GeoEngineers

January 8, 2004

Spokane Public Facilities District
720 West Mallon
Spokane, Washington 99202

Attention: Kevin Twohig

Subject: Report
Geotechnical Engineering Study
Centennial Trail
Convention Center Expansion
Spokane, Washington
File No. 0110-047-04

INTRODUCTION AND SCOPE

This report presents the results of our geotechnical engineering study along a portion of the Centennial Trail in the vicinity of the planned Convention Center Expansion project. The project site consists of an approximately 700-foot-long section of the Centennial Trail located north of the existing Convention Center building and west of the Division Street bridge in Spokane, Washington. The Convention Center site was the subject of a geotechnical and environmental evaluation by GeoEngineers, the results of which are contained in our reports dated September 2002.

We understand the Centennial Trail might be used for emergency vehicle access. Consequently, an evaluation of the pavement section and subgrade is required. Based on our discussion with a representative of the city of Spokane Fire Department, we understand that maximum anticipated loads, applied by their engine-type fire trucks, is 27,000 pounds over a single rear axle with a total vehicle weight of 37,000 pounds. The maximum total load for a ladder-type fire truck is about 72,000 pounds distributed over a double-tandem axle configuration.

The purpose of our geotechnical study was to evaluate pavement and subgrade conditions along a portion of the trail within our area of investigation based on field observations, results of our field testing, and engineering analyses. Our services were authorized by you on December 22, 2003. Specifically, our scope of services included:

1. Review existing available geotechnical data.
2. Coring of pavement at seven locations on the existing trail, to reveal the subgrade, at approximately 100-foot intervals.
3. Use a (Wildcat) portable dynamic cone penetrometer to evaluate the relative density of the near surface soils at each of the cored locations.

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SITE CONDITIONS

GENERAL

Site conditions were evaluated by reconnaissance of the project area, coring through existing asphalt concrete pavement and completing seven dynamic cone penetrometer tests (P-1 through P-2) at each pavement core location. The area of our study encompassed an approximate 700-foot-long portion of the Centennial Trail measured from the west side of the Division Street (SR Highway 2/US 395) bridge.

SURFACE CONDITIONS

The Centennial Trail was surfaced with asphalt concrete pavement within the limits of our study area. At the time of our site visit, the asphalt surface appeared to be relatively level and in good condition based on no apparent cracks of significance or rutting.

SUBSURFACE CONDITIONS

On December 19, 2003, we mobilized a core drill and a portable dynamic cone penetrometer with a work crew to the project site. The portable dynamic cone penetrometer consists of a 35-pound hammer that is manually lifted and allowed to free fall 15 inches on to a metal rod, which was filled with an oversized cone attached to the tip of the metal rod. The number of blows required to penetrate approximately 4-inch intervals was recorded and used for evaluating the relative density of the soil.

Seven, 4-inch-diameter cores (P-1 through P-7) were drilled at approximate 100-foot intervals west of the Division Street bridge. The dynamic cone penetrometer was then used to evaluate the relative soil density beneath the pavement at each cored location. Three of the test locations (P-1, P-2, and P-7) at the east and west boundary of area of study, respectively, encountered refusal (core-tipped rod would not penetrate pavement, crushed rock base course or underlying subgrade) just below the bottom of the asphalt layer. The remaining four probes (P-3 through P-6) penetrated to depths ranging between 2.1 and 2.3 feet below top of asphalt before refusal occurred.

CONCLUSIONS

We converted the field-measured blow counts from the dynamic cone testing program to approximate equivalent Standard Penetration Test (SPT) N-values based on the manufacturers recommended procedures, as shown on Table 1, Field Measurements. The N-values provide a qualitative correlation of the relative density of on-site soils.

The very high blow counts encountered below the pavement section at test locations P-1, P-2, and P-3 are likely caused by the small diameter penetrometer tip striking coarse gravel and cobble-size particles, and is probably not representative of subgrade relative density. The results of our testing at locations P-3 through P-7, however, are likely more representative of the subsurface conditions to the depths explored.

Based on results of our site exploration and evaluation, we conclude that the asphalt concrete pavement subgrade, within the limits of this study, appears to have been relatively well prepared, in terms of compaction. Dynamic penetrometer results indicate the subgrade, at the locations of our probes, is generally medium dense to dense. Likewise, the pavement base course layer appears to have been compacted.

As indicated in the previous section of this report, the asphalt concrete pavement ranges in thickness from about 3 ½ to 4 inches at the locations of our probes. This is a surprisingly thick pavement section for a recreational trail, in our opinion, and is more typical of a heavy-duty pavement, which would be subjected to frequent heavy wheel loads such as those imposed by fire trucks.

On the basis of our findings and understanding of the types, weights and axle/wheel configurations typical of Spokane Fire Department trucks, it is our opinion that the existing Centennial Trail asphalt concrete pavement, base course and underlying subgrade should provide suitable support for fire trucks during emergency situations. This opinion is based on the assumption that the conditions that we encountered at the locations of our seven probes are representative of conditions along the approximate 700-foot-length of the trail for which this study was completed.

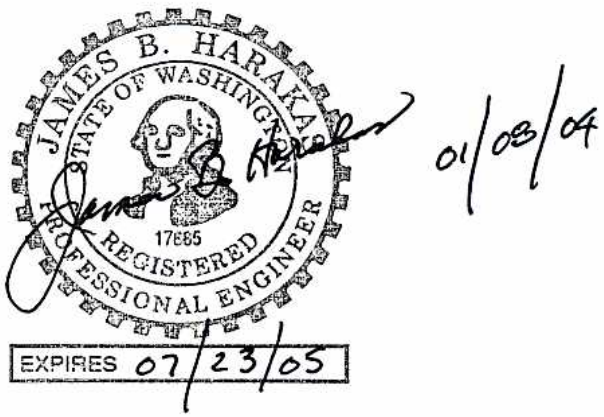
We appreciate the opportunity to provide these services for your project. Please contact the undersigned if you have any questions regarding the contents of this report or if you require additional information.

Respectfully submitted,

GeoEngineers, Inc.

Matthew L. Blankenship, LEG
Project Manager

James B. Harakas, PE, LEG
Senior Principal



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Attachments

Table 1 – Field Measurements

TABLE 1
FIELD MEASUREMENTS
Wildcat Dynamic Cone Log

Project:	Centennial Trail Evaluation	Started:	12/19/03	Hammer Wt.:	35 lbs.
File No	0110-047-04	Completed:	12/19/03	Cone Area:	10 cm^2
Client:	Spokane Public Facilities District	Logged by:	MLB	Sheet No.:	1

Location	Depth		Blows	Increment, cm.	Equivalent blows/10 cm.	Resistance Kg/cm^2	Approximate SPT 'N'-value
	Feet	Meters					
P-1	0.2	0.05	50	5.0	100	444.0	>25
	0.3	0.10	200	10.0	200	888.0	>25
P-2	0.3	0.09	30	8.9	34	149.8	>25
	0.4	0.11	100	11.4	87	388.5	>25
P-3	0.3	0.10	40	10.0	40	177.6	>25
	0.7	0.20	100	10.0	100	444.0	>25
	1.0	0.30	40	10.0	40	177.6	>25
	1.3	0.40	26	10.0	26	115.4	>25
	1.6	0.50	37	10.0	37	164.3	>25
	2.0	0.60	44	10.0	44	195.4	>25
	2.3	0.69	50	8.9	56	249.7	>25
P-4	0.3	0.10	18	10.0	18	79.9	**23**
	0.7	0.20	20	10.0	20	88.8	>25
	1.0	0.30	23	10.0	23	102.1	>25
	1.3	0.40	32	10.0	32	142.1	>25
	1.6	0.50	27	10.0	27	119.9	>25
	2.0	0.60	33	10.0	33	146.5	>25
	2.1	0.65	50	5.0	100	444.0	>25
P-5	0.3	0.10	36	10.0	36	159.8	>25
	0.7	0.20	37	10.0	37	164.3	>25
	1.0	0.30	38	10.0	38	168.7	>25
	1.3	0.40	22	10.0	22	97.7	>25
	1.6	0.50	15	10.0	15	66.6	**19**
	2.0	0.60	30	10.0	30	133.2	>25
	2.2	0.68	50	7.6	66	292.1	>25
P-6	0.3	0.10	23	10.0	23	102.1	>25
	0.7	0.20	30	10.0	30	133.2	>25
	1.0	0.30	25	10.0	25	111.0	>25
	1.3	0.40	36	10.0	36	159.8	>25
	1.6	0.50	34	10.0	34	151.0	>25
	2.0	0.60	50	10.0	50	222.0	>25
	2.3	0.70	50	10.0	50	222.0	>25
P-7	0.3	0.10	40	10.0	40	177.6	>25
	0.5	0.15	50	5.0	100	444.0	>25