who either work for one of the centers or state DOT staff closely associated with these organizations. The Appendix of this white paper contains a list of the interviewees and their programs.
3. Analyzed the results of the web search and telephone interviews for consistencies and differences regarding the following questions about the establishment and operation of a successful local government pavement improvement center:
    - Why was the program started?
    - What is the primary purpose of the program?
    - How is the program organized?
    - What were the initial obstacles in setting up the program?
    - How does the program solicit research ideas?
    - How do solicited ideas become proposed projects?
    - What are the major funding sources for the program?
    - How much funding variability is there from year to year?
    - To whom does the program report?

- What are the types of products?
- How much emphasis is there on pavement-related research?
- How do you communicate the products to the local public works managers and other users?
- What is working well in your program?
- What is not working well in your program?

Results

Below is a table summarizing basic information about the six centers investigated as part of this white paper, followed by detailed answers to all the questions asked during the phone interviews with representatives from each center.

Table 1. Summary Information of Local Government Programs in the United States

Program Name	Year Established	Administrative Division	No. of Board Members	Major Funding Sources	Focus of Activities	Approx. Annual Funding Level	Population of Program Jurisdiction	How Much of the Funding Goes to Implementation Projects
Ohio's Research Initiative for Locals (ORIL)	2013 by the state DOT	Ohio DOT	15 (4 county, 4 city, 1 township, 4 DOT, 2 academia)	ODOT SP&R2 research program	Safety, renewal of infrastructure; operations & business practices	$500,000	11.6 million	No dedicated implementation funding at this time.
Minnesota Local Road Research Board (LRRB)	1959 by the state legislature	Minnesota DOT	10 (4 county, 2 city, 3 DOT, 1 academia)	County state-aid highway fund and the municipal state-aid street fund	Pavement research, development and implementation	$3,000,000	5.5 million	Special funding is reserved for Research Implementation Committee.
Iowa Highway Research Board (IHRB)	1950 by the state legislature	Performance & Technology Division of Iowa DOT	15 (7 county, 2 city, 4 DOT, 2 academia)	Road and gas tax collected by DOT, counties and cities	Highway and bridge research and engineering studies on primary, secondary and city systems	$2.3 million	3.1 million	About 20% of funding goes to research implementation.
The North Dakota Upper Great Plains Transportation Institute (UGPTI)	1980s by state DOTs and universities	UGPTI Advisory Council (with North Dakota DOT representatives) and oversight by North Dakota Legislature	Advisory council with varying membership	ND, SD, MT and WY DOTs; Mountain Plains Consortium; State legislature-allocated oil and gas revenue	Highway, transit, rail, air, and waterway transportation	Highly variable depending on revenue	3.3 million combined	Project implementation is not administrated by UFPTI.
Texas A&M Transportation Institute - Materials and Pavements Division	1955 by legislature as state agency	Texas DOT	26 (faculty members and research staff)	Research grants and other project contracts	Pavement engineering, design, sustainability and management	Highly variable, no guaranteed funding	27.9 million	At least 30-50% of all project funding goes to implementation.
Washoe County Regional Transportation Commission (RTC) and University of Nevada, Reno	1970s by MPO	Washoe County Regional Transportation Commission	5 (2 county, 3 city)	Washoe County inflation-indexed gasoline tax	Pavement engineering and long-term traffic planning	Fixed by legislation	0.4 million	No significant amount of funding required to implement policies.

Detailed Responses

Question 1: Why was the program started?

Ohio: Ohio's Research Initiative for Locals (ORIL) was established in 2013 by the state DOT to provide research support for Ohio's local jurisdictions to address problems and challenges specific to the local roadway system. (2)

Minnesota: LRRB was established in 1959 through state legislation. (3)

Iowa: In 1949, the Iowa General Assembly enacted legislation that designated 1.5 percent of Iowa's farm-to-market highway funds for secondary road research. Primary road research funding was already permissible under existing laws. Following this action, in December 1949, the then Iowa State Highway Commission approved establishing the Iowa Highway Research Board (IHRB) to provide oversight for this research program. In 1989 the Iowa legislature designated funding from the municipal street funds to be set aside for research. (4)

North Dakota: The Upper Great Plains Transportation Institute (UGPTI) was started in the 1980s by the state legislature and North Dakota State University to meet North Dakota's (and other regional) grain-moving needs in the face of rail abandonment. At first, the program focused solely on rail, and the employees were economists and agronomists, with no engineers. (5)

Texas: The state legislature through the state DOT realized that there was a need for updated pavement engineering, standards, and management.

Washoe County, NV: The Regional Transportation Commission of Washoe County Nevada (RTC) is an independent government agency established by the state in 1976 whose member agencies are the Cities of Reno and Sparks, Nevada, and Washoe County. Its five-member commission consists of city council members and county commissioners from those agencies. The RTC is the metropolitan planning organization (MPO) for the area, and is responsible for regional transportation planning and operation of the transit system. The RTC has an engineering and construction department that oversees the design, construction, and maintenance of "regional roads", which consist of higher volume arterials and collectors. The RTC does not own any of these facilities but manages a fuel tax increment dedicated to the regional network. The RTC developed a pavement preservation program in cooperation with local agencies that prioritizes projects based on need and benefit to the network and is blind to jurisdiction.

The RTC developed an ongoing research program with the Western Regional Superpave Center at the University of Nevada, Reno, to optimize the materials performance and benefits of existing treatments and strategies, and to explore new tools that will extend pavement life and improve the performance of the pavement network.

Question 2: What is the primary purpose of the program?

Ohio: To provide practice-ready solutions to real-world issues faced by Ohio's local transportation system through research. Research focuses on safety, renewal of infrastructure and operations and business practices. (2)

Minnesota: Research to improve the design, construction, maintenance, and environmental compatibility of state-aid highways and streets and appurtenances; construction of research elements [test sections], and reconstruction or replacement of research elements that fail; and programs for implementing and monitoring research results. (3)

Iowa: To improve the efficiency and effectiveness of highway transportation and engineering in Iowa. Although the program was originally started to raise awareness of the state's secondary road research, the focus of the research currently serves the primary, secondary, and street highway systems. The IHRB funds both basic, applied and advanced research projects and other engineering studies. (4)

North Dakota: Conducting applied and advanced research in highway, transit, rail, air, and waterway transportation that addresses the critical issues of the state, region, and nation; educating the transportation workforce of tomorrow through multidisciplinary curricula that focus on transportation economics, management, infrastructure planning, mobility, and supply chain logistics; improving the skills and knowledge of the existing workforce through training, technical assistance, and the transfer of research results to practitioners. (5)

Texas: Conducting research into pavement engineering, design, sustainability and management; providing outreach to local governments through the Texas A&M Engineering Extension Service (TEEX) at UT-Arlington, which has the LTAP center. The institution mostly works for TxDOT; it does not do work specifically for local governments, unless, for instance, a regional mobility authority (RMA) or county sponsors the work. (6)

Washoe County, NV: To efficiently and optimally address the region's pavement infrastructure needs in a manner that is best for the pavement network overall and blind to political jurisdictions.

Question 3: How is the program organized?

Ohio: ORIL is directed by a board of 15 voting members, and three nonvoting/supporting members. The members are four from County Engineers Association of Ohio, four from Ohio Municipal League, one from Ohio Township Association, four from Ohio Department of Transportation, and two from academia. *[Note: the Ohio ORIL operations are summarized in the figure "Ohio ORIL Decision-Making Flowchart" on page 20, in the section "Additional Information."]*

Minnesota: LRRB membership includes four county and two city engineers who may serve a maximum of two four-year terms. MnDOT members include the State Aid Engineer, a representative from a MnDOT specialty office, and the Director of Research Services, who is the ex-officio secretary and a voting member. A University of Minnesota Center for Transportation Studies (CTS) representative is the tenth member. *[Note: the Minnesota LRRB operations are summarized in the figure "Minnesota LRRB Funding, Decision-Making and Action Framework" on page 21, in the section "Additional Information."]*

Iowa: IHRB is composed of 15 members: seven engineers employed by Iowa counties (one from each of the six districts and the Iowa County Engineer's Association (ICEA) Transportation Research Board representative); two engineers employed by Iowa municipalities, nominated by the Iowa Chapter of the American Public Works Association; the Chair of the Department of Civil and Environmental Engineering at the University of Iowa, and the Chair of the Department of Civil, Construction, and Environmental Engineering at Iowa State University; four engineers from Iowa DOT, representing the Department. For each board member, an alternate is also appointed to serve at the member's request when the member is unable to attend; alternates are nominated in the same manner as board members and often become the next member when the member leaves the board. *[Note: the Iowa IHRB operations are summarized in the figure "Iowa IHRB Funding, Decision-Making and Action Framework" on page 24, in the section "Additional Information."]*

North Dakota: UGPTI is a center at North Dakota State University, which is guided, in part, by an advisory council composed of representatives of various organizations, industries, and agencies affecting or affected by transportation.

Texas: The Texas Transportation Institute (TTI) is an agency of over 600 employees overseen by the Texas A&M University System Vice Chancellor for Engineering, headed by the TTI Director and managed by associate directors for the various technical divisions. Each division is run by a division head with program managers for specialized technical areas. The Materials and Pavements division has a total of 88 people including 34 full-time professional staff, faculty researchers, and technicians; 28 student technicians; 21 graduate students; and 5 administrative personnel.

Washoe County, NV: The RTC is unusual among MPOs in that it administers a fuel tax for road infrastructure work in-house through its Engineering and Construction Department. There are engineering staff that oversee design consultants and then the bidding and construction of projects. Project selection and prioritization are based on PCI and traffic volumes in coordination with local agency staff through monthly meetings of a Pavement Preservation committee. The fuel tax also funds the research program through a $150,000 biannual contract. It is through the execution of the pavement preservation program (preventive maintenance, rehabilitation and reconstruction) and the interaction of RTC, local agencies, and UNR that research needs and ideas emerge. (7)

Question 4: What were the initial obstacles in setting up the program?

Ohio: Limited initial funding narrowed the progress of activities of ORIL. Even though the funding has been steady for recent years, ORIL board members are working without compensation and additional funding is needed to further expand the program.

Minnesota: Unknown, it was founded more than 50 years ago.

Iowa: As the program was initiated a long time ago, and the administrations have changed multiple times over the years, it is hard to trace back to the original founders on the initial obstacles they faced.

North Dakota: Limited starting funding.

Texas: Unknown, it was started more than 50 years ago.

Washoe County, NV: There were no obstacles to the research program and the RTC board saw additional benefit beyond obtaining research findings in having the university connection with local agencies.

Question 5: How does your program solicit research ideas?

Ohio: Ideas are submitted by local practitioners (counties, townships, municipalities, metropolitan planning organizations, regional transportation planning organizations) to ORIL.

Minnesota: Transportation practitioners (local government staff, researchers, etc.) submit ideas to LRRB, which then selects the proposals to approve by a majority vote, with a minimum quorum of six members.

Iowa: There are four ways to gather research ideas: annual strategic list of research interests, previous research continuation, critically-timed issues, and innovative ideas. Most new project ideas for the strategic annual cycle are derived through annual or biennial research focus groups.

North Dakota: UGPTI's projects, which are mostly funded by grants, are informed by the UGPTI Advisory Council, which includes representatives from NDDOT, a few governmental agencies, the ND League of Cities, the ND Association of Counties, and major industry groups (corn council, associated general contractors, grain growers association, etc.). **"**In general, all the UGPTI programs partner extensively with governmental agencies, researchers, private sector groups, etc., within and without North Dakota. There is a lot of cross-pollination and good communication about needs that is transmitted through these networks."

Texas: The Materials and Pavements Division provides input via problem statements for TxDOT, NCHRP, ACRP, etc. Researchers then respond to requests for proposals (RFPs) from various agencies.

Washoe County, NV: The RTC funds a $150,000 biannual research program with the University of Nevada. Research ideas are suggested by the pavement preservation committee which meets monthly to discuss current local pavement issues. Ideas for research also come from the University of Nevada, Reno, as well, and the results of some of the work the University does on behalf of the Nevada DOT are pertinent to the local conditions, so we piggy-back on those efforts as well.

Question 6: How do solicited ideas become proposed projects?

Ohio: Board members review and prioritize ideas, and form Technical Advisory Committees (TACs). TACs then develop Request for Proposals. The Ohio Department of Transportation (ODOT) is the contracting authority for the projects, whose funding mechanism is cost-reimbursed.

Minnesota: LRRB sends out research-needs statements with an expert lead person as the contact. MnDOT/universities/consultants then develop proposals that are reviewed by the expert. One or two proposals are then selected by the expert to be heard by the board for funding. MnDOT then sets up the contracting.

Iowa: Research ideas are converted to problem statements and are voted on by board members based on Iowa's interests and needs, agendas, funding availability, risk, and possibility of implementation. Selected problem statements are developed into requests for proposal. Proposals are reviewed by the board for funding approval. The Iowa DOT manages the contracts for IHRB research project.

North Dakota: Almost all UGPTI's projects are data-gathering or educational outreach projects. It does not do its own research or pilot implementation projects. Proposals are funded by grants through government agencies.

Texas: The Materials and Pavements Division of TTI receives RFPs from TxDOT (TxDOT ranks the problem statements and decides which to put out for bid), FHWA, etc., then they respond to the RFPs after deciding on research teams. TTI also has interagency contracts with TxDOT for certain specialized projects that are sent directly to TTI and not put out for a general bid.

Washoe County, NV: Research ideas emerge from the pavement preservation committee based on current needs and issues seen in the field. The RTC then directs UNR to develop a problem statement and proposal, and perform the necessary work. UNR will also suggest and submit proposals to be contracted to do the research activities.

Question 7: What are the major funding sources for the program?

Ohio: Funding for ORIL research projects is provided through the Ohio Department of Transportation's (ODOT's) State Planning and Research Part 2 (SP&R2) program. A total of $500,000 per fiscal year was initially budgeted in ODOT's SP&R2 program to support ORIL projects for a period four fiscal years. ODOT has renewed funding for ORIL through fiscal year 2021.

Minnesota: Each year, the County Screening Board and the City Screening Committee recommend to the State Transportation Commissioner a sum of money that the Commissioner shall set aside from the county state-aid highway fund and the municipal state-aid street fund. Per Minnesota statutes, the amount set aside from each of these funds shall not exceed one half of one percent of the preceding year's apportionment sum.

Iowa: The IHRB is made up of three main funding sources. One-and-a-half percent of the Secondary portion of the Road Use Tax funds (about $1.3 million a year), $200,000 annually from the municipal portion of the Road Use Taxes, and $750,000 from unobligated funds provided by the Iowa DOT from the primary portion of the Road Use Tax funds.

North Dakota: About 15 percent of UGPTI's funding comes from state legislature allocations, with most of the rest coming from grants. For the Transportation Learning Network (TLN, a division of UGPTI) specifically, four state DOTs and the Mountain Plains Consortium (MPC) of universities are involved in governing and funding the program. Each of the four states (ND, SD, MT, and WY) provides about $117,000 annually, while the MPC contributes about $80,000. Representatives from each of the four states' DOTs and each of the MPC universities sit on the TLN steering committee.

Texas: The funding structure is very similar to that of a traditional university-based research institution, where the vast majority of their funding comes from the research projects and other project contracts they receive. Some of their researchers' salaries come from the university when they hold an academic appointment.

Washoe County, NV: The funding source is the county fuel tax for road way infrastructure.

Question 8: How much funding variability is there from year to year?

Ohio: Funding for ORIL has been consistent, at $500,000 per fiscal year, since 2013.

Minnesota: In the first funded year, 1960, the Local Road Research Board (LRRB) received $86,000 (about $700,000 in 2016 dollars). The LRRB's current budget is about $3 million.

Iowa: Funding varies slightly by year. Currently, it is approximately $2.3 million per year. Also, the IHRB serves as the Statewide Transportation and Innovation Council (STIC) for Iowa and can seek up to an additional $200,000 in federal grants from the Federal Highway Administration each year.

North Dakota: Funding has generally increased year after year since UGPTI was created. There is some variability based on grant funding and the amounts of funding provided by the legislature for one-time projects. For example, because much of funding allocated by the legislature comes from oil and gas revenues, it varies based on oil and gas revenues.

Texas: Funding period and amount is different for different grants and contracts. The amount of funding may vary from about $6 million to $10 million per year for the division.

Washoe County, NV: The fuel tax dedicated to the RTC is very robust because it is indexed to inflation and increases based on the Producer Price Index (PPI) which tracks well with construction inflation. The research funding for RTC's UNR contract remains steady at $75,000 per year in two-year contracts.

Question 9: To whom does the program report?

Ohio: The ORIL Board oversees the development and execution of the program and projects. ODOT's Office of Statewide Planning and Research coordinates funding and contracts.

Minnesota: MnDOT state-aid engineers.

Iowa: IHRB serves as an advisory board to the Iowa DOT. The IHRB program is managed by the Office of Research and Analytics under the Performance & Technology Division.

North Dakota: There is some general oversight by the state legislature and the UPGTI Advisory Council, but most of the program management falls to the different program leads and their specific program advisory boards and/or steering committees. Since the UGPTI doesn't do research itself, though, or implement pilot projects, there is not as much emphasis on post-hoc project review.

Texas: The research funding agency.

Washoe County, NV: UNR reports to the RTC Project Manager.

Question 10: What are the types of products?

Ohio: Technical reports and best practices.

Minnesota: Technical reports, policy reports, specifications, guidelines, pilot projects, educational outreach projects, and implementation assistance.

Iowa: The final form of the products includes reports, technical briefs, computer programs, manuals, databases, specifications, design standards, etc. It is based on the desired outcome of each research project.

North Dakota: Technical reports, policy reports, specifications, guidelines, pilot projects, etc. Some of the primary products are educational videoconferencing programs (about 50 per year) or webinars, and the statewide GIS-based asset management system which informs the local roads needs studies UGPTI does from time to time.

Texas: Technical reports, policy reports, specifications, guidelines, and pilot projects.

Washoe County, NV: The products of research are mainly project reports, presentations, specifications, and program practices. Research findings are often accepted for presentation at the annual meeting of the Transportation Research Board and those papers often act as the final report. Presentations of results and research updates are also provided annually to the local engineering community through workshops and brown bag lunches.

Question 11: How much emphasis is there on pavement-related research?

Ohio: Annually ORIL establishes a strategic research plan. Projects must relate to at least one of the focus areas identified in the plan. Since the program's inception, renewal has been a key focus area, which has resulted in various pavement studies being conducted.

Minnesota: The primary focus of the LRRB is pavements. Note that LRRB has also supported MnROAD's low-volume roadway activities and sponsors a MnDOT (Maplewood Lab) support staff position in research to help with implementation of pavement preservation efforts and to serve as the key expert for cities and counties to call. LRRB spends between $500,000 and $700,000 a year doing this. They also support the MnDOT library and Center for Transportation Studies at the University of Minnesota. LRRB probably is the reason MnDOT is able to do as much as we do.

Iowa: The IHRB Program funds research in pavements, foundations, soils, bridges and structures, materials, safety, and any aspect related to highways and bridges that is benefit to the state, counties and cities in Iowa.

North Dakota: The asset management system focuses on pavements, and tracks pavement conditions across the state. Some videoconferencing programs and other educational materials also emphasize pavements, but they are only a small portion of what UGPTI does overall.

Texas: The Materials and Pavements Division of TTI focuses solely on pavements.

Washoe County, NV: The RTC has two main focuses: one is local cities' pavement issues, and the other is long-term traffic planning. The RTC has an additional research contract with UNR's traffic engineering laboratory that also is also funded at $75,000 per year to conduct traffic studies, corridor analyses, signal timing, and the like. So half the research funding is dedicated to pavements.

Question 12: How do you communicate the products to the local public works managers and other users?

Ohio: Research products are distributed through the Ohio LTAP Center, ODOT's Research Section, and are made available through national repositories. Information is also presented at various conferences and workshops.

Minnesota: Website, newsletters, conferences. LRRB also supports technical staff at MnDOT and helps other researchers at MnDOT.

Iowa: Presentations of the research projects and implementation at board meetings that are open to all interested parties. Technical presentations are made throughout regional conferences sponsored by the DOT, the counties, cities and industries. Relevant documents are available to the public through the online catalog of Iowa Research Projects. For secondary roads, the Secondary Road Research Engineer serves as a liaison to share the results of research with counties.

North Dakota: The Transportation Learning Network (TLN, a division of UGPTI), for example, creates webinars and videoconferencing that it then markets to transportation professionals, including local government engineers. TLN's materials are also separately marketed by the North Dakota Local Technical Assistance Program (NDLTAP), a representative of which sits on TLN's advisory board. Likewise, a TLN representative sits on the NDLTAP advisory board. Other programs also have their own outreach to local governments or other transportation professionals. For example, the asset management system team had to reach out to the counties and major cities in North Dakota to obtain buy-in and get those jurisdictions to use the software maintained by UGPTI.

Texas: The Materials and Pavements Division does not generally interface directly with local governments except on occasions where a local government puts out an RFP that TTI responds to. Local government managers may draw on research done by TTI in developing their local

standards or when addressing specific problems, but generally not through formal channels. This may change with the development of the new Center for Infrastructure Research (CIR) at Texas A&M which has a strong outreach component that will involve the TTI Materials and Pavements Division.

Washoe County, NV: The RTC invites local city civil engineers, consultants, and researchers from the University of Nevada, Reno, to luncheons and workshops to discuss the research results and implementation strategies. Research findings are often accepted for presentation at the annual meeting of the Transportation Research Board and those papers often act as the final report.

Question 13: What is working well in your program?

Ohio: The involvement and dedication of the ORIL Board members has been critical throughout the development of this program. Engaging various city, county, and township personnel to participate on Technical Advisory Committees to assist in overseeing the technical aspects of individual projects has worked well to make sure the projects maintain focus on local needs. It has also helped in marketing this relatively new program.

Minnesota: LRRB ties the cities and counties together and allows them to fund the research they need and want. It also ties MnDOT and the University of Minnesota together and really makes things like MnROAD a reality. *[Note: MnROAD is a large test road located on an interstate with extensive research capabilities and operated by the Minnesota DOT.]* Many products are developed leading to implementation.

Iowa: Organization balance: representatives from state, city, county, and engineering associations. Industry partners are actively engaged in proposing research topics through focus groups. The synergy among different sectors of the practice encourages active participation and exchange of ideas.

North Dakota: (1) Expanding their subject matter expertise and responsibilities beyond economics and agriculture to, e.g., traffic and pavement management; and (2) branching out and making broad connections, across disciplines and organizations. With respect to the latter point, the respondents touted the consistent communication and collaboration between UGPTI, as the knowledge hub, with the research community on the one hand, and the local governments and the NDLTAP program on the other hand. They felt they had created a very successful conduit for the flow of information both downstream and upstream. One thing that is currently working well to increase knowledge of local conditions at the upstream level is the GIS-based asset management system that UGPTI developed and that is used by 90 percent of the counties and the 14 largest cities to inventory their roadway assets, including structures and pavement conditions. That system is funded in part by an increased base budget from the legislature.

Texas: Researchers generally follow-up their research projects with implementation projects that encourage participation in construction projects throughout the state, working with TxDOT project personnel and contractors, teaching short courses, and developing and refining standards. An example of this is the implementation of full-depth reclamation for TxDOT, where TTI provides instructions to engineers on the development and use of specifications and teaches maintenance personnel how to operate the equipment.

Washoe County, NV: Having an adequate funding stream and an ongoing research contract is very useful in that as research needs come up they can be assessed for inclusion in the program without an elaborate contracting process. The pool of graduate students available and the desire to produce reports suitable for presentation at the national level enhances the quality of the work as well. Also working well is coordination and communication with the local public works departments and healthy public outreach to the community.

Question 14: What is not working well in your program?

Ohio: ORIL is still maturing as an organization. Criteria for project quality control, method of tracking research implementation, raising awareness of the program and public outreach are still being developed. Opportunities for new/additional funding sources is an on-going need.

Iowa: Not answered.

Minnesota: Not answered.

North Dakota: There is no established system for assessing the degree to which local governments are changing their practices based on the informational materials provided by TLN and NDLTAP. In addition, UGPTI is not set up to monitor, assess, or respond to specific local governments' needs. Their informational and instructional materials are geared toward a general audience. The one exception is that UGPTI, when it does the local roads needs study, does make local government-specific recommendations about pavement maintenance, rehab, schedules and costs, etc.

Texas: A general problem in Texas, and probably around the country, is that local governments oftentimes are using antiquated standards and guidelines. Skill and pavement know-how are declining among local government engineers and managers, some of which is due to the fact that local governments sometimes just do not have pavement engineers on staff. For example, in some Texas counties, there is a "judge" (like a city manager), with relatively little engineering background usually, who decides how pavement projects for their jurisdiction are bid, etc.

Washoe County, NV: On occasion our program has to compete with the Nevada DOT for bandwidth for research resources at UNR.

Conclusion

In compiling the survey responses, similarities and differences were found in the approaches used in the different groups. The Ohio, Minnesota, Iowa, and North Dakota organizations are partnerships of the state DOT and local governments. The Texas program is primarily funded by the state and by projects from other sponsors it wins. The Washoe County organization has no state involvement in governance and strictly serves the needs of the city and county public works departments in the MPO.

The primary observations are these:

- Overall, these programs are successful in addressing local government pavement-related needs and are welcomed and appreciated by local agencies.
- Strong local agency involvement in governance, communication, research selection and research implementation is critical to ensure a successful program. Boards are usually dominated by local government officials, though in many cases they also include state officials, academic members, representatives from city and/or county membership organizations (e.g., League of Cities and Association of Counties), and sometimes industry representatives. It is also important to identify a local agency champion for every research project before the project begins.
    - Identifying local champions for implementation has helped the Minnesota Local Road Research Board (LRRB) become one of the most successful programs for leveraging research to address local needs.
    - This approach is also strongly recommended by the Ohio Research Initiative for Locals (ORIL) program, which is currently being established.
    - In Iowa, each research project has a designated project champion or technical expert as well as a Technical Advisory Committee comprised of stakeholders who are selected based on subject matter. In addition, the IHRB has a dedicated Secondary Road Research Engineer who is the primary liaison between the secondary road departments and the IHRB program.
- All of the organizations partner closely with universities and primarily use universities to provide technical content, except for the Minnesota program which also relies on the large Minnesota Department of Transportation (MnDOT) research effort. Programs also involve academic researchers and often the state DOT when identifying localities' needs, when translating these needs into research and development projects, and throughout the process to provide research management expertise.
- Three out of the five statewide programs interviewed are affiliated with state departments of transportation (DOTs). The state DOTs help with management of the program in some states and not in others.
- The major funding for these programs comes via the state DOTs or directly from the state with annual allocations determined by the state legislature. In these cases, the

funding is usually from gas and/or road taxes. Washoe County is unique in that it levies its own local tax on gasoline for its pavement program, a part of which is used for research and development at the local state university.

- The programs were established with initial funding periods of two to five years. Future funding varies depending on a performance evaluation. Funding levels vary and are not closely correlated with population levels.
- The most common method of soliciting research ideas is through direct communication and submission of problems and/or ideas from local government agencies. Program staff or other members review the ideas submitted following protocols set by individual programs.
- Research products typically consist of technical reports, policy reports, specifications, guidelines, and pilot projects. Research products are often communicated back to local agencies through annual conferences, as well as posted on each center's website. The number of conferences varies depending on the size of the participating local agencies. Although implementation of research products is a primary goal of such programs, the levels of implementation vary among the different states. The North Dakota consortium is primarily a training program and does not conduct research.

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Additional Information

Survey Respondents

Program	Contact
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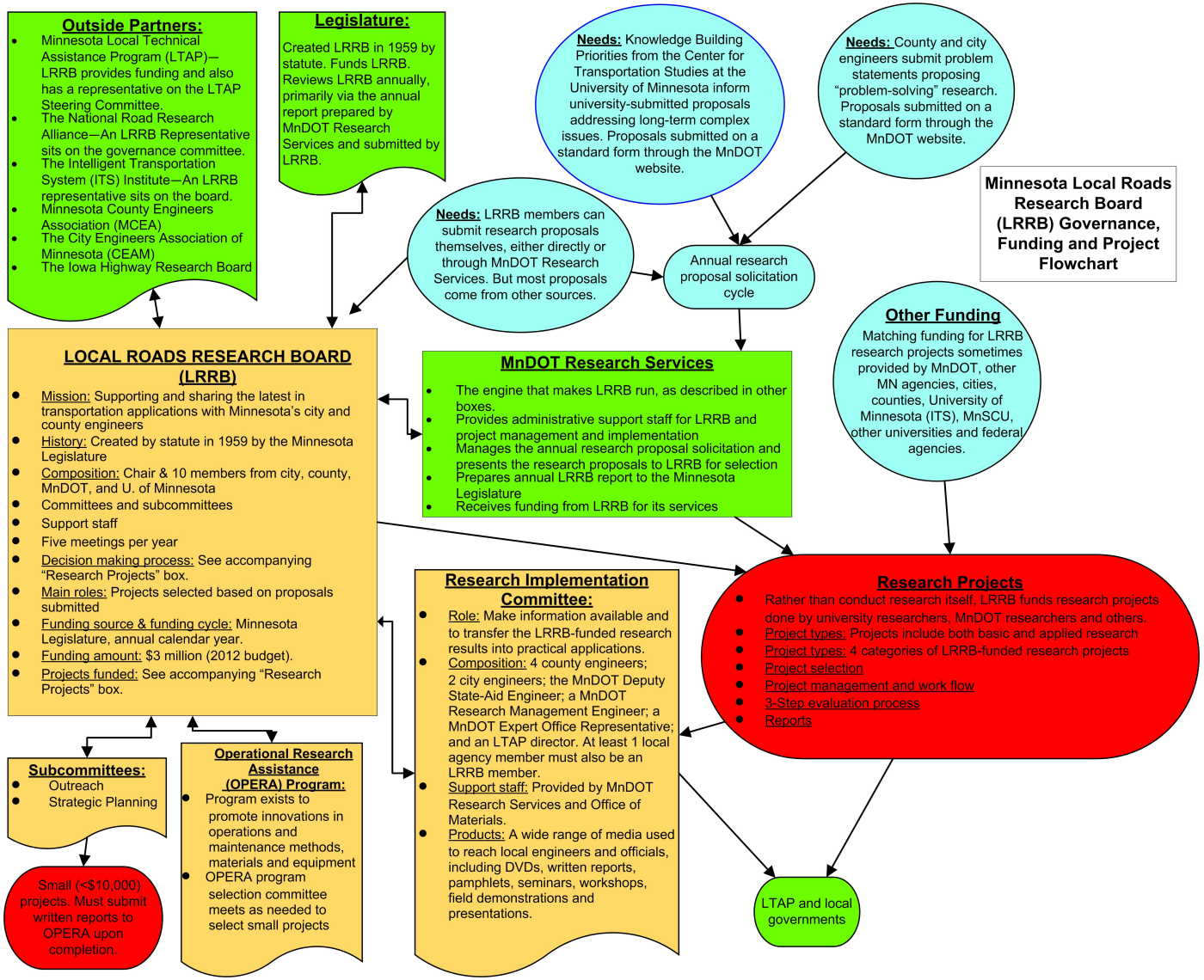
Texas A&M University, Texas Transportation Institute, Materials and Pavements Division	David Newcomb, Senior Research Engineer, d-newcomb@tti.tamu.edu
Washoe County Regional Transportation Commission (RTC) and University of Nevada, Reno	Scott Gibson, Project Manager, *Washoe County Regional Transportation Commission*, sgibson@rtcwashoe.com

Ohio ORIL Decision-Making Flowchart

ORIL Process Overview (*High Level*)
From Research Idea Generation to Contracted Project

Step 1	•Research Ideas Submitted (by Locals)
Step 2	•Board Reviews/Prioitizes Ideas & Forms Technical Advisory Committees [TACs] •Literature Searches Occurs (by ORIL, ODOT, and TACs)
Step 3	•TACs Develop Request For Proposals [RFP]
Step 4	•RFP Posted (by ODOT Research Section)
Step 5	•Proposals Received (by ODOT Research Section)
Step 6	•TACs Review/Comment Proposals & Recommend Propsoals to Board
Step 7	•Board Selects Proposals
Step 8	•Contract Negotiations with Researcher (by ODOT Research Section)
Step 9	•Project Initiation -once contract is executed (by Board with assistance from ODOT Research)
Step 10	•TACs manage indidivual projects (with assistance from ODOT Research)
Step 11	•Board Reviews Progress/Findings of all Projects and Makes Recommendations for Implementation and Technology Transfer

Minnesota LRRB Funding, Decision-Making and Action Framework



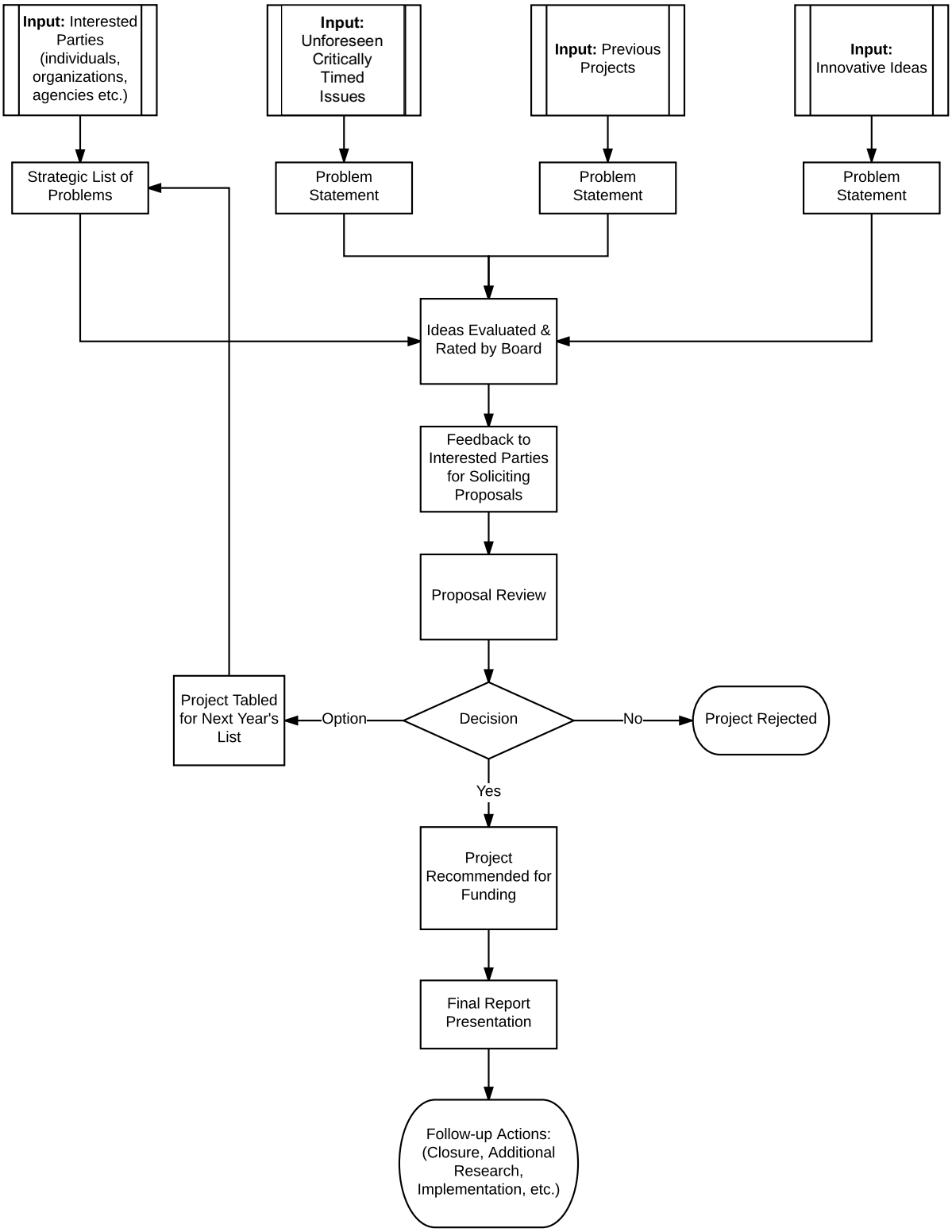
NCST

Minnesota LRRB Funding, Decision-Making and Action Framework Details: LRRB and Research Projects

LOCAL ROADS RESEARCH BOARD (LRRB)

- Mission: Supporting and sharing the latest in transformation applications with Minnesota's city and county engineers.
- History: Created by statute in 1959 by the Minnesota Legislature
- Composition:
  - Chair (elected by 10 members)
  - 10 members
    - 4 county engineers (maximum of two 4-year terms)
    - 2 city engineers (maximum of two 4-year terms)
    - MnDOT State-Aid Engineer (indefinite term)
    - MnDOT Expert Office representative (maximum of one 4-year term)
    - MnDOT Research Services Director (indefinite term)
    - University of Minnesota, Center for Transportation Studies representative (indefinite term)
- Committees: Outreach and Strategic Planning subcommittees, committees under the Operational Research Assistance (OPERA) Program, Research Implementation Committee (see accompanying figure). Chair can also form ad hoc committees as needed.
- Support staff: Provided by MnDOT Research Services.
- Meetings: 5 meetings per year
- Decision making: Minimum voting quorum of 6, 4 of whom must be from a county or city. Majority vote needed to approve LRRB expenditures and policy decisions.
- Main roles: Chooses projects to fund based on proposals submitted (1) annually through MnDOT Research Service by county and city engineers, University of Minnesota researchers, MnDOT or LRRB members in response to the annual research proposal solicitation, or (2) directly to LRRB at any time by LRRB members (they must champion the project). Determines needs and sets research priorities and strategies (including adoption of strategic plan).
- Funding source: Minnesota Legislature. Funds come from the county state-aid highway fund and the municipal state-aid street fund. Per statute, funds allocated may not exceed 0.5% of the preceding year's apportionment sum for the two funds. Specific amount is determined by the Commissioner of Transportation after recommendations from the County Screening Board and the City Screening Committees.
- Funding cycle: Annual calendar year. Funds can be carried forward for one year beyond allocating year.
- Funding amount: $3 million (2012 budget). Up from original allocation of $86,000 in 1960 (about $190,000 in 2015 dollars).
- Projects funded: See the accompanying "Research Projects" box. LRRB also provides funding to other entities and programs, including MnDOT Research Services (for administrative services), the Minnesota Transportation Libraries, and the Minnesota LTAP (matching federal base funding and also "In-demand" LTAP services that extend beyond the base services).

Research Projects

- Rather than conduct research itself, LRRB funds research projects done by university researchers, MnDOT researchers and others.
- Project types: Projects include both basic (knowledge-building) and applied (problem-solving) research.
- Project types: LRRB-funded research projects fall into 4 categories:
  - Design (e.g., community impact, constructability, economic development, economic efficiency, engineering, environmental, financing, geometrics, individual impacts, materials, project need, planning, public involvement, right of way, safety and social)
  - Construction (e.g., equipment, management system, materials, partnering, physical development of project, quality, tools and work zone safety)
  - Maintenance and Operations (e.g., equipment, level of service to public, life cycle costing, maximizing service life of projects, methods and materials, pavement management, preserving investment, privatization, protecting investment, responding to the public, safety, snow removal, staffing and traffic operations)
  - Environmental Compatibility (e.g., community and social environment, economic environment, individual environment, natural environment, mitigating environmental impacts and planning)
  - These categories are annually reviewed and updated as needed.
- Project selection: Researchers, city and county engineers, and LRRB members submit research proposals to MnDOT Research Services. MnDOT then presents the proposals to LRRB which decides which projects to fund. LRRB then presents the selected projects to the Commissioner of Transportation for final approval.
- Project management and work flow: Each project must have a PI responsible for developing a project work plan. MnDOT Research Services uses the work plan to monitor and report to the LRRB on project progress. Each project also has a Technical Advisory Panel (TAP), and administrative liaison and a technical liaison. The TAP is selected collaboratively by Research Services and LRRB, and must include at least an LRRB member or a local representative, as well as one or more professionals with relevant experience. The TAP meets as necessary to ensure project progress, and is also responsible for doing a technical review of project findings, deliverables, and the final report. The administrative and technical liaisons are Research Services employees who coordinate TAP meetings, conduct technical project review, assist the PIs in developing project work plans, and handle contractual compliance and other administrative duties.
- Evaluation: 3-step process: (1) evaluation of project value at research proposal stage; (2) post-completion evaluation to determine whether the project met its goals and if the results can be implemented; and (3) post-implementation evaluation to assess applied impact of research.
- Reports: Each project must produce a final report.

Iowa IHRB Funding, Decision-Making and Action Framework