Harrington Geotechnical Engineering, Inc.

January 13, 2010

Mr. Fred Diamond
Director Building Services
ROWLAND UNIFIED SCHOOL DISTRICT
1018 South Otterbein Street
Rowland Heights, CA 91748

Subject: **Limited Geotechnical Investigation to Provide Recommendations for Subgrade Preparation and Pavement and Floor Slab Design at Alvarado Intermediate School, 1901 Desire Avenue, Rowland Heights, Ca**
District Project No. 108RSD13
HGEI Project No. 09-01-2863

Reference: "Results of Corrosivity Testing for Reworking of Underground Utilities at Alvarado Intermediate School, 1901 Desire Avenue, Rowland Heights, Ca," prepared by Harrington Geotechnical Engineering Inc., dated October 30, 2008, HGEI Project No. 08-09-2863.

Dear Mr. Diamond:

In accordance with your request and authorization, Harrington Geotechnical Engineering, Inc. has performed pavement coring, soil borings and laboratory testing, and prepared this materials report for evaluation of pavement for the Alvarado Intermediate Pavement Assessment Project. This investigation was performed essentially in accordance with our Work Authorization No. P-2945, dated November 25, 2009.

Project Conditions

The project comprises removing and replacing significant sections of the portland cement concrete flatwork adjacent to the classroom buildings and the building floor slabs in Classroom K1-A and C-2.

Scope of Work

The Scope of Work for this project included the following:

- Coring the existing flatwork at 4 selected locations.

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- Drilling, sampling and logging four 5-ft-deep hand-auger borings in the area slated for pavement replacement.
- Testing selected samples in our laboratory to establish physical properties of materials encountered.
- Preparing this summary report which presents our findings and recommendations for subgrade preparation, flatwork and slab replacement.

Exploration and Sampling

Subsurface exploration consisted of coring the pavement at the selected locations and logging and sampling four exploratory borings (B-1 through B-4) drilled to a depth of 5 feet below existing pavement grade. All of the borings were advanced using an 4-inch-diameter hand auger. The borings were drilled on December 14, 2009, at the approximate locations indicated on Plate A.

Representatives of Harrington Geotechnical Engineering, Inc. were present to observe drilling operations and collect pavement cores and soil samples. In-place and bulk samples obtained were placed in plastic bags and brought to our laboratory for testing.

Caving did not occur in the borings. The borings were backfilled immediately upon completion of logging and sampling and the pavement surface patched with quick set concrete.

Subsurface Conditions

Pavement

Total portland concrete thickness determined by the coring and subsurface exploration varied from 3 3/4 inches in Boring B-4 to 7 5/8 inches in Boring B-2. Boring B-1 had 5 inches and B-3 had 4 inches. There was no aggregate base present.

Subsurface Soils

Subgrade soils encountered in the borings consisted of silty sand and sandy silt. Different materials may exist in other portions of the site the materials ranged from firm to dense and were moist.

Groundwater

Groundwater was not encountered at the time of drilling. Seasonal fluctuations in moisture may occur as a result of variations in subsurface conditions, rainfall, runoff and other factors.

Laboratory Testing

Laboratory tests performed on the subgrade soil samples included moisture, density, and stabilometer (R-value) tests, the results the stabilometer tests are summarized in Table 1. The moisture and density test results are on the boring logs.

TABLE 1
Stabilometer Test Result (California 301)

Sample I.D.	Soil Type	R-Value*
B-2 @ 0'-5'	Brown Silty Sand	10
B-4 @ 0'-5'	Brown Silty Sand	25

* Controlled by exudation

Recommendations

The following recommendations reflect our best assessment of project conditions and requirements based on analysis and evaluation of results reported herein. These recommendations are provided subject to confirmation of anticipated conditions during pavement and building floor removal and replacement.

Pavement and Floor Slab Preparation

In preparation for the new pavement or building, the area should be cleared of the existing concrete pavement. Any unsuitable material encountered should be properly disposed of and not incorporated into new subgrade.

The subgrade soil should be scarified 12 inches deep, moisture conditioned to approximate optimum-moisture content and mechanically compacted to a minimum relative compaction of 90 percent based on compaction tests performed in accordance with ASTM Test Method D-1557.

Footing/Floor Slab Design

It is recommended that the building slab be a full 4 inches thick and reinforced with No. 3 bars at 24 inches on center, each way. The slabs should be provided with a moisture/vapor barrier in accordance with ASTM Method E1643-98.

The slab subgrade should be pre-moistened within 24 hours of placing the moisture/vapor barrier.

Flatwork Construction

Low-slump concrete should be used for the exterior flatwork construction to minimize cracking.

The walkway and paving areas should be a full 4 inches thick and reinforced with No. 3 bars at 24 inches on center, each way. along with ample control joints for exterior flatwork to reduce unsightly cracking.

The walkway and paving subgrade should be pre-moistened within 24 hours of placing the concrete.

Concrete Quality

Concrete should conform to 2007 California Building Code, Section 1904.3 which refers to the provisions of ACI 318, Section 4.3 for negligible sulfate exposure.

Limitations

The recommendations and opinions expressed herein reflect our best estimate of project conditions and site-specific requirements based on geotechnical data established by this investigation. Variations in subsurface conditions which could influence driveway performance may occur in unexplored areas.

This report has been prepared for the specific construction site indicated herein and shall not be applied to other sites unless approved in writing by this office.

We have evaluated known site conditions and prepared this report in accordance with generally accepted geotechnical engineering practice. We offer no further warranty, express or implied, as to the professional advice presented in this report.

We appreciate this opportunity to be of service and trust this report meets your present needs. Should you have any questions or require further assistance, please do not hesitate to call.

Very truly yours,

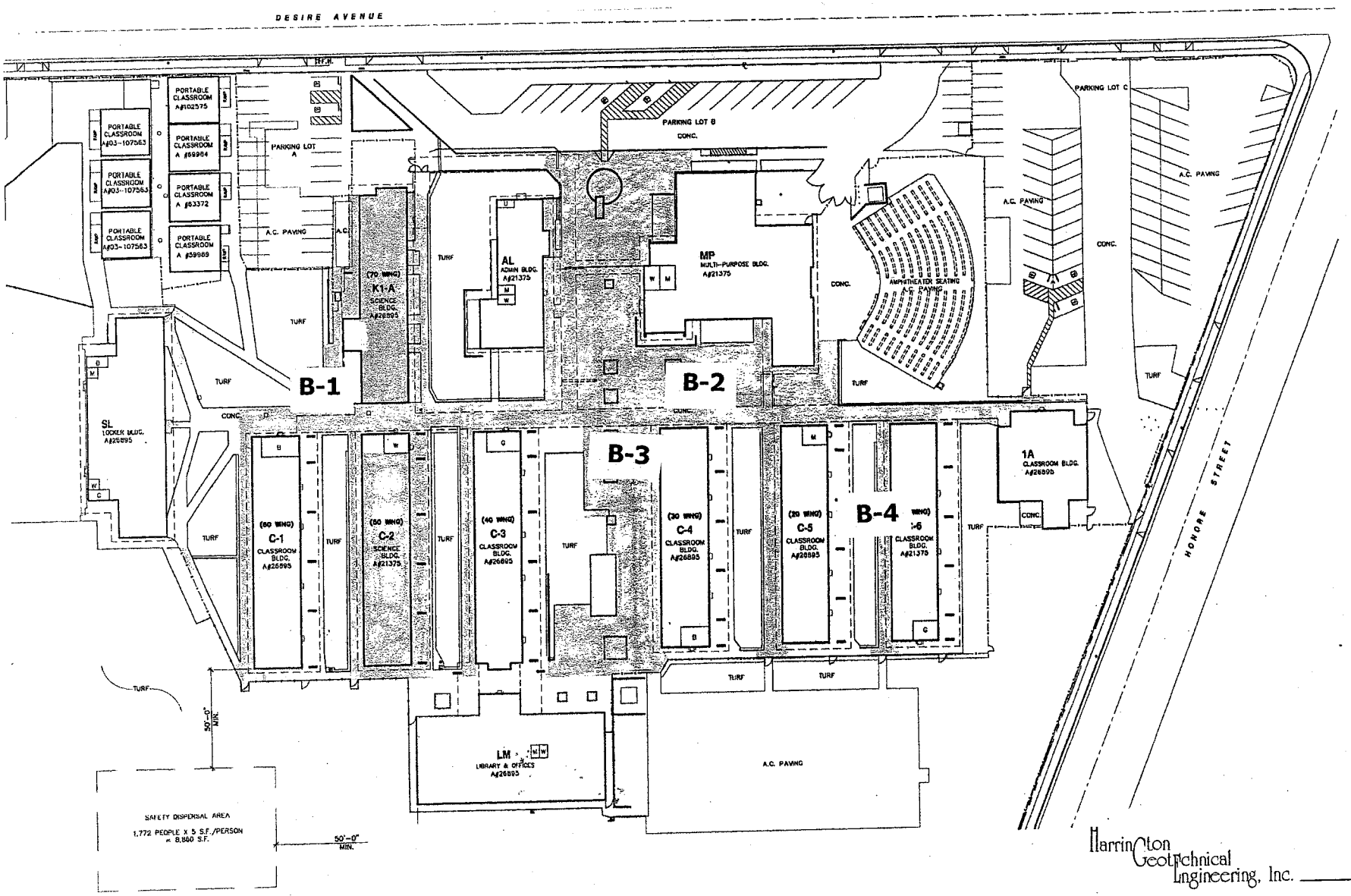
HARRINGTON GEOTECHNICAL ENGINEERING, INC.

Joseph L. Welch, P.E.
Senior Geotechnical Engineer

JLW:mvp

Attachments

(5 copies submitted)



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Date: JAN. 2010 Scale: N.T.S.

Project No. 09-01-2863

LOG OF BORING B-1

Project:	Alvarado Intermediate School	Surface Elev.:	Grade
Job No.:	09-01-2863	Top of Casing Elev.:	N.A.
Location:	1901 Desire Avenue, Rowland Heights, Ca	Drilling Method:	Core/Hand Auguer
Coordinates:		Sampling Method:	Core/Bulk

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0					5" P/C/C No Base			
						Brown; fine sandy silt (moist, firm) (ML)	12	94	14
	5								

Completion Depth:	5.0
Date Boring Started:	12/14/09
Date Boring Completed:	12/14/09
Logged By:	JVG
Drilling Contractor:	HGEI

Remarks:
Groundwater was not encountered at time of drilling. Caving did not occur.

The stratification lines represent approximate boundaries. The transition may be gradual.

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PLATE B-1

LOG OF BORING B-2

Project:	Alvarado Intermediate School	Surface Elev.:	Grade
Job No.:	09-01-2863	Top of Casing Elev.:	N.A.
Location:	1901 Desire Avenue, Rowland Heights, Ca	Drilling Method:	Core/Hand Auguer
Coordinates:		Sampling Method:	Core/Bulk

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0					7 5/8" P/C/C (No Base)			
						Brown, silty sand, moist medium dense (SM)	25	85	9
	5								

Completion Depth: 5.0
Date Boring Started: 12/14/09
Date Boring Completed: 12/14/09
Logged By: JVG
Drilling Contractor: HGEI

Remarks:
Groundwater was not encountered at time of drilling. Caving did not occur.

The stratification lines represent approximate boundaries. The transition may be gradual.

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PLATE B-2

LOG OF BORING B-3

Project:	Alvarado Intermediate School	Surface Elev.:	Grade
Job No.:	09-01-2863	Top of Casing Elev.:	N.A.
Location:	1901 Desire Avenue, Rowland Heights, Ca	Drilling Method:	Core/Hand Auguer
Coordinates:		Sampling Method:	Core/Bulk

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0					4" P/C/C No Base			
						Brown, silty sand moist medium dense (SM)	30	92	8
	5								

Completion Depth:	5.0
Date Boring Started:	12/14/09
Date Boring Completed:	12/14/09
Logged By:	JVG
Drilling Contractor:	HGEI

Remarks:
Groundwater was not encountered at time of drilling. Caving did not occur.

The stratification lines represent approximate boundaries. The transition may be gradual.

LOG OF BORING B-4

Project:	Alvarado Intermediate School	Surface Elev.:	Grade
Job No.:	09-01-2863	Top of Casing Elev.:	N.A.
Location:	1901 Desire Avenue, Rowland Heights, Ca	Drilling Method:	Core/Hand Auguer
Coordinates:		Sampling Method:	Core/Bulk

Elevation, feet	Depth, feet	Sample No.	Sampler Graphics	Symbol / USCS	Recovery %	MATERIAL DESCRIPTION	Blow Counts	Dry Unit Weight, lb/cu ft.	Water Content %
	0					3 3/4" P/C/C No Base			
						Brown, silty sand moist, dense (SM)	74	107	8
	5								

Completion Depth:	5.0
Date Boring Started:	12/14/09
Date Boring Completed:	12/14/09
Logged By:	JVG
Drilling Contractor:	HGEI

Remarks:
Groundwater was not encountered at time of drilling. Caving did not occur.

The stratification lines represent approximate boundaries. The transition may be gradual.

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PLATE B-4