Texas Department of Transportation

Pavement Design Report
FM 975

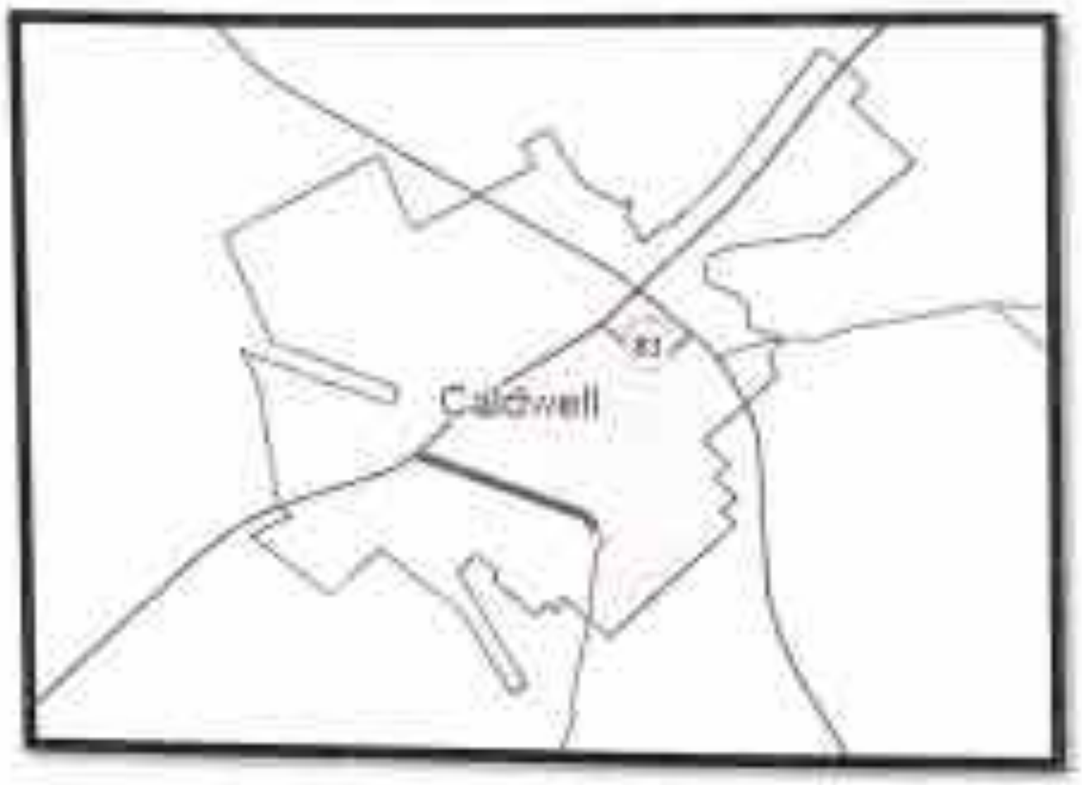
CSJ: 1129-01-029
COUNTY: BURLESON
LIMITS: RR UNDERPASS

RECOMMENDED FOR APPROVAL:	APPROVED:
JAMES W. ROBBINS, P.E. DATE PAVEMENT ENGINEER (PE NUMBER: 106267) BRYAN DISTRICT	LANCE SIMMONS, P.E. DATE DISTRICT ENGINEER BRYAN DISTRICT

This document is released for the purpose of interim review and is not intended for bidding, construction, or permitting purposes.

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Location Map:



Existing Pavement:

The existing pavement consists of approximately 5.0-7.0" of HMA and 6.0-8.0" of Flexible Base.

Proposed Pavement:

- 2.0" Course of Hot Mix: Asphalt, SP Mixes SP-D SAC-A PG 70-22, 3077-6052
- ASPH (RC-250) (DEL) (SITE 1), 8010-6184
- SCRUB SEAL (AGGR) (TY-B GR-5), 3064-6002
- 8.0" Emuls/Foam Asph Base (Foamed Asphalt Treat (8") (DC), 3063-6003; Cement (1.0-1.5%), 3063-6002; Asphalt Binder (2.0-2.8%), 3063-6001
- 7.5" Flexible Base (Rework BS MTL (TY A) (8") (ORD COMP), 0251-6022

The FPS21 Design requires a thickness of 16.7-inches total. The current grade of the road is at maximum 15.0-in. Therefore, in effort to keep the proposed grade level consistent, the decision to stay at the lowest required level was decided as to not negatively affect current residential driveways. 8-0" of Emuls/Foams Asph Base was chosen to provide lateral and vertical stress support to resist the rutting that has occurred in the current design. FPS reports a total cost of $20.93 per cubic square yard.

Recommendation:

It is recommended to reclaim and reuse as much of the existing aggregate to filter and create the new foamed asphalt base. However, due to the residential housing that lines the project the existing aggregate that is removed must be transported from the project to a dumping location that is designated by the contractor.

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Supporting Documentation

Flexible base:

Table 2 – Flexible Base Selection Criteria

Shoulder Width	Surface	Traffic (Design ESALs)	[1]Base Grade
<3'	Surface Treatment	<=3,000,000	1-2
		>3,000,000	1-2
	HMA <3"	<500,000	1-2
		>=500,000	1-2
	HMA >=3"	All Cases	1-2 or 5
>=3'	Surface Treatment	<=3,000,000	1-2 or 5
		>3,000,000	1-2
	HMA <3"	All Cases	1-2
	HMA >=3"	All Cases	1-2 or 5

1. Some sections may require a better grade base than what is shown in the chart. The designer will provide justification in the pavement design report when the grade of base differs from what is recommended in this chart.

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Asphaltic Concrete Pavement (ACP - Hot mixed or Warm mixed)

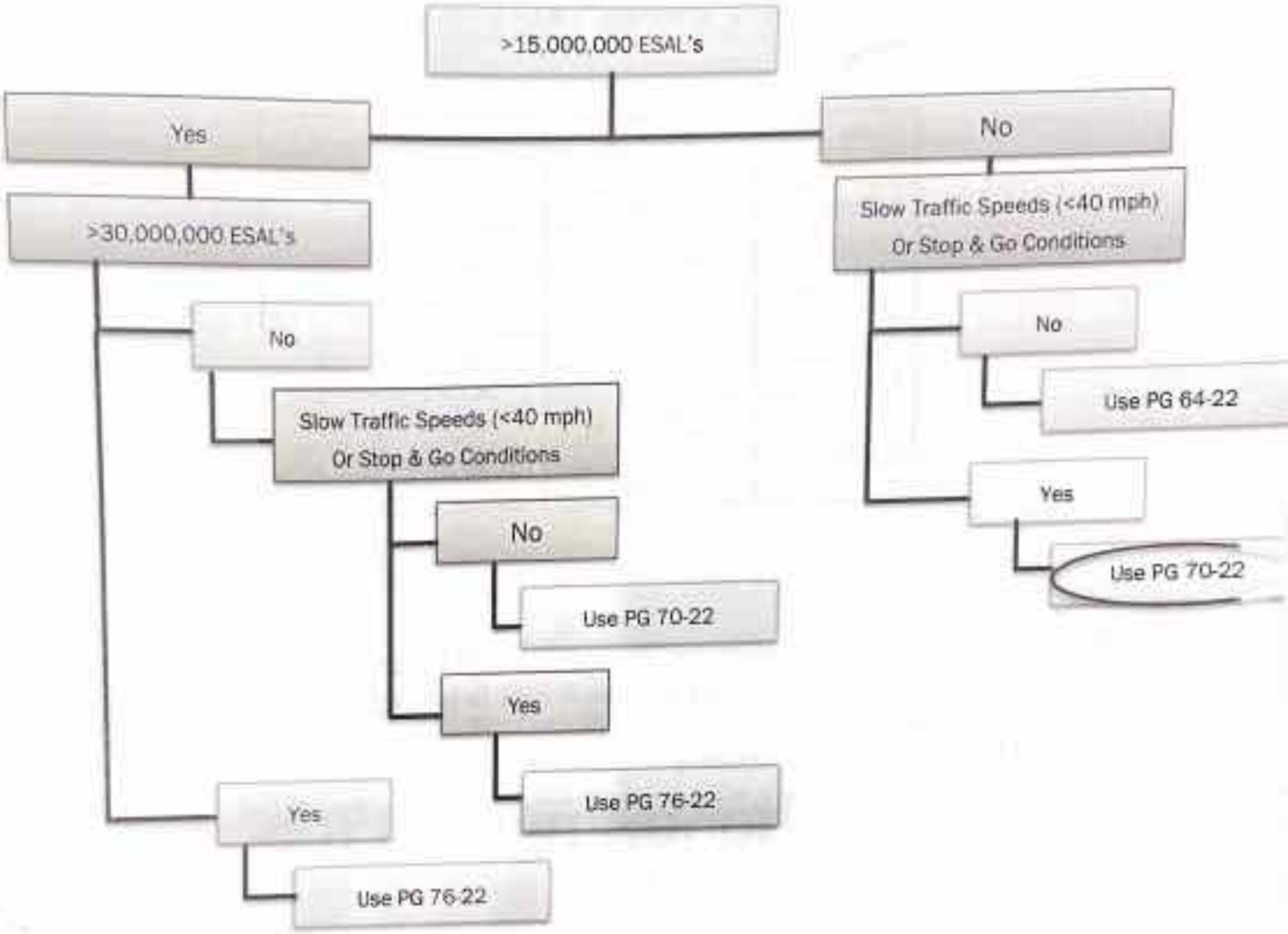
Design all ACP with the Superpave Design procedure unless specifically required for a specialty mixture. Table 4 shows the minimum total thickness of all ACP layers needed in the pavement structure.

Total Equivalent 18 Kip Single Axle Load Applications	Placed on Flexible Base Grade 1-2 (min thickness	Placed on Flexible Base Grade 5 (min thickness
100,000	1.25	1.5
150,000	1.25	1.75
250,000	1.25	2
400,000	1.5	2.25
600,000	1.75	2.5
1,000,000	2	3
1,500,000	2.5	3.5
2,500,000	3	4
4,000,000	3.5	4.5
10,000,000	4.5	5.5
Thickness shown is inches. Stage construction of surfacing is permitted if traffic studies indicate slow development of axle load equivalencies. Note: Reference Tex-117-E Figure 14 Suggested Minimum Thickness of Surface Course September 1995		

PG binder selection criteria

1. Use the chart below to select performance-graded binders for dense graded hot/warm mix on construction projects.
   a. Applies to all layers of ACP in the top 2 inches of the pavement structure.
   b. Use PG64-22 in all ACP layers below 2 inches.
   c. Use PG64-22 for Type A or B mixtures.
2. Mixes other than dense graded,
   a. Use the minimum PG binder as required by specification
   b. For Ty CAM, use a minimum PG70-22.
3. Investigations have shown that asphaltic concrete pavement failures can occur due to slower traffic speeds and stop and go conditions. Therefore, Engineers shall use engineering judgment for "bumping" the asphalt grade when these conditions warrant.
   a. Slow traffic speed is considered less than 40 mph.
4. The condition of the existing pavement should be considered when determining the PG binder. Include justification if the condition warrants a PG binder with a higher grade than determined with flow chart 1.
5. All maintenance material requisitions for plant produced mix shall specify a PG64-22.
6. Include PG binder selection documentation in the pavement design report.

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SPG binder Selection

1) Looks at climate-basis grade. This corresponds to low traffic grade.
   Use map or Excel sheet.
2) Review your application for changes to this base grade.
   Reasons to increase the high temperature number are high traffic, high truck traffic, starting and stopping.
   A reason to decrease the low temperature number may be to compensate for a weak pavement structure.

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3) Review traditional materials for reference. The table below shows typical traditional materials and their grades

County	SPG Grade	Traditional Material
Brazos	67-19	AC20-5TR
Burleson	67-19	AC20-5TR
Freestone	67-19	AC20-5TR
Grimes	73-19	AC15P
Leon	73-19	AC15P
Madison	73-19 or 67-19	AC15P or AC20-5TR
Milam	73-19 or 67-19	AC15P or AC20-5TR
Robertson	73-19 or 67-19	AC15P or AC20-5TR
Walker	67-19	AC20-5TR
Washington	67-19	AC20-5TR

4) Select to use: 1) hot applied binder, 2) emulsion, or 3) either.

5) After this process you should have a binder in mind to specify in your plans. This could be different for various roadways.

Excel Grade Selection Spreadsheet

ftp://ftp.dot.state.tx.us/pub/txdot-info/cmd/forms/docs/pg-spg-binder-climatic-grade-selection.xlsm

Climate Map

