LEE'S SUMMIT
MISSOURI

DESIGN & CONSTRUCTION MANUAL
DESIGN CRITERIA MODIFICATION REQUEST

PROJECT NAME: Lee's Summit Commerce Center Building #2/ Lot #2

ADDRESS: 1220 NW Main Street

PERMIT NUMBER: PL2022174

OWNER'S NAME: Scannell Properties

TO: Deputy Director of Public Works / City Engineer

In accordance with the City of Lee's Summit's Design and Construction Manual (DCM), I wish to apply for a modification to one or more provisions of the code as I feel that the spirit and intent of the DCM is observed and the public health, welfare and safety are assured. The following articulates my request for your review and action. (NOTE: Cite specific code sections, justification and all appropriate supporting documents.)

The project team requests the pavement section for Lee's Summit Commerce Center Building #2 be modified per the attached letter. The request is to revise the Lee's Summit standard pavement sections shown in Table 8-5, Parking Lot Pavement, Section 8.620.f.1a(1).

SUBMITTED BY:
NAME: Ian Dillon, P.E.
ADDRESS: 1700 E. 123rd Street
CITY, STATE, ZIP: Olathe, KS 66061
Email: idillon@olsson.com

( ) OWNER (X) OWNER'S AGENT
PHONE #: 913.748.2527
SIGNATURE:

SUE PYLES, P.E.
DEVELOPMENT ENGINEERING MANAGER (X) APPROVAL ( ) DENIAL
SIGNATURE: DATE: 9-22-23

JEFF THORN, P.E.
WATER UTILITIES ASSITANT DIRECTOR OF ENGINEERING SERVICES ( ) APPROVED ( ) DENIAL
SIGNATURE: DATE:

GEORGE M. BINGER III, P.E.
DEPUTY DIRECTOR OF PUBLIC WORKS/CITY ENGINEER (X) APPROVED ( ) DENIAL
SIGNATURE: DATE: 9-22-2023

COMMENTS:

A COPY MUST BE ATTACHED TO THE APPROVED PLANS ON THE JOB SITE

olsson

September 22, 2023

Scannell Properties
Attn: Don Tuttle
1600 Genessee Street
Kansas City, MO 64102

RE: Pavement Section Substitution Due to Shallow Bedrock
Northwest Corner of Tudor Road and Main Street, Lee's Summit, MO
Olsson Project Number: B21-04157

Dear Mr. Tuttle,

We understand that limestone and/or shale bedrock was encountered across the site at an elevation at or above the base of the proposed pavement elevation. We further understand that the bedrock was removed to a depth of approximately 6 inches below the pavement base. This letter provides an alternative pavement section to the standard light and heavy-duty City of Lee's Summit sections due to the increase in subgrade strength achieved from the shallow bedrock.

The City of Lee's Summit's standard light and heavy-duty section include 6 inches of MoDOT Type 5 baserock below the pavement base and either 6 inches of chemically treated cohesive soils or geogrid placed below the baserock atop of a compacted cohesive clay subgrade. In our opinion, due to existing bedrock being located at the elevation of the proposed chemically treated subbase or geogrid, the use of either the chemical stabilization or geogrid can be neglected at this site. Below and attached are calculations to support our opinions.

The following four tables provide the specific and total section structural numbers for both the City of Lee's Summit's light and heavy-duty sections and the pavement sections without the chemically stabilized base or geogrid support.

Layer Material	Lee's Summit Light Duty Pavement Section			
	Layer Coefficient	Drainage Coefficient	Layer Thickness, in	Layer Structural Number
AC Surface Course	0.42	1.0	1.5	0.63
AC Base Course	0.40	1.0	4.0	1.60
Granular Base	0.12	1.0	6.0	0.72
Chemically Stabilized Base	0.12	1.0	6.0	0.72
Total Structural Number for Lee's Summit Heavy Duty Pavement Section				**3.67**

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Layer Material	Lee's Sumit Light Duty Pavement Section (No Chemical Stab)			
	Layer Coefficient	Drainage Coefficient	Layer Thickness, in	Layer Structural Number
AC Surface Course	0.42	1.0	1.5	0.63
AC Base Course	0.40	1.0	4.0	1.60
Granular Base	0.12	1.0	6.0	0.72
Total Structural Number for Lee's Summit Heavy Duty Pavement Section				2.95

Layer Material	Lee's Summit Heavy Duty Pavement Section			
	Layer Coefficient	Drainage Coefficient	Layer Thickness, in	Layer Structural Number
AC Surface Course	0.42	1.0	1.5	0.63
AC Base Course	0.40	1.0	5.0	2.00
Granular Base	0.12	1.0	6.0	0.72
Chemically Stabilized Base	0.12	1.0	6.0	0.72
Total Structural Number for Lee's Summit Heavy Duty Pavement Section				4.07

Layer Material	Lee's Summit Heavy Duty Pavement Section (No Chemical Stab)			
	Layer Coefficient	Drainage Coefficient	Layer Thickness, in	Layer Structural Number
AC Surface Course	0.42	1.0	1.5	0.63
AC Base Course	0.40	1.0	5.0	2.00
Granular Base	0.12	1.0	6.0	0.72
Total Structural Number for Lee's Summit Heavy Duty Pavement Section				3.35

The total structural numbers for each case were then used to calculate the Design ESAL's using the computer program WinPAS. WinPAS calculates the design ESAL's in accordance with the 1993 AASHTO Guide for Design of Pavements Structures. A CBR value of 3 was used for cohesive clay soils for the city standard sections and 40 was used for bedrock. A CBR value cannot be directly measured for bedrock, and as such, a conservative number for gravel baserock was used. The resulting ESAL calculations are provided in the following table.

Flexible Pavement Design Inputs	Pavement Section			
	Light Duty (City Section)	Light Duty (Section w/ Bedrock)	Heavy Duty (City Section)	Heavy Duty (Section W/ Bedrock)
Structural Number (As Calculated Above)	3.67	2.95	4.07	3.35
Reliability	85.0	85.0	85.0	85.0
Overall Deviation	0.45	0.45	0.45	0.45
Initial Serviceability	4.0	4.0	4.0	4.0
Terminal Serviceability	2.0	2.0	2.0	2.0
CBR Value	3.0	40	40	40
Soil resilient Modulus	4,115.2 psi	24,249.2 psi	4,115.2 psi	24,249.2 psi
Design ESAL's	**0.56M**	**8.28M**	**1.12M**	**18.71M**

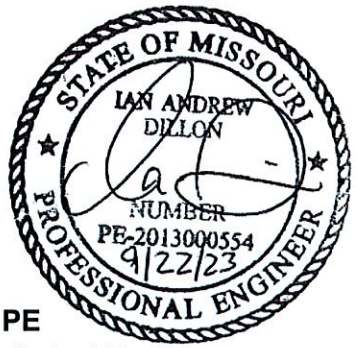
As shown in the table above, the ESAL's for the sections with bedrock exceed the ESAL's for the typical City sections. Although not anticipated, in areas where bedrock is not encountered within 6 inches of the base of the pavements, we recommend the pavement section include geogrid beneath the baserock as recommended by the City of Lee's Summit.

The conclusions and recommendations presented in this letter are based on the information available regarding the proposed construction as well as our experience with similar projects. Conditions may be encountered during construction that are substantially different from those described in this letter and adjustments to design and construction may be necessary.

In the event of any changes in the nature of the proposed project as outlined in this letter, the opinions in this letter cannot be considered valid unless Olsson reviews the changes, and the opinions of this letter are modified or affirmed by Olsson.

We appreciate the opportunity to provide our geotechnical engineering services for this project. and are prepared to provide construction phase services as well. If you have any questions or need further assistance, please contact us at your convenience.

Respectfully submitted,
Olsson, Inc.
Missouri Certificate of Authority No. 001592



Ian A. Dillon, PE
Senior Geotechnical Engineer

Luke Moore, EI
Project Manager

Attachments: WinPAS Outputs

1700 E 123rd St / Olathe, KS 66061
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WinPAS

Pavement Thickness Design According to

1993 AASHTO Guide for Design of Pavements Structures

American Concrete Pavement Association

Flexible Design Inputs

Agency: Lee's Summit Commerce Building #2
Company: Scannell Properties
Contractor: Kadean Construction
roject Description: Lee's Summit Light Duty Section
Location: 1220 NW Main Street

Flexible Pavement Design/Evaluation

Structural Number	3.67		**Soil Resilient Modulus**	4,118.20	**psi**
Design ESALs	555,200		**Initial Serviceability**	4.00	
Reliability	85.00	**percent**	**Terminal Serviceability**	2.00	
Overall Deviation	0.45				

Layer Pavement Design/Evaluation

Layer Material	Layer Coefficient	Drainage Coefficient	Layer Thickness	Layer SN
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
Asphalt Cement Concrete	0.42	1.00	1.50	0.63
Asphalt Cement Concrete	0.40	1.00	4.00	1.60
Granular Subbase	0.12	1.00	6.00	0.72
Cement Treated Agg. Base	0.12	1.00	6.00	0.72
			Σ SN	3.67

WinPAS

Pavement Thickness Design According to

1993 AASHTO Guide for Design of Pavements Structures

American Concrete Pavement Association

Flexible Design Inputs

Agency: Lee's Summit Commerce Building #2
Company: Scannell Properties
Contractor: Kadean Construction
roject Description: Lee's Summit Light Duty Section (With Bedrock)
Location: 1220 NW Main Street

Flexible Pavement Design/Evaluation

Structural Number	2.95		**Soil Resilient Modulus**	24,249.20	**psi**
Design ESALs	8,277,200		**Initial Serviceability**	4.00	
Reliability	85.00	**percent**	**Terminal Serviceability**	2.00	
Overall Deviation	0.45				

Layer Pavement Design/Evaluation

Layer Material	Layer Coefficient	Drainage Coefficient	Layer Thickness	Layer SN
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
Asphalt Cement Concrete	0.42	1.00	1.50	0.63
Asphalt Cement Concrete	0.40	1.00	4.00	1.60
Granular Subbase	0.12	1.00	6.00	0.72
	0.00	0.00	0.00	0.00
			Σ SN	2.95

WinPAS

Pavement Thickness Design According to

1993 AASHTO Guide for Design of Pavements Structures

American Concrete Pavement Association

Flexible Design Inputs

Agency: Lee's Summit Commerce Building #2
Company: Scannell Properties
Contractor: Kadean Construction
roject Description: Lee's Summit Heavy Duty Section
Location: 1220 NW Main Street

Flexible Pavement Design/Evaluation

Structural Number	4.07		**Soil Resilient Modulus**	4,118.20	**psi**
Design ESALs	1,108,300		**Initial Serviceability**	4.00	
Reliability	85.00	**percent**	**Terminal Serviceability**	2.00	
Overall Deviation	0.45				

Layer Pavement Design/Evaluation

Layer Material	Layer Coefficient	Drainage Coefficient	Layer Thickness	Layer SN
	0.00	0.00	0.00	0.00
Asphalt Cement Concrete	0.42	1.00	1.50	0.63
Asphalt Cement Concrete	0.40	1.00	5.00	2.00
Granular Subbase	0.12	1.00	6.00	0.72
Cement/Fly Ash Agg. Base	0.12	1.00	6.00	0.72
	0.00	0.00	0.00	0.00
			Σ SN	4.07

WinPAS

Pavement Thickness Design According to

1993 AASHTO Guide for Design of Pavements Structures

American Concrete Pavement Association

Flexible Design Inputs

Agency: Lee's Summit Commerce Building #2
Company: Scannell Properties
Contractor: Kadean Construction
roject Description: Lee's Summit Heavy Duty Section (With Bedrock)
Location: 1220 NW Main Street

Flexible Pavement Design/Evaluation

Structural Number	3.35		**Soil Resilient Modulus**	24,249.20	**psi**
Design ESALs	18,713,000		**Initial Serviceability**	4.00	
Reliability	85.00	**percent**	**Terminal Serviceability**	2.00	
Overall Deviation	0.45				

Layer Pavement Design/Evaluation

Layer Material	Layer Coefficient	Drainage Coefficient	Layer Thickness	Layer SN
	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
Asphalt Cement Concrete	0.42	1.00	1.50	0.63
Asphalt Cement Concrete	0.40	1.00	5.00	2.00
Granular Subbase	0.12	1.00	6.00	0.72
	0.00	0.00	0.00	0.00
			Σ SN	3.35