APPENDIX C

PRELIMINARY SOILS ENGINEERING INVESTIGATION REPORT

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PRELIMINARY SOILS ENGINEERING INVESTIGATION REPORT

Proposed 3-story
Senior Homes Over Slab On-grade
360, 410 & 416 E. Gladstone Street
Azusa, California

TKE No. 16-152F

October 7, 2016

Prepared For:

360 Glastone LLC

Attn.: Mr. Chaplon Mu

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October 7, 2016 (TKE Job No. 16-152F)

360 Gladstone LLC
3215 Santa Anita Ave.
El Monte, CA 91733

Attn.: Mr. Chaplon Mu

Subject: **PRELIMINARY SOILS ENGINEERING INVESTIGATION**
Proposed 3-story senior homes over slab on-grade
360, 410 & 416 E. Gladstone Street
Azusa, California

Dear Mr. Mu:

We are pleased to submit the Preliminary Soils Engineering Investigation Report herein for the proposed 3-story senior homes over slab on-grade at the subject site.

This study was performed in accordance with our proposal dated August 15, 2016 and accepted by you. A preliminary evaluation of the subsurface conditions was made with respect to the proposed structures. The results of our studies indicate that the site is suitable for the proposed development from a geotechnical engineer's standpoint if the recommendations presented in this report are incorporated in its design and construction.

Thank you for the opportunity to be of service on this project. Please contact the undersigned, if there is any question concerning this report.

Respectfully submitted,
T.K. ENGINEERING CORP.

Wan-Lain (Allan) Tsai, RGE 2121
Principal

CC: 5 Copy: Addressee

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Job No. 16-152F

SCOPE OF WORK

This report presents the results of a preliminary soils engineering investigation for the proposed 3-story residential buildings over slab on-grade at the subject site. Plate A-1 shows the approximate locations of the proposed building areas and test borings.

The scope of work was based on the preliminary project information made available to us and was conducted in accordance with generally accepted geotechnical practice.

This investigation was authorized to determine the static and physical characteristics of the soils beneath the site for design purpose. The scope of services provided during this investigation includes the following:

- Review of our previous soils engineering reports for the vicinity of subject site.
- Geotechnical reconnaissance of the existing site conditions.
- Drilling, logging, and sampling of three (3) test borings at the subject property.
- Laboratory testing of the representative samples of on-site earth materials to determine their properties.
- Review and engineering analysis of the tested data with respect to the proposed structures.
- Preparation of this report.

The results of the field exploration and laboratory tests, which form the basis of our

recommendations, are presented in the attached Appendices and Plates.

PROJECT DESCRIPTION

Based on the information and site plan provided by the client, it is our understanding that the proposed development is to construct 3-story residential buildings over concrete slab on-grade at the subject site.

No grading plan is available for review at this time. However, based on the existing site condition, it is anticipated that some grade change will be needed to facilitate the surface drainage. It is recommended when the grading plans become available, they are forwarded to our office for review and comment prior to grading. The geotechnical recommendations presented in this report may be revised upon the review of grading plans.

Information for design loads of the proposed building is not available at this time. However, for the purpose of this report, the column and wall loads are assumed not to exceed 25 kips and 3.0 kips per lineal foot, respectively.

SITE CONDITIONS

The subject site is located near the southeast corner of Donna Beth Avenue and E. Gladstone Street, at a short distance south of 210 Freeway, in the city of Azusa. The neighboring properties consist of residential buildings on the east and west. On the

south, the site is bound by Orkney Street.

The site is a rectangular shaped property. At the time of our investigation, the site contained four (4) 1-story buildings, many trees, some vegetation, bush and debris. Topographically, the site is relatively level.

FIELD AND LABORATORY INVESTIGATION

Field exploration was performed on September 24, 2016. Three (3) test borings were drilled to a depth of 10 feet below the existing ground surface. Approximate locations of the borings are shown on the Plate A-1. Subsurface conditions encountered in the exploration are presented in the log of test borings (Plates B-1 to B-3).

Selected samples obtained during field exploration were tested in the laboratory. A description of the field exploration and laboratory testing are presented in the attached Appendix A. The results are presented in the attached Plates.

SUBSURFACE CONDITIONS

The native soils encountered in the test borings consist generally of silty sand to sand with variant amount of gravel. No significant fill soils were encountered in any of three (3) test borings. But, based on the existing site conditions, fill soils up to 4 feet or deeper may be encountered at the other locations within the site. Ground water was not encountered in any of the three (3) test borings.

CONCLUSIONS AND RECOMMENDATIONS

General

The information obtained during our investigation indicated that the subject site is suitable for the proposed development provided that the following recommendations are incorporated in the design, and in the job specifications, and implemented during the construction. It shall be noted that the recommendations contained herein are intended to serve as guidelines to provide the project design consultants with preliminary design parameters.

Prior to construction, the grading and foundation plans shall be reviewed by the Soil Engineer so that such plans will comply with our recommendations. If needed, additional investigatory work or revising recommendations will be given at that time.

Site Preparation

Site preparation measures shall include the complete removal of existing buildings, vegetation, trees, underground utility lines, and debris within the proposed building areas. The removal of vegetation and trees shall include root balls, and resultant cavities shall be cleaned of loose soils and compacted to a firm unyielding surface prior to back filling.

To provide an adequate support for proposed buildings, we recommend the fill and upper loose/soft native soils within the proposed building areas be removed and recompacted as engineered fill. No significant fill soils were encountered in any of three

(3) test borings. However, fill soils up to 4 feet or deeper may be encountered at the other locations within the site.

The removal and recompaction of existing soils shall extend to a minimum depth of five (5) feet below the existing grade or 2 feet below the bottom of footing, whichever is greater. Two (2) feet of removal and recompaction are recommended for parking and driveway areas. However, if the encountered fill is deeper than 5 feet, the entire fill shall be removed and recompacted to a minimum of 90% relative compaction.

Bottom of excavation shall be observed by a soil engineer or his representative prior to bottom processing and placement of any compacted fill. The removal and recompaction shall extend at least 5 feet beyond the building perimeters wherever are practical. Deeper removal and recompaction will be required if local fill, soft or loose soils, and saturated soil conditions are encountered.

If the bottom of excavation is saturated and too soft, a minimum of 18 inches thick gravel may be placed to provide a firm base for the subsequent fill placement and compaction. The placement of gravel shall be observed by the soil engineer or his representative prior to placing fill soils.

The excavated on-site soils may be reused as engineered fill provided they are free of organic and deleterious substances. Soils imported from off-site sources shall be

nonexpansive or similar to on-site soils and be approved by the Soil Engineer or his representative prior to transporting to the site.

Gravel is encountered in all the test borings. Gravel larger than 6 inches in size shall be removed and shall not be incorporated into the compacted fill.

The upper 6 to 8 inches of excavation bottom shall be scarified, brought to near optimum moisture content, and properly compacted to at least 90% relative compaction. Placement of compacted fill shall be performed under the observation and testing of the Soil Engineer or his representative.

All site grading shall comply with the applicable portion of the Azusa City Grading Code and the General Specifications attached in Appendix B.

Liquefaction Potential

Based on the “Seismic Hazards Zone Map”, published by the State of California, March 25, 1999, Baldwin Park Quadrangle, the site is not located within the area where historic occurrence of liquefaction. Therefore, the liquefaction potential at the subject site is considered to be minimal. However, to safeguard the property, it is recommended that the property owner purchase adequate insurance to minimize the hazard induced by earthquake.

Foundation

Conventional spread and continuous footings may be used to support the proposed buildings. All footings shall be entirely placed into the compacted fill to a minimum depth of 24 inches below the lowest adjacent grade and shall be reinforced with a minimum of four rebar #4, placed two near the top and two near the bottom. The minimum footing width shall be at least 18 inches.

For design purpose, a bearing value of 1500 pounds per square foot (i.e. psf) may be used for conventional footings. The bearing value may be increased by 150 psf for each additional foot of footing width and 300 psf for each additional foot of footing depth to a maximum of 2500 psf. The bearing value may also be increased by 33% for wind or seismic loads.

Foundation Settlement

Settlement of the foundation placed as recommended as and subject to no more than allowable loads is not expected to exceed one inch. Differential settlement between the adjacent footings is not anticipated to exceed 1/2 inch.

Lateral Resistance

Resistance to lateral loads may be provided by friction acting on the base of footings and by passive earth pressure. Coefficient of friction between the base of footings and the competent natural soils or compacted fill may be assumed as 0.35. An allowable

lateral bearing value against the sides of footings is recommended to be 250 pounds per square foot per foot of depth to a maximum of 2500 pounds per square foot.

Seismic Parameters

Based on the latest CBC, the recommended seismic parameters are as follows:

Site Class: D

Mapped 0.2 second spectral response acceleration: Ss = 2.020g

Mapped one second spectral response acceleration: S_1 = 0.817g

Site Coefficient: Fa = 1.0, Fv = 1.5

Temporary Excavation

Unsurcharged temporary excavations may be cut vertically up to 4 feet and sloped back at a ratio of 1: 1 or flatter above the 4 feet. Tops of excavation shall be barricaded at least 5 feet from the cut to prevent any storage or equipment loads.

If the excavation will undermine the stability of adjacent improvement, the excavation shall be conducted by using ABC slot cut method with each cut panel width not to exceed 5 feet. An adequate shoring or bracing system shall be installed prior to excavation if the depth of excavation is deeper than 5 feet.

It is recommended that the current standards delineated in CAL-OSHA for safe working

conditions be followed during construction.

Concrete Slab On-Grade

The top on-site soils are considered to be very low to low in expansion potential. To provide an uniform support for proposed concrete slab on-grade, a minimum of two (2) feet soils beneath the proposed concrete slab on-grade shall be compacted to at least 90% relative compaction. The 2 feet compacted soils shall also extend at least 3 feet beyond the edges of proposed concrete slab on-grade.

It is recommended that the concrete slab placed on grade be at least 4 inches thick and be reinforced with rebar #3, 18-inch on centers, both ways, placed at slab mid-height. A minimum of 4-inch wash sand shall also be provided beneath the slab on-grade. Extra care shall be exercised to ensure the placement of reinforcement at the center of slab. If the reinforcement is placed at or sagged to the bottom of slab on-grade, the effect of reinforcement becomes null and unusual cracks may occur.

Where upward capillary moisture is not desired, a moisture barrier, such as vinyl membrane with a minimum thickness of 10 mils, shall be placed beneath the slabs-on-grade. The membrane shall be covered by 2 inches of sand to aid in uniform curing of the concrete. Care shall be taken not to puncture the membrane. Adequate expansion joints shall be provided in accordance with the latest guidelines published by Portland Cement Association to minimize the normal concrete cracks.

Prior to construction of concrete slab on-grade, all loose soils (e.g. from footing and utility trench excavation) and/or disturbed surface soil resulted from construction activity shall be removed to firm material or properly compacted. Any additional fill placed on grade to support slab shall be properly compacted and tested for its compaction. It is recommended that the subgrade soils within the building and concrete slab on-grade areas be inspected and if necessary be tested for its compaction by the soil engineer before concrete slab is placed.

Corrosive Tests

The results of soil corrosive tests are herewith attached. Results of the test indicate that the on-site soils are mildly corrosive to ferrous metals. Based on the soluble sulfate content, type II Portland cement may be used for concrete.

The PH value is 6.88 which are slightly acidic. It is recommended that all underground steel utilities and cast iron pipings be given a high quality of protective coating, or encased in an 8 mil polyethylene tube or wrapped with 20 mil plastic tapes covered by primer or hot applied coal tar enamel. Reinforcing steel shall have at least 3 inches thick concrete cover if it is placed against earth.

Utility Trenches

Trenches shall be located so as not to impair the bearing capacity or settlement under foundations. As a guide, trenches parallel to foundations shall be clear of a 45-degree

plane extending outward and downward from the edges of foundations. It is recommended that all utility trench backfills within the proposed building and concrete slab on-grade areas be compacted to at least 90% relative compaction.

Drainage

Adequate drainage system shall be provided and designed by a civil engineer. In no case shall water be allowed to pond within the site or on the pavement area. All drainage shall be directed away from the foundation areas toward the approved drainage devices.

Construction Observation and Testing

As a necessary requisite to the use of this report, the following construction stages shall be observed and/or tested by a representative of this facility:

1. Placement and compaction of fill within the building, driveway, and parking areas;

2. Placement and compaction of utility trench backfills;

3. Bottom of excavation prior to placement of compacted fill;

4. Foundation excavation prior to forming and pouring;

5. The building pad subgrade prior to placement of moisture barrier & reinforcement; and

6. Temporary excavation.

If T.K. Engineering Corp. is not allowed to perform sufficient observations and adequate testing during construction, a statement regarding suitability and stability of the project can not be made accordingly.

It is recommended that a joint meeting among the client, contractor, and the Soil Engineer be held at least 2 days in advance of the commencement of construction to discuss specific procedures and scheduling.

REMARKS

This report is prepared based upon the proposed project as described, observation and findings during field investigation, and evaluation of the test results. The conclusions and recommendations are based upon the assumption that soil conditions do not deviate significantly from those described herein. If variations from our findings or undesirable conditions are found during construction, or if the proposed construction differs from that presently planned, T.K. Engineering Corp. shall be notified so that supplemental recommendations can be given.

This report is issued with the understanding that it is the responsibility of the client to transmit the information and recommendations of this report to developers, owners,

buyers, Architects, Engineers, and Designers for the project so that the necessary steps can be taken by the Contractors and Subcontractors to carry out such recommendations in the field. The conclusions and recommendations contained in this report are solely professional opinions derived in accordance with current standards of professional practice.

This report has been prepared in accordance with generally accepted engineering practice and no warranty is expressed or implied. All exploratory borings or pits used for subsurface exploration were backfilled with reasonable effort to restore the areas to their original condition. As with any backfill in an area as small and deep as a boring, some consolidation and subsidence of the backfill soils may result in time, causing some depression at the boring area and possibly a potentially hazardous condition. The client and/or owner of the property are advised to periodically examine the boring area, and if necessary, backfill any resulting depressions.

This report is subject to review and approval by the controlling authorities for the project.

T. K. Engineering Corp. shall be retained during construction of the project so that continuous observation of the subsurface conditions can be made and additional recommendations can be given in the event of any change of condition. If another firm is retained for the geotechnical testing/observation services, our professional responsibility and liability will be impaired.

APPENDIX A

EXPLORATION AND LABORATORY TESTING

FIELD EXPLORATION

Field exploration was performed by drilling three (3) test borings. They were carried to a depth of 10 feet below the existing ground surface. Test borings were drilled by 4-inch diameter hollow stem auger.

The encountered soils were continuously logged by our field personnel and classified by visual examination. Relatively disturbed samples and representative bulk samples were obtained for laboratory testing. Relatively undisturbed samples of soils were observed at frequent intervals by driving a thin-wall steel sampler with successive drops of a hammer. The soils were retained in brass rings of 2.5 inches in diameter and one inch in height. Normally, the central portion of the sample is retained in a plastic container for shipment to the laboratory.

The locations of test borings are shown on Plate A-1. Descriptions of the encountered soils are presented on B-Plates.

LABORATORY TESTING

Classification

The field classification was verified in the laboratory. The final classification is shown on the B-Plates.

Moisture-Density

The field moisture content and dry unit weight are determined for each of the undisturbed soil samples. The dry unit weight is determined in pounds-per-cubic-foot. The field moisture content is determined as a percentage of the dry weight of the soil. Both the field moisture content and the dry density for each of the tested sample are shown on B-Plates.

Consolidation Tests

Settlement predictions of the soil under the anticipated load were made based on the results of the consolidation tests. Loads were applied in several increments and the resulting deformations were recorded at selected time intervals. Porous stones were placed in contact with the top and bottom of each specimen to permit addition or release of pore water. Results are plotted on the "Consolidation Tests", C-Plates.

Shear Tests

Shear tests were performed on selected ring samples to evaluate the shear strength of representative on-site soils. The samples were tested following a soaked period of 24 hours. Each sample is sheared at a constant rate of displacement of 0.005 in/min under a load of 1000 psf, 2000 psf and 4000 psf and the results are plotted on D-Plates.

Expansion Test

Expansion tests were performed on selected samples in accordance with UBC Test Standard No. 29-2. The representative sample of the on-site upper soils was remolded at approximately 50% degree of saturation and then soaked for 24 hours. The results are as follows.

Sample Location	Soil Description	Expansion Index	Expansion Potential
B-1 @ 0-2 ft.	silty sand	23	low

APPENDIX B

GENERAL SPECIFICATIONS FOR SITE GRADING AND EXCAVATIONS

The recommendations presented in the geotechnical report are part of the earthwork and grading specifications, and shall supersede the provisions contained hereinafter in case of conflict. Evaluation performed by the consultant during the course of grading may result in revised and/or additional recommendations, which in turn, will supersede these specifications or the recommendations of the geotechnical report.

It is necessary that the consultant provide adequate testing and observation so that the earthwork will be accomplished in accordance with the specifications. It shall be the responsibility of the contractor to assist the consultant and keep him appraised of work schedules and changes so that the consultant may schedule his personnel accordingly.

1. All existing fill, near surface loose or soft soils, vegetation, debris and disturbed soils in structure, slab or pavement areas shall be excavated. The excavated areas shall be observed by the Soil Engineer.

2. Areas to receive compacted fill shall be scarified to a depth of at least 6 inches and moistened, as required, to obtain near optimum moisture. Scarification shall continue until the soil is broken down and free of large clay lumps or clods and until the working surface is reasonable uniform and free of uneven features. The scarified areas shall be A) compacted to at least 90% of the maximum dry density as determined by the ASTM D 1557 compaction method, or B) compacted and approved by the Soil Engineer.

3. Any loose pockets, soft, dry, spongy, highly fractured or otherwise unsuitable soil, extending to such a depth that surface processing can not adequately improve the condition, shall be overexcavated down to firm ground. The excavated areas shall be observed and approved by the Soil Engineer prior to placing compacted fill.

4. Fill, consisting of soil approved by the Soil Engineer, shall be placed in controlled layers with appropriate compaction equipment. Each layer shall be compacted to at least 90% of the laboratory maximum dry density for the material used. The field density shall be determined by the ASTM D-1556 Sand Cone Method or equivalent.

5. The excavated, on-site clean fill material is considered satisfactory for re-use as compacted fill. All imported fill shall be non-expansive and approved by the Soil Engineer prior to use in the fill areas. Rocks larger than 6 inches in diameter shall not be used.

6. It shall be the sole responsibility of the contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, the geotechnical recommendations and specifications presented herein, and the approved grading plans. Observation and field tests shall be performed during grading by the Soil Engineer to assist the contractor in obtaining the required degree of compaction and the proper moisture content. Where compaction of less than 90% is indicated, additional compactive effort shall be made with the adjustment of the moisture content as necessary until 90% compaction is obtained.

7. No fill soils shall be placed during unfavorable weather conditions. When work is interrupted by rains, fill operations shall not resume until the field tests by the Soil Engineer indicate the moisture content and the dry density of the fill are as previously specified.

8. Where fill is to be placed on the ground with slopes steeper than 5 : 1 (horizontal : vertical), the ground shall be stepped or benched. The lowest bench shall be a minimum of 15 feet wide at least 2 feet deep, shall expose firm materials and shall be approved by the consultant. Other benches shall be excavated in firm materials for a minimum width of 4 feet. Ground sloping flatter than 5 : 1 shall be benched or otherwise overexcavated when considered necessary by the consultant.