PROPOSAL TO FORM A UWM INSTITUTE  

(OCTOBER 12, 2016)

A. PROPOSED NAME: INSTITUTE FOR PHYSICAL INFRASTRUCTURE & TRANSPORTATION (IPIT)

B. BRIEF DESCRIPTION, PURPOSE, AND JUSTIFICATION

Effective infrastructure and transportation networks are considered as primary factors that enhance economic growth and competitiveness in any society. While significant investments have been made in our state and nation to create adequate infrastructure and transportation networks, we are now faced with many challenges in dealing with outdated facilities that exhibit signs of deterioration and poor performance and with transportation issues that can significantly benefit from the infusion of new and advanced technologies. These challenges create a unique prospect where human intellect and creativity may be combined with the integration of available and new technologies to address many of the infrastructure and transportation problems we face today.

The UWM College of Engineering & Applied Science (CEAS) and School of Architecture and Urban Planning (SARUP) propose to establish a new Institute for Physical Infrastructure & Transportation (IPIT). The primary objective of the Institute will be addressing the current infrastructure and transportation challenges we face in our state and nation. The Institute will initially leverage the expertise of UWM faculty and available research and development (R&D) facilities. It will serve as an umbrella organization to enhance collaboration and growth for multi-disciplinary research and teaching activities in all areas of physical infrastructure and transportation. These areas of interest include roads, bridges, buildings, ports, airports, water and electricity facilities, construction, and transportation mobility, congestion, safety, policy, finance, products, and others. The activities of the Institute will include teaching, outreach, research and development, and job training that will enhance the state of our infrastructure and transportation, leading to economic development for our region and nation.

Currently, there are more than 25 UWM faculty who are known to have expertise and interest related to various issues in infrastructure and transportation. These and other UWM faculty from all schools and colleges who have interest will be invited to collaborate by becoming affiliated members of the Institute. Several faculty with relevant expertise have expressed interest in joining the Institute. They are from academic departments including Civil and Environmental Engineering, Urban Planning, Electrical Engineering, Computer Science, Materials Engineering, Industrial Engineering, Economics, History, Political Science, Sociology, and the Lubar School of Business. Faculty from other departments will also be invited to join the Institute. Several of these faculty members have enjoyed national recognition, held leadership positions, and had lengthy established records of funding and scholarship in topics related to infrastructure and transportation.
UWM is home to several infrastructure and transportation related facilities including major laboratories, computing laboratories, and Centers. These facilities will offer a solid foundation for the work of our faculty and students in the Institute’s areas of interest. The expertise of the faculty and available facilities offer a unique advantage to UWM to formally establish the Institute for Infrastructure and Transportation and become a leader in offering solutions to many infrastructure and transportation challenges our nation faces today. The Institute’s eventual goal is to benefit from even broader collaborations with people from other academic, government, and private organizations. Through exploratory discussions, enthusiastic support for the creation of IPIT at UWM has been expressed by the Secretary of the Wisconsin Department of Transportation, Office of the Milwaukee County Executive, Office of the City of Milwaukee Mayor, Office of Congresswoman Gwen Moore, and Office of US Senator Tammy Baldwin. Through preliminary discussions with Wisconsin Department of Transportation, City of Milwaukee, and Milwaukee County, a strong belief has emerged that annual financial support in excess of a few hundred thousand dollars could be provided by these government organizations to support various efforts of the Institute after it is formally created.

C. ORGANIZATIONAL STRUCTURE, INCLUDING THE METHOD OF APPOINTMENT AND TERM OF OFFICE FOR THE DIRECTOR

The proposed Institute will be based on the Principal Dean (PD) model. Activities of the Institute will largely be centered in the College of Engineering and Applied Science (CEAS), but with essential collaboration with and contributions from faculty and students from SARUP and other colleges and units. Accordingly, the CEAS Dean will serve as the Principal Dean for the proposed Institute. The Principal Dean will forward the proposal to form IPIT to the Provost.

Figure 1 shows the organization chart for the proposed IPIT. An External Advisory Committee and an Internal Advisory Committee will be formed to aid the successful operation of the Institute. The External Advisory Committee will guide the overall strategic direction, management and policies of the Institute. The membership of the External Advisory Committee will be determined by the Provost in consultation with the Principal Dean and IPIT Director. Membership may include Deans or their designees from participating or other colleges and schools, and members external to UWM from industrial, governmental, or other academic institution partners. The Internal Advisory Committee will advise and support the IPIT Director in efficient and effective management of the Institute. Committee members will be appointed by the IPIT Director in consultation with the Principal Dean. Members will be selected from participating faculty and staff that represent the programmatic and operational divisions within IPIT. The organization chart includes a number of UWM faculty, Centers and Laboratories that have agreed to be affiliated with the proposed Institute. Letters of participation and collaboration have been solicited from the directors of the affiliated Centers and Laboratories and are included in this proposal. Additional UWM faculty and facilities will be identified and asked to join the Institute as affiliated members or units to collaborate in research and other efforts of IPIT.
The Provost will determine the appropriate means of appointing the Institute Director. The terms and conditions of appointment require approval of the Provost. The IPIT Director will serve as the executive officer responsible for the intellectual and administrative leadership of the Institute and will report to the Principal Dean. The term of appointment for the IPIT Director will be for six years.

For the Provost’s consideration and approval, it is proposed that Professor Al Ghorbanpoor, Fellow of the American Society of Civil Engineers, be appointed as the Founding Director of IPIT. Dr. Ghorbanpoor currently serves as a Professor in the Department of Civil & Environmental Engineering. He is a nationally recognized transportation leader and over the last 30 years at UWM, he has continuously received major research funds to address various transportation infrastructure problems. The primary sponsors of the majority of Dr. Ghorbanpoor’s past and current sponsored research have been the US and various state Departments of Transportation.

Dr. Ghorbanpoor has a long history of research collaboration with UWM faculty and others and has established close working relationships with infrastructure and transportation leaders at the national and local governmental and professional levels. The most recent example of a collaborative effort that was led by Dr. Ghorbanpoor is preparing and submitting a major research proposal to the US DOT to establish a Tier 1 Transportation Research Center (5-years, $7.5 M – currently pending approval) at UWM. This effort was made possible by active participation of fifteen UWM faculty members, faculty from four other major universities, and partnerships by state and local government entities.
D. List of Resources to be Committed to the Center, Including Their Source

Facilities:
The Institute for Physical Infrastructure & Transportation will be comprised of several existing laboratories, centers, and facilities that are currently active and operate independently. These include the Structural Engineering Laboratory, Center for Urban Transportation, Center for By-Products Utilization, Construction Materials Laboratory, Concrete Laboratory, Non-Destructive Evaluation (NDE) Laboratory, Geotechnical Engineering Laboratory, computing facilities within the College of Engineering & Applied Science, various laboratories of affiliated faculty, and other facilities as they become available. IPIT’s physical presence will be at the recently assigned office space at the NWQ Building. As external funding of the affiliated faculty increases, additional space may be required that will be discussed with CEAS and UWM as appropriate.

Operation:
The College of Engineering & Applied Science has agreed to provide $15 k per year for the first 3 years of the existence of the Institute to cover relevant start-up operating expenses. These will include seed funding for small exploratory efforts of the affiliated faculty to enhance potential research proposals, travel funds to meet research program directors, and covering expenses for holding meetings, and workshops. Negotiation will be made with CEAS and UWM to secure a percentage of the generated indirect cost from external funding by the IPIT affiliated faculty to cover the operating expenses of the Institute in subsequent years.

Preliminary discussions were held recently with the Wisconsin Department of Transportation to secure significant ongoing external funding that can support research projects and operation costs of IPIT. Similar recent discussions with the City of Milwaukee and Milwaukee County have shown potential for ongoing external funding to support the efforts of the Institute when it is formally established. These discussions will be finalized after the UWM approval process is completed for IPIT.

Funding Overview:
Several of the listed IPIT affiliated faculty have been very active in securing external funds to direct their research in the areas of infrastructure and transportation. The collective level of research funding by the faculty exceeds $15 M over the last 10 years. It is expected that collaborative efforts of the faculty within IPIT will result in higher success to secure significant external funds. This will become possible through exploring large multi-disciplinary research funding opportunities that are more appropriate for entities such as IPIT.

Major sources of potential funding for the Institute will include the US Department of Transportation, Departments of Transportation from different states, National Transportation Safety Administration, National Cooperative Highway Research Program, local governments including City of Milwaukee and Milwaukee County, National Science Foundation,

E. PARTIAL LIST OF UWM FACULTY AS AFFILIATED MEMBERS OF THE INSTITUTE

Faculty from departments across UWM schools and colleges are invited to join IPIT as affiliated members. While a majority of the current IPIT’s affiliated members are from the College of Engineering & Applied Science, it is anticipated that many faculty members from other UWM schools and colleges will join the Institute. The following UWM faculty members (listed in alphabetical order) have agreed to be affiliated with IPIT. Many of these colleagues have active ongoing research with major external funding in the areas of infrastructure and transportation.

Aneesh Aneesh, Associate Professor, Sociology
Edward Beimborn, Professor Emeritus, Civil & Environmental Engineering
Niloy Bose, Professor, Economics
Roshan D’Souza, Associate Professor, Mechanical Engineering
Nancy Frank, Associate Professor, Urban Planning
Al Ghorbanpoor, Professor, Civil & Environmental Engineering
Alan Horowitz, Professor Emeritus, Civil & Environmental Engineering
Lingqian Hu, Associate Professor, Urban Planning
Marc Levine, Professor, History
Troy Liu, Associate Professor, Civil & Environmental Engineering
Matthew Petering, Associate Professor, Industrial Engineering
Xiao Qin, Associate Professor, Civil & Environmental Engineering
Joel Rast, Associate Professor, Political Science
Robert Schneider, Associate Professor, Urban Planning
Konstantin Sobolev, Professor, Civil & Environmental Engineering
Habib Tabatabai, Associate Professor, Civil & Environmental Engineering
Hani Titi, Associate Professor, Civil & Environmental Engineering
Lingfen Wang, Associate Professor, Electrical Engineering
Jie Yu, Assistant Professor, Civil & Environmental Engineering
Jian Zhao, Associate Professor, Civil & Environmental Engineering

Additional UWM faculty members have expressed informal interest in joining the Institute and will be welcomed as affiliated members after the approval process is completed. Also after the UWM approval, faculty and researchers from our local and regional academic institutions, industry and government bodies will be invited to join the Institute and collaborate as appropriate. It is expected that a large number of undergraduate and graduate students will be involved in the research and education efforts of the IPIT affiliated faculty.

F. LONG-TERM OBJECTIVES AND PLAN FOR IPIT

The overall long-term goal of the proposed Institute for Physical Infrastructure & Transportation is to enable the faculty and students at UWM to grow their research,
scholarship, teaching, outreach, and job training activities to solve many of our current infrastructure and transportation problems. This will in turn result in economic development and competitiveness for our region and nation. The overall goal of the Institute will be accomplished through meeting the following objectives:

- Promote the capabilities and activities of UWM faculty and available research facilities
- Facilitate interaction among faculty, students, and other collaborators
- Remove barriers against collaboration
- Identify appropriate sources of extramural research funding
- Organize and lead efforts to secure major funding for multi-PI/Multi-institution/multi-disciplinary programs
- Promote the culture of technology transfer and entrepreneurship among UWM faculty and students
- Promote integration of green technologies into transportation mobility and safety products
- Develop, Implement, Evaluate, and Promote safe, efficient, and cost-effective surface transportation
- Develop new technologies to offer more durable, safer, and cost effective materials and structures for transportation and other applications
- Develop new technologies and capabilities to assess the condition of various physical infrastructure
- Develop effective and economical rehabilitation and repair solutions
- Promote the interchange of transportation research and product development knowledge among scientists, engineers, and entrepreneurs
- Promote public-private-academic partnerships in the Wisconsin’s Transportation industry.
- Foster education and career development
- Promote the institute's work through legislative contacts
- Provide suitable research and scholarship infrastructure
- Provide direction and management to reach short-term and long-term goals
- Offer administrative and support staff
- Offer financial management support
PROJECTED ANNUAL BUDGET

INSTITUTE FOR PHYSICAL INFRASTRUCTURE & TRANSPORTATION (IPIT)

A. Projected Revenues: $  
   1) Wisconsin Department of Transportation  
      a) Transportation Related Research 360,000  
      b) Institute Operation 40,000  
   2) City of Milwaukee  
      a) Transportation Related Research 90,000  
      b) Institute Operation 10,000  
   3) Milwaukee County  
      a) Transportation Related Research 45,000  
      b) Institute Operation 5,000  
   4) Federal and non-Federal External Research Funds  
      a) Transportation Related Research 1,000,000  
      b) Institute Operation 100,000  
   5) Institutional Funds  
      a) College of Engineering & Applied Science 15,000  
         (For operation only for the first three years)  

   Total  $1,665,000

B. Projected Expenditures:  
   1) Faculty Research 1,495,000  
   2) Faculty Seed Fund (small projects, travel to funding agencies) 75,000  
   3) Staff Assistant (full time – salary + benefits) 55,000  
   4) Director One Course Release 15,000  
   5) Associate Director One Course Release 12,500  
   6) Hosting Annual Conference, Outside Speakers 12,500  

   Total  $1,665,000