

Project No. 5188.01  
June 22, 2023

Nevada County Department of Public Works  
950 Maidu Avenue, Suite 170  
Nevada City, CA 95959

Attention: Pat Perkins, Principal Civil Engineer

**Reference:** **Donner Pass Road – Rock Fall**  
Nevada County, California

**Subject:** **Proposal for Rock Fall Analysis and Geotechnical Engineering Recommendations**

This letter presents our proposal to provide geotechnical engineering services involving the rock fall and potential unstable rock slopes on Donner Pass Road in Nevada County, California. There was a recent large rock fall on Donner Pass Road east of Donner Pass. At your request, NV5 performed a reconnaissance evaluation of the site and observed potentially unstable rock masses above Donner Pass Road. The purpose of our services will be to explore and evaluate the rock slope conditions at the site and develop geotechnical engineering recommendations for rock fall and safety mitigation measures. We intend to work with a sub-consultant, Dr. Martin Woodard of Woodard Geotechnical Services, who has extensive rock fall expertise and experience. Included in this proposal is a summary of our understanding of the potential hazard, the scope of services we intend to provide, and an estimate of our fees.

## **SITE AND HAZARD DESCRIPTION**

Donner Pass Road climbs up a steep granitic rock slope on the east side of the Sierra Nevada mountain range. The modern road was constructed nearly 100 years ago. On Friday June 9, 2023 Pat Perkins with Nevada County Department of Public Works requested NV5's services to help evaluate the potential further hazard associated with a rock fall on Donner Pass Road. The initial rock fall was on the order of 40 tons of rock and significantly damaged the road surface. Engineering Geologists from NV5 have performed site reconnaissance and drone assisted photogrammetry surveys of the site. Based on our work to date there is a significant potential hazard of rock fall at and near the site. There are adversely dipping fracture planes underlying thousands of tons of rock. The rock mass above the road is near vertical and has numerous open fractures. Significant fall hazard of individual boulders is apparent on the slope, but of greater concern are large masses of rock that appear to have recently moved downslope relative to the larger rock outcrop.

After further evaluation and confirming that the rock slope is unstable, dangerous and action is required, we will analyze and explore at least two options to help stabilize the slope. One option is to remove by scaling or blasting the potentially unstable rock masses. The second option is to stabilize the slope using rock bolts and similar methods to lock down the rock masses. A combination of these options is possible.

## **SCOPE OF SERVICES**

### **Site Reconnaissance and Photogrammetry**

NV5 has performed reconnaissance level site observation and performed a drone assisted photogrammetry survey of the site area. We performed a photo and video documentation of the rock outcrop in the rock fall area using oblique and orthogonal photos to develop an interactive 3D model of the rock slope.

### **Develop and Process Rock Outcrop Model**

Based on the drone 3D image we will develop fracture orientations and a rock mass model to be used for engineering analysis of the rock slope. This will be performed by NV5 and Woodard Geotechnical Services using Rock Science Dips software program. The output will be used with a stereo net to plot stereographic projection of potential failure planes.

### **Limit Equilibrium Analysis and Mitigation Report Preparation**

Using the potential failure planes and rock masses developed using the Dips program and stereo net, we will analyze potential failures of individual rock masses using RocPlane and SWedge software. Analyses of the limit equilibrium will help develop rock stability parameters that can be used to evaluate the feasibility of and design bolts to stabilize the rock slope. The results of our analyses will be presented in a written report with recommendations for rock fall hazard mitigation.

### **Meetings, Consultation and Project Management**

We anticipate up to several meetings and/or presentations concerning the results of our analyses and recommendations. We intend to work with Nevada County to develop the preferred mitigation.

## **SCHEDULE AND FEES**

As noted above, we have performed the initial site reconnaissance and drone assisted survey. We are in contact with Dr. Martin Woodard of Woodard Geotechnical Services and a couple of rock fall mitigation contractors. NV5 anticipates performing the analysis and submitting our written report within three to four weeks upon your authorization. If requested, NV5 can provide preliminary verbal information with respect to our anticipated conclusions and recommendations prior to completion of our final report.

NV5 will provide the scope of services described above on a time and expense basis in accordance with our existing Professional Services Contract with Nevada County and our 2022 Fee Schedule. For the scope of services outlined above, we anticipate our fees will be approximately \$60,649. This cost includes the sub-consultants NV5 plans to use for the analysis and a site visit by Marty Woodard. Billing will be monthly on a time and expense basis. Additional services beyond the scope of this proposal performed at the client's request will be billed on a time and expense basis using the fee schedule applicable at the time the services are provided.

## CLOSING

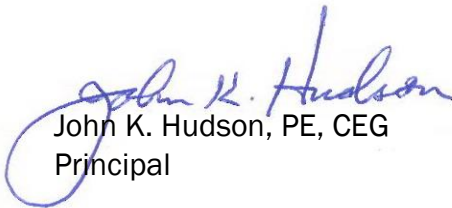
NV5 will perform its services in a manner consistent with the standard of care and skill ordinarily exercised by members of the profession practicing under similar conditions in the geographic vicinity at the time the services are performed. No warranty or guarantee, express or implied, is part of the services offered by this proposal.

If this proposal meets with your approval, please provide a Nevada County work order in accordance with our existing agreement.

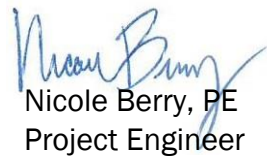
If you have any questions or need additional information, please contact the undersigned.

Sincerely,

**NV5**



John K. Hudson, PE, CEG  
Principal



Nicole Berry, PE  
Project Engineer

Attachment:

Table 1 Cost Estimate

**Donner Pass Road Rock Fall**

**Table 1**

**Geotechnical Engineering Cost Estimate**

2023 Fee Schedule ITEM OF WORK	QUANTITY OF UNITS		UNIT PRICE	UNIT TOTAL	TASK TOTAL
<b>Site Reconnaissance and Photogrammetry</b>					
<b>Site Reconnaissance</b>					
Associate Engineer	20 hours	@	\$200 hour	\$4,000	
Principal	6 hours	@	\$250 hour	\$1,500	
Drone photogrammetry	1 lump sum	@	\$1,500 20%	\$1,800	
CMG Subconsultant	6 hours	@	\$125 20%	\$900	
Woodard Subconsultant - Travel	14 hours	@	\$150 20%	\$2,520	
Woodard Subconsultant - Field	10 hours	@	\$225 20%	\$2,700	
Estimated Travel Expenses	\$2,000 lump sum	@	\$2,000 20%	\$2,400	
Mileage	150 miles	@	\$0.76 each	\$114	\$15,934
<b>Develop and Process Drone Model</b>					
Project Engineer	8 hours	@	\$165 each	\$1,320	
CMG Subconsultant	8 hours	@	\$125 20%	\$1,200	
Woodard Subconsultant	32 hours	@	\$225 20%	\$8,640	\$11,160
<b>Limit Equilibrium Analysis and Mitigation Report Preparation</b>					
Associate Engineer	4 hours	@	\$200 hour	\$800	
Project Engineer	8 hours	@	\$165 hour	\$1,320	
Woodard Subconsultant	32 hours	@	\$225 20%	\$8,640	
Autocad Operator	8 hours	@	\$115 hour	\$920	\$11,680
<b>Develop Project Specifications and Drawings</b>					
Associate Engineer	12 hours	@	\$200 hour	\$2,400	
Project Engineer	24 hours	@	\$165 hour	\$3,960	
Principal	6 hours	@	\$250 hour	\$1,500	
Woodard Subconsultant	24 hours	@	\$225 20%	\$6,480	
Project Assistant	4 hours	@	\$86 hour	\$344	\$14,684
<b>Project Management, Meetings and Coordination</b>					
Associate Engineer	16 hours	@	\$200 hour	\$3,200	
Project Engineer	8 hours	@	\$165 each	\$1,320	
Woodard Subconsultant	8 hours	@	\$225 20%	\$2,160	
Project Assistant	4 hours	@	\$86 hour	\$344	
Mileage	220 miles	@	\$0.76 each	\$167	\$7,191
<b>TOTAL FEES</b>					<b>\$60,649</b>

Woodard Geotechnical Services

Billing Rate: \$225/hour

Travel Rate: \$150/hour

Expenses: Cost plus 15%