Date of Submission	3/25/2026

IPL Project (IPL-Number) Annual Report Form

Period of activity under report
from 1 January 2024 to 31 December 2025

1. **Project Number and Title: Slope monitoring of San Eduardo landslide in Colombia using multiple techniques**

2. **Main Project Fields**

   Select the suitable topics. If no suitable one, you may add new field.

   (1) Technology Development

   A. Monitoring and early warning B. Hazard Mapping, Vulnerability and Risk Assessment

   (2) Targeted Landslides: Mechanisms and Impacts

   A. Catastrophic Landslides

   (3) Capacity Building

   B. Collating and Disseminating Information/ Knowledge

   (4) Mitigation, Preparedness and Recovery

   A. Preparedness

3. **Name of Project Leader**

Affiliation: Guillermo Ávila, Full Professor Civil and Agricultural Engineering, National University of Colombia

Telephone: 571-3165000

Email: geavilaa@unal.edu.co

Core members of the Project: Guillermo Ávila, Juan Reinosa, Henry Silva

4. **Objectives** (5 lines maximum)

   - Comparing multiple monitoring techniques for large slope movements
   - Stablishing the conditional and triggering factors of the San Eduardo Landslide in Colombia
   - Modelling large displacements of the landslide using Material Point Method and validate the numerical results with the current instrumentation and multiple remote sensing technics.
   - Identifying the key elements for early warning systems in large area landslides

5. **Study Area** the San Eduardo Landslide covers about 600 ha in is located in the central Andean region of the Colombian republic.

6. Project Duration 3 years

7. Report

1) Progress in the project: During 2025 we reviewed the hazard information presented by the Colombian Geological Service (SGC) in order to include it in our analysis, particularly, the geotechnical zonation and the monitoring data. Based on this information we have been working on the analysis of the landslide triggering factors and on its evolution, using satellite images and In-Sar analysis. In another front of work we continued to develop one optic fiber inclinometer to measure possible landslide displacements and we made some initial laboratory tests.

2) Planned future activities or statement of completion of the Project: We plan to visit the place to get new information and to review how the technical information given by the SGC about the early warning system has been incorporated into the local capacity. We plan to finish the project by November 2026.

3) Beneficiaries of Project for Science, Education and/or Society: Direct beneficiaries will be the community near to slope in San Eduardo, department of Boyacá, Colombia (163 people) composed by 60 farmer families. The National System of Disaster Risk Management due improvement in the knowledge of initial signs of large landslide processes in colluvial Colombian deposits and the proposal of and early warning system with multiple monitoring technics. The academic community considering the new insights on large landslides on colluvial deposits, especially its behavior during and post failure event. That includes the National University with a strengthening in research network of the of Civil Engineering Department.

4) Results: We send a manuscript for publication on the P-LRT, Volume 5, Issue 1 named

   "Modeling post-failure landslide travel distances and velocities using a work-energy method".

   Also, we have used the information as part of the documentation in a risk analysis course given to a staff of the Bogotá risk Management Office (IDIGER). One masters student is working on the In-Sar analysis and another worked on landslide displacements using work-energy method.

Note:

1) If you will change items 2-6 from the proposal, please write the revised content in Red.
2) Please fill and submit this form to ICL Network <icl-network@landslides.org>
3) Reporting year must be one or two years (Maximum).