

# MEMORANDUM

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**TO: Camille Crichton-Summers, NCHRP Senior Program Officer**

FROM: Project 24-46 Research Team

DATE: September 28, 2018

**RE: Implementation of Research Findings Memorandum: Project 24-46 Development of an Implementation Manual for Geotechnical Asset Management**

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The product of this research is an Implementation Manual for transportation agencies to use in the Implementation of Geotechnical Asset Management (GAM). Given that GAM is a relatively new process and funds and staff resources are anticipated to be limited at the start of a program, the implementation process in the manual is intended to be simple and practical to enable broad adoption across the nation. The manual also allows for flexible process improvements by each agency as they integrate the geotechnical assets into the broader asset and performance management programs. A Microsoft Excel based tool, the GAM Planner, accompanies the manual to enable agencies to start GAM now without needing further resources.

It is possible for agencies to start GAM now regardless of investment capacity and expertise and transportation departments from the federal to the local level should be encouraged to begin implementation and realize the benefits without further delay. This memorandum summarizes implementation recommendations from the team based on research outcomes from the project and per the scope of work directions for Task 8.

1) Recommendations for incorporating the GAM Implementation Manual and Concepts into Practice:

- Seek implementation funds: funds to support implementation would be beneficial to the agencies and remove an identified barrier to implementation. One such source of funds could be through the NCHRP research implementation program that encourages states and NCHRP panels to apply: <http://www.trb.org/nchrp/nchrpimplementationsupportprogram.aspx>
- Training support: Suggested training subjects include an introduction to geotechnical assets, how GAM can connect with transportation asset management (TAM), risk and risk management, and life-cycle cost analysis. Additionally, training specific to the use and development of agency specific models in the GAM Planner would be beneficial. This training could be accomplished through development of an National Highway Institute (NHI) course on GAM or incorporation of GAM subjects into future NHI courses, in addition to more limited content such as TRB webinars.
- Propose GAM as an Every Day Counts or other federally supported improvement initiative: The FHWA Every Day Counts program is a proven tool for increasing and accelerating deployment of emerging innovations to state transportation agencies.
- Incentivize agencies to use GAM in support of emergency and other funding requests: Having an inventory of geotechnical assets can enable an agency to communicate the extent and condition of assets that existed prior to a catastrophic natural hazard event. The geotechnical asset inventory can

support recovery fund requests and an implemented GAM program would utilize funds following good business and stewardship practices that will maximize the benefit.

- Implementation team support for assisting states with starting GAM: An implementation support team would be beneficial for quickly responding to implementation questions, helping agencies to quickly progress along the GAM learning curve, and identify process improvement steps that can be shared among agencies.
- FHWA guidance to states for natural hazard risk sources to transportation assets: Across agencies, there is a legacy practice of geotechnical staff managing the consequences from both geotechnical assets within the right of way (ROW) and from natural hazard sites beyond ROW. Agencies may benefit from guidance on treatment of natural hazard risk sources for all transportation assets.

2) Recommended institutions that could lead implementation processes:

- Pilot implementation agencies: To facilitate implementation, a trial group of pilot agencies could be selected for a GAM implementation demonstration project. The selected agencies could collaborate with representatives from the research team to facilitate the start of GAM within a short period of time and the outcome would demonstrate feasibility to others.
- Risk management options workgroup: The risk from geotechnical assets can be managed using approaches such as treatment, transfer, tolerate, and terminate. Of these approaches, treatment and tolerate are legacy practice in most agencies. Transfer and terminate approaches are less familiar and therefore seldom considered. A GAM risk management working group could be formed with cross-functional expertise in geotechnical assets, executive roles, insurance, financial planning, and private and public operations and maintenance. This work group could be tasked with developing actionable transfer and terminate risk management approaches to support risk-based GAM.
- Other Federal agencies: In addition to FHWA, agencies such as the Federal Emergency Management Agency, Federal Railroad Administration, and Federal Transit Administration could support and enable implementation beyond just state and local highway departments.

3) Possible barriers to implementation and options to reduce barriers:

- Perceived effort required to implement GAM: The GAM manual has considered this potential barrier throughout the development and attempted to develop an implementation process that minimizes effort. Additional steps to address this barrier can include training, federal support for GAM implementation (e.g., EDC funding), technical support for an agency during GAM development, and providing other incentives as described throughout this memo.
- Absence of federal and/or state mandates for GAM: To reduce this barrier, FHWA Division offices and other programs could suggest adoption of GAM on the basis of good stewardship of public funds. Federally funded projects that include geotechnical assets could be given preference over other projects if a GAM program exists and is used to justify project actions. Additionally, for emergency

repair or recovery fund requests, the allocation or approval of funds could be influenced by whether an agency has a working GAM program. Also, highlighting project examples that show measurable benefits can reduce this barrier through the demonstration of practice advancement. This could be accomplished through webinars, conferences, publications, and training events that are focused on implementation success.

- Risks from litigation NCHRP Project 20-06/Topic 24-02 will evaluate the potential liability associated with unstable slope management programs. When complete, this project may provide guidance that reduces the barriers related to legal liability.
  - Perceived potential to compromise federal financial support for not obtaining TAM goals: Some agencies indicated a concern with implementing GAM (or another non-pavement/non-bridge TAM program) and the adverse perception that the agency is not making progress towards objectives. To mitigate this barrier, FHWA could issue guidance that advocates for inclusion of GAM over omission, with an emphasis that states including geotechnical assets in the TAM plan will be viewed more favorably. For example, FHWA Division Offices could indicate that including a simple maturity implementation of GAM (or another non-pavement, non-bridge asset in the ROW) program would have a positive influence on TAM evaluations.
  - Differentiation between on ROW geotechnical assets and beyond the ROW geotechnical features: Combining beyond the ROW features with geotechnical assets without distinction may be confusing, especially when communicating with non-technical stakeholders. To reduce this barrier, FHWA could provide guidance indicating the need to differentiate these categories based on different management and investment approaches.
  - Deterioration model development: Evidence from successful GAM programs in the United Kingdom indicates that certainty in GAM deterioration models will take time to achieve. Therefore, emphasis should be placed on starting data collection to support eventual model calibrations. Any future research on geotechnical asset deterioration should incorporate deterioration modeling that is occurring for geotechnical assets in the Highways England and Network Rail agencies.
  - Agency organization structures: Agencies should be encouraged to identify a geotechnical asset manager that is recognized by the agency TAM and/or performance management staff, even in the absence of funding for position. An aspirational goal to address this barrier would be to identify an agency that could implement a trial organizational structure that aligns TAM and GAM with executive, financial, and O&M functions that are above engineering and construction function, rather than in parallel.
- 4) Recommend methods to measure impacts from GAM Implementation:
- Short term: Because GAM is new for many agencies, tracking adoption should be used to measure the initial research impact. At a minimum, this should include the number of state transportation departments, Federal Land Management agencies, and local agencies both starting GAM and

reporting on GAM performance in the TAM plans. A secondary measure could be the proportion of reported inventoried geotechnical assets across the nation.

- Intermediate: Once implementation of GAM is started at several agencies, other potential measures of impact may include example treatment projects showing highly favorable cost-benefit ratios.
- Longer-term: Evidence from the established programs in the United Kingdom suggests that in 10 to 20 years there will be an opportunity to communicate how GAM implementation has produced substantial life-cycle benefits for agencies and the federal highway system. Examples would include decreasing agency costs and broader economic consequences from “emergency” response events of a geotechnical nature, reliable life-cycle investment plans for geotechnical assets, and demonstrated reduction in risks to agency objectives.