Pavement Design Recommendations and Calculations - Revised

FRA-SR 317-10.63
CIP NO. 530103-100052
HAMILTON ROAD
I-70 TO REFUGEE ROAD

June 6, 2016

ms consultants, inc.
engineers, architects, planners
2221 Schrock Road
Columbus, Ohio 43229-1547

FRA-317-10.63 Hamilton Road Widening

PID 95570

Proposed Pavement Sections – Hamilton Road

Flexible Pavement Design

1.50”	442	Asphalt Concrete Surface Course, 12.5 mm, Type A (448)
	407	Tack Coat, Trackless Tack, Intermediate Course
1.75”	442	Asphalt Concrete Intermediate Course, 19 mm, Type A (448) **
	407	Tack Coat, Trackless Tack
6”	302	Asphalt Concrete Base
6”	304	Aggregate base

*** Intermediate Course will be variable depth in some locations to correct for existing cross slope which is greater than 1.56% (1.75” min. & 3.00” max.)***

Composite Pavement Design

1.50”	442	Asphalt Concrete Surface Course, 12.5 mm, Type A (448)
	407	Tack Coat, Trackless Tack
1.75”	442	Asphalt Concrete Intermediate Course, 19 mm, Type A (448)
	407	Tack Coat, Trackless Tack
10.5”	305	Concrete Base
6”	304	Aggregate base

LOCATION	BASIS OF EXISTING PAVEMENT	EXISTING PAVEMENT	PROPOSED PAVEMENT NOTES	PROPOSED PAVEMENT SECTION	
Hamilton Road STA 10+40 TO STA 22+25	B-001-0-15, B-002-0-15	6" Asphalt 12" Concrete	Rigid Pavement 10+40 to 22+25 - full depth replacement due to profile correction to meet design speed)	1.50" 1.75" 10.5" 6"	442 AC Surface Course, 12.5mm,Type A 442 AC Intermediate, 19mm, Type A 305 Concrete Base 304 Aggregate base
STA 22+25 TO STA 39+30	FRA-317-1.32 (1966) B-004-0-15, C-1	*1939 - Center 20'* +/-3" Asphalt (newer overlay) 6" to 8" Concrete (Orig. Pvmt.) and *1966 - Widening* 6" Asphalt 9" Aggregate Base	Flexible Pavement Widening	1.50" 1.75" 6" 6"	442 AC Surface Course, 12.5mm,Type A 442 AC Intermediate, 19mm, Type A 302 AC Base 304 Aggregate base
STA 39+30 TO STA 47+65	FRA-317-1.32 (1966) B-006-0-15, C-3				
STA 47+65 TO STA 60+50	FRA-317-1.32 (1966) B-0106-0-15				
STA 60+50 TO STA 63+50	FRA-40-18.69 (1964) FRA-317-12.07 (1976) C-4	+/-4.5" Asphalt (newer overlay) 9" Concrete (Reinforced) 6" Aggregate Base	Rigid Pavement Widening *leveling course variable 1.50" min. to match planed pavement surface	1.50" 1.75" 1.50" 9" 6"	442 AC Surface Course, 12.5mm,Type A 442 AC Intermediate, 19mm, Type A 442 AC Intermediate, 19mm, Type A 305 Concrete Base 304 Aggregate base
Eastland One	C-2	6.5" Asphalt	Flexible Pavement Full Depth Replacement (Existing Private Drive Entrance, Commercial – reconstructed as new public street)	1.50" 1.75" 6" 6"	442 AC Surface Course, 12.5mm,Type A 442 AC Intermediate, 19mm, Type A 302 AC Base 304 Aggregate base
Kimberly Parkway	B-008-0-15	4" Asphalt 8" Concrete	Rigid Pavement Widening *leveling course variable 1.00" min. to match planed pavement surface	1.50" 1.75" 1.00" 8" 6"	442 AC Surface Course, 12.5mm,Type A 442 AC Intermediate, 19mm, Type A 442 AC Intermediate, 19mm, Type A 305 Concrete Base 304 Aggregate base
Kingsland Ave.	B-007-0-15	6" Asphalt 6" Concrete	Rigid Pavement Widening	1.50" 1.75" 2.75" 6" 6"	442 AC Surface Course, 12.5mm,Type A 442 AC Intermediate, 19mm, Type A 442 AC Intermediate, 19mm, Type A 305 Concrete Base 304 Aggregate base

Groves Road (East)	B-011-0-15 1131 Dr E	6” Asphalt 9” Concrete 6” Aggregate Base	Rigid Pavement Widening	1.50” 1.75” 2.75” 9” 6”	442 AC Surface Course, 12.5mm,Type A 442 AC Intermediate, 19mm, Type A 442 AC Intermediate, 19mm, Type A 305 Concrete Base 304 Aggregate base
Groves Road (West)	B-016-0-15 1131 Dr E	9” Asphalt 6” Aggregate Base	Flexible Pavement Widening	1.50” 1.75” 5.75” 6”	442 AC Surface Course, 12.5mm,Type A 442 AC Intermediate, 19mm, Type A 302 AC Base 304 Aggregate base
Service Road (East)	FRA-40-18.69 (1964)	+/-3” Asphalt (newer overlay) 8” Concrete	Rigid Pavement Relocation	1.50” 1.75” 8” 6”	442 AC Surface Course, 12.5mm,Type A 442 AC Intermediate, 19mm, Type A 305 Concrete Base 304 Aggregate base
Service Road (West)	FRA-40-18.69 (1964)	+/-3” Asphalt (newer overlay) 9” Concrete	Rigid Pavement Relocation	1.50” 1.75” 9” 6”	442 AC Surface Course, 12.5mm,Type A 442 AC Intermediate, 19mm, Type A 305 Concrete Base 304 Aggregate base

Pavement Design - Hamilton Road

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2221 Schrock Road
Columbus, Ohio 43229
Phone: (614) 898-7100 Fax: (614) 898-7570

Project:	FRA-SR317-10.63	Date:	22 April, 2016	ms Proj. No.:	60-06748
Location:	Groves Road (West)	Calc. By:	Walter Williams	PID No.:	95570

Flexible Pavement Design:

Note: Pavement design based on:
ODOT Pavement Design Manual, revised July 2014
Geotechnical Report prepared by: Resource International, Inc., Feb. 2016

Design Data:

Number of Lanes	2	
Functional Classification	Local Collector	Major Collector
Opening Year ADT	6,500	
Design Year ADT	7,500	
24 Hour Truck % ($\%T_{24}$)	8.0%	
Design Period	30	Years
Opening Year	2018	
Subgrade CBR	7	
Length	0.5	Miles

Step 1 - Determine 18 Kip Equivalent Single Axle Loading (ESAL)

Calculate the mid design life ADT
Mid design life year = 2033
7033

Directional Distribution (%D) (Figure 202-1)	50%	
Lane Factor (%LF) (Figure 202-1)	100%	
% B:C Ratio (Figure 202-1)	1 : 1	
ESAL Conversion Factor for B Trucks (CF_B) (Figure 202-1)	1.04	
ESAL Conversion Factor for C Trucks (CF_C) (Figure 202-1)	0.41	

ESALs from B trucks: ADT * %T24 * %D * %LF * %B * CF_B
146

ESALs from C trucks: ADT * %T24 * %D * %LF * %C * CF_C
58

Total Daily ESALs 204 ESAL/day

Design Period ESALs 2,234,965

Use 2,234,965

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Flexible Pavement Design:

Step 2 - Determine Subgrade Resilient Modulus (M_r)

CBR from Geotechnical Report = 7

M_r = 8400 psi

If CBR is not provided by Geotechnical Report, calculate the CBR using Figures 203-1 and 203-2.

From Geotechnical Report, obtain Percent Passing No. 200 Sieve and either Liquid Limit or Plasticity Index

Precent Passing No. 200 Sieve
Liquid Limit (LL)
Plasticity Index (PI)

From Figure 203-1, Partial group Index (GI) No.

From Figure 203.2, Determine CBR using Parial Group Index

CBR =

M_r = 0 psi

Step 3 - Determine the Design Structural Number (SN)

From Figure 402-2, Determine Match Line Number

Reliability (Figure 201-1)	90%
Overall Standard Deviation (Figure 201-1)	0.49
18-Kip Axle Loads	2,234,965
Subgrade Resilient Modulus	8,400

Match Line Number (Figure 402-2) 50

From Figure 402-3, Determine Design Structural Number (SN)

Design Serviceability Loss (Figure 201-1) 2.0

From Figure 402-3, the Structural Number (SN) 3.75

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Location:	Groves Road (West)	Calc. By:	Walter Williams	PID No.:	95570

Flexible Pavement Design:

Step 4 - Design Typcial Seciton

Check for Heavy Traffic (see Proposal Note 416) by calculating opening day (2018) truck traffic

ADTT 523

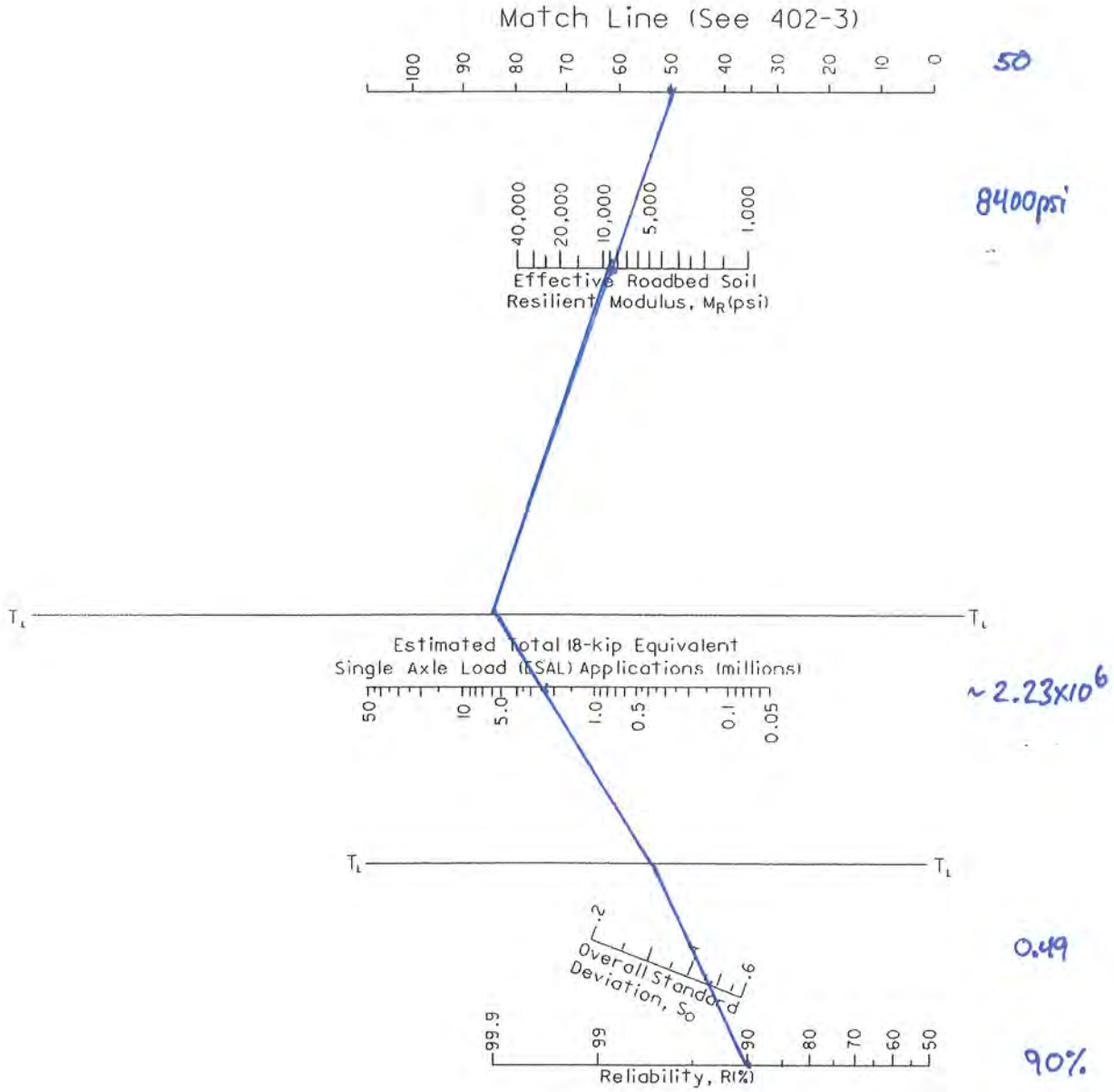
Using the layer coefficients found in Figure 401-1, build the typcial section for the project.

Material	Thickness (inches)	Coefficient	SN
AC Surface Courses	1.5	0.43	0.645
Intermediate Courses	1.75	0.43	0.7525
Asphalt Concrete Base Courses	5.75	0.36	2.07
Agreegate Base	6	0.14	0.84
			0
			0
			0
			0
			0
			0
			0
			0
		Total SN	**4.3075**

SN of: 3.75 needed.

Check Left Thickness and Usage Guidelines listed in Section 406 and Figure 406-1.

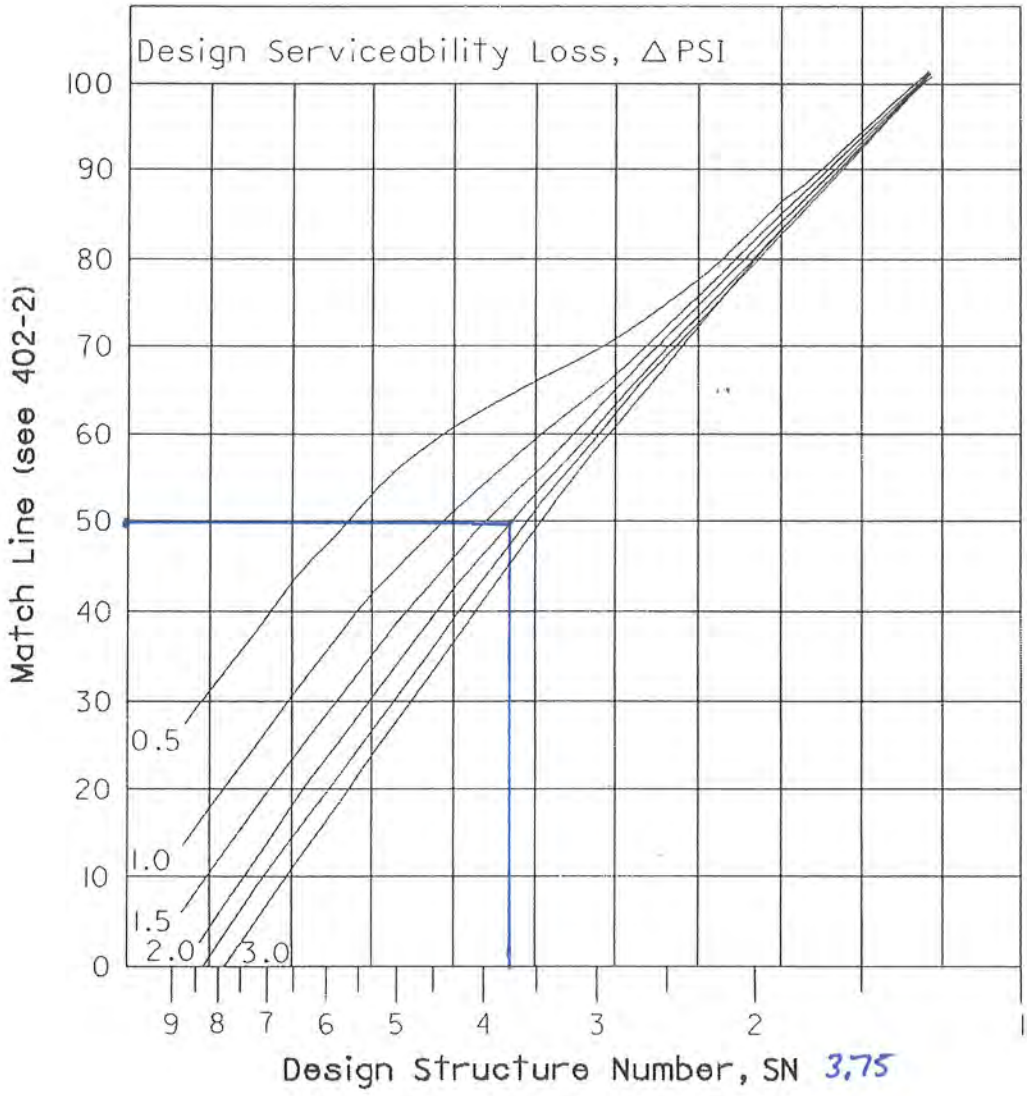
Flexible Pavement Design Chart Segment 1	402-2 July 2008 Reference Section & Figure 402, 402-1(step 3)



Flexible pavement design for Groves Rd (West)
as per markups from COC

Prepared by WJW
4/22/2016

Flexible Pavement Design Chart Segment 2	402-3 July 2008 Reference Section & Figure 402, 402-1(step 3)



Flexible pavement design for Graves (West) as per markups from COC

Prepared by WJH
4/22/2016

Pavement Design

ms consultants, inc.
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Columbus, Ohio 43229
Phone: (614) 898-7100 Fax: (614) 898-7570

Project:	FRA-SR317-10.63	Date:	22 April, 2016	ms Proj. No.:	60-06748
Location:	Groves Road (East)	Calc. By:	Walter Williams	PID No.:	95570

Rigid Pavement Design:

Note: Pavement design based on:
ODOT Pavement Design Manual, revised July 2014
Geotechnical Report prepared by: Resource International, Inc., Dec. 2013

Design Data:

Number of Lanes	2	
Functional Classification	Local Collector	Major Collector
Opening Year ADT	7,500	
Design Year ADT	8,600	
24 Hour Truck % ($\%T_{24}$)	8.0%	
Design Period	30	Years
Opening Year	2018	
Subgrade CBR	7	
Pavement Choice	Dowled, jointed concrete	
Design Subbase (D_{SB})	6	
Shoulders	tied, jointed, concrete	
Project Length	0.5	Miles

Step 1 - Determine 18 Kip Equivalent Single Axle Loading (ESAL)

Calculate the mid design life ADT
Mid design life year = 2033
8087

Directional Distribution (%D) (Figure 202-1)	50%		
Lane Factor (%LF) (Figure 202-1)	100%		
% B:C Ratio (Figure 202-1)	1	:	1
ESAL Conversion Factor for B Trucks (CF_B) (Figure 202-1)	1.64		
ESAL Conversion Factor for C Trucks (CF_C) (Figure 202-1)	0.53		

ESALs from B trucks: ADT * %T24 * %D * %LF * %B * CF_B
265

ESALs from C trucks: ADT * %T24 * %D * %LF * %C * CF_C
86

Total Daily ESALs 351 ESAL/day

Design Period ESALs 3,845,659

Use 3,845,659

Pavement Design

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Location:	Groves Road (East)	Calc. By:	Walter Williams	PID No.:	95570

Rigid Pavement Design:

Step 2 - Determine Subgrade Resilient Modulus (M_r)

CBR from Geotechnical Report = 7

M_r = 8400 psi

If CBR is not provided by Geotechnical Report, calculate the CBR using Figures 203-1 and 203-2.

From Geotechnical Report, obtain Percent Passing No. 200 Sieve and either Liquid Limit or Plasticity Index

Percent Passing No. 200 Sieve
Liquid Limit (LL)
Plasticity Index (PI)

From Figure 203-1, Partial group Index (GI) No.

From Figure 203.2, Determine CBR using Partial Group Index

CBR =

M_r = 0 psi

Step 3 - Determine the Composite Modulus of subgrade Reaction (Kc) using Figure 301-2

From Figure 301-2

Using the figure and the following information, solve for the modulus of Subgrade Reaction (Kc)

Subbase thickness (Dsb)	6	inches
Subbase Elastic Modulus (Esb)	30,000	Figure 301-1
Subgrade Resilient Modulus (Mr)	8400	psi

From Figure 301-2, Composite Modulus of Subgrade Reaction (Kc) 450 pci

Step 4 - Determine the Effective Modulus of Subgrade Reaction (k) using 301-3

From Figure 301-3

Using the figure and the following information, solve for the Effective Modulus of Subgrade Reaction (k).

Composite Modulus of Subgrade Reaction (Kc)	450	pci
Loss of Support (Figure 301-1)	1	
Effective Modulus of Subgrade Reaction(k)	150	pci

Pavement Design

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Location:	Groves Road (East)	Calc. By:	Walter Williams	PID No.:	95570

Rigid Pavement Design:

Step 5 - Determine the thickness of the concrete slab using Figures 302-2 and 302-3

Figure 302-2 is used to solve for the match line number using the following information

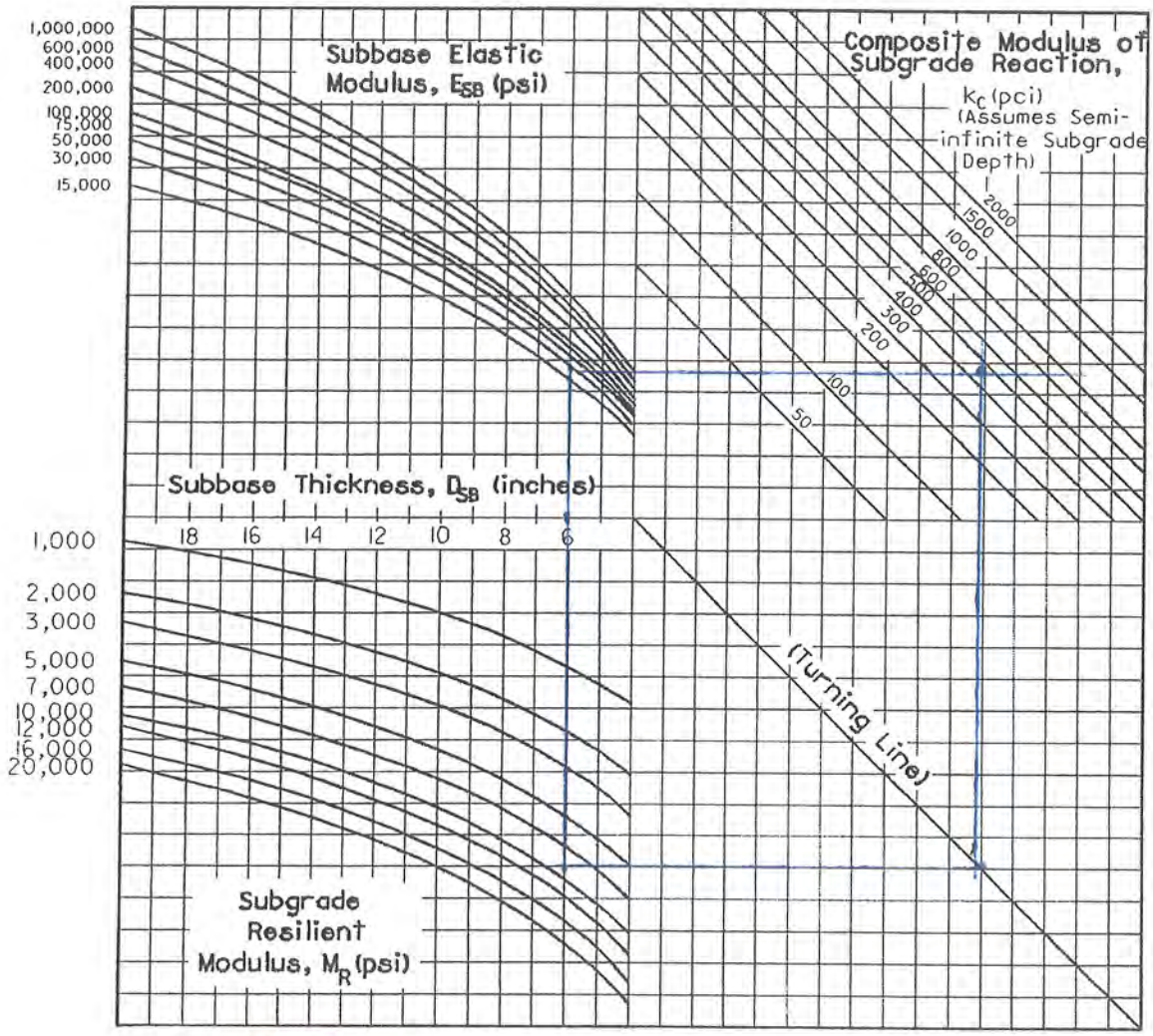
Effective Modulus of Subgrade (k)	150	pci			
Concrete Elastic Modulus (Ec)	5,000,000	psi			
Concrete Modulus of Rupture (S'c)	700	psi			
Load Transfer Coefficient (J)	3.2		Edged?	N	(Y for yes, N for no)
Drainage Coefficient (Dc)	1				
Match Line (see Figure 302-3)	70				

Figure 302-3 is then used to solve for the Design Slab Thickness (D) using the following information

Design Serviceability Loss (psi)	1.7	psi
Reliability	90%	
Overall Standard Deviation	0.39	
18-Kip Equivalent Signle Axel Load	3,845,659	
Design Slab Thickness	9	inches

The composite section of 9 inch concrete and 6 inch asphalt will exceed the structural requirement needed

Composite Modulus of Subgrade Reaction (k_c)	301-2 July 2008 Reference Section & Figure 301.4, 302-1 (step 3)



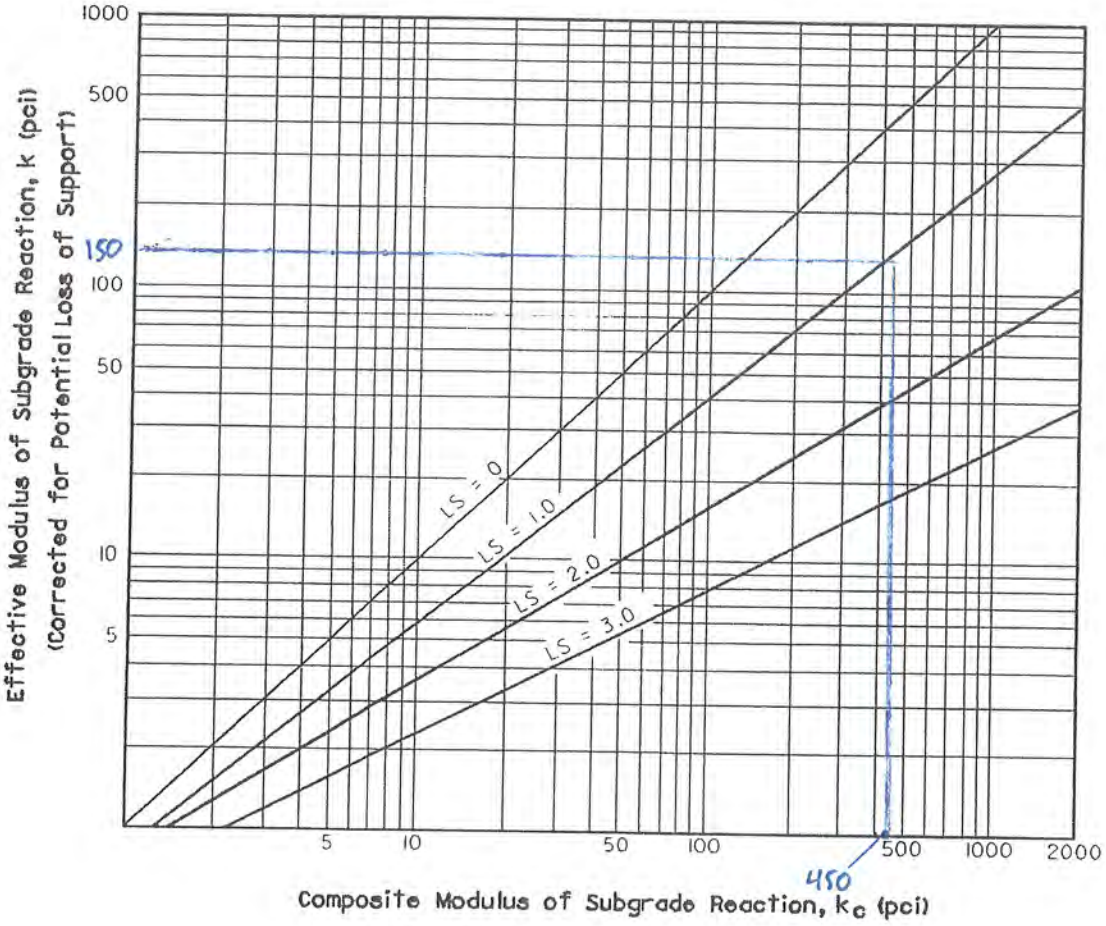
450pci

8400psi

Rigid pavement design for Groves Road (East) as per markups from COC

Prepared by WJW
4/22/2016

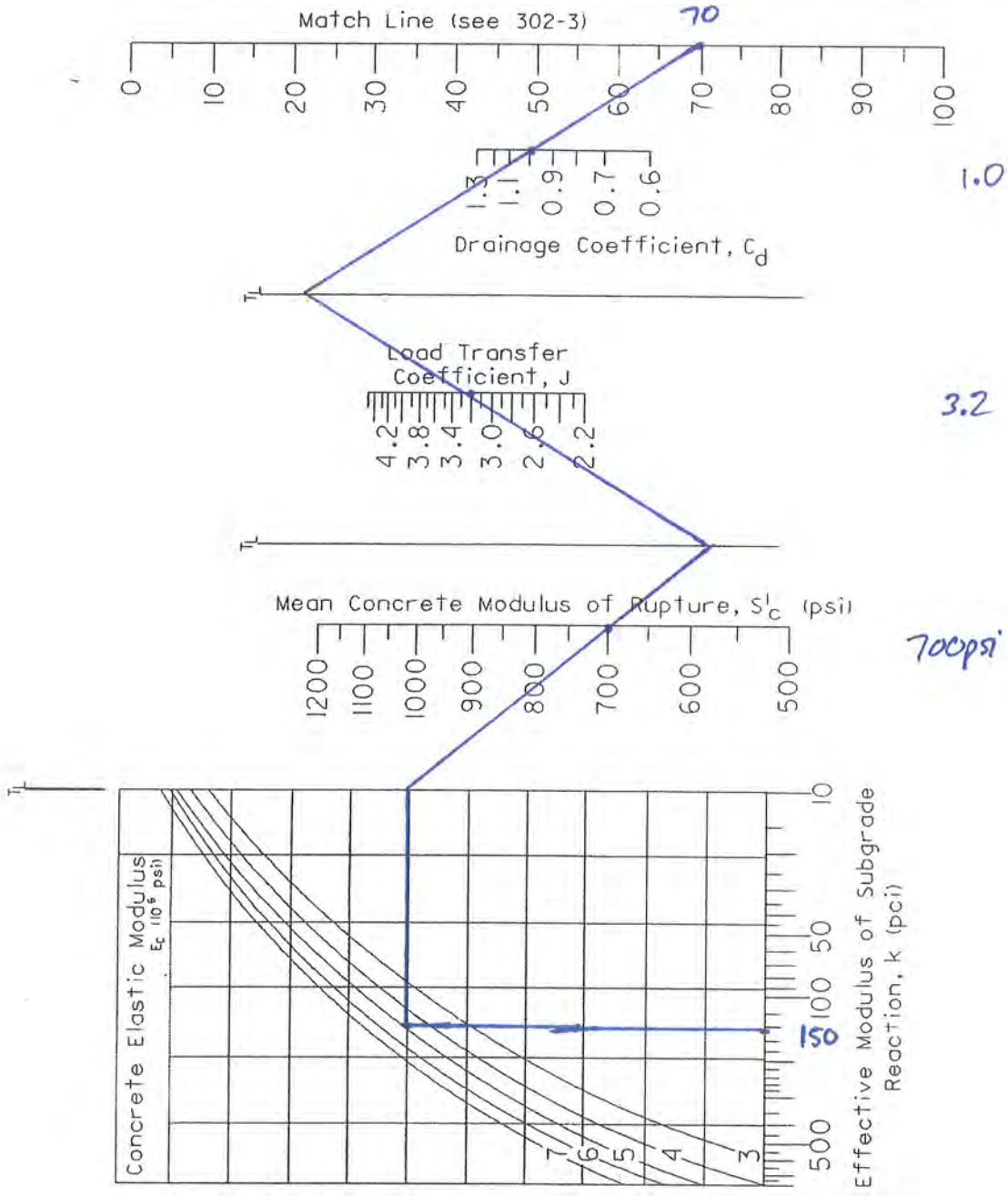
Effective Modulus of Subgrade Reaction (k)	301-3 July 2008 Reference Section & Figure 301.6, 302-1 (step 4)



Rigid pavement design for Groves Rd (East)
as per markups from COC

Prepared by WJW
4/22/2016

Rigid Pavement Design Chart Segment 1	302-2 July 2008 Reference Section & Figure 302, 302-1 (step 5)

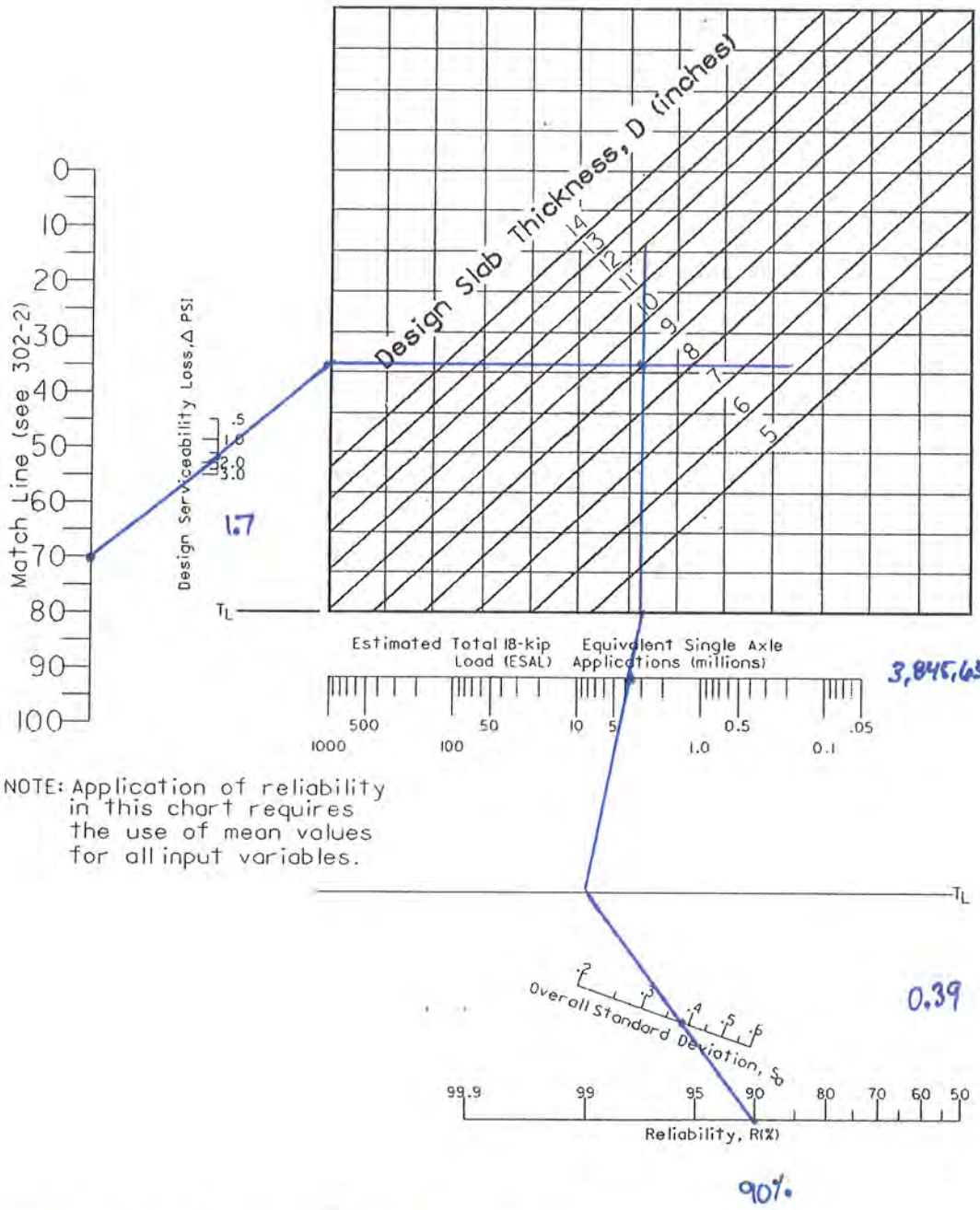


Rigid pavement design for Groves Rd (East)
as per markups from COC

Prepared by WJW
4/22/2016

Rigid Pavement Design Chart Segment 2	302-3 July 2008 Reference Section & Figure 302, 302-1 (step 5)

use 9.0 inches



Rigid pavement design for Graves Rd (East) as per markups from COC

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4/22/2016

Pavement Design - Hamilton Road

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Project:	FRA-SR317-10.63	Date:	21 April, 2016	ms Proj. No.:	60-06748
Location:	Hamilton (south of Refugee to north of Groves Road)	Calc. By:	Walter Williams	PID No.:	95570

Flexible Pavement Design:

Note: Pavement design based on:
ODOT Pavement Design Manual, revised July 2014
Geotechnical Report prepared by: Resource International, Inc., Feb. 2016

Design Data:

Number of Lanes	4				
Functional Classification	Urban Principal Arterial				
Opening Year ADT	30,800				
Design Year ADT	35,600				
24 Hour Truck % ($\%T_{24}$)	5.0%				
Design Period	30	Years			
Opening Year	2018				
Subgrade CBR	7				
Length	0.714	Miles	21+00	TO	58+70

Step 1 - Determine 18 Kip Equivalent Single Axle Loading (ESAL)

Calculate the mid design life ADT
Mid design life year = 2033
33360

Directional Distribution (%D) (Figure 202-1)		50%	
Lane Factor (%LF) (Figure 202-1)		95%	
% B:C Ratio (Figure 202-1)	2	:	1
ESAL Conversion Factor for B Trucks (CF_B) (Figure 202-1)		1.04	
ESAL Conversion Factor for C Trucks (CF_C) (Figure 202-1)		0.41	

ESALs from B trucks: ADT * %T24 * %D * %LF * %B * CF_B
549

ESALs from C trucks: ADT * %T24 * %D * %LF * %C * CF_C
108

Total Daily ESALs 658 ESAL/day

Design Period ESALs 7,205,751

Use 7,205,751

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Location:	Hamilton (south of Refugee to north of Groves Road)	Calc. By:	Walter Williams	PID No.:	95570

Flexible Pavement Design:

Step 2 - Determine Subgrade Resilient Modulus (M_r)

CBR from Geotechnical Report = 7

M_r = 8400 psi

If CBR is not provided by Geotechnical Report, calculate the CBR using Figures 203-1 and 203-2.

From Geotechnical Report, obtain Percent Passing No. 200 Sieve and either Liquid Limit or Plasticity Index

Precent Passing No. 200 Sieve
Liquid Limit (LL)
Plasticity Index (PI)

From Figure 203-1, Partial group Index (GI) No.

From Figure 203.2, Determine CBR using Parial Group Index

CBR =

M_r = 0 psi

Step 3 - Determine the Design Structural Number (SN)

From Figure 402-2, Determine Match Line Number

Reliability (Figure 201-1)	90%
Overall Standard Deviation (Figure 201-1)	0.49
18-Kip Axle Loads	7,205,751
Subgrade Resilient Modulus	8,400

Match Line Number (Figure 402-2)

From Figure 402-3, Determine Design Structural Number (SN)

Design Serviceability Loss (Figure 201-1) 2.0

From Figure 402-3, the Structural Number (SN) 4.3

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Flexible Pavement Design:

Step 4 - Design Typcial Seciton

Check for Heavy Traffic (see Proposal Note 416) by calculating opening day (2018) truck traffic
ADTT 1548

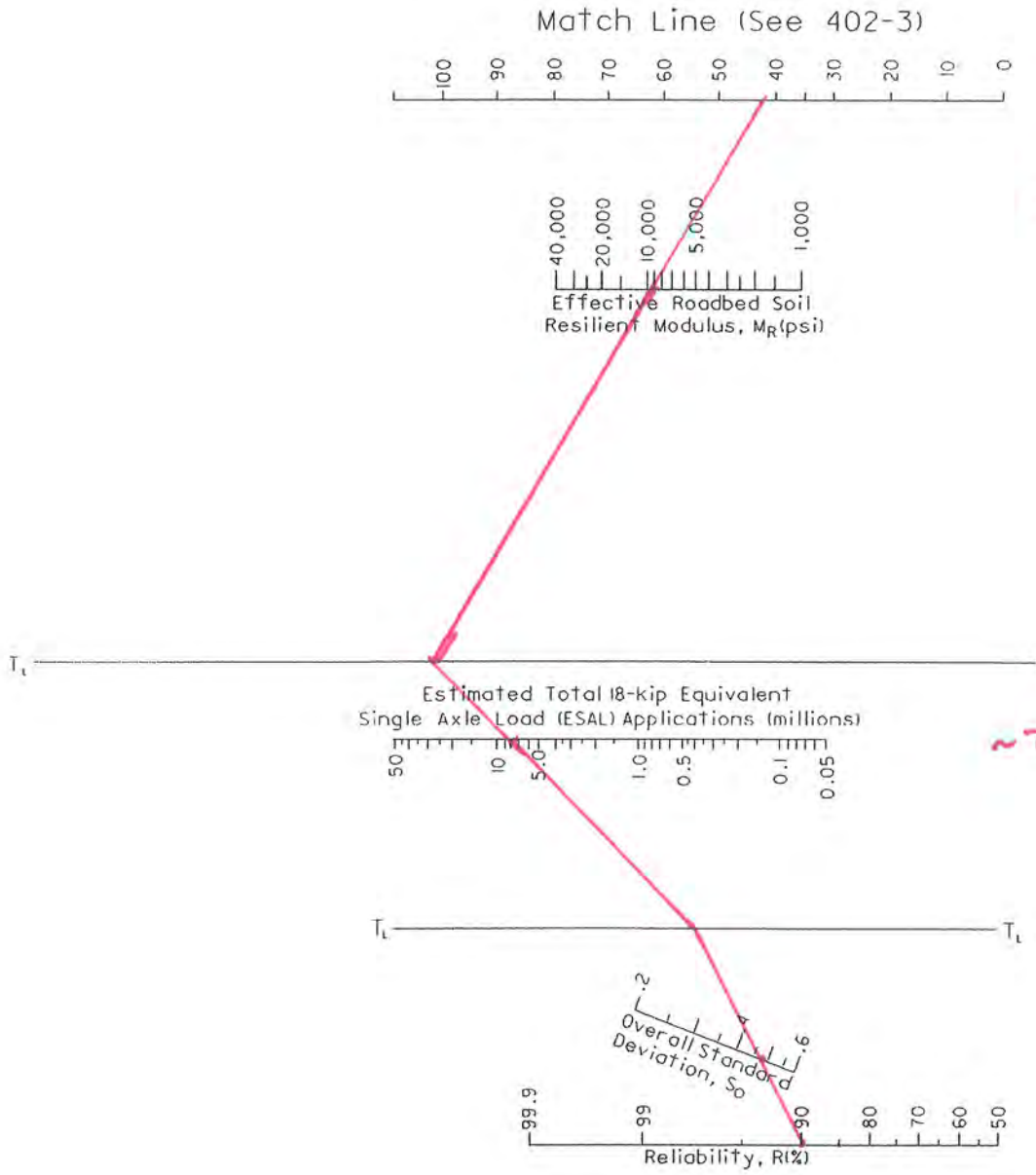
Using the layer coefficients found in Figure 401-1, build the typcial section for the project.

Material	Thickness (inches)	Coefficient	SN	
AC Surface Courses	1.5	0.43	0.645	
Intermediate Courses	1.75	0.43	0.7525	
Asphalt Concrete Base Courses	6	0.36	2.16	
Agreegate Base	6	0.14	0.84	
			0	
			0	
			0	
			0	
			0	
			0	
			0	
			0	
			0	
		Total SN	**4.3975**	OK

SN of: 4.3 needed.

Check Left Thickness and Usage Guidelines listed in Section 406 and Figure 406-1.

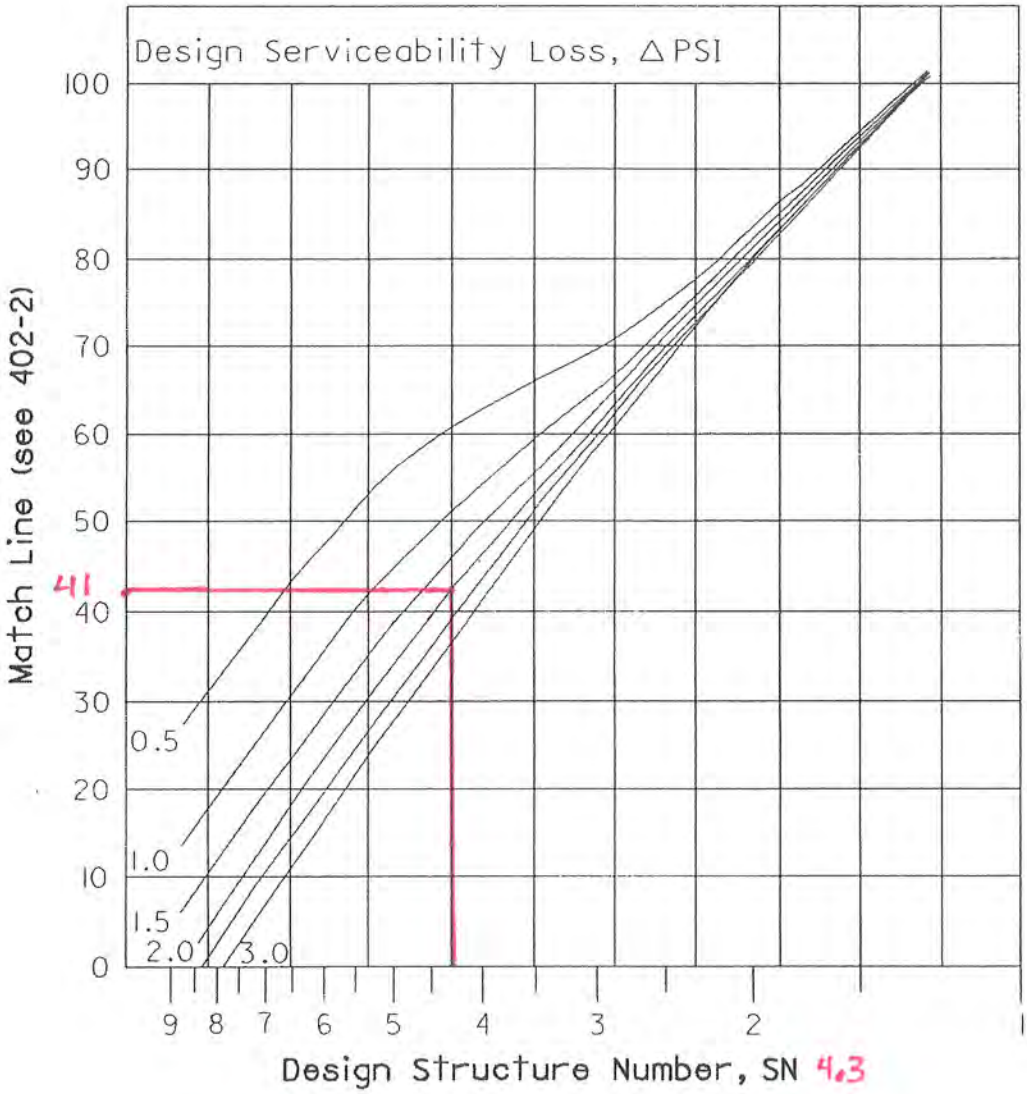
Flexible Pavement Design Chart Segment 1	402-2 July 2008 Reference Section & Figure 402, 402-1(step 3)



Flexible pavement design for Hamilton as per markups from COC

Prepared by WJW
4/21/2016

Flexible Pavement Design Chart Segment 2	402-3 July 2008 Reference Section & Figure 402, 402-1(step 3)



Flexible pavement design for Hamilton as per markups from LOC

Prepared by WJW
4/21/2016

Pavement Design

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Design Year ADT	35,600	
24 Hour Truck % ($\%T_{24}$)	5.0%	
Design Period	30	Years
Opening Year	2018	
Subgrade CBR	7	
Pavement Choice	Dowled, jointed concrete	
Design Subbase (D_{SB})	6	
Shoulders	tied, jointed, concrete	
Project Length	0.714	Miles

Step 1 - Determine 18 Kip Equivalent Single Axle Loading (ESAL)

Calculate the mid design life ADT
Mid design life year = 2033
33360

Directional Distribution (%D) (Figure 202-1)		50%	
Lane Factor (%LF) (Figure 202-1)		95%	
% B:C Ratio (Figure 202-1)	2	:	1
ESAL Conversion Factor for B Trucks (CF_B) (Figure 202-1)		1.64	
ESAL Conversion Factor for C Trucks (CF_C) (Figure 202-1)		0.53	

ESALs from B trucks: $ADT * \%T24 * \%D * \%LF * \%B * CF_B$
866

ESALs from C trucks: $ADT * \%T24 * \%D * \%LF * \%C * CF_C$
140

Total Daily ESALs 1006 ESAL/day

Design Period ESALs 11,025,667

Use 11,025,667

Pavement Design

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Rigid Pavement Design:

Step 2 - Determine Subgrade Resilient Modulus (M_r)

CBR from Geotechnical Report = 7

M_r = 8400 psi

If CBR is not provided by Geotechnical Report, calculate the CBR using Figures 203-1 and 203-2.

From Geotechnical Report, obtain Percent Passing No. 200 Sieve and either Liquid Limit or Plasticity Index

Percent Passing No. 200 Sieve
Liquid Limit (LL)
Plasticity Index (PI)

From Figure 203-1, Partial group Index (GI) No.

From Figure 203.2, Determine CBR using Partial Group Index

CBR =

M_r = 0 psi

Step 3 - Determine the Composite Modulus of subgrade Reaction (Kc) using Figure 301-2

From Figure 301-2

Using the figure and the following information, solve for the modulus of Subgrade Reaction (Kc)

Subbase thickness (Dsb)	6	inches
Subbase Elastic Modulus (Esb)	30,000	Figure 301-1
Subgrade Resilient Modulus (Mr)	8400	psi

From Figure 301-2, Composite Modulus of Subgrade Reaction (Kc) 450 pci

Step 4 - Determine the Effective Modulus of Subgrade Reaction (k) using 301-3

From Figure 301-3

Using the figure and the following information, solve for the Effective Modulus of Subgrade Reaction (k).

Composite Modulus of Subgrade Reaction (Kc)	450	pci
Loss of Support (Figure 301-1)	1	
Effective Modulus of Subgrade Reaction(k)	150	pci

Pavement Design

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2221 Schrock Road
Columbus, Ohio 43229
Phone: (614) 898-7100 Fax: (614) 898-7570

Project:	FRA-SR317-10.63	Date:	21 April, 2016	ms Proj. No.:	60-06748
Location:	Hamilton (south of Refugee to north of Groves Road	Calc. By:	Walter Williams	PID No.:	95570

Rigid Pavement Design:

Step 5 - Determine the thickness of the concrete slab using Figures 302-2 and 302-3

Figure 302-2 is used to solve for the match line number using the following information

Effective Modulus of Subgrade (k)	150	pci			
Concrete Elastic Modulus (Ec)	5,000,000	psi			
Concrete Modulus of Rupture (S'c)	700	psi			
Load Transfer Coefficient (J)	3.2		Edged?	N	(Y for yes, N for no)
Drainage Coefficient (Dc)	1				
Match Line (see Figure 302-3)	69				

Figure 302-3 is then used to solve for the Design Slab Thickness (D) using the following information

Design Serviceability Loss (psi)	1.7	psi
Reliability	90%	
Overall Standard Deviation	0.39	
18-Kip Equivalent Signle Axel Load	11,025,667	
Design Slab Thickness	10.5	inches

Rigid Pavement Design Parameters	**301-1** July 2008
	Reference Section 301

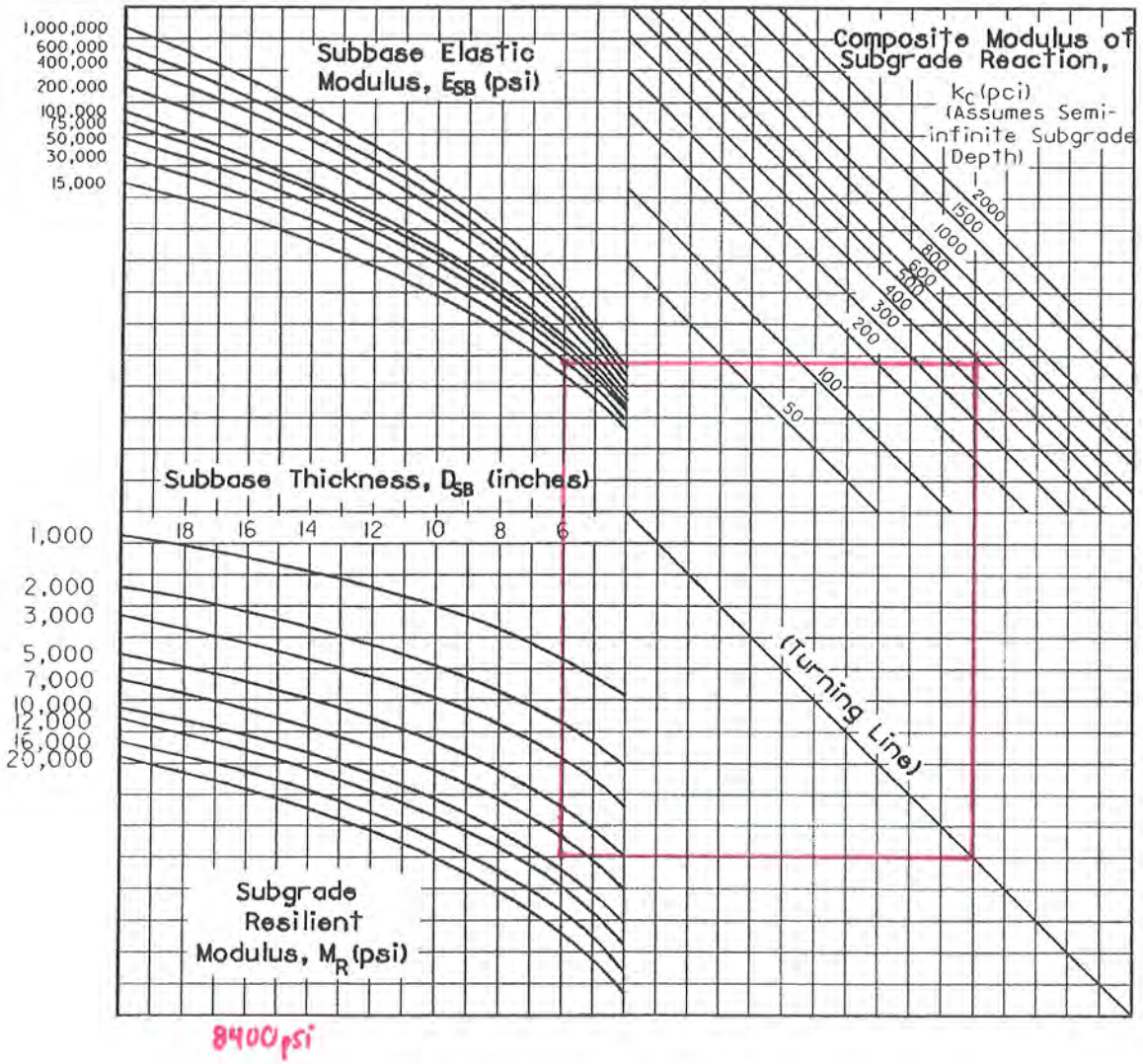
MATERIAL PROPERTIES	
Modulus of Rupture (S'c)	700 psi
Modulus of Elasticity (Ec)	5,000,000 psi
Load Transfer Coefficient (J) - Doweled, Edge Support*	2.7
Load Transfer Coefficient (J) - Doweled, No Edge Support*	3.2

* Edge support includes tied concrete shoulders, integral curb, widened lane, etc. Widened lane referes to concrete slabs built 14 feet (4.2 m) wide or wider, but striped fro a standard 12-foot (3.6 m) lane, leaving 2 feet (0.6 m) outside the traveled lane to provide edge support.

SUBBASE FACTORS			
ODOT Specifications	**Recommedned Thickness (in.) (D_{SB})**	**Elastic Modulus (psi) (E_{SB})**	**Loss of Support (LS)**
Item 301, 302 Asphalt Concrete Base	4"	300,000	0
Item 304 Aggregate Base	6"	30,000	1
Natural Subgrade**			2

** Not recommended for most applications. See Section 301.4.

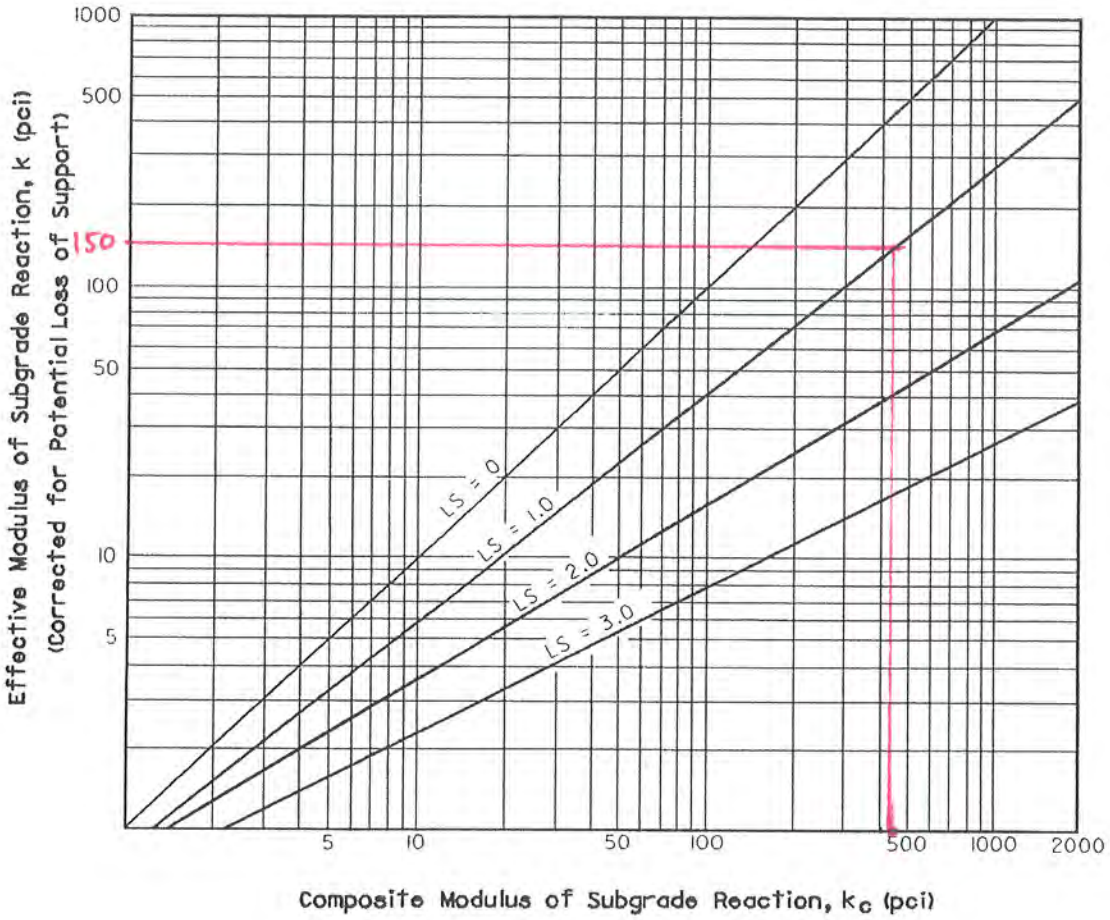
Composite Modulus of Subgrade Reaction (k_c)	301-2 July 2008 Reference Section & Figure 301.4, 302-1 (step 3)



Rigid pavement design for Hamilton Rd
as per mark-ups from COC

Prepared by WJW
4/22/2016

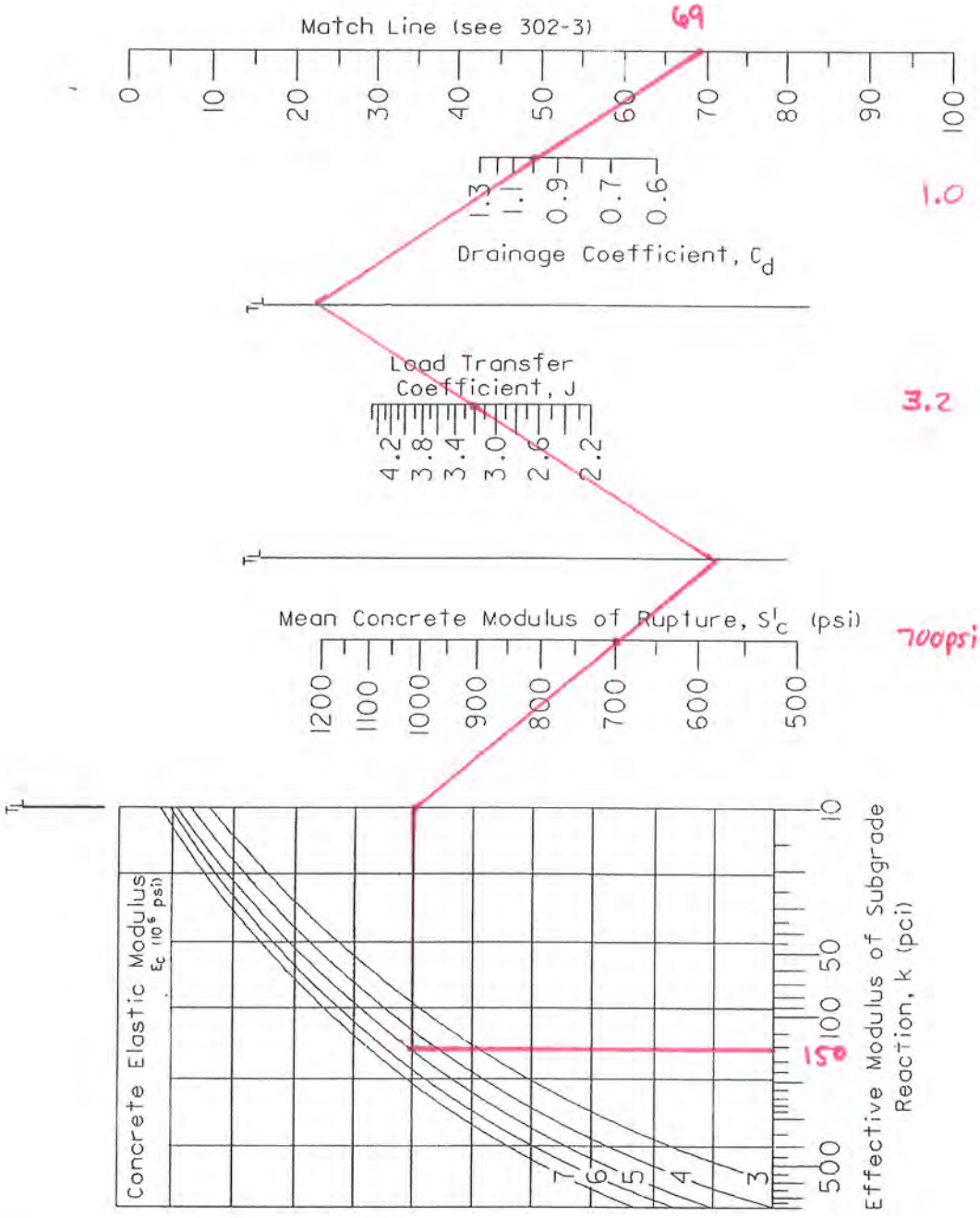
Effective Modulus of Subgrade Reaction (k)	301-3 July 2008 Reference Section & Figure 301.6, 302-1 (step 4)



Rigid pavement design for Hamilton Rd
as per markups from COC

Prepared by HJW
4/22/2016

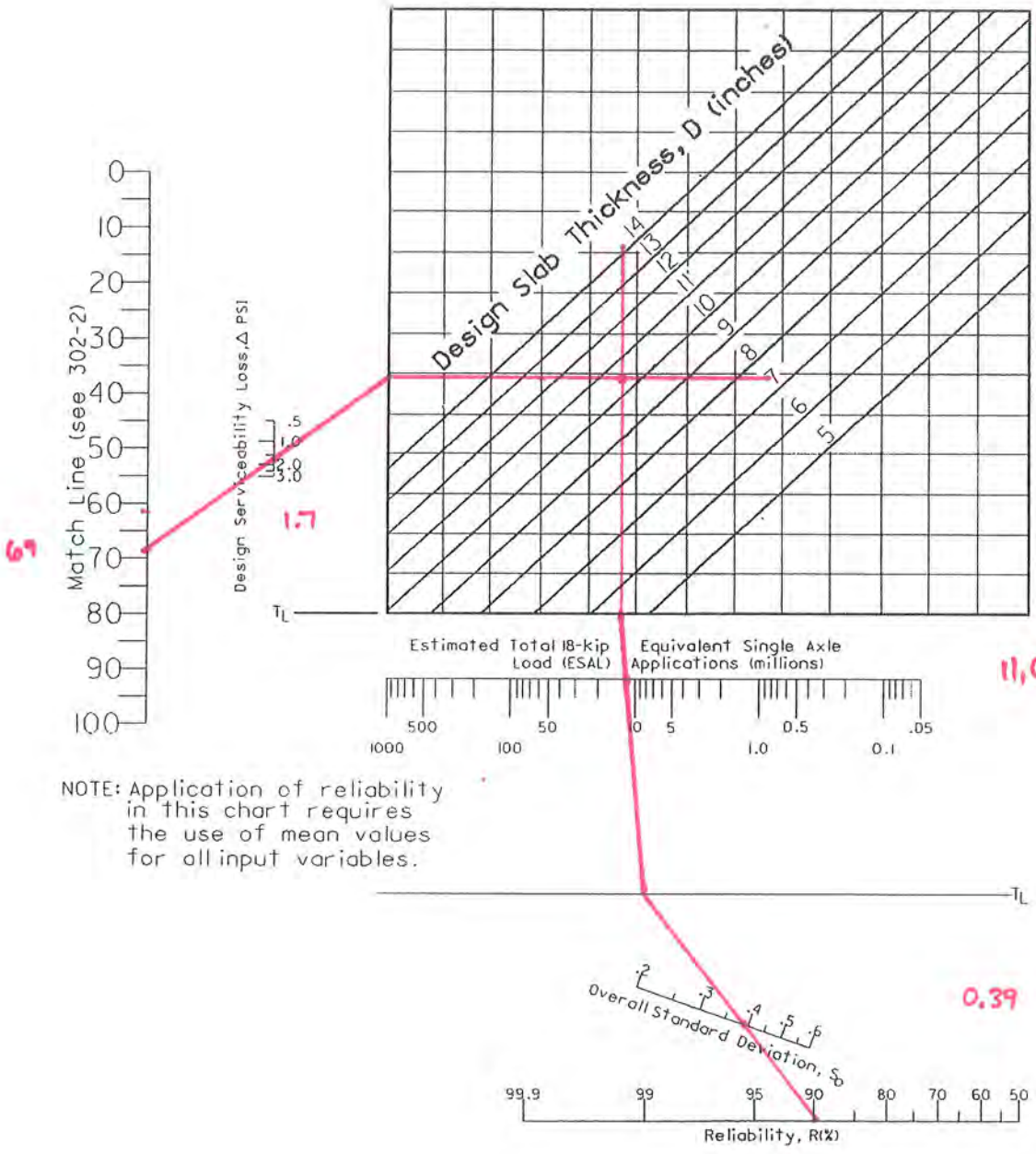
Rigid Pavement Design Chart Segment 1	302-2 July 2008
	Reference Section & Figure 302, 302-1 (step 5)



Rigid pavement design for Hamilton Rd
as per markups from COC

Prepared by WJW
4/22/2016

Rigid Pavement Design Chart Segment 2	302-3 July 2008 Reference Section & Figure 302, 302-1 (step 5)



use 10.5 inches

Rigid pavement design for Hamilton Rd as per markups from COC

Prepared by WJW
4/22/2016