CITY OF SANTA CLARA, UTAH
ORDINANCE NO. 2026-22

AN ORDINANCE AMENDING THE SANTA CLARA CITY MUNICIPAL CODE BY ADDING CHAPTER 15.34, "GEOLOGIC HAZARDS," ESTABLISHING REGULATIONS FOR DEVELOPMENT IN AREAS SUBJECT TO GEOLOGIC HAZARDS; AND ESTABLISHING AN EFFECTIVE DATE

WHEREAS, the City of Santa Clara, Utah, has adopted regulations governing land use and development within the City to protect the public health, safety, and welfare; and

WHEREAS, the City currently does not have a dedicated Geologic Hazards chapter in its Municipal Code to establish regulations addressing geologic hazards associated with development; and

WHEREAS, the City Council adopted Ordinance No. 2026-19 on October 14, 2026, enacting Chapter 17.80, Sensitive Lands Overlay Zone (SLOZ), to establish additional land use regulations for sensitive lands within the City; and

WHEREAS, the adoption of Chapter 17.80 was intended to establish permanent land use regulations before the expiration of the temporary land use regulation and moratorium authorized under City Ordinance No. 2026-07; and

WHEREAS, the City has determined that the adoption of Chapter 15.34, "Geologic Hazards," is a necessary next step in establishing appropriate regulations for development in areas subject to geologic hazards; and

WHEREAS, the proposed Chapter 15.34 is based on the Utah Geological Survey (UGS) model ordinance and is intended to provide standards and requirements addressing geologic hazards associated with land development within the City; and

WHEREAS, the proposed ordinance was discussed with the City Council Work meeting on October 14, 2026, and the City Council expressed support for proceeding with the proposed regulations; and

WHEREAS, the City Council held a duly noticed public hearing on November 4, 2026, to receive public comment regarding the proposed addition of Chapter 15.34, "Geologic Hazards," to the Santa Clara City Municipal Code; and

WHEREAS, the City Council has reviewed the proposed ordinance, supporting materials, and recommendations from City staff regarding the adoption of Chapter 15.34, "Geologic Hazards"; and

WHEREAS, the City Council finds that adopting regulations governing geologic hazards will promote orderly development, reduce potential risks associated with geologic hazards, protect public health and safety, and serve the best interests of Santa Clara City and its residents;

NOW, THEREFORE, BE IT ORDAINED by the City Council of the City of Santa Clara, Utah, as follows:

SECTION 1. Addition of Chapter 15.34

The Santa Clara City Municipal Code is hereby amended to add Chapter 15.34, "Geologic Hazards," as set forth in Exhibit "A," attached hereto and incorporated herein by this reference.

SECTION 2. Severability

If any section, subsection, sentence, clause, or phrase of this Ordinance is declared invalid by a court of competent jurisdiction, such invalidity shall not affect the remaining portions of this Ordinance, which shall remain in full force and effect.

SECTION 3. Effective Date

This Ordinance shall become effective immediately upon adoption, recording, and posting in the manner prescribed by law.

ADOPTED AND APPROVED by a duly constituted quorum of the City Council of the City of Santa Clara, Utah, this **4th day of November, 2026.**

IN WITNESS THERETO:

_____

Jarett Waite, Mayor

ATTEST:

_____

Selena Nez, City Recorder

EXHIBIT "A"

CHAPTER 15.34
GEOLOGIC HAZARDS

CHAPTER 15.34

GEOLOGIC HAZARDS

SECTION:

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15.34.010: PURPOSE:

The purpose of this geologic hazard ordinance is to promote and protect the health, safety, and welfare of the citizens of Santa Clara, protect the infrastructure and financial health of Santa Clara, and minimize adverse effects of geologic hazards to public health, safety, and property by encouraging wise land use and development.

15.34.020: DEFINITIONS:

As used in this geologic hazard ordinance, the following terms have the following meanings:

ACCEPTABLE AND REASONABLE RISK: No loss or significant injury to occupants, no release of hazardous or toxic substances, and minimal structural damage to buildings or infrastructure during a hazard event allowing occupants egress outside.

ACCESSORY BUILDING: Any structure not designed for human occupancy, which may include tool or storage sheds, gazebos, and swimming pools. Accessory dwelling units and businesses located in accessory buildings must comply with all requirements as buildings designed for human occupancy.

BUILDABLE AREA: Based on an accepted geologic hazard investigation report, the portion of a site not impacted by geo-logic hazards, or the portion of a site where it is concluded the identified geologic hazards can be mitigated to an acceptable and reasonable risk, and where structures may be safely located. Buildable areas must be clearly marked on approved site plans and/or final approved plats, as appropriate.

CITY COUNCIL: The City Council of Santa Clara.

CIVIL ENGINEER: A Civil Engineer registered with the Utah Division of Professional Licensing and licensed to practice as a Professional Engineer in the State of Utah. meeting the requirements of Section 1.6.

CRITICAL FACILITIES: Essential, hazardous, special occupancy, and all Risk Categories III and IV structures, as defined in the statewide adopted International Building Code (IBC), and lifelines, such as major utility, transportation, communication facilities, and their connections to critical facilities.

DEVELOPMENT: All critical facilities, subdivisions, single-family dwellings, duplexes, and multi-family dwellings, commercial and industrial buildings; also includes additions to or intensification of existing buildings, storage facilities, pipelines and utility conveyances, roadways, and other land

uses.

ENGINEERING GEOLOGIST: A Utah-licensed Professional Geologist, who, through education, training, and experience, practices in the field of engineering geology and geologic hazards meeting the requirements of Section 1.6.

ENGINEERING GEOLOGY: Geologic work that is relevant to engineering and environmental concerns, and the health, safety, and welfare of the public. Engineering geology is the application of geological data, principles, and interpretation affecting the planning, design, construction, and maintenance of engineered works, land use planning, and groundwater issues.

ESSENTIAL FACILITY: Buildings and other structures in-tended to remain operational in the event of an adverse geo-logic event, including all structures with an occupancy greater than 1000 shall also be considered IBC Risk Category III when not meeting the criteria for IBC Risk Category IV; and IBC Risk Category IV buildings and other structures are designated as essential (critical) facilities.

GEOLOGIC HAZARD: A geologic condition that presents a risk to life, of substantial loss of real property, or of substantial damage to real property (Utah Code 17-27a-103[19]: and includes, but not limited to, liquefaction, landslides, slope stability, rock-falls, and other hazards.

GEOLOGIC HAZARD STUDY AREA: A potentially hazardous area as defined in Section 1.4 of this ordinance within which geologic hazard investigations are required prior to development.

GEOTECHNICAL ENGINEER: A Utah-licensed Professional Engineer who, through education, training, and experience, is competent in the field of geotechnical or geological engineering meeting the requirements of Section 1.6.

GEOTECHNICAL ENGINEERING: The investigation and engineering evaluation of earth materials, including soil, rock, and manmade materials and their interaction with earth retention systems, foundations, and other civil engineering works. The practice involves the fields of soil and rock mechanics and the earth sciences, and requires the knowledge of engineering laws, formulas, construction techniques, and performance evaluation.

GOVERNING BODY: The City of Santa Clara, or a designee of the City Council.

INFRASTRUCTURE: Those improvements which are required to be installed and guaranteed in conjunction with an approved subdivision or other land use approval. Infrastructure may be public or private, on site or off site, depending on development design, and may include streets, curb, gutter, sidewalk, water and sanitary sewer lines, storm sewers, flood control facilities, and other similar facilities.

INTERNATIONAL BUILDING CODE (IBC): The latest, statewide adopted International Code Council International Building Code (Utah Code Title 15A,) and the latest International Residential

Code (IRC).

LANDSLIDE: The downslope movement of a mass of soil, surficial deposits, and/or bedrock, including a continuum of processes between landslides, earth flows, debris flows, de-bris avalanches, and rockfalls.

LEGAL LOT OF RECORD: A parcel of land which meets all zoning requirements to be eligible for the development of a dwelling, habitable structure, or other facility or structure, pursuant to all Santa Clara requirements.

LIQUEFACTION: A sudden, large decrease in shear strength of a saturated, cohesionless soil caused by a collapse of soil structure and temporary increase in pore water pressure during earthquake ground shaking. May lead to ground failure, including lateral spreads and flow-type landslides.

MOISTURE SENSITIVE SOILS AND BEDROCK: Soils and bedrock susceptible to hydro-collapse, expansion, and/or dissolution and capable of causing structural damage to buildings, concrete flatwork, and roadways when wetted. Moisture sensitive soils and bedrock are generally considered adverse construction conditions and not geologic hazards because they rarely cause rapid, catastrophic damage or are a threat to life safety.

NON-BUILDABLE AREA: That portion of a site which a geologic hazard investigation report has concluded is impacted by geologic hazards that present an unreasonable and unacceptable risk, and where the siting of habitable structures, accessory structures which house an accessory dwelling unit or business, or critical facilities, are not permitted.

ROCKFALL: A rock or mass of rock, newly detached from a cliff or other steep slope which moves downslope by falling, rolling, toppling, and/or bouncing; includes rockslides, rock-fall avalanches, and talus.

SETBACK: An area subject to risk from a geologic hazard within which habitable structures or critical facilities and their supports are not permitted.

SLOPE STABILITY: The resistance of a natural or constructed slope to failure by landsliding and assessed under both static and dynamic (earthquake-induced) conditions.

STRUCTURE DESIGNED FOR HUMAN OCCUPANCY: Any residential dwelling or any other structure used or intended for supporting or sheltering any use or occupancy by humans or businesses, includes all Risk Category II structures as defined in the currently adopted International Building Code, but does not include an accessory building that houses no accessory dwelling unit or business.

TALUS: Rock fragments lying at the base of a cliff or a very steep rocky slope.

SANTA CLARA CITY: The Santa Clara Public Services Director, City Engineer, Planning Director, Building Official, Fire Chief, Sensitive Lands Review Board member(s), or another City of Santa Clara employee or designee.

15.34.030: APPLICABILITY:

The regulations contained in this ordinance shall apply to all lands under the jurisdiction of Santa Clara City. Every legal lot of record, lot in a proposed land subdivision, and parcel within a Geologic Hazard Study Area as defined by this ordinance must have a safe buildable area for the intended use. Each buildable area must also have access from the nearest existing public or private street which is free of unreasonable and unacceptable geologic hazards. Any geologic hazards which must be mitigated to provide a buildable area with acceptable and reasonable access must be mitigated prior to issuance of the final plat approval.

Detached accessory buildings that are not designed for human occupancy are not required to comply with the provisions of this ordinance. In addition, the remodeling of existing structures designed for human occupancy may occur without compliance with this ordinance, if no expansion of the existing structure footprint, foundation, and no structure use change is proposed. Complete or substantial demolition and replacement of structures shall comply with this ordinance.

As defined in the statewide adopted latest International Building Code (IBC), Table 1604.5, Santa Clara considers IBC Risk Category III buildings and other structures to represent a substantial hazard to human life in the event of failure, except that any structure with an occupancy greater than 1000 shall also be considered IBC Risk Category III when not meeting the criteria for IBC Risk Category IV; and IBC Risk Category IV buildings and other structures are designated as essential (critical) facilities.

15.34.040: GEOLOGIC:

Geologic Hazard Study Areas that Santa Clara City finds to be of significance to the health, safety, and welfare of the citizens of Santa Clara are defined in Section 1.9 as, but are not necessarily limited to:

- Landslide and Slope Instability Hazard areas; and
- Flooding and Erosion Hazard areas; and
- Liquefaction Hazard areas; and;
- Rockfall Hazard areas; and

15.34.050: GEOLOGIC HAZARD IVESTIGATIONS AND REPORTS REQUIRED FOR DEVELOPMENT:

Any applicant requesting land-use approval for a concept plan; preliminary or final plats; a commercial, institutional, or one-, two-, and multi-family dwelling conditional use permit; or site plan approval on a parcel or parcels of land within a Geologic Hazard Study Area or where there are known or readily apparent geologic hazards and the area is not included within a current

Geologic Hazard Study Area, shall submit to Santa Clara three stamped paper copies and one an unlocked PDF digital copy of a site-specific geologic hazard investigation report that specifically relates to the geologic hazards present on and adjacent to that may affect the site.

15.34.060: MINIMUM INVESTIGATOR PROFESSIONAL QUALIFICATIONS:

Geologic hazard investigations often involve engineering geology, geotechnical engineering, and civil/hydrology engineering. Engineering geology investigations shall be performed under the direct supervision of a Utah-licensed Professional Geologist specializing in engineering geology and geologic hazards. Geotechnical engineering investigations shall be performed under the direct supervision of a Utah-licensed Professional Engineer specializing in geotechnical engineering. Civil / hydrology investigations shall be performed under the direct supervision of a Utah-licensed Professional Civil Engineer specializing in Hydrology as defined in section 1.6. Proof of qualifications shall be provided to Santa Clara upon request.

Engineering Geologist: The minimum qualifications required by Santa Clara City for an Engineering Geologist, include:

1. An undergraduate or graduate degree in geology, engineering geology, or geological engineering, or closely related field, from an accredited college or university; and
2. Five full-time years of experience in a responsible position in the field of engineering geology and geologic hazards in Utah, or in a state with similar geologic hazards and regulatory environment, and experience demonstrating the geologist's knowledge and application of appropriate techniques in geologic hazard investigations; and
3. An active Utah Professional Geologist license in good standing.

Geotechnical Engineer: The minimum qualifications required by Santa Clara for a Geotechnical Engineer, include:

1. A graduate degree in civil or geological engineering, with an emphasis in geotechnical engineering; or a B.S. degree in civil engineering with 12 semester hours credit in geotechnical engineering, or course content closely related to evaluation of geologic hazards; and
2. Five full-time years of experience in a responsible position in the field of geotechnical engineering and geologic hazards in Utah, or in a state with similar geologic hazards and regulatory environment, and experience demonstrating the engineer's knowledge and application of appropriate techniques in geologic hazard investigations; and
3. An active Utah Professional Civil Engineer license in good standing.

Civil/Hydrological Engineer: The minimum qualifications required by Santa Clara for a Civil/Hydrological Engineer, include:

1. A graduate degree in civil or geological engineering, with an emphasis in hydrological

engineering; or a B.S. degree in civil engineering with 12 semester hours credit in hydrological engineering, or course content closely related to evaluation of flooding and erosion geologic hazards; and

2. Five full-time years of experience in a responsible position in the field of geotechnical engineering and geologic hazards in Utah, or in a state with similar geologic hazards and regulatory environment, and experience demonstrating the engineer's knowledge and application of appropriate techniques in geologic hazard investigations; and
3. An active Utah Professional Civil Engineer license in good standing.

15.34.070: PRELIMINARY ACTIVITIES:

This section shall apply to any geologic hazard investigation for the purpose of determining the feasibility of land-use approval for a concept plan; preliminary or final plat approval; a commercial, institutional, or one-, two-, or multi-family dwelling conditional use permit; site plan approval; or for the purpose of exploring, evaluating, or establishing locations for permanent improvements. A geologic hazard report shall be submitted to Santa Clara as part of the land-use application, pursuant to the requirements of this ordinance, for any proposed development in a Geologic Hazard Study Area.

A. Prior to a land-use application, the applicant shall schedule a scoping meeting with Santa Clara to evaluate the Engineering Geologist's and Geotechnical Engineer's investigative approach and work plan. The investigation approach should allow for flexibility due to unexpected site conditions. Field findings may require modifications to the work plan. At this meeting, the applicant shall present a work plan that includes the locations of anticipated geologic hazards and proposed subsurface exploratory excavations, such as test pits, borings, and cone penetrometer test (CPT) soundings, which meet the minimum acceptable regional standards of practice, this ordinance, and includes:
    1. A property location map; and
    2. A geologic map; and
    3. A topographic map with contours; and
    4. A slope map or lidar imagery, if available; and
    5. A map showing the location of the proposed development, including structures, roads, depths of basements and foundations, etc.; locations of proposed subsurface exploration, such as trenches, borings, test pits, etc.; with a description of the proposed development; and
    6. A map showing the slope stability analysis cross-section locations, if existing landslides are present on or near the proposed site and/or slope instability is anticipated.

Upon successful completion of a scoping meeting, an application for an [excavation or grading] permit, as necessary, may be submitted to Santa Clara.

B. Santa Clara will arrange for a Utah-licensed Professional Geotechnical Engineer or Geologist to attend the scoping meeting on behalf of the City, at the applicant's expense. The Santa Clara Geotechnical Engineer/Geologist will provide verbal feedback to the applicant and their consultants regarding their proposed work plan and the requirements of this article. Reimbursement to the City for the direct costs of any outsourced staff shall be paid by the applicant prior to the acceptance of a land-use or building permit application; and

C. As required by this code and except as otherwise noted herein, no person shall commence or perform any land disturbance, grading, excavation, relocation of earth, or any other land disturbance activity, without first obtaining an excavation or grading permit. Application for an excavation or grading permit shall be filed with Santa Clara on forms furnished by the City for such purposes only after a scoping meeting has taken place; and

D. The applicant shall specify a primary contact responsible for coordination with Santa Clara during the land disturbance activities.

15.34.080: BUILDING PERMITS ON PARCELS RECORDED BEFORE EFFECTIVE DATE OF ORDINANCE:

E. The following submittals and processes are required prior to the issuance of a building permit for a new or replacement structure designed for human occupancy and additions to structures designed for human occupancy for all parcels recorded prior to the effective date hereof which are on property noted as [restricted (R) or otherwise designated] for geologic hazard reasons on a recorded plat or within designated Geologic Hazard Study Areas:

1. A statement from an Engineering Geologist identifying the presence or absence of any geologic hazards and describing the buildable area on the lot for the proposed structure; and
2. A statement from a Geotechnical Engineer verifying that the slope stability of the proposed structure location will have a ≥1.1 dynamic (pseudostatic) and ≥1.5 static factor of safety. The statement shall clearly identify the anticipated conditions, such as the seismic ground acceleration and pseudostatic coefficients used, and any required mitigation measures to achieve the required factors of safety; and
3. A statement from a Utah-licensed Professional Structural Engineer stating that they have reviewed the geologic and geotechnical reports, which may be combined into one report, and that they have de-signed the structure in

accordance with the report recommendations, accounting for any identified geologic and geotechnical hazards in accordance with the currently statewide adopted International Building Code and related standards; and

4. Written verification from the consultant's issuer of professional errors and omissions liability insurance, in the amount of $2,000,000.00 per consultant, which covers the licensed Professional Engineering Geologist, Geotechnical Engineer, and Structural Engineer, and which are in effect on the date of issuance of the building permit by the City Building Official; and
5. A Hold Harmless Agreement on a City approved form, which is executed and recorded on the subject property; and
6. A Geologic Hazards Disclosure on a City approved form, which is executed and recorded for the subject property; and
7. All conditions of the adopted statewide building and fire codes (see https://le.utah.gov/xcode/ Title15A/15A.html) must be adhered to.

F. Prior to the issuance of a Certificate of Occupancy for a new or replacement structure designed for human occupancy, and additions to structures designed for hu-man occupancy for all parcels recorded prior to the effective date hereof, and which are within a Geologic Hazards Study Area:

1. An Excavation Inspection Report shall be submitted by a Geotechnical Engineer to the City Building Official prior to footing placement, which verifies that the proposed building was in accordance with the recommendations of the geologic and geotechnical re-ports, which may be combined into one report; and
2. The City Building Official may require, at any time, written verification from a Geotechnical Engineer or a Utah-licensed Professional Structural Engineer, that the structure conforms to the recommendations of the original reports and designs, and if not, provides appropriate as-built drawings documenting the changes; and
3. All requirements of the statewide adopted Utah State Construction and Fire Codes Act (https://le.utah.gov/xcode/Title15A/15A.html) must be met.

15.34.090: GEOLOGIC HAZARD INVESTIGATIONS:

Each geologic hazard investigation and report shall be site-specific and shall identify all known or suspected potential geologic hazards, whether previously identified or unrecognized, that may affect the subject property, both on and adjacent to the property. A geologic hazard report may be combined with a geotechnical report and/or contain information on multiple hazards.

A. LANDSLIDES AND SLOPE INSTABILITY HAZARD INVESTIGATIONS: Landslides are the downslope movement of earth materials and can cause significant property damage, injury, and/or death. The evaluation of landslides generally requires quantitative slope

stability analyses, involving Engineering Geologists and Geotechnical Engineers experienced in landslide investigation, analysis, and mitigation. Considering the complexity inherent in performing slope stability analyses, additional effort beyond the minimum standards presented herein may be required at some sites to adequately address slope stability.

1. Landslide and Slope Instability Hazard Maps can be found on the city website at https://maps.santaclarautah.gov/sensitivelands under the Landslide Susceptibility layer show the location of previous landsliding, areas of potential slope instability/landsliding. Properties within these areas require submittal and review of a site-specific geologic hazard report discussing landslide hazards and/or potential slope instability, prior to receiving a land-use or building permit from Santa Clara. It is the responsibility of the applicant to retain a qualified Engineering Geologist and Geotechnical Engineer to perform the slope stability analysis.

2. Landslide hazard and slope instability investigations (field investigation, laboratory testing, and analyses) and reports shall conform with the latest edition of the UGS Guidelines for Evaluating Landslide Hazards in Utah. Investigations shall also address the potential for surficial instability, rock slope instability, and soil creep on all slopes that may affect the proposed development, be affected by the proposed development, and along access roads and utility corridors.

3. When evaluating site conditions to determine the need for slope stability analyses, off-property conditions shall be considered (both up-slope to the tops of ad-jacent, ascending slopes and down-slope to and be-yond the toes of adjacent, descending slopes). Also, the professionals shall demonstrate that the proposed hillside development will not affect adjacent sites or limit adjacent property owners' ability to develop their sites.

4. An Engineering Geologist shall provide appropriate input to the Geotechnical Engineer with respect to the potential impact of the geology, stratigraphy, and hydrologic conditions on slope stability. The shear strength and other geotechnical properties shall be evaluated by the Geotechnical Engineer. Qualified Engineering Geologists may assess and quantitatively evaluate slope stability; however, the Geotechnical Engineer shall perform all design stability calculations. Ground motion parameters for use in seismic stability analysis may be provided by either the Engineering Geologist or the Geotechnical Engineer.

5. The potential effects of soil creep shall be addressed where any proposed structure is planned near an existing fill or natural slope. The potential effects on the proposed development shall be evaluated and mitigation measures proposed, including appropriate setback recommendations that consider the potential effects of creep forces.

6. The minimum acceptable static factor of safety (FS) is 1.5 for both overall and surficial slope stability and for a calibrated pseudostatic analysis using Stewart and others (2003) or other method pre-approved by Santa Clara.

7. If the long-term static FS is ≤1.5, mitigation measures shall be required to bring the factor of safety up to the required level or the project may be redesigned to achieve a minimum FS of ≥1.5; and
   a. The temporary stability of excavations shall be evaluated, and mitigation measures shall be recommended as necessary to obtain a minimum FS of ≥1.3; and
   b. Long-term slope stability shall be analyzed using the highest known and anticipated groundwater level along with groundwater sensitivity analyses; and
   c. Slope stability and analysis input parameters, such as groundwater elevations and conditions, cannot
      be contingent on uncontrollable factors, such as limiting landscape irrigation, etc.; and
   d. Where back-calculation is appropriate, shear strengths utilized for design shall be no higher than the lowest strength computed using back calculation. If a professional proposes to use shear strengths higher than the lowest back-calculated value, justification shall be required. Assumptions used in back-calculations regarding pre-sliding topography and groundwater conditions at failure must be discussed and justified.

8. Pseudostatic methods for evaluating seismic slope stability are acceptable if minimum factors of safety are satisfied, and due consideration is given in the selection of the seismic coefficient (k) reduction in material shear strengths, and the factor of safety for pseudostatic conditions; and Pseudostatic seismic slope stability analyses can be performed using the procedure described in latest edition of the UGS Guidelines for Evaluating Landslide Hazards in Utah as appropriate.

9. When slope stability hazards are determined to exist on a project, measures to mitigate impacts from those hazards shall be implemented. Some guidance regarding mitigation measures and methods include:
   a. Hazard avoidance; or
   b. Grading to improve slope stability; and/or
   c. Reinforcement of the slope and/or improvement of the soil within the slope.

10. On some projects or portions of, such as non-habitable structures, and non-structural natural-slope areas, full mitigation of seismic slope displacements may not be possible, due to physical and/or economic constraints. In those cases, partial mitigation, to the extent that it prevents structural collapse, injury, and loss of life, may be possible if consistent with IBC design criteria, and if it is approved by Santa Clara. The applicability of partial mitigation to specific projects shall be evaluated on a case-by-case basis.

11. For developments when full mitigation of seismic slope displacements is not implemented, a Notice of Geologic Hazard shall be recorded with the proposed development describing the displacement hazard at issue and the partial mitigation employed. The Notice shall clearly state that the seismic displacement hazard at the site has been reduced by partial mitigation but not eliminated. In addition, the owner shall assume all risks, waive all claims against Santa Clara and its consultants, and indemnify and hold Santa Clara and its consultants harmless from all claims arising from the partial mitigation of the seismic displacement hazard.

B. FLOODING AND EROSION HAZARD INVESTIGATIONS: Flooding is the overflow of water onto lands that are normally dry and is the most prevalent and destructive (on an annual basis) geologic hazard affecting the Santa Clara area. Damage from flooding includes inundation of land and property, extreme bank erosion, deposition of sediment and debris, and the force of the water itself, which can damage property. Floodplain and Erosion Hazard maps are found on the city website at https://maps.santaclarautah.gov/sensitivelands under the Erosion Hazard Zone layer. Flooding and erosion hazard investigations shall be included in a Storm Drainage Report and Management Plan prepared in accordance with the requirements of Chapter 15.34 Flood Damage Prevention, and the Washington County Flood Control Authority Storm Drainage Systems Design and Management Manual, and the Santa Clara City Standards for Design and Construction.

C. LIQUEFACTION HAZARD INVESTIGATIONS: Liquefaction is a process by which strong shaking during an earthquake causes the ground to temporarily lose its strength and to behave like a viscous liquid rather than a solid material. Liquefaction can cause buildings to tip and settle; roads to crack and deform, buried storage tanks to rise towards the surface; and other types of damage to buildings and infrastructure. The Liquefaction hazard map found on the city website at https://maps.santaclarautah.gov/sensitivelands under Liquefaction Susceptibility layer shows the location of potential liquefaction during an earthquake. Liquefaction hazard investigation reports shall conform with the requirements described below and be prepared by a qualified Geotechnical Engineer as defined above.

1. A liquefaction-hazard investigation shall be performed for:
    a. All Critical Facilities and IBC Risk Category III and IV facilities, regardless of whether the site lies within a designated Geologic Hazard Study Area or not; and
    b. All Industrial and Commercials structures, and IBC Category II(b) Structures, within the designated Geologic Hazard Study Area. The project Structural Engineer must provide documentation that the building is designed to accommodate the predicted ground settlements and displacements in such a

manner as to be protective of life (collapse prevention) during and after the design seismic event.

2. The investigation of liquefaction hazard is an inter-disciplinary practice. The site investigation report must be prepared by a qualified Geotechnical Engineer, who must have competence in the field of seismic hazard evaluation and mitigation. Because of the differing expertise and abilities of qualified Engineering Geologists and Geotechnical Engineers, the scope of the site investigation report for a project may require that both types of professionals prepare and review the report, each practicing in the area of their expertise. The Geotechnical and Structural Engineers shall develop all mitigation and design recommendations.

3. Except for the derivation of input ground motion, liquefaction-hazard investigations shall be performed in general accordance with the latest version of *Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California* (Martin and Lew, 1999). Additional protocol for liquefaction-hazard investigations is provided in Youd and Idriss (1997, 2001), *Assessment of the Liquefaction Susceptibility of Fine-Grained Soils* (Bray and Sancio, 2006), *SPT-Based Liquefaction Triggering Procedures* (Idriss and Boulanger, 2010), and the *State of the Art and Practice in the Assessment of Earthquake-Induced Soil Liquefaction and Its Consequences* (Committee on State of the Art and Practice in Earthquake Induced Soil Liquefaction Assessment, 2016). Acceptable factors of safety for liquefaction are shown in Table 1.

Table 1. Minimum factors of safety for various International Building Code facility types.

Type of Facility	Minimum Factor of Safety (FS)
Critical Facilities including Essential or Hazardous Facilities and Special Occupancy structures	1.3
IBC Category III and IV Structures	
Industrial and Commercial Structures	1.25
IBC Category II(b) Structures	

4. The following screening criteria may be applied to determine if further quantitative evaluation of liquefaction hazard is required:
    a. If the estimated maximum past-, current-, and maximum-future-groundwater-levels (i.e., the highest groundwater level applicable for liquefaction-hazard analyses) are determined to be deeper than 50 feet below the existing ground surface or proposed finished grade (whichever is deeper), liquefaction-hazard assessments are not required. For soil materials that are located above the groundwater level, a quantitative assessment of seismically induced settlement is required; and
    b. If bedrock underlies the site, those materials need not be considered liquefiable, and no analysis of their liquefaction potential is necessary; and
    c. If the corrected Standard Penetration Test (SPT) blow count, $(N_1)60$, is ≥ 33 in all samples with an acceptable number of blow counts recorded, liquefaction-hazard assessments are not required. If CPT soundings are made, the corrected CPT tip resistance, q_{c1N}, should be ≥ 180 in all soundings in sandy soils; otherwise, liquefaction-hazard assessments are needed; and
    d. If plastic soils with a Plasticity Index (PI) ≥ 18 are encountered during site exploration, those materials may be considered non-liquefiable. Additional acceptable screening criteria regarding the effects of plasticity on liquefaction susceptibility are presented in Boulanger and Idriss (2004), Bray and Sancio (2006), and Seed and others (2003). Youd and others (2002) provide additional guidance on analyzing lateral spreads.

    If the screening investigation clearly demonstrates the absence of liquefaction hazards at a project site and Santa Clara concurs, the screening investigation will satisfy the site investigation report requirement for liquefaction hazards. If not, a quantitative evaluation is required to assess the liquefaction hazards.

5. Liquefaction hazard reports shall include boring logs, geologic cross-sections, laboratory data, a de-tailed explanation pertaining to how idealized sub-surface conditions and parameters used for the analyses were developed, analytical results and software output files, and summaries of the liquefaction-hazard analyses and conclusions regarding liquefaction potential and likely types and magnitudes of ground failure. Additional information and/or data may be requested to facilitate Santa Clara City's review.

D. ROCKFALL HAZZARD INVESTIGATIONS: Rockfall is a type of landslide and a natural mass-wasting process that involves the dislodging and rapid downslope movement of individual rocks and rock masses. T h e Rockfall Hazard map found on the city website at https://maps.santaclarautah.gov/sensitivelands under the Rockfall Hazard layer shows the locations areas of potential rockfall and recommended special study areas. Rock-fall hazard investigations and reports shall conform with the *Guidelines for Evaluating Rockfall Hazards in Utah* (Lund and Knudsen, 2020; UGS Circular 128, Chapter 7,

E. MOISTURE SENSITIVE SOILS AND ROCK INVESTIGATIONS: Moisture sensitive soil and rock constraints consist of collapsible soils, expansive soil and rock, and soluble soil and rock. Areas impacted by these soils can be found on the city website at https://maps.santaclarautah.gov/sensitivelands under the Expansive Soil & Rock Susceptibility layer.. Geotechnical Investigations should specifically address the presence or absence of these problem soils and rock and provide recommendations for mitigation if present. In accordance with the following minimum guidelines.

1. Expansive Soil and Rock: Expansive soil and rock contain a significant percentage of clay minerals that can absorb water directly into their crystal structure when wetted and therefore increase in volume as they get wet. The resulting expansion forces can be greater than 10,000 pounds per square foot and can easily exceed the loads imposed by small structures, resulting in cracked foundations and other structural damage. Where expansive clay or rock is or will be present within 20 feet of finish grade elevations, special grading and foundation design considerations should be anticipated.
   (Minimum number of explorations, minimum exploration depths, specific laboratory testing, etc. may be discuss potential mitigation procedures (i.e. current standards of practice where expansive clay is or will be present within 20 feet, etc.)?
2. Collapsible Soils: Collapsible soils have considerable dry strength and stiffness in their dry natural state but can collapse (settle) greater than 3 percent of the susceptible deposit thickness when wetted causing damage to property and structures. The engineering properties of these soils can generally be improved by overexcavation, moisture conditioning and recompaction. The required overexcavation depths will be determined by the amount of low-density soils encountered during the geotechnical investigation(s), the planned structural loads, footing dimensions, and pad elevations relative to the natural grade.
3. Soluble Soil and Rock: Gypsum-bearing soil and rock are subject to dissolution of the gypsum which causes a loss of internal structure and volume. Dissolution of gypsum may lead to foundation problems that affect roads. Additionally, when gypsum weathers it forms dilute sulfuric acid and sulfate, which can react with cement, corroding and weakening unprotected concrete. Sulfate-resistant cement is typically required in high-gypsum areas.

15.34.100: GEOLOGIC HAZARD FIELD REVIEW:

A field review by Santa Clara may be required during subsurface exploration activities (test pits, drilling, etc.) to allow the City to evaluate the subsurface conditions, such as the presence or absence of landslides, etc. with the applicant's consultant. Discussions about questionable features or appropriate setback distances are appropriate, but Santa Clara will not assist with field logging, explaining stratigraphy, or give approval of the proposed development during the field review. Exploratory test pits when excavated shall be open, safe, and in compliance with applicable federal Occupational Safety and Health Administration, and a

field log completed by the time of the review. The applicant must provide a minimum notice of [2 days] to Santa Clara for scheduling the field review.

15.34.110: GEOLOGIC HAZARD REPORTS:

1. Geologic hazard reports shall meet the submittal and preparation requirements of this ordinance, the *Guidelines for Conducting Engineering-Geology Investigations and Preparing Engineering-Geology Re-ports in Utah* (Bowman and Lund, 2020; UGS Circular 128, Chapter 2, https://doi.org/10.34191/c-128), and the following:
2. A 1:24,000-scale geologic map with references, showing the general surface geology, including landslides, rockfall, alluvial fans, bedrock geology where exposed, bedding attitudes, faults, other geologic structural features, and the location of any other known geologic hazards; and
3. A detailed site geologic map and geologic cross section(s), at a scale equal to or more detailed than 1 inch = 100 feet to illustrate local geologic structure. The site geologic map shall include locations of all subsurface exploratory trenches, test pits, borings, etc., and site-specific geologic mapping performed as part of the geologic hazard investigation, including boundaries and features related to any geologic hazards, topography, and drainage. The site geologic map must show the location and boundaries of the property, geologic hazards, delineation of any recommended setback distances from hazards, and recommended locations for structures. Buildable and non-buildable areas shall be clearly identified; and
4. Boring and test pit logs, when applicable, shall be prepared with standard geologic and engineering nomenclature and format. Copies of field logs may be requested by Santa Clara City for review during the project;
5. Conclusions and recommendations, clearly supported by adequate data included in the report, that summarize the characteristics of the geologic hazards, and that address the potential effects of the geologic conditions and geologic hazards on the proposed development and occupants thereof, particularly in terms of risk and potential damage; and
6. An evaluation of whether mitigation measures are required, including an evaluation of multiple, viable mitigation options that include specific recommendations for avoidance or mitigation of the effects of the hazards, consistent with the purposes set forth in Section 1.1, including design or performance criteria for engineered mitigation measures and all supporting calculations, analyses, modeling or other methods, and assumptions. Final design plans and specifications for engineered mitigation must be signed and stamped by a qualified Utah-licensed Engineer (specializing in geotechnical or civil) and/or Structural Engineer, as appropriate; and
7. A statement by the Engineering Geologist shall be provided regarding the suitability of the site for the proposed development from a geologic hazard perspective; and

8. All geologic hazard reports shall be signed and stamped by the Utah-licensed professional(s) that prepared the reports in accordance with Utah Code 58-76-603. When a submitted report does not contain adequate data to support its findings, additional or more de-tailed investigations shall be required by Santa Clara to ex-plain and/or quantify the geologic hazard and/or to describe how mitigation measures recommended in the report are appropriate and adequate.

15.34.120: SUBMITTAL AND CERTIFICATION OF GEOLOGIC HAZARD REPORTS:

All applicants for land use approval within a Geologic Hazard Study Area shall prepare and submit a geologic hazard report (may be combined with geotechnical and/or other geologic reports) pursuant to the requirements of this article prior to any consideration for a concept plan; preliminary or final plat; commercial, institutional, or one-, two-, and multi-family dwelling; or any conditional use permit which requires site plan approval. The applicant must include with the geologic report, a mitigation plan that defines how the identified hazards or limitations will be addressed without impacting or adversely affecting off-site areas. Mitigation measures must be reasonable and practical to implement, especially if such measures require on-going maintenance by property owners.

Santa Clara City may set other requirements as are necessary to mitigate any geologic hazards and to ensure that the purposes of this article are met. These requirements may include, but are not limited to:

1. Additional or more detailed investigations to understand or quantify the hazards and/or determine whether mitigation measures recommended in the report are adequate; and
2. Specific mitigation requirements, establishing buildable and non-buildable areas, limitations on slope grading, controls on grading, and/or revegetation; and
3. Prior to receiving a grading, excavation, or building permit, final grading plans, when required, shall be prepared, signed and sealed by the Utah licensed Engineering Geologist and Geotechnical Engineer that prepared the geologic hazard and geotechnical report(s) to verify that their recommendations have been appropriately incorporated in the final grading plan and that building locations are approved; and
4. As-built grading plans, when required, shall be pre-pared, signed, and sealed by the Utah licensed Engineering Geologist and Geotechnical Engineer that prepared the geologic hazard and geotechnical report(s) to verify that their recommendations have been appropriately incorporated and that building locations are approved, prior to the issuance of a building permit; and
5. Grading plans, when required, shall include, at a minimum, the following:
    a. Maps of existing and proposed contours and the source and accuracy of

topographic data used; and

b. Present and proposed slopes for each graded area; and

c. Existing and proposed drainage patterns; and

d. Location and depth of all proposed cuts and fills; and

e. Description of the methods to be employed to achieve soil and/or rock stabilization and compaction, as appropriate; and

f. Location and capacities of proposed structures, and drainage and erosion control measures based on maximum runoff for a 100-year storm or greater; and

g. Location of existing buildings, structures, roads, wells, retention and other basins, and on-site sew-age disposal systems on or within 100 feet of the site that may be affected by the proposed grading and construction; and

6. Other Requirements: Santa Clara City may set other requirements such as:

b. Installation of monitoring equipment, time schedules for completion of the mitigation and phasing of development, etc.;

c. Requirements necessary to protect the health, safety, and welfare of the citizens of Santa Clara, protect the infrastructure and financial health of Santa Clara, and mini-ze potential adverse effects of geologic hazards to the public health, safety, and property as a condition of approval of any development which requires a geologic hazard report.

d. Requiring the Engineering Geologist and Geotechnical Engineer that prepared the geologic hazard and/or geotechnical report(s) be on site, at the cost of the applicant, during certain phases of construction.

6. Should a geologic report be found deficient with respect to this ordinance and/or the current, regional state of practice, a letter will be provided to the applicant summarizing the specific deficiencies.

7. No final inspection shall be completed, Certificate of Occupancy issued, or performance bond released until the Engineering Geologist and Geotechnical Engineer who signed, stamped, and approved the report(s), provides a statement in writing, that the completed development, improvements, and structures conform to the descriptions and requirements contained within the report, and that all the required inspections were made and approved by the Engineering Geologist and Geotechnical Engineer that prepared said report(s). If the preparing Engineering Geologist and Geotechnical Engineer are unavailable, an Engineering Geologist and Geotechnical Engineer, similarly qualified and licensed in Utah, shall provide the certifications.

8. An applicant may appeal any decision made under the provisions of this article only after the land-use authority has issued a final decision and shall set forth the specific

grounds or issues upon which the appeal is based. The appeal shall be submitted in writing to Santa Clara City in accordance with the appeals provision ordinances of Santa Clara City and current State of Utah code.

15.34.130: DISCLOSURE WHEN A GEOLOGIC HAZARD REPORT IS REQUIRED:

Whenever a geologic hazard report is required under this article; the owner of the parcel shall record a notice running with the land on a form provided by Santa Clara prior to the approval of any development or subdivision of such parcel or commencement of construction activity. Disclosure shall include signing a *Disclosure and Acknowledgment Form* provided by Santa Clara, which includes:

1. Notice that the parcel is located within a Geologic Hazard Study Area or as otherwise defined in this article; and
2. Notice that a geologic hazard report was prepared and is available for public inspection in Santa Clara files.
3. Where geologic hazards, related setbacks, and non-buildable areas are delineated in a subdivision, the owner shall also place additional notification on the plat stating the above information, prior to final approval of the plat by Santa Clara.

15.34.140: WARNING AND DISCLAIMER:

The Geologic Hazard Study Areas designated herein represent only those potentially geologic hazardous areas known to Santa Clara and should not be construed to include all possible potential hazard areas. The geologic hazard ordinance and the Geologic Hazard Study Areas may be amended as new information becomes available, pursuant to procedures set forth in this ordinance. The provisions of this ordinance do not in any way assure or imply that areas outside the Geologic Hazard Study Areas are free from the possible adverse effects of geologic hazards. This article shall not create any liability on the part of Santa Clara, its officers, reviewers, or employees thereof, for any damages from geologic hazards that result from reliance on this ordinance or any administrative requirement or decision lawfully made hereunder.

15.34.150: CHANGE OF USE:

No change-in-use which results in the conversion of a building or structure from one not used for human occupancy to one that is so used shall be permitted unless the building or structure complies with the provisions of this article.

15.34.160: HOLD HARMLESS AGREEMENT:

Applicants receiving any permit or approval within a Geologic Hazard Study Area shall be required to sign and record on the property a *Hold Harmless Agreement* available from Santa Clara.

15.34.170: CONFLICTING REGULATIONS:

In cases of conflict between the provisions of existing zoning classifications, building codes, the subdivision ordinance, or any other ordinance of Santa Clara and this geologic hazard ordinance, the most restrictive provision shall apply.