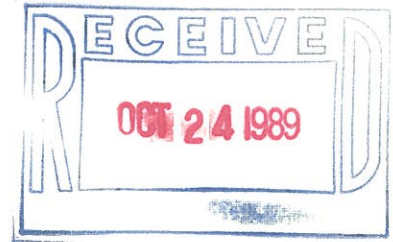


Empire Laboratories, Inc.

GEOTECHNICAL ENGINEERING & MATERIALS TESTING

October 24, 1989

CORPORATE OFFICE
P.O. Box 503 • 301 No. Howes
Fort Collins, Colorado 80522
(303) 484-0359
FAX No. (303) 484-0454



Albrecht Homes
4836 South College Avenue
Fort Collins, Colorado 80525

Attention: Mr. Bill Albrecht

Re: Fairway Seven Estates at
SouthRidge Greens P.U.D.
Fort Collins, Colorado
ELI Project No. 8116-89

Gentlemen:

At your request, Empire Laboratories, Inc. has prepared a pavement design for Fairway Seven Court located in the above-referenced subdivision. The pavement design is based on previous subsurface work done on the site and presented in our "Report of a Geotechnical Investigation" prepared for the site dated August 9, 1989.

Three test borings were drilled on the lots adjacent to Fairway Seven Court. The soils at the site consist of silty clays underlain by sandy silty clays which extend to depths greater than fifteen (15) feet below the surface. Ground water was encountered in this area at depths of ten (10) to greater than fifteen (15) feet below the surface.

Based on the soil conditions encountered at the site, an assumed "R" value of the subgrade material of 5 was used. Based on this "R" value and using the City of Fort Collins "Design Criteria and Standards for Streets", an eighteen kip equivalent daily load application of 5, a regional factor of 1, a twenty-year design life, a serviceability index of 2, and a weighted structural number of 2.35, the following pavement thickness is recommended for Fairway Seven Court:

Asphalt Concrete	3"
Crushed Aggregate Base Course	4"
Select Subbase	6"
Total Pavement Thickness	13"

Asphalt Concrete	2"
Plant Mix Bituminous Base Course	4½"
Total Pavement Thickness	6½"

The select subbase should meet City of Fort Collins Class 1 specifications, and the crushed aggregate base course should meet City of Fort Collins Class 5 or 6 specifications. The subgrade below the proposed asphalt

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Albrecht Homes
Page 2
October 24, 1989

pavement should be prepared in accordance with the recommendations discussed in the "Site Grading, Excavation and Utilities" section of our original report. Upon proper preparation of the subgrade, the subbase and base course should be placed and compacted at or near optimum moisture to at least ninety-five percent (95%) of Standard Proctor Density ASTM D 698-78.

It is recommended that the asphalt concrete and/or plant mix bituminous base course be placed in two (2) to three (3) inch lifts. All plant mix bituminous base course and asphalt concrete shall meet City of Fort Collins specifications and should be placed in accordance with these specifications. All subbase material shall have an "R" value of between 50 and 69, the crushed aggregate base course shall have an "R" value between 70 and 77, the plant mix bituminous base course shall have an Rt value of 90 or greater, and the asphalt concrete shall have an Rt value of 95 or greater. The "R" value of the pavement materials used should be verified by laboratory tests. Field density tests should be taken in the aggregate base course, bituminous base course, and asphalt concrete under the direction of the geotechnical engineer.

A feasible pavement alternate at the site would be rigid pavement. Using the eighteen kip equivalent daily load application described above, a modulus of subgrade reaction of one hundred (100) pounds per square inch per inch based on the assumed "R" value of 5, a design life of twenty (20) years, and concrete designed with a modulus of rupture of six hundred (600) pounds per square inch, five (5) inches of nonreinforced concrete is recommended for Fairway Seven Court.

Subgrade below the proposed street should be prepared in accordance with the recommendations set forth in the "Site Grading, Excavation and Utilities" section of our original report prepared for the site. Concrete pavement should be placed directly on the subgrade that has been uniformly and properly prepared in accordance with the above recommendations. All concrete used in the pavement shall meet ASTM specifications, and all aggregate shall conform to ASTM C 33 specifications. The concrete should be designed with a minimum modulus of rupture of six hundred (600) pounds per square inch in twenty-eight (28) days. It is recommended that laboratory mix designs be done to determine the proper proportions of aggregates, cement, and water necessary to meet these requirements. It is essential that the concrete have a low water-cement ratio, an adequate cement factor, and sufficient quantities of entrained air. Joints should be carefully designed and constructed in accordance with the City of Fort Collins "Design Criteria and Standards for Streets" to ensure good performance of the pavement. It is recommended that all concrete pavement be placed in accordance with City of Fort Collins specifications. If paving is done during cold weather, acceptable cold weather procedures as outlined in the City

Albrecht Homes
Page 3
October 24, 1989

specifications should be utilized. The concrete pavement should be properly cured and protected in accordance with the above specifications. Concrete injured by frost should be removed and replaced. It is recommended that the pavement not be opened to traffic until a flexural strength of four hundred (400) pounds per square inch is obtained or a minimum of fourteen (14) days after the concrete has been placed.

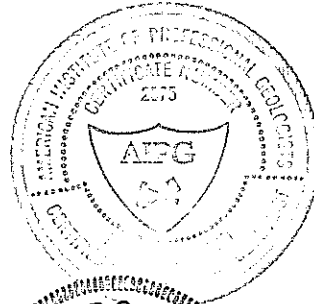
It should be noted that test borings were not drilled in the proposed roadway and should variations in soil conditions from those described in our "Report of a Geotechnical Investigation" or any other unforeseen conditions be encountered during construction, the site should be evaluated by the geotechnical engineer to determine if changes in the pavement design will be required.

If you have any questions regarding our recommendations for pavement design, please do not hesitate to contact us.

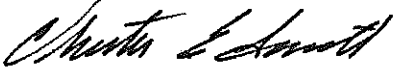
Very truly yours,

EMPIRE LABORATORIES, INC.


Neil R. Sherrod
Senior Engineering Geologist



Reviewed by:


Chester C. Smith, P.E.
President



clc

cc: City of Fort Collins - Mr. Mike Hertzog

Empire Laboratories, Inc.

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CORPORATE OFFICE
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December 7, 1989

RECEIVED

DEC 8 1989

Engineering Dep

City of Fort Collins
Engineering Department
P. O. Box 580
Fort Collins, Colorado 80522

Attention: Mr. Dave Stringer

Re: Fairway Seven Estates
Fort Collins, Colorado
ELI Project No. 8116-89

Gentlemen:

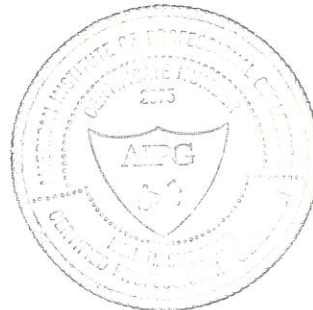
Empire Laboratories, Inc. prepared a pavement design for Fairway Seven Court located in the above-referenced subdivision. The pavement was designed based on the subgrade material having an "R" value of 5. It is our understanding that Connell Resources is to use imported material from Brittany Knolls which has an "R" value of 8. Since our design was based on a lower "R" value, it is our opinion that this material would be suitable for use as fill below the proposed street. If you have any questions regarding our recommendations, please do not hesitate to contact us.

Very truly yours,

EMPIRE LABORATORIES, INC.



Neil R. Sherrod
Senior Engineering Geologist



Reviewed by:



Chester C. Smith, P.E.
President



clc

cc: Connell Resources - Mr. Dale Miller
Albrecht Homes - Mr. Bill Albrecht



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