



INFORMATIONAL MEMORANDUM

TO: **Transportation and Infrastructure Committee**
FROM: **Pete Mayer, Interim Public Works Director**
BY: **Sherry Edquid, Levee and Floodplain Project Manager**
CC: **Mayor Thomas McLeod**
DATE: **August 23, 2024**
SUBJECT: **Landslide Risk Assessment and Management Project Phase I**
Project No.
Consultant Services

ISSUE

Request to execute a Consultant Agreement for services with BGC Engineering to conduct a landslide study. This work is being done in conjunction with DCD.

BACKGROUND

In 2023, the city received a FEMA's - Cooperating Technical Partners (CTP) grant to fund a landslide study. BGC Engineering will be identifying and understanding landslide hazards with the overall goal of reducing property damage and life loss.

ANALYSIS

BGC Engineering will provide a report that investigates existing and historical landslide information including forestry health and location of critical infrastructure within these areas. The information will then be summarized into a report which will include GIS maps and recommendations. Additional studies and field work could occur in phase II should grant funding become available.

This information can be used by the City in ways to avoid, minimize and/or mitigate future landslide hazards.

FISCAL IMPACT

BGC Engineering has provided a cost not to exceed \$134,500.00 to perform the attached scope of work. This contract will be entirely funded by a FEMA CTP grant the city received which has no cost share.

RECOMMENDATION

Council is being asked to approve the Consultant Agreement with BGC Engineering in the amount of \$134,500.00 and consider this item on the Consent Agenda at the September 16, 2024 Regular Meeting.

City of Tukwila Comprehensive Landslide Assessment Plan - a citywide assessment of landslide hazard and urban forestry health

Table A-1. Summary of Proposed Scope of Work and Estimated Cost

Task	Responsible Firm	Title	Description	Deliverables	Estimated Cost
			<i>*refer to proposal dated June 28, 2024 for detailed descriptions of each BGC task and the attached Revised Approach dated August 12, 2024 for DRG</i>		
1	BGC	Data Compilation	Compile relevant and available public data related to geology and geologic hazard maps, imagery, land use, and reasonably accessible/available consultant reports. Compile reasonably accessible/available built environment information (sources: City of Tukwila and other asset and landowners). Interviews with Tukwila staff to communicate relevant historical knowledge of the area, including known landslide events and histories, ground disturbance activities, mitigations, areas with drainage or groundwater seepage issues, and other relevant site context information.	Provide supporting information for Tasks 3 and 5. Relevant and available data layers will be compiled in Cambio.	\$10,500
2	BGC	LCD Analysis & Data Delivery	LCD analysis for the City of Tukwila to include two LCD comparisons with full-city coverage using datasets from 2005, 2011, 2016, and 2021 Data delivery in Cambio (a web-enabled earth science data platform). Cambio subscription for 1-year with access for up to 10 users.	LCD analysis results delivered in Cambio for review and interrogation by BGC for this analysis and by Tukwila staff. Custom configuration of Cambio workspace.	\$15,000
3	BGC	Landslide Assessment	Review and analysis of data compiled in Task 1 and 2. Landslide inventory validation and additions, as needed. Landslide susceptibility map. Assessment of above with consideration for critical facilities and infrastructure, with the results of the urban forest health assessment (Task 4) integrated as appropriate.	Landslide inventory and susceptibility maps in Cambio, or other format as requested by Tukwila.	\$24,000
4	DRG	Urban Forest Health Assessment	4.1 Forest cover type mapping to include GIS-based Urban Tree Canopy Assessment (UTC) and delineation of Management Units (MU's) polygons with unique designations. 4.2 Field assessment, data collection, and ground proofing to include: - ground validation by ISA-certified arborists. - consideration for common urban forestry metrics.	Delineation of Management Units (MU's) polygons. Results presented in the final report. Relevant data layers and results of this task will be delivered in Cambio (as decided upon by the project team). Cost includes 10% markup.	\$44,000
5	BGC & DRG	Reporting & Final Delivery	Final report and data delivery. Will include collaboration between BGC & DRG.	Draft and final report summarizing methods, findings, and recommendations for prioritization for areas of further study and potential mitigation. Data delivery in Cambio, with access for Tukwila staff, to include results of Task 1, 2, 3, and 4.	\$23,000
6	BGC & DRG	Milestone Meetings & Project Management	Project management, maintaining communication between relevant parties, communicating project progress to Tukwila, maintaining schedule and budget, and planning and facilitating milestone meetings throughout the project (4 estimated meetings, varying from 1 to 2 hours in length). - Kick-off mtg. - Check-in mtg after Task 1 and 4.1. - Review mtg to discuss preliminary findings and draft report. - Final delivery mtg.	Project management and meetings.	\$12,500
Total Estimated Cost: \$134,500					

REVISED APPROACH -Tukwila 2024

DRG will complete a remotely sensed forest health assessment and inventory of forest cover types as well as ground-proofing inspections of priority areas as directed by the City of Tukwila. Priority areas identified with increased risk of slope failure and poor forest health will be field inspected. The data DRG collects can be used for long-range forest health management, prioritizing funding and forest enhancement efforts, and possibly informing slope stability assessments.

Task 4.1: Forest Cover Type Mapping:

After the kickoff meeting, DRG's GIS team will conduct an Urban Tree Canopy Assessment (UTC) to map forest cover types. This cost-effective and accurate analysis of tree canopy and forest composition (deciduous vs conifer forest) will be performed in the project area using remotely sensed and semi-automated feature extraction methods. DRG will use these results, GIS aerial imagery, LiDAR, and boundary data to delineate park/open space areas into Management Units (MU's) polygons. DRG will utilize elevation and contour data to process and record the aspect and slope for each MU.

We will then assign each MU polygon one of the following land cover designations:

- **Forested:** $\geq 25\%$ of the area is covered by forest canopy
- **Natural:** Natural vegetation that has $< 25\%$ forest canopy cover
- **Open Water:** Open water without woody vegetation
- **Hardscape:** Impervious surface
- **Landscape:** Landscaped or has been mechanically maintained within the last year

Once these attributes have been established, DRG will run three years of vegetation health indices using multispectral imagery to determine foliar conditions. These indices will be clipped to the canopy layer to understand tree health conditions and how they have changed over time. Through this distinction by implementing statistical procedures, DRG will identify locations of canopy health that change due to seasonal variances or if they are actual health declines. Areas of moderate or major decline will be further inspected using field assessments by arborists. Additional information provided in Task 4.2.

Ecosystem benefit data for air pollution, carbon storage and sequestration, and avoided runoff will also be calculated to determine the value of forests and any potential threat of potential loss to future canopy.

COST FOR TASK 4.1: \$29,884

Task 4.2: Field Assessment/Data Collection/Ground Proofing

After the forest cover mapping is completed, DRG will deploy ISA-certified arborists to supplement the information about the MUs in priority areas identified through remotely sensed data. Ownership of these management units may be public property parcels, private property parcels, or a combination of both. Ownership will have specific implications for slope stability risk management. Where MU's have private property, the team may need to consider visual evaluations or seek permission to trespass. DRG will consult with the City of Tukwila to finalize field data solutions.

The team will work with City of Tukwila staff to evaluate the vegetation conditions in priority areas with steep slopes, active landslide activity, poor forest health, and/or low canopy. The results of DRG's fieldwork effort will provide the City with a vegetation management strategy for risk mitigation. Field staff will collect information about the management units using a customized approach adapted from [FLAT](#). This could include the identification of hazardous trees, quantifying invasive vegetation, and quantifying tree sapling recruiting. The customizations are intended to provide the City with actionable risk mitigation tactics.

COST FOR TASK 4.2

Preferred budget: \$10,000

Applicable rates:

\$150 per hour (ISA Certified Arborist Consulting)

\$125 per hour (IT support and Customizations)