Geotechnical

Soils Report: Soft to very stiff sand, lean clay, rock not prevalent.
See attachment GT1 for detail.

Water Table Depth: 11 feet and 13 feet

Seismic Rating: Zone 1

ETTL ENGINEERS & CONSULTANTS INC.
GEOTECHNICAL • MATERIALS • ENVIRONMENTAL
MEMBER ACIL

June 13, 2005

James Rice
NRS Consulting Engineers
4415 Jefferson Ave.
Texarkana, Arkansas 71854

SUBJECT: Magnolia Economic Development Buildings
Magnolia Business Park, Magnolia, Arkansas
Geotechnical Investigation
ETTL Job No. G1737-05

Dear Mr. Rice:

Submitted herein is the report summarizing the results of a geotechnical investigation conducted at the site of the above referenced project. An executive summary was issued on June 3, 2005.

If you have any questions concerning this report, or if we can be of further assistance during construction, please contact us. We are available to perform any construction materials testing and inspection services that you may require.

Thank you for the opportunity to be of service.

Sincerely,
ETTL Engineers & Consultants Inc.

Arthur M. Campos
Senior Project Manager

Stephen R. Richards, P. E.
Vice President

STATE OF TEXAS
STEPHEN R. RICHARDS
46424
REGISTERED
PROFESSIONAL ENGINEER
6/14/05

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ETTL ENGINEERS & CONSULTANTS INC.
TYLER - LONGVIEW - TEXARKANA

GEOTECHNICAL INVESTIGATIONS

Geotechnical Investigation
Magnolia Economic Development Buildings
Magnolia Business Park
Magnolia, Arkansas

Submitted to

NRS Consulting Engineers
Texarkana, Arkansas

Prepared by

ETTL Engineers & Consultants Inc.
Tyler, Texas

June 2005

EXECUTIVE SUMMARY

This Executive Summary is provided as a brief synopsis of the specific recommendations and design criteria provided in the attached report. It is not intended as a substitute for a thorough reading of the report in its entirety.

Project Description
Two new 12,000 sf, single-story preengineered metal buildings with steel framing and partial brick veneer. The north structure (Planning & Development building) will be used for offices and the south structure (Career Development building) for education. Up to 2' of cut in the northwest corner of each building to 2' of fill in the southeast will be required to construct the pads. Parking areas and drives will also be provided on the east and south sides of the complex.

Site Description
Open and slopes down moderately from northwest to southeast within the building limits.

Depth & Number of Borings
4 – 25' deep and 2 – 15' deep for the buildings and 4 – 5' deep for parking

Soils Encountered
Predominantly soft to very stiff sandy lean clay (CL). A 10' thick zone of medium dense sandy silt (ML) was encountered in borings B-1, B-2, B-3 & B-6 at 8' to 13' deep. Atterberg Plasticity Indices of the tested soils range from 8 to 27.

Groundwater Depth
Phreatic surface predicted to vary between 11' and 13' deep, probably confined below the clay soil at 13' deep.

Recommended Foundation Type
Shallow spread footings

Allowable Gross Bearing Pressure
2,000 psf for isolated footings or 1,500 psf for strip footings. Footings should be founded at a minimum depth of 2 feet below finished subgrade.

Building Subgrade Preparation

- Remove the existing vegetation, topsoil and loose or soft soils. Cut to proposed subgrade as required.
- Scarify the exposed subgrade and recompact.
- Place select fill as required.

Construction Considerations
The surficial soils at most portions of this site may become unstable when wet necessitating stabilization or removal and replacement of wet/soft soils to facilitate construction.

Pavement
Scarify and recompact subgrade. Place asphalt or concrete pavement section.

Pavement Options – Light Duty

Type	Surface/Base Thickness	
Flexible HMAC	2" Surface (Type 2 or Type 3)	6" Crushed Stone Base
Full Depth HMAC	2" Surface (Type 2 or Type 3) & 3" Binder (Type 2)	No Crushed Stone Base
Concrete	5"	No Crushed Stone Base

Pavement Options – Medium Duty

Type	Surface/Base Thickness	
Flexible HMAC	3" Surface (Type 2 or Type 3)	8" Crushed Stone Base
Full Depth HMAC	2" Surface (Type 2 or Type 3) & 4" Binder (Type 2)	No Crushed Stone Base
Concrete	6"	No Crushed Stone Base

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APPENDIX

1.0 INTRODUCTION

This study was performed at the request and authorization to proceed granted by James Rice, Project Manager of NRS Consulting Engineers, Texarkana, Arkansas in accordance with our proposal dated May 5, 2005. Field operations were conducted on May 23, 2005.

The purpose of this investigation was to define and evaluate the general subsurface conditions at the interior Lots 1 & 2, west side of Magnolia Business Park that is located on the north side of Hwy 82, about 0.4 mile east of its intersection with Hwy 371 in Magnolia, Arkansas. Specifically, the study was planned to determine the following:

- Subsurface stratigraphy within the limits of exploratory borings;
- Classification, strength, expansive properties, and compressibility characteristics of the foundation soils;
- Suitable foundation types and allowable loading;
- Construction related problems that may be anticipated by the investigation; and
- Pavement recommendations for the construction of parking and driveways.

To determine this information a variety of tests were preformed on the soil samples. The scope of testing for this report comprised Standard Penetration, Atterberg liquid and plastic limits, Percentage of Fines Passing the No. 200 sieve, Natural Moisture Content and Unconsolidated Undrained Triaxial Compression. These tests were conducted to classify the soil strata according to a widely used engineering classification system; identify, and provide quantitative data for active (expansive) soils; define strength characteristics relating to allowable bearing values; predict immediate settlement; and assess construction workability of the soils.

The conclusions and recommendations that follow are based on limited information regarding site grading and proposed finished floor elevations provided to ETTL by others. Borings were drilled at locations staked by the client. (ETTL did not confirm by survey that the locations indicated on the attached Plan of Borings accurately reflect the location on the ground). This information should be verified prior to design. *Should any portion of it prove incorrect, this firm should be notified in order to assess the need for revisions to this report.*

2.0 PROJECT DESCRIPTION

The project entails two Two new 12,000 sf, single-story preengineered metal buildings with steel framing and partial brick veneer. The north structure (Planning & Development building) will be used for offices and the south structure (Career Development building) for education. Up to 2' of cut in the northwest corner of each building to 2' of fill in the southeast will be required to construct the pads. Parking areas and drives will also be provided on the east and south sides of the complex.

3.0 SITE DESCRIPTION

The site is open and slopes down moderately from northwest to southeast within the building

limits.

4.0 FOUNDATION SOIL STRATIGRAPHY & PROPERTIES

The soil profile is predominantly soft to very stiff sandy lean clay (CL). A 10' thick zone of medium dense sandy silt (ML) was encountered in borings B-1, B-2, B-3 &8-6 at 8' to 13' deep. Atterberg Plasticity Indices of the tested soils range from 8 to 27.

4.1 Behavior of Expansive Soils

Moderately expansive soils such as are found In the upper 5' in boring B-6 swell when they absorb moisture and shrink as they dry. Structures placed on these soils move up and down with such volume changes of the soil. When expansive soils are covered by an impermeable surface such as a building slab or pavement, seasonal moisture fluctuation at the interior of the covered area tends to be reduced or eliminated due to the lack of exposure to natural wetting and drying conditions (i.e., wind, raln, sun, vegetative, etc.). At the edges of the structure. however, the near surface soils are still subject to seasonal drying and wetting. Where continuously irrigated areas abut a building, the risk of severe shrinkage due to seasonal evaporative drying effects is low, but excess moisture could lead to some swelling (especially if native clays are dry at the start of construction). Where areas immediately adjacent to the structure are paved both the risk of swelling due to excess moisture and shrinkage due to moisture loss are reduced significantly.

The moderately expansive soils found in the upper 5' in boring B-6 are generally moderate in moisture content. Potential for swelling is considered to be low to moderate under conditions at the time of drilling. Potential for shrinkage is predicted to be low. As the moisture content of the soil changes from what it was in our samples, the potential for swelling and shrinkage will change accordingly.

One method for quantifying the potential for subgrade movement at any given location is to calculate the Potential Vertical RIse (PVR) (Tex 124 E Modified). This calculation takes into account the inter-relationship between depth, PI, and fluctuations in soil moisture. The maximum potential movement of the eXisting subgrade, PVR, due to normal climatological fluctuations in soil moisture content is predicted to be on the order of 1 inch at the *existing grade* and less than 1 Inch at the finished slab subgrade near boring B-6 (based on assumed dry conditions and an estimated annual seasonal moisture fluctuation zone of approximately 10 feet).

5.0 GROUNDWATER OBSERVATIONS

Groundwater levels and seepage depths were monitored during and upon completion of drilling as well as at some point fol/owing completion. Seepage was observed at 13 feet deep. Groundwater depths were measured at 11 to 20 feet deep 30 minutes to 5.5 hours and after completion of drilling. The phreatic surface is predicted to vary from 11 feet to 13 feet deep, probably confined below the clay soil at 13 feet deep.

It should be noted, however, that seasonal groundwater conditions might vary throughout the year depending upon prevailing climatio conditions. This magnitude of variance will be largely dependent upon the duration and intensity of precipitation, surface drainage characteristics of the surrounding area, and significant changes In site topography.

6.0 FOUNDAnON DESIGN RECOMMENDATIONS

A system of indfvldual and/or continuous shallow spread footings with a monolithic flat slab is recommended for support of the proposed superstructure loads for both structures. The risk of distress due to shrink/swell movement of the native soil is considered very low for the education building and somewhat higher (although still relatively low) for the office building (due to the native expansive clay seam in boring B-6 which will remain beneath the structure). That is, shrink/swell movements of the clay that remains beneath the buildings, sh.ould they occur, are predicted to be small and, thus, resulting distress would be relatively minor. A system of shallow footings incorporated in a stiffened slab can be considered as an option to further reduce the risk of movement and recommendations for this system will be provided upon request. Recommendations and pertinent design parameters for a shallow foundation system are presented below. With ground supported floor systems it is *essential* that measures be taken to assure subgrade moisture stability (see section 11.2 Site Design) in order to enhance the chances of satisfactory structure perfolTTlance. Proper site design that prevents water from soaking Into the subgrade solis around the building is essential to reduce the potential for excessive movement caused by saturation of foundation soils.

6.1 Shallow Spread Footings

Shallow footings should be designed to bear in undisturbed native subgrade or properly compacted select fill at a minimum depth of 2 feet below the finished Slab subgrade or adjacent exterior grade (whichever is deeper). Isolated footings should have a minimum width of 3 feet and strip footings shOUld be at least 12 inches wide. Footings should be proportioned for allowable gross bearing pressures of 2,000 pSf for Individual (isolated) footings and 1,500 psf for continuous (strip) shallow footings. These allowable pressures incorporate a safety factor relative to shear failure of the soil of at least 3 and may be increased up to 33% for intermittent loads such as wind. Predicted immediate settlement due to a loading of 2,000 psf for footing Widths less than 6 feet is less than 1 inch (total) and 0.5 Inch (d.ifferential). Detailed testing for the prediction of long-term consolidation settlement due to load is beyond the scope of this investigation, but the magnitUde of such settlement is not anticipated to be significant

7.0 FLOOR SYSTEMS

The floor system for use with a shallow spread footing system consists of a flat slab that is either monolithic with, or isolated from, shallow footings.

7.1 Flat Slab

This floor system consists of a cast-in-place concrete, unstiffened, flat slab on prepared subgrade (according to section 8.0 BUILDING SUBGRADE PREPARATION, below), which is placed monolithically with shallow footings, or can be isolated from them. ProviSion should be made to account for the fact that a heavily loaded foundation element, which is monolithic with an unloaded slab, may result in significant stress in the transition zone between the unloaded slab and the foundation element Reinforcing in the slab is used primarily to control shrinkage.

8.0 BUILDING SUBGRADE PREPARATION

In order to validate the design assumptions given above regarding allowable foundation

loads, and, in order to provide a serviceable floor system (within the limitations stated above), it is imperative that the subgrade of the buJlding be properly prepared. The following procedures are recommended as a minimum:

- Remove surficial vegetation and topsoil. Cut to proposed subgrade as required. Proof roll exposed subgrade to detect loose of soft soils, which should be removed and replaced. Backfill any disturbed areas with property compacted select fill.

- Scarify the exposed subgrade to a depth of 8 Inches, adjust the moisture content to, and maintain it within a range of optimum to optimum +3 percent and recompact to a minimum density of 95% of the maximum density defined by ASTM 0698 (Standard Proctor).

- Place select fill to finished slab subgrade. Specifications for the placement of select fill are covered in section 11.3. Select Fill.

A durable moisture barrier should be provided belween the concrete building slab and the underlying soil subgrade. An Intact membrane installation with lapped and sealed joints and which is repaired If damaged during construction will help to Inhibit moisture migration from the subgrade through the slab.

9.0 CONSTRUCTION CONSIDERATIONS

Surficial soils in most areas may become unstable when wet necessitating stabilization or removal and replacement of wet soils to facilitate construction.

10.0 PAVEMENT RECOMMENDATIONS

General recommendations for the design of *minimal* pavement structures are provided herein for your infonnation. A more detailed pavement analysis would require additional laboratory tests on bulk samples of the materials to be used in pavement construction and is beyond the scope of this Investigation.

These recommendations are based on surface soil characteristics inferred from the borings drilled for the building and at the areas to be paved. Both flexible and rigid pavement sections are presented. A summary of proposed designs is provided in Tables 10.1 and 10.2, below.

10.1 Pavement Subgrade Preparation

As a minimum, strip the native subgrade to remove topsoil and other deleterious materials. Cut to the proposed sUbgrade elevation as required. Exposed subgrade should be proof rolled prior to compaction in accordance with TxDOT Item 216 with the exception of roller size. The use of a 20 ton pneumatic roller or a fully loaded dump truck is recommended. Unstable areas will need to be cut out and replaced with select fill. Scarify the exposed subgrade to a depth of 6 inches. adjust the moisture content to within a range of optimum -1% to optimum +3%, and recompact to a minimum of 95% of the density as defined by ASTM D 698 (Standard Proctor). Fill material required to achieve final grade in paving areas should be selected and placed in accordance with section 11.3 Select Fill with the exception that only the soil in the top two feet of finished subgrade need meet the *material*

requirements for select fill {it should still meet density requirements}, Positive surface drainage should be provided during construction (especially in low areas) to maintain pavement 5ubgrade in a dry and stable condition.

Islands and irrigated areas adjacent to pavement edges can be a source of pavement problems, especially where trave/lanes (as opposed to parking spaces) are adjacent. Over watering can lead to infiltration (and consequent destabilization) of flexible base material adjaoent to the area. Where a flexible pavement option is chosen, landscaped areas subject to over watering (especially sprinklered islands) should be designed to contain all irrigation water (i.e. prevent leakage out the bottom into adjacent stone base material). An altemate, but less desirable solution is to place a strip of base material in the immediate vicinity of the potential infiltration comprised of HMAC base of the same thiokness as the crushed stone base material in lieu of the crushed stone.

10.2 Light-Duty Pavements

10.2.1 Flexible Pavement

The minimum pavement seetlon (and a section commonly used) for light-duty driveways and parking areas consists of 6 inches of crushed stone base with 2 inches of hot mix asphaltic concrete (HMAC). Crushed stone base Should consist of a stone that meets or exceeds the requirements of Section 303, Class 7, AHTD Standard Specifications for Highway Construction. Compaction of the stone base should be to a minimum of 95 percent of ASTM D 1557 (modified proctor) maximum denSity at optimum moisture ±3 percent. Asphaltic concrete surfacing should comply with the requirements of Type 2 or Type 3, Section 407 of the noted AHTD Specifications and should be compacted to a density of 92 to 94 percent of maximum theoretical density.

10.2.2 Full Depth Asphalt

The minimum full depth asphalt pavement section consists of 3 inches of hot mixed asphaltic concrete binder course (Type 2) with 2 inches of hot mixed asphaltic concrete surfacing (Type 2 or 3). Asphaltic concrete surfacing should comply with the requirements of Type 2 or Type 3, Section 407 of the noted AHTD Specifications and the asphaltic concrete binder should comply with the requirements of Type 2, Section 406. All HMAC should be compacted to a density of 92 to 94 percent of maximum theoretical density.

10.2.3 Rigid Pavement

The performance of concrete pavement is dependent on many factors including weight and frequency of traffic, subgrade oonditions, concrete quality (Which itself is dependent on a host of factors), joint type and layout, jointing procedures, and numerous oonstruction practices. A detailed discussion of all of these items is beyond the scope of this report By way of general guidance, the following recommendations are offered:

- Minimum conorete compressive strength of 3,500 psi at 28 days placed with a maximum slump of 5 inches. The mix should contain 4% - 6% entrained air for durability.
- Minimum pavement thickness of 5 inches. Concrete thickness may be increased to 6" in lieu of lime stabilized subgrade.
- Sawcut or preformed control joints at maximum spacing of 12 feet each way. Layout

of joints should form basically square panels. Timing of the cutting of joints is critical to their performance and generally should be within 4 - 18 hours of concrete placement. *Sealing of joints and cracks and maintenance of the seal are critical for satisfactory performance.*

- Adequate site drainage to prevent ponding on or near the pavement
- Cure concrete via use of liquid membrane curing compound.
- Concrete quality should be controlled and jointing properly executed. Minimum reinforcement should consist of 6 x 6 No.6 welded wire fabric or No.3 at 18 inches each way and should not be continuous through control joints.
- All edges of pavement should be thickened to 9 inches (transitioning back to 5 inches over a minimum distance of 3 feet).
- Allow a minimum of 7 days curing time before permitting traffic on the pavement

The reader is referred to the American Concrete Institute Publication No. ACI 330R, *Guide for Design and Construction of Concrete Parking Lots* for more detailed information.

10.3 Medium-Duty Pavements

10.3.1 Flexible Pavement

For areas that will be subject to trash or delivery truck parking and traffic, the minimum recommended flexible pavement section consists of 8 inches of crushed stone base (Class 7, Section 303, AHTD Standard Specifications for Highway Construction) and 3 inches of asphaltic concrete surfacing (Type 2 or Type 3, Section 407). Paving materials should be specified as discussed previously.

10.3.2 Full Depth Asphalt

For a medium-duly full depth asphalt section, the minimum recommended section is 6 inches of HMAC paving consisting of 2 inches wearing surfacing (Type 2 or Type 3, Section 407) over 4 inches of asphaltic binder (Type 2, Section 406). Paving materials should be specified as discussed previously.

10.3.3 Rigid Pavement

Recommendations for medium-duty concrete paving are the same as for light duty except that 6 inches of portland cement concrete should be considered the minimum pavement section and the edges should be thickened to 9 inches. Increase thicknesses by 1" where subgrade is not lime stabilized or 12" of select fill is not placed for finished subgrade.

Table 10.1 .. Pavement Options - Light Duty

Type	Surface/Sase Thickness	
Flexible HMAC	2" Surface Type 2 or Type 3)	6" Crushed Stone Base
Full Depth HMAC	2" SUrface (Type 2 or Type 3) & 3" Binder (Type 2)	No Crushed Stone Base
Concrate	5"	No Crushed Stone Base

Table 10.2 - Pavement Options - Medium Duty

Type	SurfacelBase Thickness	
Flexible HMAC	3" Surface pe 2 or Type 3)	8" Crushed Stone Base
Full Depth HMAC	2" Surface (Type 2 or Type 3) & 4" Binder (Type 2)	No Crushed Stone Base
Concrete	6"	No Crushed Stone Base

11.0 GENERAL CONSTRUCTION CONSIDERATIONS

11.1 Shallow Footings

All footing excavations should be inspected by qualified personnel to insure that subgrade is composed of firm, undisturbed native soil or properly compacted select fill as recommended in this report. Water and/or loose material in footing excavations should be removed prior to final shaping of the footing excavation and placement of concrete.

11.2 Site Design

The followin9 recommendations are derived from years of experience with structures founded on expansive soils and are considered essential to satisfactory structure performance. especially where the slab is to be placed on grade:

- Sidewalks should be sloped away from buildings and should not be tied to the structures. The joint between the sidewalk and the foundation should be sealed. Sidewalks should not impound water adjacent to the structure. Potential heave of newe ground adjacent to the structure needs to be taken into consideration when constructing the walk so as to avoid a sidewalk which Impounds water adjacent to the structure.

- The ground surface around the building as well as paved areas should be sloped away from the building on all sides so that water will drain away from the structure. A minimum slope of 5% is recommended for the area 10 feet wide Immediately adjacent to the structure. Drainage swales should have a minimum longitudinal slope of 2%. Roof drainage shoUld be conveyed by an appropriate means for a distance of at least 15 feet from the building before it is allowed to drain into the subgrade. Water should not be allowed to pond near the bUilding after the floor system has been placed.

- Trees should not be closer than their mature height to the structure and shrubbery should not be planted adjacent to the building unless they can be contained in watertight planter boxes and irrigation waler can be prevented from seeping Into the subgrade around the building. A horizontal moisture barrier (e.g. Mirafi 1212 reinforced polyethylene permanently sealed to the foundation edge at the ground line and sloped away from the bUilding) and placed beneath planting beds is an alternative to planter boxes provided it is maintained In a watertight condition (Le.• joints sealed and punctures repaired). Planting bed edging should not impound water. A root banier around the entire structure perimeter will provide some added assurance against desiccation of the soil due to roots growing beneath the structure. Periodic root pruning may be required to limit drying of soils beneath foundations due to vegetation. *Over irrigation adjacent to the structure can cause an increase in subsurface moisture contents that could lead to heaving.*

- To help limit surface water infiltration beneath the structure, backfill in the area 10 feet wide adjacent to the structure should be native lean or fat clay soil compacted to a minimum density of 95% of ASTM D 698 (Standard Proctor) at a moisture content of optimum or above. This zone should be at least 2 feet thick. This backfill is not necessary where pavement abuts the structure and the joint is sealed.

- Backfill for utility line ditches should be carefully controlled and should consist of a relatively impenneable material (clayey sand or lean clay), especially in the area beneath and immediately outside of the structure. Old utility lines should be removed from beneath the structure. Fill in new or old utility trenches shOUld be placed to the same specifications as select fill. The top 6 inches under paving should be compacted to a density equal to that specified for the pavement subgrade.

- Utility connections to the building should be flexible to allow for anticipated soil movements that will be different than the anticipated movement of the structure to which they are connected (e.g. where a suspended slab is used).

11.3 Select Fill

Select fill shall consist of homogeneous soils (i.e. not sand with clay lumps) free of organic matter and rocks larger than 6 inches in diameter and possessing an Atterberg PI of 8 to 18. with a liqUid limit of 40 or less. Atterberg limits testing of the fill at a rate of 1 test per every 250 cubic yards of fill placed is recommended to verify that fill specifications are met. The material should be placed in the following manner.

- Prepare the subgrade in accordance with the recommendations discussed in a previous section of this report entitled BUILDING SUBGRADE PREPARATION

section 8.0. Sites that slope more than about 15% should be benched With 5-foot wide benches prior to placing fill.

- Place subsequent lifts of select fill in thin, loose layers not exceeding nine inches In thickness to the desired rough grade and compact to a minimum of 95% of the maximum density defined by ASTM 0 698. Maintain moisture within a range of optimum to optimum +3%.

- Conduct in-place field density tests at a rate of one test per 3,000 square feet for every lift with a minimum of 2 tests per lift. Density testing is essential to assure that the soil, which supports the structure, is properly placed.

- Prevent excessive loss of moisture during construction.

- For select fill placed above the existing groundline, extend the lateral limits of the fill at least 5 feet beyond the perimeter of the building area, transitioning back to the existing groundline on a 3:1 (horizontal/verticaJ) slope.

12.0 LIMITATIONS

Geotechnical design work is characterized by the presence of a calculated risk that soil and groundwater conditions may not have been fully revealed by the exploratory borings. This risk derives from the practical necessity of basing interpretations and design condusions on a limited sampling of the subsoil stratigraphy at the project site. The number of borings and spacing is chosen in such a manner as to decrease the possibility of undiscovered anomalies, while considering the nature of loading, size and cost of the project. The recommendations given in this report are based upon the conditions that existed at the boring locations at the time they were drilled. The term "existing groundline" or "existing subgrade" refers to the ground elevations and soil conditions at the time of our field operations.

It is conceivable that soli conditions throughout the site may vary from those observed in the exploratory borings. If such discontinuities do exist, they may not become evident until construction begins or possibly much later. Consequently, careful observations by the geotechnical engineer must be made of the construction as It progresses to help detect significant and obvious deviations of actual conditions throughout the project area from those inferred from the exploratory borings: Should any conditions at variance with those noted in this report be encountered during cons1ruction, this office should be notified immediately so that further investigations and supplemental recommendations can be made.

This company is not responsible fur the conclusions, opinions, or recommendations made by others based on the contents of this report. The purpose of this study is only as stated elsewhere herein and is not intended to comply with the requirements of 30 TAC 330 Subchapter T regarding testing to determine the presence of a landfill. Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. No warranties are either expressed or implied.

APPENDIX

1.0 FIELD OPERATIONS

Subsurface conditions at the site were defined by 10 sample core borings drilled to depths of 5 feet and 25 feel ETTL personnel drilled the borings at locations staked by the client. The field boring logs were prepared as drilling and sampling progressed and final boring logs are included in the Appendix. Descriptive tenns and symbols used on the logs are in accordance with the Unified Soli Classification System (ASTM D 2487). A reference key is provided on the final page of this report

A truck-mounted rotary drill rig utilizing dry auger drilling procedures was used to advance the borings. Soils were sampled by means of sampled by means of a 1 *3IB-inch* I.D. by 24-inch long split-spoon sampler driven into the bottom of the borehole in accordance with ASTM D 1586 procedures. In conjunction with this sampling technique, the Standard Penetration Test was conducted by recording the N-value, which is the number of blows required by a 140-pound weight falling 30 inches to drive a split-spoon sampler 1 foot into the ground. For very dense strata, the number of blows is limited to a maximum of 50 blows within a 6-inch increment Where possible, the sampler is "seated" 6 inches before the N-value is detennined. The N-vatue obtained from the Standard Penetration Test provides an approximate measure of the relative density that correlates with the shear strength of soil. The disturbed samples were removed from the sampler, logged, packaged, and transported to the laboratory for further identification and classification.

Soils were also sampled by means of a 3-inch *O.D.* by 24-inch long thick-walled Shelby Tube sampler. Using the drilling rig's hydraulic pressure, the samplerwas pushed smoothly into the bottom of the borehole. The consistency of these samples was measured in the field by a calibrated pocket penetrometer. These values, recorded in tons per square foot, are shown on the boring logs. Such samples were extruded in the field, logged, sealed to maintain *in situ* conditions. and paCkaged for transport to the laboratory.

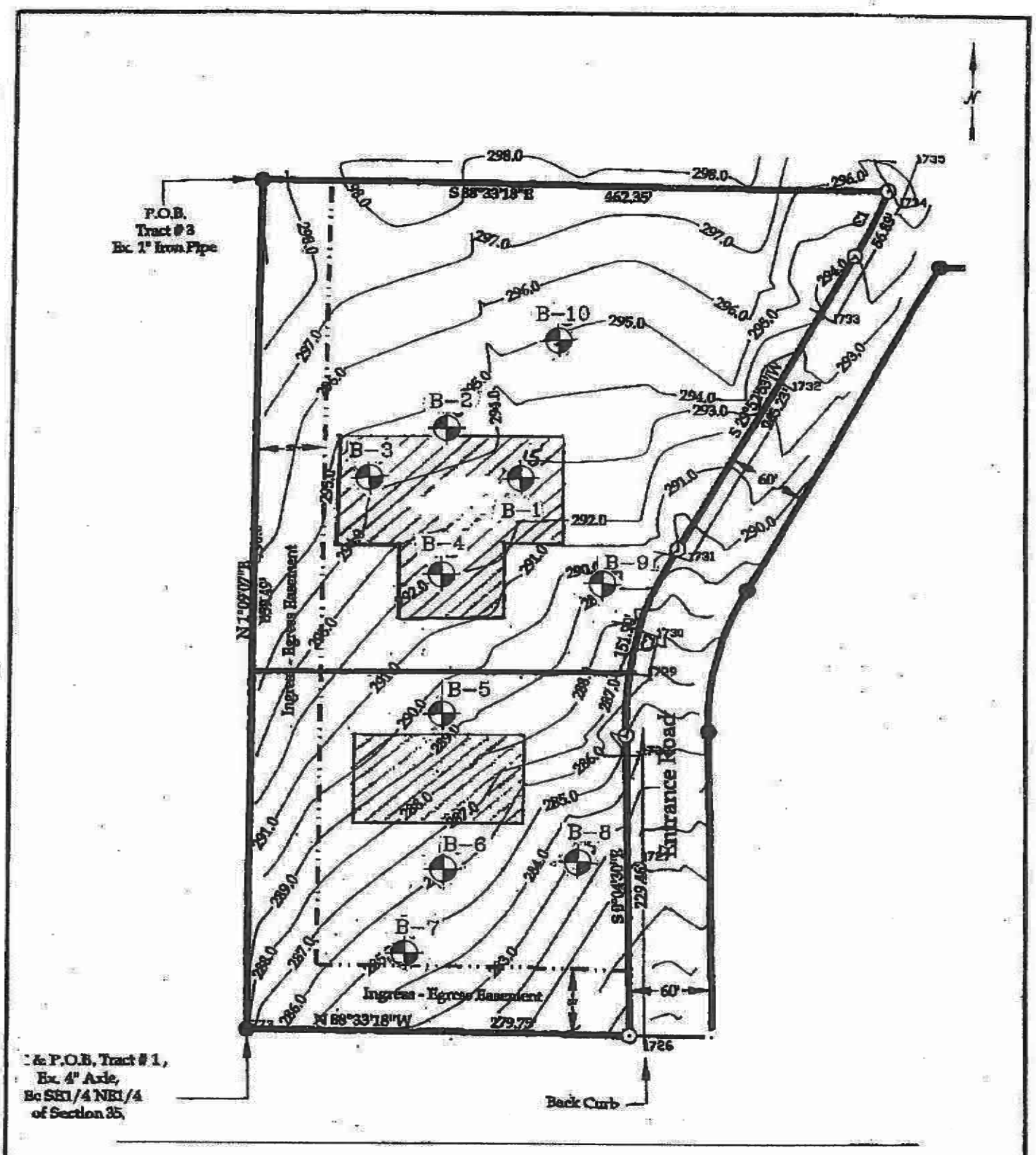
Samples obtained during our field studies and not consumed by laboratory testing procedures will be retained in our Tyler office free of charge for a period of 60 days. To arrange storage beyond this point in time, please contact the Tyler office.

11.0 LABORATORY TESTING

Upon retum to the laboratory, a geotechnical engineer visually examined all samples and several specimens were selected for representative identification of the substrata. By detennining the Atterberg liquid and plastic limits (ASTM 0 43'18) and percentage of fines passing the No. 200 sieve (ASTM 0 1140), field classification of the various strata was verified. Also conducted were natural moisture contenttests (ASTM D 2216). The results of these tests are presented on each respective log in this Appendix.

Strength characteristics of the cohesive substrata were evaluated by conducting unconsolidated, undrained triaxial compression tests (ASTM D 2850) on selected undisturbed field samples obtained with the Shelby tube sampler. In this type of compression test, confining pressures were chosen that approximate in situ pressures at the sample depth below existing ground. The specimens were axially loaded until failure occurred. The shear strength (or cohesion) is equal to one-half the peak compressive

stress. Moisture content (ASTM 02216) and dry density (ASTM 0 2437) are detennined as part of this test. The results of these tests are also presented in the indMduallog of boring provided in this Appendix.



ETTL ENGINEERS & CONSULTANTS	MAGNOLIA ECONOMIC DEVELOPMENT BUILDINGS MAGNOLIA, ARKANSAS	PLATE I – PLAN OF BORINGS		APPROVED BY:
		JOB No.: G 1737-05		DRAWN BY: K.C.R.
		DATE: JUNE 2005	SCALE: N.T.S.	

ETTL
ENGINEERS &
CONSULTANTS

MAIN OFFICE
1717 East Erwin
Tyler, Texas 75702
(903) 595-4421

LOG OF BORING B-1

PROJECT: Magnolia Economic Development
Magnolia, Arkansas

PROJECT NO.: G 1737-05 **BORING TYPE:** Dry Auger

DATE 5/23/05

SURFACE ELEVATION ~293'

DEPTH (ft)	SAMPLES	USC	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (t)	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
0		CL		SANDY LEAN CLAY(CL) medium stiff; tan	N=7										
				–stiff	N=13					16	30	16	14	58	+40 Sieve =1%
5				–tan and red	N=12					11	39	17	22	66	+40 Sieve =0%
				–tan and gray	P=2.7					28	48	26	22	61	+40 Sieve =3%
10															
		ML		SANDY SILT(ML) medium dense; tan; moist	N=15										
15				Bottom of Boring @ 15'											

BLOW COUNT 20 40 60 80
Qu (tsf) 1.0 2.0 3.0 4.0
PPR (tsf) 1.0 2.0 3.0 4.0
Torvane (tsf) 1.0 2.0 3.0 4.0

Natural Moisture Content and Atterberg Limits
Plastic Limit — Moisture Content — Liquid Limit
20 40 60 80

Water Level Est.: ▽ Measured: ▼ Perched: ▼

Water Observations: Seepage @ 13' while drilling. Water level @ 13' and open upon completion. Water level @ 11' and open after 5 hours and 20 minutes.

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
Coordinates: N 33 18'07.6", W 93 14'40.6"

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(903) 595-4421

LOG OF BORING B-2

PROJECT: Magnolia Economic Development
Magnolia, Arkansas

PROJECT NO.: G 1737-05 **BORING TYPE:** Dry Auger

DATE 5/23/05

SURFACE ELEVATION ~293.5'

DEPTH (ft)	SAMPLES	USC	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA (BLOW COUNT; Qu (tsf); PPR (tsf); Torvane (tsf))	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (t)	Natural Moisture Content and Atterberg Limits (Plastic Limit / Moisture Content / Liquid Limit)	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LL	PL	PI	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
0		CL		SANDY LEAN CLAY(CL) medium stiff; brown	N=4						18	35	16	19	66	+40 Sieve =2%
					N=6						18	32	16	16	60	+40 Sieve =2%
5					P=3.0 T=1.0	107	1.30	4	6		18					
				–very stiff; gray and red	P=2.7 T=0.8						24	46	22	24	50	+40 Sieve =2%
10																
		ML		SANDY SILT(ML) medium dense; tan and gray	N=16											
15																
				–gray and tan	N=20											
20																
		CL		LEAN CLAY(CL) very stiff; brown	N=26 P=2.7											
25				Bottom of Boring @ 25'												

Water Level Est: Measured: Perched:

Water Observations: Seepage @ 13' while drilling. Water level @ 20' and open upon completion. Water level @ 13' and caved to 21' after 3 hours and 45 minutes.

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
Coordinates: N 33 18'07.6", W 93 14'40.3"

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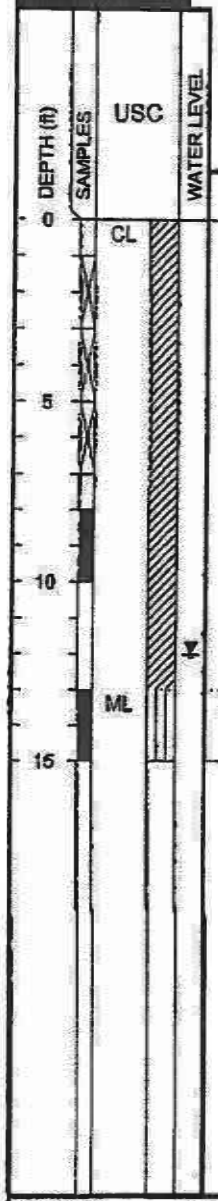
LOG OF BORING B-3

PROJECT: Magnolia Economic Development
Magnolia, Arkansas

PROJECT NO.: G 1737-05 **BORING TYPE:** Dry Auger

DATE 5/23/05

SURFACE ELEVATION ~294.5'



MATERIAL DESCRIPTION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (1)	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LL	PL	PI	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
SANDY LEAN CLAY(CL) stiff; brown and red	N=5 P=1.5					18	34	15	19	63	+40 Sieve =1%
--very stiff	N=8 P=2.5					17	30	16	14	60	+40 Sieve =2%
--with roots	N=11										
SANDY SILT(ML) tan; wet	P=2.5 T=0.7										
Bottom of Boring @ 15'											

BLOW COUNT 20 40 60 80
Qu (tsf) 1.0 2.0 3.0 4.0
PPR (tsf) 1.0 2.0 3.0 4.0
Torvane (tsf) 1.0 2.0 3.0 4.0

Natural Moisture Content and Atterberg Limits
Plastic Limit — Moisture Content — Liquid Limit
20 40 60 80

Water Level Est: ▽ Measured: ▼ Perched: ▼

Water Observations: Seepage @ 13' while drilling. Water level @ 13' and open upon completion. Water level @ 12' and open after 2 hours and 15 minutes.

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
Coordinates: N 33 15'07.0", W 93 14'40.9"

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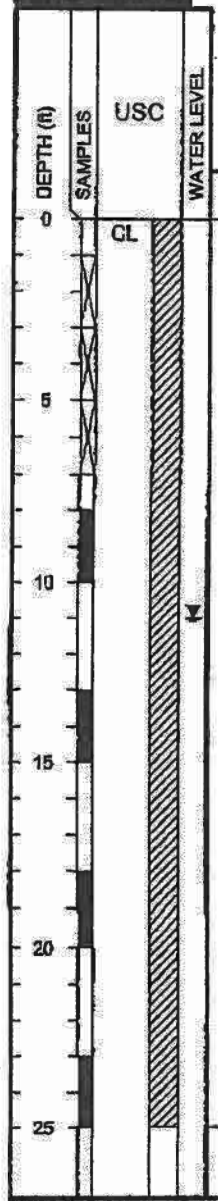
LOG OF BORING B-4

PROJECT: Magnolia Economic Development
Magnolia, Arkansas

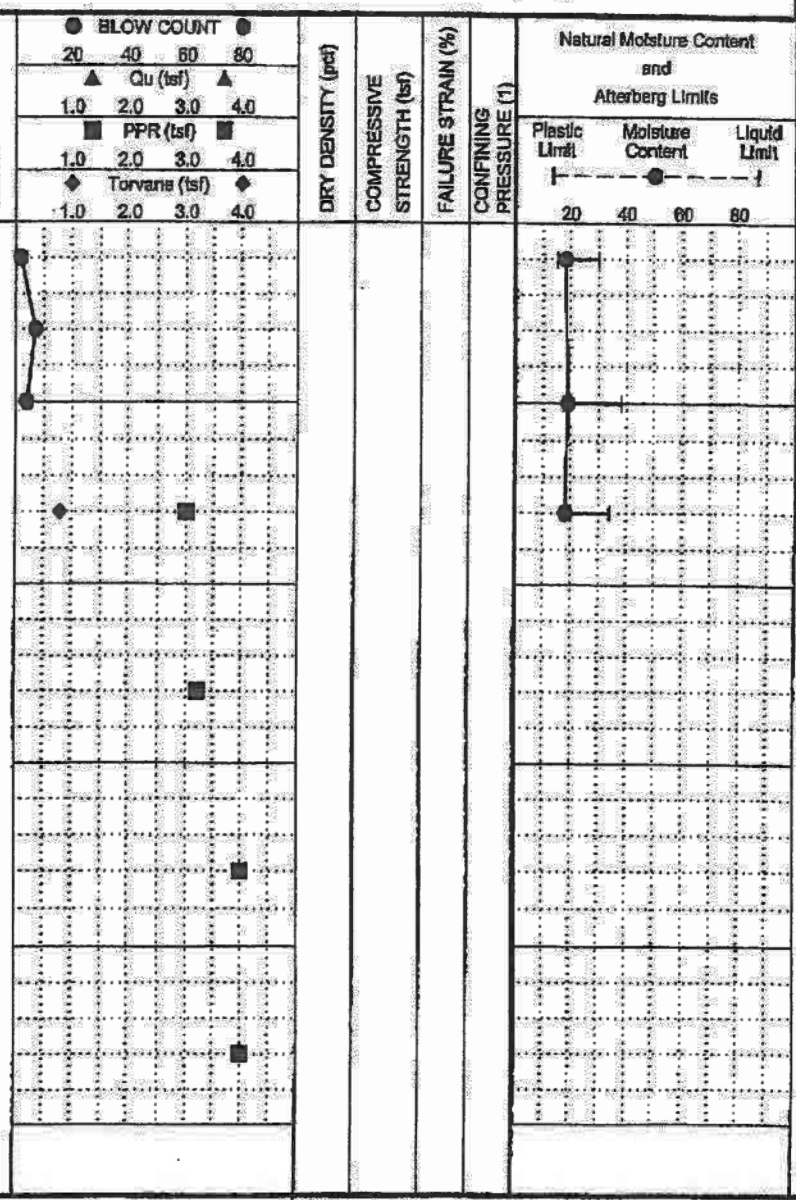
PROJECT NO.: G 1737-05 **BORING TYPE:** Dry Auger

DATE 5/23/05

SURFACE ELEVATION ~292'



MATERIAL DESCRIPTION	FIELD STRENGTH DATA	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
SANDY LEAN CLAY(CL) soft; red and gray	N=2	18	30	15	15	61	+40 Sieve =1%
–medium stiff	N=7						
–gray and red	N=4	19	38	17	21	68	+40 Sieve =2%
–very stiff	P=3.0 T=0.8	18	34	17	17	58	+40 Sieve =1%
–tan	P=3.2						
–gray; with sand seams	P=4.0						
	P=4.0						
Bottom of Boring @ 25'							



Water Level Est.: Measured: Perched:

Water Observations: Seepage @ 13' while drilling. Water level @ 21' and open upon completion. Water level @ 11' and caved to 22' after 1 hour and 20 minutes.

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
Coordinates: N 33 18'06.2", W 93 14'40.3"

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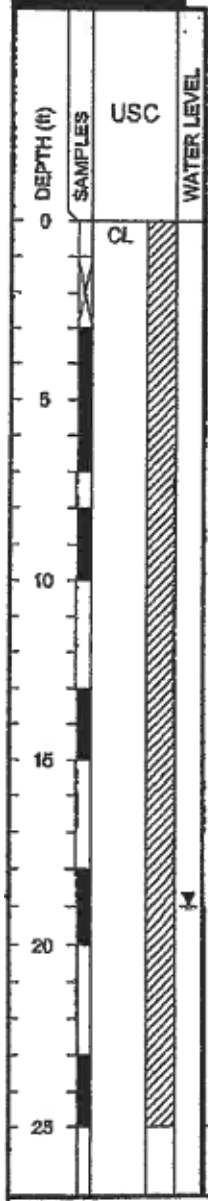
LOG OF BORING B-5

PROJECT: Magnolia Economic Development
Magnolia, Arkansas

PROJECT NO.: G 1737-05 **BORING TYPE:** Dry Auger

DATE 5/23/05

SURFACE ELEVATION ~289.5'



MATERIAL DESCRIPTION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (1)	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
SANDY LEAN CLAY(CL) stiff; red and tan	N=10					17	34	17	17	68	+40 Sieve =1%
	P=2.0					18	32	17	15	62	+40 Sieve =2%
--very stiff	P=2.8 T=0.9	101	2.00	10	6	23					
--red	P=2.7					26	43	25	18	74	+40 Sieve =1%
--stiff; gray; with sand seams	P=1.7										
--gray and tan	P=1.5										
--very stiff; gray	P=2.5										
Bottom of Boring @ 25'											

FIELD STRENGTH DATA: BLOW COUNT (20 40 60 80); Qu (tsf) (1.0 2.0 3.0 4.0); PPR (tsf) (1.0 2.0 3.0 4.0); Torvane (tsf) (1.0 2.0 3.0 4.0)

Natural Moisture Content and Atterberg Limits: Plastic Limit — Moisture Content — Liquid Limit (20 40 60 80)

Water Level — Est: ▽ Measured: ▼ Perched: ▽

Water Observations: Seepage @ 13' while drilling. Water level @ 22' and open upon completion. Water level @ 19' and caved to 22' after 30 minutes.

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
Coordinates: N 33 18'05.2", W 93 14'40.3"

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LOG OF BORING B-6

PROJECT: Magnolia Economic Development
Magnolia, Arkansas

PROJECT NO.: G 1737-05 **BORING TYPE:** Dry Auger

DATE 5/24/05

SURFACE ELEVATION ~286'

DEPTH (ft)	SAMPLES	USC	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (1)	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
0		CL		SANDY LEAN CLAY(CL) stiff; tan and brown	N=5 P=1.5					17	34	17	17	65	+40 Sieve =2%
					N=7 P=2.0					18	44	17	27	66	+40 Sieve =10%
5					P=2.5 T=0.5					26	40	23	17	74	+40 Sieve =2%
		ML		SILT(ML) medium dense; gray and tan						28	35	27	8	95	+40 Sieve =2%
10															
				--moist	N=21 P=2.5										
15															
		CL		SANDY LEAN CLAY(CL) hard; dark gray; with sand seams	P=4.0										
20															
					N=18 P=4.5										
25				Bottom of Boring @ 25'											

FIELD STRENGTH DATA: BLOW COUNT (20 40 60 80); Qu (tsf) (1.0 2.0 3.0 4.0); PPR (tsf) (1.0 2.0 3.0 4.0); Torvane (tsf) (1.0 2.0 3.0 4.0)

Natural Moisture Content and Atterberg Limits: Plastic Limit — Moisture Content — Liquid Limit (20 40 60 80)

Water Level Est: ▽ Measured: ▼ Perched: ▼

Water Observations: Seepage @ 13' while drilling. Water level @ 23' and open upon completion. Water level @ 20' and caved to 22' after 1 hour and 30 minutes.

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
Coordinates: N 33 18'04.8", W 93 14'40.1"

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LOG OF BORING B-7

PROJECT: Magnolia Economic Development
Magnolia, Arkansas

PROJECT NO.: G 1737-05 **BORING TYPE:** Dry Auger

DATE 5/24/05

SURFACE ELEVATION ~285'

DEPTH (ft)	SAMPLES	USC	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	BLOW COUNT / Qu (tsf) / PPR (tsf) / Torvane (tsf)	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (t)	Natural Moisture Content and Atterberg Limits	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
0		CL		LEAN CLAY WITH SAND(CL) medium stiff; light red and lan	N=5							20	34	18	16	73	#40 Sieve =1%
5				Bottom of Boring @ 5'													

BLOW COUNT 20 40 60 80
Qu (tsf) 1.0 2.0 3.0 4.0
PPR (tsf) 1.0 2.0 3.0 4.0
Torvane (tsf) 1.0 2.0 3.0 4.0
Natural Moisture Content and Atterberg Limits: Plastic Limit — Moisture Content — Liquid Limit; 20 40 60 80

Water Level Est: Measured: Perched:
Water Observations: Dry and open upon completion.

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
Coordinates: N 33 18'02.8", W 93 14'40.5"

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LOG OF BORING B-8

PROJECT: Magnolia Economic Development
Magnolia, Arkansas

PROJECT NO.: G 1737-05 **BORING TYPE:** Dry Auger

DATE 5/24/05

SURFACE ELEVATION ~283'

DEPTH (ft)	SAMPLES	USC	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (1)	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
0		CL		SANDY LEAN CLAY(CL) stiff; light brown and light red	N=7 P=1.5					15	25	16	9	64	+40 Sieve =3%
5				Bottom of Boring @ 5'											

Field Strength Data: ● BLOW COUNT ● (20 40 60 80); ▲ Qu (tsf) ▲ (1.0 2.0 3.0 4.0); ■ PPR (tsf) ■ (1.0 2.0 3.0 4.0); ◆ Torvane (tsf) ◆ (1.0 2.0 3.0 4.0)

Natural Moisture Content and Atterberg Limits: Plastic Limit — Moisture Content — Liquid Limit (20 40 60 80)

Water Level — Est.: ▽ Measured: ▼ Perched: ▽

Water Observations: Dry and open upon completion.

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
Coordinates: N 33 18'03.4", W 93 14'39.8"

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LOG OF BORING B-9

PROJECT: Magnolia Economic Development
Magnolia, Arkansas

PROJECT NO.: G 1737-05 **BORING TYPE:** Dry Auger

DATE 5/24/05

SURFACE ELEVATION ~289'

DEPTH (ft)	SAMPLES	USC	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA (BLOW COUNT 20 40 60 80; Qu (tsf) 1.0 2.0 3.0 4.0; PPR (tsf) 1.0 2.0 3.0 4.0; Torvane (tsf) 1.0 2.0 3.0 4.0)	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (1)	Natural Moisture Content and Atterberg Limits (Plastic Limit – Moisture Content – Liquid Limit; 20 40 60 80)	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LIQUID LIMIT LL	PLASTIC LIMIT PL	PLASTICITY INDEX PI	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
0		SC		CLAYEY SAND(SC) loose; tan and red	N=5											
5				Bottom of Boring @ 5'												

Water Level Est.: ▽ Measured: ▽ Perched: ▽

Water Observations: Dry and open upon completion.

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
Coordinates: N 33 18'05.7", W 93 14'39.4"

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LOG OF BORING B-10

PROJECT: Magnolia Economic Development
Magnolia, Arkansas

PROJECT NO.: G 1737-05 **BORING TYPE:** Dry Auger

DATE 5/24/05

SURFACE ELEVATION ~295.0'

DEPTH (ft)	SAMPLES	USC	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (t)	MOISTURE CONTENT (%)	ATTERBERG LIMITS(%) LL	PL	PI	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
0		CL		SANDY LEAN CLAY(CL) medium stiff; tan and red	N=6					17	29	16	13	60	+40 Sieve =1%
				–very stiff	P=2.0										
5				Bottom of Boring @ 5'											

BLOW COUNT 20 40 60 80
Qu (tsf) 1.0 2.0 3.0 4.0
PPR (tsf) 1.0 2.0 3.0 4.0
Torvane (tsf) 1.0 2.0 3.0 4.0

Natural Moisture Content and Atterberg Limits
Plastic Limit — Moisture Content — Liquid Limit
20 40 60 80

Water Level Est.: ▽ Measured: ▼ Perched: ▽
Water Observations: Dry and open upon completion.

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
Coordinates: N 33 18'08.1", W 93 14'39.6"

KEY TO SOIL CLASSIFICATIONS AND SYMBOLS

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions		Letter	Symbol	Color	Name
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW		Red	Well-graded gravels or gravel-sand mixtures, little or no fines.
		GP			Poorly-graded gravels or gravel-sand mixtures, little or no fines
		GM		Yellow	Silty gravels, gravel-sand-clay mixtures.
		GC			Clayey gravels, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS	SW		Red	Well-graded sands or gravelly sands, little or no fines
		SP			Poorly-graded sands or gravelly sands, little or no fines
		SM		Yellow	Silty sands, sand-silt mixtures
		SC			Clayey sands, sand-clay mixtures
FINED GRAINED SOILS	SILTS AND CLAYS LL < 50	ML		Green	Inorganic silts and very fine sands, rock flour, fine sandy silts, gravelly silts or silts with slight plasticity
		CL			Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL			Organic silts and organic silt-clays of low plasticity.
	SILTS AND CLAYS LL > 50	MH		Blue	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH			Inorganic clays of high plasticity, fat clays
		OH			Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		Pt		Orange	Peat and other highly organic soils

TERMS CHARACTERIZING SOIL STRUCTURE

SLICKENSIDED-having inclined planes of weakness that are slick and glossy in appearance

FISSURED-containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical

LAMINATED (VARVED)-composed of thin layers of varying color and texture, usually grading from sand or silt at the bottom to clay at the top

CRUMBLY-cohesive soils which break into small blocks or crumbs on drying.

CALCAREOUS-containing appreciable quantities of calcium carbonate, generally nodular.

WELL GRADED-having wide range in grain sizes and substantial amounts of all intermediate particle sizes.

POORLY GRADED-predominantly of one grain size (uniformly graded) or having a range of sizes with some intermediate size missing (gap or skip graded).

SYMBOLS FOR TEST DATA

M/C = 15 - Natural moisture content in percent

δ = 95 -- Dry unit weight in lbs/cu ft.

Qu = 1.23 - Unconfined compression strength in tons/sq. ft.

Qc = 1.68 (21 psi) - Confined compression strength at indicated lateral pressure.

51-21-30 - Liquid limit, Plastic limit and Plasticity index.

30% FINER - Percent finer than No. 200 mesh sieve.

30 B/F - Blows per foot, standard penetration test.

▼ - Ground water table.

TERMS DESCRIBING CONSISTENCY OF SOIL (2)

COARSE GRAINED SOILS		FINE GRAINED SOIL		
DESCRIPTIVE TERM	NO. BLOWS/FT. STANDARD PEN. TEST	DESCRIPTIVE TERMS	NO. BLOWS/FT. STANDARD PEN. TEST	UNCONFINED COMPRESSION TONS PER SQ.FT.
Very loose	0-4	Very Soft	< 2	< 0.25
Loose	4-10	Soft	2 - 4	0.25 - 0.50
Medium Dense	10-30	Medium Stiff	4 - 8	0.50 - 1.00
Dense	30-50	Stiff	8 - 15	1.00 - 2.00
Very Dense	over 50	Very Stiff	15 - 30	2.00 - 4.00
		Hard	over 30	over 4.00

Field classification for "Consistency" is determined with a 0.25" diam. penetrometer.

SAMPLER TYPES

Shelby Tube | Rock Core | Split Spoon | Auger | No Recovery

1 - From Waterways Experiment Station Technical Memorandum No. 3-357
2 - From "Soil Mechanics in Engineering Practice" by Terzaghi and Peck

Zoning/Permitting

Copy of Restrictive Covenants:	See attachment Z-1 for detail.
Current Classification and Proposed Zoning (if different) to Conform with Intended Use:	Site is zoned Industrial (I-2).
Copy of Zoning Ordinance:	See attachment Z-2 for detail. (Magnolia Zoning Regulations Manual Sec. 23-106; see page 29 for Industrial Districts)
Explanation of Process to Change Zoning:	No change is necessary.

Restrictive Covenants

This Declaration made this _____3rd_____ day of _____October_____, 2000, by the Magnolia Economic Development, hereinafter called MED.

Article I

The purposes of these restrictive covenants are to assist the owner in achieving quality building site development, to ensure orderly, attractive and lasting development, and to preserve and enhance land values.

Article II

2.1 Permitted Operations & Uses

All of the building sites are intended to be used for production and assembly and distribution plants, engineering, research facilities, laboratories, office warehousing, and business of a kindred nature, including accessory or directly related services in compliance with all ordinances of the City of Magnolia and Columbia County.

2.2 Prohibited Operations and Uses

The operation and use of a drilling for and/or removal of oil, gas or other hydrocarbon substances on any property subject to these Protective Covenants shall not be permitted without the prior written consent of the MED. No annoying noises, smoke, odors, vibrations, or other nuisances shall be permitted. The following operations and uses shall not be permitted on any property subject to the Protective Covenants:

Residential uses
Trailer or mobile home for primary or accessory structure, except during construction
Junkyards
Commercial excavation of building or construction materials
Dumping, disposal, incineration, or reduction of garbage, sewage, offal, dead animals or refuse
Fat Rendering
Slaughter of animals
Refining of petroleum
Smelting of iron, tin, zinc, or other ores
The raising of animals other than for research and laboratory purposes

2.3 Other Operations and Uses

Operations and uses which are neither specifically prohibited nor specifically authorized by These Protective Covenants may be permitted in a specific case if operational plans and specifications are submitted to and approved in writing by MED. Approval or disapproval of such operational plans and specifications shall be based upon the effect of such operations or uses on other property subject to these Protective Covenants or upon the occupants thereof as determined by MED.

Article III

3.1 Building Materials and Design

A. Metal Buildings are acceptable, but fronts of main structures facing roadways shall have a masonry facing or equal finish.
B. Masonry and concrete finish:
   Materials shall be approved by MED and shall be one or more of the following:
   1) Brick shall be of a size, type, texture, color and placement as shall be approved by MED.
   2) Stone shall have a weathered face or shall be polished, fluted, or broken face to be approved by MED.
   3) Concrete Masonry units shall be those generally described as "Customized Architectural Concrete Masonry Units" or shall be broken faced brick-type units with marble aggregate, in either case to be approved by MED. All concrete masonry units shall be coated with a coating approved by MED, and there shall be no exposed concrete block on the exterior of any building unless approved by MED.
   4) Concrete may be poured in place, tiltup, or precast, and shall be finished in stone, textured, or coated in a manner to be approved by MED. All coating shall be approved by MED and shall have a minimum life expectancy of ten (10) years.
   5) Metal Siding not visible from streets shall be of the self-weathering type or with a long life (10 years minimum) finish.
   6) Roof Mounted Equipment: Roof mounted equipment shall be located, or screened as may be required by MED, to minimize visibility from the street or surrounding buildings.

3.2 Parking

No parking shall be permitted on any street or at any place other than on the paved spaces provided for and described herein below. Each Owner and tenant shall be responsible for compliance with the foregoing by his employees and visitors.
Adequate off street parking shall be provided by each Owner and tenant for customers and visitors. All off-street parking and access drives and loading areas shall be paved and properly graded to assure proper drainage.

3.3 Loading Docks and Areas:

A. It is preferred that loading docks and areas shall not be located on the street side of any building or structure, except that the MED may approve such location in writing.
B. Loading areas may not encroach setback areas, except that MED may approve such encroachment.
C. Loading docks and areas shall be screened in a manner to prevent visibility from any street bordering this lot.

3.4 Outside Storage:

Waste and rubbish facilities shall be properly screened.

3.5 Screening:

A. Storage areas, incinerators, storage tanks, trucks based on the premises, roof objects (including fans, vents, cooling tower, skylights and all roof mounted equipment which rises above the roof line), trash containers and maintenance facilities, shall either be housed in closed buildings or otherwise completely screened from public view.

B. Antenna or tower visible from any street shall be erected to the rear of the building.

3.6 Maintenance:

Each Owner of any Building Site shall keep his buildings, improvements and appurtenances thereon in a safe, clean, maintained, neat wholesome condition and shall comply in all respects with all governmental statutes, ordinances, regulations, health and police and fire requirements. Each such Owner, tenant or occupant shall remove at his own expense any rubbish or trash of any character which may accumulate on its Building Site. Rubbish, trash, garbage or other waste shall be kept in a clean and sanitary condition. Rubbish and trash shall not be disposed on the premises by burning in open fires.

3.7 Signs:

A. All signs which shall be erected shall have the prior written approval of the MED as to size, color, location and content.
   1) No billboard or outdoor advertising leases shall be permitted; however, the MED may erect a sign or signs identifying, describing or advertising The Magnolia Business Park or any of its available buildings or land. Real estate broker signs advertising any premises for sale or lease by owner must be permitted by MED.
   2) A single, free standing sign shall be permitted on the building site, stating only the name or identification of the occupant of that facility.
   3) Additional signs shall be single-faced and confirmed to the walls of the larger buildings or to secondary structures which are lower than the main building.
   4) Signs located other than on the main building (gateways, concrete or masonry yard enclosure) shall be subject to the written approval of the MED.

B. Limitations:
   1) Mobile/Portable signs shall not be allowed.
   2) Signs with flashing, blinking or blinding lights are prohibited.
   3) Signs shall not interfere with driver visibility of the roadway.
   4) All signs that are illuminated shall be permanently wired to meet the National Electric Code. Special care shall be given to ground fault connections, underground wire, and/or conduct with proper circuit breakers.

3.8 Lighting:

While not all businesses require the same amount of illumination, The Magnolia Business Park shall have an evening quality, and must provide the basic needs of safety and security. Appropriate lighting must be provided to:

a. Delineate roads and routes of travel;
b. Identify intersections, buildings and important organizational points.

Primary parking lot illumination will consist of sharp cut-off luminaries as manufactured by Gardco, Moldcast, Kim, or equal, in black duronadic finish. Parking lot lights will not exceed twenty-four (24) feet from ground level and be used in a single or twin format. Characteristics: 40 watt mercury Vapor spaced approximately 100-200 feet O.C.
Walkway lighting should be of the same family as mentioned above, height to be 12-14 feet from ground level. Characteristics: 150-175 watt color corrected Mercury Vapor.
Bollard lights are often appropriate as low level walkway illumination.
Where possible, lighting should occur as part of the architectural concept using recessed lighting in overhangs and at entrance. Sharp cut-off type fixtures reduce the visual impact of the light source while providing excellent illumination levels.

3.9 Utility Connection:

All utility connections, including all electrical and telephone connections and installation of wires to buildings shall be made underground from the nearest available power source. No transformer, electric, gas or other meter of any type or other apparatus shall be located on any power pole nor hung on the outside of any building, but the same shall be placed on or below the surface of the Property and where placed on the surface shall be adequately screened and fenced and all such installations shall be subject to prior written approval of the MED. The MED shall have the right to grant on any Building Site, easements for utilities with in the setback of any Building Site to other Owners of Building Sites.

3.10 On-Site Drainage:

A. Surface drainage between any building and the street and visible from the street shall be in the form of swales instead of ditches. Such swales shall have slide slopes no steeper than 10 horizontal to 1 vertical. Berming and planting may be employed to raise grades to enhance drainage and to shield such swales which must have steeper side slopes.

B. Underground drainage piping is encouraged.

C. Driveways
Driveway entrances shall be located no closer than 100 feet from centerline to centerline.
Driveways shall be curbed from the street curbing for at least 30 feet.

Article IV

ARCHITECTURAL REVIEW

4.1 Process:

A. Signed plan approval by the MED is required prior to the undertaking of any site improvements, construction or installation, including clearing, grading, paving, signs, structures, landscaping, building additions, or alterations, subdivisions. Review should be coordinated with required governmental approvals.
B. Submission to the City of Magnolia for building permits should not be made until Preliminary approval and proper governmental clearances have been granted. Actual construction starts, such as excavating or concrete foundations, should not commence until final plans have been approved by the MED.

   All submissions to the MED are to be made <u>in duplicate</u>. The review of each submission by the MED will be carried out within ten (10) working days from the date of each submission; and notification of recommendations or approval will be provided in writing to the owner at that time.

4.2 Two-Stage Process:

Plans must be submitted to the MED at the following stages of planning and design:
I. Schematic/Preliminary
II. Construction Documents

At each stage the following elements shall be considered:
A. Site Plan
B. Building Design
C. Landscaping

Signs may be submitted and reviewed simultaneously with, or separately from, the above elements.

Two Sets of plans shall be submitted for each review. One set shall be retained for the MED's files.

<u>Stage I</u> or schematic/preliminary review, the following shall be submitted:
A. Site plan which includes the following:

Site location
Grades, existing and proposed
Site survey
Building location, overall dimensions and height with setbacks
Landscape plan

Site lighting plan
Connections to existing utility lines
Storm water and sewer
Site drainage
Amount and location of employee and guest parking
Truck loading and service areas
Screening, including size, location and method

B. Building Design:
Floor plans
Elevations, exterior materials, colors, textures, and shapes
Perspective rendering (optional)
Building materials
Preliminary review shall be concerned with building materials, colors, and finishes, architectural treatment and rooflines.

Stage II Construction Documents:
Working drawings and specifications reflecting the approved schematic/preliminary plans are submitted to MED for review and approval at the time application is made to the City of Magnolia Planning Department for a building permit.

Design revision occurring after Construction Document approval by the MED shall be subject to review and approval by the MED.

4.3 Interpretation and Waiver:

MED's interest in reviewing the above items is to assure that a high quality of compatible development is consistently achieved.

In order to meet special situations which may not be foreseen, it may be desirable from time to time for MED to allow variances of certain requirements. Any variance granted is considered not to be precedent setting because the decision is being made with the welfare of overall development in mind.

MAGNOLIA ZONING REGULATIONS

(Effective January 13, 2003)

Chapter 23 of the Magnolia Code

ZONING

ARTICLE I. IN GENERAL

Sec. 23-1. Definitions.

For definitions of all terms not specifically defined in this article, the planning commission, the city council or any court of law construing this chapter may refer to report no.322 of the planning advisor service entitled The Language of Zoning, a Glossary of Words and Phrases by Michael J. Meshenberg, a copy of which shall be on file in the Building Inspector's office. For terms not defined by this article nor by the foregoing publication, the planning commission, the city council and any court construing this chapter may refer to The Illustrative Book of Development Definitions by Harvey S. Moskowitz and Carl G. Lindbloom(1981), a copy of which shall be on file in the Building Inspector's office. The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Accessory building or use means a building located on the same lot with the main structure, or a subordinate use of land, either of which is customarily incidental to the main building or to the principal use of the land. Where a substantial part of the wall of the accessory building is a part of the wall of the main building, or where an accessory building is attached to the main building in a substantial manner as by a roof, such accessory building shall be considered a part of the main building and is not an accessory building.

Administrative Official or Officer, See Building Inspector.

Adult Daycare Center means an establishment that provides, on a regular basis, assistance or care for five or more unrelated adults for a period of less than twenty-four hours a day and which receives a payment, fee, or grant for the adults attending the facility, whether or not operated at a profit.

Advertising Sign or Structure means any cloth, card, paper, metal, glass, wooden, plastic, plaster, stone or other sign, device, or structure of any character whatsoever, including statuary placed for outdoor advertising purposes on the ground or on any tree, wall, bush, rock, post, fence, building, or structure. The term 'plate' shall include erecting, constructing, posting, painting, printing, tacking, mailing, gluing, sticking, carving, or otherwise fastening, affixing, or making visible in any manner whatsoever. The area of an advertising structure shall be determined as the area of the largest cross section of the structure. Neither directional, warning, nor other signs

(2) In the C-3 commercial zoning district each business establishment may install one(1) on-premises sign not exceeding thirty (30) square feet in area to advertise a product or the name of the firm.

(3) In the C-2 and C-3 commercial zoning districts, no advertising sign shall be located within ten (10) feet of the street right-of-way or of a residential district.

(h) *Gasoline pumps and canopy supports.* In the C-2 and C-3 commercial zoning district, gasoline pumps and supports for canopies shall be a minimum of twenty-five (25) feet from the property line.

(i) *Canopies and theater marquees.* In the C-1 commercial zoning district, structural canopies and theater marquees may be constructed over the public right-of-way with approval of a Conditional Use Permit by the planning commission.
(Ord. No. 631, § 23-107, 6-8-70; Ord. No. 757. § 5, 6-24-85; Ord. No. 95-8, § 1, 8-14-95)

Sec. 23-106. Industrial districts.

(a) *Description.* Industrial zoning districts are intended for general manufacturing and industrial activities, and for the bulk storage of goods.

(1) The industrial zoning district I-1 represents the industrial park areas. This district is intended for those operations carried on within the building, with adequate land area for parking and landscaping. This district is intended for those uses that place a value upon aesthetics, planning and good development.

(2) Industrial zoning district I-2 represents areas for normal industrial activities, including bulk storage of goods in the open.

(b) *Permitted Uses.* Permitted uses are as follows:

(1) Industrial zoning district (I-1).

a. Manufacturing, compounding, processing, packaging, and assembling of products which by the nature of the operation does not produce noise, dust, odor, or vibration that is detrimental or dangerous to the health , safety, or general welfare of the community.

b. All uses now permitted in commercial zoning district C-2.

(2) Industrial zoning district (I-2).

a. Permitted uses in Industrial zoning district I-1 as provided by subparagraphs (b)(1)a., and (b)(1)b. of this section.

b. Storage of bulk materials when it is found that the specific location and the safeguard provided will so reduce the danger from fire or explosion as not to be dangerous to the health, safety or general welfare of the community.

(c) *Area requirements.* Area requirements are as follows:

(1) Industrial zoning district (I-1).

a. Lot coverage. Buildings shall not cover more than fifty (50) percent of the lot area.

b. Yards. All buildings shall be built at least forty (40) feet from the front property line and twenty-five (25) feet from all other property lines, except that, where property abuts a railroad where siding facilities are utilized, buildings may be built up to railroad property lines.

c. On-lot parking. See Section 23-156.

d. On-lot loading and unloading facilities. Each building or use shall provide on-lot loading and unloading facilities which shall not block a street, alley or other public way.

e. Storage. All bulk storage must be within the confines of buildings.

(2) Industrial zoning district (I-2).

a. Lot coverage. Building shall not cover more than sixty-six and two-thirds (66 2/3) percent of the lot area.

b. Yards. All buildings shall be built at least sixty (60) feet from all property line, except that, where property abuts a railroad where siding facilities are utilized, buildings may be built up to railroad property lines.

c. On-lot parking. See Section 23-156.

d. On-lot loading and unloading facilities. Each structure or use shall provide on-lot loading and unloading facilities which shall not block a street, alley or other public way.

(d) *Signs.* Sign requirements for the industrial zoning district shall be the same as the C-2 zoning district sign requirements.

(e) Approval of industrial uses by planning commission. When an application is submitted for a building permit for an industrial use in an industrial district, the application shall be referred to the Building Inspector. If the applicant is dissatisfied with the decision of the Building Inspector or the Building Inspector is uncertain about how he should proceed, then the matter shall be referred to the planning commission. The inspector shall:

(1) Determine if the industry meets the general character of the industrial zoning district in which proposed.

(2) Determine if any safeguards are necessary and if so, to do stipulate to protect the health, safety and general welfare of the community in general and abutting property in particular.

(3) Approve or disapprove the application.

(Ord. No. 631, §23-108, 6-8-70; Ord. No. 757, §§ 6—8, 6-24-85)

Sec. 23-107. Urban Transitional District

The Urban Transitional (UT) district is confined to areas within the city limits where a clear development pattern is not apparent. The district may ultimately be suited for a number of uses that will be determined by future conditions. Permitted uses in the interim will be restricted to those uses permitted in the low-density single-family residential (R-1) and community and neighborhood commercial (C-3) districts. Area and other regulations (i.e. parking requirements) in the UT district shall conform to the appropriate district regulations (either R-1 or C-3 district) depending upon the proposed use. Other uses may be allowed by the Planning Commission as Conditional Uses under the provisions set forth in Division 5, Conditional Uses.

Sec. 23-108. Billboards

Billboards as defined in Section 23-1, Definitions, are permitted in the C-2 zoning district only as the principal structure on the lot and thereby required to meet all setback and area regulations.

Sec. 23-109. Planned Unit Developments (PUDs)

Utilities

Electric Utility:

Name of Utility:	Entergy Arkansas
Contact Person(s):	Joe Bailey or Chris Murphy
Address:	425 West Capitol Ave., Suite 2700
City, State, Zip:	Little Rock, AR 72201
Phone:	501-377-4089 or 501-377-4467
Fax:	501-377-4448
Email:	jbail12@entergy.com or cmurph4@entergy.com
Service and Proximity to Site:	Three-phase power is on site.

Natural Gas Utility:

Name of Utility:	CenterPoint
Contact Person(s):	Chauncey Taylor
Address:	P.O. Box 751
City, State, Zip:	Little Rock, AR 72203
Phone:	501-377-4557
Fax:	501-377-4630
Email:	chauncey.taylor@centerpointengergy.com
Service and Proximity to Site:	The 4” gas line is located at the NW Corner of the intersection of U.S. Hwy. 371/82 Bus. and is ⅛ of a mile from the Harvey Couch Business Park.

Water Utility:

Name of Utility:	Magnolia Utilities
Contact Person(s):	Mayor Parnell Vann
Address:	201 E. North St.
City, State, Zip:	Magnolia, AR 71753
Phone:	870-234-1375
Fax:	870-235-5690
Email:	mayor@magnolia-ar.com
Service and Proximity to Site:	The 12" water line is located on the east side of Harvey Couch Blvd. Pressure and flow test are: psi static 65, psi residual 40, gpm flow 753/1130 CALC.

Utilities

Sewer:

Name of Utility:	Magnolia Wastewater System
Contact Person(s):	Mayor Parnell Vann
Address:	201 E. North St.
City, State, Zip:	Magnolia, AR 71753
Phone:	870-234-1375
Fax:	870-235-5690
Email:	mayor@magnolia-ar.com
Service and Proximity to Site:	The 10" main is located on the west side of Harvey Couch Blvd. Daily plant treatment capacity is 2.5 million gallons with an average of 1.7 million gallons.

Telecommunications:

Name of Utility:	South Arkansas Telephone Company (SATCO)
Contact Person(s):	Mark Lundy
Address:	403 W. Main St.
City, State, Zip:	Hampton, AR 71744
Phone:	870-798-2201
Fax:	None
Email:	mlundy@satco.biz
Service and Proximity to Site:	South Arkansas Telephone Company provides single mode business Ethernet for voice and data at 25 Mbs/10Gb. The service line is approximately 504' to the site.

Name of Utility:	AT&T Arkansas
Contact Person(s):	Casey Ricky, Mgr. OSP Plng & Engineering Design
Address:	1051 Chevrolet Dr.
City, State, Zip:	Arkadelphia, AR 71923
Phone:	870-897-7233
Fax:	None
Email:	Cr886s@att.com
Service and Proximity to Site:	AT&T provides traditional telephone service and high speed data and voice over in their Fiber Optic network. The service line is approximately 1,200' to the site.

Utilities

Rail:

Name of Utility:	Louisiana & North West (LNW) Railroad
Contact Person(s):	Patti Foy
Address:	10060 Skinner Lake Dr.
City, State, Zip:	Jacksonville, FL 32246
Phone:	904-438-2451
Fax:	904-416-3124
Email:	Patti.foy@patriotrail.com
Service and Proximity to Site:	0 miles (on site)

Taxes

Local Sales Tax Rates:	6.5% - Arkansas 1.5% - Columbia County 2.375% - Magnolia 10.375 - Total Sales Tax
Property Tax Rates (Real, Personal) and Methods of Assessment:	Millage rate for Magnolia is 39.6. $10,000,000 x 20% = $2,000,000 x .0455 = $91,000
State Taxation Summary:	See Arkansas Economic Development Commission Taxation Summary behind tab T1 for detail.

as of August 2018

State of Arkansas Taxation Summary

Corporate Income Tax

Taxable income is apportioned according to a three-factor formula (property (25%), payrolls (25%) and sales (50%) attributed to Arkansas with a double-weighted sales factor. Corporate income tax is levied statewide only; not on the local level.

Taxable Income	Tax Rate
First $3,000	1%
Next $3,000	2%
Next $5,000	3%
Next $14,000	5%
Next $75,000	6%
Over $100,000	6.5%

Personal Income Tax

2018 (Personal income tax is levied statewide only; not on the local level)

For Incomes less than $21,000 per year

Taxable Income	Tax Rate
$0 - $4,299	0.9%
$4,300 – $8,399	2.4%
$8,400 - $ 12,599	3.4%
$12,600 - $20,999	4.4%

For incomes between $21,000 and $75,000

Taxable Income	Tax Rate
$0 - $4,299	0.9%
$4,300 - $8,399	2.5%

$8,400 - $12,599	3.5%
$12,600 - $20,999	4.5%
$21,000 - $35,099	5.0%
$35,100 - $75,000	6.0%

For incomes more than $75,000

Taxable Income	**Tax Rate**
$0 - $4,299	0.9%
$4,300 - $8,399	2.5%
$8,400 - $12,599	3.5%
$12,600 - $20,999	4.5%
$21,000 - $35,099	5.0%
$35,100 - $75,000	6.0%
$35,100 and above	6.9%

Incomes between $75,000 and $80,000 shall reduce the amount of income tax due by deducting bracket adjustment as set forth below

Taxable Income	**Tax Rate**
$75,001 - $76,000	$440
$76,001 - $77,000	$340
$77,001 - $78,000	$240
$78,001 - $79,000	$140
$79,001 - $80,000	$ 40
$80,001and above	$ 0

Federal Insurance Contributions Act (FICA)

The Federal Insurance Contributions Act (FICA) tax includes two separate taxes. One is social security tax and the other is Medicare tax. Different rates apply for each of these taxes.

The current tax rate for social security is 6.2% for the employer and 6.2% for the employee, or 12.4% total. The current rate for Medicare is 1.45% for the employer and 1.45% for the employee, or 2.9% total.

Only the social security tax has a wage base limit. The wage base limit is the maximum wage that is subject to the tax for that year. For earnings in 2018, this base is $128,400. There is no wage base limit for Medicare tax. All covered wages are subject to Medicare tax.

Additional Medicare Tax are applied to an individual's Medicare wages that exceed a threshold amount based on the taxpayer's filing status. Employers are responsible for withholding the 0.9% Additional Medicare Tax on an individual's wages paid in excess of $200,000 in a calendar year, without regard to filing status. An employer is required to begin withholding Additional Medicare Tax in the pay period in which it pays wages in excess of $200,000 to an employee and continue to withhold it each pay period until the end of the calendar year. There is no employer match for Additional Medicare Tax.

Corporate Franchise Tax

The chart below lists the franchise tax rates for various entities under Arkansas Code 26-54-104.

Franchise Tax Type	**Current Rate**
Corporation/Bank with Stock	0.3% of the outstanding capital stock; $150 minimum
Corporation/Bank without Stock	$300
Limited Liability Company	$150
Insurance Corporation Legal Reserve Mutual, Assets Less Than $100 million	$300
Insurance Corporation Legal Reserve Mutual, Assets Greater Than $100 million	$400
Insurance Company Outstanding Capital Stock Less Than $500,000	$300
Insurance Company Outstanding Capital Stock Greater Than $500,000	$400
Mortgage Loan Corporation	0.3% of the outstanding capital stock; $300 minimum
Mutual Assessment Insurance Corporation	$300

Sales Tax

The Arkansas sales tax is **6.5%** of the gross receipts from the sales of tangible personal property and certain selected services. “Sale” includes the lease or rental of tangible personal property. In addition to the state sales and use tax, local sales and use taxes may be levied by each city or county. However, businesses may apply to the Arkansas Department of Finance and Administration for a refund of local taxes. “Single transaction” means any sale of tangible personal property or taxable service reflected in a single invoice, receipt or statement for which an aggregate sales or use tax amount has been reported or remitted to the state for a single, local taxing jurisdiction. These taxes are collected by the state and distributed to the cities and counties each month.

Sales Tax Exemptions – Sales Tax Savings

Exemptions from sales and use taxes for manufacturers are as follows:

- Property which becomes a recognizable, integral part of property manufactured, compounded, processed, or assembled for resale.
- Machinery and equipment used directly in manufacturing which are purchased for a new or expanding manufacturing facility or to replace existing machinery or equipment
- Machinery and equipment required by Arkansas law to be purchased for air or water pollution control

The value of this statutory exemption depends on the amount of eligible expenditures as determined by the Arkansas Department of Finance and Administration.

Sales and Use Tax Reduction on Electricity and Natural Gas

The State of Arkansas has a reduced 0.625% on electricity and natural gas used directly in the manufacturing process. For purposes of determining what utility usage is subject to this reduced rate, the manufacturing process includes processes beginning at the point where raw materials are first moved from raw material storage to the beginning of manufacturing or processing of those raw materials into items of tangible personal property and ends when the finished manufactured goods are packaged and ready for shipment or storage.

Sales and Use Tax Refund – Replacement and Repair

Effective July 1, 2014, state sales and use taxes relating to the partial replacement and repair of machinery and equipment used directly in manufacturing process may be refunded. Manufacturers may utilize one of two of the options presented below:

Option One:

- Provides a refund of one percent (1%) of the total sales and use taxes (5.875* percent) levied for the purchase and installation of machinery and equipment to modify, replace or repair, either in whole or part, existing machinery or equipment used directly in the manufacturing process.

Effective Date	Option 1 Percentage
July 1, 2014	1%
July 1, 2018	2%
July 1, 2019	3%
July 1, 2020	4%
July 1, 2021	5%
July 1, 2022	Full exemption of state sales and use taxes

Option Two:

- Provides for an increased refund of the total sales and use taxes (5.875* percent) levied. It is discretionary and may be offered by the Executive Director of AEDC to those manufacturers who have a major maintenance and improvement project totaling at least $3 million to purchase and install machinery or equipment used directly in the manufacturing process. The project is subject to approval and the Company must enter into a financial incentive agreement with AEDC for the project prior to incurring project expenditures.

*The excise tax of one-eighth of one percent (1/8 of 1%) levied in Arkansas Constitution, Amendment 75, and the temporary excise tax of one-half percent (0.5%) levied in Arkansas Constitution Amendment 91, are not subject to refund under this section.

Unemployment Insurance Tax

New Businesses

A business with no previous employment record in Arkansas is taxed at **3.2%** on the first **$10,000** of each employee's earnings until an employment record is established, usually within three years.

Existing Arkansas Businesses

2018 Experience-Based Rate range between **0.4% - 14.3%** and averages **3.1%.** Each business' employment record is determined primarily by its taxable payroll and history of employee voluntary termination. The tax is determined by past experience and the amount of the reserve-ratio. The reserve-ratio is the excess of contributions paid over benefits charged as related to payroll. The higher the reserve-ratio, the lower the tax rate. Currently, the maximum weekly benefit in Arkansas is $451.

Federal Unemployment Tax (FUTA)

Aside from state unemployment insurance taxes, employers pay a federal unemployment or FUTA tax. The FUTA tax rate is 6.0% with a taxable wage base of $7,000. However, if states operate their unemployment insurance programs in compliance with federal law then the FUTA tax is reduced (credit) by 5.4% to 0.6%.

Property Tax

The State of Arkansas does not have a property tax; however, Arkansas cities and counties do collect a property tax, which is the principal source of revenue for funding local public schools.

The tax is calculated based on 20 percent of the true market value of real and to the usual selling price of personal property (vehicles, boats, etc.) and the average annual value of merchants' stocks and/or manufacturers' inventories based on millage rates in individual school districts. Business firms and individuals are subject to annual property tax on all real and personal property.

Local county tax assessors and collectors calculate and collect all personal and real property taxes. Revenue derived from personal property taxes supports your local government agencies. Personal property must be assessed each year before May 31. Any personal property taxes assessed after the deadline will include a monetary penalty determined by the respective county. These taxes are due on or before October 15 of the following year.

Real Property Option (Using Arkansas Average Millage Rate as an Example):

Total Market Value		*Assessment Level*		*Assessed Value*
$4,000,000	x	20%	=	$800,000

Assessed Value		*Millage Rate*		*Annual Property Tax Due*
$800,000	x	.04748	=	$37,984

Please note: Corporate personal property taxes (equipment, office furniture, etc.) follow a depreciation schedule for each type of property. The schedule below (with exceptions dependent on the area) is issued by each County Assessor's Office in Arkansas.

COMMERCIAL PERSONAL PROPERTY
Depreciation Schedule

Remaining Life Percent

Schedule Age	3	5	6	8	10	12	16	20	25	30	Schedule Age
1	.55	.73	.78	.87	.89	.91	.93	.94	.96	.96	1
2	.30	.53	.60	.71	.82	.85	.88	.88	.91	.93	2
3	.10	.39	.48	.59	.75	.79	.84	.85	.87	.89	3
4		.24	.35	.50	.68	.73	.79	.81	.84	.87	4
5		.10	.23	.42	.61	.67	.75	.78	.81	.84	5
6			.10	.33	.53	.61	.70	.74	.79	.82	6
7				.24	.46	.55	.66	.71	.76	.80	7
8				.15	.39	.49	.61	.67	.73	.77	8
9					.32	.43	.57	.64	.70	.75	9
10					.25	.37	.52	.60	.67	.73	10
11						.31	.48	.57	.64	.70	11
12						.25	.43	.53	.62	.68	12
13							.39	.50	.59	.65	13
14							.34	.46	.56	.63	14
15							.30	.43	.53	.61	15
16							.25	.39	.50	.58	16
17								.36	.48	.56	17
18								.32	.45	.53	18
19								.29	.42	.51	19
20								.25	.39	.49	20
21									.36	.46	21
22									.33	.44	22
23									.31	.42	23
24									.28	.39	24
25									.25	.37	25
26										.34	26
27										.32	27
28										.30	28
29										.27	29
30										.25	30

Industrial revenue bond financing is available to a company in Arkansas for land acquisition, building acquisition, construction and equipment. Bonds can be issued either taxable or tax exempt, depending on certain IRS qualifications and restrictions.

The Arkansas Economic Development Commission Bond Guaranty Program was created to provide long-term, tax exempt and taxable financing for businesses expanding or locating in Arkansas. Although the city or county may issue the revenue bond, the company is still responsible for paying the principal and interest.

Under this program, the Commission can guarantee timely payment of principal and interest, up to $5,000,000 principal per bond issue, to the bondholders. This guaranty gives the bonds a better rating, thereby making the bond more attractive to investors and reducing the company's cost to borrow money.

An additional benefit of bond financing is:

Cities and counties are authorized to enter into a Payment in Lieu of Tax (PILOT) Agreement with industrial projects resulting in a reduction of property taxes that would otherwise be due. Industrial Revenue Bonds are issued by the city or county on behalf of the project. Under PILOT agreements, title to the property is held in name only by the public issuer for the term of the bond issue. At the end of the bond term, title will transfer to the company. The amount of the payment in lieu of taxes must not be not less than 35% of what normal taxes would have been. The PILOT Agreement may not last longer than the term of the bond.

Inventory Tax

All real estate and tangible personal property (inventory) shall be assessed for taxation in the taxing district in which the property is located and kept in use.

If destination of a company's tangible personal property (inventory) is within the state, taxes will be assessed at its prior year's value only in the county/city of its destination.

Freeport Law

If destination of a company's tangible personal property (inventory) is out of state, the following statement applies:

Arkansas' Freeport Law exempts from property tax those finished goods and raw materials in transit or awaiting shipment to out-of-state customers.

Workers' Compensation Rate for the Manufacturing Sector

2018

Type of Rate	**Rate per $100 payroll**
Assigned Risk	$2.06
Advisory Loss Cost	$1.02

Source: NCCI July 2018 Arkansas Manufacturing Rates

The assigned risk rate is based on the inability for companies to obtain their own insurance, while the loss cost is for companies which are self-insured.

Maps

The following maps are provided:

- Transportation, Regional
- Transportation, Immediate
- Aerial
- Topographic
- Elevation Contours
- FEMA Flood Hazard
- National Wetlands Inventory
- Pipeline Infrastructure
- Electrical Infrastructure
- Surrounding Uses

HARVEY COUCH BUSINESS PARK - SOUTHEAST

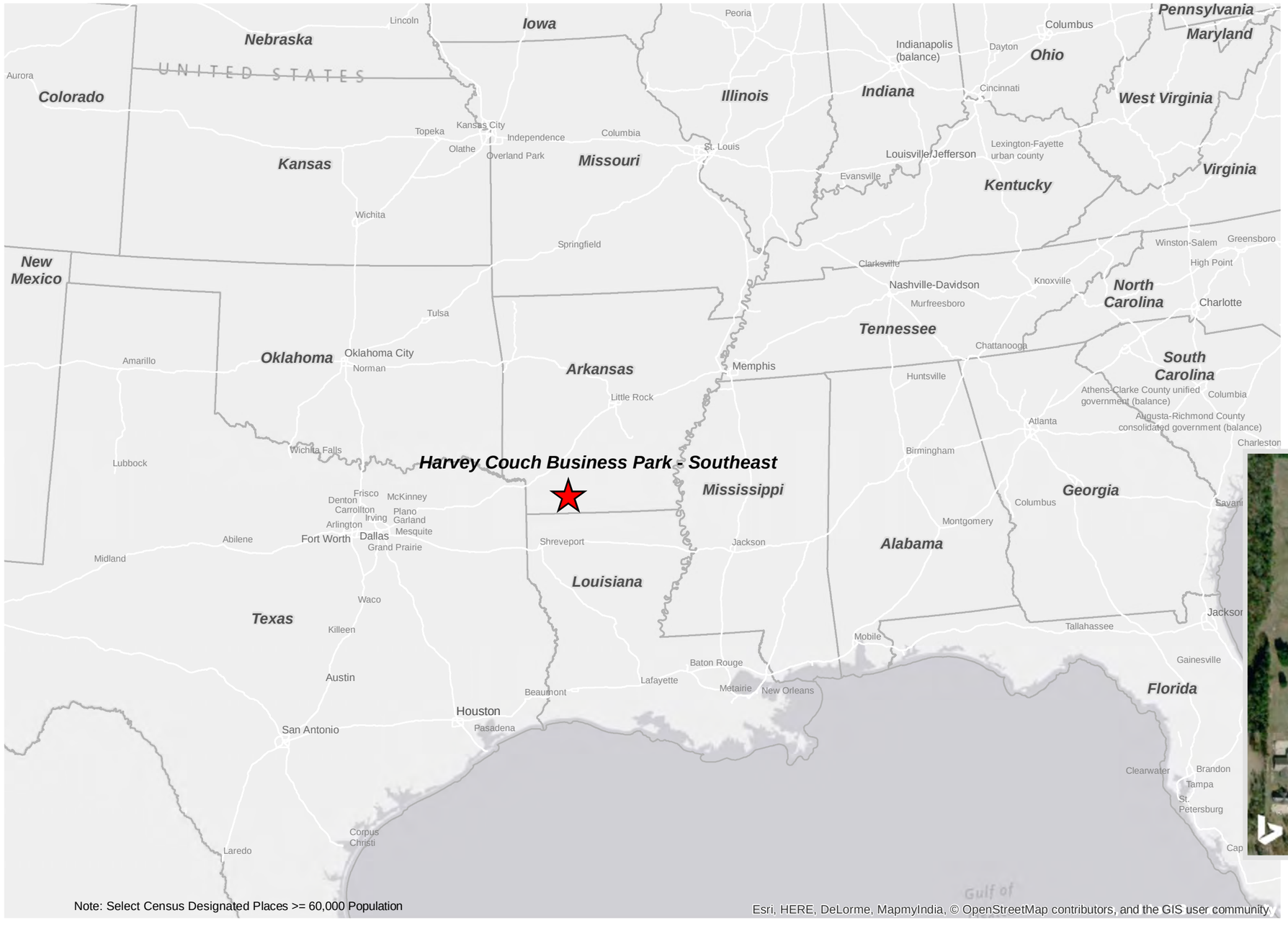
Magnolia, AR

425 West Capital Ave Suite 2700
Little Rock, AR 72201

Phone: 1-888-301-5861

goentergy.com/ar

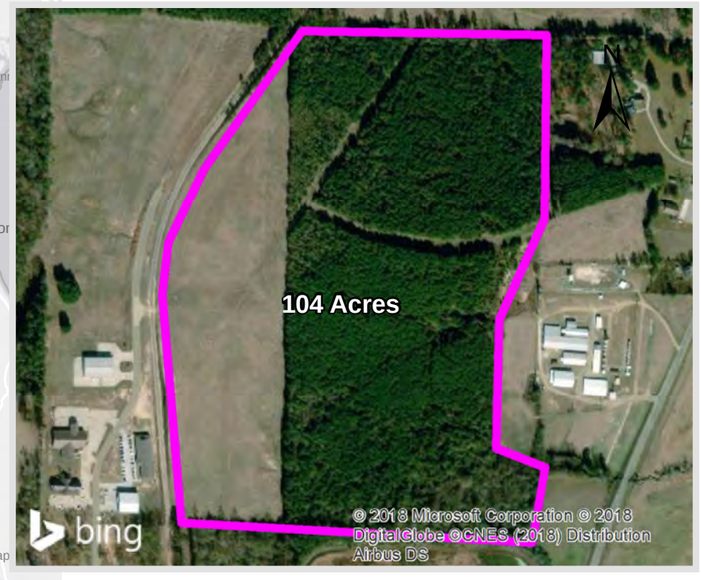
Coordinates: -93.23949, 33.304186



Note: Select Census Designated Places >= 60,000 Population

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

Contents



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Harvey Couch Business Park - Southeast

Transportation, Regional Vicinity

425 West Capitol Ave, Suite 2700
Little Rock, AR 72201

Phone: 1-888-301-5861

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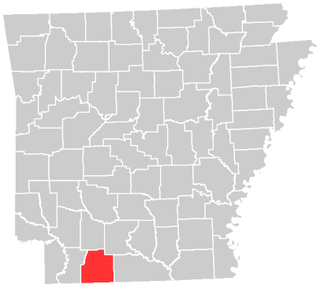
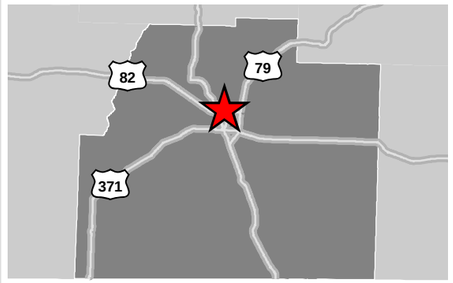
COLUMBIA COUNTY



VICINITY MAP



LEGEND

- Site Location
- Port
- Airports

Highways

- Interstate
- U.S.

NOTE

These drawings are provided merely to assist in economic development efforts. The Entergy Companies make no representations or warranties whatsoever regarding the accuracy or completeness of any information contained herein nor the condition or suitability of any properties. Users should direct inquiries about any property to the listing broker for that property.

SOURCE

Roads: Census/TIGER database, 2014
Railroads: Federal Railroad Administration,
Bureau of Transportation Statistics, ESRI, 2014
ESRI Basemaps; ESRI Datamaps 10.2

Created by: RPG
Date: 11/2018

0 30 60 Miles

0 31.6 63.2 Kilometers

N

BUSINESS DEVELOPMENT
ARKANSAS

Harvey Couch Business Park - Southeast

Transportation, Immediate Vicinity

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Little Rock, AR 72201

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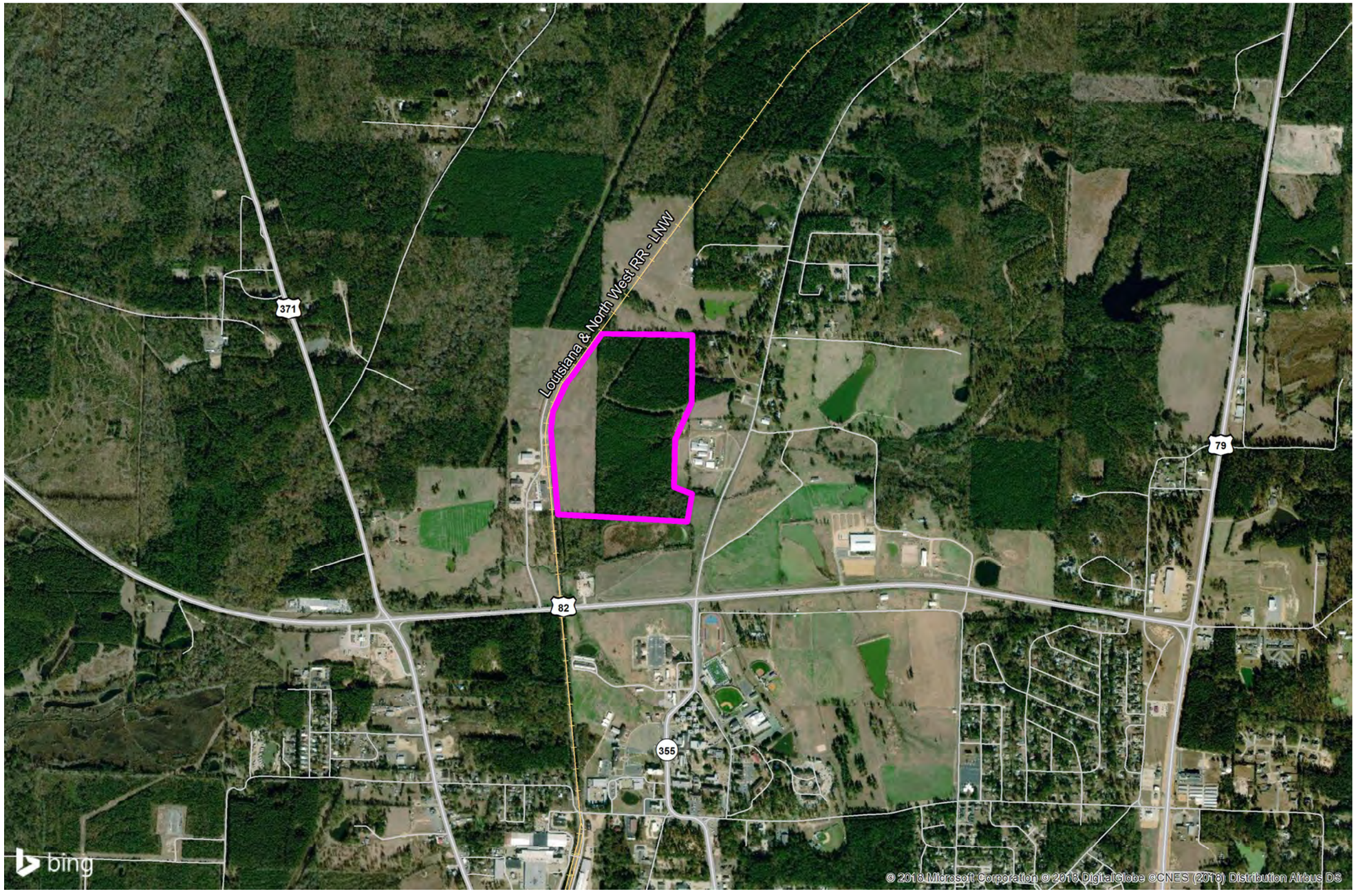
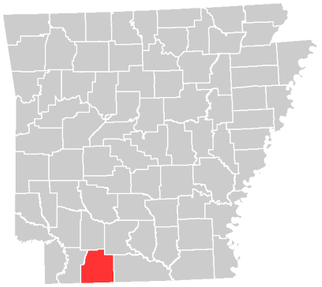


COLUMBIA COUNTY



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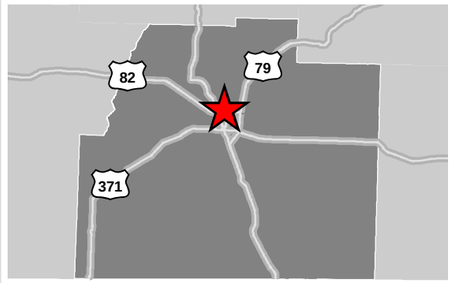

LEGEND

- Boundary
- Railroad
- City Road
- U.S. Hwy
- State Hwy

NOTE

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SOURCE

Roadway: Arkansas GIS Office Download 11/2018

Created by: RPG
Date: 11/2018

0 1,500 3,000 Feet

0 360 720 Meters

N

Entergy | BUSINESS DEVELOPMENT ARKANSAS

Harvey Couch Business Park - Southeast

Aerial

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Little Rock, AR 72201

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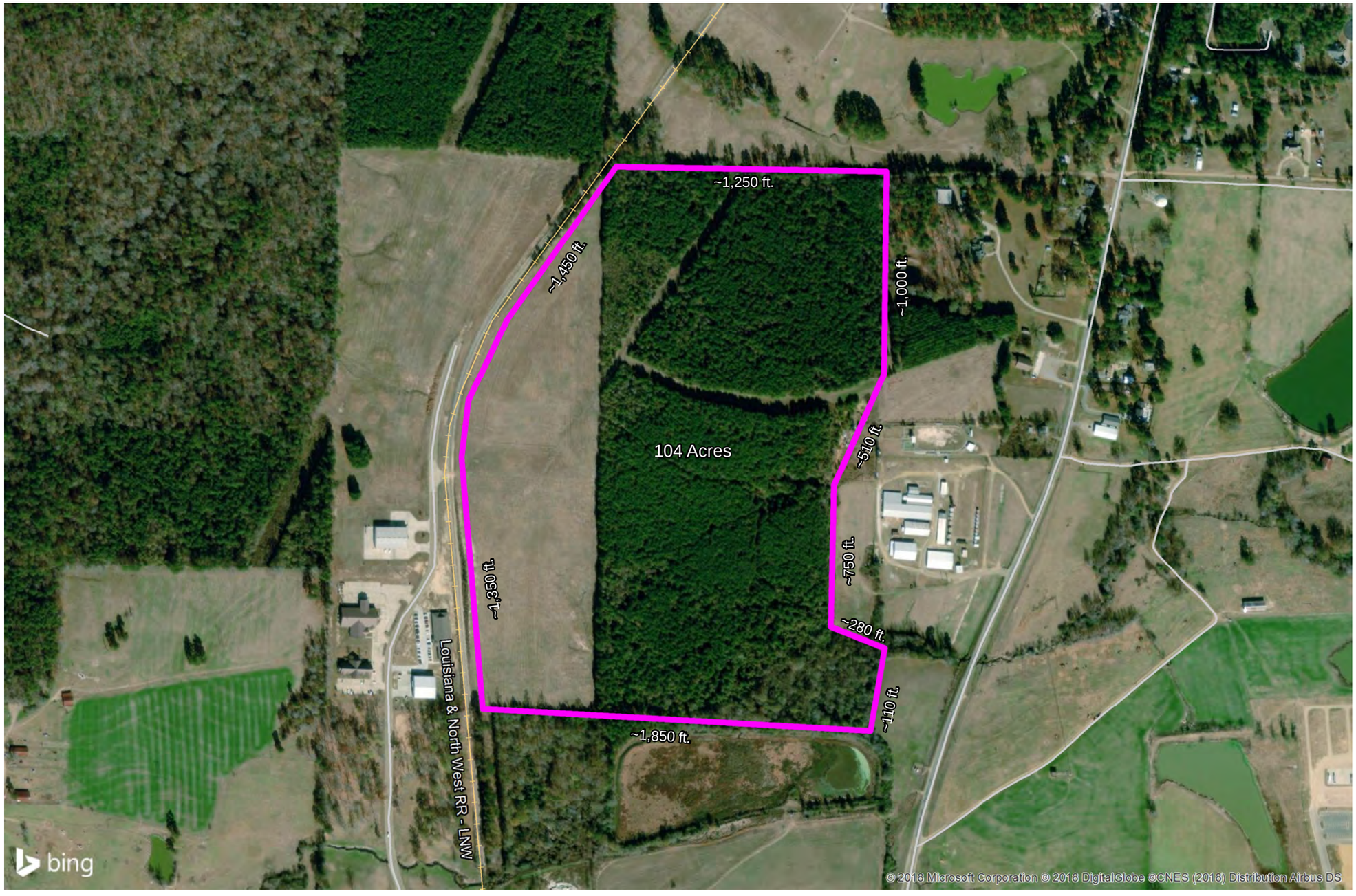
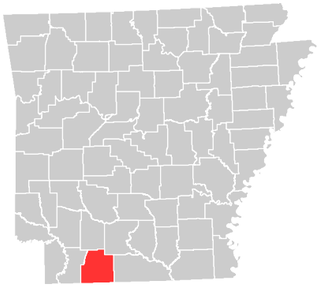


COLUMBIA COUNTY



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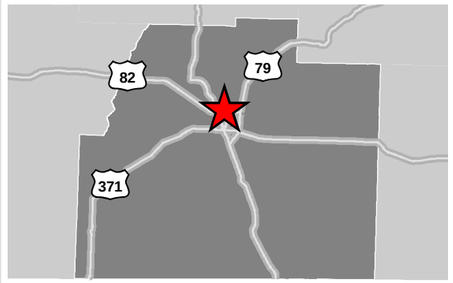

LEGEND

Boundary

Railroad

NOTE

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SOURCE

Roadway: Arkansas GIS Office Download 11/2018

Created by: RPG
Date: 11/2018

0 500 1,000 Feet

0 120 240 Meters

N

BUSINESS DEVELOPMENT
ARKANSAS

Harvey Couch Business Park - Southeast

Topographic Map

425 West Capitol Ave, Suite 2700
Little Rock, AR 72201

Phone: 1-888-301-5861

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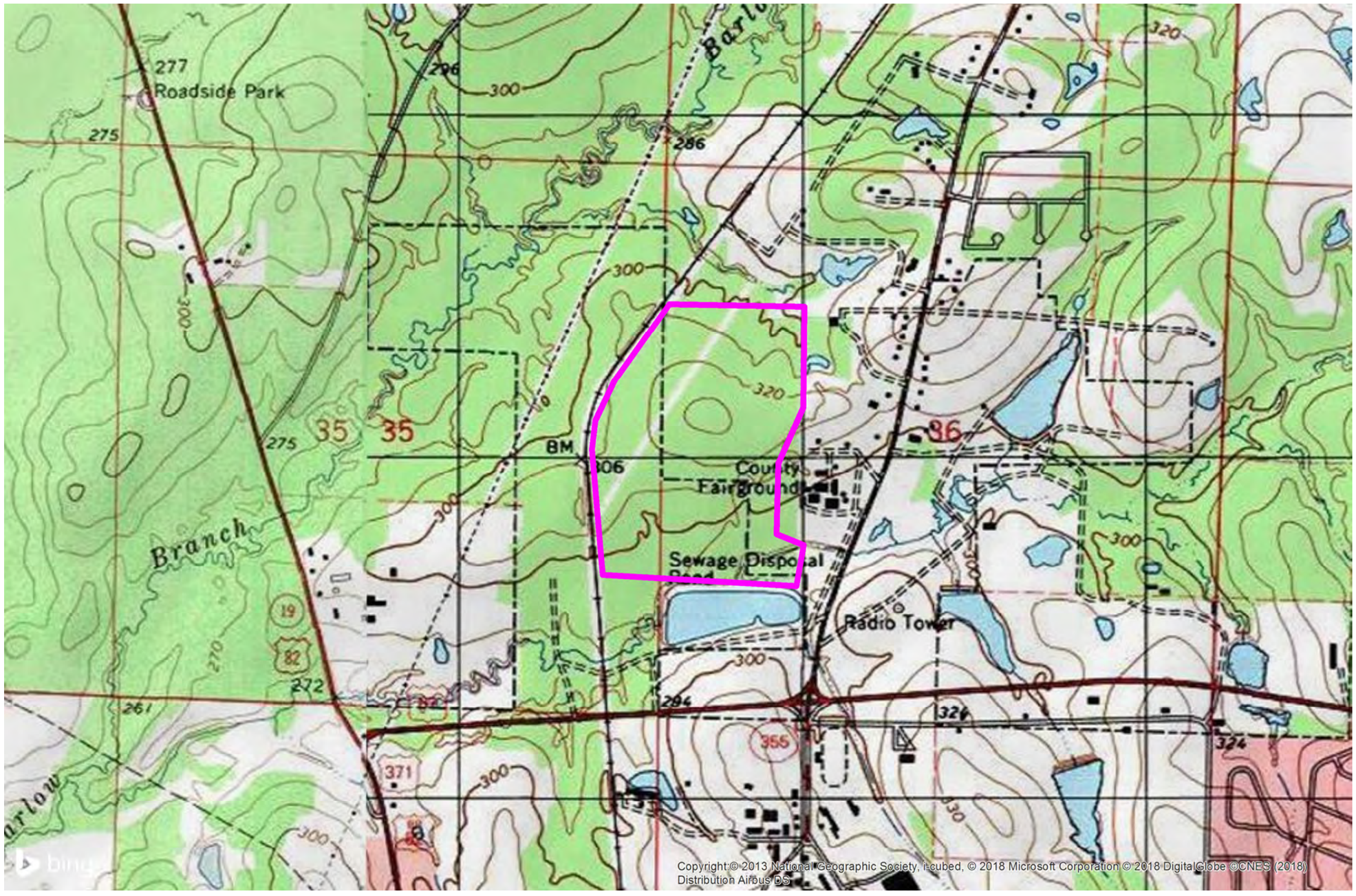
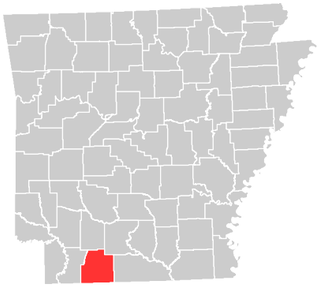


COLUMBIA COUNTY



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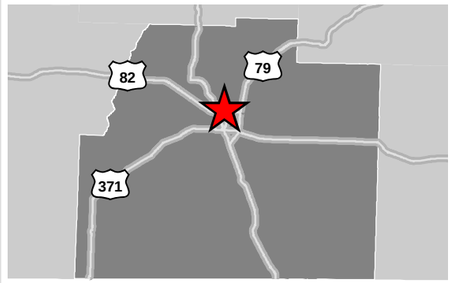

LEGEND

Boundary

NOTE

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SOURCE

Topo Map: 2013 National Geographic Society, i-cubed

Created by: RPG
Date: 11/2018

0 1,000 2,000 Feet

0 240 480 Meters

N

Entergy | BUSINESS DEVELOPMENT ARKANSAS

Harvey Couch Business Park - Southeast

Elevation Contours

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Little Rock, AR 72201

Phone: 1-888-301-5861

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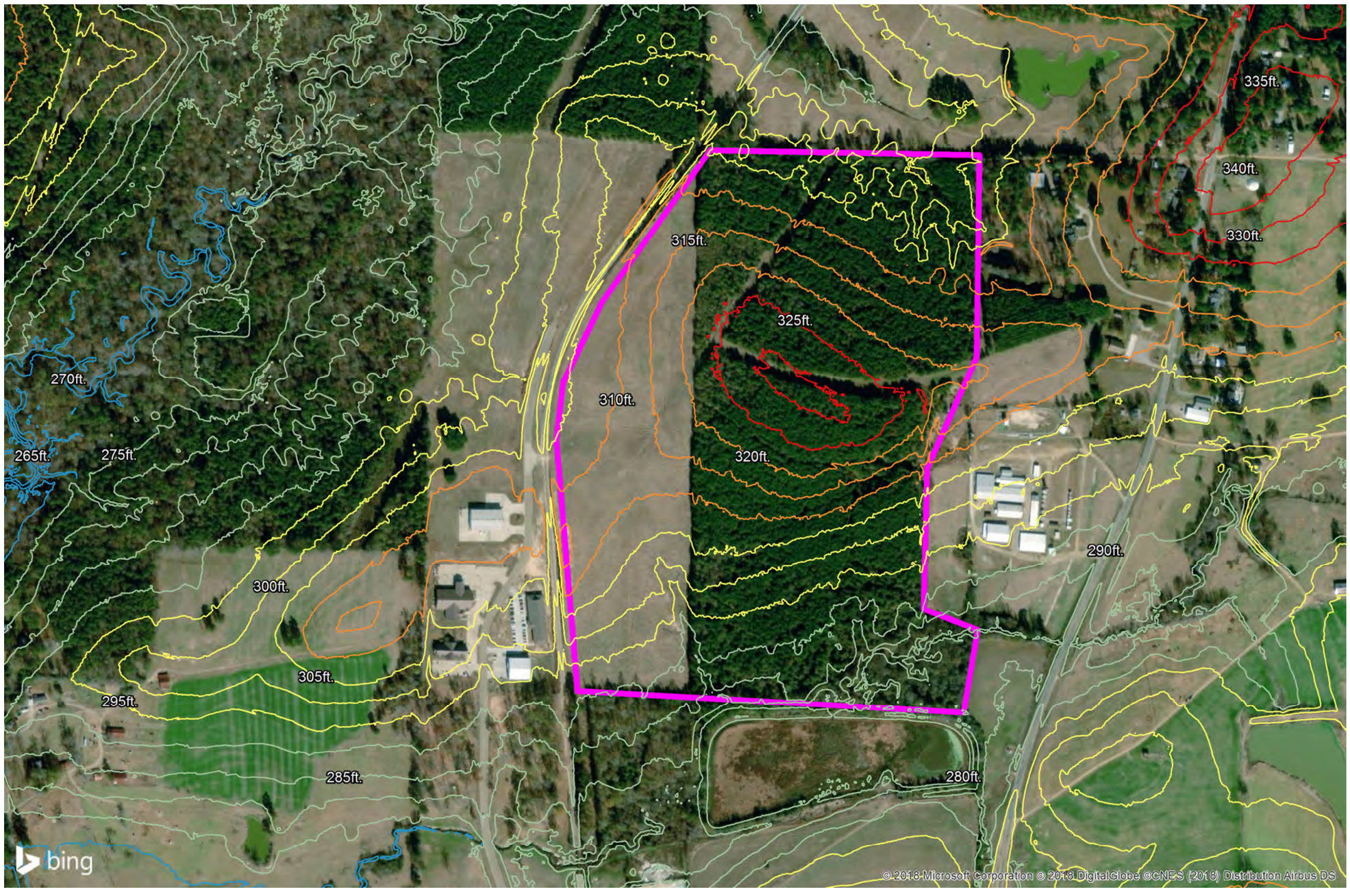

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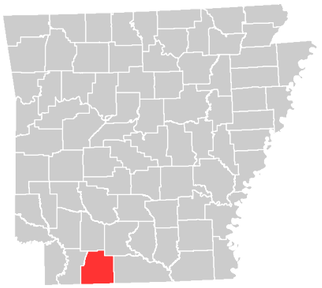

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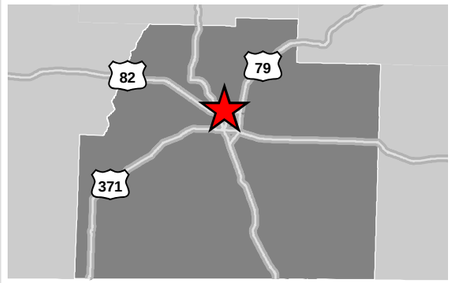

LEGEND

Boundary

Contour (Ft.)

- 255 - 270
- 271 - 290
- 291 - 305
- 306 - 320
- 321 - 355

NOTE

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SOURCE

Roadway: Arkansas GIS Office Download 11/2018

Created by: RPG
Date: 11/2018

0 500 1,000 Feet

0 120 240 Meters

N

BUSINESS DEVELOPMENT
ARKANSAS

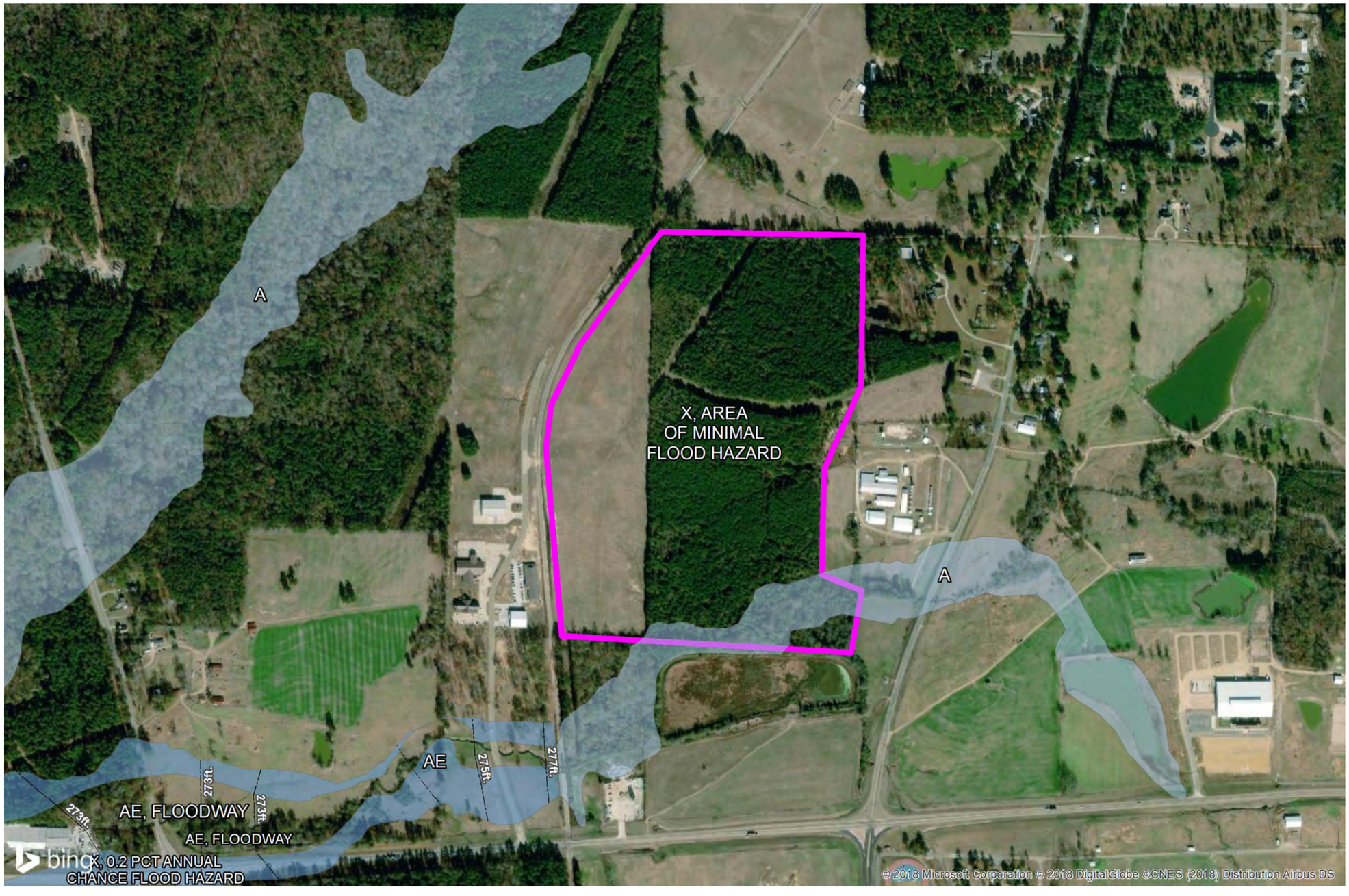
Harvey Couch Business Park - Southeast

FEMA Flood Hazards

425 West Capitol Ave, Suite 2700
Little Rock, AR 72201

Phone: 1-888-301-5861

goentergy.com/ar



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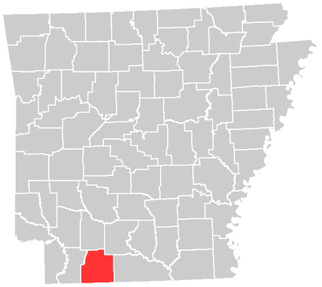

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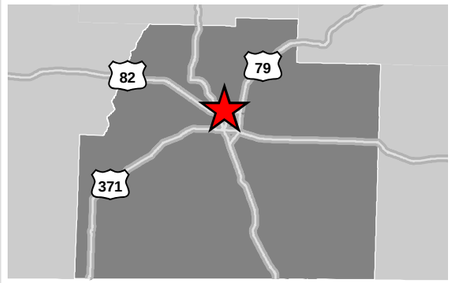

LEGEND

- Boundary
- Base Flood Elevation

Flood Hazard

- A,
- AE,
- X, 0.2 PCT ANNUAL CHANCE FLOOD HAZARD

NOTE

These drawings are provided merely to assist in economic development efforts. The Entergy Companies make no representations or warranties whatsoever regarding the accuracy or completeness of any information contained herein nor the condition or suitability of any properties. Users should direct inquiries about any property to the listing broker for that property.

SOURCE

Flood Hazards: FEMA FIRM Data, Downloaded 11/14/2018

Created by: RPG
Date: 11/2018

0 667 1,334 Feet

0 160 320 Meters

N

Entergy
BUSINESS DEVELOPMENT
ARKANSAS

Harvey Couch Business Park - Southeast

National Wetland Inventory

425 West Capitol Ave, Suite 2700
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Phone: 1-888-301-5861

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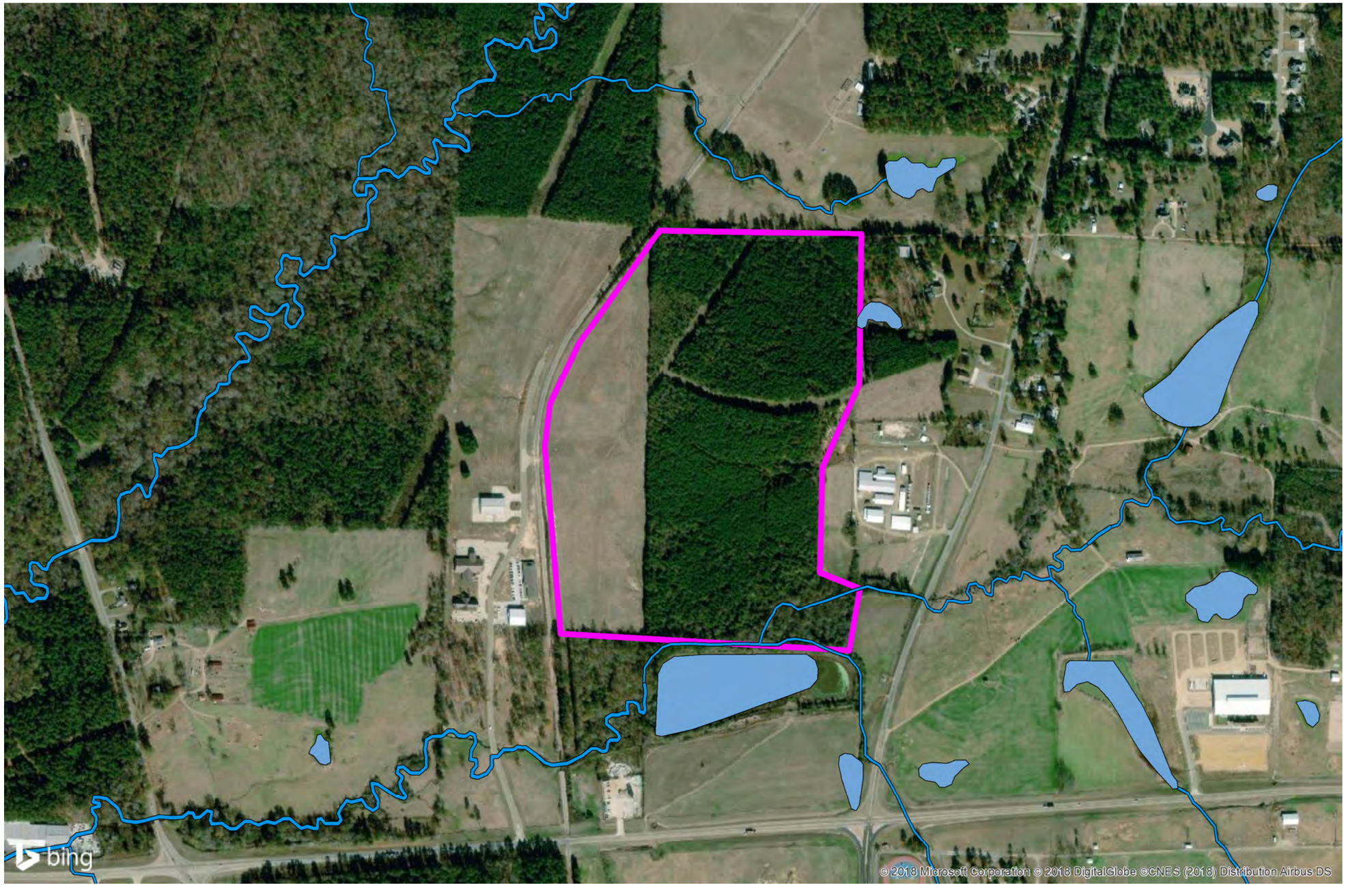
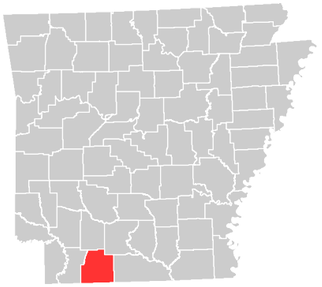


COLUMBIA COUNTY



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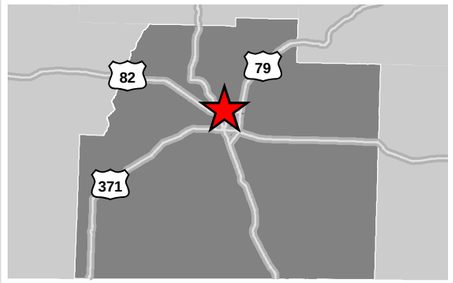

LEGEND

Boundary

Wetland Types

Freshwater Pond

Riverine

NOTE

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SOURCE

Wetlands: US. Fish and Wildlife Services,
National Wetland Inventory, Download date: 11/14/2018

Created by: RPG
Date: 11/2018

0 667 1,334 Feet

0 160 320 Meters

N

Entergy | BUSINESS DEVELOPMENT ARKANSAS

Harvey Couch Business Park - Southeast

Pipeline Infrastructure

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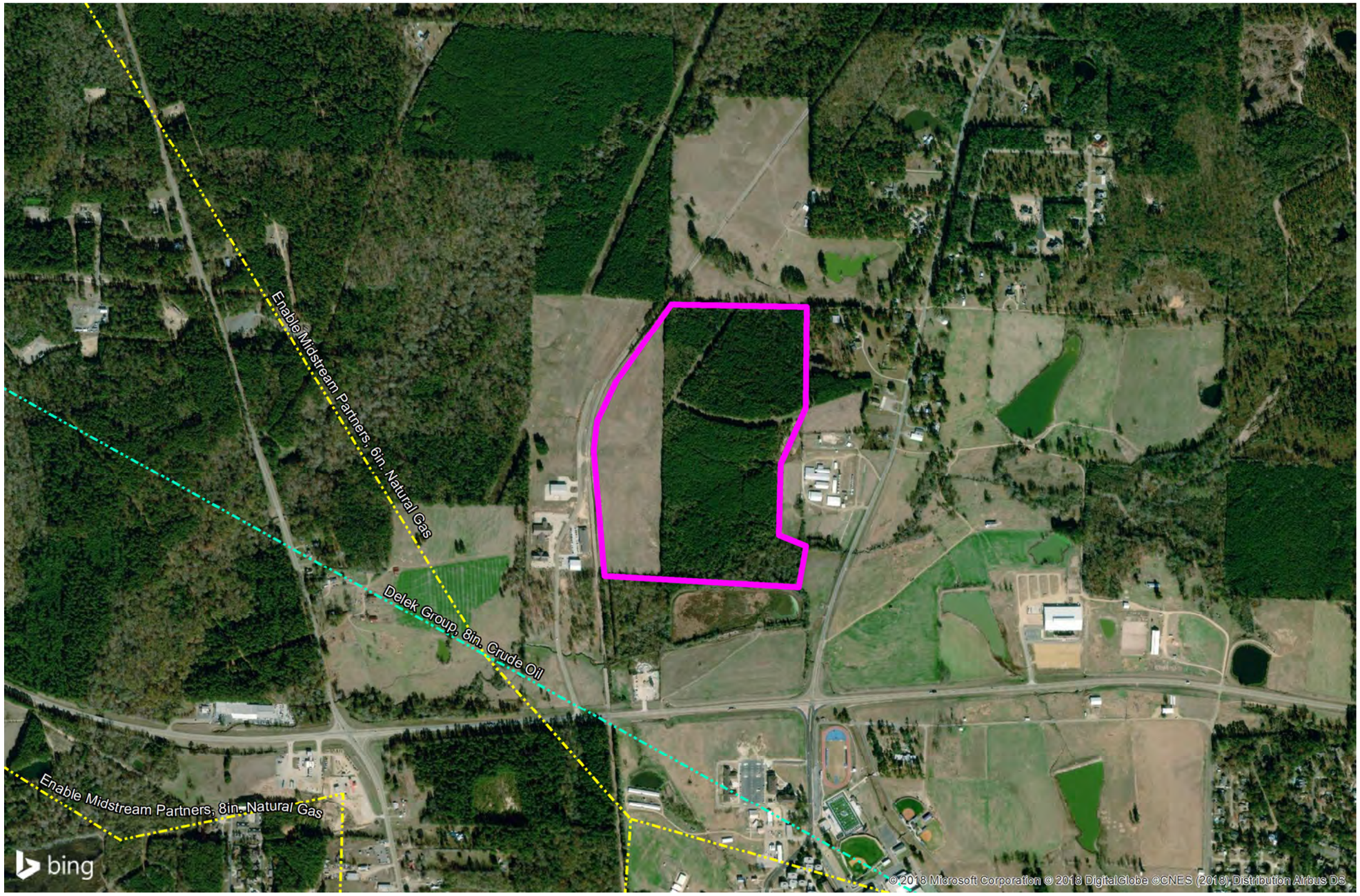

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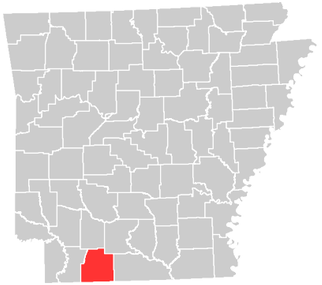

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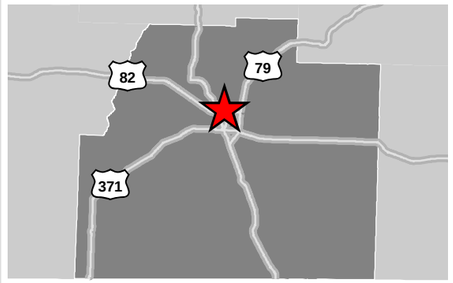

LEGEND

Boundary

Pipelines

Crude Oil

Natural Gas

NOTE

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SOURCE

Topo Map: 2013 National Geographic Society, i-cubed

Created by: RPG
Date: 11/2018

0 1,000 2,000 Feet

0 240 480 Meters

N

Entergy BUSINESS DEVELOPMENT ARKANSAS

Harvey Couch Business Park - Southeast

Entergy's Electrical Infrastructure

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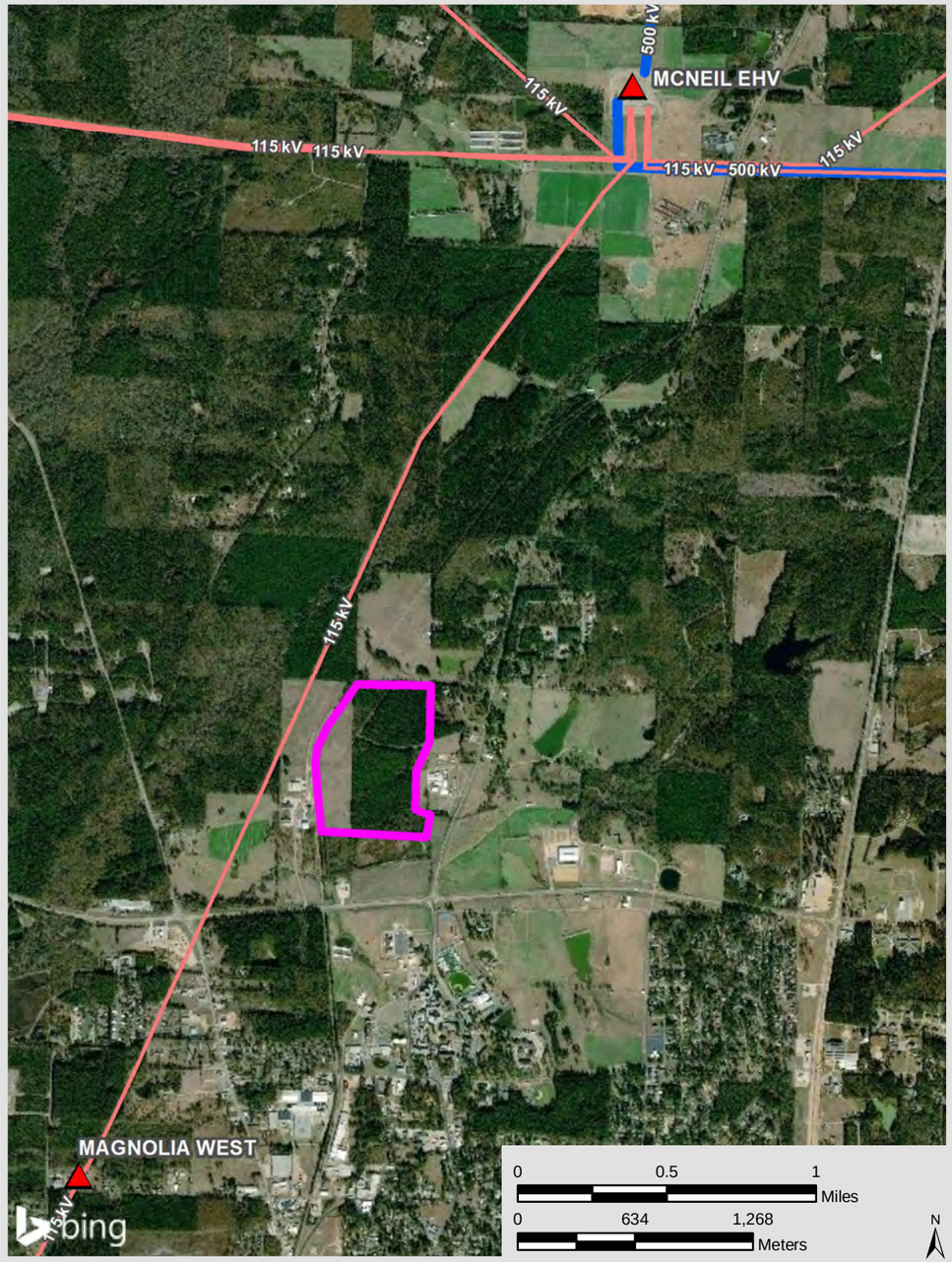
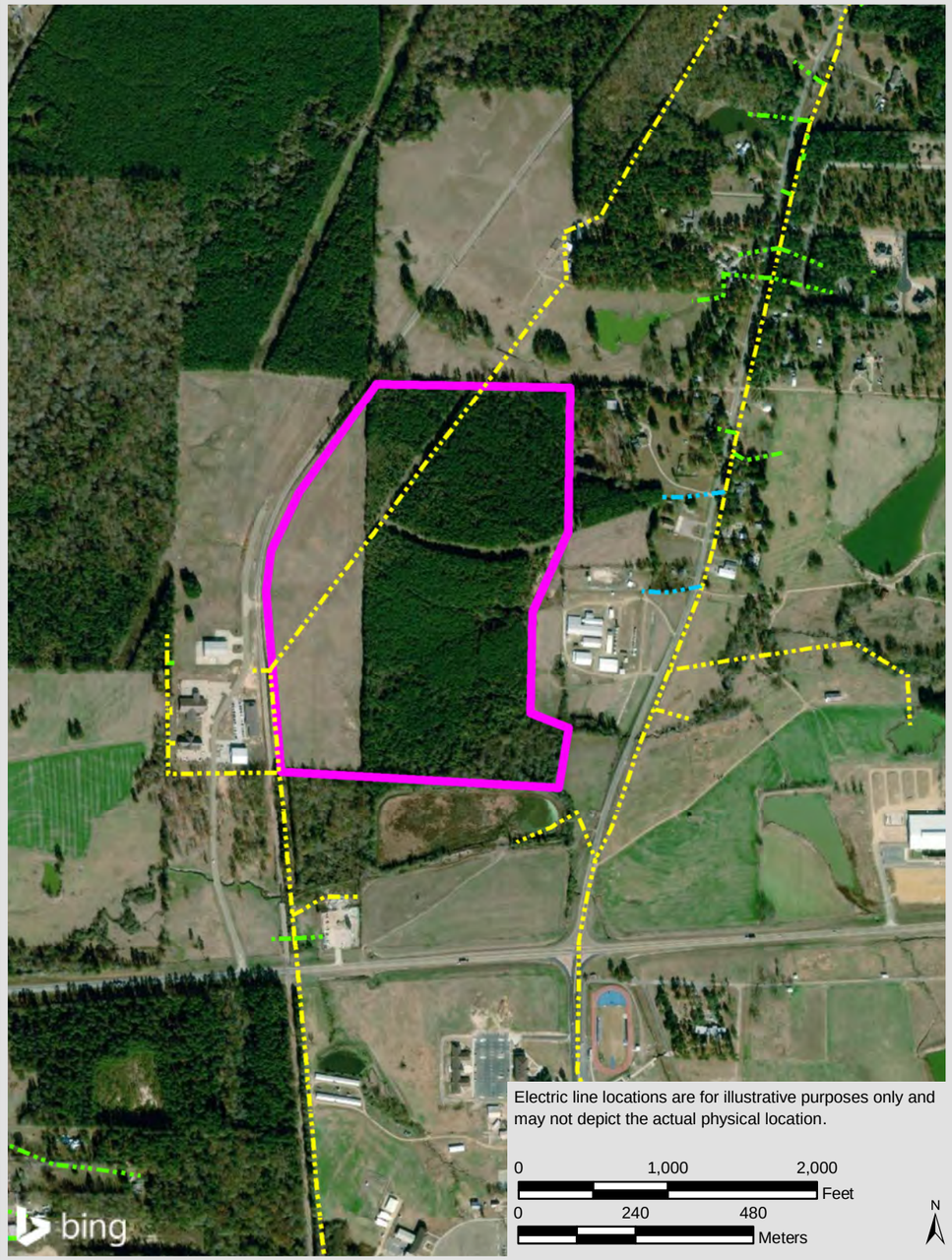
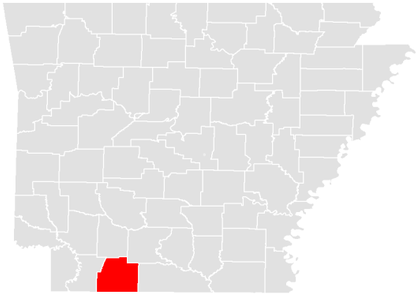
TRANSMISSION



DISTRIBUTION



COLUMBIA COUNTY



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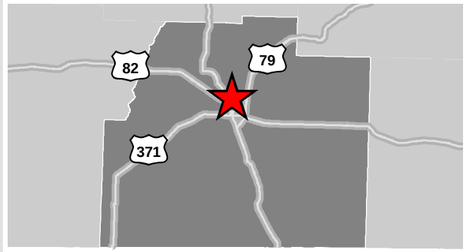

LEGEND

Boundary

Transmission

Substations

500 kV

115 kV

Distribution

Phase, Voltage

Single Phase, 13.8 kV

Two Phase, 13.8 kV

Three Phase, 13.8 kV

NOTE

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SOURCE

Source: Transmission-Entergy, Distribution-Entergy, 2018

Created by: RPG
Date: 11/2018

Entergy | BUSINESS DEVELOPMENT ARKANSAS

Harvey Couch Business Park - Southeast

Surrounding Use Map

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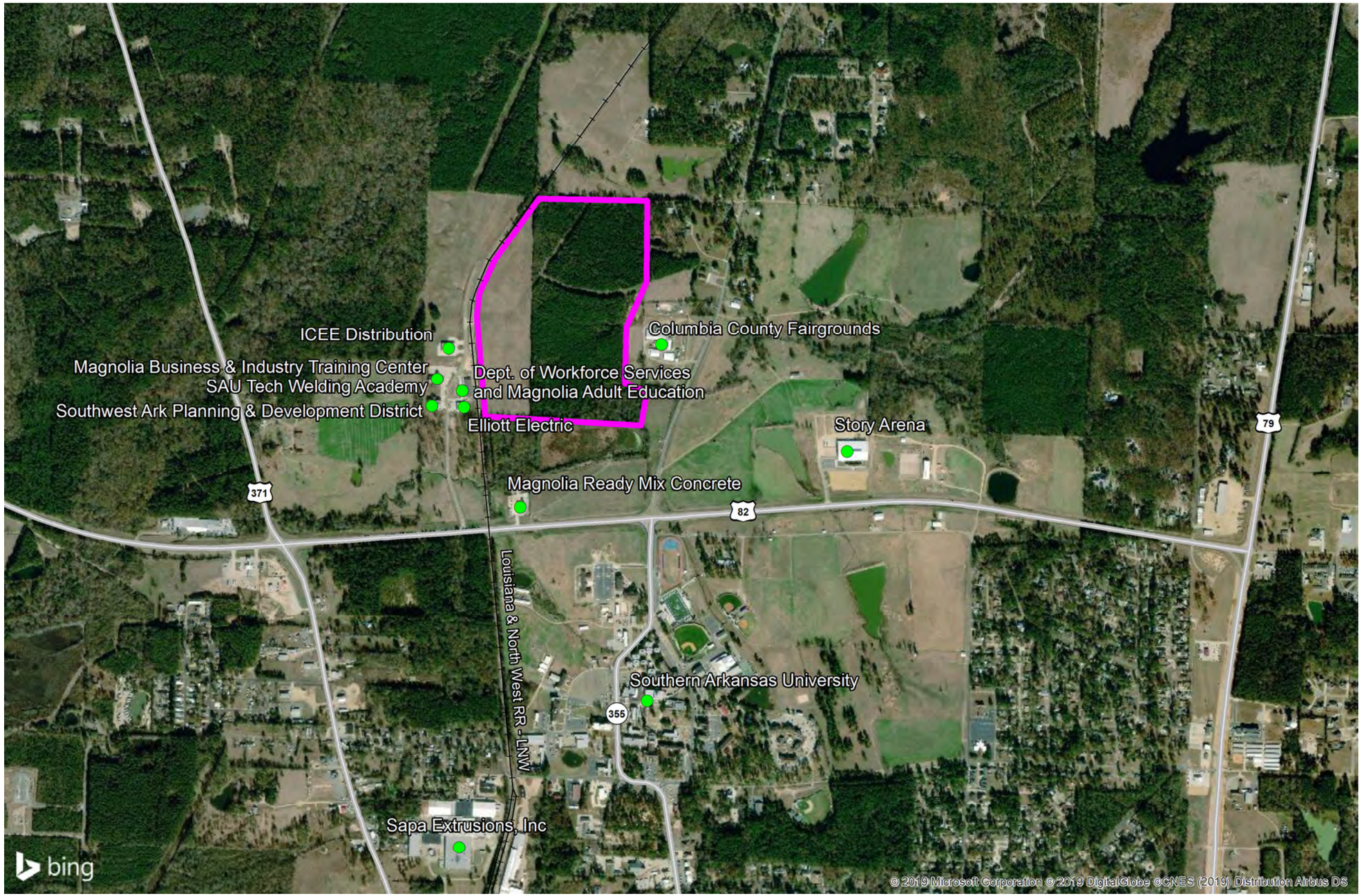
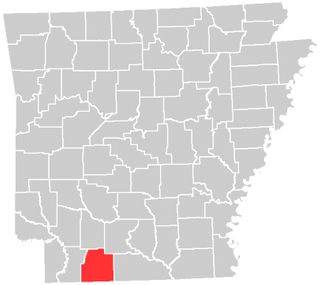
Little Rock, AR 72201

Phone: 1-888-301-5861

goentergy.com/ar



COLUMBIA COUNTY



VICINITY MAP

LEGEND

- Boundary
- Surrounding Use

NOTE

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SOURCE

Google Map Street View

Created by: RPG
Date: 11/2018

0 1,000 2,000 Feet

0 240 480 Meters

N

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Recipients of these materials must perform their own investigation and due diligence concerning all aspects of the site and/or improvements, financial, tax, and business matters associated therewith so as to enable them to evaluate the merits and risks of the site and to make any informed decision with respect thereto.