1. INTRODUCTION

This section identifies and evaluates geologic and soils conditions at the project sites that could affect, or be affected by, implementation of the proposed project and recommends mitigation measures to avoid or lessen potential impacts. This section incorporates and summarizes information contained in a Revised Geotechnical Investigation Report prepared by Converse Consultants July 29, 2005. A copy of the report is provided in **Appendix IV.C**.

2. ENVIRONMENTAL SETTING

a. Geology and Topography

The Herald Examiner project sites are located in the extreme northern portion of the Central Block of the Los Angeles Basin as defined by Yerkes, et al. (1965). The Central Block is bounded on the north by the Santa Monica and Raymond Hill Fault zones, on the northeast and east by the Whittier-Elsinore Fault zone, and on the west and southwest by the Newport-Inglewood Fault zone. This block is underlain by a deep structural depression. In the area of the site, the depression is filled with sedimentary bedrock assigned to the Puente Formation that is overlain by Old Alluvium.

The project sites are located within Downtown Los Angeles, which is a relatively flat area of the Los Angeles Basin. No distinctive natural landforms are located around the project sites.

b. Soil*s*

According to the geotechnical investigation report prepared for the proposed project, five borings adjacent to the Broadway and Hill Street sites and three borings on the 12th Street site, as shown in **Figure IV.C-1, Broadway and Hill Street Borings**, and **Figure IV.C-2, 12th Street Borings**, indicated shallow fill consisting of moderately dense/firm silty sand, sandy clay, lean clay and, in some locations, a layer of processed gravel and detected limited amounts of debris at a maximum depth of 10 feet. It is assumed that fill exists at other locations of the property as this fill is expected to be associated with existing and past uses of the project sites.

The native soils encountered below the fill consisted of Gravelly Sand (SP), Sand (SP), Sand with Silt (SP, SM), Clayey Sand (SC) and Lean Clay (CL). The predominant soil classification was Sand with Silt and Gravel. These soils were found to be, in general, moderately dense to dense or firm.

Based upon laboratory testing of soil borings taken from the project sites, a medium expansion potential, as defined in Table 18-1-B of the 2002 Los Angeles Building Code (LABC), has been assumed for the shallow clayey soils encountered around the Broadway and Hill Street sites.

c. Groundwater

Groundwater was not encountered in any of the exploratory borings drilled during the geologic investigation for the proposed project. The depth to historical high groundwater, as reported in the Seismic Hazard Evaluation Report for the Hollywood Quadrangle, in which the project is located, is on the order of 120 feet below the ground surface.[1]

d. Tectonics

The project site, as with all of Southern California, is located within a seismically active region. However, the project sites are not within a currently designated Fault Rupture Hazard Zone. The closest fault to the project sites is the Hollywood Fault and is located approximately 8.5 kilometers (km) (5.3 miles) northwest of the sites.

The anticipated peak horizontal ground acceleration for the maximum probable earthquake presented in the Seismic Evaluation Report for the project area, California Division of Mines and Geology (CDMG) Open File Report 98-17, is 0.46 g (acceleration due to gravity). The maximum probable earthquake as defined in the LABC is the maximum seismic event anticipated with a 10 percent probability of exceedance in 50 years.

e. Liquefaction

Liquefaction is a form of earthquake-induced ground failure that occurs primarily in relatively shallow, loose, granular, water-saturated soils. Liquefaction is the sudden decrease in the cohesiveness of soils, which, in turn, creates a liquefaction of soils. Liquefaction potential has been found to be the greatest where the groundwater level and loose sands occur within a depth of about 50 feet or less. The potential for liquefaction decreases with increasing soil and sand grain size and clay and gravel content but increases as the ground acceleration and duration of shaking increase. The project sites are not listed near or on a liquefaction zone in the Inglewood Triangle based on the California Geologic Survey (CGS) hazards maps.[2]

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1 Converse Consultants, Revised Geotechnical Investigation Report, July 29, 2005.

2 http://gmw.consrv.ca.gov/shmp/MapProcessor.asp?MapNavAction=IMapRefresh&Action=IMap&Location=SoCal&FClass=Quad&FID=Inglewood&Liq=true&Land=false&Bore=false&Road=true&City=false&x1=369928.632909084&y1=3763310.34319493&x2=387464.52167691605&y2=3748697.1025550696.

Figure IV.C-1 (Broadway and Hill Street Borings)

Figure IV.C-2 (12th Street Borings)

3. REGULATORY FRAMEWORK

a. Federal Regulations

Flood Insurance Rate Maps are prepared by the Federal Insurance Administration of the Department of Housing and Urban Development (HUD) after a risk study for a community has been completed and the risk premium rates have been established. The maps indicate the risk premium zones applicable in the community and when those rates are effective. They are used in making flood plain determinations and to determine if a proposed action is located in the base or critical action flood plain, as appropriate.

Because, collectively, the project is over 1 acre in size, a General Permit for Discharges of Storm Water Associated with Construction Activity is required by the Los Angeles Regional Water Quality Control Board (LARWQCB), as part of the National Pollution Discharge Elimination System (NPDES), to control erosion and pollution during construction of the project. The permit requires the project applicant to prepare and submit a Storm Water Pollution Prevention Plan (SWPPP) to be administered throughout project construction. The SWPPP must list Best Management Practices (BMPs) that the discharger (project applicant) will use to protect storm water runoff.

b. State and Regional Regulations

Under the Seismic Hazards Mapping Act, the CGS provides maps of seismic hazard zones to local governments for planning purposes. These maps are intended to protect the public from the risks involved with strong ground shaking, liquefaction, landslides and other hazards related to earthquakes. CGS also provides guidelines to evaluate and mitigate hazards for projects within seismic hazard zones.

The Alquist-Priolo Earthquake Fault Zoning Act (PRC Section 2621.5) provides policies and criteria to assist cities, counties and state agencies in the development of structures for human occupancy across the trace of active faults. Maps associated with this Act show the seismic hazard zones throughout California.

The South Coast Air Quality Management District's Rule 403 – Fugitive Dust requires projects to comply with specific actions to prevent, reduce or mitigate fugitive dust emissions during excavation, demolition and other construction activities.

The project applicant must comply with the California Building Code (CBC) (CCR Title 24, Part 2), which provides guidelines for building design to protect occupants from seismic hazards.

c. Local Regulations

The City of Los Angeles also regulates building design through the LABC. The LABC provides requirements for construction, grading, excavations, use of fill and foundation work, including type of materials, design and procedures, which are intended to limit the probability of occurrence and the severity of consequences from geological hazards.

4. ENVIRONMENTAL IMPACT ANALYSIS

a. Significance Criteria

The following thresholds for determining the significance of impacts related to Geologic Hazard conditions are contained in the *L.A. California Environmental Quality Act (CEQA) Thresholds Guide*, which was adopted by the City Council May 14, 1998. Impacts related to geologic hazards are considered significant if the proposed project would:

- Cause or accelerate geologic hazards, which would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.

Impacts related to sedimentation and erosion are considered significant if the proposed project would:

- Constitute a geologic hazard to other properties by causing or accelerating instability from erosion; or
- Accelerate natural processes of wind and water erosion and sedimentation, resulting in sediment runoff or deposition, which would not be contained or controlled on site.

Impacts related to landform alteration are considered significant if the proposed project would:

- Have one or more distinct and prominent geologic or topographic features destroyed, permanently covered or materially and adversely modified. Such features may include, but are not limited to, hilltops, ridges, hill slopes, canyons, ravines, rock outcrops, water bodies, streambeds and wetlands.

b. Project Impacts

Rehabilitation of the Broadway building would involve the conversion of the existing vacant building to office and retail space. No excavation beneath the existing building would be associated with rehabilitating the Broadway building. The new Hill Street building would have four levels of subterranean parking, one level of retail at the ground surface and 22 levels of residential uses above the ground floor retail. The top of the building would be approximately 280 feet above the ground surface. Maximum depth of excavation necessary to construct the subterranean parking levels is expected to be on the order of 50 to 60 feet below the ground surface. The excavation for the new subterranean levels would extend to approximately the property line on three sides and up to the existing Broadway building on the easterly side.

Development plans for the 12th Street site call for the construction of a new tower building with two levels of subterranean parking and 37 stories of residential units above the ground surface. The excavation for the new subterranean levels would extend to approximately the property line on all four sides of the structure. Converse Consultants has estimated that maximum column dead load plus live loads to be on the order of 3,000 to 4,500 kips (1 kip is equal to 1,000 pounds).

Geologic Hazards

Seismic Ground Shaking

Impacts related to geologic hazards are considered significant if the proposed project would:

- *Cause or accelerate geologic hazards, which would result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury.*

Surface Fault Rupture

The project sites are located approximately 8.5 km (5.3 miles) from the surface projection of the Hollywood Fault. The Hollywood Fault is the closest fault line to the project sites and is located north of the project sites. The nearest special studies zone is associated with the Newport-Inglewood fault zone, which is approximately 10.6 km (6.6 miles) southwest of the project sites. Other faults located within the vicinity of the project, along with their distance to and direction from the project sites, are listed in **Table IV.C-1**, below. As a result of the project's proximity to faults in the greater Los Angeles area, the potential for surface rupture resulting from the movement of this fault or other nearby faults, although not known with certainty, is considered to be low. Therefore, impacts resulting from potential surface fault rupture would not expose people to substantial risk of injury and would be less than significant.

Table IV.C-1
Fault Locations in the Vicinity of the Project Sites

Fault	Closest* Distance to Site (km)	Direction from Site
Hollywood	8.5	Northwest
Raymond	9.7	Northeast
Newport-Inglewood	10.6	Southwest
Verdugo	13.1	Northwest
Santa Monica	14.6	Northwest

* *Closest distance to a vertical projection of the fault rupture surface within 10 km of the ground surface.*

Strong Seismic Ground Shaking

The site, similar to all of Southern California, is located within a seismically active region. The site is not within a currently designated Fault Rupture Hazard Zone, but is located approximately 8.5 km (5.3 miles) southerly of the Hollywood fault. Accordingly, strong ground shaking is anticipated as a result of a major seismic event at the proposed project sites. The provisions of the CBC, LABC and the Structural Engineers Association of California (SEAOC) guidelines are considered appropriate for the design of the proposed project. Because all structures on the Broadway, Hill Street and 12th Street sites shall be designed in accordance with the CBC, LABC and SEAOC guidelines to ensure safety in the event of an earthquake, impacts associated with strong seismic ground shaking are anticipated to be less than significant.

Seismic Related Ground Failure, including Liquefaction

Liquefaction potential has been found to be the greatest where the groundwater level and loose sands occur within a depth of approximately 50 feet below ground surface or less. The potential for liquefaction decreases with increasing grain size and clay and gravel content, but increases as the ground acceleration and duration of ground shaking increase.

Historical high groundwater was reported to be approximately 120 feet below the ground surface, and the apparent density of the soils encountered during the geologic investigation was moderately dense to dense or firm with predominant soils being sand with silt and gravel. Given that the groundwater level is far below the 50-foot threshold for high liquefaction potential and that the soils at the project sites are relatively dense with gravel and clay, the potential for liquefaction at the site is considered low. In addition, the project sites are not listed near or on the liquefaction zone in the Inglewood Triangle based on the California Geologic Survey hazards maps.[3] Therefore, the potential for seismic-related ground failure, including ground failure resulting from liquefaction, is considered to be less than significant.

Landslides

The project sites, as well as the surrounding area, are flat without slope. Landslides, lateral spreading and slope failures are associated with sloping land and, therefore, the potential at the project sites for seismically induced landslides or other ground failures associated with slopes is very low. The potential for impacts to the project sites and surrounding area from landslides is considered to be less than significant.

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3 http://gmw.consrv.ca.gov/shmp/MapProcessor.asp?MapNavAction=IMapRefresh&Action=IMap&Location=SoCal&FClass=Quad&FID=Inglewood&Liq=true&Land=false&Bore=false&Road=true&City=false&x1=369928.632909084&y1=3763310.34319493&x2=387464.52167691605&y2=3748697.1025550696.

Expansive Soils Shallow fill was found at the project sites. The shallow fill consisted of moderately dense/firm silty sand, sandy clay, lean clay and in some locations a layer of processed gravel and limited amounts of debris at a maximum depth of 10 feet.

Based upon the laboratory testing conducted as part of the geologic investigation, a medium expansion potential, as defined in Table 18-1-B of the 2002 LABC, has been assumed for the near surface clayey soils encountered around the Broadway and Hill Street sites. Special design and/or construction for expansive soil conditions are considered necessary for this site to reduce impacts associated with expansive soils to less than significant and are included as mitigation measures for the proposed project. These mitigation measures are included as earthwork mitigation measures below.

Soil Conditions

Tests performed on shallow borings numbers 3 and 4, at the 12th Street, Hill Street and Broadway sites, indicate that the near surface soils have a chloride content of 100 to 108 parts per million (ppm), a pH of 7.27 to 8.10 and a saturated resistivity of 1,200 to 1,500 ohms-centimeter. The resistivity value of 1,200 to 1,500 indicates a moderate corrosivity potential for ferrous metals in contact with these soils. Conventional corrosion mitigation measures may not be adequate for metal in contact with the on-site soils, and, therefore, the impact of corrosion from soils to building materials is significant. As stated in **MM-GEO-30**, below, the services of a Corrosion Engineer should be retained to develop project specific recommendations for the protection of ferrous metal in contact with soils. With these recommended mitigation measures, the impact of soil corrosivity will be reduced to less than significant.

The tests preformed on the two samples of shallow boring also indicate a sulfate concentration of 0.009 to 0.011 percent by weight of dry soil. According to Table 19-A-3 of the LABC (2002 ed.), those sulfate concentrations are considered negligible. However, as stated in **MM-GEO-29**, below, Converse Consultants have required additional testing during construction, prior to the placement of footings, in order to confirm the condition of sulfate concentrations. With this mitigation measure to rule out potential impacts from sulfate concentrations, impacts of sulfate to the proposed project would be less than significant.

Sedimentation and Erosion

Impacts related to sedimentation and erosion are considered significant if the proposed project would:

- *Constitute a geologic hazard to other properties by causing or accelerating instability from erosion; or*
- *Accelerate natural processes of wind and water erosion and sedimentation, resulting in sediment runoff or deposition, which would not be contained or controlled on site.*

Construction activity associated with project site development may result in wind and water driven erosion of soils due to grading activities if soil is stockpiled or exposed during construction. This impact would be considered short term in nature since the potential for significance would end after construction is finished. During project operation, each project site would be covered with structures, pavement and landscaping.

As part of the project, the applicant would adhere to conditions under the NPDES Permit set forth by the LARWQCB and prepare and submit an SWPPP, as outlined in **MM-GEO-2**, to be administered throughout project construction. The SWPPP would incorporate BMPs to ensure that potential water quality impacts during construction from erosion would be reduced to less than significant. In addition, the applicant would adhere to SCAQMD Rule 403 – Fugitive Dust during construction activities, which would further prevent impacts associated with wind erosion. The project applicant would employ actions described in **MM-GEO-3**, which are currently recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation. Therefore, potential sedimentation and erosion impacts would be less than significant.

Landform Alteration

Impacts related to landform alteration are considered significant if the proposed project would:

- *Have one or more distinct and prominent geologic or topographic features destroyed, permanently covered or materially and adversely modified. Such features may include, but are not limited to, hilltops, ridges, hill slopes, canyons, ravines, rock outcrops, water bodies, streambeds and wetlands.*

The proposed Herald Examiner project sites are located on flat land in the Downtown Los Angeles area. The downtown area is a highly urbanized area, and the project sites are neither on nor near any unique or natural geologic or topographic features such as hilltops, ridges, hill slopes, canyons, ravines, rock outcrops, water bodies, streambeds and/or wetlands. Therefore, the project would not have a significant impact by altering landforms.

c. Cumulative Impacts

Potential geologic hazards associated with the proposed project are site-specific and do not represent a cumulative impact concern. Implementation of the proposed project and other projects in the Southern California region would cumulatively increase the number of structures and people exposed to geologic- and seismic-related hazards. As long as project design and construction occurs consistent with proper engineering practices and to the requirements of applicable portions of the Municipal Code as they apply to each component of the project, seismic and regional geologic hazards would not be considered cumulatively considerable.

Grading of the proposed project would adhere to the City's thresholds and the City's Department of Building and Safety codes and requirements. Grading and geologic hazards and features are not expected to have cumulative impacts as individual development projects would be required to comply with the requirements of the City's Department of Building and Safety thresholds. Compliance with the City's requirements would ensure that both individual and cumulative project impacts associated with the project's structure and grading would not exceed the identified thresholds of significance. Therefore, impacts would not be cumulatively considerable and so are considered to be less than significant.

d. Mitigation Measures

MM-GEO-1. The Hill Street and 12th Street structures shall be designed in accordance with the CBC, LABC and the SEAOC guidelines to ensure safety in the event of an earthquake.

MM-GEO-2. Prior to start of soil-disturbing activities at the site, a Notice of Intent (NOI) and SWPPP shall be prepared in accordance with, and in order to partially fulfill, the California State Water Resources Control Board Order No. 99-08-DWQ, NPDES General Permit No. CAS000002 (General Construction Permit) and Chapter 6 Article 4.4, Stormwater and Urban Runoff Pollution Control from the Los Angeles Municipal Code. The SWPPP shall meet the applicable provisions of Sections 301 and 402 of the CWA and Chapter 6 Article 4.4, Stormwater and Urban Runoff Pollution Control from the Los Angeles Municipal Code, by requiring controls of pollutant discharges that utilize best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT) to reduce pollutants.

MM-GEO-3. The project Applicant shall implement dust control measures consistent with SCAQMD Rule 403 – Fugitive Dust, during the construction phases of new project development. The following actions are currently recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation:

- Apply water and/or approved nontoxic chemical soil stabilizers according to manufacturer's specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days);
- Replace ground cover in disturbed areas as quickly as possible;
- Enclose, cover, water twice daily or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content;
- Water active grading sites at least twice daily during construction activities;
- Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period;
- All trucks hauling dirt, sand, soil or other loose materials are to be covered or should maintain at least 2 feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code;
- Sweep streets at the end of the day if visible soil material is carried over to adjacent roads;
- Install wheel washers or gravel construction entrances where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip; and
- Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads.

Earthwork

MM-GEO-4. Prior to the start of construction, the existing structures, concrete pavement and landscaping shall be removed from the site. All undocumented fill extending below the bottom of the design excavation shall be removed. It is anticipated that excavation for the subterranean structure will remove any existing fill from within the limits of the structure. Any loose, disturbed or otherwise unsuitable materials encountered at the bottom of the excavation shall be excavated to firm acceptable material. Excavation activities shall not disturb remaining adjacent utilities, buildings and structures. Existing utilities shall be removed and adequately capped at the project boundary line or salvaged/rerouted as designed.

MM-GEO-5. All exposed subgrade soil surfaces, including subgrade surfaces below the proposed basement floor slabs, shall be observed by a Converse Consultants representative prior to placement of fill or placement of slabs. If soft, yielding or unsuitable soils are exposed at the subgrade surface, then the unsuitable soils shall be removed and replaced with properly compacted fill soils. Sandy soils shall be maintained at within 3 percent of optimum moisture until the concrete slab-on-grade has been completed.

MM-GEO-6. All fill and backfill soils shall be placed in lifts not exceeding 8 inches in thickness, moisture conditioned at near optimum moisture and compacted to 90 percent of the laboratory maximum density determined in accordance with ASTM Test Method D-1557 (95 percent relative compaction in accordance with City of Los Angeles criteria if sand is used for backfill). All fill and backfill shall be placed and compacted under observation and testing performed by Converse Consultants.

MM-GEO-7. Fill soils shall consist of site sand soils or imported sandy soils free of organics, cobbles, boulders, rubble or rock larger than 3 inches in largest dimension. Any imported soils shall be sandy soils and have an Erodibility Index (EI) of less than 40. Import soils shall be evaluated and tested by a qualified geotechnical consultant if the materials are questionable. Imported soils shall, also, have a minimum of 25 percent fines (material passing #200 sieve).

Foundations

MM-GEO-8. Conventional spread footings founded on undisturbed natural soils may be used to support the proposed subterranean parking structure. Footings for the proposed building shall be founded at least 24 inches below lowest adjacent final grade. Continuous spread footings and isolated rectangular footings shall have a minimum width of 24 inches.

MM-GEO-9. Conventional Footings supported by native soil with the above minimum size and embedment depths may be designed for the net allowable vertical bearing pressure presented in **Table IV.C-2**, below.

Table IV.C-2
Vertical Bearing Capacity, Conventional Spread Footings

Building/Location	Vertical Bearing Capacity (Ksf)
Broadway Building	4.0
Hill Street Building	10.0
12th Street Building	7.0

Ksf = kips per square foot

MM-GEO-10. The maximum anticipated settlement of a square footing below the bottom of structures founded on undisturbed native soils is estimated to be less than 0.50 inch for a column load of 800 kips (1 kips is equivalent to 1,000 pounds). Differential settlements are expected to be on the order of 0.25 inch between similarly loaded adjacent footings below the bottom of the parking structure.

MM-GEO-11. As an alternate to conventional spread footings, a mat foundation may be used to support the new structures. A mat foundation shall be founded on undisturbed natural soils. Mats shall be founded at least 18 inches thick. A coefficient of vertical subgrade reaction (k), will be calculated (in pounds per cubic inch (pci)) as k = 250 ([B+1]/2B), where B is mat width in feet, for mats of various size.

MM-GEO-12. Resistance to lateral loads can be provided by friction acting at the base of the foundations and by passive earth pressure. A coefficient of friction of 0.40 will be assumed with the dead load forces. An allowable passive lateral earth pressure of 350 pounds per square foot (psf) per foot of depth, up to a maximum of 3,500 psf, may be used for sides of footings or basement walls poured against undisturbed native soils or with compacted backfill. This lateral pressure shall be considered to be actual earth pressure. An appropriate factor of safety shall be added in the structural design of the structure.

MM-GEO-13. Bearing values and passive pressure, indicated in **Table IV.C-2** and **MM-GEO-12**, are for total dead load and frequently applied live loads. The above vertical bearing and passive pressure will be increased by 33 percent for a short duration of loading which will include the effect of wind or seismic forces.

Slabs-on-Grade

MM-GEO-14. Slabs-on-grade shall be placed on native soils or properly compacted subgrade soils as described in **MM-GEO-5**.

MM-GEO-15. Slabs-on-grade shall have a minimum thickness of 4 inches for support of nominal ground-floor live loads without hydrostatic uplift pressures. Minimum reinforcement for slabs-on-grade shall be No. 3 reinforcing bars, spaced at 18 inches on-center each way. The thickness and reinforcement of more heavily-loaded slabs will be dependent upon the anticipated loads and shall be designed by a structural engineer. A static modulus of subgrade reaction equal to 200 pounds per square inch (psi) per inch may be used in structural design of concrete slabs-on-grade.

MM-GEO-16. Equivalent welded wire mesh may be used for reinforcement of concrete slabs-on-grade. However, to be effective, it is imperative that the reinforcement be located within the center third of the slab thickness. The commonly used procedure of "hooking" the reinforcement during concrete placement seldom, if ever, results in proper location of the slab reinforcing.

MM-GEO-17. Care shall be taken during concrete placement to avoid slab curling.

MM-GEO-18. Slabs shall be designed and constructed as promulgated by the American Concrete Institute (ACI) and the Portland Cement Association (PCA). Prior to the slab pour, all utility trenches shall be properly backfilled and compacted.

MM-GEO-19. In areas where a moisture-sensitive floor covering (such as vinyl tile or carpet) is used, slabs shall be protected by at least a 10-mil-thick polyethylene vapor barrier between the slab and compacted subgrade. Where a vapor barrier is used, it shall be protected with 2 inches of sand placed above the barrier, to reduce the potential for punctures and to aid concrete curing. Polyethylene sheets shall be overlapped a minimum of 6 inches and shall be taped or otherwise sealed.

Subterranean Walls

MM-GEO-20. Basement wall footings that are a load carrying structural part of the basement structure may be evaluated and/or designed in accordance with the vertical bearing value presented in **Table IV.C-2**. Lateral bearing pressure and coefficient-of-friction given in **Table IV.C-2** may also be used for design of retaining walls.

MM-GEO-21. Walls, which are top-restrained and support level on site or similar soil backfill will be evaluated and/or designed for a uniform earth pressure distribution. An earth pressure equal to 21H psf, where H is the height of the wall in feet, is recommended.

MM-GEO-22. Freestanding cantilever retaining walls designed to retain level on site or similar soil backfill shall be designed to resist an equivalent fluid pressure of 32 pounds per cubic foot (pcf).

MM-GEO-23. Basement walls for the easterly side of the proposed Hill Street building shall include surcharge pressures from the adjacent footings of the existing Broadway building.

MM-GEO-24. The surcharge pressures presented in **Appendix IV.C**, **Figure 4**, shall be added to the earth pressure presented in **Table IV.C-2** and be considered actual pressures (factor of safety equal to 1.0).

MM-GEO-25. If loading from any source other than the Broadway building is located within a distance equal to the height of the wall, its surcharge effect shall be added to the above-earth pressure. Surcharge coefficients of 30 percent and 45 percent of any other surcharge may be used in the design of cantilever and braced walls, respectively. The surcharge for automotive and truck traffic within 10 feet horizontally of the wall shall have a uniform lateral pressure of 100 psf applied to the top 10 feet of the wall.

MM-GEO-26. The lateral pressure values presented herein considered actual earth pressure with no increase for factors of safety. The design engineer shall add an appropriate factor of safety to the wall design.

MM-GEO-27. Where a wet wall condition is not desirable, the wall shall be waterproofed.

MM-GEO-28. Overstressing retaining walls during the compaction of backfill shall be avoided.

Corrosivity and Chemical Attack

MM-GEO-29. Additional testing during construction, prior to the placement of footings, should be preformed to confirm if the sulfate concentrations found on the sites are considered significant or not.

MM-GEO-30. The services of a Corrosion Engineer should be retained to further develop project-specific recommendations for the project of ferrous metal in contact with the soil on the project sites.

Temporary Excavations

MM-GEO-31. Temporary slopes may be used during excavations where not constrained by adjacent utilities and structures. Shoring will be required where space is limited due to adjacent facilities and buried utilities that must be salvaged and protected.

MM-GEO-32. Based upon the soils encountered in the borings, sloped temporary excavations shall be cut according to the slope ratios presented in **Table IV.C-3**, below.

Table IV.C-3
Temporary Excavation Slopes

Maximum Depth of Cut (feet)	Maximum Slope Ratio* (horizontal:vertical)
0–3	Vertical
3–20	1.5:1

* *Slope ratio assumed to be uniform from top to toe of slope.*

MM-GEO-33. Surfaces exposed in sloped excavations shall be kept moist, but not saturated, to retard raveling and sloughing during construction. Adequate provisions shall be made by the contractor to protect slopes from erosion during periods of rainfall. Surcharge loads shall not be permitted within a horizontal distance equal to the depth of the cut from the top of slopes. There is the potential that sandy strata may be encountered that will require temporary cut slopes to be less steep than tabulated above. As a result, the excavation slope shall be observed on a periodic basis during the excavation of the subterranean portion of the structure in order to verify soil conditions. Workers entering excavations shall be protected from possible caving and raveling soils.

Cantilevered Shoring

MM-GEO-34. Shoring design must consider the support of adjacent underground utilities and/or structures and shall consider the effects of shoring deflection on supported improvements.

MM-GEO-35. Temporary cantilever shoring shall be designed to resist a lateral earth pressure equivalent to a fluid density of 28 pcf. This equivalent fluid pressure is valid only for shoring retaining level ground.

MM-GEO-36. Surcharge pressures shall be added to the above-earth pressures for surcharges within a distance from the top of the shoring less than or equal to the shoring height. A surcharge coefficient of 30 percent of any uniform vertical surcharge shall be added as a horizontal shoring pressure for cantilever shoring. Surcharge pressure from the existing footings from the Broadway building, as presented in **Appendix IV.C, Figure 4, Lateral Surcharge from Broadway Building Footings**, may be used in the shoring design. These values for earth pressure are considered actual earth pressure with no increase for factors of safety. The shoring design engineer shall add an appropriate factor of safety when designing the shoring system.

MM-GEO-37. Vertical skin friction against soldier piles extending below the bottom of the parking structure shall be taken as 400 psf.

MM-GEO-38. Lateral resistance for soldier piles may assume to be provided by passive pressure below the bottom of excavations. The allowable passive pressure for soldier piles spaced at least 3 diameters on center shall be taken as 700 psf on the pile per foot of depth, measured below the bottom of excavation. Closer-spaced soldier piles shall be designed using a passive resistance of 350 psf. The allowable maximum passive resistance shall not exceed 7,000 psf. It shall be noted that the above values for passive earth pressure given for the design of soldier piles have been adjusted for potential arching between piles, and no additional increases for arching shall be assumed.

MM-GEO-39. Caving soils shall be anticipated between the piles. To limit local sloughing, continuous lagging or guniting can support caving soils. All lumber to be left in the ground shall be treated in accordance with Section 204-2 of the *"Standard Specifications for Public Works Construction"* (2000 Edition, Green Book).

MM-GEO-40. A qualified geotechnical consultant shall review plans and specifications for proposed shoring and shall observe the installation of shoring. A licensed surveyor shall be retained to establish monuments on shoring and the surrounding ground prior to excavation. Such monuments shall be monitored for horizontal and vertical movement during construction. Results of the monitoring program shall be provided immediately to the project Structural (shoring) Engineer and geotechnical consultant for review and evaluation. Adjacent buildings shall be photo documented prior to construction.

Braced (Tied-Back Shoring)

MM-GEO-41. A tied-back soldier pile shoring system may be used to maintain temporary support of deep vertical wall excavations. Braced or tied-back shoring, retaining a level ground surface, shall be designed for a uniform pressure distribution of 19 H psf where H is the height of the retained cut in feet.

MM-GEO-42. Surcharge pressures shall be added to this earth pressure for surcharges within a distance from the top of the shoring less than or equal to the shoring height. A surcharge coefficient of 45 percent of any uniform vertical surcharge shall be added as a horizontal shoring pressure for braced shoring. Surcharge pressure from the existing footings from the Broadway building, as presented in **Appendix IV.C, Figure 4, Lateral Surcharge from Broadway Building Footings**, may be used in the shoring design. These values for earth pressure are considered actual earth pressure with no increase for factors of safety. The shoring design engineer in designing the shoring system shall add an appropriate factor of safety.

MM-GEO-43. For design of tied-back used as part of the shoring, it shall be assumed that the potential wedge of failure is determined by a plane at 30 degrees from the vertical, through the bottom of the excavation. Tied-back anchors may be installed at angles of 15 to 40 degrees below a horizontal plane. Tied-back installation and testing guidelines and procedures are presented in **Appendix IV.C**, "Guide Specifications for Installation and Acceptance of Tied-back Anchors."

MM-GEO-44. An average soil friction value of 400 pounds per square foot shall be used for estimating the allowable capacity of conventional drilled friction anchors.

MM-GEO-45. The capacity of "Post-Grouted" anchors shall be determined in accordance with the California Department of Transportation (Caltrans) *"Trenching and Shoring Manual"* Criteria.

MM-GEO-46. Only the frictional resistance developed beyond the assumed failure plane shall be included in the tieback design for resisting lateral loads.

Soil Stability

MM-GEO-47. As a result of the low to medium expansion characteristics of the on-site clayey soils, continued maintenance of the moisture content of the subgrade soils will be required during the construction until the concrete slab-on-grade has been completely constructed.

MM-GEO-48. Final grades shall slope at 1 to 2 percent away from the structure to prevent ponding and to reduce percolation of water into foundation soils.

Geology and Soils Comprehensive Mitigation Measure

MM-GEO-49. If conditions encountered during construction appear to be different from those assumed in the investigative report conducted by Converse Consultants, a qualified geotechnical consultant shall be notified immediately.

e. Adverse Effects

The proposed project incorporates the City's requirements pertaining to geologic hazards, including grading and fill techniques and seismic safety. With the implementation of the mitigation measures recommended in this EIR to mitigate potentially significant impacts associated with geologic hazards and sedimentation and erosion, no significant adverse impacts would result from the construction and operation of the proposed Herald Examiner project.