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REPORT OF GEOTECHNICAL SERVICES

Hawthorne Boulevard Improvement  
at City Hall  
Rancho Palos Verdes, California

CLIENT

Great Lakes Properties

July 30, 1986

Job No. 286-203

## REPORT OF GEOTECHNICAL SERVICES

Introduction

This report presents the results of our field observations and tests performed during recent grading operations on the subject site. These soils engineering services were conducted in compliance with a request by Mr. Douglas Shrouf, representing Great Lakes Properties. Grading recommendations and data pertaining to the soils on the site were presented in a Soils Engineering Investigation report prepared by Robert Stone and Associates dated January 24, 1986 (Job No. 2295-00).

Grading Procedures

The grading was performed by Nelson & Belding Contracting Corporation during April and May, 1986. Earthwork consisted of natural ground preparation and fill placement on sloping hillside land to create a road connection from City Hall to Hawthorne Boulevard. The area was previously vacant land. Site preparation included the removal of vegetation and existing road fills where possible. No other surface or subsurface obstructions were encountered.

Beneath the proposed fills, low density top soils and slope wash were removed to expose firm natural ground. Existing fills associated with Hawthorne Boulevard were removed to the extent possible without endangerment to existing improvements. Soils used as fills were obtained on the site and imported from an adjacent project. The soils were essentially free of organic matter or objectionable debris. Fill materials were spread in thin lifts, watered to about optimum moisture content and compacted by sheepsfoot and pneumatic wheel rolling. A moderate amount of rock was incorporated into the fills. Rocks were spread in lifts or windrowed. Each rock lift or windrow was covered with an acceptable thickness of compacted soil before commencing additional rock placement. The maximum depth of compacted fill is about 25 feet.

The approximate location and elevation of the filled ground are shown on the attached plan. The drawing is a modification of Sheet 2 of the Improvement Plans - Hawthorne Boulevard.

Testing

Maximum dry density and optimum moisture content of the representative soils used to construct the fills were determined in the laboratory by ASTM Test Method D1557-70.

The results of the compaction curves were:

| Soil<br>Type | Description                          | Maximum<br>Dry Density | Optimum<br>Moisture Content |
|--------------|--------------------------------------|------------------------|-----------------------------|
|              |                                      | (pcf)                  | (percent)                   |
| A            | Dark brown SILTY CLAY                | 95.5                   | 23.0                        |
| B            | Light brown SILTY CLAY               | 93.0                   | 26.0                        |
| C            | Red-brown SANDY CLAY                 | 110.5                  | 16.8                        |
| D            | Dark gray CLAYEY SILT                | 101.0                  | 21.1                        |
| E            | Red-brown SANDY SILT<br>with GRAVEL  | 114.0                  | 15.0                        |
| F            | Yellow-red SANDY SILT<br>with GRAVEL | 121.0                  | 13.5                        |
| G            | Light brown CLAYEY SILT              | 101.5                  | 22.0                        |

A total of ninety-seven (97) field moisture-density tests were taken on the site during fill placement operations to determine relative compaction. Fill soils were tested using the drive cylinder, sand volume and nuclear guage methods, as described in ASTM publications. Results of the relative compaction tests are presented in Table I and test locations are shown on the attached drawing.

#### CONCLUSIONS AND RECOMMENDATIONS

##### Grading

Accepted construction practice and testing procedures were followed during the grading operations. It is our opinion that the fill was placed and compacted in conformance with the project plans and specifications, and the City of Rancho Palos Verdes Grading Ordinance. Based on our observations and tests, it is concluded that the natural ground was properly prepared as required. Representative field tests indicate the fill materials were compacted to a minimum of 90 percent relative compaction at the locations shown on the attached drawing.



APPENDIX

-A-

TABLE I

| Test<br>No. | Test<br>Date | Test<br>Elev.<br>(feet) | Maximum<br>Density<br>(pcf) | Moisture<br>Content<br>(percent) | Dry<br>Density<br>(pcf) | Relative<br>Compaction<br>(percent) |
|-------------|--------------|-------------------------|-----------------------------|----------------------------------|-------------------------|-------------------------------------|
| 1 nu        | 4-15-86      | 52.0                    | 101.0                       | 19.7                             | 95.3                    | 94                                  |
| 2 nu        | 4-15-86      | 54.0                    | 110.5                       | 18.0                             | 100.0                   | 90                                  |
| 3 nu        | 4-15-86      | 52.0                    | 101.0                       | 27.0                             | 93.8                    | 93                                  |
| 4 nu        | 4-16-86      | 53.0                    | 101.0                       | 26.7                             | 94.6                    | 94                                  |
| 5 nu        | 4-16-86      | 53.0                    | 101.0                       | 24.1                             | 93.8                    | 93                                  |
| 6 nu        | 4-16-86      | 55.0                    | 101.0                       | 27.4                             | 91.1                    | 90                                  |
| 7 nu        | 4-16-86      | 54.5                    | 101.0                       | 23.7                             | 95.4                    | 94                                  |
| 8 nu        | 4-16-86      | 54.0                    | 101.0                       | 26.7                             | 96.4                    | 95                                  |
| 9 nu        | 4-17-86      | 56.0                    | 101.0                       | 23.5                             | 91.7                    | 91                                  |
| 10 nu       | 4-17-86      | 57.0                    | 101.0                       | 24.1                             | 97.0                    | 96                                  |
| 11 nu       | 4-17-86      | 52.5                    | 101.0                       | 35.0                             | 84.9                    | 84 ck by #12                        |
| 12 nu       | 4-18-86      | 52.5                    | 101.0                       | 26.4                             | 93.4                    | 92                                  |
| 13 nu       | 4-18-86      | 58.0                    | 101.0                       | 27.9                             | 91.4                    | 90                                  |
| 14 nu       | 4-18-86      | 58.0                    | 101.0                       | 25.0                             | 91.9                    | 91                                  |
| 15 nu       | 4-21-86      | 53.0                    | 101.0                       | 25.6                             | 96.7                    | 96                                  |
| 16 nu       | 4-21-86      | 58.5                    | 101.0                       | 25.9                             | 95.2                    | 94                                  |
| 17 nu       | 4-21-86      | 53.0                    | 101.0                       | 23.9                             | 90.2                    | 89 ck by #23                        |
| 18 sv       | 4-22-86      | 55.0                    | 114.0                       | 14.9                             | 104.5                   | 92                                  |
| 19 nu       | 4-22-86      | 53.0                    | 101.0                       | 30.7                             | 90.3                    | 89 ck by #23                        |
| 20 nu       | 4-22-86      | 54.0                    | 101.0                       | 30.7                             | 90.1                    | 89 ck by #24                        |
| 21 nu       | 4-22-86      | 59.0                    | 101.0                       | 22.7                             | 89.9                    | 89 ck by #25                        |
| 22 nu       | 4-22-86      | 53.0                    | 101.0                       | 35.0                             | 86.5                    | 86 ck by #27                        |
| 23 nu       | 4-22-86      | 53.0                    | 101.0                       | 29.8                             | 91.4                    | 90                                  |
| 24 nu       | 4-22-86      | 54.0                    | 101.0                       | 30.7                             | 90.9                    | 90                                  |
| 25 nu       | 4-22-86      | 59.0                    | 101.0                       | 30.2                             | 90.9                    | 90                                  |
| 26 sv       | 4-23-86      | 55.0                    | 114.0                       | 18.1                             | 104.4                   | 92                                  |
| 27 nu       | 4-23-86      | 53.0                    | 101.0                       | 25.2                             | 95.2                    | 94                                  |
| 28 nu       | 4-23-86      | 55.5                    | 101.0                       | 27.9                             | 91.1                    | 90                                  |
| 29 nu       | 4-25-86      | 59.5                    | 95.5                        | 26.7                             | 89.7                    | 94                                  |
| 30 nu       | 4-23-86      | 57.0                    | 101.0                       | 27.4                             | 94.1                    | 93                                  |
| 31 nu       | 4-24-86      | 59.0                    | 101.0                       | 27.4                             | 93.9                    | 93                                  |
| 32 nu       | 4-24-86      | 61.0                    | 101.0                       | 23.9                             | 93.0                    | 92                                  |
| 33 sv       | 4-24-86      | 55.5                    | 114.0                       | 11.7                             | 103.0                   | 90                                  |
| 34 sv       | 4-24-86      | 58.0                    | 110.5                       | 18.6                             | 99.7                    | 90                                  |
| 35 nu       | 4-25-86      | 58.0                    | 101.0                       | 22.5                             | 96.7                    | 96                                  |

TABLE I (Continued)

| Test<br>No. | Test<br>Date | Test<br>Elev.<br>(feet) | Maximum<br>Density<br>(pcf) | Moisture<br>Content<br>(percent) | Dry<br>Density<br>(pcf) | Relative<br>Compaction<br>(percent) |
|-------------|--------------|-------------------------|-----------------------------|----------------------------------|-------------------------|-------------------------------------|
| 46 SV       | 4-25-86      | 59.0                    | 114.0                       | 19.9                             | 102.9                   | 90                                  |
| 47 nu       | 4-25-86      | 55.5                    | 95.5                        | 25.7                             | 86.0                    | 90                                  |
| 48 nu       | 4-25-86      | 56.5                    | 95.5                        | 25.8                             | 88.0                    | 92                                  |
| 49 SV       | 4-25-86      | 57.5                    | 114.0                       | 16.6                             | 107.5                   | 94                                  |
| 50 SV       | 4-25-86      | 62.5                    | 114.0                       | 17.4                             | 105.1                   | 92                                  |
| 51 SV       | 4-28-86      | 58.5                    | 121.0                       | 15.7                             | 113.8                   | 94                                  |
| 52 SV       | 4-28-86      | 59.0                    | 121.0                       | 15.7                             | 119.5                   | 99                                  |
| 53 SV       | 4-28-86      | 64.5                    | 121.0                       | 15.7                             | 117.1                   | 97                                  |
| 54 SV       | 4-29-86      | 59.0                    | 121.0                       | 15.3                             | 114.9                   | 95                                  |
| 55 SV       | 4-29-86      | 63.5                    | 121.0                       | 15.6                             | 115.0                   | 95                                  |
| 56 SV       | 4-29-86      | 57.5                    | 121.0                       | 12.6                             | 117.7                   | 97                                  |
| 57 SV       | 4-29-86      | 59.0                    | 121.0                       | 11.6                             | 105.7                   | <del>87</del> ck by #48             |
| 58 SV       | 4-29-86      | 59.0                    | 121.0                       | 16.7                             | 110.7                   | 91                                  |
| 59 SV       | 4-30-86      | 62.0                    | 114.0                       | 14.1                             | 105.2                   | 92                                  |
| 60 SV       | 5-01-86      | 65.0                    | 121.0                       | 16.3                             | 119.5                   | 99                                  |
| 61 SV       | 5-01-86      | 65.5                    | 121.0                       | 17.0                             | 108.9                   | 90                                  |
| 62 SV       | 5-02-86      | 68.5                    | 110.5                       | 22.7                             | 99.8                    | 90                                  |
| 63 SV       | 5-02-86      | 60.0                    | 121.0                       | 18.3                             | 114.3                   | 94                                  |
| 64 SV       | 5-02-86      | 60.5                    | 121.0                       | 17.4                             | 115.0                   | 95                                  |
| 65 SV       | 5-03-86      | 69.5                    | 101.0                       | 29.5                             | 94.9                    | 94                                  |
| 66 SV       | 5-05-86      | 65.0                    | 101.0                       | 18.6                             | 89.1                    | 88 ck by #67                        |
| 67 SV       | 5-05-86      | 66.0                    | 101.0                       | 24.1                             | 96.5                    | 95                                  |
| 68 SV       | 5-06-86      | 67.0                    | 110.5                       | 16.8                             | 88.4                    | <del>80</del> ck by #62             |
| 69 SV       | 5-06-86      | 65.0                    | 110.5                       | 19.0                             | 92.9                    | 84 ck by #67                        |
| 70 SV       | 5-06-86      | 66.0                    | 114.0                       | 19.8                             | 106.4                   | 93                                  |
| 61 SV       | 5-07-86      | 62.5                    | 114.0                       | 23.2                             | 105.9                   | 93                                  |
| 62 SV       | 5-07-86      | 67.0                    | 110.5                       | 17.4                             | 103.9                   | 94                                  |
| 63 SV       | 5-08-86      | 71.0                    | 101.5                       | 23.5                             | 98.1                    | 97                                  |
| 64 SV       | 5-08-86      | 69.0                    | 110.5                       | 27.9                             | 106.3                   | 96                                  |
| 65 SV       | 5-08-86      | 70.0                    | 101.5                       | 30.7                             | 95.1                    | 94                                  |
| 66 SV       | 5-09-86      | 66.5                    | 95.5                        | 29.9                             | 88.3                    | 92                                  |
| 67 SV       | 5-12-86      | 65.0                    | 121.0                       | 14.3                             | 117.6                   | 97                                  |
| 68 SV       | 5-12-86      | 66.5                    | 114.0                       | 19.8                             | 105.8                   | 93                                  |
| 69 SV       | 5-12-86      | 71.0                    | 101.0                       | 25.8                             | 97.4                    | 96                                  |
| 70 SV       | 5-13-86      | 70.5                    | 121.0                       | 19.6                             | 116.6                   | 96                                  |

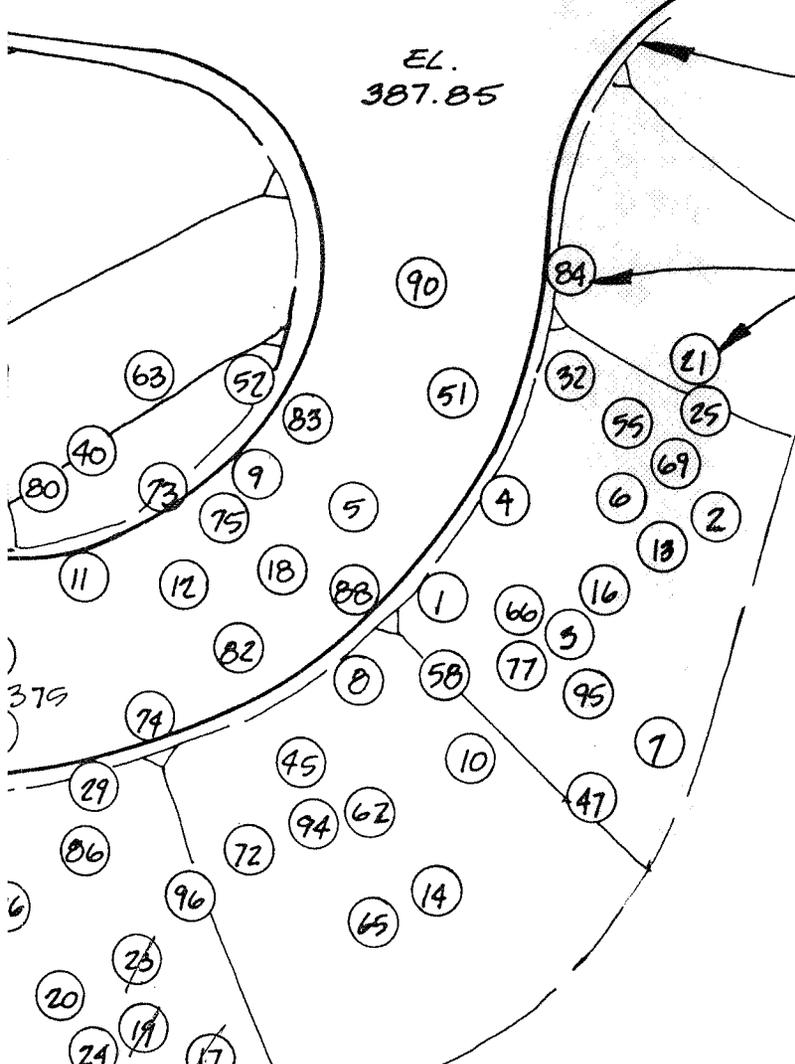
TABLE I (Continued)

| Test Number | Test Date | Test Elev. (feet) | Maximum Density (pcf) | Moisture Content (percent) | Dry Density (pcf) | Relative Compaction (percent) |
|-------------|-----------|-------------------|-----------------------|----------------------------|-------------------|-------------------------------|
| 71 sv       | 5-13-86   | 64.5              | 95.5                  | 33.7                       | 87.7              | 92                            |
| 72 sv       | 5-14-86   | 68.5              | 95.5                  | 34.6                       | 81.4              | <del>85</del> ck by #74       |
| 73 sv       | 5-14-86   | 70.0              | 101.5                 | 26.6                       | 89.9              | <del>89</del> ck by #75       |
| 74 sv       | 5-15-86   | 68.5              | 93.0                  | 27.4                       | 83.6              | 90                            |
| 75 sv       | 5-15-86   | 70.5              | 110.5                 | 17.6                       | 104.7             | <del>95</del>                 |
| 76 sv       | 5-15-86   | 71.5              | 110.5                 | 17.6                       | 104.0             | 94                            |
| 77 sv       | 5-16-86   | 71.0              | 114.0                 | 19.7                       | 107.4             | 94                            |
| 78 sv       | 5-16-86   | 71.0              | 101.5                 | 30.7                       | 93.9              | 93                            |
| 79 sv       | 5-20-86   | 73.0              | 121.0                 | 16.0                       | 117.2             | 97                            |
| 80 sv       | 5-21-86   | 73.0              | 101.5                 | 27.4                       | 96.3              | 95                            |
| 81 sv       | 5-21-86   | 72.0              | 95.5                  | 23.5                       | 93.1              | 98                            |
| 82 sv       | 5-22-86   | 75.0              | 101.0                 | 25.3                       | 91.5              | 91                            |
| 83 sv       | 5-22-86   | 74.5              | 114.0                 | 21.2                       | 104.4             | 92                            |
| 84 sv       | 5-22-86   | 78.0              | 114.0                 | 21.2                       | 108.1             | 95                            |
| 85 sv       | 5-23-86   | 68.0              | 114.0                 | 16.3                       | 103.5             | 91                            |
| 86 sv       | 5-23-86   | 75.5              | 101.5                 | 20.5                       | 93.1              | 92                            |
| 87 sv       | 5-23-86   | 75.0              | 114.0                 | 16.8                       | 104.9             | 92                            |
| 88 sv       | 5-23-86   | 79.0              | 114.0                 | 22.7                       | 109.6             | 96                            |
| 89 sv       | 5-28-86   | 77.0              | 114.0                 | 20.0                       | 104.2             | 91                            |
| 90 sv       | 5-29-86   | 79.5              | 101.5                 | 30.1                       | 91.9              | 91                            |
| 91 sv       | 5-30-86   | 76.5              | 121.0                 | 20.0                       | 110.3             | 91                            |
| 92 sv       | 5-30-86   | 70.0              | 110.5                 | 18.5                       | 92.6              | <del>84</del> ck by #97*      |
| 93 sv       | 5-30-86   | 77.0              | 114.0                 | 18.8                       | 103.3             | 91                            |
| 94 sv       | 5-30-86   | 74.0              | 110.5                 | 20.5                       | 77.0              | <del>70</del> ck by #96*      |
| 95 sv       | 6-19-86   | 75.0              | 121.0                 | 16.1                       | 110.9             | 92 *                          |
| 96 sv       | 6-20-86   | 76.0              | 121.0                 | 16.3                       | 110.8             | 92 *                          |
| 97 sv       | 6-23-86   | 70.0              | 93.3                  | 25.6                       | 85.3              | 92 *                          |

sv - indicates that this test is a sand volume test

\* - slope test

HORNE BLVD.



TOP OF SLOPE  
TOE OF SLOPE  
LOCATION OF FIELD TESTS  
EL. 370

SCALE  
1" = 40'

CITY PARK GRADING, CITY HALL  
RANCHO PALOS VERDES, CA.

LOCATION OF FIELD TESTS

MOORE & TABER Engineers-Geologists

| DRAFT | APPROV. | DATE    | JOB #   |
|-------|---------|---------|---------|
| EGD   | T       | 7/31/86 | 206-203 |