

# Improve highway safety by reducing the risks of landslides

## Data Collection

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### What data will you collect or create?

Four types of data will be obtained, processed and analyzed in this project: 1) GIS data of MDOT SHA Geotechnical Assets for identifying the highway cut-slope locations and properties in Maryland; 2) geological data from USGS and MGS for analyzing and mapping weak/risk geologic strata of landslides; 3) Geotechnical and slope design data for analyzing cut-slope instability/landslide risk; and 4) weather (precipitation) data at selected cut-slope locations for analyzing and forecasting triggering of cut-slope landslide.

### How will the data be collected or created?

Historical observation, project design data will be acquired from multiple sources and compiled. Additional field observation and laboratory test data will be collected and compiled during the project. Commercial data will be acquired with licenses and used for the project. Raw quantitative data will not be presented; summary statistics will be generated. The data engine offers organization, visualization and analytics.

A project-wide protocol for naming, storing, and backing up project information will be developed and implemented. The protocol will include a secure-shared-data interface that will allow the project team to manage and locate project documents and help create best practices for long- and short-term information access in accordance with national archiving and preservation standards.

## Documentation and Metadata

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### What documentation and metadata will accompany the data?

While integrating data extracted from various entities, the raw data will first be converted to MySQL database file for cleansing, fusion and processing. The data in MySQL are further imported into ArcGIS for visualization. The PIs and research assistants will code algorithms using ANSI C++ that is compatible for any platform. The aggregated data, without any personally identifiable information, can be provided in the standard .cvs format or GIS formats to any interested party via the web application up to approval of MDOT SHA.

## Ethics and Legal Compliance

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## **How will you manage any ethical issues?**

Morgan's Office of Research Administration provides full support for addressing ethical issues during the project and will be consulted by PI and Co-PIs when data sharing and management issues arise.

## **How will you manage copyright and Intellectual Property Rights (IP/IPR) issues?**

If the research and discoveries found during the project might be secured with intellectual property, the PI will work with our respective Technological Transfer Offices to protect potential proprietary data. In addition, the PIs will not post to any publicly available site any raw data that are not permitted to share, especially under data usage agreement with private sector.

## **Storage and Backup**

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### **How will the data be stored and backed up during the research?**

The data will be stored and managed in distributed servers across MSU. Any used data will reside on PCs and workstations belonging to the PIs' university. All data will be periodically and systematically backed up either onto multiple external hard drives, or a centralized backup cloud through the university, to ensure full data recovery in the event of equipment failure.

### **How will you manage access and security?**

Throughout the duration of the proposed work, the PIs will in a timely manner communicate any significant findings with the scientific community in accordance with USDOT and MDOT policy through journal publications, national and international conference presentations, and seminars. The reported results will be made available to the research community, where possible and permitted and upon request and under approval of MDOT SHA or other partners. Electronic data will be accessible for project team with password-protected accounts.

## **Selection and Preservation**

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### **Which data are of long-term value and should be retained, shared, and/or preserved?**

Project team members will retain project information indefinitely, specifically time-sensitive field observation and sensing data and non-repeatable test data of undisturbed samples. Upon conclusion of the project period, information both gathered and produced by the project will remain accessible to the project team. Morgan allows information to be retained for future use and/or sharing with other interested parties, manage that information in a manner that facilitates research and scholarly activities, and simplifies access.

### **What is the long-term preservation plan for the dataset?**

The information held at Morgan maintains its value over time with information (metadata) that outlines its importance, long-term usability, and the dedicated efforts of those who were involved. Morgan data hosting includes back-ups, disaster recovery, and long-term support for managing data and access. Additionally, since the licensing, format, packaging and web exposure of the public curricular and professional development materials are all designed to encourage wide dissemination, we expect them to be effectively archived by the public web archiving services (e.g. the Internet Archive).

## **Data Sharing**

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### **How will you share the data?**

Throughout the duration of the proposed work, the PIs will in a timely manner communicate any significant findings with the scientific community in accordance with USDOT and MDOT policy through journal publications, national and international conference presentations, and seminars. The reported results will be made available to the research community, where possible and permitted and upon request and under approval of MDOT SHA. When sharing the data, the PIs commit to protect privacy, confidentiality, and security.

### **Are any restrictions on data sharing required?**

Commercial data set will be restricted by the license of data providers. Data acquired from State and other government agencies will be shared with the permission. Access to the raw data will be restricted to the project team members for quality assurance.

## **Responsibilities and Resources**

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### **Who will be responsible for data management?**

PI will be responsible for QA/QC of data collected from the Project. PI will designate a dedicated team member (one of Co-PIs) to assure all of the project team member are informed of the proper data management skills and upload its requirements.

**What resources will you require to deliver your plan?**

Morgan has an extensive IT team that is available to assist with identifying and acquiring the equipment, systems and software needed to meet the projects goals for accessibility and preservation.

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