



**EARTH ENGINEERING
CONSULTANTS, INC.**

May 5, 1994

Geneva Homes
344 Foothills Parkway
Fort Collins, CO 80525

Todd -
FYI

Attn: Gary Hoover, President

Re: Proposed Pavement Subgrade Stabilization
Winterstone and Summerstone Courts
Sunstone Eighth Filing
Fort Collins, Colorado
EEC Project No. 1944038

Mr. Hoover:

As requested, Earth Engineering Consultants, Inc. (EEC) completed an evaluation of the potential for stabilizing the pavement subgrades for the referenced streets utilizing Class C fly ash. Recommendations concerning alternative pavement sections for this project which incorporate a fly ash stabilized subgrade have also been developed. Results of laboratory testing completed as part of this project and our recommendations concerning potential alternative pavement section are presented in the remainder of this report.

Pavement section recommendations were provided as part of our subsurface exploration for this project (EEC Project 1932008, dated May 31, 1993). Those pavement section recommendations were based on an estimated R value of 5 and projected traffic counts of 5. The pavements recommended as part of that report consist of 3-inches of asphaltic concrete on 8-inches of aggregate base. Testing completed subsequent to preparation of that report indicated an R-value of 7 would be appropriate for the pavement design.

Some instability has been observed in the pavement subgrades in this area during preparation of the subgrades for placement of the aggregate base. Stabilizing the in-place subgrades with the addition of Class C fly ash has been considered to increase the stability of the subgrades during construction. Taking advantage of the increased subgrade strength through a reduction in the thickness of the other components in the pavement section has also been considered. The purpose of the laboratory study completed as part of this project was to establish the suitability of the Class C fly ash for use as a stabilizing agent in the site materials and, if appropriate, establish a recommended application rate for developing a stabilized subgrade suitable for incorporation into the pavement section.

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EEC personnel obtained samples of the in-place roadway subgrade materials for the laboratory evaluation. Class C fly ash was obtained from the Pawnee Power Plant in Brush. The subgrade soils were blended with 12% and 14% Class C fly ash, based on dry weight of the soil. Five point moisture-density curves were compacted for each of the blends using standard Proctor compactive effort. The compacted plugs were removed from the split molds, wrapped in saran wrap and aluminum foil to prevent drying, cured and tested for compressive strength. Results of the moisture-density and moisture-strength test results are shown on the attached summary sheets.

ANALYSIS AND RECOMMENDATIONS

Maximum compressive strengths determined for the 12% and 14% Class C fly ash blends were 265 and 295 psi, respectively. The maximum strength occurred at a moisture content slightly wet of optimum moisture for maximum density. Based on these tests results, we recommend the in-place subgrade soils be stabilized through the addition of 12% Class C fly ash from the Pawnee Power Plant.

We understand the stabilization contractor for this project will be Son-Haul, Inc. from Fort Morgan. We have worked with this company on numerous similar projects in the Fort Collins and northern Colorado area and it our opinion the stabilization methods used are consistent with methods typically required to develop a high quality stabilized subgrade. With that past working relationship, we do not feel a need to reiterate means and methods as part of this report. If desired, we can provide additional recommendations concerning means and methods used for the stabilization process at a later time.

A 12-inch thick stabilized subgrade with 4-inches of aggregate base and 3-inches of asphalt surface would result in a design structural number of 2.96. The 3-inch asphalt surfacing and 4-inches of aggregate base is the minimum acceptable section for the City of Fort Collins when utilizing a stabilized subgrade. It is our opinion that this section would be appropriate for both Winterstone and Summerstone Courts. With a subgrade R-value of 7, maximum EDLA for local and collector streets using this section would be 58 and 34, respectively.

GENERAL COMMENTS

The analyses and recommendations presented in this report are based upon the data indicated and from any other information discussed in this report. This report does not reflect any variations which may occur between or across the site.

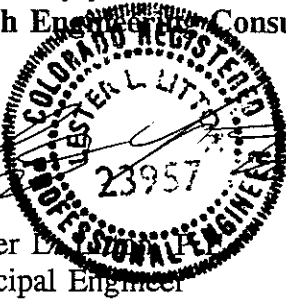
This report has been prepared for the exclusive use of the Geneva Homes for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranty, express or implied, is made.

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We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we can be of further service to you in any other way, please do not hesitate to contact us.

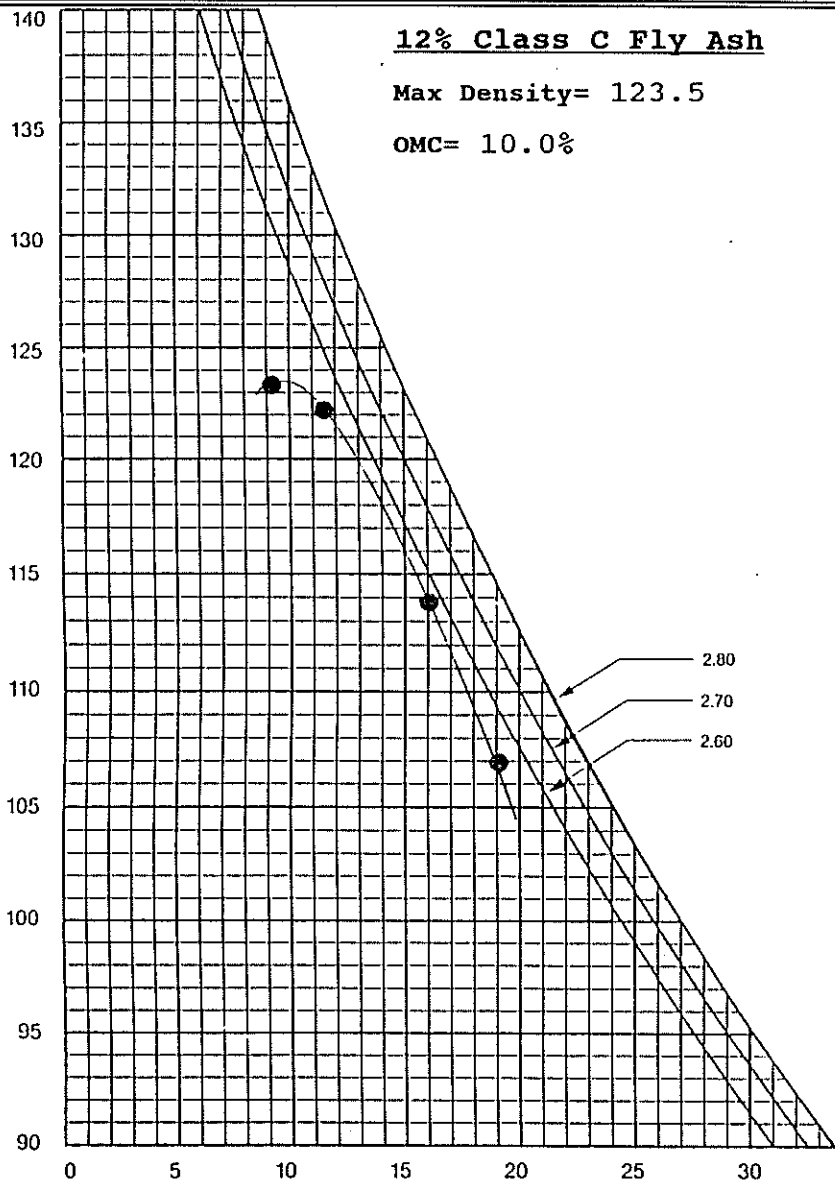
Very truly yours,
Earth Engineering Consultants, Inc.



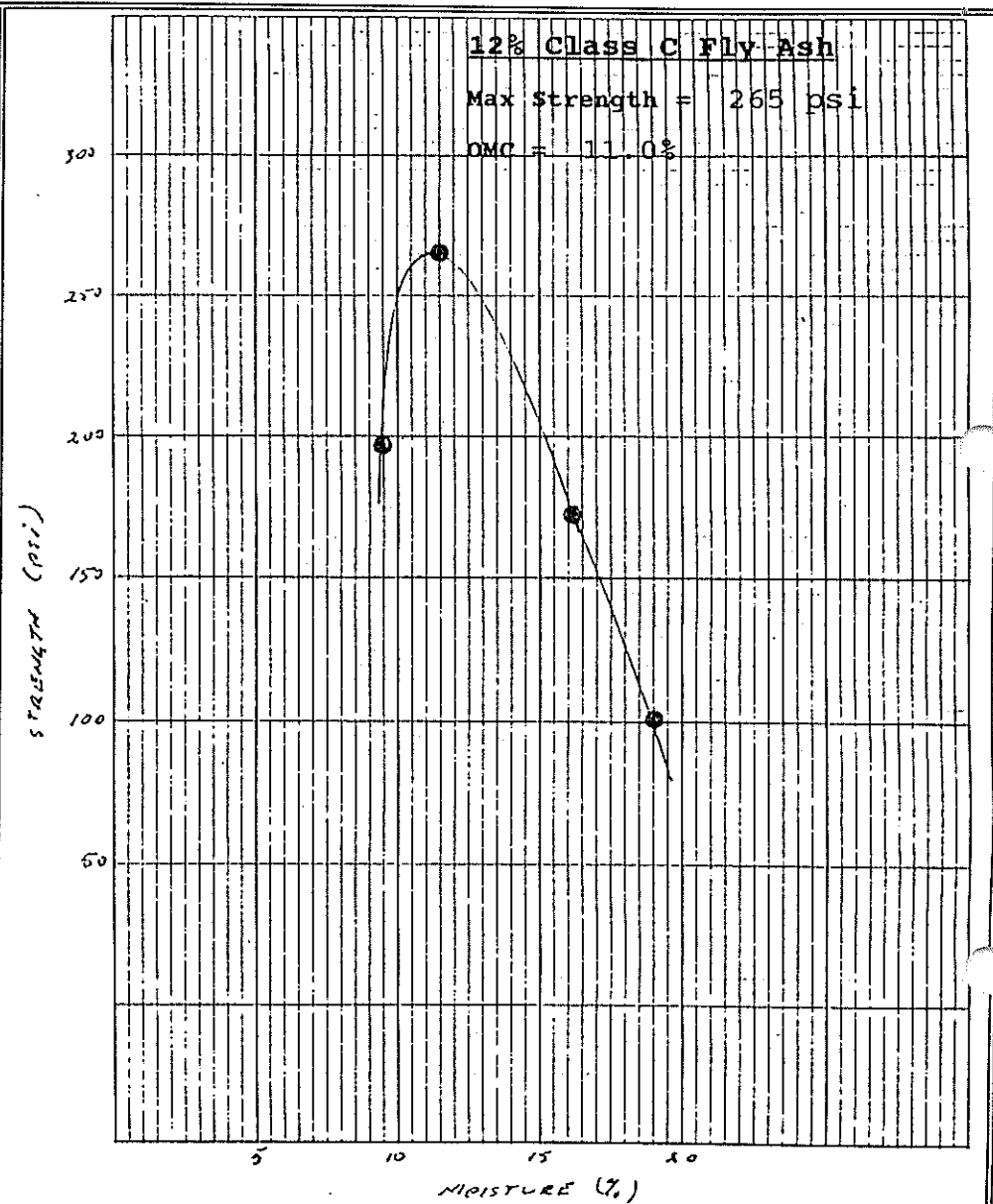
A circular professional engineer seal for Lester L. Litt, registered professional engineer in Colorado, license number 23957. The seal is stamped over a handwritten signature.

Lester L.
Principal Engineer

cc: Land Development Services

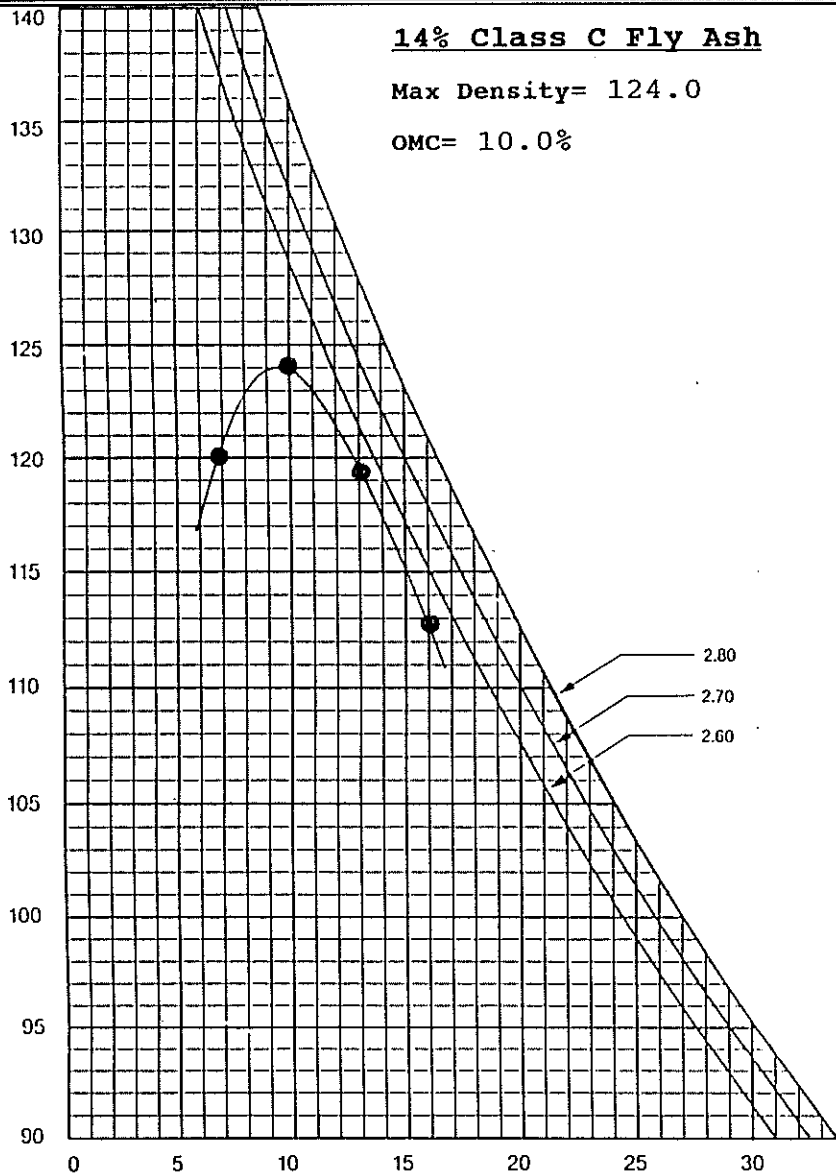


Moisture-Density Relationship

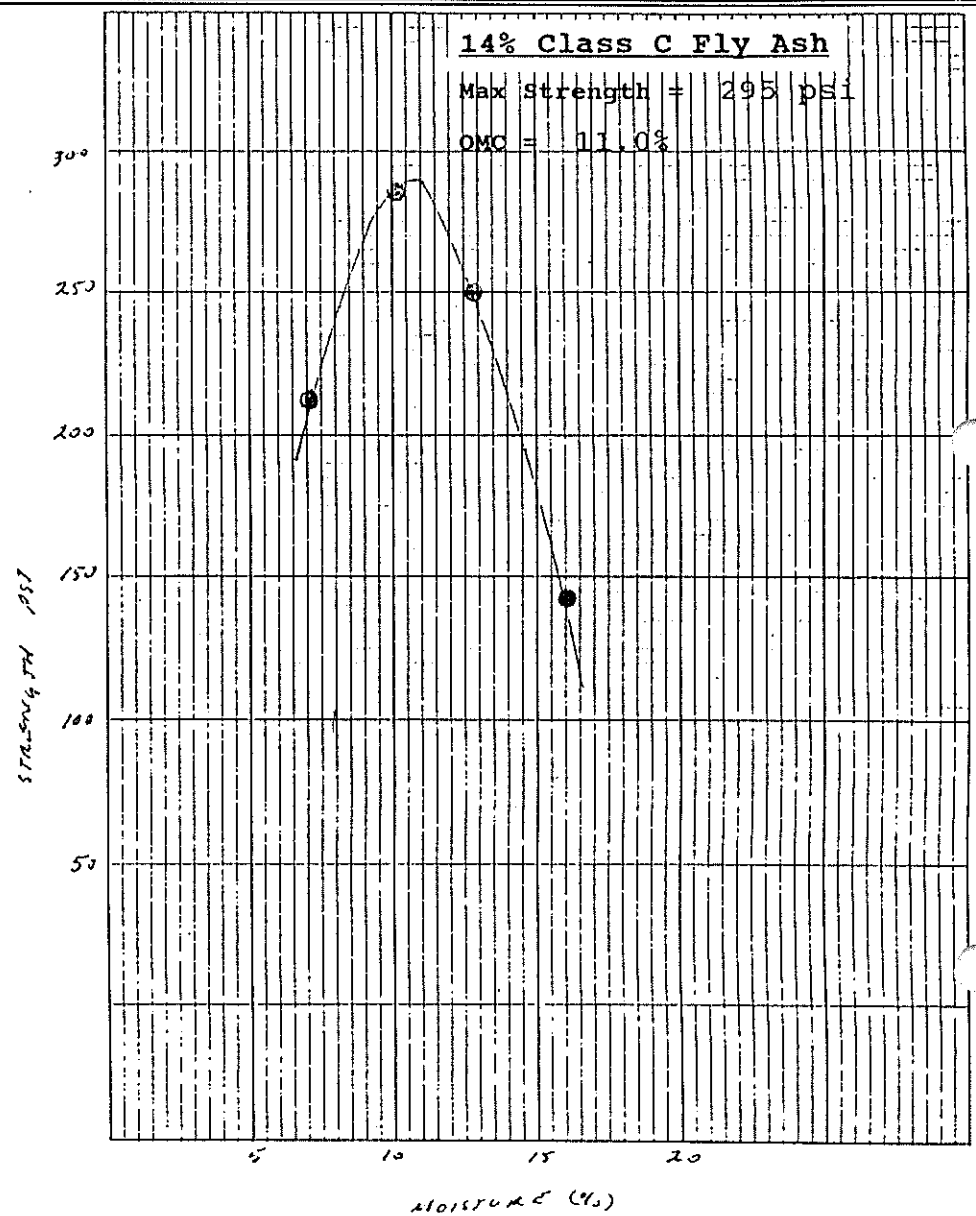


Moisture-Strength Relationship

STABILIZED SOIL DENSITY AND STRENGTH TEST RESULTS
 Winterstone & Summerstone Courts - Sunstone 8th Filing
 Fort Collins, Colorado



Moisture-Density Relationship



Moisture-Strength Relationship

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