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January 4, 2021

Frank Pohl,
County Engineer
County of Albemarle
Dept. of Community Development
401 McIntire Rd
Charlottesville, VA 22902

RE: ZMA 2024340-011 Premier Circle Preliminary Pavement Investigation

Dear Mr. Pohl,

Timmons Group has performed a preliminary investigation of Premier Circle on the existing pavement, including visual inspections, as well as asphalt corings. Calculations, using the VDOT Pavement Design Guide have been prepared and attached to this letter with a recommended pavement section that is acceptable for the proposed use. In addition to pavement thickness and sizing, we also reviewed Premier Circle's geometry, noting variations from VDOT design standards that may preclude its future acceptance into the VDOT system.

VISUAL INSPECTION

During a visual inspection of Premier Circle it was noted that pavement was cracking, but in general was still safe, functional, and navigable. Striping and signage was faded or non-existent (there was no stop sign located at the southern connection), presenting some safety concerns at both the signalized and non-signalized intersections. Additionally, there was vegetation encroaching into the through lanes that is in need of trimming.

PAVEMENT CORING

To determine the existing pavement section Timmons Group has conducted a Pavement Exploration consisting of three asphalt cores along Premier Circle. The results of the pavement section cores are included in the table below. A Core Location Plan has been attached as well.

Measured Pavement Section Thicknesses

Core	Asphalt Pavement Thickness (inches)	Base Stone Thickness (inches)	Total Section Thickness (inches)
C-01	4.5	3.0	7.5
C-02	3.0	6.0	9.0
C-03	2.5	5.5	8.0

The current schedule did not allow for a full geotechnical investigation to field determine the soil's CBR which would be required before construction of a new road. The Pavement Design Guide list CBR values for Albemarle County in Appendix 1. These values are typically very conservative and need to be verified during construction by on-site testing. Due to this, Timmons Group used CBR results from a nearby site for this preliminary analysis (CBR = 18.9). Any final evaluations or design of the pavements section will require a field run CBR test.

For the existing condition, as shown in the attached pages from the Pavement Design Guide, the average thickness index provided (Dp) value of 10.3 is less than the thickness index required (Dr) value of 13.3. It is assumed that the average annual daily traffic under the existing conditions is around 960 trips per day, while the thickness of the average pavement supports slightly less then 500 trips per day. It should be noted that this does not mean the pavement will fail, but that resurfacing may be necessary sooner.

For the proposed condition, including the housing and commercial space, as shown in the attached pages from the Pavement Design Guide the average thickness index provided (Dp) value would need to be at least 13.9 to equal the thickness index required (Dr) value. If this road was being developed under today's standards it would require 4.5" of asphalt over 8" of stone. Under the proposed condition the trips per day value goes up to 1,120 or just over 18%. Again, this does not result in immediate pavement failure, but the maintenance needs will most likely accelerate.

VARIATION FROM CURRENT VDOT STANDARDS

Given that Premier Circle was constructed as a private road over thirty years ago, there are inevitably design elements that do not comply with today's VDOT standards for a public road. This is largely due to VDOT's standards being based on a minimum design speed of 25 MPH. While Premier Circle is not currently signed with a speed limit it appears to operate similarly to a private access road in a shopping center which would assume much lower speeds.
Should Premier Circle be evaluated for public acceptance at a future date at a higher speed, it is likely that VDOT would expect the following to brought up to current standards:

- Sight Distance is not met for the southern entrance of the Royal Inn, as only 130-150' is available, while 280' is required for a 25 mph road. Site distance is not met for Royal Inn at its

northern entrance either, as it only has around 210' looking south. In both cases the only solution would be to move the building.

- Sight distance issues also existing for Marks & Harrison's office and the Classic Furniture building. Site distance could be achieved, however it would require approximately 20 parking spaces to be removed.
- Clear Zone requirements may not be met for VDOT required minimum design speeds.
- Entrance spacing to meet Corner Clearance on a Minor Side Street is not met in several instances, with the minimum requirement being 225'. The Waffle House is approximately 60' from the signalized intersection, while the Royal Inn's entrance is approximately 110' from the unsignalized entrance.
- Entrance spacing on local roads (50') is not met at the Marks & Harrison entrance and the southern Classic Furniture entrance.
- VDOT would require all asphalt, curb, storm infrastructure to be in "like new" condition. In this location, most of the infrastructure is 30-35 years old.
- Some of the existing inlet configurations don't comply with current VDOT standards, which would require additional inlets to be added, flanking inlets in a sump.
- Curb and gutter do not extend along the entire length of both sides of the road. Adding curb and gutter would also change the drainage patterns and require additional stormwater inlets.

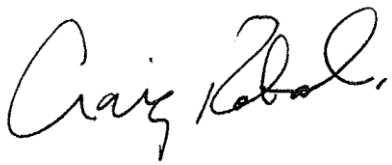
While a full evaluation of these items in coordination with VDOT would be required to determine if this road could be accepted by VDOT we believe it is unlikely that VDOT would accept this road.

CONCLUSION

While there is visible pavement cracking, it does not appear to be creating any safety concerns, however new striping, signage, and general landscape maintenance should be addressed as soon as possible. Furthermore, while a private road maintenance agreement is in place, it is suggested that it should be improved upon and managed with the input of current ownership of all parcels.

If you have any questions or comments, please feel free to give us a call at 434.295.5624.

Sincerely,



Craig Kotarski, PE
Principal

Jonathan Showalter, PE
Project Manager

Appendix IV

Flexible Pavement Design Worksheet for New Subdivision Streets

This sheet is intended for use and submission in conjunction with VDOT's Secondary Street Acceptance Requirements

County	Albemarle County	Date: 1/4/2021
Subdivision		
Street Name	Premier Circle Existing Condition	
Design Engineer	Timmons Group	Phone: 434.295.5624

AADT	Projected traffic for the street segment considered, as defined in the Subdivision Street Requirements.
CBR_D	Design CBR = Average of CBR_T x 2/3 and modified only as discussed in the Pavement Design Guide.
CBR_T	CBR value of the subgrade sample, taken and tested as specified in the Pavement Design Guide
DME	VDOT District Materials Engineer
EPT	Equivalent projected traffic
HCV	Number of Heavy Commercial Vehicles (e.g. trucks, buses, etc., with 2 or more axles and 6 or more tires).
%HCV	Percentage of the total traffic volume composed of Heavy Commercial Vehicles.
RF	Resiliency Factor = Relative value of the subgrade soil's ability to withstand repeated loading.
SSV	Soil support value of subgrade (SSV = CBR_D x RF)
D_P	Thickness index of proposed pavement design computed by the Conventional Pavement Design Method
D_R	Thickness index required, based on Design AADT and SSV, determined by Appendix II.

Step 1: Determine Design AADT

AADT	
%HCV = 100 (HCV / AADT) or EPT = 20 x HCV Note: For %HCV ≤ 5%, use AADT	_____ Note: For %HCV>5%, EPT>AADT
Design AADT Use greater of AADT or EPT	

Step 2: Determine Design Values CBR, RF, and SSV

Sample No.	CBR_T
1	
2	
3	
CBRT*	18.9
CBRD	18.9* 2/3
CBRD	12.6

Resiliency Factor	(RF)
Source	Value
Table 1	
Appendix I	
DME approved RF	

For preliminary designs, use the lowest RF value in the equation

CBR_D	x	RF	=	SSV
(_____)	x	(_____)	=	12.6

Step 3: Pavement Design (Check appropriate box and show proposed pavement design below.)

☐ (A) Limited to Design AADT ≤ 400 - Show pavement material notations and thickness from Appendix IV Tables A and B.

☐ (B) Show pavement section as developed in the Pavement Design Guide.
(See Appendix III for material notations and thickness equivalency values (a)).

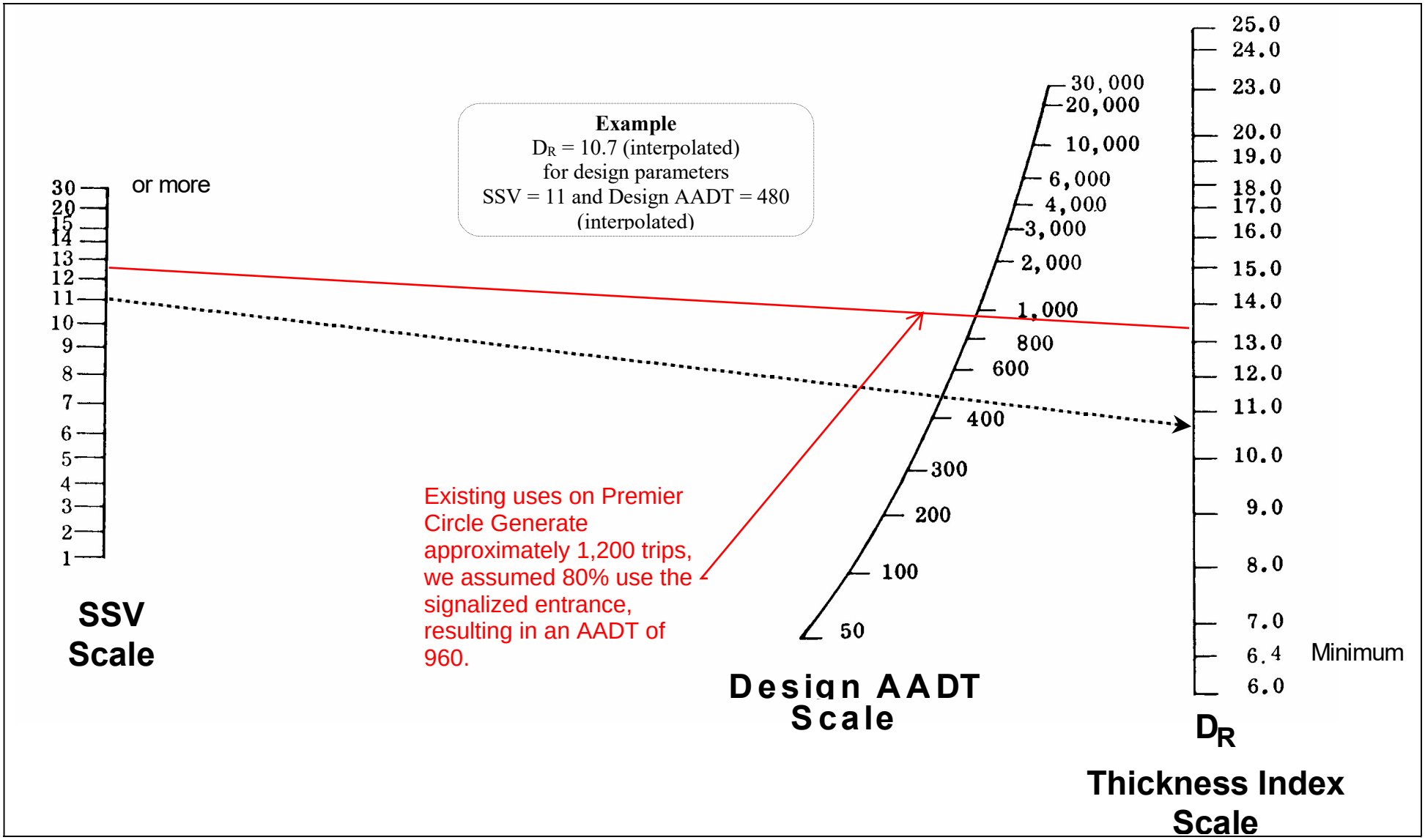
D_R = 13.3 from Appendix II

Description of Proposed Pavement Section

	Material Notation	Thickness, h	a	(a x h)
Surface	Average of Cores From Existing	3.3"	2.25	Dp = 7.4
Base				
Subbase	Average of Cores From Existing	4.8"	0.6	Dp = 2.9

D_P must equal or exceed the value of D_R. $D_P = \Sigma$**(a x h)** = 10.3

CBRT* CBR date from a nearby site was used as an example instead of conservative Appendix 1 CBR values for these preliminary calculations. For any final designs or improvements CBR value needs to be field verified.



Please refer to Appendices II and V for the application of this diagram in the design of pavement.

Appendix IV

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Subdivision		
Street Name	Premier Circle Proposed Conditions	
Design Engineer	Timmons Group	Phone: 434.295.5624

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CBR_D	Design CBR = Average of CBR_T x 2/3 and modified only as discussed in the Pavement Design Guide.
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DME	VDOT District Materials Engineer
EPT	Equivalent projected traffic
HCV	Number of Heavy Commercial Vehicles (e.g. trucks, buses, etc., with 2 or more axles and 6 or more tires).
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SSV	Soil support value of subgrade (SSV = CBR_D x RF)
D_P	Thickness index of proposed pavement design computed by the Conventional Pavement Design Method
D_R	Thickness index required, based on Design AADT and SSV, determined by Appendix II.

Step 1: Determine Design AADT

AADT	
%HCV = 100 (HCV / AADT) or EPT = 20 x HCV Note: For %HCV ≤ 5%, use AADT	_____ Note: For %HCV>5%, EPT>AADT
Design AADT Use greater of AADT or EPT	

Step 2: Determine Design Values CBR, RF, and SSV

Sample No.	CBR_T
1	
2	
3	
CBRT*	18.9
CBRD	18.9* 2/3
CBRD	12.6

Resiliency Factor	(RF)
Source	Value
Table 1	
Appendix I	
DME approved RF	

For preliminary designs, use the lowest RF value in the equation

CBR_D	x	RF	=	SSV
(_____)	x	(_____)	=	12.6

Step 3: Pavement Design (Check appropriate box and show proposed pavement design below.)

☐ (A) Limited to Design AADT ≤ 400 - Show pavement material notations and thickness from Appendix IV Tables A and B.

☐ (B) Show pavement section as developed in the Pavement Design Guide.
(See Appendix III for material notations and thickness equivalency values (a)).

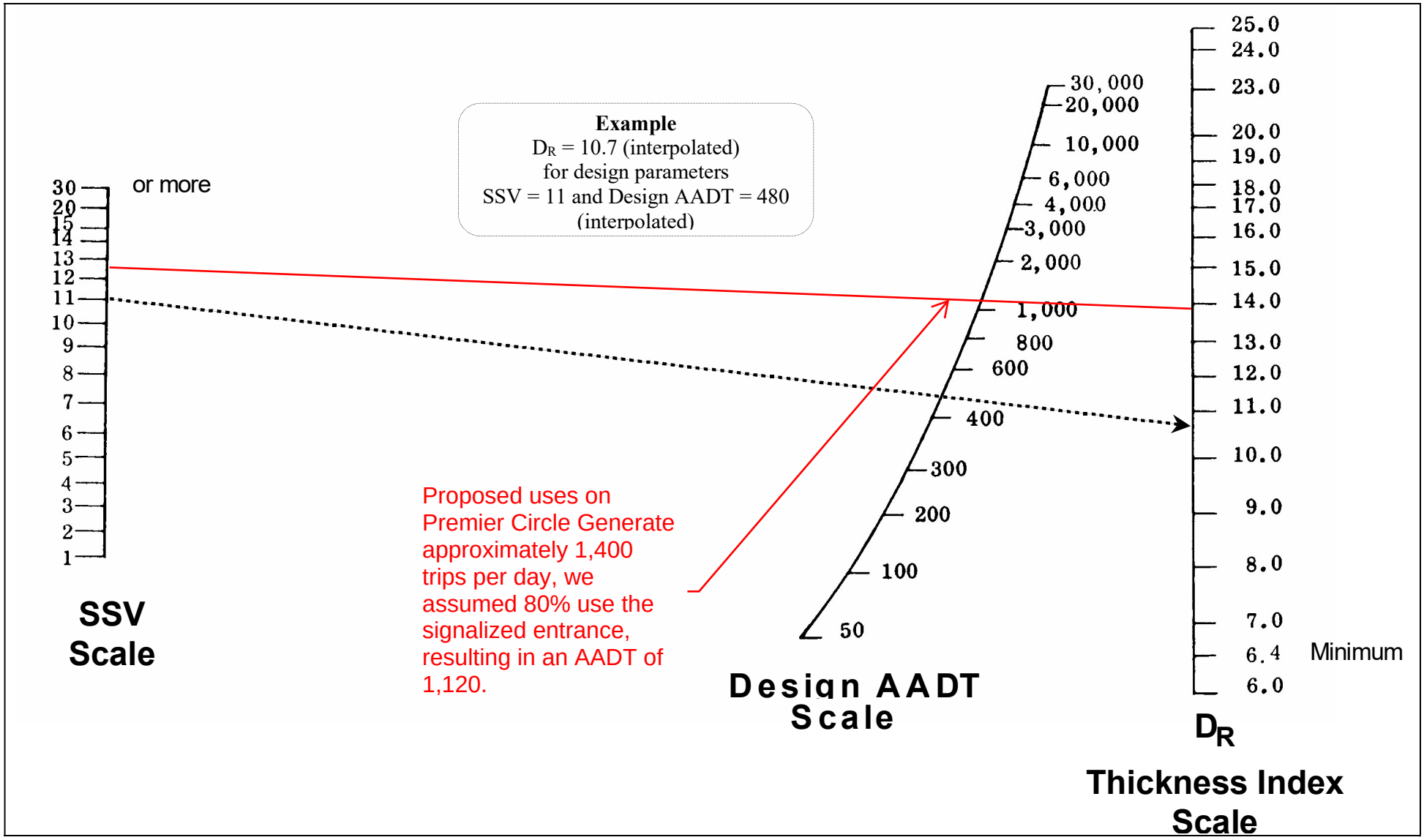
D_R = 13.9 from Appendix II

Description of Proposed Pavement Section

	Material Notation	Thickness, h	a	(a x h)
Surface	Required Thickness for Proposed Condition	1.5"	2.25	Dp = 3.4
Base	Required Thickness for Proposed Condition	3"	2.25	Dp = 6.7
Subbase	Required Thickness for Proposed Condition	8"	0.6	Dp = 4.8

D_P must equal or exceed the value of D_R. $D_P = \Sigma$(a x h) = 14.9

CBRT*: CBR date from a nearby site was used as an example instead of conservative Appendix 1 CBR values for these preliminary calculations. For any final designs or improvements CBR value needs to be field verified.



Please refer to Appendices II and V for the application of this diagram in the design of pavement.