

October 9, 2023

Project No.
3417.000.001

Mr. Terry Woram
154 Sunhaven Road
Danville, CA 94506

Subject: Magee Ranch Geologic Hazard Abatement District
Danville, California

RESERVE FUND STUDY

Dear Mr. Woram:

ENGEO is pleased to provide this Reserve Fund Study for the Magee Ranch Geologic Hazard Abatement District (GHAD) in Danville, California. The Magee Ranch GHAD was formed in 1992 and is a Geologic Hazard Abatement District (GHAD) within the meaning of Public Resources Code Division 17. The boundary of the GHAD encompasses a total of approximately 438 acres with approximately 252 acres of common-area open space. The GHAD includes 259 single-family residential lots. It is our understanding that the GHAD has been responsible for monitoring and maintenance activities, as provided in the adopted Plan of Control, since 1992 (Reference 1). The Board of Directors consists of five property owners within the GHAD.

This reserve study was undertaken to forecast expenses that can reasonably be expected in the decades ahead and to confirm that sufficient funds are being set aside in the GHAD's reserve to pay for these expenses.

The reserve fund study is based on:

- Expenditures expected to address existing maintenance and repair responsibilities focusing on those that occurred during the 2022/23 winter.
- Expenditures expected to address future monitoring, maintenance, and repair responsibilities, as outlined in the Plan of Control (Reference 1).
- Long-term reserves to address larger geologic events. The projected long-term reserve requirement is based on the published work, "Estimating an Appropriate Maintenance and Monitoring District (GHAD) Reserve" and is provided as an attachment to this study.

REVENUE

Fund Assessment and Reserve

A projected budget included in the adopted Plan of Control anticipated an income of \$300 per residence per year. With 259 residential lots, the assessment totaled \$77,700 per year in fiscal year (FY) 1992/1993 dollars. For the purposes of this reserve study and as used by the State of California and most local governmental agencies, we are using a FY for the Magee Ranch GHAD that starts annually on July 1 and ends on June 30. The budget included in the Plan of Control would be \$172,781 in FY 2023/2024 dollars when adjusted for inflation. The current assessment to support this budget would be \$719.01 per year per residential lot. For this reserve study, we have used the U.S. Bureau of Labor Statistics Consumer Price Index for San Francisco-Oakland-Hayward, California, All Urban Consumers to adjust the GHAD's income and expenses.

The projected budget in the Plan of Control anticipated an annual reserve amount of \$24,700 in FY 1992/1993. If the GHAD reserves had not been needed for expenses between the formation of the GHAD and the present, the GHAD would have an account balance of approximately \$1.24M from this planned surplus. The cumulative reserve balance does not consider any investment income generated from unused reserve funds. As reported to us, the account balance was approximately \$254,000 on July 1, 2023.

Inflation and Investment Estimates

For this reserve study, we are estimating an annual investment return of 1.5 percent for the 40-year pro forma budget. The investment return is based on a review of 2017 through 2022 actual returns, which averaged 0.15% for this period. For inflation, we are estimating an annual inflation rate of 2.5 percent. This is near the inflation target of 2 percent adopted by the Federal Open Market Committee in January 2012 (Reference 5). In their recent economic projections, Federal Reserve Bank policymakers forecast that inflation for the next 3 years would be at 4.1 percent in 2023, 2.7 percent in 2024, and 2.3 percent in 2025, which is above the estimates used in this reserve study, although the reserve study pro forma budget analyzes a period of 40 years.

Higher real rates of return decrease the assessment necessary to support the operations of the GHAD and maintain an appropriate target reserve. If the real rate of return is negative, as is projected in this reserve study, a portion of the assessment is applied to achieving and maintaining constant-dollar value for the target reserve funds. If the GHAD is able to obtain a positive real rate of return over the long term, this could allow for an annual levy below the assessment limit or a reduction in the assessment limit.

GHAD RESPONSIBILITIES

Based on the District's Plan of Control (Reference 1), GHAD monitoring, maintenance, and repair responsibilities include the following.

- Storm retention basins and embankments
- Concrete-lined drainage ditches and associated inlets and outlets
- Storm drain improvements servicing the open space areas
- Subdrains and horizontal drains
- Slopes
- Drainageways
- Gabion retention structures
- Sanitary sewer access road

As provided in the Plan of Control, *"The Town of Danville shall maintain all facilities, other than those of other public agencies, within the public right-of-way or easements, as shown on the final maps for Subdivisions 7058, 7355, 7668, and 7669. The GHAD is responsible for all subdrains and private storm drain facilities (as designated in the approved improvement plans) to the point of their connection with a public facility."* In addition, the Plan of Control states, *"The District will not be responsible for repairs that are wholly within individual private parcels."*

PROJECTED EXPENSES

Expense Estimates

To prepare the current GHAD reserve fund amount, we reviewed the following documents and conditions.

- 1992 plan of control projected budget (adjusted for inflation)
- 2023 reserve study
- 2021 and 2022 site monitoring reports
- 2017 through 2022 revenue and expense statements
- 2023 site visit

A projected budget was included in the adopted Plan of Control, as discussed in the Fund Assessment and Reserve section above. Some of the initial expense estimates remain valid, but other amounts have been adjusted to account for site performance, “as-built” conditions, a cost estimate for repair from events during the winter of 2022/2023, and cost estimate bids for maintenance and emergency response items received by other GHADs in the Bay Area. Adjusted for inflation, annualized GHAD expenses calculated from the adopted 1992 Plan of Control would be \$127,026, excluding contribution to the planned reserve. As shown in Exhibit A and used in the calculations for Exhibit B, the current annualized GHAD expenses are estimated at \$164,554, which does not include accumulating funds for achieving the target reserve described below.

It appears that routine maintenance of some GHAD-maintained improvements has been deferred. Since a major benefit of being within a GHAD is the ability to conduct preventive maintenance and, therefore, likely reduce repair costs, this reserve study anticipates a prudent level of scheduled preventive maintenance.

Large-Scale Repair

As identified in the referenced Tryhorn Site Visit report, significant erosion and slope instability events have occurred within Magee Ranch during high precipitation periods, which occurred in 1997-98, 2002, 2012, and in 2016-17. In addition, a heavy rainfall period occurred in 2023, as identified in the Cal Engineering and Geology reports. Since the GHAD’s formation in 1992, a high-precipitation event has occurred on average every 6 years. While expense information was not available for 1997-98, 2002, or 2012, we reviewed the 2017 financial statement and the referenced B.C. McCosker and ENGEEO bids for repairs from the 2023 repairs for these events, which were \$99,135 and approximately \$1.1M, respectively. For this reserve study, we have estimated a large-scale landslide or other geologic hazard (estimated at \$200,000 in FY 2023/24 dollars every 8 years). As shown in the Estimated Expense section, we have provided \$37,500 annually for minor repairs as may occur in average or below average rainfall years.

Although the Magee Ranch GHAD had a reserve balance of approximately \$254,000 as of July 1, 2023, we understand that current expenses to complete ongoing repairs will exhaust these funds and will likely require additional funding, which would be obtained through HOA fees. For the purposes of this reserve study, we assumed no reserve funds are available to the GHAD at the start of the analysis.

RESERVE ESTIMATION AND METHODOLOGY

For this reserve study, we estimated the reserve appropriate for the Magee Ranch GHAD using the following factors from the attached paper titled, "Estimating an Appropriate GHAD Reserve" dated July 6, 1999 (Exhibit C).

- Number of assessed units (n)
- Level of geotechnical risk within the development boundaries (g)
- Average value of assessed properties (v)
- Relative density of construction (d)

Table 1 provides the inputs and target reserve amounts used in the calculation.

TABLE 1: Target Reserve Calculations

Magee Ranch Target Reserve	$R=v(d+gn)$
Number of Assessed Units (n)	259
Average Value of each residence (v)	\$2,670,000
Geotechnical Risk Factor (g)	0.002
Density Factor (d)	1
Target Reserve (Rounded)	\$4,053,000

For this analysis, a total of 259 residential units are expected to be subject to the levy of a GHAD assessment. The average value of assessed residential properties is used as a surrogate index to represent local construction costs over time. The average value of assessed properties is based on current values derived from web-based sources.

Items considered in determining the level of geotechnical risk include the following.

- Site geology including seismic hazards
- Corrective grading and other geotechnical mitigation measures
- Proximity of geologic hazards to GHAD-maintained improvements
- Performance of the site improvements

It does not appear that the corrective grading and geotechnical mitigation improvements are significantly different from those completed during the mass grading for the development and as accounted for in the initial projected budget included in the Plan of Control. Likewise, the proximity of geologic hazards to GHAD-maintained improvements does not appear significantly different from those encountered during mass grading for the site. The geotechnical risk factor used in the target reserve calculation ranges between 0.001 to 0.01, where 0.001 represents the lowest risk and 0.01 represents a site with the highest risk.

The relative density of construction is the maximum number of units expected to be impacted by a major geologic event. The existing configuration of the development footprint is similar to that on the site plans available at the time of the initial mass grading.

Based on these parameters, we estimate that an appropriate long-term reserve for the GHAD for 259 units would be approximately \$4,053,000 in current dollars. The \$4,053,000 reserve amount would allow the GHAD to respond to anticipated events within the GHAD, while still having funds to continue its other administration, maintenance, and monitoring functions.

DISCUSSION AND CONCLUSIONS

Based on the assumptions listed above, an annual assessment of \$648 per unit per year would be required to fund the GHAD's responsibilities, excluding the accumulation of what we consider a prudent target reserve. To fund the GHAD's responsibilities as outlined in the Plan of Control and achieve an adequate target reserve of approximately \$4,053,000 over a 40-year period, we recommend an annual assessment of \$1,117 per residential lot per year in 2023/24 dollars. The proposed initial assessment level will be automatically adjusted annually on June 30 to reflect the percentage change in the San Francisco-Oakland-Hayward Consumers Price Index for All Urban Consumers.

As noted above, higher real rates of return decrease the assessment necessary to support the operations of the GHAD and maintain an appropriate target reserve. If the real rate of return is negative, as is projected in this reserve study, a portion of the assessment is applied to achieving and maintaining constant-dollar value for the target reserve funds. With the assumptions used in this reserve study, for each increase of 1% in the long-term real rate of return on GHAD reserves, the assessment would be lowered by approximately \$100 per residential unit annually.

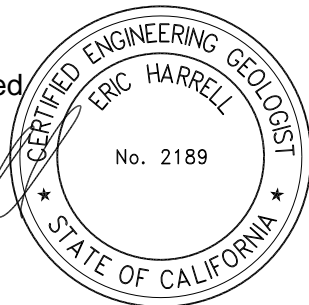
If you have any questions regarding the contents of this letter, please do not hesitate to contact us.

Sincerely,

ENGEO Incorporated



Eric Harrell, CEG



Uri Eliahu, GE

eh/ue/ar

Attachments: Selected References
Exhibit A: Expense Details
Exhibit B: Pro Forma Budget with \$4,053,000 Reserve Target (2023/24 dollars)
Exhibit C: Estimating an Appropriate GHAD Reserve

SELECTED REFERENCES

1. Nystrom Engineering. 1992. Plan of Control, Magee Ranch Geologic Hazard Abatement, Danville, California. Attached with Petition for Formation dated May 5, 1992.
2. Association Reserves. 2022. Reserve Study Update “No-Site-Visit”, Magee Ranch GHAD, Danville, California. August 12, 2022. Report No: 20912-11.
3. Diablo Ranch Development Company. 1989. Declaration of Covenants, Conditions and Restrictions for Magee Ranch Planned Development, December 11, 1989.
4. Gagen, McCoy, McMahon, and Armstrong. 1992. Petition for Geologic Hazard Abatement District Magee Ranch, Danville, California, May 6, 1992.
5. Danville, Town of, Administrative Staff Report, Petition for Geologic Hazard Abatement District, June 2, 1992.
6. Danville, Town of, Resolution No. 82-92, Setting a Public Hearing to form a Geologic Hazard Abatement District in the Magee Ranch Subdivision, June 2, 1992.
7. Danville, Town of, Administrative Staff Report, Formation of Magee Ranch Geologic Hazard Abatement District, August 4, 1992.
8. Danville, Town of, Resolution No. 124-92, Formation of a Geologic Hazard Abatement District in the Magee Ranch Subdivision, August 4, 1992.
9. United States Federal Reserve Board of Governors, Federal Open Market Committee Statement of Longer-Run Goals and Policy Strategy, Press Release, January 25, 2012.
10. ENGEO. 2023. Request for Proposals, Magee Ranch Geologic Hazard Abatement District, Geotechnical and Geological Consultation Related to Recent Storm Events, Danville, California. March 27, 2023, Revised March 30, 2023. Project No. 3417.000.001.
11. BC McCosker Construction, Inc. 2023. Magee Ranch GHAD, Slope Failure Repair Budget Revised, August 21, 2023.
12. ENGEO. 2023. Proposal for Testing and Observation Services, Magee Ranch GHAD Repairs, Danville, California. September 27, 2023. Project No. 3417.000.002.
13. Tryhorn Consulting. 2021. Biennial (2019 through 2020 Geological Site Visit, Magee Ranch, Danville, California, TC Number 1006-900, February 17, 2021.
14. Cal Engineering and Geology. 2022. Preliminary Geologic and Geotechnical Evaluation and Annual Observation Services, Magee Ranch Open Space, Danville, California, GE&G Document 202560-001, September 22, 2022.
15. Levy, Erlanger, and Company LLP. 2023. Magee Ranch Homeowners Association, Financial Statements and Independent Accountant’s Review Report, Years Ended December 31, 2022 and 2021, Transmittal from Howe Association Management, Inc. dated February 21, 2023.

SELECTED REFERENCES (Continued)

16. Levy, Erlanger, and Company LLP. 2021. Magee Ranch Homeowners Association, Financial Statements and Independent Accountant's Review Report, Years Ended December 31, 2021 and 2020.
17. Levy, Erlanger, and Company LLP. 2020. Magee Ranch Homeowners Association, Financial Statements and Independent Accountant's Review Report, Year Ended December 31, 2019, Transmittal from Howe Association Management, Inc. dated March 6, 2020.
18. Levy, Erlanger, and Company LLP. 2019. Magee Ranch Homeowners Association, Financial Statements and Independent Accountant's Review Report, Years Ended December 31, 2018 and 2017, Transmittal from Howe Association Management, Inc. dated March 20, 2019.
19. Levy, Erlanger, and Company LLP. 2018. Magee Ranch Homeowners Association, Financial Statements and Independent Accountant's Review Report, Year Ended December 31, 2017, Transmittal from Howe Association Management, Inc. dated February 20, 2018.

EXHIBIT A
Expense Details

Magee Ranch Geologic Hazard Abatement District (GHAD) Budget
Reserve Study Expense Details

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Item No.	Description	Unit	Quantity	Unit Price	Total Cost	Reoccurrence Interval (Years)	Annual Total Budget	Comments
1	Administration and Accounting							
	GHAD Manager	monthly	12	\$1,500	\$18,000	1.0	\$18,000	We have reviewed approved budget records for the existing GHADs in the region and these have provided a basis for the Administration and Accounting cost estimate.
	GHAD Treasurer	quarterly	4	\$425	\$1,700	1.0	\$1,700	This cost estimate is based on fees currently charged to GHADs in Contra Costa County for these services.
	GHAD Clerk	ls	1	\$1,500	\$1,500	1.0	\$1,500	This cost estimate is based on fees currently charged to GHADs in Contra Costa County for these services.
	Legal Counsel	ls	1	\$4,000	\$4,000	1.0	\$4,000	This cost estimate is based on fees currently charged to GHADs in Contra Costa County for these services.
	Insurance - Open Space Areas	acre	252	\$12	\$3,024	1.0	\$3,024	This cost estimate is based on fees currently charged to GHADs in California through the California Association of GHADs.
	Membership dues for the California Association of Geologic Hazard Abatement Districts	ls	1	\$165	\$165	1.0	\$165	This cost estimate is based of membership fees currently charged by the California Association of GHADs (\$100 plus \$0.25/residential parcel).
	Contra Costa County Assessor's Fees	ls	1	\$470	\$470	1.0	\$470	Assumes an assessment is approved under the provisions of Proposition 218
	Assessment Roll and Levy Update	ls	1	\$1,500	\$1,500	1.0	\$1,500	Assumes an assessment is approved under the provisions of Proposition 218
						Subtotal	\$30,359	

Magee Ranch Geologic Hazard Abatement District (GHAD) Budget
Reserve Study Expense Details

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Item No.	Description	Unit	Quantity	Unit Price	Total Cost	Reoccurrence Interval (Years)	Annual Total Budget	Comments
2	Professional Services							
	GHAD Monitoring Event including instrumentation - April and October	ls	1	\$8,000	\$8,000	1.0	\$8,000	<p>The frequency of monitoring is based on the adopted Plan of Control requirements for Magee Ranch. Monitoring budget estimates are based on the fees these services are currently being provided to the GHAD for other GHAD's within Contra Costa County.</p> <p>The frequency of monitoring is based on the adopted Plan of Control requirements for Magee Ranch. Monitoring budget estimates are based on the fees these services are currently being provided to the GHAD for other GHAD's within Contra Costa County.</p>
	Heavy Rainfall Event Monitoring	ls	1	\$4,000	\$4,000	1.0	\$4,000	
						Subtotal	\$12,000	

Magee Ranch Geologic Hazard Abatement District (GHAD) Budget
Reserve Study Expense Details

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Item No.	Description	Unit	Quantity	Unit Price	Total Cost	Reoccurrence Interval (Years)	Annual Total Budget	Comments	
3	Maintenance & Operation								
	Subdrains and outlets	each	29	\$100	\$2,900	5.0	\$580	We do not anticipate regular maintenance on the subdrain outfalls which tend to have low flow volumes, but this budget figure allows for maintenance or repair as may be necessary. Services currently contracted by the other GHADs. Includes concrete-lined ditches in open space and private lots as provided in the Plan of Control.	
	Sediment/debris removal from concrete-lined drainage ditches and associated drop inlets.	lf	26,200	\$0.50	\$13,100	1.0	\$13,100		
	Asphaltic concrete surfaced sanitary sewer access roadway (Partial Resurface)	sf	24,778	\$5.29	\$131,076	15.0	\$8,738		Adapted from 2023 Reserve Study
	Asphaltic concrete surfaced sanitary sewer access roadway - (Seal/Repair)	sf	49,555	\$0.64	\$31,715	5.0	\$6,343		Adapted from 2023 Reserve Study
	Minor slope instability and erosion	ls	1	\$75,000	\$75,000	2.0	\$37,500		Adapted from Plan of Control budget and 2017 through 2022 expense records.
	Maintenance of the 6 onsite sedimentation basins and associated rock walls including sediment and debris removal.	each	6	\$1,500	\$9,000	6.0	\$1,500		Vegetation, sediment, and debris removal with proper offsite disposal.
	Open space storm drain pipeline (4,800 lf), drop inlets (54 each), basin inlets, and outlets.	ls	1	\$5,000	\$5,000	1.0	\$5,000		Adapted from 2023 Reserve Study
	Retention Basins - Shadewell Drive and Windover Drive includes basin, embankments, inlet and outlet structures, and fencing	each	2	\$12,000	\$24,000	6.0	\$4,000		Adapted from 2023 Reserve Study
						Subtotal	\$76,761		

Magee Ranch Geologic Hazard Abatement District (GHAD) Budget
Reserve Study Expense Details

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Item No.	Description	Unit	Quantity	Unit Price	Total Cost	Reoccurrence Interval (Years)	Annual Total Budget	Comments
4	Capital Improvements							
	Concrete-lined drainage ditch replacement	lf	26,200	\$50	\$1,310,000	75.0	\$8,733	We have provided for a 75-year replacement cycle for the concrete-lined drainage ditches for 50 percent of the ditches. This replacement quantity applies to concrete lined drainage ditch that is not involved with slope instability. Drainage ditches that are involved with slope instability would be repaired or replaced during corrective work for the individual events. We have provided for a 75-year replacement cycle for 50 percent of the open space storm drain pipelines and associated facilities. This replacement quantity applies to system components that are not damaged due to slope instability.
	Open space storm drain pipeline, drop inlets (50), basin inlets, and outlets.	lf	4,800	\$250	\$1,200,000	75.0	\$8,000	
	Wood retaining walls	lf	250	\$30	\$7,500	15.0	\$500	
	Rock walls	lf	480	\$200	\$96,000	30.0	\$3,200	Existing open space wooden retaining walls. Existing open space rock walls.
						Subtotal	\$20,433	

Magee Ranch Geologic Hazard Abatement District (GHAD) Budget
Reserve Study Expense Details

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Item No.	Description	Unit	Quantity	Unit Price	Total Cost	Reoccurrence Interval (Years)	Annual Total Budget	Comments
5	Major Repair (Annualized)	Is	1	\$200,000	\$200,000	8.0	\$25,000	This figure represents the annualized repair cost estimate for a \$200,000 repair event that occurs on average every 8 years. This has been estimated based on frequency of heavy rainfall events documented since the GHAD's formation in 1992 and the cost or cost estimates from the 2016-17 and 2023 repair work.
						Subtotal	\$25,000	
						TOTAL	\$164,554	

EXHIBIT B

**Pro Forma Budget with \$4,053,000 Reserve
(2023/24 dollars)**

Magee Ranch Geologic Hazard Abatement District

Estimated Budget - October 9, 2023

FISCAL YEAR (Starting July 1)	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Cumulative No. of Units (Equivalent)	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
A. INCOME																
Assessment	289,284	296,516	303,929	311,528	319,316	327,299	335,481	343,868	352,465	361,276	370,308	379,566	389,055	398,782	408,751	418,970
B. PROJECTED EXPENSES																
1. Administration and Accounting	30,359	31,118	31,896	32,693	33,511	34,348	35,207	36,087	36,989	37,914	38,862	39,834	40,829	41,850	42,896	43,969
Solano County Assessor's Fees	4,918	5,041	5,167	5,296	5,428	5,564	5,703	5,846	5,992	6,142	6,295	6,453	6,614	6,779	6,949	7,122
2. Professional Services	12,000	12,300	12,608	12,923	13,246	13,577	13,916	14,264	14,621	14,986	15,361	15,745	16,139	16,542	16,956	17,380
3. Maintenance & Operation	39,261	40,243	41,249	42,280	43,337	44,420	45,531	46,669	47,836	49,032	50,257	51,514	52,802	54,122	55,475	56,862
4. Slope-Erosion Stabilization	37,500	38,438	39,398	40,383	41,393	42,428	43,489	44,576	45,690	46,832	48,003	49,203	50,433	51,694	52,987	54,311
5. Repair	-	-	-	-	-	-	-	-	243,681	-	-	-	-	-	-	-
6. Capital Improvement	20,433	20,944	21,467	22,004	22,554	23,118	23,696	24,288	24,896	25,518	26,156	26,810	27,480	28,167	28,871	29,593
7. Misc. Expenses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUBTOTAL - EXPENSES	144,471	148,083	151,785	155,579	159,469	163,455	167,542	171,730	419,704	180,424	184,935	189,558	194,297	199,155	204,134	209,237
RESERVE	144,813	148,434	152,145	155,948	159,847	163,843	167,939	172,138	(67,239)	180,852	185,374	190,008	194,758	199,627	204,618	209,733
EARNINGS	-	2,172	4,431	6,780	9,221	11,757	14,391	17,126	19,965	19,256	22,257	25,372	28,602	31,953	35,427	39,027
CUMULATIVE RESERVE	144,813	295,420	451,995	614,724	783,792	959,392	1,141,722	1,330,985	1,283,711	1,483,819	1,691,449	1,906,829	2,130,189	2,361,769	2,601,813	2,850,574

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ASSUMPTIONS

Total No. of Units (equivalent)	259
Annual Assessment per Unit	\$1,117
Annual Increase in Assessment	2.50%
Inflation	2.50%
Investment Earnings	1.5%
Initial Seed Fund	\$0
Amount Financed	\$0
Borrowing Rate	8.0%
Term of Loan (yrs.)	10
Frequency of Large-Scale Repair (yrs.)	8
Cost of Large-Scale Repair (current \$)	\$200,000
Assessment Cap (per residential unit)	9999
Expense Deferral Period (Yrs.)	0

ESTIMATED ANNUAL EXPENSES IN 2023/24 DOLLARS	PROFORMA CATEGORY
Administration & Accounting	Administration & Accounting
GHAD Monitoring Program	Professional Services
Sediment/Debris Removal Drainage Improvements	Maintenance and Operation
Sedimentation Basins	Maintenance and Operation
Maintenance Roads	Maintenance and Operation
Subdrains	Maintenance and Operation
Erosion -Slope Stabilization (incl. minor landsliding)	Slope Stabilization and Erosion Protection
Ditch and Storm Drain Replacement	Capital Improvement
Wall Replacement	Capital Improvement
Major Repair (Annualized)	Major Repair
Contingency	Miscellaneous Expenses
TOTAL	

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<u>2039</u>	<u>2040</u>	<u>2041</u>	<u>2042</u>	<u>2043</u>	<u>2044</u>	<u>2045</u>	<u>2046</u>	<u>2047</u>	<u>2048</u>	<u>2049</u>	<u>2050</u>	<u>2051</u>	<u>2052</u>	<u>2053</u>	<u>2054</u>	<u>2055</u>	<u>2056</u>	<u>2057</u>
259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
429,444	440,180	451,185	462,464	474,026	485,877	498,024	510,474	523,236	536,317	549,725	563,468	577,555	591,994	606,793	621,963	637,512	653,450	669,786
45,068	46,195	47,350	48,533	49,747	50,990	52,265	53,572	54,911	56,284	57,691	59,133	60,612	62,127	63,680	65,272	66,904	68,576	70,291
7,301	7,483	7,670	7,862	8,058	8,260	8,466	8,678	8,895	9,117	9,345	9,579	9,818	10,064	10,315	10,573	10,838	11,109	11,386
17,814	18,259	18,716	19,184	19,663	20,155	20,659	21,175	21,705	22,247	22,804	23,374	23,958	24,557	25,171	25,800	26,445	27,106	27,784
58,283	59,740	61,234	62,765	64,334	65,942	67,591	69,280	71,012	72,788	74,607	76,473	78,384	80,344	82,353	84,411	86,522	88,685	90,902
55,669	57,061	58,487	59,949	61,448	62,984	64,559	66,173	67,827	69,523	71,261	73,043	74,869	76,740	78,659	80,625	82,641	84,707	86,825
296,901	-	-	-	-	-	-	-	361,745	-	-	-	-	-	-	-	440,751	-	-
30,333	31,091	31,869	32,665	33,482	34,319	35,177	36,056	36,958	37,882	38,829	39,799	40,794	41,814	42,860	43,931	45,029	46,155	47,309
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
511,369	219,829	225,325	230,958	236,732	242,651	248,717	254,935	623,053	267,841	274,537	281,400	288,435	295,646	303,037	310,613	759,130	326,338	334,497
(81,925)	220,351	225,860	231,506	237,294	243,226	249,307	255,539	(99,817)	268,476	275,188	282,068	289,119	296,347	303,756	311,350	(121,618)	327,112	335,290
42,759	42,171	46,109	50,188	54,414	58,790	63,320	68,009	72,862	72,458	77,572	82,863	88,337	93,999	99,854	105,909	112,168	112,026	118,613
2,811,408	3,073,930	3,345,898	3,627,593	3,919,300	4,221,316	4,533,942	4,857,491	4,830,536	5,171,470	5,524,230	5,889,162	6,266,618	6,656,965	7,060,576	7,477,834	7,468,384	7,907,522	8,361,425

<u>2058</u>	<u>2059</u>	<u>2060</u>	<u>2061</u>	<u>2062</u>	<u>2063</u>
259	259	259	259	259	259
686,531	703,694	721,287	739,319	757,802	776,747
72,048	73,849	75,696	77,588	79,528	81,516
11,671	11,963	12,262	12,568	12,883	13,205
28,478	29,190	29,920	30,668	31,435	32,221
93,174	95,504	97,891	100,339	102,847	105,418
88,995	91,220	93,501	95,838	98,234	100,690
-	-	-	-	-	537,013
48,492	49,704	50,947	52,220	53,526	54,864
-	-	-	-	-	-
342,859	351,430	360,216	369,222	378,452	924,926
343,672	352,264	361,071	370,097	379,350	(148,179)
125,421	132,458	139,729	147,241	155,001	163,016
8,830,518	9,315,240	9,816,039	10,333,377	10,867,727	10,882,564

Reserve in
Dollars

2,023

4,053,000

EXHIBIT C

Estimating an Appropriate GHAD Reserve

ESTIMATING AN APPROPRIATE GHAD RESERVE

Uri Eliahu G.E., ENGEO Incorporated, June 1999

An important parameter in establishing initial GHAD budgets and in assessing the financial health of mature GHADs is the appropriate level of reserve needed to address probable future geologic events. The reserve must be unique to each GHAD, and must consider several factors, not all of which are geotechnical in nature.

As an initial approach, a loss history can be compiled based on records of actual losses that have occurred in the region in the last 20 years. If the last 20 years can be assumed to be representative of future years, this loss history can be distilled to obtain a current net present value (NPV) of the statistically-expected loss over a given time period. This can be expressed per dwelling unit, per parcel, or per dollar value of improvements. If, based on historic geologic and rainfall records, it is believed that the last two decades do not represent the full range of expected geologic activity, a correction factor can be applied to the calculated risk to arrive at the expected loss rate.



In converting the expected loss rate to an estimated reserve (**R**), consideration must be given to the following factors.

Number of assessed units (**n**) in the GHAD.

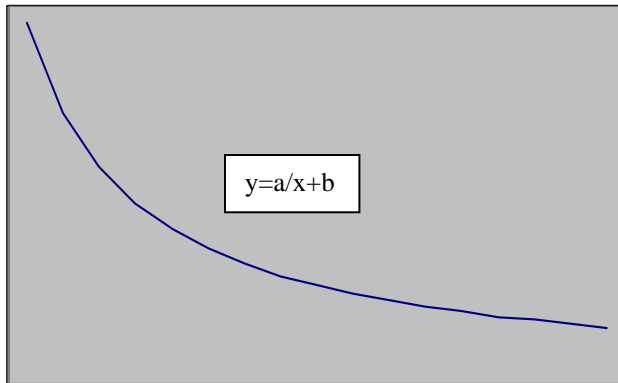
The reserve per dwelling unit (**R/n** or **average reserve**) should, in theory, diminish asymptotically with increasing unit count to a “floor” value.

Level of geotechnical risk (**g**) within the GHAD boundaries. Depending on geology, terrain, prior mitigation measures, grading techniques, irrigation and age, geotechnical risk may vary, even within a particular region.

Average value of assessed properties (**v**). In areas of high property values, repair or reconstruction of private improvements may be more costly and may require greater average reserves.

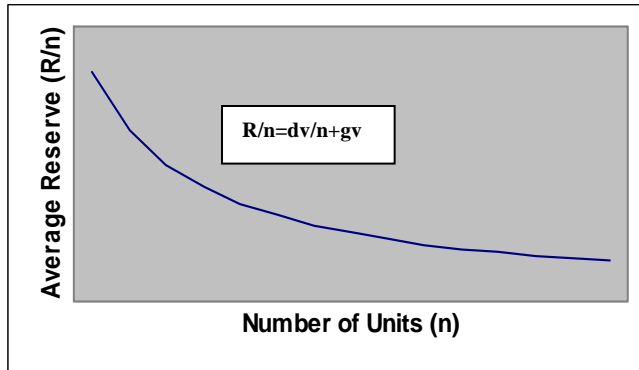
Relative density of construction (**d**). The number of units likely to be affected during a major geologic event will have an impact on the total reserve.

In consideration of the forgoing, an expression describing the average reserve may take the general hyperbolic form, $y = a/x + b$



Intuitively, this general expression may be applied to a GHAD reserve formula by substituting R/n for y , n for x , dv for a , and gv for b , to arrive at the relationship $R/n = dv/n + gv$ where:

- R** is the total reserve
- n** is the total number of assessed parcels
- v** is the average value of each residence
- g** is the geotechnical risk factor
- d** is a density factor related to the maximum number of units expected to be impacted in a major geologic event (eg. landslide)



This formula can be simplified to $R = dv + gvn$ or $R = v(d + gn)$

To apply this to a specific situation, g can be estimated based on historical data as described above, and d can be estimated by comparing regional landslide sizes to average lot sizes. Preliminarily, it appears that d may range from approximately 2 to 10 and g may range from 0.001 to 0.01, depending on the physical characteristics of the assessed areas as described above.

