October 29, 2004
Job No.: 99-020
DCN: 04R-183

ISKCON Cultural Center
1806 Missouri Street
San Diego, CA 92109

ATTENTION: SWAMY BADRINARAYANA DASA

SUBJECT: ADDITIONAL GEOTECHNICAL INVESTIGATIONS (PHASE 2)
PROPOSED SRI RADHA-KRISHNA TEMPLE, SRI BALAJI TEMPLE AND ISKCON CULTURAL CENTER
1365, 1391, & 1491 RINCON AVENUE
CITY OF ESCONDIDO, CALIFORNIA

Dear Swamiji:

In accordance with your authorization, we have completed additional geotechnical investigations for the subject site. We have attached two copies of the report that describes the work performed, our conclusions and our suggestions for carrying out grading and other work related to the geotechnical engineering aspects of the project. If you have any questions or comments on the contents of this report please do not hesitate to contact the undersigned.

We are grateful for the opportunity you have given to us for working on this project.

Thank you.

Sincerely yours,

Dr. Balakrishna Rao, RCE, RGE

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1. INTRODUCTION

Apex Geotechnology, Inc. carried out a preliminary geotechnical investigation program for the subject site and prepared a report entitled "Preliminary Geotechnical Investigation, Proposed ISKCON Cultural Center, Escondido, California", dated November 15, 1999. That report (referenced here as the Phase 1 report) described the subsurface conditions of the site and presented the parameters required for the foundation design. The same phase 1 report also presented the anticipated site grading requirements.

During the design phase of the project, and from discussions with the project engineer it appeared prudent to verify the consistency and uniformity of the subsurface conditions in greater detail so that the grading requirements could be more clearly defined for this site. Therefore, additional explorations were proposed for this project to develop recommendations for carrying out the grading work. Also, these investigations provided an opportunity for us to review and make necessary changes to our previous recommendations. This report provides only supplemental information. Therefore, it is necessary to use the recommendations provided in the Phase 1 report in conjunction with the recommendations developed in this report.

This report describes the additional work carried out in the field and provides more specific guidelines for carrying out the site grading work. The nature of subgrade soils present at this site is granular. Therefore, additional laboratory testing work to determine the strength and deformation characteristics of the soil was not considered to be necessary. Standard penetration tests were carried out to determine the relative density and competence of granular subsurface soils. A limited number of gradation tests were performed to verify the nature of the subgrade soils present in different borings and at different depths. Additional tests were also performed to qualitatively identify the potential for settlement of the site soils (usually referred as the soil collapse) resulting from its saturation caused from rain and irrigation water.

The present investigations were carried out primarily to identify the material that need to be removed during site grading. Such materials include top soil and near surface loose to medium dense terrace deposit and colluvium.

2. SCOPE OF WORK

The present supplemental subsurface investigation program included advancing a limited number of borings around and within the foot-print of the building. The work included carrying out standard penetration tests in various borings at different depths and obtaining a limited number of drive samples using California Sampler.

A limited number of somewhat unconventional laboratory tests were performed as a part of this work. These tests were intended to provide a qualitative feel for the magnitude of settlement that could occur from soil saturation and collapse of the soil structure.

The scope of work also included the preparation of this summary report outlining the procedures used in the investigations, analyses of boring logs, and laboratory test results, providing recommendations for site grading and for the design of structural foundations. The conclusions and recommendations presented are based on the analyses of data obtained from the Phase 1 and the current Phase 2 exploratory borings, laboratory tests and our experience with similar soils.

3. SITE LOCATION AND DESCRIPTION OF THE PROJECT

The proposed structures are to be constructed on the south side of Rincon Road in Escondido on an undeveloped parcel that slopes gently to the North and West (see Vicinity Map, Figure 1). A residential development borders the western property line. The eastern property-line borders a small hill covered with avocado trees. Currently there is one residential structure on the lot

4. PHASE 2 GEOTECHNICAL INVESTIGATIONS

The geotechnical investigations were performed on this property on August 31, 2004. This work consisted of advancing 5 borings to depths that ranged from 13 feet to 19.5 feet. Three of these borings (Borings B-1, B-2 and B-3) were advanced in the southwest, southeast and northeast corners of the foot-print of the proposed structures. The fourth boring (B-4) was located in the vicinity of the center of the proposed foot-print. The fifth boring was located approximately near the mid point of the western edge of the planned structure. These borings were logged by an experienced Certified Engineering geologist. The logs of these borings are included in Appendix A.

5. LABORATORY TESTING

Soil samples obtained in the borings were transported to our laboratory and a testing program was developed. The following tests were conducted to evaluate the subgrade soil conditions. The laboratory test results are presented in Appendix B.

5.1 **Classification:** During subsurface explorations soil samples were visually and texturally classified in accordance with the Unified Soil Classification System. Soil Classifications are indicated on the boring logs.

5.2 **Field Moisture Contents:** Soil samples were obtained in the field at various depths to determine their moisture content. The results of these tests are presented in Table B-1.

5.3 **Field Density Tests:** Dry densities of soil samples were obtained by the weight and volume measurements on ring samples recovered from California Sampler. These results are also included in Table B-2, Appendix B.

5.4 **Particle Size Distribution:** Gradation tests were performed on selected composite samples of soil obtained from different depth ranges of borings. The material was first washed through a No. 200 sieve. A sieve analysis was then performed on the oven dry material retained on the No. 200 sieve. The gradation test results are

presented on Figures B-1 through B-5.

5.5 **Unconventional Soaking Tests:** Load frames normally used for testing the consolidation characteristics of soils were used to determine qualitatively the magnitude of settlement that could occur from soil saturation. Trimmed ring samples of soils recovered from California sampler from various borings were used in these tests. These samples were retained in the original rings and were trimmed on their upper and lower faces and mounted on the consolidation apparatus. The specimens were loaded with pre-established surcharge loads. After the completion of the load induced settlement, the specimens were given access to water through the porous discs provided on the top and bottom surfaces of the ring. The test specimen showed increased displacement. The increased displacements (settlement) caused from increased saturation were monitored for a time duration of about 24 hours under the specified surcharge loads. The results obtained are summarized in Table B-3, in Appendix B. Although the test procedure we have used is not an approved standard procedure, the magnitude of settlement from saturation measured in terms of strain in the specimen seems to suggest the collapse potential of these soils.

6. SITE CONDITIONS

Information on the Surface conditions, Geologic Setting, Stratigraphy and Seismicity were described in the Phase 1 report and hence will not be repeated here. Approximate locations of the Phase 1 and Phase 2 borings are shown on Figure 2, Boring Locations. The site soils consist of near surface top soil with organic materials and roots extending down to depths ranging from 3 ft to about 4 feet from the presently existing grade. Below the top soil, layers of terrace deposit/colluvium were observed. The total thickness of these layers ranged from 6.5 feet to more than 16 feet (in Boring B-5). Weathered Granodiorite was observed below the terrace deposit/colluvium in Borings B1 through B4. Although we did not encounter weathered Granodiorite to a depth of about 20 feet in Boring B5, one would most likely encounter such a layer within a few feet below the bottom of the

boring B-5.

Approximate cross sections were developed using the information obtained from the boring logs. The cross sections are presented in Figures 3, 4 and 5.

The near surface top soils are considered to be unsuitable for the support of fills and/or structures. The less dense portion of the terrace deposit/colluvium appeared to have high porosity and was determined to be susceptible to collapse on saturation (see test results included in Appendix B). Parts of the relatively less dense terrace/colluvium in their present condition may not be suitable for support of fills and/or structures because of their potential for settlement on saturation. Therefore, these materials will require remediation in the form of excavation and re-compaction as recommended later in this report. The weathered part of the Granodiorite is sufficiently dense that it would adequately support the fills and structures planned in this project.

No ground water was encountered in the borings.

7. GEOLOGIC HAZARDS

7.1 Faulting and Seismcity:

No active faults are known to exist at this site. The distance to the nearest known active fault is about 15 miles or more. The site could be subject to moderate to strong ground shaking in the event of an earthquake. The earthquake hazard at this site is considered to be comparable to other sites in the general vicinity. The site structures could experience average ground acceleration in the range of 0.2 to 0.25g.

Absence of ground water within reasonable depths coupled with the nature of materials anticipated to be present at lower depths preclude the possibility of liquefaction at this site caused from the induced earthquake ground accelerations.

7.2 Landslides and other hazards:

Based on our visual observations of the slopes present on and adjacent to this property there are no observed features to suggest existence of landslides on this property. The near surface materials are fine and granular and are susceptible to develop erosion gullies from flow of water during and after rain storms.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 General:

1. The soil and geologic conditions observed at this site are suitable for the development of the planned project.
2. Our investigations did not show conditions that are substantially different from those reported in Phase 1 report.
3. Near surface top soils present at this site should be removed and may be hauled to waste or used as fills in landscape areas. The less dense parts of terrace deposits could be excavated and hauled to waste or could be used as fills after re-compacting to achieve the required density. Although it is a common practice to specify 90 percent minimum compaction for fills in San Diego County, since these soils are granular and can be easily compacted to 95 percent of the maximum we suggest using 95 percent compaction requirements in the specification particularly in areas where large areas of floor slabs are likely to be covered with decorative floor coverings and specialized materials. The site soils are easily compactable by the use of vibratory rollers.
4. In areas where the floor slab extends over cut and fill areas, we recommend over-excavating the cut area and back filling it with compacted soil in order to provide uniform subgrade condition to support the slab. Since the materials are granular, any soil settlement will most likely occur within few months after fill placement, compaction, and construction of the structure. Therefore, planned delayed

Installation of sensitive floor coverings would reduce the potential for occurrence of distress features.

8.2 Soil and Excavation Characteristics:

It is most likely that the soils contained within the upper 10 feet from the natural grade could be excavated with low or moderate effort using heavy-duty grading equipment. Materials from lower depths extending in the Granodiorite layer could require heavy effort with conventional heavy-duty equipment and with potential for occasional use of rock breakers.

We have not carried out any chemical tests to identify the corrosion potential of these soils on the buried metals and concrete. Similarly we have not determined the soluble sulfate contents of the soils to recommend the type of cement to be used in the construction. During or near the completion of site grading work, chemical tests should be performed. The services of a corrosion engineer familiar with the interpretation of the results of these chemical tests should be used to assess the corrosion potential and develop recommendations for mitigating the potential hazards from corrosion of buried utility lines. Apex Geotechnology, Inc. does not have the expertise to recommend the requirements to avert corrosion potential.

8.3 Seismic Design Criteria:

The lower Granodiorite soil is characterized as soil type Sc. The upper material in the terrace deposit or colluvium could be categorized as Sd. The following table may be used for the seismic design criteria in accordance with the requirements specified in the UBC 1997:

SEISMIC DESIGN PARAMETERS

Parameter	Factor	UBC Reference
Zone	0.4	Table 16-1
Profile	Sc and Sd	Table 16-J
Coefficient Ca	0.4 to 0.44 Na	Table 16-Q
Coefficient, Cv	0.56 t0 0.64 Nv	Table 16-R
Near Source Factor, Na	1.00	Table 16-S
Near Source Factor, Nv	1.00	Table 16-T
Seismic Source	B	Table 16-U

8.4 GRADING:

All of the earthwork requirements specified in the preliminary geotechnical engineering report (dated November 15, 1999) are applicable.

Grading should be performed in accordance with the requirements specified by the City of Escondido. Earthwork should be observed and fills tested for adequacy of compaction by the consulting Geotechnical Engineer. Prior to grading, a pre-construction meeting should be held with the project engineer, the grading contractor, civil engineer and the geotechnical engineer. Special soil handling requirements can be discussed at that time.

Initial grading work should begin with the removal of top soil, vegetation, buried utility lines and other construction materials that could be present. The depth of this excavation will extend till the exposed cut areas soils are relatively free from organic materials. The material generated in this process should be preferably wasted off-site unless directed otherwise by the project engineer.

The depth of removal of soil below the organic rich soil layer should extend down to

the base of the finish grade as shown in the grading plan. Additional excavation will be required below limited areas adjacent to the cut/fill lines shown in order to provide uniform support conditions for the floor slabs as described earlier in this report (see approximate cross sections shown on Figures 3, 4 and 5). Acceptable parts of the material excavated from the terrace deposits could be reused as fill by proper compaction of the fill material.

After removal of unsuitable soils and completion of the required excavation, the site could be backfilled in thin lifts not exceeding 8 inches in thickness (of loose materials), moisture conditioned to 1 to 3 percent above optimum and compacted to 95 percent of the maximum determined in accordance with ASTM D 1557-02. The magnitude of relative compaction requirement may be relaxed by the approval of the project engineer and the consulting geotechnical engineer. However, the relative compaction requirement will not be less than the 90 percent of the maximum. The moisture content of the in-place soil is expected to be very low. There is a potential for generation of considerable dust during the excavation. Therefore, the contractor should anticipate the need for providing the volume of water required to control the dust and moisture condition the soil during excavation and compaction.

In order to reduce the potential for differential settlement the cut portion of the cut/fill transition areas of the pad should be under cut to a depth of 3 feet below the cut area of the rough grade elevation.

Although our investigations did not show evidence of large amounts of boulders and cobbles, based on the geologic description of the material we anticipate that there could be oversized materials present within the proposed excavation. The contractor should make his own determination about the presence of hard lumps and rocks that are greater than 8 inches in diameter. If substantial quantities of rocks and boulders are encountered, the project engineer in consultation with the geotechnical engineer will provide recommended placement or export requirements for the over-sized materials.

8.5 Excavation Slopes and Shoring Requirements:

Temporary slopes in terrace deposits may be excavated no steeper than 1:1 to a height of about 15 feet without shoring. Loose cobbles and boulders should be removed from the face of the slope. OSHA codes and regulatory guidelines should be used where applicable. All safety related matters will be the responsibility of the Contractor. The geotechnical engineer is not responsible for monitoring the safety requirements in this project.

Steeper excavation slopes would require support by shoring. Temporary cantilevered shoring may be used to laterally support the excavation walls. The shoring will have to be designed for the conditions observed during the excavation. Continuous support of the excavation face may be achieved by the provision of soldier piles and wood lagging. Since the proposed excavations are of limited area and the site is situated in an open area, the site does not seem to restrict excavation of flatter side slopes. Therefore, it would be possible to take advantage of the flatter slopes in lieu of the shoring required to support the excavation.

8.6 Permanent Slopes:

Permanent cut or fill slopes should be no steeper than 2 horizontal to 1 vertical. In addition, such slopes should have adequate factor of safety against failure.

Soil contained within the outer edges of the fill slopes should consist of properly compacted granular soils. The exposed soils on the slope would need protection by Jute mesh or Enkamat or equivalent manufactured fabrics to minimize erosion damage to the slope face during run offs from heavy rains until adequate vegetation can be established.

Fill slopes should be initially overbuilt by at least 3 feet and cut back to the final slope condition. Back rolling of fill slopes may be required. Proper drainage swales should be

provided parallel to the edge of the slope. Erosion problems could be significant at this site because of the non-cohesive nature of the in-place soil.

The recommendations for the extent of grading beyond the foot print of the structure was specified in the preliminary report dated November 1999.

9. CONDITIONS AND LIMITATIONS

The recommendations presented in this report are specifically intended for the proposed temples and the ISKCON Cultural Center in Escondido, California. Our office should be notified of any changes in the proposed development for further recommendations, if necessary, based on our review. As grading and foundation plans are developed we should have an opportunity to review the anticipated magnitudes of loads on individual column footings and on the perimeter foundations to ensure conformance to our recommendations. We also recommend that our office review any other plans which may affect the geotechnical conditions on-site such as landscaping, irrigation, plumbing, or other similar type plans. A soil engineer should be retained to review any future development plans including building additions in order to develop specific recommendations for proposed construction.

The conclusions and recommendations presented in this report are based on our evaluation of the subsurface materials encountered on-site during our investigation, our understanding of the proposed development, and our general experience in the field of geotechnical engineering. If significant variations in geotechnical conditions are encountered during construction our office should be consulted for further recommendations.

The satisfactory performance of the site is also dependent on proper maintenance. Proper maintenance includes, but is not limited to, providing and maintaining good drainage away from structures and slopes, establishing good vegetation cover on slopes, and

avoiding excess irrigation.

Significant variations in geotechnical conditions may occur with the passage of time due to natural processes or the works of man on this or adjacent properties. In addition, changes in the state of the practice may occur as a result of legislation or the broadening of knowledge. Accordingly, the conclusions and recommendations presented in this report should be reviewed during construction for changed conditions, and updated, if necessary.

Our services consist of professional opinions and recommendations made in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties either expressed or implied.

Sincerely yours,

Scott Rugg, RG, CEG
Consulting Engineering Geologist

Dr. Balakrishna Rao, RCE, RGE
Principal Geotechnical Engineer