CITY OF OAKLAND

AGENDA REPORT

TO: Office of the City Administrator
ATTN: Deborah Edgerly
FROM: Community & Economic Development Agency
DATE: May 23, 2006

RE: **Adoption Of A Resolution To Initiate Formation Of The Oakland Area Geologic Hazard Abatement District (GHAD) And Setting A Public Hearing For July 18, 2006 To Consider Formation Of The GHAD.**

SUMMARY

The resolution before the City Council initiates formation of the Oakland Area Geologic Hazard Abatement District (GHAD pronounced "GAD"). On November 12, 2002 the City Council adopted Resolution No. 77524 C.M.S. declaring that the City is subject to the statutory provisions of the GHAD laws for initiating formation proceedings as required by Public Resources Code 26500 et seq. Agencies are required to adopt this type of resolution before a GHAD is created in their jurisdiction. Resolution No. 77524 C.M.S. was adopted to allow formation of the Leona Quarry GHAD.

GHADs are political subdivisions of the state and are formed in specific geographic areas to address potential geologic hazards. The purpose of a GHAD is to prevent, mitigate, control, or abate defined geologic hazards through maintenance, improvements, or other means. Financing of a GHAD is accomplished through an assessment of only those property owners who live within the boundaries of the designated district. Issuing and servicing of bonds, notes, or other debentures is also authorized under a GHAD.

The Oakland Area GHAD would initially include the Siena Hill project. This project is a 32-unit attached single-family development with a private driveway. On March 2, 2005, the Commission approved Preliminary and Final Planned Unit Development Permits and Minor Variances for the project. As recommended by the Planning Commission, the geologic conditions of the site warrant on-going specialized preventive maintenance by identifying and monitoring potential geologic hazards and undertaking improvements or other actions to address them.

In addition, Planning and Zoning staff requests that the City Council consider the formation of the Oakland Area GHAD to include future approved projects that are deemed to have potential geologic hazards as defined in GHAD law. Since GHADs are required to be self sustaining and require an assessment of the property owners who live within the boundaries of the district, it is economically challenging for small projects, 200 units or less, to establish a GHAD. In order to address the budget concerns as well as the geologic concerns, staff proposes the Oakland Area GHAD as an alternative to a "stand alone" GHAD like Leona Quarry. In this way, smaller approved projects with geologic conditions can be annexed into the Oakland Area GHAD.

FISCAL IMPACTS

As proposed the GHAD would be a self-sustaining entity and costs for all related City staff and professional services to operate the GHAD would be recovered through the annual assessment of the property owners living within the district boundaries. No direct fiscal impacts on the City are therefore anticipated. In addition, the resolution now before the City Council merely establishes the legal basis required to consider the formation of a GHAD.

BACKGROUND

Initiation and Formation of the GHAD

Once an agency has determined that they are subject to the GHAD laws, a proposed GHAD can be initiated in one of two ways: 1) By a petition of not less than 10 percent of the property owners within the proposed district, or 2) By City Council resolution. City staff is requesting that the Oakland Area GHAD be initiated by resolution, absent a petition from the property owner. Additionally, this resolution sets a public hearing to consider the actual formation of the Oakland Area GHAD for July 18, 2006. The public hearing date must be set, pursuant to California Public Resources Code 26561, at least 20 days prior to the Council considering the actual formation of a GHAD.

Siena Hill Project

The Planning Commission approved a project with a total of 32 attached residential units and a private driveway off of Keller Avenue, between Rilea Way and Greenridge Drive. The Siena Hill project has been reviewed and considered by the Planning Commission during the past 12 months, including public review, technical review, and the preparation and certification of a comprehensive Environmental Impact Report (EIR).

On March 2, 2005, the Planning Commission approved Preliminary and Final Planned Unit Development Permits and Minor Variances for the project. In addition, the Commission also recommended that a GHAD be formed. The project was approved as a Preliminary and Final Planned Unit Development (PUD and FPUD) with Conditions of Approval, based on Mitigation Measures contained in the Final EIR and other City conditions and requirements. Design review of the project was also required, along with three variances from the Zoning Ordinance regulations that were not a part of the exceptions provided through the PUD, although they also directly relate to the planned and integrated development approach being proposed for the site. The variances are for retaining wall heights greater than six feet in certain locations, retaining walls with less than four feet of separation, and building length along side lot lines (greater than 35 feet).

On June 1, 2005, the Planning Commission approved a Tentative Tract Map (TTM) that allows the property to be subdivided into the residential lots proposed for the PUD. The TTM included

additional Conditions of Approval related to the formation of a GHAD. Staff received no appeals of the Planning Commission's approval of this project.

KEY ISSUES AND IMPACTS

Rational for Formation of the Oakland Area GHAD for the Siena Hill Project.

Both the Planning Commission and staff believe that the GHAD is an appropriate tool to use for this project for the following reasons:

- The project includes extensive grading of the hillside
- Construction of numerous retaining walls that retain earth and stabilize the site
- Construction of walls and improvements within the public right-of-way and in access easements
- Installation of drainage improvements that affect slope stability
- A landslide was previously noted at the north-western edge of the property

Rational for Formation of the Oakland Area GHAD for Future Development Projects

The City of Oakland has many geologic hazards within its jurisdiction. City Council has determined that it is prudent to require certain developments to be part of a GHAD. The Oakland Area GHAD will be available for the annexation of projects that are located in areas that meet the criteria as defined in GHAD law. Staff believes that the GHAD is an appropriate tool for future projects for the following reasons:

- The City is generally bisected by the Hayward Fault and many properties are located within the Seismic Hazard Zone as delineated by the California Geologic Survey.
- The City boundaries contain soils subject to liquefaction per the California Department of Conservation, Division of Mines and Geology.
- The City boundaries contain mapped and unmapped landslides.
- Many parcels within the City are hillside properties with slope grades of 20% or more and exhibit the potential for severe soil erosion.
- Many properties require a high level of care needed to maintain and monitor the site with regard to slope stability, vegetation and fire management.
- The City needs the ability to act immediately with adequate resources should a geologic problem occur.

PROJECT DESCRIPTION

As previously noted in the *Summary* section, GHADs are political subdivisions of the state and are formed in specific geographic areas to address potential geologic hazards. The purpose of a GHAD is to prevent, mitigate, control or abate defined geologic hazards through maintenance, improvements, or other means. As previously noted in the *Key Issues and Impacts* section, both

the Siena Hill project and the City of Oakland would benefit from the formation of a GHAD. The GHAD ensures that there are funds available to perform preventive inspections and maintenance on improvements within the GHAD boundaries. The GHAD also ensures that there are funds to address catastrophic failure of the improvements due to the defined geologic hazards. The key advantage here is that there is a documentation of the as-built conditions, a process to collect the assessments, and a GHAD Board of Directors formed with the technical and organizational resources to immediately respond to the potential or unforeseen geologic hazards.

Siena Hill Project

The Conditions of Approval for the Siena Hill project, as approved by the Planning Commission, require the formation of a GHAD in order to maintain and monitor the slope stabilization, drainage and other improvements required to mitigate potential geologic hazards. The proposed district boundaries include the lands within the Siena Hill subdivision. In addition, retaining walls, and appurtenant drainage facilities are to be constructed within an off-site access easement (the western edge of the project) and, if approved, within the Keller Avenue (City) right-of-way. The GHAD will have maintenance responsibilities both within the Siena Hill boundaries and within the access easement and right-of-way areas since these improvements are part of the proposed development.

Future Development in Oakland

Once the Oakland Area GHAD is formed, additional lands may be annexed to the GHAD if those properties meet the geologic hazard criteria as defined in GHAD law. Annexation proceedings are similar to the formation procedures except that the GHAD Board of Directors acts in place of the City Council. However, the annexation must also be approved by the City Council since it initially approved the formation of the GHAD. The City Council has been through a typical annexation process with respect to Leona Quarry. Several years after the City Council formed the Leona Quarry GHAD, the project applicant petitioned the Leona Quarry GHAD to annex additional properties to the GHAD. The Leona Quarry GHAD processed and approved this request and the City Council subsequently approved that annexation. A similar process would occur to annex additional properties into the Oakland Area GHAD.

GHAD Functions

The Plan of Control is the mechanism that lays out the actual on-going work, monitoring schedule, and priority of expenditures that would need to be accomplished through the GHAD. A Plan of Control is required per California Public Resource Code Section 26553 and 26558 when proceedings have been initiated to form a GHAD. This plan describes the geotechnical hazards, their location and provides measures to prevent, mitigate, abate and otherwise control those hazards. The Plan of Control attached to the report (Attachment A) describes the geologic hazards, monitoring, and mitigations for the Siena Hill project. As other developments are annexed into the Oakland Area GHAD, the Plan of Control would be amended to include the monitoring and mitigations for those projects with similar hazards.

Financing of a GHAD is accomplished through the assessment of property owners who live within the boundaries. Issuing and servicing of bonds, notes or other debentures is also authorized under a GHAD.

ENVIRONMENTAL DETERMINATION

GHAD formations are exempt from the environmental review requirements of the California Environmental Quality Act (CEQA) pursuant to California Public Resource Code Section 26559 (GHAD law that specifically exempts the application of CEQA to GHADs).

SUSTAINABLE OPPORTUNITIES

The consideration of a GHAD, in and of itself, does not present sustainable opportunities.

Economic: Economically, the GHAD will assure the appropriation of adequate resources to manage potential geotechnical, drainage, and other problems. Furthermore, the GHAD will ensure that the required services are provided in a responsible manner for those properties within the district.

Environmental: The GHAD's purpose is to prevent, mitigate, control or abate defined geologic hazards through maintenance, improvements, or other means. These geologic hazards include landslides, mudslides, steep slopes, and soil erosion all of which could impact Oakland's creeks, riparian corridors, native plant communities, wildlife habitat, and water quality. The GHAD ensures that there are adequate resources to address these problems.

Social Equity: All properties deemed to exhibit potential geologic hazards could request to annex into the GHAD. However, the GHAD requires field-verified geologic mapping, detailed as-built construction documents, and an assessment from the property owners that may discourage many economically disadvantaged properties from joining the GHAD.

However, the GHAD will mitigate or minimize environmental impacts on Oakland's creeks, plant and wildlife communities, and water quality, thereby serving to create a safer environment for all of Oakland.

DISABILITY AND SENIOR CITIZEN ACCESS

The formation of the GHAD will not directly affect accessibility for people with disabilities or senior citizens. Any new development in the area would be subject to the Americans with Disabilities Act (ADA), as provided for in the Uniform Building Code (UBC), and in Title 24 of the California State Code.

ACTION REQUESTED OF THE CITY COUNCIL

The Planning Commission recommends, and staff concurs, that the City Council adopt the resolution entitled: Resolution to Initiate Formation of the Oakland Area Geologic Hazard Abatement District (GHAD) and Setting a Public Hearing for July 18, 2006 to Consider Formation of the GHAD.

Respectfully submitted,

Scott Miller, for

CLAUDIA CAPPIO
Development Director
Community & Economic Development Agency

Reviewed by:
Gary Patton, Deputy Director of Planning
Planning & Zoning Division

Prepared by:
Heather Klein, Planner III
Planning & Zoning Division

APPROVED AND FORWARDED TO THE
COMMUNITY AND ECONOMIC DEVELOPMENT COMMITTEE:

Cheryl A Thompson

OFFICE OF THE CITY ADMINISTRATOR

ATTACHMENTS:

A. Oakland Area GHAD Plan of Control

GEOLOGIC HAZARD ABATEMENT DISTRICT (GHAD) PLAN OF CONTROL

OAKLAND AREA GHAD

OAKLAND, CALIFORNIA

SUBMITTED

TO

HILLSIDE HOMES GROUP, INC.

WALNUT CREEK, CALIFORNIA

PREPARED

BY

ENGEO INCORPORATED

PROJECT NO. 6964.1.001.01

APRIL 19, 2006

DRAFT B

Project No.
6964.1.001.01

April 19, 2006

Mr. Ed Patmont
Hillside Homes Group, Inc.
184 Rudgear Drive
Walnut Creek, CA 94596

Subject: Oakland Area Geologic Hazard Abatement District (GHAD)
Oakland, California

GEOLOGIC HAZARD ABATEMENT DISTRICT (GHAD)
PLAN OF CONTROL

Dear Mr. Patmont:

ENGEO Incorporated is pleased to present this Oakland Area Geologic Hazard Abatement District (GHAD) Plan of Control.

We are pleased to be of service to you on this project. If you have any questions concerning the contents of our report, please do not hesitate to contact us.

Very truly yours,

ENGEO INCORPORATED

Reviewed by:

Eric Harrell, CEG

Uri Eliahu, GE

Jeffrey A. Adams, PhD

DRAFT B

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

I. AUTHORITY AND SCOPE

The Oakland Area Geologic Hazard Abatement District ("GHAD" or "District") is proposed to be formed under authority of the California Public Resources Code (Division 17, commencing with Section 26500).

Section 26509 of the Public Resources Code requires a Plan of Control, prepared by a State-Certified Engineering Geologist, as a prerequisite to formation of a GHAD. Pursuant to Section 26509, this Plan of Control was prepared by an Engineering Geologist certified pursuant to Section 7822 of the Business and Professions Code and describes, in detail, the geologic hazards, their location, and the area affected by them. It also provides a plan for the prevention, mitigation, abatement, or control thereof.

As used in this Plan of Control, and as provided in Section 26507, "geologic hazard" means an actual or threatened landslide, land subsidence, soil erosion, earthquake, fault movement, or any other natural or unnatural movement of land or earth.

Property Identification

The proposed GHAD boundary is shown in Figure 1. The GHAD area includes the areas within the proposed Siena Hill project. The legal description of the land to be included within the Siena Hill GHAD is included in Exhibit A.

II. BACKGROUND

The Siena Hill property is located at Keller Avenue and Greenridge Drive in Oakland, California. The irregularly shaped site has approximately 950 feet of frontage on Keller Avenue and extends approximately 250 feet in width. Prior to the grading activities, elevations ranged from a low of about 340 feet above mean sea level (msl) near Keller Avenue to a high of about 450 feet above msl in the most elevated portion of the site.

Proposed Development

A Geotechnical Investigation was completed by Gary E. Underdahl (2001) for the Siena Hill site. Geotechnical corrective recommendations provided in this report have presumably been incorporated into plans prepared by A.C.K. Engineering and Surveying dated March 3, 2005. Current grading plans for the Siena Hill project show a total of 32 multi-family residential lots. The building pads and streets will be developed with cuts of up to about 30 feet, and placement of engineered fill up to approximately 15 feet thick from the original grade. To establish building pads, a number of retaining walls are planned for the site. Final grading work at the site will have been completed prior to acceptance of the property by the GHAD.

Easement and Keller Avenue Right of Way

As part of the proposed development, retaining walls and appurtenant drainage facilities are to be constructed within an off-site easement (Easement) and within the Keller Avenue right-of-way (Right-of-Way). Although these areas are located outside of the property boundary, the GHAD will be responsible for the maintenance of the retaining walls and appurtenant drainage facilities, as they directly benefit the Sienna Hill project. The legal description of the Easement and a depiction of the retaining walls outside of the property are presented in Exhibit B and C, respectively.

The GHAD is charged with responsibilities that relate to the prevention, mitigation, abatement, or control of geologic hazards, which includes the maintenance of facilities that enhance geologic as well as hydrogeologic stability such as drainage facilities and associated improvements. This may include the monitoring and maintenance of drainage facilities which, if subject to improper care, could result in decreased slope stability, the prime concern of the GHAD. As currently planned, the drainage facilities to be maintained by the GHAD include Best Management Practice (BMP) water quality treatment facilities and filter systems, concrete-lined drainage ditches, storm drain facilities, and drain inlets.

The GHAD will mitigate or abate landslide or erosion hazards that could directly affect improved, developed, and accepted properties (as defined in Section VII) within the project, in accordance with Section VI. The GHAD will also perform maintenance of water control and conveyance facilities.

III.SITE GEOLOGY

Geologic Setting

The Siena Hill property is located within the Coast Ranges geologic province of California, a series of northwest-trending ridges and valleys. Bedrock in the province has been folded and faulted during regional uplift beginning in the Pliocene period, roughly 4 million years before present. According to a geotechnical investigation report prepared by Gary E. Underdahl (2001), the Siena Hill property is situated on geologically young volcanics, labeled as Leona Rhyolite (Radbruch (1969), Dibblee (1980) and Crane (1988)). The bedrock strength of the formation reportedly varies considerably in strength and hardness. Nilsen (1975) has mapped the site as rock and colluvial filled swales. The Nilsen map reportedly identifies colluvium and numerous landslides on adjacent hillsides and swales.

Geologic Units

The geologic units mapped on the site include bedrock and surficial deposits consisting of artificial fill, topsoil, and colluvium that are described below. The fill and topsoil geologic units were described in the Underdahl (2001) geotechnical investigation report.

Artificial Fill. The upper soil in the central swale is a well-compacted fill. The fill is composed of a gravelly silt or clay or silty gravel, with the gravel consisting of sandstone and shale rock fragments.

Topsoil. The natural layer, under the fill, is a firm and dry sandy clay topsoil, ranging from 6 to 18 inches in thickness. The topsoil is moderately to highly plastic and probably highly expansive. Sand and gravel content is relatively high.

Colluvium. Mantling the unquarried bedrock and filling swales are colluvial deposits. These sediments are derived from weathering of the underlying bedrock and consist mostly of silty clay. This material generally is moderately expansive and has low strength. Where colluvium is located on sloping ground, it may be characteristically unstable. Within swales, the colluvial deposits tend to be relatively thicker and may be subject to flow or slip downslope.

Groundwater

Groundwater was not encountered during the field investigation performed by Underdahl. Fluctuations in groundwater levels may occur seasonally and over a period of years because of precipitation, changes in drainage patterns, irrigation and other factors. Future irrigation may cause an overall rise in groundwater levels.

Seismic Sources

No faults are have been mapped as crossing the site (Underdahl, 2001). The nearest State of California-zoned, active[1] fault is the Hayward fault located about 350 feet southwest of the site. As discussed in the geotechnical investigation, there is a high probability that the site and any improvements will be subject to strong ground shaking and some deformation of the site slopes during the lifetime of the project.

[1] An active fault is defined by the State Mining and Geology Board as one that has had surface displacement within Holocene time (about the last 10,000 years) (Hart, 1994). The State of California has prepared maps designating zones for special studies that contain these active earthquake faults.

IV. GEOLOGIC HAZARDS

The following geologic hazards were identified for the Property in the previous site studies and are expected to remain to some extent after site grading has been completed.

- Slope instability
- Seismically-induced ground shaking

Slope Instability

Earth stability is the GHAD's prime geotechnical concern at this site. This is not unique to this project, but is of importance for hillside projects in the San Francisco Bay Area. This section describes several types of slope instability which are within the GHAD's responsibility, subject to the provisions of Sections VI and VII.

Landslides are a common geologic phenomenon and are part of the process of mass wasting. Weathered or fractured bedrock and soil are transported downslope over geologic time as a result of gravitational and hydrostatic forces. Landslides and earth movement in this bedrock formation are typically rotational slumps and earthflows. Depth of movement is typically about 10 to 30 feet below the ground surface. Earthflows are confined to the upper 3- to 5-foot-thick clayey soil mantle. In the winter rainy season, these earthflows can move at a rate of several feet per day.

A landslide is a deposit of soil and/or bedrock moving downward from its original position under the influence of gravity. Landslides include a variety of morphologies and are further defined by type of materials, wetness, and mode of movement. They can consist of mass movements of earth materials that are primarily intact, and occur along discrete shear surfaces. These surfaces (shear or slip planes) can be rotational (conchoidal or concave), such as for earth slumps, or planar, as for translational earth slide or bedrock block slides. Most landslides are truly

"complex landslides", sliding, falling and flowing with more than one type of movement and/or material. According to the Underdahl report, numerous landslides have been mapped on hillsides and within swales adjacent to the Siena Hill property.

Falls are an abrupt free-fall of earth materials off cliffs, steep cuts, or steep stream banks while earthflows are mass movements of earth materials in which the type of movement is one of flowing. When composed of soil finer than gravel size, the flowing material is commonly called a mudflow. A debris flow/debris avalanche is composed of natural earth materials, artificial fill, and/or organic debris which flow downslope with speed. Most of the material is transported away from the area of initial ground failure.

Slope failures are also often triggered by increased pore water pressure due to the infiltration of rainwater. The resulting decrease of shear resistance (internal resistance to deformation by shearing) can cause the slope to move. The level of groundwater table varies with the amount of rainfall for the area. If rainfall is higher than average during the winter season, the water table will become higher than average on a hillslope and groundwater pressures may become sufficiently high to activate the hillside.

Soil creep is the slow, often imperceptible, deformation of slope materials under low stress levels, which normally affects the shallow portion of the slopes, but can be deep seated where a weak zone of soil or bedrock exists. It results from gravitational and seepage forces, and may be indicative of conditions favorable for landsliding. Creep can be caused by wetting and drying of clays, by solution and crystallization of salts, by the growth of roots, by burrowing animals and by downslope movement of saturated ground. Colluvium refers to the mantle of loose soil and weathered bedrock debris that progresses down hillsides by creep.

The District shall also be concerned with erosion and sedimentation affecting developed lots or improvements. Erosion is defined as the process by which earth materials are loosened and

removed by running water on the ground surface or in the subsurface. Sedimentation is the depositing or settling of soil or rock particles from a state of suspension in a liquid.

Hilly terrain in a natural condition or particularly on excavated slopes can be subject to erosion. Landslide deposits which are sometimes in a loosened condition are particularly prone to erosion. Earth flow-, debris flow- and mud flow-type landslides typically have an area of deposition or accumulation (sedimentation area) at their base. Graded slopes in the District, particularly those not sufficiently vegetated, can be subject to erosion and therefore a source of transported sediment.

It is necessary that field-verified geologic field mapping will be prepared during mass grading operations. The detailed maps showing bedrock structure, springs, and landslide limits and repairs should be provided to the GHAD when available. The cuts should be viewed by the project geologist during grading to provide mitigation schemes for unsuspected slope conditions which could decrease the slope stability. Such conditions include unfavorable bedrock attitudes and seepage conditions.

In repaired or buttressed landslide areas, the landslide debris should be overexcavated to firm undisturbed materials below the landslide plane as determined by the Geotechnical Engineer or Engineering Geologist at the time of grading. In the case of the complete removal of a landslide, systems of surface and subsurface drains should be installed to collect the subsurface waters which may have initially caused the landslide. The configuration of each subdrainage system should be tailored to the individual landslide at the time of grading. The Geotechnical Engineer and/or the Engineering Geologist should determine the location and depths of subdrains at that time. The location and elevation of subdrains and outlets should be recorded by survey. Each landslide subexcavation then would be reconstructed to final grade by keying and benching below the landslide plane with compacted, drained, engineered fill.

Seismically-Induced Ground Shaking

As identified in the geologic and geotechnical reports pertaining to the project, an earthquake of moderate to high magnitude generated within the San Francisco Bay Region could cause considerable ground shaking at the Property, similar to that which has occurred in the past. To mitigate the shaking effects, all structures should be designed using sound engineering judgment and the latest building code requirements, as a minimum.

Seismic slope stability analysis has presumably been incorporated in the corrective grading plans for the graded portions of the Property; however, seismically-generated slope failures could occur in open space areas outside of the development limits.

V. CRITERIA FOR GHAD RESPONSIBILITY

In forming the GHAD and establishing the assessment levels and budgets for the District, it is important to clearly define the limits of the GHAD's responsibilities. The GHAD will accept responsibility for property and retaining walls and appurtenant drainage facilities within the Easement and the Right-of-Way as described in Section VI of this Plan of Control. However, the intent of this Plan of Control is not to extend the GHAD's responsibilities to every potential situation of instability; rather, the following are exclusions from GHAD responsibility.

Isolated or Remote Feature Requiring Mitigation

The GHAD shall not have responsibility to monitor, abate, mitigate or control slope instability that does not involve damage to or pose a significant threat to damage site improvements or retaining walls and appurtenant drainage facilities within the Easement and/or the Right-of-Way.

Single Property

The GHAD will not prevent, mitigate, abate or control geologic hazards which are limited in area to a single parcel of property unless the geologic hazard has damaged, or poses a significant threat of damage to site improvements located on other property within the GHAD boundaries. As used herein, the term "site improvements" means buildings, roads, sidewalks, utilities, improved trails, swimming pools, tennis courts, gazebos, cabanas, geologic stabilization features, or similar improvements. This exclusion does not apply to geologic hazards existing on commercial property, recreational property, and open space property owned by any homeowner's associations or within the GHAD-owned property.

Geologic Hazards Resulting From Negligence of Property Owner

The GHAD may, in the general manager's sole discretion, decline to prevent, mitigate, abate or control geologic hazards which occurred or resulted from any negligence of the homeowner and/or the homeowner's contractors, agents or employees in developing, investigating, grading, constructing, maintaining or performing or not performing any post-development work on the subject property as long as the geologic hazard is limited to a single lot, pursuant to exclusions described herein.

Property Not Accepted

The GHAD shall not have responsibility to repair damage, which is situated on a parcel of real property, which the GHAD has not accepted in accordance with Section VI, below. The GHAD, however, may monitor, abate, mitigate or control geologic or hydrogeologic hazards on a parcel of real property which the GHAD has not accepted in accordance with Section VI, below, and is not excluded from GHAD responsibility by Paragraphs 1, 2 and 3; provided, however, that GHAD responsibility on such parcel shall be limited to the extent necessary to address damage or a significant threat to damage site improvements which are within a parcel of real property which the GHAD has accepted in accordance with Section VI, below.

Geologic Hazard Which Requires Expenditure in Amount Exceeding the Value of the Threatened or Damaged Improvement

The GHAD may elect not to prevent, mitigate, abate or control a geologic hazard where, in the general manager's sole discretion, the anticipated expenditure required to be funded by the GHAD to prevent, mitigate, abate or control the geologic hazard will exceed the value of the structure(s) and site improvement(s) threatened with damage or loss.

GHAD Funding or Reimbursement for Damaged or Destroyed Structures or Site Improvements

In the event a residence or any other structure, site improvement or landscaping is damaged or destroyed due to, or as a result of, a geologic hazard, the GHAD may fund or reimburse the property owner for the expenses necessary to repair or replace the damaged or destroyed structure, site improvement or landscaping. Unless authorized by the Board of Directors, the dollar amount of the GHAD funding or reimbursement may not exceed ten percent (10%) of the costs incurred by the GHAD in preventing, mitigating, abating or controlling the geologic hazard responsible for the damage. In the event the geologic hazard damaged or destroyed a structure, site improvement or landscaping which violated any provisions of the City Building Code or City Ordinance Code at the time of its installation or improvement, the GHAD may decline to provide any funding, or reimbursement to the property owner, for repair or replacement of the damaged structure, improvement or landscaping.

No Reimbursement of Expenses Incurred by Property Owners

The GHAD will not be obligated to reimburse a property owner for expenses incurred for the prevention, mitigation, abatement, or control of a geologic hazard absent a written agreement between the property owner and the GHAD to that effect, which agreement has been executed prior to the property owner incurring said expenses, and following an investigation conducted by the GHAD.

VI. ACCEPTANCE

Activation of Assessment

An annual assessment shall be promptly authorized on all residential parcels in the GHAD. The assessment shall be levied by the GHAD on each individual parcel beginning the first fiscal year following issuance of a building permit for that parcel.

Responsibility for GHAD Activities

The party that, on the date the Final Map within the boundaries of the GHAD is approved by the City of Oakland, owns the developable parcels shown on that Final Map shall have the responsibility to perform all the activities of the GHAD on property within that Final Map. Such responsibility shall become eligible for transfer to the GHAD on the day exactly three years after the first residential building permit is issued by the City of Oakland, two years following final approval of all retaining wall construction, or two years following final approval of site grading, whichever is later.. This turn-over date may be extended at the sole discretion of the project developer provided that the assessments shall continue to be levied during the extension period and that notice of such extension is delivered to the District Manager at least 30 days prior to the turn-over date. The Board of the GHAD intends that the period between the levying of the GHAD assessment and the GHAD becoming responsible to perform activities on property within the Final Map will allow the District to accumulate reserve funds without incurring significant expenses.

Process for Transferring Responsibility for GHAD Activities

After the Transfer Eligibility Date for parcel(s), the process for transferring responsibility for performing GHAD activities on such parcel(s) shall be as follows:

A. In the calendar year of the Transfer Eligibility Date or in any subsequent year, at its discretion, the developer may apply to the GHAD ("Transfer Application") to transfer the responsibility for performing GHAD Activities for parcel(s) to the District.

B. Within 30 days of receiving such notice, a representative of the GHAD shall verify that all the facilities for which the GHAD will have maintenance responsibility have been constructed and maintained according to the city-approved plans and specifications for the individual improvements, and that such facilities are operational and in good working order.

C. Within 15 days of such inspection, the GHAD will send the developer a list ("Punch list") of all of the items that need to be constructed, repaired or otherwise modified in order to comply with the city-approved plans and specifications.

D. The developer may notify the GHAD when it has completed the items identified on the Punch list.

E. Within 30 days of receipt of such notice, the GHAD shall verify that all Punch list items have been completed and notify the developer that the District accepts responsibility for performing all future GHAD Activities on the parcel(s).

VII. SIENA HILL GHAD PLAN OF CONTROL

The GHAD shall be responsible for the maintenance of geologic stabilization and hydrogeologic features within the GHAD boundaries and retaining walls and appurtenant drainage facilities within the Easement and the Right-of-Way. The GHAD's maintenance responsibilities include prevention, abatement, vegetation control, and control of landslide and erosion hazards within the project open space, as applicable, as provided in this Plan of Control.

General maintenance of the surface drainage improvements in the open space will be the GHAD's responsibility. Additionally, the GHAD will have the following maintenance responsibilities as outlined below:

- Inspection and maintenance of lined ditches.
- Monitoring and maintenance of measurement devices, such as piezometers, inclinometers, and tiltmeters, if any.
- Inspection and maintenance of retaining walls.
- Maintenance of designated trails or fences, if any.
- Inspection and maintenance of surface water quality treatment and detention facilities within the development, if any.

General Landslide and Erosion Hazard Mitigation

The techniques which may be employed by the GHAD to prevent, mitigate, abate, or control geologic hazards include, but are not limited to, the following.

A. Removal of the unstable earth mass.

B. Stabilization (either partial or total) of the landslide by removal and replacement with compacted, drained fill.

C. Construction of structures to retain or divert landslide material or sediment.

D. Construction of erosion control devices such as gabions, riprap, geotextiles, or lined ditches.

E. Placement of drained engineered buttress fill.

F. Placement of subsurface drainage devices (e.g. underdrains, or horizontal drilled drains).

G. Slope correction (e.g. gradient change, biotechnical stabilization, slope trimming or contouring).

H. Construction of additional surface ditches and/or detention basins, silt fences, sediment traps, or backfill or erosion channels.

Potential landslide and erosion hazards can be mitigated best by controlling soil saturation and water runoff and by maintaining the surface and subsurface drainage system. Maintenance shall be provided for lined surface drainage ditches and drainage terraces including debris benches or drop inlets.

VIII. PRIORITY OF GHAD EXPENDITURES

Emergency response and scheduled repair expenditures by the GHAD are to be prioritized by the General Manager, utilizing his or her discretion, based upon available funds and the approved operating budget. When available funds are not sufficient to undertake all of the identified remedial and preventive stabilization measures, the expenditures are to be prioritized as follows in descending order of priority:

A. Prevention, mitigation, abatement or control of geologic hazards that have either damaged or pose a significant threat of damage to residences, critical underground utilities or paved streets.

B. Prevention, mitigation, abatement or control of geologic hazards which have either damaged or pose a significant threat of damage to ancillary structures, including but not limited to water quality facilities, pool cabanas or restroom buildings.

C. Prevention, mitigation, abatement or control of geologic hazards which have either damaged or pose a significant threat of damage to open space amenities.

D. Prevention, mitigation, abatement or control of geologic hazards which have either damaged or pose a significant threat of damage limited to loss of landscaping or other similar non-essential amenities.

E. Prevention, mitigation, abatement or control of geologic hazards existing entirely on open-space property and which have neither damaged nor pose a significant threat of damage to any site improvements.

In performing its duties as described above, the GHAD may seek reimbursements from public and private entities including, but not limited to, FEMA, City and County agencies, insurance companies, etc.

IX. MAINTENANCE AND MONITORING SCHEDULE

Geologic features and GHAD-maintained facilities should be inspected by GHAD staff or GHAD-assigned consultants as presented below. The site inspections should be undertaken at appropriate intervals as determined by the GHAD manager using supporting documents prepared for the site and its improvements. The GHAD budget should provide for four or more inspections in years of heavy rainfall. Generally, the inspections should take place in October, prior to the first significant rainfall; mid-winter as necessary during heavy rainfall years; and in early April at the end of the rainy season. The frequency of the inspections should increase depending upon the intensity and recurrence of rainfall. Site inspections should increase sufficiently to provide for mitigation of potential hazards.

The GHAD shall obtain copies of geologic or geotechnical exploration reports related to site development and keep these reports on file in the records of the GHAD. In addition, copies of any earthwork-related testing and observation reports that will be finalized at the completion of grading, when as-built drawings are available, shall be maintained as part of the GHAD records.

Following are guidelines for a monitoring plan. The actual timing, scope, frequency and other details regarding such maintenance, inspection and similar activities shall be at the discretion of the GHAD manager.

- The engineer and/or geologist retained by the District should carry out an inspection of lined surface ditches at least twice a year, budget permitting. One inspection should be in the fall prior to the onset of winter rains. The inspection shall check for sedimentation and cracking or shifting of the concrete lined ditches. Repairs and maintenance, as needed, should be undertaken including removal of excess silt or sediment in ditches and patching or replacement of cracked or broken ditches, prior to the beginning of the next rainy season.

- Subsurface drain outlets and horizontal drilled drain outlets, if any, should be checked. Water flowing from these outlets should be measured and recorded during each inspection. The inspections should take place at least twice annually, preferably in the fall and spring. Any suspicious interruption in flow should signal a need to unplug or clean by flushing the affected drain.

- Piezometers to measure groundwater levels, or instruments such as inclinometers or tiltmeters measuring potential slope instability should be monitored quarterly, if installed.

- Settlement monitoring devices, if any, should be measured annually and tracked. In the event of anomalous readings or excessive settlement, the monitoring frequency should be increased to once per quarter.

- Inlets, outfalls or trash racks, if used, must be kept free of debris and spillways maintained. It is anticipated that initially at least once every two (2) years, cleanup of vegetation and removal of silt would be in order. Attention should be given to plantings or other obstructions which may interfere with access by power equipment.

- An annual inspection shall be made by the engineer and/or engineering geologist to assess the effectiveness of the preventive maintenance program and to make recommendations as to which landslide or erosion measures should be undertaken in the next fiscal year. Any appropriate site-specific study of landslide or erosion conditions shall be determined at that time. Consultants, if necessary, will be retained to undertake the needed studies. An annual inspection report to the GHAD shall be prepared by the District Engineer and/or Engineering Geologist.

SELECTED REFERENCES

A.C.K. Engineering and Surveying, Siena Hill Subdivision, Oakland, California, dated March 3, 2005.

California Division of Mines and Geology, January 1, 1982, State of California Earthquake Fault Zones, Oakland East 7-½' Quadrangle.

Graymer, R. W., 2000, Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa and San Francisco Counties, California: United States Geological Survey MF-2342.

Nilsen, T. H., 1975, Preliminary Photointerpretation Map of Landslide and Other Surficial Deposits of the Oakland East 7½' Quadrangle, Alameda and Contra Costa Counties, California; USGS Open File Map 75-277-14.

Radbruch, D.H., 1969, Areal and Engineering Geology of the Oakland East Quadrangle, Alameda and Contra Costa Counties, California; USGS GQ769.

Underdahl, G. E., September 10, 2001, Geotechnical Investigation, Planned Townhouse Development, Keller Avenue, Oakland, Alameda County, California, Project Number 9460501023.

APPENDIX A

Figure and Exhibits

Figure 1	GHAD Boundary
Exhibit A	Legal Description of Siena Hill Property
Exhibit B	Legal Description of Siena Hill Easement Area
Exhibit C	Retaining Walls Outside of Project Area

Approved as to Form and Legality

F. Faiz
City Attorney

FILED
OFFICE OF THE CITY CLERK
OAKLAND

OAKLAND CITY COUNCIL

RESOLUTION NO._____C.M.S.

2006 MAY 11 PM 6:35

Introduced by Councilmember _____

RESOLUTION TO INITIATE FORMATION OF THE OAKLAND AREA GEOLOGICAL HAZARD ABATEMENT DISTRICT (GHAD) AND SETTING A PUBLIC HEARING FOR JULY 18, 2006 TO CONSIDER FORMATION OF THE GHAD.

WHEREAS, this Resolution is made pursuant to Division 17 (Sections 26500 *et. seq.*) of the California Public Resources Code; and

WHEREAS, on June 1, 2005, the City of Oakland Planning Commission approved the tentative map for the Siena Hill Project (TTM 7396) and imposed Condition of Approval No. 8 that requires a geologic hazard abatement district to be fully operational, and all assessments, reserve funding and/or long-term financing and other requirements necessary to fully fund the district be established and authorized before the final map for the Project can be approved; and

WHEREAS, this Condition further requires the applicant of the Siena Hill Project to prepare a plan of control for the GHAD, as defined in California Public Resources Code 26509; and

WHEREAS, the applicant caused the Plan of Control for the Oakland Area GHAD to be prepared and submitted it to the City for review and comment; the Plan of Control dated April 19, 2006 is hereby presented to the City Council for its review and consideration and is attached as Attachment "A"; and

WHEREAS, it is the intent of the City to continue conditioning future development projects to be placed within a GHAD and it is the further intent of the City Council to form the Oakland Area GHAD to initially include the Siena Hill Project and to allow future development projects the ability to annex to the GHAD; and

WHEREAS, the City Council has determined that the GHAD will protect the health, safety and welfare of the future residents within the Oakland Area GHAD and within the City and that the GHAD is being created to prevent, mitigate, abate, or control landslides, land subsidence, soil erosion and similar geologic hazards within its boundaries; now, therefore be it

RESOLVED: That, the City Council of the City of Oakland hereby orders: That a public hearing (Hearing) be set on this Resolution as required by California Public Resources Code Section 26558, which Hearing will be held on Tuesday, July 18, 2006, 2006 at 7:00 p.m. in the City Council Chambers, City Hall, One Frank H. Ogawa Plaza, Oakland, California, 94612; and be it

FURTHER RESOLVED: The City Council hereby directs that notice of the Hearing shall be mailed to all owners of real property to be included within the proposed GHAD as shown on the assessment roll last equalized by the County. Notice of the Hearing shall be mailed by first class postage certified mail with return receipt requested and postmarked not less than 20 nor more than 30 days preceding the date of the Hearing. Notice of the Hearing shall include a copy of this Resolution and shall indicate where the Plan of Control may be reviewed or duplicated. Notice of

the Hearing shall also set forth the address where objections to the proposed formation may be mailed or otherwise delivered up to and including the time of the hearing; and be it

FURTHER RESOLVED: At any time not later than the time set for the Hearing of objections to the proposed formation of the GHAD, any owner of real property within the proposed district may make a written objection to the formation. Such objection shall be in writing, shall contain a description of the land owned by the objector by lot, tract, and map number, and shall be signed by such owner. If the person whose signature appears on such an objection is not shown on the assessment roll last equalized by the County as the owner of the subject property, the written objection shall be accompanied by evidence sufficient to indicate that such person is the owner of such property; and be it

FURTHER RESOLVED: The City Council finds and determines that this Resolution is exempt from CEQA pursuant to California Public Resources Code Section 26559 and the Environmental Review Officer is directed to cause to be filed a Notice of Exemption with the Alameda County Clerk and the State Office of Planning and Research.

FURTHER RESOLVED: The custodians and locations of the documents or other materials which constitute the record of proceedings upon which the City Council's decision is based, including the Plan of Control, are respectively: (a) Community & Economic Development Agency, Planning & Zoning Division, 250 Frank H. Ogawa Plaza, 3rd floor, Oakland CA.; and (b) Office of the City Clerk, 1 Frank H. Ogawa Plaza, 1st floor, Oakland, CA; and be it

FURTHER RESOLVED: The recitals contained in this Resolution are true and correct and are an integral part of the City Council's decision.

IN COUNCIL, OAKLAND, CALIFORNIA, _____, 20_____

PASSED BY THE FOLLOWING VOTE:

AYES - BROOKS, BRUNNER, CHANG, KERNIGHAN, NADEL, QUAN, REID, and PRESIDENT DE LA FUENTE

NOES -

ABSENT -

ABSTENTION -

ATTEST:_____
LaTonda Simmons
City Clerk and Clerk of the Council
of the City of Oakland, California

GEOLOGIC HAZARD ABATEMENT DISTRICT (GHAD) PLAN OF CONTROL

OAKLAND AREA GHAD

OAKLAND, CALIFORNIA

SUBMITTED

TO

HILLSIDE HOMES GROUP, INC.

WALNUT CREEK, CALIFORNIA

PREPARED

BY

ENGEO INCORPORATED

PROJECT NO. 6964.1.001.01

APRIL 19, 2006

DRAFT B

Project No.
6964.1.001.01

April 19, 2006

Mr. Ed Patmont
Hillside Homes Group, Inc.
184 Rudgear Drive
Walnut Creek, CA 94596

Subject: Oakland Area Geologic Hazard Abatement District (GHAD)
Oakland, California

GEOLOGIC HAZARD ABATEMENT DISTRICT (GHAD)
PLAN OF CONTROL

Dear Mr. Patmont:

ENGEO Incorporated is pleased to present this Oakland Area Geologic Hazard Abatement District (GHAD) Plan of Control.

We are pleased to be of service to you on this project. If you have any questions concerning the contents of our report, please do not hesitate to contact us.

Very truly yours,

ENGEO INCORPORATED

Reviewed by:

Eric Harrell, CEG

Uri Eliahu, GE

Jeffrey A. Adams, PhD

DRAFT B

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

I. AUTHORITY AND SCOPE

The Oakland Area Geologic Hazard Abatement District ("GHAD" or "District") is proposed to be formed under authority of the California Public Resources Code (Division 17, commencing with Section 26500).

Section 26509 of the Public Resources Code requires a Plan of Control, prepared by a State-Certified Engineering Geologist, as a prerequisite to formation of a GHAD. Pursuant to Section 26509, this Plan of Control was prepared by an Engineering Geologist certified pursuant to Section 7822 of the Business and Professions Code and describes, in detail, the geologic hazards, their location, and the area affected by them. It also provides a plan for the prevention, mitigation, abatement, or control thereof.

As used in this Plan of Control, and as provided in Section 26507, "geologic hazard" means an actual or threatened landslide, land subsidence, soil erosion, earthquake, fault movement, or any other natural or unnatural movement of land or earth.

Property Identification

The proposed GHAD boundary is shown in Figure 1. The GHAD area includes the areas within the proposed Siena Hill project. The legal description of the land to be included within the Siena Hill GHAD is included in Exhibit A.

II. BACKGROUND

The Siena Hill property is located at Keller Avenue and Greenridge Drive in Oakland, California. The irregularly shaped site has approximately 950 feet of frontage on Keller Avenue and extends approximately 250 feet in width. Prior to the grading activities, elevations ranged from a low of about 340 feet above mean sea level (msl) near Keller Avenue to a high of about 450 feet above msl in the most elevated portion of the site.

Proposed Development

A Geotechnical Investigation was completed by Gary E. Underdahl (2001) for the Siena Hill site. Geotechnical corrective recommendations provided in this report have presumably been incorporated into plans prepared by A.C.K. Engineering and Surveying dated March 3, 2005. Current grading plans for the Siena Hill project show a total of 32 multi-family residential lots. The building pads and streets will be developed with cuts of up to about 30 feet, and placement of engineered fill up to approximately 15 feet thick from the original grade. To establish building pads, a number of retaining walls are planned for the site. Final grading work at the site will have been completed prior to acceptance of the property by the GHAD.

Easement and Keller Avenue Right of Way

As part of the proposed development, retaining walls and appurtenant drainage facilities are to be constructed within an off-site easement (Easement) and within the Keller Avenue right-of-way (Right-of-Way). Although these areas are located outside of the property boundary, the GHAD will be responsible for the maintenance of the retaining walls and appurtenant drainage facilities, as they directly benefit the Sienna Hill project. The legal description of the Easement and a depiction of the retaining walls outside of the property are presented in Exhibit B and C, respectively.

The GHAD is charged with responsibilities that relate to the prevention, mitigation, abatement, or control of geologic hazards, which includes the maintenance of facilities that enhance geologic as well as hydrogeologic stability such as drainage facilities and associated improvements. This may include the monitoring and maintenance of drainage facilities which, if subject to improper care, could result in decreased slope stability, the prime concern of the GHAD. As currently planned, the drainage facilities to be maintained by the GHAD include Best Management Practice (BMP) water quality treatment facilities and filter systems, concrete-lined drainage ditches, storm drain facilities, and drain inlets.

The GHAD will mitigate or abate landslide or erosion hazards that could directly affect improved, developed, and accepted properties (as defined in Section VII) within the project, in accordance with Section VI. The GHAD will also perform maintenance of water control and conveyance facilities.

III. SITE GEOLOGY

Geologic Setting

The Siena Hill property is located within the Coast Ranges geologic province of California, a series of northwest-trending ridges and valleys. Bedrock in the province has been folded and faulted during regional uplift beginning in the Pliocene period, roughly 4 million years before present. According to a geotechnical investigation report prepared by Gary E. Underdahl (2001), the Siena Hill property is situated on geologically young volcanics, labeled as Leona Rhyolite (Radbruch (1969), Dibblee (1980) and Crane (1988)). The bedrock strength of the formation reportedly varies considerably in strength and hardness. Nilsen (1975) has mapped the site as rock and colluvial filled swales. The Nilsen map reportedly identifies colluvium and numerous landslides on adjacent hillsides and swales.

Geologic Units

The geologic units mapped on the site include bedrock and surficial deposits consisting of artificial fill, topsoil, and colluvium that are described below. The fill and topsoil geologic units were described in the Underdahl (2001) geotechnical investigation report.

Artificial Fill. The upper soil in the central swale is a well-compacted fill. The fill is composed of a gravelly silt or clay or silty gravel, with the gravel consisting of sandstone and shale rock fragments.

Topsoil. The natural layer, under the fill, is a firm and dry sandy clay topsoil, ranging from 6 to 18 inches in thickness. The topsoil is moderately to highly plastic and probably highly expansive. Sand and gravel content is relatively high.

Colluvium. Mantling the unquarried bedrock and filling swales are colluvial deposits. These sediments are derived from weathering of the underlying bedrock and consist mostly of silty clay. This material generally is moderately expansive and has low strength. Where colluvium is located on sloping ground, it may be characteristically unstable. Within swales, the colluvial deposits tend to be relatively thicker and may be subject to flow or slip downslope.

Groundwater

Groundwater was not encountered during the field investigation performed by Underdahl. Fluctuations in groundwater levels may occur seasonally and over a period of years because of precipitation, changes in drainage patterns, irrigation and other factors. Future irrigation may cause an overall rise in groundwater levels.

Seismic Sources

No faults are have been mapped as crossing the site (Underdahl, 2001). The nearest State of California-zoned, active[1] fault is the Hayward fault located about 350 feet southwest of the site. As discussed in the geotechnical investigation, there is a high probability that the site and any improvements will be subject to strong ground shaking and some deformation of the site slopes during the lifetime of the project.

[1] An active fault is defined by the State Mining and Geology Board as one that has had surface displacement within Holocene time (about the last 10,000 years) (Hart, 1994). The State of California has prepared maps designating zones for special studies that contain these active earthquake faults.

IV. GEOLOGIC HAZARDS

The following geologic hazards were identified for the Property in the previous site studies and are expected to remain to some extent after site grading has been completed.

- Slope instability
- Seismically-induced ground shaking

Slope Instability

Earth stability is the GHAD's prime geotechnical concern at this site. This is not unique to this project, but is of importance for hillside projects in the San Francisco Bay Area. This section describes several types of slope instability which are within the GHAD's responsibility, subject to the provisions of Sections VI and VII.

Landslides are a common geologic phenomenon and are part of the process of mass wasting. Weathered or fractured bedrock and soil are transported downslope over geologic time as a result of gravitational and hydrostatic forces. Landslides and earth movement in this bedrock formation are typically rotational slumps and earthflows. Depth of movement is typically about 10 to 30 feet below the ground surface. Earthflows are confined to the upper 3- to 5-foot-thick clayey soil mantle. In the winter rainy season, these earthflows can move at a rate of several feet per day.

A landslide is a deposit of soil and/or bedrock moving downward from its original position under the influence of gravity. Landslides include a variety of morphologies and are further defined by type of materials, wetness, and mode of movement. They can consist of mass movements of earth materials that are primarily intact, and occur along discrete shear surfaces. These surfaces (shear or slip planes) can be rotational (conchoidal or concave), such as for earth slumps, or planar, as for translational earth slide or bedrock block slides. Most landslides are truly

"complex landslides", sliding, falling and flowing with more than one type of movement and/or material. According to the Underdahl report, numerous landslides have been mapped on hillsides and within swales adjacent to the Siena Hill property.

Falls are an abrupt free-fall of earth materials off cliffs, steep cuts, or steep stream banks while earthflows are mass movements of earth materials in which the type of movement is one of flowing. When composed of soil finer than gravel size, the flowing material is commonly called a mudflow. A debris flow/debris avalanche is composed of natural earth materials, artificial fill, and/or organic debris which flow downslope with speed. Most of the material is transported away from the area of initial ground failure.

Slope failures are also often triggered by increased pore water pressure due to the infiltration of rainwater. The resulting decrease of shear resistance (internal resistance to deformation by shearing) can cause the slope to move. The level of groundwater table varies with the amount of rainfall for the area. If rainfall is higher than average during the winter season, the water table will become higher than average on a hillslope and groundwater pressures may become sufficiently high to activate the hillside.

Soil creep is the slow, often imperceptible, deformation of slope materials under low stress levels, which normally affects the shallow portion of the slopes, but can be deep seated where a weak zone of soil or bedrock exists. It results from gravitational and seepage forces, and may be indicative of conditions favorable for landsliding. Creep can be caused by wetting and drying of clays, by solution and crystallization of salts, by the growth of roots, by burrowing animals and by downslope movement of saturated ground. Colluvium refers to the mantle of loose soil and weathered bedrock debris that progresses down hillsides by creep.

The District shall also be concerned with erosion and sedimentation affecting developed lots or improvements. Erosion is defined as the process by which earth materials are loosened and

removed by running water on the ground surface or in the subsurface. Sedimentation is the depositing or settling of soil or rock particles from a state of suspension in a liquid.

Hilly terrain in a natural condition or particularly on excavated slopes can be subject to erosion. Landslide deposits which are sometimes in a loosened condition are particularly prone to erosion. Earth flow-, debris flow- and mud flow-type landslides typically have an area of deposition or accumulation (sedimentation area) at their base. Graded slopes in the District, particularly those not sufficiently vegetated, can be subject to erosion and therefore a source of transported sediment.

It is necessary that field-verified geologic field mapping will be prepared during mass grading operations. The detailed maps showing bedrock structure, springs, and landslide limits and repairs should be provided to the GHAD when available. The cuts should be viewed by the project geologist during grading to provide mitigation schemes for unsuspected slope conditions which could decrease the slope stability. Such conditions include unfavorable bedrock attitudes and seepage conditions.

In repaired or buttressed landslide areas, the landslide debris should be overexcavated to firm undisturbed materials below the landslide plane as determined by the Geotechnical Engineer or Engineering Geologist at the time of grading. In the case of the complete removal of a landslide, systems of surface and subsurface drains should be installed to collect the subsurface waters which may have initially caused the landslide. The configuration of each subdrainage system should be tailored to the individual landslide at the time of grading. The Geotechnical Engineer and/or the Engineering Geologist should determine the location and depths of subdrains at that time. The location and elevation of subdrains and outlets should be recorded by survey. Each landslide subexcavation then would be reconstructed to final grade by keying and benching below the landslide plane with compacted, drained, engineered fill.

Seismically-Induced Ground Shaking

As identified in the geologic and geotechnical reports pertaining to the project, an earthquake of moderate to high magnitude generated within the San Francisco Bay Region could cause considerable ground shaking at the Property, similar to that which has occurred in the past. To mitigate the shaking effects, all structures should be designed using sound engineering judgment and the latest building code requirements, as a minimum.

Seismic slope stability analysis has presumably been incorporated in the corrective grading plans for the graded portions of the Property; however, seismically-generated slope failures could occur in open space areas outside of the development limits.

V. CRITERIA FOR GHAD RESPONSIBILITY

In forming the GHAD and establishing the assessment levels and budgets for the District, it is important to clearly define the limits of the GHAD's responsibilities. The GHAD will accept responsibility for property and retaining walls and appurtenant drainage facilities within the Easement and the Right-of-Way as described in Section VI of this Plan of Control. However, the intent of this Plan of Control is not to extend the GHAD's responsibilities to every potential situation of instability; rather, the following are exclusions from GHAD responsibility.

Isolated or Remote Feature Requiring Mitigation

The GHAD shall not have responsibility to monitor, abate, mitigate or control slope instability that does not involve damage to or pose a significant threat to damage site improvements or retaining walls and appurtenant drainage facilities within the Easement and/or the Right-of-Way.

Single Property

The GHAD will not prevent, mitigate, abate or control geologic hazards which are limited in area to a single parcel of property unless the geologic hazard has damaged, or poses a significant threat of damage to site improvements located on other property within the GHAD boundaries. As used herein, the term "site improvements" means buildings, roads, sidewalks, utilities, improved trails, swimming pools, tennis courts, gazebos, cabanas, geologic stabilization features, or similar improvements. This exclusion does not apply to geologic hazards existing on commercial property, recreational property, and open space property owned by any homeowner's associations or within the GHAD-owned property.

Geologic Hazards Resulting From Negligence of Property Owner

The GHAD may, in the general manager's sole discretion, decline to prevent, mitigate, abate or control geologic hazards which occurred or resulted from any negligence of the homeowner and/or the homeowner's contractors, agents or employees in developing, investigating, grading, constructing, maintaining or performing or not performing any post-development work on the subject property as long as the geologic hazard is limited to a single lot, pursuant to exclusions described herein.

Property Not Accepted

The GHAD shall not have responsibility to repair damage, which is situated on a parcel of real property, which the GHAD has not accepted in accordance with Section VI, below. The GHAD, however, may monitor, abate, mitigate or control geologic or hydrogeologic hazards on a parcel of real property which the GHAD has not accepted in accordance with Section VI, below, and is not excluded from GHAD responsibility by Paragraphs 1, 2 and 3; provided, however, that GHAD responsibility on such parcel shall be limited to the extent necessary to address damage or a significant threat to damage site improvements which are within a parcel of real property which the GHAD has accepted in accordance with Section VI, below.

Geologic Hazard Which Requires Expenditure in Amount Exceeding the Value of the Threatened or Damaged Improvement

The GHAD may elect not to prevent, mitigate, abate or control a geologic hazard where, in the general manager's sole discretion, the anticipated expenditure required to be funded by the GHAD to prevent, mitigate, abate or control the geologic hazard will exceed the value of the structure(s) and site improvement(s) threatened with damage or loss.

GHAD Funding or Reimbursement for Damaged or Destroyed Structures or Site Improvements

In the event a residence or any other structure, site improvement or landscaping is damaged or destroyed due to, or as a result of, a geologic hazard, the GHAD may fund or reimburse the property owner for the expenses necessary to repair or replace the damaged or destroyed structure, site improvement or landscaping. Unless authorized by the Board of Directors, the dollar amount of the GHAD funding or reimbursement may not exceed ten percent (10%) of the costs incurred by the GHAD in preventing, mitigating, abating or controlling the geologic hazard responsible for the damage. In the event the geologic hazard damaged or destroyed a structure, site improvement or landscaping which violated any provisions of the City Building Code or City Ordinance Code at the time of its installation or improvement, the GHAD may decline to provide any funding, or reimbursement to the property owner, for repair or replacement of the damaged structure, improvement or landscaping.

No Reimbursement of Expenses Incurred by Property Owners

The GHAD will not be obligated to reimburse a property owner for expenses incurred for the prevention, mitigation, abatement, or control of a geologic hazard absent a written agreement between the property owner and the GHAD to that effect, which agreement has been executed prior to the property owner incurring said expenses, and following an investigation conducted by the GHAD.

VI. ACCEPTANCE

Activation of Assessment

An annual assessment shall be promptly authorized on all residential parcels in the GHAD. The assessment shall be levied by the GHAD on each individual parcel beginning the first fiscal year following issuance of a building permit for that parcel.

Responsibility for GHAD Activities

The party that, on the date the Final Map within the boundaries of the GHAD is approved by the City of Oakland, owns the developable parcels shown on that Final Map shall have the responsibility to perform all the activities of the GHAD on property within that Final Map. Such responsibility shall become eligible for transfer to the GHAD on the day exactly three years after the first residential building permit is issued by the City of Oakland, two years following final approval of all retaining wall construction, or two years following final approval of site grading, whichever is later.. This turn-over date may be extended at the sole discretion of the project developer provided that the assessments shall continue to be levied during the extension period and that notice of such extension is delivered to the District Manager at least 30 days prior to the turn-over date. The Board of the GHAD intends that the period between the levying of the GHAD assessment and the GHAD becoming responsible to perform activities on property within the Final Map will allow the District to accumulate reserve funds without incurring significant expenses.

Process for Transferring Responsibility for GHAD Activities

After the Transfer Eligibility Date for parcel(s), the process for transferring responsibility for performing GHAD activities on such parcel(s) shall be as follows:

A. In the calendar year of the Transfer Eligibility Date or in any subsequent year, at its discretion, the developer may apply to the GHAD ("Transfer Application") to transfer the responsibility for performing GHAD Activities for parcel(s) to the District.

B. Within 30 days of receiving such notice, a representative of the GHAD shall verify that all the facilities for which the GHAD will have maintenance responsibility have been constructed and maintained according to the city-approved plans and specifications for the individual improvements, and that such facilities are operational and in good working order.

C. Within 15 days of such inspection, the GHAD will send the developer a list ("Punch list") of all of the items that need to be constructed, repaired or otherwise modified in order to comply with the city-approved plans and specifications.

D. The developer may notify the GHAD when it has completed the items identified on the Punch list.

E. Within 30 days of receipt of such notice, the GHAD shall verify that all Punch list items have been completed and notify the developer that the District accepts responsibility for performing all future GHAD Activities on the parcel(s).

VII. SIENA HILL GHAD PLAN OF CONTROL

The GHAD shall be responsible for the maintenance of geologic stabilization and hydrogeologic features within the GHAD boundaries and retaining walls and appurtenant drainage facilities within the Easement and the Right-of-Way. The GHAD's maintenance responsibilities include prevention, abatement, vegetation control, and control of landslide and erosion hazards within the project open space, as applicable, as provided in this Plan of Control.

General maintenance of the surface drainage improvements in the open space will be the GHAD's responsibility. Additionally, the GHAD will have the following maintenance responsibilities as outlined below:

- Inspection and maintenance of lined ditches.
- Monitoring and maintenance of measurement devices, such as piezometers, inclinometers, and tiltmeters, if any.
- Inspection and maintenance of retaining walls.
- Maintenance of designated trails or fences, if any.
- Inspection and maintenance of surface water quality treatment and detention facilities within the development, if any.

General Landslide and Erosion Hazard Mitigation

The techniques which may be employed by the GHAD to prevent, mitigate, abate, or control geologic hazards include, but are not limited to, the following.

A. Removal of the unstable earth mass.

B. Stabilization (either partial or total) of the landslide by removal and replacement with compacted, drained fill.

C. Construction of structures to retain or divert landslide material or sediment.

D. Construction of erosion control devices such as gabions, riprap, geotextiles, or lined ditches.

E. Placement of drained engineered buttress fill.

F. Placement of subsurface drainage devices (e.g. underdrains, or horizontal drilled drains).

G. Slope correction (e.g. gradient change, biotechnical stabilization, slope trimming or contouring).

H. Construction of additional surface ditches and/or detention basins, silt fences, sediment traps, or backfill or erosion channels.

Potential landslide and erosion hazards can be mitigated best by controlling soil saturation and water runoff and by maintaining the surface and subsurface drainage system. Maintenance shall be provided for lined surface drainage ditches and drainage terraces including debris benches or drop inlets.

VIII. PRIORITY OF GHAD EXPENDITURES

Emergency response and scheduled repair expenditures by the GHAD are to be prioritized by the General Manager, utilizing his or her discretion, based upon available funds and the approved operating budget. When available funds are not sufficient to undertake all of the identified remedial and preventive stabilization measures, the expenditures are to be prioritized as follows in descending order of priority:

A. Prevention, mitigation, abatement or control of geologic hazards that have either damaged or pose a significant threat of damage to residences, critical underground utilities or paved streets.

B. Prevention, mitigation, abatement or control of geologic hazards which have either damaged or pose a significant threat of damage to ancillary structures, including but not limited to water quality facilities, pool cabanas or restroom buildings.

C. Prevention, mitigation, abatement or control of geologic hazards which have either damaged or pose a significant threat of damage to open space amenities.

D. Prevention, mitigation, abatement or control of geologic hazards which have either damaged or pose a significant threat of damage limited to loss of landscaping or other similar non-essential amenities.

E. Prevention, mitigation, abatement or control of geologic hazards existing entirely on open-space property and which have neither damaged nor pose a significant threat of damage to any site improvements.

In performing its duties as described above, the GHAD may seek reimbursements from public and private entities including, but not limited to, FEMA, City and County agencies, insurance companies, etc.

IX. MAINTENANCE AND MONITORING SCHEDULE

Geologic features and GHAD-maintained facilities should be inspected by GHAD staff or GHAD-assigned consultants as presented below. The site inspections should be undertaken at appropriate intervals as determined by the GHAD manager using supporting documents prepared for the site and its improvements. The GHAD budget should provide for four or more inspections in years of heavy rainfall. Generally, the inspections should take place in October, prior to the first significant rainfall; mid-winter as necessary during heavy rainfall years; and in early April at the end of the rainy season. The frequency of the inspections should increase depending upon the intensity and recurrence of rainfall. Site inspections should increase sufficiently to provide for mitigation of potential hazards.

The GHAD shall obtain copies of geologic or geotechnical exploration reports related to site development and keep these reports on file in the records of the GHAD. In addition, copies of any earthwork-related testing and observation reports that will be finalized at the completion of grading, when as-built drawings are available, shall be maintained as part of the GHAD records.

Following are guidelines for a monitoring plan. The actual timing, scope, frequency and other details regarding such maintenance, inspection and similar activities shall be at the discretion of the GHAD manager.

- The engineer and/or geologist retained by the District should carry out an inspection of lined surface ditches at least twice a year, budget permitting. One inspection should be in the fall prior to the onset of winter rains. The inspection shall check for sedimentation and cracking or shifting of the concrete lined ditches. Repairs and maintenance, as needed, should be undertaken including removal of excess silt or sediment in ditches and patching or replacement of cracked or broken ditches, prior to the beginning of the next rainy season.

- Subsurface drain outlets and horizontal drilled drain outlets, if any, should be checked. Water flowing from these outlets should be measured and recorded during each inspection. The inspections should take place at least twice annually, preferably in the fall and spring. Any suspicious interruption in flow should signal a need to unplug or clean by flushing the affected drain.

- Piezometers to measure groundwater levels, or instruments such as inclinometers or tiltmeters measuring potential slope instability should be monitored quarterly, if installed.

- Settlement monitoring devices, if any, should be measured annually and tracked. In the event of anomalous readings or excessive settlement, the monitoring frequency should be increased to once per quarter.

- Inlets, outfalls or trash racks, if used, must be kept free of debris and spillways maintained. It is anticipated that initially at least once every two (2) years, cleanup of vegetation and removal of silt would be in order. Attention should be given to plantings or other obstructions which may interfere with access by power equipment.

- An annual inspection shall be made by the engineer and/or engineering geologist to assess the effectiveness of the preventive maintenance program and to make recommendations as to which landslide or erosion measures should be undertaken in the next fiscal year. Any appropriate site-specific study of landslide or erosion conditions shall be determined at that time. Consultants, if necessary, will be retained to undertake the needed studies. An annual inspection report to the GHAD shall be prepared by the District Engineer and/or Engineering Geologist.

SELECTED REFERENCES

A.C.K. Engineering and Surveying, Siena Hill Subdivision, Oakland, California, dated March 3, 2005.

California Division of Mines and Geology, January 1, 1982, State of California Earthquake Fault Zones, Oakland East 7-½' Quadrangle.

Graymer, R. W., 2000, Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa and San Francisco Counties, California: United States Geological Survey MF-2342.

Nilsen, T. H., 1975, Preliminary Photointerpretation Map of Landslide and Other Surficial Deposits of the Oakland East 7½' Quadrangle, Alameda and Contra Costa Counties, California; USGS Open File Map 75-277-14.

Radbruch, D.H., 1969, Areal and Engineering Geology of the Oakland East Quadrangle, Alameda and Contra Costa Counties, California; USGS GQ769.

Underdahl, G. E., September 10, 2001, Geotechnical Investigation, Planned Townhouse Development, Keller Avenue, Oakland, Alameda County, California, Project Number 9460501023.

APPENDIX A

Figure and Exhibits

Figure 1	GHAD Boundary
Exhibit A	Legal Description of Siena Hill Property
Exhibit B	Legal Description of Siena Hill Easement Area
Exhibit C	Retaining Walls Outside of Project Area