



Korbmacher Engineering, Inc.

Geotechnical Environmental Material Testing Special Inspection

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30 September 2008

Mr. John G. Mahoney
Antrim Construction
1635 Chestnut Street, Suite A
Livermore, California 94551

Subject: **REPORT OF EARTHWORK OBSERVATION AND TESTING**
Backfill of Excavation
Commercial Service Building
461 McGraw Avenue
Livermore, California
Project No. JH-871

Dear Mr. Mahoney:

As requested, Korbmacher Engineering, Inc. has completed testing of earthwork materials for the backfill of the excavation at the subject property. This report summarizes our conclusions based on our test results. Test results are included with this report.

We appreciate being of service to you during the testing of earthwork materials phase of the project. If you have questions concerning this report or any of our testing services, please call at your earliest convenience.

Respectfully submitted,
KORBMACHER ENGINEERING, INC.

Bruno Korbmacher, PE

Attachments: Tables 4 and 11

Copies to: Addressee (2, 1 e-mail)



**PAD CERTIFICATION REPORT OF EARTHWORK OBSERVATION AND TESTING
BACKFILL OF EXCAVATION
COMMERCIAL SERVICE BUILDING
461 MCGRAW AVENUE
LIVERMORE, CALIFORNIA
PROJECT NO. JH-871**

1.0 INTRODUCTION

Korbmacher Engineering Inc.'s (KEI) engineering technicians have observed and tested certain earthwork materials for the backfill of the excavation at the subject site. The purpose of the observation and testing services was to confirm that the earthwork and related items conformed to the recommendations in the below referenced report and to provide any necessary supplementary recommendations.

This report presents the results of tests and observations, and related professional opinions, in conjunction with the subject operations on the referenced project during the period from 23 September to 26 September 2008.

Our opinions regarding compliance with project requirements have been based on the following:

- Recommendations for Backfill of Excavation, Commercial Service Building, 461 McGraw Avenue, Livermore, California, prepared by Korbmacher Engineering, Inc., Project No. JB-773, dated 8 September 2008.
- Recommendations for Backfill of Excavation, Commercial Service Building, 461 McGraw Avenue, Livermore, California, prepared by Korbmacher Engineering, Inc., Project No. JB-773, dated 22 September 2008.

2.0 SCOPE OF TESTING SERVICES

As requested, designated materials and operations for specific elements of the referenced project are subject to observation, sampling, and testing by KEI's technicians supervised by our professional engineer.

KEI's services do not include any superintendence, supervision, direction or certification of the work, actions or safety of others; nor will KEI be responsible for the costs incurred by any party due to misinterpretation of data or intent of said services or the results contained herein.

2.1 Project Elements

Only the following project elements were under observation and testing by Korbmacher Engineering, Inc.:

- Backfill of a large excavation that crossed near the center of the site. The shape of the excavation was irregular. At its widest point was about 50 feet and its deepest point was about 25 feet.
- On-site soil stockpiled at the subject site was approved by KEI for use as backfill of the excavation.

2.2 Work Performed for Project Elements

Only the following project materials and operations are designated for observations and testing by Korbmacher Engineering, Inc. at the designated project elements:

- Observing the placement and compaction of the bottom 2 to 5 feet of on-site fill due to safety concerns (from minus 25 feet to 15 feet) across the bottom of the excavation. For the 10 x 42 x 23 foot deep excavation and due to safety concerns, the import fill was observed to be placed and compacted for the bottom 13 feet of fill (from a minus 23 to 10 feet) below grade. The last excavation was tested for density from the 1st lift at 6 feet to FG.
- Using on-site soils as structural backfill, the soil was moisture-conditioned at a minimum of 1 percent over the optimum moisture content and compacted to a minimum of 90 percent relative compaction according to American Society of Testing Materials (ASTM) test methods and procedures.

3.0 SUMMARY OF OBSERVATIONS

3.1 Reports

Daily reports of observations are on file in KEI's project file. We will supply these reports, if required. The following are attached and transmitted here with, and are for observation and testing performed between, 23rd through the 26th of September, 2008, on a continued basis.

- Tables I and II listing the results of field density testing and laboratory analysis.

3.2 Status of Project Requirements

- a. All materials and operations designated for KEI observation testing in Section 2.0 of this report have been completed. At completion of the earthwork, we understand that the grade is about 1 foot lower than the surrounding and existing grade. The area was graded with a gradual slope from existing grade to the backfill excavation grade.

- b. On-site stockpiled soils from areas of excavation were used as structural fill for the excavation.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations presented in this report are based on the results of the referenced geotechnical report, and the observations and tests performed during the earthwork operations. If conditions different from those previously encountered become evident, this office should be notified.

Based on the results of field and laboratory tests, observation of the grading procedures, and on our experience, we certify that the specific earthwork materials observed and tested by KEI for items listed in Section 2.1 at the subject project substantially complies with the recommendations of the referenced letter reports and of Korbmacher Engineering, Inc.

5.0 LIMITATIONS AND EXCEPTIONS

Any future grading and/or backfilling of excavations/trenches of any nature that would alter or affect the areas of materials and operations observed and tested by KEI should be performed with observation and testing under the supervision of our representatives. It is not reasonable for you or others to rely upon our conclusions and recommendations if any future unobserved and untested trenching, grading or backfilling disturbs the work covered by this report.

The use of the word "certify" or "certification" constitutes an expression of professional opinion regarding those facts or findings which are subject of the certification, and does not constitute a warranty or guarantee, either express or implied. The use of the word "certify" or "certification" is made according to the definition discussed in the 1998 Handbook of Laws and Rules, Section 6735.5 of the California Board of Registration for Professional Engineers and Land Surveyors. Furthermore, the use of the word "certify" or "certification" of the building pad does not express an opinion of the elevation or location of the building pad according to plans and specifications. We recommend that the project civil engineer or the project surveyor provides the pad certification letter confirming that the elevation and location of the building pad is according to project plans and specifications.

The conclusions and recommendations presented in this report represent our professional opinions, and as such are based upon the findings and assumptions and subject to the limitations and exceptions set forth herein.

Our services were performed according to generally accepted engineering practices for the county area at the time this report was prepared. KEI's opinions and conclusions are based upon field observations made during KEI's period of onsite observation only, and the specific test results obtained from certain

locations. KEI makes no representation, express or implied, and no warranty or guarantee is included or intended as to the professional opinion or recommendation provided. KEI does not guarantee construction, nor do KEI assume the contractor's primary responsibility to produce a completed project conforming to the project plans and specifications.

TABLE I
LABORATORY TEST DATA

Soil Type	Description	Optimum Moisture, %	Maximum Dry Density, lbs/ft ³
1	Sandy CLAY, brown, with fine grained gravel	11.5	122.0

TABLE II
FIELD DENSITY TEST RESULTS

Date & Test No.	Test Location	Depth or Elevation, ft	Moisture Content, %	Dry Density lbs/ft ³	Relative % Compaction	Soil Type
23 Sep 08						
1	S. section of fill	15'	16.3	104.3	85*	1
2	Retest #1	15'	10.5	111.8	91	1
3	center of fill	14'	12.5	113.2	92	1
4	E. section of fill	13'	14.1	107.2	87*	1
5	W. section of fill	13'	11.3	110.9	90	1
24 Sep 08						
1	Retest of #4, 23 September 2008	13'	12.1	110.8	90	1
2	center of fill	12'	12.5	111.4	91	1
3	E. section in front of ramp	11'	15.3	113.3	92	1
4	NW section in front of ramp	11'	14.1	111.3	91	1

*Indicates failed test

FG indicates finished grade in structural areas

FSG indicates finished subgrade in pavement areas

AB indicates top of aggregate base layer for pavement section

AC indicates asphaltic concrete layer for pavement section



TABLE II
FIELD DENSITY TEST RESULTS

Date & Test No.	Test Location	Depth or Elevation, ft	Moisture Content, %	Dry Density lbs/ft ³	Relative % Compaction	Soil Type
5	center of fill	10'	14.7	119.1	98	1
6	W. well cut-out	9'	14.1	111.4	91	1
7	W. of center of fill	9'	12.9	117.6	96	1
8	E. section in front of ramp	9'	12.6	116.0	95	1
9	Center of fill	8'	12.3	116.0	95	1
25 Sep 08						
1	W. well dig-out	7'	114.7	110.4	91	1
2	NW section in front of ramp	7'	13.2	114.9	94	1
3	E. section in front of ramp	7'	14.5	114.9	94	1
4	E. section in front of ramp	6'	15.4	105.3	86*	1
5	Center of backfill pit	5'	15.5	112.7	92	1

*Indicates failed test

FG indicates finished grade in structural areas

FSG indicates finished subgrade in pavement areas

AB indicates top of aggregate base layer for pavement section

AC indicates asphaltic concrete layer for pavement section



TABLE II
FIELD DENSITY TEST RESULTS

Date & Test No.	Test Location	Depth or Elevation, ft	Moisture Content, %	Dry Density lbs/ft ³	Relative % Compaction	Soil Type
6	Retest of #4	6'	13.4	109.8	90	1
7	Center of backfill pit	4'	12.6	112.3	92	1
8	W. well dig-out	4'	12.5	113.6	93	1
26 Sep 08						
1	S. section of backfill pit	3'	12.8	114.7	94	1
2	W. section in front of well	3'	13.3	111.7	92	1
3	E. section in front of ramp	2'	11.9	116.1	95	1
4	N to NW section of backfill	2'	14.3	111.9	92	1
5	W. well dig-out	1'	10.1	109.7	89*	1
6	Retest #5	1'	12.3	115.3	94	1

*Indicates failed test

FG indicates finished grade in structural areas

FSG indicates finished subgrade in pavement areas

AB indicates top of aggregate base layer for pavement section

AC indicates asphaltic concrete layer for pavement section

