APPROVED

By: RCR Date: 5-9-02

City of Fort Collins
Engineering Department

Alternatives A & C only

Terracon

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REPORT OF FINAL PAVEMENT DESIGN

PAVEMENT EVALUATION FOR COTTONWOOD RIDGE SUBDIVISION
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SOUTH OF WESTBURY DRIVE AND WEST OF SOUTH SHIELDS STREET
FORT COLLINS, COLORADO

TERRACON PROJECT NO. 20025046

MAY 7, 2002

INTRODUCTION

This report contains the results of our final pavement design for the proposed streets located within the Cottonwood Ridge Subdivision, located south of Westbury Drive, and west of South Shields Street, in southwest Fort Collins, Colorado. The site is located in the Northeast 1/4 of Section 3, Township 6 North, Range 69 West of the 6th Principal Meridian.

The purpose of this report is to provide the appropriate pavement thickness sections for the proposed streets based on the results of our subsurface exploration, laboratory test results and information received from the City of Fort Collins – Engineering Department.

The conclusions and recommendations contained in this report are based upon the results of field and laboratory testing, engineering analyses, our experience with similar soil conditions and our understanding of the proposed project. Terracon prepared a geotechnical engineering pavement report containing subsurface data for the site dated April 22, 2002.

PROPOSED CONSTRUCTION

The proposed roadways to be constructed within the Cottonwood Ridge Subdivision are to consist of Fairchild Drive, Kininak Circle, Aqua Fria Drive, Sarvis Lane, Crystal Brook Court and Gilpin Drive.

PAVEMENT RECOMMENDATIONS

Geotechnical Engineering Considerations

As presented in our initial "Geotechnical Engineering Report" shallow bedrock was encountered in the general vicinity of Test Boring No. 5 at an approximate depth of 1-foot below site grades. The City of Fort Collins – Engineering Department requires a minimum separation of 3-feet exist beneath the bottom of the pavement section to the top of the expansive and/or impervious bedrock stratum. Therefore, we recommended an overexcavation and replacement operation occur to allow for the required 3-foot separation.

Due to the relatively shallow depth to bedrock in the general vicinity of Test Boring No. 5, it was recommended that over-excavation and replacement procedures be performed where the bedrock was encountered within 3-feet of the bottom of the final pavement structure. It was suggested that a series of 3 to 4 foot depth backhoe test pits be excavated in the general vicinity of Test Boring No. 5 to better define the depth to bedrock. We recommended that during the backhoe test pit operations, a representative from Terracon and the City of Fort Collins be present to document the soil profile and the depth to bedrock and delineate the limits where over-excavation would be required. If bedrock was encountered within the upper 3-feet of subgrade beneath the pavement section, the bedrock should be removed and replaced with an approved fill material. The on-site overburden soils are suitable for reuse as fill material. The replaced fill material should then be moisture conditioned, placed in uniform lifts and compacted to at least 95 % of Standard Proctor Density ASTM D698. If during the additional backhoe test pit procedures, bedrock is not encountered within 3-feet of final subgrade, no additional subgrade preparation is necessary.

A representative from Terracon was on-site on May 1, 2002, to observe the backhoe test pit operations and provide recommendations for the over-excavation limits. During this on-site visit, a representative of Progressive Living Structures was also present. After a series of backhoe test pits were excavated, it was determined that the over-excavation limits were to include the full-width of Fairchild Drive from approximately 120-feet north of Test Boring No. 5 and continue to approximately 130-feet south of Test Boring No. 5 and the full-width of Aqua Drive from approximately 200 feet west of Test Boring No. 5. We are including a site diagram, Figure No. 1, which depicts the area of work.

It is recommended Terracon be on-site to observe the overexcavation procedures and to monitor and test the moisture and density during the placement of the fill material.

Based on the subsurface conditions encountered at the site, it is our opinion the proposed pavement construction is feasible at the site from a geotechnical engineering point of view. Asphalt concrete underlain by crushed aggregate base course, full-depth asphalt pavement, and non-reinforced concrete pavement are feasible alternatives for the proposed pavement sections. Based on the subsurface conditions encountered at the site, it is recommended that all street improvements within the Cottonwood Ridge Subdivision be designed using an "R-Value" of 10.

Due to the swell potential of the subgrade materials, as reported in our "Geotechnical Engineering Report- Pavement Evaluation" subgrade stabilization will be required. The subgrade soils appeared to be relatively dry and when inundated with water at an initial load of 150 pounds per square foot, (PSF), as required, swell-index results in excess of 2% were calculated. The City of Fort Collins – Engineering Department requires subgrade soils to be stabilized to mitigate swell potential subgrade soils having swell-index values in excess of 2%. We are providing 2 alternatives to minimize the swell potential of the pavement subgrade stratum.

- The first is to over excavate and moisture condition the subgrade materials to plus or minus 2 % of optimum moisture content and recompact to at least 95 percent of Standard Proctor Density ASTM

D698. The upper 3-feet of the existing subgrade soils should "tilled" moisture conditioned and recompacted. Verification of this procedure will be required to assure the swell potential has been reduced. Additional swell-consolidation laboratory tests should be taken and a proof-roll of the reconditioned subgrade should be performed.

- The second subgrade stabilization procedure would be to incorporate a fly ash subgrade treatment. Flyash, where utilized, should be placed in general accordance with the standard of industry for placement procedures. Terracon is available to provide the required laboratory soil and flyash mix design as well as placement recommendations upon request.

Pavement Design and Construction

Design of pavements for the project have been based on the procedures outlined in the 1993 Guideline for Design of Pavement Structures by the American Association of State Highway and Transportation Officials (AASHTO), City of Fort Collins criteria, and the following data. For flexible pavement design, a design life of 20 years was utilized. The City of Fort Collins provided the equivalent daily axle loads (EDLAs) for the project. Using a correlated design R-value of 10, appropriate ESAL/day, environmental criteria and other factors, the structural numbers (SN) of the pavement sections were determined on the basis of the 1993 AASHTO design equation.

Street Name/Street Type	18 kip EDLA	ESALs	Reliability	Terminal Serviceability	Structural No.
Fairchild Drive – Major Residential Collector	25	182,500	75	2.3	2.43
Kininak Circle – Minor Residential Collector	20	146,000	75	2.3	2.35
Aqua Fria Drive- Minor Local Residential Collector	15	109,500	70	2.0	2.18
Gilpin Drive, Sarvis Lane, & Crystal Brook Court-Local Residential	7	51,100	70	2.0	1.92

Local drainage characteristics of proposed pavement areas are considered to vary from fair to good depending upon location on the site. For purposes of this design analysis, fair drainage characteristics are considered to control the design. These characteristics, coupled with the approximate duration of saturated subgrade conditions, results in a design drainage coefficient of 1.0 when applying the AASHTO criteria for design.

In addition to the flexible pavement design analyses, a rigid pavement design analysis was completed, based upon AASHTO design procedures. Rigid pavement design is based on an evaluation of the Modulus of Subgrade Reaction of the soils (K-value); the Modulus of Rupture of the concrete, and other factors previously outlined. The design K-value of 100 pounds per cubic inch (pci) for the subgrade soil was determined by correlation to the laboratory tests results. A modulus of rupture of 650 psi (working stress 488 psi) was used for pavement concrete. The rigid pavement thicknesses for each traffic

category were determined on the basis of the AASHTO design equation. Recommended alternatives for flexible and rigid pavements, summarized for each street, are as follows:

Traffic Area	Alternatives	*Recommended Minimum Pavement Thickness – inches*						
		(1) Asphalt Concrete Surface Grading S or SX	(1) Asphalt Concrete Surface Grading S or SG	Aggregate Base Course – Class 5 or 6	(2) Fly Ash Treated Sub Base	Portland Cement Concrete	Total	Actual versus Required S_N
Fairchild Drive	(3) A	1-1/2	3	6			10-1/2	2.64/2.43
	(4) B	3	3				6	2.64/2.43
	(5) C	3-1/2 4 1/2		6	12		21-1/2	3.40/2.43
	(6) D	1-1/2	3		12		16-1/2	3.18/2.43
	(7) E					7	7	N/A
Kininak Circle	(3) A	3-1/2		8			11-1/2	2.42/2.35
	(4) B	2-1/2	3				5-1/2	2.42/2.35
	(5) C	3-1/2		6	12		21-1/2	3.40/2.35
	(6) D	1-1/2	3		12		16-1/2	3.18/2.35
	(7) E					6	6	N/A
Aqua Fria Drive	(3) A	3-1/2		6			9-1/2	2.20/2.18
	(4) B	2	3				5	2.20/2.18
	(5) C	3-1/2		6	12		21-1/2	3.40/2.18
	(6) D	1-1/2	3		12		16-1/2	3.18/2.18
	(7) E					6	6	N/A
Sarvis Lane, Crystal Brook Court, and Gilpin Drive	(3) A	3-1/2		6			9-1/2	2.20/1.92
	(4) B	2	3				5	2.20/1.92
	(5) C	3-1/2		6	12		21-1/2	3.40/1.92
	(6) D	1-1/2	3		12		16-1/2	3.18/1.92
	(7) E					5-1/2	5-1/2	N/A

(1) If the asphalt surface course is to consist of Grading S, then the required minimum thickness placed should be 2-inches. If the asphalt surface course is to consist of Grading SX, the required minimum thickness placed should be 1-1/2-inches. If the asphalt pavement section is to be placed in conjunction with either S or SG, then the required minimum thickness placed should be 3-inches.

(2) If flyash is utilized for portions of the proposed roadway construction and is to be considered as part of the strength coefficient equation, it is recommended that the upper 12-inches of the subgrade be treated with flyash. Terracon used a strength coefficient value of 0.10 for the required minimum thickness of 12-inches, which results in a total strength value of 1.2 in the pavement thickness

formula. Using a minimum thickness of 12-inches of flyash treated subgrade could reduce the required asphalt thickness by approximately 2-1/2-inches. However, in most cases the required minimum asphalt pavement thickness values may take precedent in the pavement thickness sections. Therefore no reduction may be provided and the use of flyash may not be economical, ***unless needed for subgrade stabilization***. Due to the swell potential exhibited by the swell consolidation tests, inundated at 150 psf, stabilization of subgrade soils are recommended. Use of flyash should be considered as a stabilization technique.

(3) Alternative A: Provides the minimum pavement thicknesses for use of asphalt concrete surface material, Grading S, SX and SG, underlain by Class 5 or 6 aggregate road base material.

(4) Alternative B: Provides the minimum pavement thicknesses for use of full-depth asphalt concrete surface material, Grading S or SX, underlain by asphalt concrete surface material, Grading SG.

(5) Alternative C: Provides the minimum pavement thicknesses for use of asphalt concrete surface material, Grading S, SX and SG, underlain by a minimum of 6-inches of Class 5 or 6 aggregate road base material, and a minimum of 12-inches of flyash treated subgrade.

(6) Alternative D: Provides the minimum pavement thicknesses for use of full-depth asphalt concrete surface material, Grading S, SX and SG, underlain by a minimum of 12-inches of flyash treated subgrade.

(7) Alternative E: Provides the minimum required pavement thicknesses for use of Portland Cement Concrete pavement.

Each alternative should be investigated with respect to current material availability and economic conditions. Aggregate base course (if used on the site) should consist of a blend of sand and gravel, which meets strict specifications for quality and gradation. Use of materials meeting Colorado Department of Transportation (CDOT) Class 5 or 6 specifications is recommended for base course. Aggregate base course should be placed in lifts not exceeding six inches and should be compacted to a minimum of 95% Standard Proctor Density (ASTM D698).

Asphalt concrete should be composed of a mixture of aggregate, filler and additives, if required, and approved bituminous material. Asphalt concrete should conform to approved mix designs stating the SuperPave and/or Hveem properties, optimum asphalt content, job mix formula and recommended mixing and placing temperatures. Aggregate used in asphalt concrete should meet Colorado Department of Transportation Grading S, SX or SG specifications. Mix designs should be submitted prior to construction to verify their adequacy. Asphalt material should be placed in maximum 3-inch lifts and should be compacted within a range of 92 to 96% of Maximum Theoretical Density.

Preventative maintenance should be planned and provided for through an on-going pavement management program in order to enhance future pavement performance. Preventative maintenance activities are intended to slow the rate of pavement deterioration, and to preserve the pavement investment.

Preventative maintenance consists of both localized maintenance (e.g. crack sealing and patching) and global maintenance (e.g. surface sealing). Preventative maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements.

Recommended preventative maintenance policies for asphalt and jointed concrete pavements, based upon type and severity of distress, are provided. Prior to implementing any maintenance, additional engineering observation is recommended to determine the type and extent of preventative maintenance.

GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide testing and observation during excavation, grading, and pavement construction phases of the project. In the event that any changes of the proposed project are planned, the conclusions and recommendations contained in this report should be reviewed and the report modified or supplemented as necessary.

The analyses and recommendations in this report are based in part upon data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations, which may occur between borings, across the site, or due to the modifying effects of weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report, are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes, and either verifies or modifies the conclusions of this report in writing.

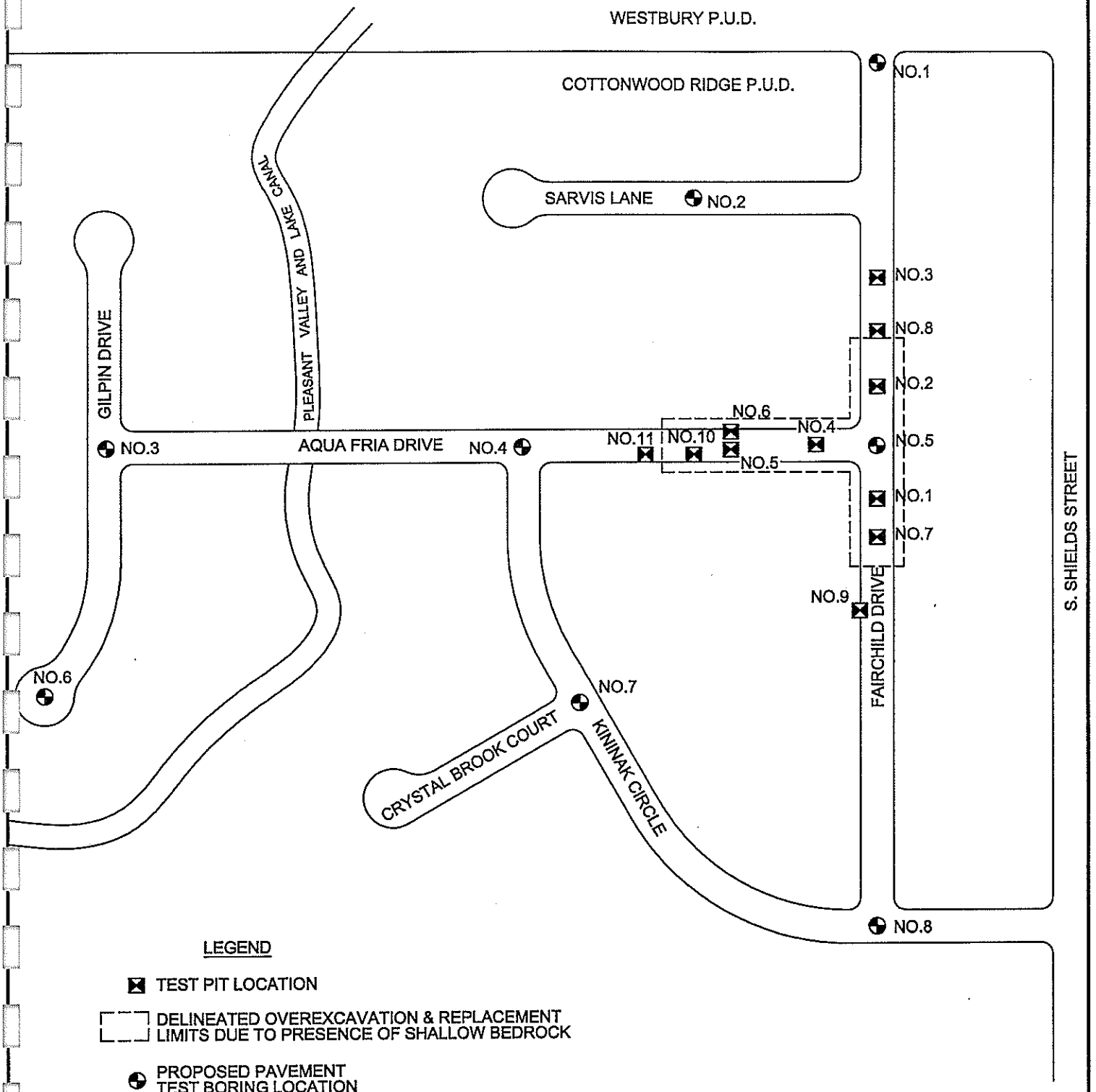

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES.

FIGURE 1: SITE DIAGRAM
COTTONWOOD RIDGE RESIDENTIAL DEVELOPMENT
PAVEMENT DESIGN THICKNESS EVALUATION
FORT COLLINS, COLORADO

Project Mngr: DAR	Terracon	Project No.	20025046
Designed By: DAR		Scale:	1"=120'
Checked By: DAR	301 N. Howes Street Fort Collins, Colorado 80521	Date:	5/3/02
Approved By: DAR		Drawn By:	SDC
File Name: 25026FIG1TP		Figure No.	1

Terracon

CLIENT:	Progressive Living Structures			**PROJECT:**	Cottonwood Ridge Residential Development
PROJECT NO.	20025046	**DATE:**	5/6/2002	**LOCATION:**	South of Westbury Drive, and west of Shields Street Fort Collins, Colorado

AASHTO 1993 PAVEMENT DESIGN - Fairchild Drive EDLA 25

	RIGID PAVEMENT ANALYSIS			FLEXIBLE PAVEMENT ANALYSIS	
	(1) DESIGN 18-kip - (ESAL's)	25	182,500	(1) DESIGN 18-kip (ESAL's)	182,500
	(2) RELIABILITY		75%	(2) RELIABILITY	75%
	(3) OVERALL DEVIATION		0.34	(3) OVERALL DEVIATION	0.44
	(4) MODULUS OF RUPTURE		650		
	(5) MODULUS OF ELASTICITY		3,705,000		
	(6 LOAD TRANSFER		3.1	(4) R-VALUE (HVEEM STABILOMETER)	10
	(7) MODULUS OF SUBGRADE REACTION		100	(5) SOIL RESILIENT MODULUS	6,550
	(8) DRAINAGE COEFFICIENT		1.0		
	(9) INITIAL SERVICEABILITY		4.5	(6) INITIAL SERVICEABILITY	4.5
	(10) TERMINAL SERVICEABILITY		2.3	(7) TERMINAL SERVICEABILITY	2.3
Alternative E	**CALCULATED RIGID PAVEMENT THICKNESS, (IN):**		**4.52"**	**CALCULATED STRUCTURAL NUMBER:**	2.43

LAYER NUMBER	PAVEMENT THICKNESS COEFFICIENT	PAVEMENT THICKNESS, (INCHES)	PAVEMENT TYPE SECTION	DRAINAGE COEFFICIENT	CALCULATED STRUCTURAL NO. - S_N	REQUIRED S_N
UPPER	0.44	1.5	ASPHALT -GRADING S, SX	1.0	0.66	
2	0.44	3.0	ASPHALT -GRADING S, SG	1.0	1.32	
3	0.11	6.0	AGGR. BASE - Class 5 or 6	1.0	0.66	
Alternative A		TOTAL 10.5			TOTAL 2.64	2.43
UPPER	0.44	3.0	ASPHALT -GRADING S, SX	1.0	1.32	
2	0.44	3.0	ASPHALT -GRADING S, SG	1.0	1.32	
Alternative B		TOTAL 6.0			TOTAL 2.64	2.43
UPPER	0.44	3.5	ASPHALT -GRADING S, SX	1.0	1.54	
2	0.44	0.0	ASPHALT -GRADING S, SG	1.0	0.00	
3	0.11	6.0	AGGR. BASE - Class 5 or 6	1.0	0.66	
4	0.10	12.0	12-INCHES FLYASH	1.0	1.20	
Alternative C		TOTAL 21.5			TOTAL 3.40	2.43
UPPER	0.44	1.5	ASPHALT -GRADING S, SX	1.0	0.66	
2	0.44	3.0	ASPHALT -GRADING S, SG	1.0	1.32	
3	0.10	12.0	12-INCHES FLYASH	1.0	1.20	
Alternative D		TOTAL 16.5			TOTAL 3.18	2.43

Terracon

CLIENT: Progressive Living Structures
PROJECT NO. 20025046 **DATE:** 5/6/2002

PROJECT: Cottonwood Ridge Residential Development
LOCATION: South of Westbury Drive, and west of Shields Street
Fort Collins, Colorado

AASHTO 1993 PAVEMENT DESIGN - Kininak Circle EDLA 20

RIGID PAVEMENT ANALYSIS			FLEXIBLE PAVEMENT ANALYSIS	
(1) DESIGN 18-kip - (ESAL's)	20	146,000	(1) DESIGN 18-kip (ESAL's)	146,000
(2) RELIABILITY		75%	(2) RELIABILITY	75%
(3) OVERALL DEVIATION		0.34	(3) OVERALL DEVIATION	0.44
(4) MODULUS OF RUPTURE		650		
(5) MODULUS OF ELASTICITY		3,705,000		
(6 LOAD TRANSFER		3.1	(4) R-VALUE (HVEEM STABILOMETER)	10
(7) MODULUS OF SUBGRADE REACTION		100	(5) SOIL RESILIENT MODULUS	6,550
(8) DRAINAGE COEFFICIENT		1.0		
(9) INITIAL SERVICEABILITY		4.5	(6) INITIAL SERVICEABILITY	4.5
(10) TERMINAL SERVICEABILITY		2.3	(7) TERMINAL SERVICEABILITY	2.3
Alternative E CALCULATED RIGID PAVEMENT THICKNESS, (IN):		4.38"	CALCULATED STRUCTURAL NUMBER:	2.35

LAYER NUMBER	PAVEMENT THICKNESS COEFFICIENT	PAVEMENT THICKNESS, (INCHES)	PAVEMENT TYPE SECTION	DRAINAGE COEFFICIENT	CALCULATED STRUCTURAL NO. - S_N	REQUIRED S_N
UPPER	0.44	3.5	ASPHALT -GRADING S, SX	1.0	1.54	
2	0.44	0.0	ASPHALT -GRADING S, SG	1.0	0.00	
3	0.11	8.0	AGGR. BASE - Class 5 or 6	1.0	0.88	
Alternative A		TOTAL 11.5			TOTAL 2.42	2.35
UPPER	0.44	2.5	ASPHALT -GRADING S, SX	1.0	1.10	
2	0.44	3.0	ASPHALT -GRADING S, SG	1.0	1.32	
Alternative B		TOTAL 5.5			TOTAL 2.42	2.35
UPPER	0.44	3.5	ASPHALT -GRADING S, SX	1.0	1.54	
2	0.44	0.0	ASPHALT -GRADING S, SG	1.0	0.00	
3	0.11	6.0	AGGR. BASE - Class 5 or 6	1.0	0.66	
4	0.10	12.0	12-INCHES FLYASH	1.0	1.20	
Alternative C		TOTAL 21.5			TOTAL 3.40	2.35
UPPER	0.44	1.5	ASPHALT -GRADING S, SX	1.0	0.66	
2	0.44	3.0	ASPHALT -GRADING S, SG	1.0	1.32	
3	0.10	12.0	12-INCHES FLYASH	1.0	1.20	
Alternative D		TOTAL 16.5			TOTAL 3.18	2.35

Terracon

CLIENT: Progressive Living Structures
PROJECT NO. 20025046 **DATE:** 5/6/2002

PROJECT: Cottonwood Ridge Residential Development
LOCATION: South of Westbury Drive, and west of Shields Street
Fort Collins, Colorado

AASHTO 1993 PAVEMENT DESIGN - Aqua Fria Drive EDLA 15

	RIGID PAVEMENT ANALYSIS			FLEXIBLE PAVEMENT ANALYSIS	
	(1) DESIGN 18-kip - (ESAL's)	15	109,500	(1) DESIGN 18-kip (ESAL's)	109,500
	(2) RELIABILITY		70%	(2) RELIABILITY	70%
	(3) OVERALL DEVIATION		0.34	(3) OVERALL DEVIATION	0.44
	(4) MODULUS OF RUPTURE		650		
	(5) MODULUS OF ELASTICITY		3,705,000		
	(6 LOAD TRANSFER		3.1	(4) R-VALUE (HVEEM STABILOMETER)	10
	(7) MODULUS OF SUBGRADE REACTION		100	(5) SOIL RESILIENT MODULUS	6,550
	(8) DRAINAGE COEFFICIENT		1.0		
	(9) INITIAL SERVICEABILITY		4.5	(6) INITIAL SERVICEABILITY	4.5
	(10) TERMINAL SERVICEABILITY		2.0	(7) TERMINAL SERVICEABILITY	2.0
Alternative E	CALCULATED RIGID PAVEMENT THICKNESS, (IN):		4.00"	CALCULATED STRUCTURAL NUMBER:	2.18

LAYER NUMBER	PAVEMENT THICKNESS COEFFICIENT	PAVEMENT THICKNESS, (INCHES)	PAVEMENT TYPE SECTION	DRAINAGE COEFFICIENT	CALCULATED STRUCTURAL NO. - S_N	REQUIRED S_N
UPPER	0.44	3.5	ASPHALT -GRADING S, SX	1.0	1.54	
2	0.44	0.0	ASPHALT -GRADING S, SG	1.0	0.00	
3	0.11	6.0	AGGR. BASE - Class 5 or 6	1.0	0.66	
Alternative A		TOTAL 9.5			TOTAL 2.20	2.18
UPPER	0.44	2.0	ASPHALT -GRADING S, SX	1.0	0.88	
2	0.44	3.0	ASPHALT -GRADING S, SG	1.0	1.32	
Alternative B		TOTAL 5.0			TOTAL 2.20	2.18
UPPER	0.44	3.5	ASPHALT -GRADING S, SX	1.0	1.54	
2	0.44	0.0	ASPHALT -GRADING S, SG	1.0	0.00	
3	0.11	6.0	AGGR. BASE - Class 5 or 6	1.0	0.66	
4	0.10	12.0	12-INCHES FLYASH	1.0	1.20	
Alternative C		TOTAL 21.5			TOTAL 3.40	2.18
UPPER	0.44	1.5	ASPHALT -GRADING S, SX	1.0	0.66	
2	0.44	3.0	ASPHALT -GRADING S, SG	1.0	1.32	
3	0.10	12.0	12-INCHES FLYASH	1.0	1.20	
Alternative D		TOTAL 16.5			TOTAL 3.18	2.18

Terracon

CLIENT: Progressive Living Structures
PROJECT NO. 20025046 **DATE:** 5/6/2002

PROJECT: Cottonwood Ridge Residential Development
LOCATION: South of Westbury Drive, and west of Shields Street
Fort Collins, Colorado

AASHTO 1993 PAVEMENT DESIGN - Sarvis Lane, Crystal Brook Court, and Gilpin Drive EDLA 7

RIGID PAVEMENT ANALYSIS			FLEXIBLE PAVEMENT ANALYSIS	
(1) DESIGN 18-kip - (ESAL's)	7	51,100	(1) DESIGN 18-kip (ESAL's)	51,100
(2) RELIABILITY		70%	(2) RELIABILITY	70%
(3) OVERALL DEVIATION		0.34	(3) OVERALL DEVIATION	0.44
(4) MODULUS OF RUPTURE		650		
(5) MODULUS OF ELASTICITY		3,705,000		
(6 LOAD TRANSFER		3.1	(4) R-VALUE (HVEEM STABILOMETER)	10
(7) MODULUS OF SUBGRADE REACTION		100	(5) SOIL RESILIENT MODULUS	6,550
(8) DRAINAGE COEFFICIENT		1.0		
(9) INITIAL SERVICEABILITY		4.5	(6) INITIAL SERVICEABILITY	4.5
(10) TERMINAL SERVICEABILITY		2.0	(7) TERMINAL SERVICEABILITY	2.0
Alternative E	**CALCULATED RIGID PAVEMENT THICKNESS, (IN):**	**4.00"**	**CALCULATED STRUCTURAL NUMBER:**	**1.92**

LAYER NUMBER	PAVEMENT THICKNESS COEFFICIENT	PAVEMENT THICKNESS, (INCHES)	PAVEMENT TYPE SECTION	DRAINAGE COEFFICIENT	CALCULATED STRUCTURAL NO. - S_N	REQUIRED S_N
UPPER	0.44	3.5	ASPHALT -GRADING S, SX	1.0	1.54	
2	0.44	0.0	ASPHALT -GRADING S, SG	1.0	0.00	
3	0.11	6.0	AGGR. BASE - Class 5 or 6	1.0	0.66	
Alternative A		**TOTAL** 9.5			**TOTAL** 2.20	1.92
UPPER	0.44	2.0	ASPHALT -GRADING S, SX	1.0	0.88	
2	0.44	3.0	ASPHALT -GRADING S, SG	1.0	1.32	
Alternative B		**TOTAL** 5.0			**TOTAL** 2.20	1.92
UPPER	0.44	3.5	ASPHALT -GRADING S, SX	1.0	1.54	
2	0.44	0.0	ASPHALT -GRADING S, SG	1.0	0.00	
3	0.11	6.0	AGGR. BASE - Class 5 or 6	1.0	0.66	
4	0.10	12.0	12-INCHES FLYASH	1.0	1.20	
Alternative C		**TOTAL** 21.5			**TOTAL** 3.40	1.92
UPPER	0.44	1.5	ASPHALT -GRADING S, SX	1.0	0.66	
2	0.44	3.0	ASPHALT -GRADING S, SG	1.0	1.32	
3	0.10	12.0	12-INCHES FLYASH	1.0	1.20	
Alternative D		**TOTAL** 16.5			**TOTAL** 3.18	1.92