



July 10, 1997  
Job No. 97-408

Russellville Economic Development Partnership, Inc.  
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708 West Main  
Russellville, Arkansas 72801

**REF: PRECONSTRUCTION SOIL EVALUATION  
40A TRACT - ROBINSON  
EAST END INDUSTRIAL PARK  
RUSSELLVILLE, ARKANSAS**

As requested by Mr. Robby Robinson, we have prepared a Preconstruction Soil Evaluation for the referenced tract in the East End Industrial Park. Our evaluation was based on prior geotechnical studies in the Industrial Park and on contiguous properties.

The primary purposes of this study were to:

- a) Establish basic soil and rock stratigraphy and review engineering properties and characteristics of the foundation strata; and
- b) Prepare preliminary conclusions regarding potential foundation types, site grading conditions, and other geotechnical factors of consequence to design development and control cost estimates.

This evaluation is not intended to present final design criteria for foundations, pavements, or site grading for a specific facility. Rather, final design should be based on a geotechnical study planned on the basis of the intended building siting, structural characteristics, and grading requirements. This evaluation may, however, be utilized in the comprehension study.

### GENERAL SUBSURFACE CONDITIONS

The tract is a gently to moderately sloping site. Existing vegetation consists primarily of pasture with some scattered trees mostly along fence rows. The site is bounded by Tyler Road on the west and abuts CARMAR, Inc. facility on the east. The Union Pacific Railroad forms the south boundary and Industrial Boulevard crosses the north side (see Plate 1).

Geologically, the site is underlain primarily by overburden soils consisting of silty clays and clayey silts. The near surface soils are comprised of moisture sensitive clayey silts with organic matter. These surficial soils extend to about 1.5 to 2.5 ft but may be locally deeper in swales and/or natural drainage.

These surficial soils are underlain by residual silty clays which extend to depths of about 5 to 7 ft below existing grades. The silty clays exhibit moderate stability and strength properties and generally low plasticity.

The overburden soils are underlain by parent shale units of the Atoka Formation. The shale units grade from soft highly weathered tan and gray clayey shale to moderately hard dark gray shale. The highly weathered intervals of the nearly flat bedded shale generally comprise the upper 4 to 6 ft of formation. Although locally variable, the harder dark gray shale is generally present below depths of 8 to 12 ft.

The basic properties and characteristics of the soil and rock strata underlying the tract considered of primary consequence to individual facility siting and foundation design are summarized below:

- ... The presence of 1.5 to 2.5 ft of moisture sensitive silty soils and the inherent potential for strength loss during wetter seasons.
- ... The moderate shear strength and typically low plasticity of the residual silty clay soils found from about 2 ft to 5 to 7 ft below present grades.
- ... The higher strengths of the weathered shale and increasing strengths with penetration into the fresh dark gray shale typically found below depths of 8 to 12 ft.

These factors were considered in subsequent comments and conclusions relative to preliminary design and site planning.

## CONCLUSIONS

The construction of an individual facility on the 40 A tract will likely require some cut and fill to establish finished grades. Site development cost will be impacted by site grading requirements. Foundation type, depths, and allowable bearing pressures will be impacted by building type and structural features, as well as, cut and fill requirements. Preliminary foundation design and site grading conclusions are presented in subsequent sections.

## FOUNDATION CONSIDERATIONS

The surficial clay silts and silts provide low strength and are typically subject to loss of strength and increased compressibility with saturation. Foundations should be supported below these surficial soil types. Typically, these soils are undercut due to instability under construction equipment when wet and/or as a result of poor support properties for structural elements or pavement sections.

Light foundation loads and floor slabs may be supported on the stiff residual silty clay soils. For individual and continuous spread footings founded at depths of 3 to 4 ft, allowable soil bearing pressures of 2500 to 3500 may be anticipated. Slab-on-grade floor systems may be supported on the silty clays. Typically subgrade modulus values on the order of 100 to 120 pci can be obtained with proper subgrade preparation.

The foundations for heavy structural loads may consist of straight drilled piers founded in either the weathered shale or deeper competent moderately hard dark gray shales. Allowable end bearing values on the order of 10 to 15 kips per sq ft may be appropriate for the weathered shale intervals. Final bearing values of 30 to 60 kips per sq ft may be obtained in the dark gray shale. Penetrations of 3 to 15 ft into the dark gray shale may be anticipated to obtain the capacities noted.

Straight drilled pier foundation systems can generally be installed with medium to heavy-duty drilling equipment. However, the shale contains some thin hard sandstone/siltstone interbedding which can require use of rock teeth or other heavy-duty tools. The dark gray shale is subject to development of seepage and down-hole pumping could be warranted at greater penetration depths. Seepage may also be encountered in the weathered shale during wetter seasons.

### SITE GRADING CONSIDERATIONS

Site grading activities involving cuts of up to 8 to 10 ft can typically be performed by medium to heavy-duty equipment. On the other hands deeper cuts into the harder dark gray shale may require heavy ripping due, in part, to the presence of sandstone interbedding.

During wetter seasons, the near surface silty soils typically become unstable and are subject to rutting/pumping. Consequently, undercutting to depths of 2 to 3 ft may be required in wet periods. Perched water seepage may also develop in the surficial silt during wet seasons.

The residual silty clays exhibit lower sensitivity and undercutting should not typically be required. However, during extended wet periods saturation and perched seepage can create instability under construction activity. It is prudent to perform site grading during normally drier summer and fall months to reduce undercut potential.

The residual silty clays and weathered shale strata generally provide satisfactory fill for building foundations, floor slabs, and pavement sections. The upper silts should not be used for structure or pavement support.


As noted the potential exists for seasonal perched groundwater development. As a consequence, the installation of French drains may be warranted to intercept downgradient flow into building or pavement areas. The potential for seepage is particularly high when the weathered shale interval is intercepted in cuts or present at or is slightly below subgrade.

### PAVEMENT CONSIDERATIONS

While specific criteria for pavement design cannot be prepared without site grading criteria and traffic data, the use of either flexible (asphalt) or rigid (PCCP) paving systems should be possible. CBR values of 4 to 8 and subgrade modulus values of 80 to 120 pci should be obtainable in the residual silty clay and weathered shales. The upper silts should not be used for subgrade below pavement sections.

Improvement in subgrade support by cement and lime modification has historically not been cost effective due primarily to the rather reasonable cost of undercutting and replacement with select fill. Some drying by flyash incorporation has been effective during wetter seasons. The use of geotextile support fabric may also have application locally or seasonally.

We appreciate the opportunity to be of assistance in preparation of this Preconstruction Soil Evaluation for the Industrial site. If there are any questions or as we may be of service in comprehensive geotechnical services for the tract, please contact us.

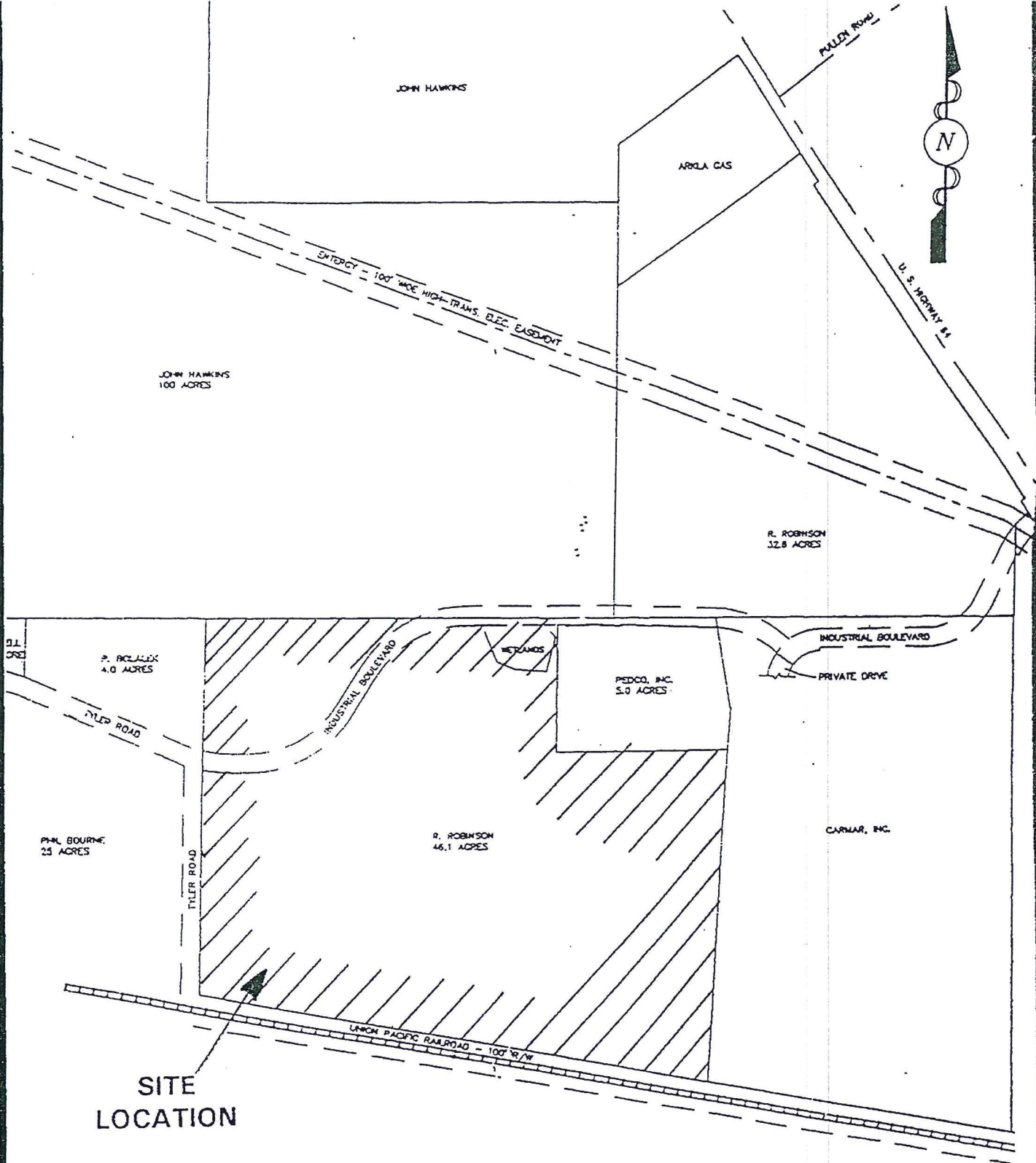
Very truly yours,  
  
GRUBBS, GARNER & HOSKYN, INC.

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