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November 17, 2022
Project No. 19-113-SC

Central Fire Protection District
930 17th Avenue
Santa Cruz, California 95062

ATTN: Anthony Cefaloni

SUBJECT: **ADDENDUM TO GEOTECHNICAL REPORT**
Foundation Improvements
410 Kennedy Drive, Capitola, Santa Cruz County, California
APN 036-041-29

REFERENCES: See the Attached List

Dear Mr. Cefaloni:

In accordance with you authorization, we have completed an addendum to the existing geotechnical investigation report for the subject project. This addendum presents additional geotechnical recommendations based on the field exploration and laboratory testing presented in the referenced report. It is a pleasure being associated with you on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office.

Sincerely,

CMAG ENGINEERING, INC

Adrian L. Garner, PE, GE
Principal Engineer
C 66087, GE 2814
Expires 6/30/24

Distribution: Addressee (Electronic Copy)
Cumming-Group (Electronic Copy)

1.0 INTRODUCTION

Per our discussions with the project design team and our review of the referenced plans by Streeter Group, Inc. (Streeter, July 9, 2021), two items require geotechnical input prior to finalizing the project bid documents: 1) Earthwork recommendations beneath the replacement concrete slab on the western half of the building and 2) Cut slope recommendations to temporarily remove the soil adjacent to the western perimeter of the building and subsequent replacement with a backdrain and compacted engineered fill.

All other recommendations presented in the referenced report (CMAG, Engineering, Inc, June 30, 2019), not included in this addendum, should be adhered to.

2.0 RECOMMENDATIONS

2.1 Slab Subgrade Preparation - Western Half of the Building

As outlined on the structural plans (Streeter, July 9, 2021), the replacement slab for the western half of the building is supported by 3 feet of compacted engineered fill.

CMAG Engineering, Inc. (CMAG) had discussions with the design team during the initial planning phase of the project, after the production of our report (CMAG, June 30, 2019). The discussions were regarding the risks from geotechnical hazards coupled with the cost of underpinning the foundations and structurally supporting the slab, on the western half of the structure. Based on that cost-benefit analysis, the eastern portion of the building was selected as the critical portion to underpin with helical piles and anchors, including constructing a structural slab. A conventional slab supported by the subgrade was selected for the western half of the building.

For the replacement concrete slab-on-grade on the western half of the building, the native soil should be overexcavated a minimum of 3 feet below the bottom of the crushed rock. The exposed surface should then be scarified, moisture conditioned, and compacted. The material which was removed should then be replaced with engineered fill compacted to a minimum of 90 percent relative compaction. The upper 24 inches of subgrade should be compacted to a minimum of 95 percent relative compaction.

The on-site soils, with the exception of clay soils and highly organic soils, may be used as engineered fill. Note: If this work is done during or soon after the rainy season, or in the spring, the soil may require significant drying prior to use as engineered fill. Regardless of the time of year, moisture conditioning the on-site soils to achieve moisture requirements should be anticipated. Moisture conditioning may include adding water or drying back the soil to achieve the required moisture. It is the contractors responsibility to adequately process the soil to achieve uniform moisture conditions of the material to be used as engineered fill. The soil should be

verified by a representative of CMAG in the field during grading operations. All soils, both existing on-site and imported, to be used as fill, should contain less than 3 percent organics and be free of debris and gravel over 2.5 inches in maximum dimension.

Imported fill material should be approved by a representative of CMAG prior to importing. Soils having a significant expansion potential should not be used as imported fill. **The Geotechnical Engineer should be notified not less than 5 working days in advance of placing any fill or base course material proposed for import**. Each proposed source of import material should be sampled, tested, and approved by the Geotechnical Engineer prior to delivery of any soils imported for use on the site.

All fill should be compacted with heavy vibratory equipment. Fill should be compacted by mechanical means in uniform horizontal loose lifts not exceeding 8 inches in thickness. The relative compaction and required moisture content shall be based on the maximum dry density and optimum moisture content obtained in accordance with ASTM D1557. **The Geotechnical Engineer should observe the overexcavations, and placement of engineered fill.**

Any surface or subsurface obstruction, or questionable material encountered during grading, should be brought immediately to the attention of the Geotechnical Engineer for proper processing as required.

2.2 Utility Trenches Beneath Slab - Western Half of the Building

Bedding material should consist of sand with SE not less than 30 which may then be jetted.

The on-site soils, with the exception of clay soils and highly organic soils, may be used as trench backfill. Imported fill should be free of organic material and gravel over 2.5 inches in diameter. Backfill of all exterior and interior trenches should be placed in thin lifts and mechanically compacted to achieve a relative compaction of not less than 95 percent per ASTM D1557. Care should be taken not to damage utility lines.

Utility trenches that are parallel to the sides of a building should be placed so that they do not extend below a line sloping down and away at an inclination of 2:1 H:V (horizontal to vertical) from the bottom outside edge of all footings.

A 3 foot concrete plug should be placed in each trench where it passes under the exterior footings. Anti-seep collars (trench dams) should also be placed in utility trenches on steep slopes to prevent migration of water and sand.

Trenches should be capped with 1.5± feet of impermeable material. Import material should be approved by the Geotechnical Engineer prior to its use.

Trenches must be shored as required by the local regulatory agency, the State Of California Division of Industrial Safety Construction Safety Orders, and Federal OSHA requirements.

2.3 Temporary Cut Slope - Western Perimeter

The western perimeter of the building is currently retaining 6 to 7 feet of soil. As it appears that this wall was not designed as a retaining wall, the soil is to be temporarily removed during construction to help prevent lateral movement of the building during removal and replacement of the concrete slab.

Temporary excavations must comply with all applicable local, state and federal safety regulations and specifications, which should include reference to the State of California Trenching and Shoring Manual. This includes compliance with California Occupational Safety and Health Regulations (Cal/OSHA). These safety regulations are contained within the larger California Code of Regulations, Title 8 Industrial Relations (CCR Title 8). It is the Contractor's responsibility to maintain a safe work environment and to select the means, methods, and sequencing of all construction operations.

Heavy construction equipment, construction materials, excavated soils, and vehicular traffic may act as surcharge and therefore should not be allowed within a specified distance from the excavation. Recommendations for setback distances can be provided upon request.

For temporary excavations that are properly dewatered, the on-site soils in this area may be considered Type B Soils (CCR, Title 8, Section 1541.1). Type B Soils may be temporarily excavated to provide a maximum slope of 1:1 H:V (horizontal to vertical).

The excavations are considered temporary excavations only. The recommended slope configuration is based on dry conditions (dewatered and no significant precipitation). **A representative of our firm should be present during the excavation to observe the stability of the excavation slopes and to verify the slope angle.** A representative of our firm should visit the site a minimum of once a week after the excavation to observe the moisture condition of the soil and the stability of the excavation slopes. If any tension cracks occur at the top of the excavation during construction, our firm should be notified immediately. All work within the excavation should stop until a representative of our firm is present at the site.

2.4 Backdrain

Prior to replacing the soil on the western perimeter, we recommend constructing a backdrain that extends to the bottom of the slab. Depending on the conditions encountered during excavation, extending the backdrain below that depth, may be necessary. Waterproofing the wall should also be considered. CMAG does not practice in the field of waterproofing and if it is a concern, a waterproofing expert should be consulted for their recommended protection measures.

Backdrains should consist of 4 inch diameter SDR 35 PVC perforated pipe or equivalent, embedded in Caltrans Class 2 permeable drain rock. The drain should be a minimum of 18 inches in width and should extend to within 12 inches from the surface. The upper 12 inches should be capped with native soils. Mirafi 140N filter fabric should be placed between the native soil cap and the drain rock. The pipe should be 4± inches above the trench bottom; a gradient of 2± percent being provided to the pipe and trench bottom; discharging into suitably protected outlets. See Figure 1 for the standard detail for the backdrain.

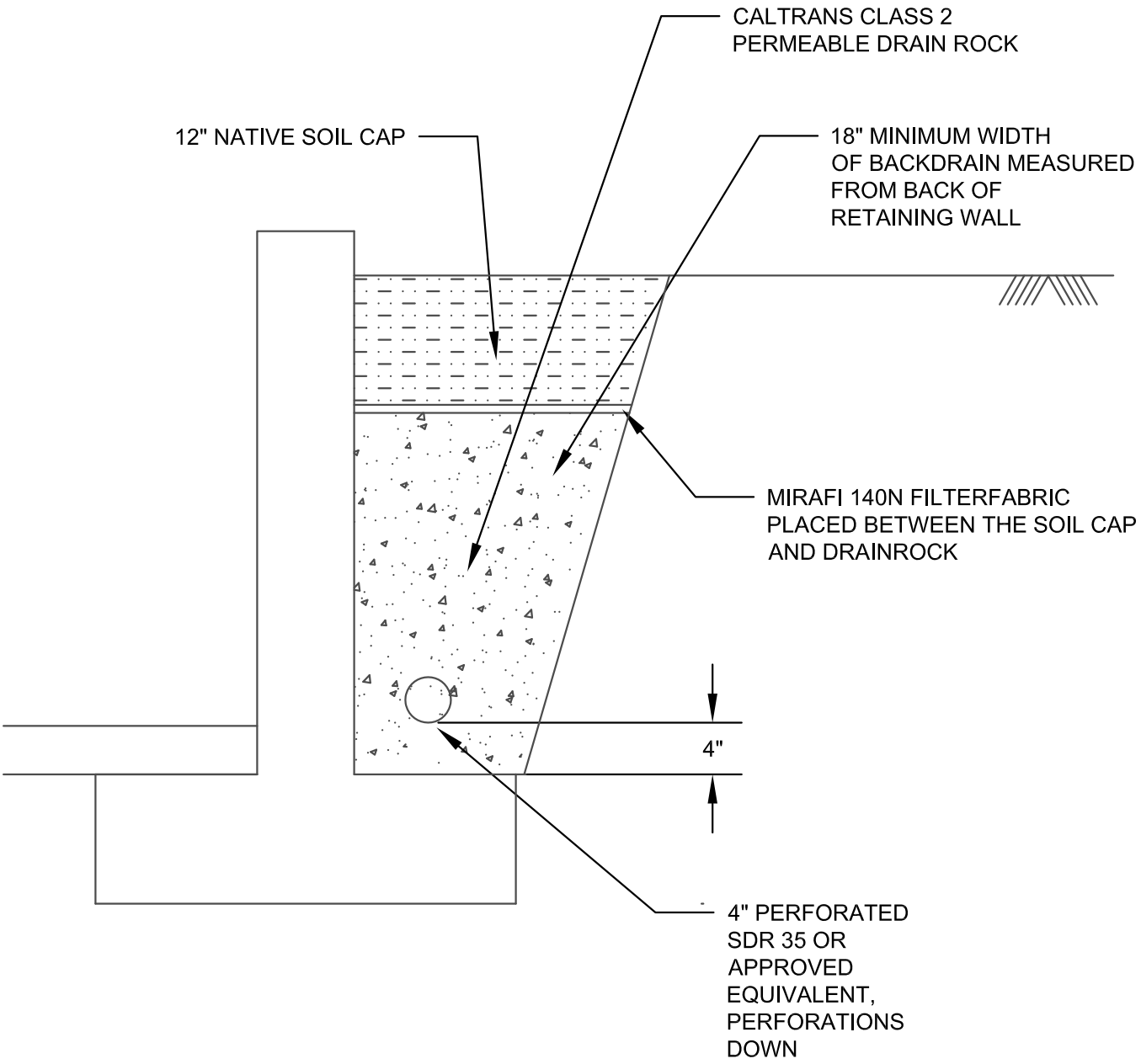
Perforations in backdrains are recommended as follows: 1/2 inch diameter, in 2 rows at the ends of a 120 degree arc, at 5 inch centers in each row, staggered between rows, placed downward.

Backdrains should be observed by the Geotechnical Engineer after placement of bedding and pipe and prior to the placement of clean crushed gravel.

An unobstructed outlet should be provided at the lower end of each segment of backdrain. The outlet should consist of an unperforated pipe of the same diameter, connected to the perforated pipe and extended to a protected outlet at a lower elevation on a continuous gradient of at least 1 percent.

2.5 Backfill

Backfill should be placed under engineering control. Backfill should be compacted to a minimum of 90 percent relative compaction and not to exceed 92 percent per Section 2.1, however, precautions should be taken to ensure that heavy compaction equipment is not used immediately adjacent to walls, so as to prevent undue pressures against, and movement of, the walls. It is recommended that granular, or relatively low expansivity, backfill be utilized.



NOTES:

1. DRAWING IS NOT TO SCALE
2. 2± PERCENT TO PIPE AND TRENCH BOTTOM
3. PERFORATED SDR 35 PVC PIPE, OR APPROVED EQUIVALENT, CONNECTED TO CLOSED CONDUITS THAT DISCHARGE TO AN APPROVED LOCATION
4. INSTALL CLEAN OUTS AT APPROVED LOCATIONS

CMAG ENGINEERING	TYPICAL BACKDRAIN DETAIL	FIGURE 1

3.0 LIMITATIONS

Our addendum was performed in accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, expressed or implied, is provided as to the conclusions and professional advice presented in this report.

As in most projects, conditions revealed during construction excavation may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by the Project Geotechnical Engineer, and revised recommendations be provided as required.

This addendum is issued with the understanding that it is the responsibility of the Owner, or of his Representative, to ensure that the information and recommendations contained herein are brought to the attention of the Architect and Engineer for the project and incorporated into the plans, and that it is ensured that the Contractor and Subcontractors implement such recommendations in the field.

This firm does not practice or consult in the field of safety engineering. We do not direct the Contractor's operations, and we are not responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the Contractor. The Contractor should notify the Owner if he considers any of the recommended actions presented herein to be unsafe.

The findings of this addendum are considered valid as of the present date. However, changes in the conditions of a site can occur with the passage of time, whether they be due to natural events or to human activities on this or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur, whether they result from legislation or the broadening of knowledge.

Accordingly, this addendum may become invalidated wholly or partially by changes outside our control. Therefore, this addendum is subject to review and revision as changed conditions are identified.

REFERENCES

CMAG Engineering, Inc. (June 30, 2019). *Geotechnical Investigation, Foundation Improvements, 410 Kennedy Drive, Capitola, Santa Cruz County, California*, *APN 036-041-24.* Project No. 19-113-SC.

Streeter Group, Inc. (July 9, 2021). *Central Fire 2021 Fleet Improvement, 410 Kennedy Drive, Capitola, CA.* Sheets S0, S1.0, S1.2, S1.3(12/20/19), S1.4, S3.0(12/20/19), S5.1(12/20/19), S5.2(12/20/19), S5.3, and S5.4(12/20/19). Job No. 17046.

William Fisher Architecture, Inc. (February 1, 2022). *2021 Fleet Improvement, Central Fire, 410 Kennedy Drive, Capitola, CA 95010, 03604124.* Sheets A0.0, A0.1, A0.2, A0.3, A0.4, A1.0, A1.1, A1.2, A1.4, A2.0, A3.0, A4.0, A4.1, A5.0, and A5.1.