

SHB AGRA, INC.
Engineering & Environmental Services

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May 24, 1994

Mr. Thomas White
420 North Main Street
Centerville, Utah 84014

SHB AGRA Job No. E94-2257

Re: Discussions
Soil and Groundwater Concerns
Eakles/Linda Loma/Crouch Property
North of 1500 South Street and Approximately 950 West
Woods Cross City, Utah

Dear Mr. White:

1. INTRODUCTION

This letter presents discussions and recommendations pertaining to soil and groundwater conditions at the site, and their potential effect upon the development of the site for single-family residential homes. This letter essentially summarizes detailed discussions and recommendations presented in the report dated July 15, 1986¹. It should be noted that this writer prepared the referenced report. In addition to the review of the referenced report, we have also been provided with the presently proposed layout for the subdivision.

2. DISCUSSIONS AND RECOMMENDATIONS

2.1. General

The most significant geotechnical aspects of the site are 1) numerous springs and very high groundwater conditions, and 2) the presence of highly organic surface and near surface soils which are unsuitable for support of footings.

1

¹ "Report, Soil and Foundation Investigation, Proposed Single-Family Residential Development, North of 1500 South Street, Between the Denver and Rio Grand Western and Union Pacific Railroad Tracks, Woods Cross, Utah, For Landforms Inc."



Mr. Thomas White
May 24, 1994
SIB AGRA Job No. E94-2257

Page 2

Even with these considerations, it is our opinion that the single-family residential homes, as proposed, can be constructed at the site. The residential structures will be supported upon conventional spread and continuous wall foundations, with the footings being established upon suitable natural soils, or structural fill extending to suitable natural soils.

To facilitate construction, and to most probably allow for the utilization of partial-depth basements as part of the overall development plan, it is essential that an area subdrain system be installed as far in advance of other construction as possible. In addition, it will be essential to install foundation/chimney drain systems around all portions of the proposed residential structures which will extend below grade. More detailed discussions pertaining to both foundations and groundwater are presented in the following sections.

2.2. Foundations

In conjunction with the July 15, 1986 investigation, logs of 19 test pits which had been excavated across the site, were presented. The predominant soils encountered in the test pits consisted of silty clays, silty fine sand, and fine sandy mixtures, silts, and some sequences containing alternating thin layers of silty clays, clayey silts, silts, and silty fine sands. In a number of the test pits, and in addition to topsoil, highly organic soils exhibiting low strength and high compressibility characteristics were encountered. These organic soils, in most cases, were a downward extension of the topsoil sequence. However, in a few cases, the organic soils were encountered generally in one foot or less layers below surficial non-highly organic soils. In none of the test pits were the organic soils encountered at depths greater than five feet.

The proposed residential structures can be supported upon conventional spread and continuous wall foundations. Because of the relatively high groundwater conditions, it is recommended that the footings be designed to impose pressures no greater than 1,000 pounds per square foot.

In conjunction with normal construction activities, especially if a partial-depth basement are utilized, the footings as part of standard construction should penetrate through the highly compressible organic soils which have been encountered across the site. To determine that significant compressible organic soils are not immediately below the base of the proposed footings,



Mr. Thomas White
May 24, 1994
SHB AGRA Job No. E94-2257

Page 3

It is strongly recommended that a test pit be excavated at each site as part of the excavation operations for the homes.

2.3. Groundwater/Springs

Because of the high groundwater conditions and the presence of numerous springs, it is absolutely essential that the first phase of site development include the installation of an area subdrain system. The depth of the subdrain system should be at least seven to eight feet, but will be controlled by the elevation of a suitable point of gravity discharge, which we understand is located near the northwest corner of the site. The primary purposes of the area subdrain is to 1) lower and control the overall general groundwater conditions at the site, and 2) provide a point of discharge for secondary area subdrains and foundation/chimney subdrains which we recommend be installed around the perimeter of all habitable subgrade portions of the proposed residential structures.

The area subdrain system as discussed should essentially "dry-up" most of the surficial springs. In areas where the springs prevail, secondary subdrains would be installed from the spring and discharge into the overall main area subdrain system. It is our opinion that it would be unrealistic to try to layout the roadways and lots to miss locations of the springs. The more preferable approach would be to install the area subdrain system so that the springs are "dried-up". With the proper design and installation of the area subdrain system, it is our opinion that partial-depth basements may be incorporated beneath most of the proposed single-family residential structures. To provide added control of groundwater, it is essential that a perimeter foundation/chimney subdrain system be installed around the immediate outside of all habitable portions of the proposed residential structures. Waters collected by the individual home subdrain systems could be discharged by gravity to the nearest downgradient area subdrain line.

The primary area subdrain lines should run in a north-south direction, with the first being installed as far east as possible within the row of lots along the eastern site boundary. Additional north-south running lines would be installed beneath the proposed roadways and along common lot boundaries. The area subdrain would generally consist of six to eight inch diameter slotted or perforated PVC or other durable plastic pipe encased in free-draining granular material, such as "pca" gravel or three-quarter to one inch minus clean gap-graded gravel. The gravel would extend



Mr. Thomas White
May 24, 1994
SHB AGRA Job No. E94-2257

Page 4

2 inches below and laterally, and at least 12 inches below the top of the subdrain pipe. To reduce the possibility of long-term plugging, the gravel would be wrapped in a geotextile fabric, such as Mirafi 140N or equivalent. Minimum slope of the subdrain system would be 0.25 percent. Backfill over the subdrain pipe, and to within one and one-half feet of existing grade, should consist of a moderately permeable bankrun type mixture of sands and gravels containing no more than 10 to 12 percent fines, that is material passing the No. 200 sieve.

A sketch of a typical foundation/chimney drain system is attached.

3. CONCLUSIONS

If the organic soil and high groundwater conditions are addressed as summarized herein, and presented in detail in the July 15, 1986 report, it is our opinion that the subdivision may be effectively developed.

We appreciate the opportunity of providing this service for you. If you have any questions, or desire additional information, please do not hesitate to contact the undersigned.

Respectfully submitted,
SHB AGRA, Inc.

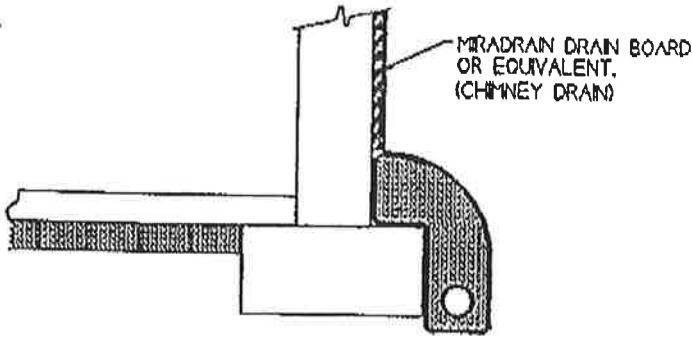
By

William J. Gordon
Professional Engineer No. 3457
State of Utah

WJG/sp (94-5-6b)

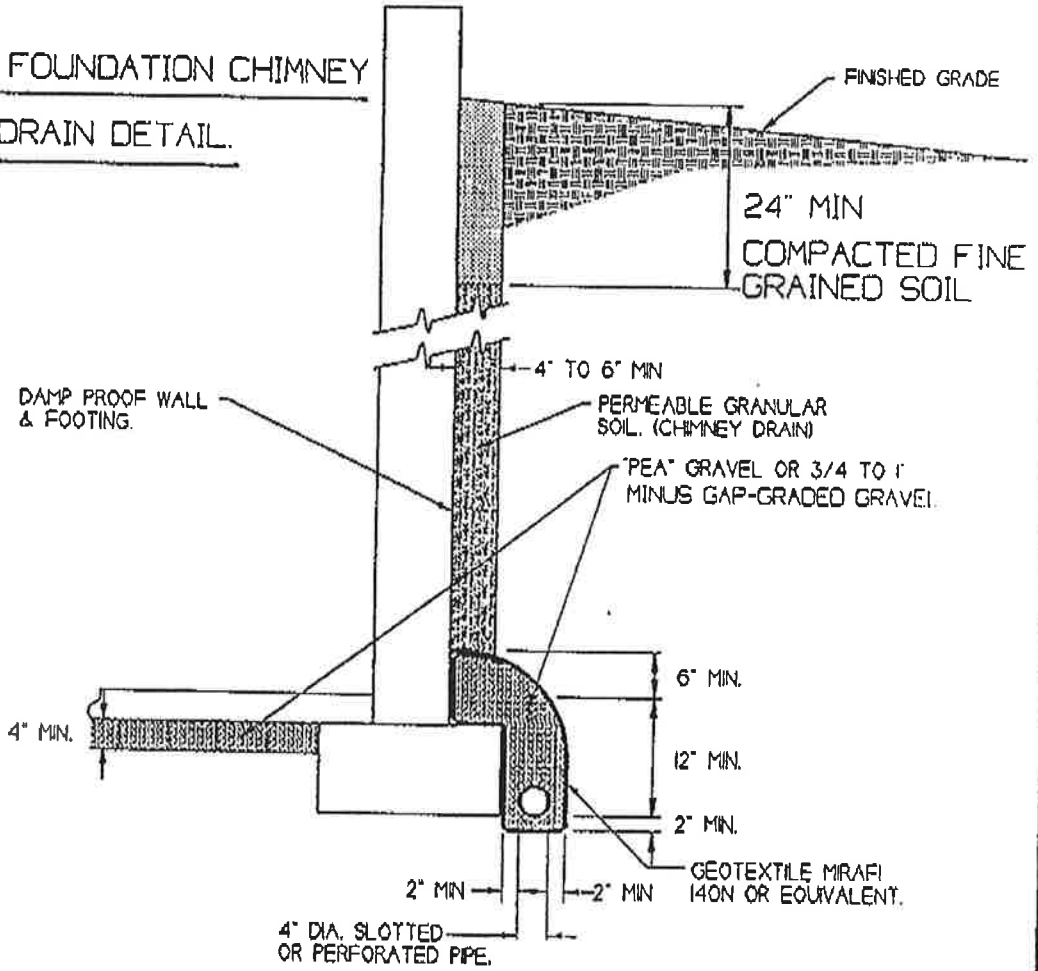
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Attachment: Sketch of Typical Foundation/Chimney Drain System



ALTERNATE FOUNDATION CHIMNEY

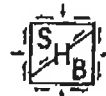
SUBDRAIN DETAIL.



TYPICAL FOUNDATION CHIMNEY

SUBDRAIN DETAIL.

(NOT TO SCALE.)



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