

**SECTION 905 -- PROPOSAL (CONTINUED)**

I (We) hereby certify by digital signature and electronic submission via Bid Express of the Section 905 proposal below, that all certifications, disclosures and affidavits incorporated herein are deemed to be duly executed in the aggregate, fully enforceable and binding upon delivery of the bid proposal. I (We) further acknowledge that this certification shall not extend to the bid bond or alternate security which must be separately executed for the benefit of the Commission. This signature does not cure deficiencies in any required certifications, disclosures and/or affidavits. I (We) also acknowledge the right of the Commission to require full and final execution on any certification, disclosure or affidavit contained in the proposal at the Commission's election upon award. Failure to so execute at the Commission's request within the time allowed in the Standard Specifications for execution of all contract documents will result in forfeiture of the bid bond or alternate security.

Bidder acknowledges receipt of and has added to and made a part of the proposal and contract documents the following addendum (addenda):

ADDENDUM NO.   1   DATED   7/17/2017        ADDENDUM NO.        DATED         
ADDENDUM NO.        DATED             ADDENDUM NO.        DATED       

Number	Description
1	Revised Table of Contents; Revised NTB No. 237; Add NTB Nos. 259, 260, 261, 262, & 263; Revised Bid Items; Amendment EBS Download Required.

TOTAL ADDENDA:   1    
(Must agree with total addenda issued prior to opening of bids)

Respectfully Submitted,

DATE \_\_\_\_\_

\_\_\_\_\_  
Contractor

BY \_\_\_\_\_  
Signature

TITLE \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY, STATE, ZIP \_\_\_\_\_

PHONE \_\_\_\_\_

FAX \_\_\_\_\_

E-MAIL \_\_\_\_\_

(To be filled in if a corporation)

Our corporation is chartered under the Laws of the State of \_\_\_\_\_ and the names, titles and business addresses of the executives are as follows:

\_\_\_\_\_  
President Address

\_\_\_\_\_  
Secretary Address

\_\_\_\_\_  
Treasurer Address

The following is my (our) itemized proposal.

SP-9999-01(007)/ 107364301,302, & 303

Lee, Pontotoc, & Union County(ies)

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION  
TABLE OF CONTENTS**

**PROJECT: SP-9999-01(007)/107364301 - Lee  
SP-9999-01(007) / 107364302 - Pontotoc  
SP-9999-01(007) / 107364303 - Union**

Section 901 - Advertisement

Section 904 - Notice to Bidders

#1	Governing Specification
#2	Status of ROW, w/ Attachments
#3	Final Cleanup
#9	Federal Bridge Formula
#12	MASH Compliant Devices
#234	Contract Time
#235	Traffic Management Center (TMC) Modifications
#236	Location & Configuration of Communications Nodes
#237	Tupelo Antenna Tower, w/ Attachments
#238	ITS Equipment Cabinet Modifications
#239	Pre-Bid Meeting
#240	Camera Pole with Foundation, 80' Pole - Camera Lowering Device
#248	Radio Interconnect
#259	Cooperation Between Contractors
#260	Pay Item Correction
#261	Pre-Bid Meeting Clarifications, Questions and Answers
#262	Project Number Change
#263	Pullbox Correction

Section 907 - Special Provisions

907-103-1	Award and Execution of Contract
907-636-1	Ground Mounted Enclosures
907-650-1	On-Street Video Equipment
907-659-2	Traffic Management Center (TMC) Modifications
907-661-2	Fiber Optic Cable (OSP)
907-663-2	Networking Equipment
907-664-2	Communications Node
907-666-2	Bluetooth Detection System (BDS)
907-675-1	Antenna Tower

Section 905 - Proposal, Proposal Bid Items, Combination Bid Proposal

State Board of Contractors Requirement

State Certification Regarding Non-Collusion, Debarment and Suspensions

Section 902 - Contract Form

Section 903 - Contract Bond Forms

(REVISIONS TO THE ABOVE WILL BE INDICATED ON THE SECOND SHEET  
OF SECTION 905 AS ADDENDA)

07/17/2017 02:08 PM

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

## SECTION 904 - NOTICE TO BIDDERS NO. 237

**DATE:** 06/02/2017

**SUBJECT:** Tupelo Antenna Tower

**PROJECT:** SP-9999-01(007) / 107364301, 302, & 303 – Lee, Pontotoc & Union

Bidders are hereby advised that the following Antenna Tower specifications shall be required on this project. Work and materials not paid for under other pay items shall be included in the price bid for Pay Item Number 907-675-A.

### **Tupelo Antenna Tower**

**Scope of Work:** The Mississippi Department of Transportation desires to construct a 150-foot monopole Antenna Tower able to support four levels of antenna arrays including, but not limited to the tower, foundation, anchor bolts and templates, waveguide ladder, safety devices, power, lighting, painting, lightning rod, grounding system, ice bridge, Contractor-designed tower-mounted wireless system, attachment hardware and brackets. All structures must meet 2012 IBC and TIA 222-G Standards. The foundation and grounding system must meet Motorola R-56 Standards. The lighting system and paint must be in accordance with FAA and FCC rules and regulations, if applicable. The tower will be constructed at the MDOT District 1 Headquarters office located at 1909 N. Gloster Street, Tupelo, MS, 38804 near an existing monopole tower.

A new Communications Hut shall be installed near the new Antenna Tower while the existing 150-foot monopole Antenna Tower and existing Tower building shall be demolished and removed as part of this project. These shall be paid for under the associated pay items of Removal of Obstructions (202-A), Removal of Antenna Tower Communication Hut (202-B), and Communications Node Hut (SP 907-664-B).

A wireless communication system shall be designed and installed on the proposed Antenna Tower as part of the Antenna Tower pay item (SP 907-675-A). A preliminary Microwave Network Feasibility Assessment, including line of sight measurements, has been included in Appendix A for informational purposes. Not all project sites are included in the report and the report includes some sites that are not a part of the project. It is the Contractors responsibility to design and install a complete and fully functional wireless system based on actual conditions found in the field.

**Project Location/Site:** The proposed tower will be installed near the existing monopole tower at the MDOT District 1 Headquarters office. The proposed tower coordinates will be 34°17'28"N, 88°43'2"W.

Typical EIA soil conditions for this area of Mississippi should be used by the Bidder to determine the bid estimate for the tower foundation. MDOT will provide boring logs & soil

samples to the Contractor as an addendum to the project Bid Package. Based on the Final Geotechnical Soil Report provided by MDOT, the Contractor must submit a foundation design, certified by a professional engineer registered in the state of Mississippi, to the Project Engineer.

**Design, Installation and Configuration:** The foundation must be of a drilled pier design. The contractor is responsible for designing all components of the tower and for specifying the required concrete mix design.

Temporary Silt Fence and Solid Sodding shall be used at the Tower site to control erosion. Silt Fence shall be placed as directed by the Project Engineer to prevent runoff from the top of the hill upon which the Antenna Tower sits. This shall be paid for under the associated pay items of Solid Sodding (216-A), Watering (219-A), and Temporary Silt Fence (234-A).

The Contractor must provide, installed and working at the new tower, the following equipment:

- 1 - Contractor-designed, tower-mounted wireless system
- 1 - Waveguide ladder, at a minimum
- 1 - Climbing System with Fall Restraint System
- 1 - Lighting System, if necessary
- 1 - Ice Bridge to be placed between Tower and Point of Entrance to Communication Hut per the written Specifications

**Demolition of Existing Tower:** The Contractor will dismantle, remove and dispose of the existing 150 feet tall monopole tower once the MDOT and C Spire equipment has been installed on the proposed tower and all equipment has been removed from the existing tower. The existing tower foundation will be wrecked to a depth of 2 feet below finished grade.

**Coordination with Existing Carrier:** The Contractor shall coordinate with C Spire to provide a proper schedule for C Spire to place equipment on the new Antenna Tower and remove equipment from the existing Antenna Tower.

**Documentation: The Contractor must provide in their response to this bid a Conceptual Tower Design.** Failure to include the conceptual tower design in the bid package may cause the bid to be considered **irregular**.

Preliminary drawings and/or design documentation will be provided with all bids submitted. The suitability of the proposed tower design will be verified by including complete tower and foundation construction drawings and detailed structural analysis and calculations in bidders pricing proposal. Drawings must include installation details for all assemblies provided. The tower foundation drawings must include requirements to verify concrete and rebar quality.

These documents shall contain sufficient detail such that MDOT could engage an independent engineering firm to conduct third party structural reviews of submitted tower proposals. Bid packages which do not contain proper design documentation may cause the bid to be considered **irregular**.

All drawings and calculations will be stamped by a professional engineer registered in the state of Mississippi. Any drawing errors encountered during construction of the tower shall be corrected and re-issued as "As-Built" drawing revisions prior to receipt of final payment.

All documents and drawings must be professionally drafted, clear, and legible. Contractor must provide an electronic copy of all documents and drawings.

The bid response must clearly name the manufacture and model of safety climb system for bid evaluation.

MDOT reserves the right to accept or reject the proposed Conceptual Design at its sole discretion.

**References:** The Contractor must be a reputable, established, and financially stable provider of Antenna Towers and provide a minimum of three references for similar projects to the Project Engineer.

# **Microwave Network Feasibility Assessment**

**For**

**Gresham Smith and Partners**

PRESENTED BY:



20331 Highland Road

Baton Rouge, Louisiana 70817

Prepared By: Wayne Kairdolf

**For the incorporation of Microwave in the MDOT Tupelo ITS Project**

July 17, 2017

## Introduction

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Deep South Communications (DSC) has conducted a wireless terrain analysis in support of the Intelligent Transportation System infrastructure in Tupelo, MS. The purpose of this analysis was to further examine the terrain and radio line of sight between the MDOT headquarters tower and the proposed connectivity locations. Also to recommend an approach for the wireless portion of the system that will provide a practical solution. This document will serve as a reference in the design of the transport infrastructure to ensure a functional communications system deployment. All of the locations in question and that were visited are specified throughout this document.

Based on many years of designing and maintaining wireless systems, we prefer to remain as agnostic as possible where equipment is concerned. Nevertheless, a predominately licensed full duplex wireless system is always the safest implementation. In this wireless analysis, due to the size and scope for this project it is relatively safe to say that an unlicensed system will be a useful solution. The main issues often afflicting an unlicensed platform is the experience of interference as time goes on and as population density increases. This is not to overshadow the fact that many clients in somewhat rural environments, such as these locations, have tremendous success using the unlicensed portion of the 5GHz band. There are several reasons for this. One major reason is that the band is so large that it can support many simultaneous paths nearby without jeopardizing each other in the form of interfering noise. Another major reason is that the band as a whole is at such a high frequency that it dissipates well in ground clutter, in a sense eliminating noise for other operators that may be just a few miles away in a slightly different location.

For the purposes of this wireless analysis the focus is predominantly considering the use of the 5GHz band. All things considered, the recommendation is an unlicensed radio that has a very wide range of frequency to choose from and preferably one that can operate anywhere within the entire 5GHz band, including the 4.9GHz range as well, all in one piece of hardware. The unlicensed band at the main tower location currently has spectrum availability in all of the 5GHz band ranging from 4.9 to 5.9GHz. The noise floor should be expected to be around a -100 after eliminating the antenna.

Please note that these links are fixed and the ability to overcome noise (interference), even if it was introduced into this environment, is likely to be possible by using interference mitigation, high gain multi polarized antennas, and multiple chains.

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## Technology Summary

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There are many common types of wireless Ethernet implementations that systems such as intelligent transportation rely. Here are 3 of the more frequently used today.

-NLOS – NON LINE OF SIGHT – SHORTER PATHS / OBSTRUCTED TERRAIN - Using systems that incorporate very low frequencies. Sometimes these frequencies are licensed but they often are more widely used as unlicensed. An example of such frequencies would be 900MHz on the unlicensed side and 220MHz on the licensed side of things. Most, if not all of the 900 MHz systems on the market today will be lucky to get real world useable bandwidth of more than 2-3 Mbps. The 220MHz systems operate only in the 10-100 Kbps range. If a system's needs are to solely communicate with serial devices, then this is ample bandwidth. One thing end users should take seriously into account when being tempted to deploy these types of systems is the fact that they are often riddled with interference. Inherently these signals travel well through large objects. If that concept is taken one step further, the reasoning for all of the interference is obvious due to the more limitless nature of the signal. Higher frequencies that do not propagate nearly as well, have built-in interference resistance due to the ease of attenuation, thereby creating less noise.

- SISO LOS – LINE OF SIGHT – LONGER PATHS / UNOBSTRUCTED TERRAIN - Older technology SISO (Single Antenna, Single Polarization) type systems that incorporate licensed and unlicensed type frequencies in and around the mid to lower gigahertz range:

-2.4, 3.65, & 5.8 GHz range unlicensed

-2.5, 4.9, 6, 11, & 18 GHz licensed

Most, if not all, of the 2.4 GHz unlicensed systems are also riddled with interference. Not because of that particular frequencies ability to propagate, but more often because it is the default wifi access point frequency of choice. In summary, every residential and commercial entity and every WISP (Wireless Internet Service Provider) has some of these deployed, generating unpredictable and unprecedented amounts of noise for outdoor systems.

Considering the 3.65GHz range is a great choice but it is very limited where spectrum is concerned. To put it plainly, there just isn't much space in this band for everyone to live in harmony. Essentially, this works best in extremely rural environments using WISPs that were the first to deploy.

On the 5.8GHz side, the spectrum band has more range of frequency and there are far fewer deployments of this gear on the WISP side due to its inability to propagate as well as 2.4GHz. One of the drawbacks, however, is the need for good clear radio line of sight which includes Fresnel zone clearance. This means extra height is needed to ensure a minimal amount of obstructions between antennas.

Licensed equipment is always wildly popular due to the lack of concern where interference is an issue such as metro areas. The main negative for this gear is that it is far less used and far more expensive



because of it. The licensing also can cost much more than the equipment itself. Large companies with deep pockets such as oil companies often choose this option.

- MIMO near LOS – AVERAGE PATH / AVERAGE OBSTRUCTION - Very cutting edge technology that has been sourced enough to no longer be considered bleeding edge. This is by far becoming the most practical wireless gear on the market today. MIMO stands for multiple in and multiple out. To make a very long and complex story short, the use of multiple antennas and high speed processors are incorporated together to assist in exponential bandwidth and interference mitigation. This technology works across many licensed and unlicensed bands; however, it is most readily incorporated into the 5.8GHz unlicensed band. When used in 5.8GHz band properly, the transmission can experience 2.4GHz or even 900MHz like propagation without all of the other more problematic aspects of those lower bands. Having said all of that, these tower/base station deployments often require more technical equipment and highly experienced technicians for proper use. BUT, once the complex and complicated base equipment is installed, the implementation of subscribers can be less demanding than a typical SISO deployment. These systems are much more similar to LTE type cellular architecture than an old wireless bridge.

In summary there are many different wireless technologies. Far too many to list all of the categories, much less all of the equipment and protocols themselves. These listed above are what about 95% of the ITS systems in the US likely incorporate. Also important, each path to each signal pole has different topology and bandwidth needs. Some signals incorporate cameras, and other technologies that require high bandwidth connectivity. The bandwidth needs and the terrain of the path is going to be the most essential elements in determining which frequency in which technology is right for the application. The 5.8GHz MIMO is not a silver bullet and should NOT be used for all deployments but it is the most well rounded solution if you have the technical expertise to deploy it.

## **Approach**

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The terrain analysis discussed herein was conducted near the GPS coordinates outlined within this report. This wireless analysis was physically performed on September 19-21, 2016. An Anristu Sitemaster Spectrum Analyzer paired with an 18dBi panel antenna that was connected by a phase stable cable was used at the main tower. Every location was visited with a 75ft man basket. At each site surveyed a simple spotting scope was used for the verification of optical line of site. A spotter was lifted as high as necessary in order to verify the height that the optical line of site was no longer present between the remote site and the top of the headquarters tower where the Base Station antennas will ultimately be installed. Each intersection was also noted for the best placement of radio equipment to optimize for efficiency. In most cases this is done by scouting each quadrant of the intersection for the best unobstructed line of site as close to ground level as possible considering all structures present at that intersection, camera location, or DMS location. After the physical information was compiled the raw data was then used in conjunction with different software to verify the findings for accuracy and the best overall results. This information was then put into a report to aid in the actual construction of the

aforementioned system. The Fresnel zone was calculated based on antenna heights, a typical radio frequency, and distance between antennas.

## Findings

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Based on the wireless analysis results attained in September of 2016, a properly designed microwave communications system, implemented with the outlined frequency bands within this document, could provide reliable communications to all sites visited with only a few exceptions. Originally the system was examined from the perspective of a star topology whereby all locations homerun directly back to the main tower at the Department of Transportation's local headquarters. The exceptions are noted below:

Exactly one site was eliminated due to the extreme structure height needed to obtain connectivity at that particular SIGNAL ONLY location:

- SR178 (MCCULLOUGH BLVD.) @ COLEY ROAD an 80ft pole required

Three other CAMERA sites may have to be eliminated due to the requirements for an 80ft pole at minimum needed to obtain connectivity at these locations:

- SR145 @ EUCLAUTUBBARD RD (OLD 45) an 80ft pole required
- US45 @ EUCLAUTUBBARD RD (OLD 45) an 80ft pole required
- US78 @ SR9 (SHERMAN) an 80ft pole required

Nine alternate paths were recommended along with five repeater sites. Thereby reducing the structure height required at those nine locations within the confines of the existing parameters requested:

- SR145 @ CR814 via a repeater at SR145 @ PONOTOTOC PKWY / S. GREEN ST.
- SR145 @ SHELL STREET via a repeater at SR145 @ PONOTOTOC PKWY / S. GREEN ST.
- SR145 @ CLIFF GOOKIN BLVD via a repeater at SR145 @ VARSITY
- SR145 @ GARFIELD STREET via a repeater at SR145 @ VARSITY
- SR145 @ VARSITY via a repeater at SR145 @ MAIN
- SR145 @ NEW WALMART via a repeater at SR145 @ MAIN
- SR145 @ JEFFERSON STREET via a repeater at SR145 @ MAIN
- US45 BETWEEN MAIN & MCCULLOUGH STREET via a repeater at US45 @ SR178
- US78 BETWEEN MT. VERNON & COLEY ROAD via a repeater at US78 @ NATCHEZ TRACE

Four sites were not visited as they had existing connectivity. These are SIGNAL ONLY sites that are currently connected as Traffic Signal Slaves to the Traffic Signal Master at VARSITY :

- SR145 @ CROSSOVER ROAD
- SR145 @ DAYBRITE DRIVE
- SR145 @ PRESIDENT AVENUE
- SR145 @ ROBERT E. LEE DRIVE

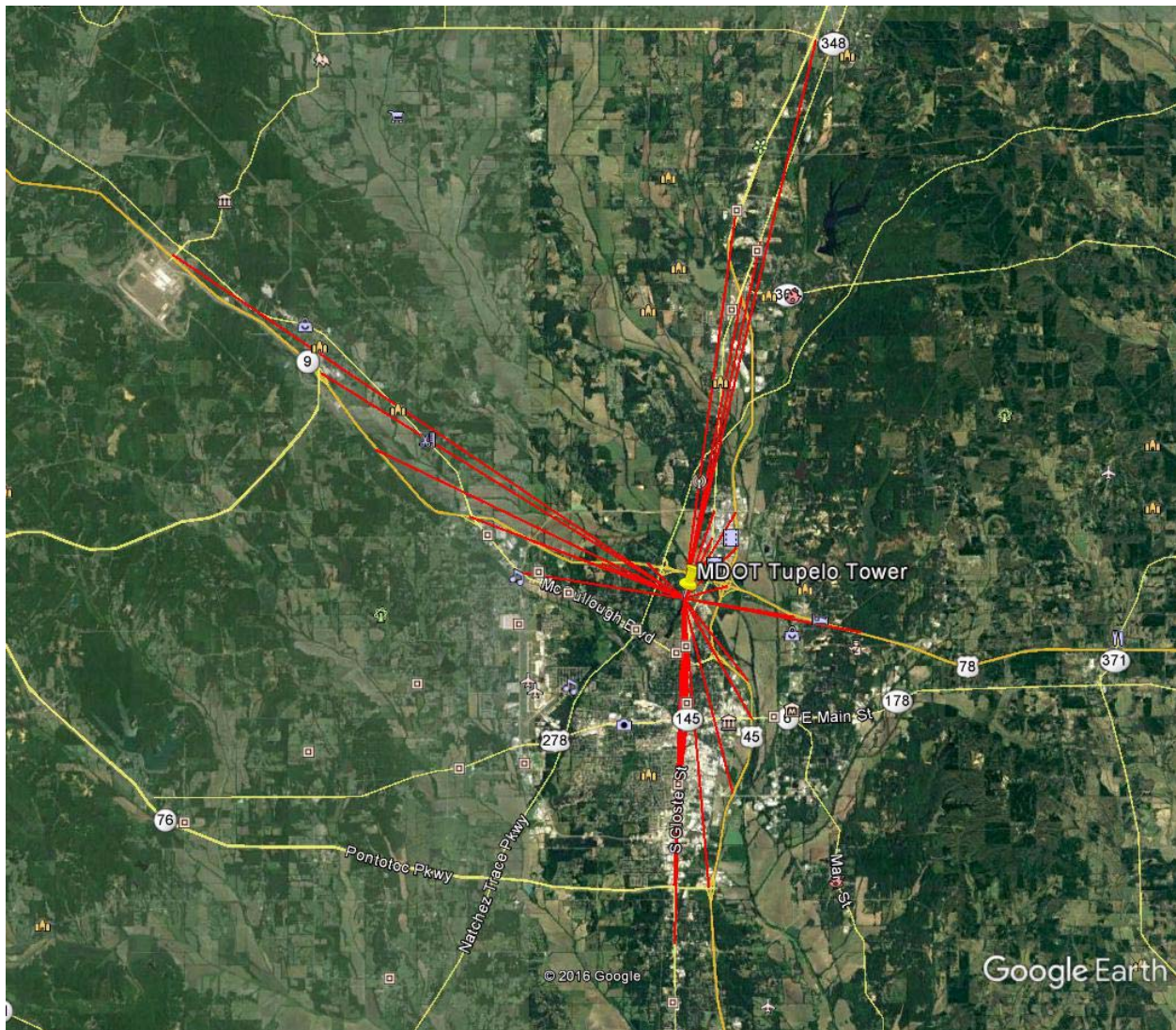
The report also summarizes and documents all proposed microwave transmission locations visited and outlines the clearance height needed for different radio architectures to achieve stability unless otherwise noted. The paths that do have some minor clutter in them where noted and specified accordingly.

## Location - System Overview

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The boundaries of the system being examined within this particular site survey's scope are all within a 12 mile radius of the main tower at the Tupelo Headquarters of the Mississippi Department of Transportation.

The Map Below is an overview map of the project path. Locations reviewed are indicative of where the forthcoming microwave system was surveyed.



In the above map the location names are turned off to prevent overwhelming clutter however the red lines depict each link in question. These links all start at the main tower and terminate at the exact physical location of all of the surveyed sites.

## **Survey Locations and Corresponding Summary**

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The ASR (Antenna Site Registration) for the EXISTING MAIN TOWER SITE located at the Tupelo MDOT Headquarters office (156ft Tall Including Appurtenances) and a photo of the tower are located on the following sheets.

This tower is 150ft tall and is grandfathered in to Tupelo's zoning restrictions. It has appurtenances that are registered as having a clearance of 6 feet above the top of the tower thereby making the entire structure 156ft tall overall. This structure will be replaced in an upcoming bid project.

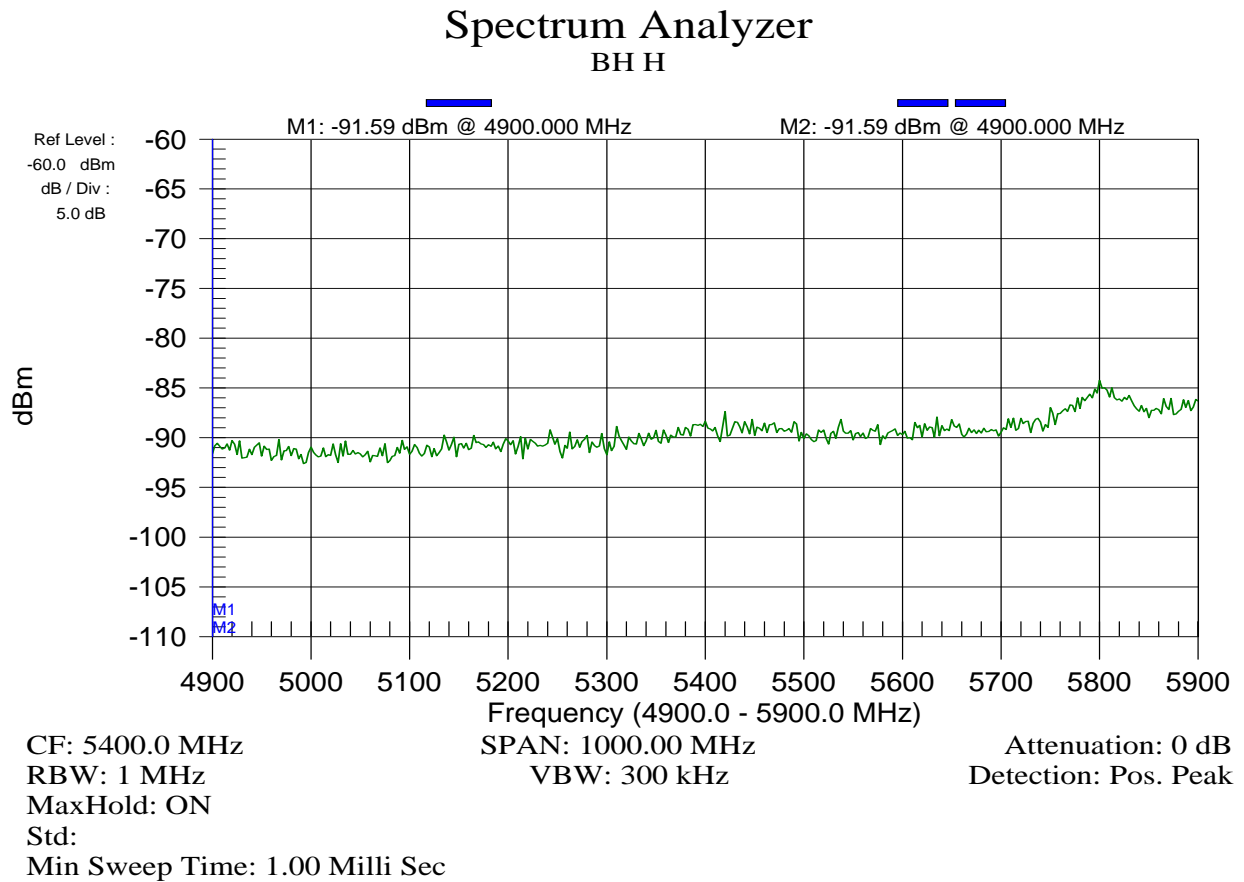
Registration Detail	
Reg Number	1262064
File Number	A0587278
EMI	No
NEPA	No
Status	Granted
Constructed	
Dismantled	
Antenna Structure	
Structure Type	TOWER - Free standing or Guyed Structure used for Commu
Location (in NAD83 Coordinates)	
Lat/Long	34-17-27.2 N 088-43-01.5 W
City, State	Tupelo , MS
Zip	38804
Center of AM Array	
Position of Tower in Array	LEE
Heights (meters)	
Elevation of Site Above Mean Sea Level	Overall Height Above Ground (AGL)
106.0	47.5
Overall Height Above Mean Sea Level	Overall Height Above Ground w/o Appurtenances
153.5	45.7
Painting and Lighting Specifications	
None	
FAA Notification	
FAA Study	2006-ASO-6772-0E
FAA Issue Date	02/01/2007
Owner & Contact Information	
FRN	0001740950
Owner	Owner Entity Type
State of Mississippi	P: (601)359-1513
Attention To: MCOOT Radio Shop	F:
P.O. Box 1850	E: ohosey@mdot.state.ms.us
Jackson , MS 39216	
Contact	
Hosey , Obie W	P: (601)359-1513
P.O. Box 1850	F:
Jackson , MS 39216	E: ohosey@mdot.state.ms.us
Last Action Status	
Status	Granted
Purpose	New
Mode	Interactive
Received	03/04/2008
Entered	03/04/2008
Related Applications	
03/04/2008	A0587278 - New (NE)
Comments	
Comments	None
History	
Date	Event
03/10/2009	Construction Reminder Letter Sent
03/05/2008	Registration Printed
03/04/2008	New Application Received
Automated Letters	
03/10/2009	Construction Reminder, Reference 619560
03/05/2008	Authorization, Reference

PHOTO OF EXISTING MAIN TOWER SITE:



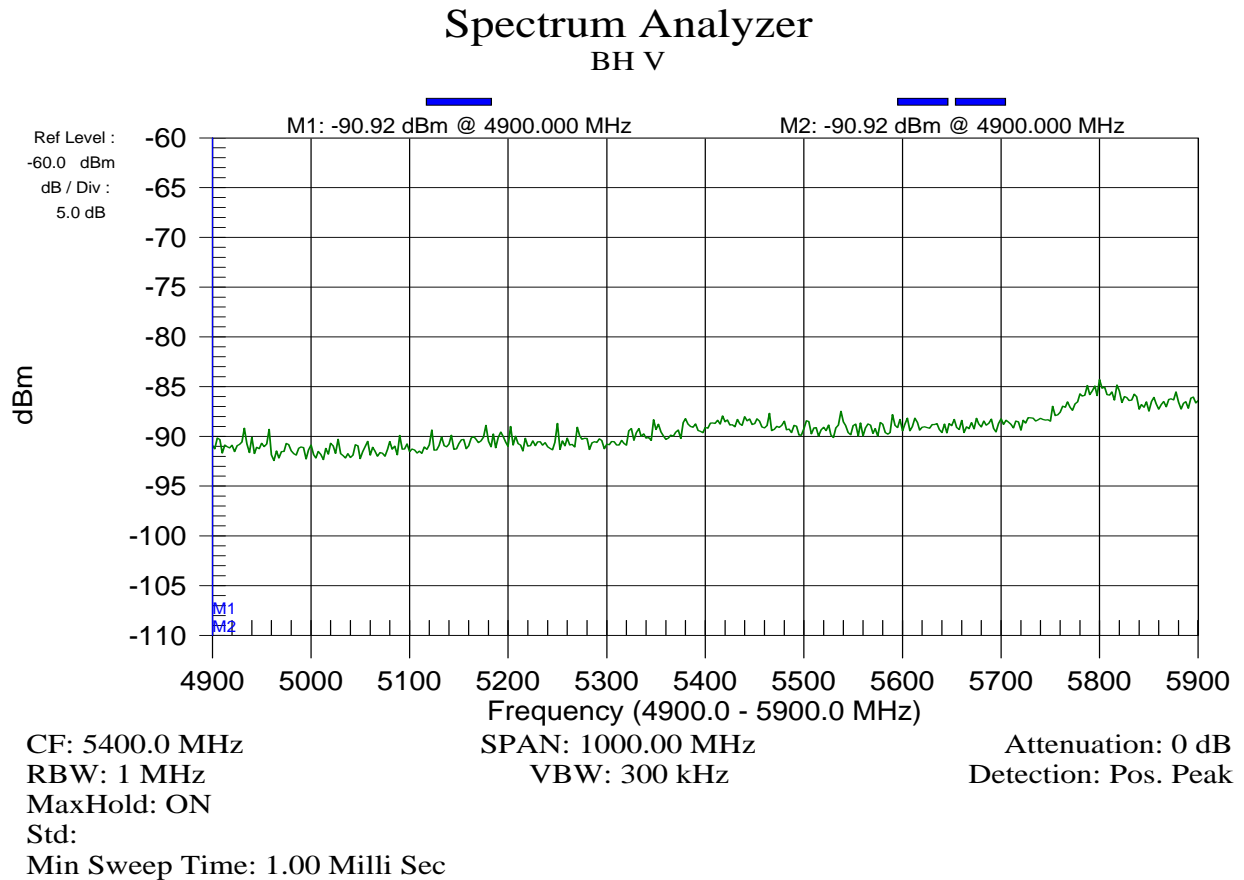
## Spectrum Analysis – MDOT Tupelo Tower Horizontal Polarization

The Spectrum samples attained here look primarily clear for the immediate use of this band. There is one small gradual and expected hump peaking around 5800 MHz however it only rises to a -85 (considering the use of an 18dBi antenna during the survey) which with proper planning will be far from the signal range anticipated on these links. This particular max hold was attained with the antenna mentioned above oriented in a horizontal polarization pointed 360 degrees over roughly 15 minutes at approximately 75ft above ground level at the main tower location.



## Spectrum Analysis – MDOT Tupelo Tower Vertical Polarization

The Spectrum samples attained here look primarily clear for the immediate use of this band. There is one small gradual and expected hump peaking around 5800 MHz however it only rises to a -85 (considering the use of an 18dBi antenna during the survey) which with proper planning will be far from the signal range anticipated on these links. This particular max hold was attained with the antenna mentioned above oriented in a vertical polarization pointed 360 degrees over roughly 15 minutes at approximately 75ft above ground level at the main tower location.





## Deployment Location Analysis

Signal Site - SR145 at CR 814 (Main Street)

Site Name / GPS Coordinates	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ CR 814 (Main Street)	Near Cabinet	6.7 miles	None	None	1	181
34°11'34.91"N / 88°43'11.44"W						
Note: 220 MHz to SR145 @ Pontotoc Pkwy / S. Green St.		1.1 miles	N/A	N/A	359	179

LOS (line of site) was not visualized all the way up to 80ft AGL during the survey. Due to the crane and pole size limitations that were within the given parameters of this analysis this will eliminate this location from having high speed connectivity.

An alternative solution is feasible at the existing traffic signal pole height with a low speed Serial/Ethernet radio operating in the 220 MHz licensed band with a 25 to 50KHz channel. This alternate path may have minor clutter present however this will not pose a challenge to the propagation characteristics of the 220MHz band.

Signal Site - SR145 at Pontotoc Parkway (SR6 / 76) / South Green Street

Site Name / GPS Coordinates	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ Pontotoc Pkwy (SR6/76) /S. Green	West Pole	5.6 miles	10	32	2	182
34°12'36.01"N / 88°43'11.94"W						

LOS was visualized from ground level due to the high elevation of the entire intersection. Any of the 4 poles in the intersection should have connectivity however the West side of the intersection may have a slight advantage so it would be recommended to place a radio on either of the 2 west traffic poles. Because this location is nearly 6 miles from the tower, Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High Speed connectivity is feasible to this existing signal pole height using a MIMO radio.

This location is a feasible solution as a repeater from the existing signal pole heights for serial connectivity to SR145 @ CR814 & SR145 @ Shell.

Signal Site - SR145 at Shell Street

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ Shell Street	NE Pole	5.2 miles	35	57	2	182
34°12'56.23"N / 88°43'11.71"W						
Note: 220 MHz to SR145 @ Pontotoc Pkwy / S. Green St.		.38 miles	10	N/A	183	3

LOS was visualized from approximately 35ft AGL (above ground level) depending on the exact location of radio placement. Any location on the East side of the intersection should have connectivity. Because

this location is just over 5 miles from the tower, Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

An alternative solution is feasible at the existing traffic signal pole height with a low speed Serial/Ethernet radio operating in the 220 MHz licensed band with a 25 to 50KHz channel.

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Signal Site - SR145 at South Green Street

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ S. Green Street	NE Pole	4.6 miles	15	35	2	182
34°13'29.63"N / 88°43'11.53"W						

LOS was visualized from approximately 15ft AGL depending on the exact location of radio placement. Any location on the East side of the intersection should have connectivity. Because this location is nearly 5 miles from the tower, Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High Speed connectivity is feasible to this existing signal pole height using a MIMO radio.

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Signal Site - SR145 at Cliff Gookin Blvd. / Eason Blvd.

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ Cliff Gookin Blvd	SE Pole	4.2 miles	34	54	2	182
34°13'49.99"N / 88°43'10.63"W						
Note: Near LOS from Pole Height to repeater @ SR145 & Varsity		1.4 miles	10	N/A	7	187

LOS was visualized at approximately 34ft AGL measured from above the existing utility / traffic pole combo. The South East side of the intersection seems best for connectivity. Because of this locations distance from the tower, Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

In an effort to use the existing pole structure as a mounting location, an alternate site was visualized that could act as a repeater for this location as well as others. That alternate location is the intersection of SR145 & Varsity. An additional base station type solution will need to be installed at SR145 & Varsity in order to accomplish this alternative option.

High Speed connectivity is feasible to this existing signal pole height using a MIMO radio.

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Signal Site - SR145 at Garfield Street

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ Garfield Street	SE Pole	3.4 miles	30	47	1	181
34°14'28.20"N / 88°43'4.03"W						
Note: Near LOS from Pole Height to repeater @ SR145 & Main		1.14 miles	10	N/A	7	187

LOS was visualized at approximately 30ft AGL measured from above the existing traffic pole. The South East side of the intersection appears best for connectivity. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

In an effort to use the existing pole structure as a mounting location, an alternate site was visualized that could act as a repeater for this location as well as others. That alternate location is the intersection of SR145 & Varsity. An additional base station type solution will need to be installed at SR145 & Varsity in order to accomplish this alternative option.

High Speed connectivity is feasible to this existing signal pole height using a MIMO radio.

**NOTE: Regarding CROSSOVER ROAD, DAYBRITE DRIVE, PRESIDENT AVENUE, and ROBERT E. LEE DRIVE:**

All of these locations are currently connected as slaves through the Master Site of Varsity Drive. All of these locations also have near line of site to Varsity Drive. Therefore the only site that was examined in this wireless analysis was the master site, Varsity Drive which is below:

Signal Site - SR145 at Varsity Drive

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ Varsity Drive	SW Pole	2.8 miles	40	56	359	179
34°15'0.68"N / 88°42'59.37"W						
Note: LOS from Ground Level to repeater @ SR145 & Main		.51 miles	10	N/A	7	187

LOS was visualized at approximately 40ft AGL measured from above the existing southwest traffic pole. The Northeast side of the intersection appears optimal however due to the lack of space on that utility/traffic pole the survey was conducted from above the Southwest Pole. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

In an effort to use the existing southwest pole structure as a mounting location, an alternate site was visualized that could act as a repeater for this location as well as several other sites. That alternate location is the intersection of SR145 & Main Street. An additional base station type solution will need to be installed at SR145 & Main in order to accomplish this alternative option. Therefore, high Speed connectivity is feasible to this existing signal pole height using a MIMO radio.

ALSO this location is a feasible solution as a repeater from the existing signal pole height for high speed connectivity to SR145 @ Cliff Gookin & SR145 @ Garfield.

Signal Site - SR145 at New Walmart Entrance

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ New Walmart Entrance	West Side of Int.	2.6 miles	65	81	358	178
34°15'15.74"N / 88°42'56.51"W						
Note: LOS from Ground Level to repeater @ SR145 & Main		.21 miles	10	N/A	3	183

LOS was visualized at approximately 65ft AGL measured from above the existing light pole on the east side of the road in front of the gas station. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

In an effort to use one of the existing pole structures as a mounting location, an alternate site was visualized that could act as a repeater for this location as well as several other sites. That alternate location is the intersection of SR145 & Main Street which is approximately 2 blocks away. An additional base station type solution will need to be installed at SR145 & Main in order to accomplish this alternative option. Therefore high Speed connectivity is feasible to this existing signal pole height using a MIMO radio.

Signal Site - SR145 at Main Street

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ Main Street	NE Pole	2.3 miles	10	26	357	177
34°15'26.74"N / 88°42'55.52"W						

LOS was visualized at approximately ground level measured near the existing pole in the median of the northeast quadrant of the intersection. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation. High Speed connectivity is feasible from the existing signal pole height using a MIMO radio.

This site should also be considered as a possible location of a repeater base station similar to the main tower. With that in mind this site could act as a repeater for the following locations: SR145 & Garfield, Varsity, Walmart, and Jefferson. Thereby allowing all of those locations to use their existing structures for connectivity rather than having to place taller structures at each site in order to accomplish links all the way back to the main tower. An important note when considering repeater sites: Because of all of the connectivity flowing through this site which also needs connectivity, it is best to make this locations primary feed to the main tower a Point to Point link rather than just another multipoint location.

Signal Site - SR145 at Jefferson Street

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ Jefferson Street	SW Side of Int.	2.2 miles	None	N/A	358	178
34°15'32.29"N / 88°42'55.73"W						
Note: LOS from Ground Level to repeater @ SR145 & Main		.11 miles	10	N/A	359	179

LOS (line of site) was NOT visualized all the way up to 80ft AGL during the survey from the existing poles. Due to the crane and pole size limitations that were within the given parameters of this analysis this could eliminate this location from having high speed connectivity, however there is an alternative option. In an effort to use one of the existing pole structures as a mounting location, an alternate site was visualized that could act as a repeater for this location as well as several other sites. That alternate location is the intersection of SR145 & Main Street which is approximately 1 block away. Any pole at any side of the intersection will suffice. An additional base station type of solution will need to be installed at SR145 & Main in order to accomplish this alternative option. Therefore high Speed connectivity is feasible to this existing signal pole height using a MIMO radio.

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Signal Site - SR145 at Jackson Street

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ Jackson Street	NE Pole	1.8 miles	10	23	357	177
34°15'52.64"N / 88°42'55.94"W						

LOS was visualized at approximately ground level measured near the existing pole in the northeast quadrant of the intersection. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High Speed connectivity is feasible from the existing signal pole height using a MIMO radio.

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Signal Site - SR145 at Symphony Lane

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ Symphony Lane	SW Pole	1.3 miles	10	23	205	25
34°18'28.77"N / 88°42'26.34"W						

LOS was visualized at approximately ground level measured near the existing pole in the southwest quadrant of the intersection. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High Speed connectivity is feasible from the existing signal pole height using a MIMO radio.

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Signal Site - SR145 at Barnes Crossing Road

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ Barnes Crossing Road 34°18'56.56"N / 88°42'23.50"W	Any East Pole	1.8 miles	10	23	199	19

LOS was visualized at approximately ground level measured near the existing pole in the southwest quadrant of the intersection. Any pole on the east or south side of the intersection should suffice. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High Speed connectivity is feasible from the existing signal pole height using a MIMO radio.

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Signal Site - SR178 (McCullough Blvd.) at Coley Road

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR178 (McCullough Blvd) @ Coley Road 34°17'54.16"N / 88°46'24.46"W	West Pole	3.2 miles	78	95	98	278

LOS was visualized at approximately 78ft AGL above the existing pole on the west quadrant of the intersection. Due to the crane and pole size limitations that were within the given parameters of this analysis this will likely eliminate this location. Also Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation. High Speed Connectivity is feasible considering such a tall pole for implementation. A solution that seems more feasible at this location would be a low speed Serial/Ethernet radio operating in the 220 MHz licensed band with a 25 to 50KHz channel. This type of radio will not provide enough bandwidth to sustain a video camera however it will provide enough connectivity for serial type communications required by a traffic signal cabinet.

High Speed connectivity is NOT feasible to this existing signal pole height.

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Camera Site - SR145 at SR178 (McCullough Blvd.)

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ SR178 (McCullough Blvd) 34°16'21.10"N / 88°42'55.55"W	SE Side of Int.	1.3 miles	60	73	355	175

LOS was visualized at approximately 60ft AGL measured from above the existing light pole on the east side of the road on the south side of the intersection. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High Speed connectivity is feasible using a 60ft AGL pole height and a high powered MIMO radio.

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Camera Site - SR145 at Euclautubbard Road (Old 45)

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
SR145 @ Euclautubbard Rd (Old 45) 34°23'28.90"N / 88°41'27.22"W	South Side	7.1 miles	73	98	192	12

LOS was visualized at approximately 73ft AGL above the existing pole in the south quadrant of the intersection. Due to the crane and pole size limitations that were within the given parameters of this analysis this will likely eliminate this location. Also Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

Considering the long distance of this site, high speed connectivity is feasible using at least an 80ft AGL pole height and a high powered MIMO radio. Otherwise this site will have to be eliminated.

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Camera Site - US45 at Pontotoc Parkway (SR6/76) / South Green Street

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US45 @ Pontotoc Pkwy (SR6/76) / S. Green 34°12'35.01"N / 88°42'30.19"W	NW Side of Int.	5.6 miles	20	44	355	175

LOS was visualized at approximately 20ft AGL measured from above the stake placed on the northwest side of the intersection. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High speed connectivity is feasible using a 50ft AGL pole height.

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Camera Site - US45 at Eason Blvd

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US45 @ Eason Blvd 34°14'10.76"N / 88°42'1.06"W	NW Side of Int.	3.9 miles	68	86	345	165

LOS was visualized at approximately 68ft AGL measured from above the proposed location on the northwest side of the intersection. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High speed connectivity is feasible using at least a 70ft AGL pole height and a high powered MIMO radio.

---

Camera Site - US45 at Main Street

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US45 @ Main Street 34°15'25.42"N / 88°41'37.15"W	SE Side of Int.	2.7 miles	30	46	330	150

LOS was visualized at approximately 30ft AGL measured from above the proposed location on the southeast side of the intersection. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High speed connectivity is feasible using a 50ft AGL pole height.

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Camera Site - US45 at SR178 McCullough Blvd.

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US45 @ SR178 (McCullough Blvd) 34°16'30.53"N / 88°42'22.85"W	NE Side of Int.	1.3 miles	68	81	330	150

LOS was visualized at approximately 68ft AGL measured from above the proposed location on the northeast side of the intersection. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High speed connectivity is feasible using at least a 70ft AGL pole height and a MIMO radio.

This site should also be considered as a possible location of a repeater base station, similar to the main tower. With that in mind, this site could act as a repeater for DMS 1. Thereby allowing DMS 1 to use a shorter structure for connectivity. An important note when considering repeater sites: Because of all of the connectivity flowing through this site, which also needs connectivity, it is best to make this locations primary feed to the main tower a Point to Point link rather than just another multipoint location.

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Camera Site - US45 at SR78

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US45 @ SR78 34°17'40.20"N / 88°42'7.49"W	NE Side of Int.	.9 miles	10	19	254	74

LOS was visualized at approximately ground level measured near the proposed pole location in the northeast quadrant of the intersection. Any pole in any quadrant of the intersection should suffice due to the short distance of this link but should be checked for clearance first. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High speed connectivity is feasible using a 50ft AGL pole height.

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Camera Site - US45 at Barnes Crossing Road

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US45 @ Barnes Crossing Road 34°18'54.69"N / 88°41'57.31"W	SE Side of Int.	1.9 miles	10	23	211	31

LOS was visualized at approximately ground level measured near the proposed pole location in the southeast quadrant of the intersection. Any pole in any quadrant of the intersection should suffice due to the short distance of this link but should be checked for clearance first. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High speed connectivity is feasible using a 50ft AGL pole height.

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Camera Site - US45 at SR145 – Saltillo

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US45 @ SR145 Saltillo 34°22'33.77"N / 88°41'50.21"W	SE Side of Int.	6.0 miles	43	65	190	10

LOS was visualized at approximately 43ft measured near the proposed pole location in the southeast quadrant of the intersection. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High speed connectivity is feasible using a 50ft AGL pole height and a high powered MIMO radio.

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Camera Site - US45 @ Euclautubbar Road (Old 45)

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US45 @ Euclautubbar Rd (Old 45) 34°23'54.51"N / 88°41'58.38"W	SW Side of Int.	7.5 miles	75	100	188	8

LOS was visualized at approximately 75ft AGL above the proposed pole location on the west side of the intersection. Due to the crane and pole size limitations that were within the given parameters of this analysis this will likely eliminate this location. Also Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation. High Speed Connectivity is feasible considering such a tall pole for implementation. Given that this is a “camera only” site, a low speed NLOS solution is not feasible.

High speed connectivity is feasible using an 80ft AGL pole height and a high powered MIMO radio. Otherwise this site will have to be eliminated.

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Camera Site - US45 at SR348 – Guntown

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US45 @ SR 348 (Guntown)	SE Side of Int.	11.1 miles	58	88	193	13

LOS was visualized at approximately 58ft AGL measured from above the proposed location on the southeast side of the intersection. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High speed connectivity is feasible using a 80ft AGL pole height and a high powered MIMO radio.

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Camera Site - US78 at Toyota Plant

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US78 @ Toyota Plant	N-NE Side Int.	12 miles	15	46	124	304

LOS was visualized at approximately 15ft AGL measured from above the proposed location on the northeast side of the intersection. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High Speed connectivity is feasible using a 50ft AGL pole height and a high powered radio.

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Camera Site - US78 at SR9 – Sherman

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US78 @ SR9 (Sherman)	SE-E Side Int.	8.3 miles	80	106	122	302

LOS was visualized at approximately 80ft AGL above the proposed pole location in the north side of the intersection. Due to the crane and pole size limitations that were within the given parameters of this analysis this will likely eliminate this location. Also Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High Speed Connectivity is feasible using an 80ft AGL pole height and a high powered MIMO radio. Otherwise this site will have to be eliminated.

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Camera Site - On US78 East of Sherman

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US78 @ East of Sherman	see coordinates	6.6 miles	40	63	116	296

LOS was visualized at approximately 40ft AGL measured from above the proposed location on the south side of the interstate. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High Speed connectivity is feasible using a 50ft AGL pole height and a high powered radio.

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Camera Site - US78 at SR178 (McCullough Blvd.)

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US78 @ SR178 (McCullough Blvd)	SW Side of Int.	4.5 miles	10	30	111	291

LOS was visualized at approximately ground level measured near the proposed location on the southwest side of the intersection. Any pole in any quadrant of the intersection should suffice due to the elevation of this link and the considerable distance to the first obstructions however this should be verified for clearance first before using an alternative position. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High Speed connectivity is feasible using a 50ft AGL pole height.

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Camera Site - US78 at Coley Road

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US78 @ Coley Road	SE Side of Int.	3.2 miles	10	27	110	290

LOS was visualized at approximately ground level measured near the proposed location on the south side of the intersection. Any pole in any quadrant of the intersection should suffice due to the elevation of this link and the considerable distance to the first obstructions however this should be verified for clearance first before using an alternative position. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High Speed connectivity is feasible using a 50ft AGL pole height.

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Camera Site - US78 at Natchez Trace

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US78 @ Natchez Trace	see coordinates	.98 miles	53	62	134	314
34°18'3.39"N / 88°43'45.90"W						

LOS was visualized at approximately 53ft AGL measured from above the proposed location on the far west side of the interstate. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High Speed connectivity is feasible using a 50ft AGL pole height and a high powered MIMO radio.

This site should also be considered as a possible location of a repeater base station, similar to the main tower. With that in mind, this site could act as a repeater for DMS 2. Thereby allowing DMS 2 to use a shorter structure for connectivity. An important note when considering repeater sites: Because of all of the connectivity flowing through this site, which also needs connectivity, it is best to make this locations primary feed to the main tower a Point to Point link rather than just another multipoint location.

Camera Site - US78 at Veterans Memorial Blvd.

Link Information / Remote Site	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US78 @ Veterans Memorial Blvd.	SW Side of Int.	2.19 miles	10	25	280	100
34°17'9.15"N / 88°40'45.70"W						

LOS was visualized at approximately ground level measured near the proposed location on the south west side of the intersection. Any pole in any quadrant of the intersection should suffice due to the elevation and short distance of this link and the considerable distance to the first obstructions however this should be verified for clearance first before using an alternative position. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High Speed connectivity is feasible using a 50ft AGL pole height.

DMS 1 – On US45 between Main Street and McCullough Blvd.

Link Information / Remote Site (DMS 1)	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
US45 @ Between Main St. & McCullough St.	see coordinates	2.0 miles	NLOS	N/A	322	142
34°16'4.24"N / 88°41'42.23"W						
Note: LOS from Pole Height to repeater @ US45 & SR178		.82 miles	10	N/A	308	128

LOS (line of site) was NOT visualized all the way up to 80ft AGL during the survey from the proposed pole placement. Due to the crane and pole size limitations that were within the given parameters of this analysis this could eliminate this location from having high speed connectivity, however there is an alternative option. In an effort to use a shorter structure as a mounting location, an alternate site was visualized that could act as a repeater for this location. That alternate location is the nearby intersection

of US45 & SR178 which is less than a mile away. An additional base station type of solution will need to be installed at US45 & SR178 in order to accomplish this alternative option.

High Speed connectivity is feasible using at least a 25ft AGL pole height considering the alternative repeater option.

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DMS 2 – On US78 between Mount Vernon Road and Coley Road

Link Information / Remote Site (DMS 2)	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
US78 @ Between Mt. Vernon & Coley Rd.	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
34°18'2.69"N / 88°44'41.39"W	see coordinates	1.72 miles	NLOS	N/A	113	293
Note: LOS from Pole Height to repeater @ US78&Natches Trace		.88 miles	10	N/A	89	269

LOS (line of site) was NOT visualized all the way up to 80ft AGL during the survey from the proposed pole placement. Due to the crane and pole size limitations that were within the given parameters of this analysis this could eliminate this location from having high speed connectivity, however there is an alternative option. In an effort to use a shorter structure as a mounting location, an alternate site was visualized that could act as a repeater for this location. That alternate location is the nearby intersection of US78 & Natchez Trace which is less than a mile away. An additional base station type of solution will need to be installed at US78 & Natchez Trace in order to accomplish this alternative option.

High Speed connectivity is feasible using at least a 22ft AGL pole height considering the alternative repeater option.

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DMS 3 – On US45 between US78 and Barnes Crossing Road

Link Information / Remote Site (DMS 3)	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
US45 @ Between US78 & Barnes Crossing	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
34°18'18.84"N / 88°41'56.43"W	see coordinates	1.42 miles	10	22	226	46

LOS was visualized at approximately ground level measured near the proposed location. This is primarily due to the considerable distance to the nearest obstruction. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation.

High Speed connectivity is feasible using at least a 22ft AGL pole height considering the alternative repeater option.

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DMS 4 – On US78 between Veterans Memorial Blvd. and Eason Blvd.

Link Information / Remote Site (DMS 4)	Other Details		Line of Site (in feet)		Azimuth (in degrees)	
US78 @ Veterans Memorial & Eason Blvd.	Survey Location	Path Distance	Optical	w/ Fresnel @ 5GHz	to Tower	to Site
34°16'53.28"N / 88°39'24.52"W	see coordinates	3.51 miles	38	55	281	101

LOS was visualized at approximately 38ft AGL measured near the proposed location. Fresnel zone clearance may be needed depending upon the wireless technology used in the final implementation. High Speed connectivity is feasible.

High Speed connectivity is feasible using at least a 38ft AGL pole height and a MIMO radio or at least a 55ft pole height and a SISO radio.

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## Recommendations

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In conclusion we believe that it is safe to predict the desired outcome and longevity that can be anticipated along these paths provided that the implementation team uses the proper equipment and seasoned microwave engineers. As with any unlicensed link, there may be times when the configured center frequency may need adjusting due to noise such as nearby interference. However it is clear that these paths will produce desired results chiefly due to the fact that the signal on such paths traditionally has the ability to overcome noise issues well when the proper equipment and antennas are implemented. We are also recommending a high fade margin and high output power MIMO radio system so that if a single pole receives interference it can be expected that the other polarization can continue to operate unhindered and with high signal, thereby maintaining the link and again producing the desired results. MIMO systems using multiple polarities properly and in conjunction with one another actually multiplies the output power giving another added benefit to this architecture. As stated in the opening summary, Fresnel Zone Clearance was calculated for each path and depending on the distance of the path and the exact radio architecture installed, these calculations should be seriously considered. The use of a MIMO radio system will likely be best as these particular paths, when visually studied, have minimal to no clutter in them currently; however, due to various factors over time, such as vegetation growth and urbanization, the optical and radio line of site can be expected to be impacted. Lastly, the spectrum analysis performed in September of 2016 shows the majority of the unlicensed band being relatively clear at the tower site; however, this can change over time and, even considering the improbability of monitoring the spectrum at each and every site daily, this can and will also change over time.

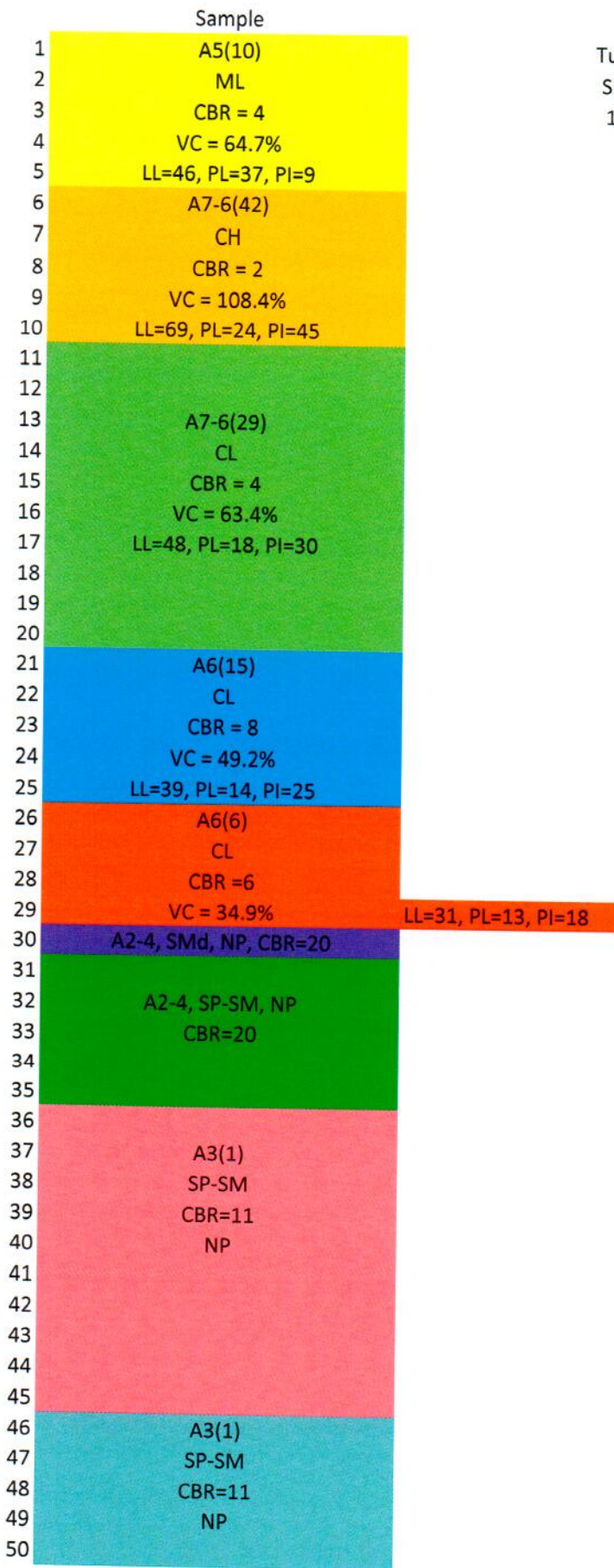
The alternate frequency outlined often in this document is 220 MHz and can be used as a very low bandwidth (or serial only) alternative when little to No Line of Site (NLOS) is present. These frequencies are licensed and operate in a similar manner to 900MHz radios without the high noise floor and corresponding interference.

Any future noise/interference introduced is out of the control of Deep South Communications and should be considered when implementing these links.

Considering all of the pertinent parameters these links should perform as expected and stated throughout this report.

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Feet



Tupelo Tower Site  
SP-9999-01(007)  
107364-101000

LL=31, PL=13, PI=18



**MISSISSIPPI DEPARTMENT OF TRANSPORTATION  
SOIL REPORT**

Test Method AASHTO T11, AASHTO T27, AASHTO T88, And MT22

Contract ID	<u>MTL-DISTRCT-OCA</u>	Fed/State Proj. #	<u>For Charging Tests to District</u>	FMS Proj. #	<u>DISTRICT1-OCA</u>
Sample Status	<u>COMP</u>			LAB ID	<u>D1001</u>
Revising Sample Number				Date Sampled	<u>2017-06-05</u>
Material Code	<u>070300153</u>	Material Name	<u>SOIL PROFILE(ORG)</u>	Sample Test Number	<u>1</u>
Linked To Sample #				Date Authorized	<u>2017-06-08</u>

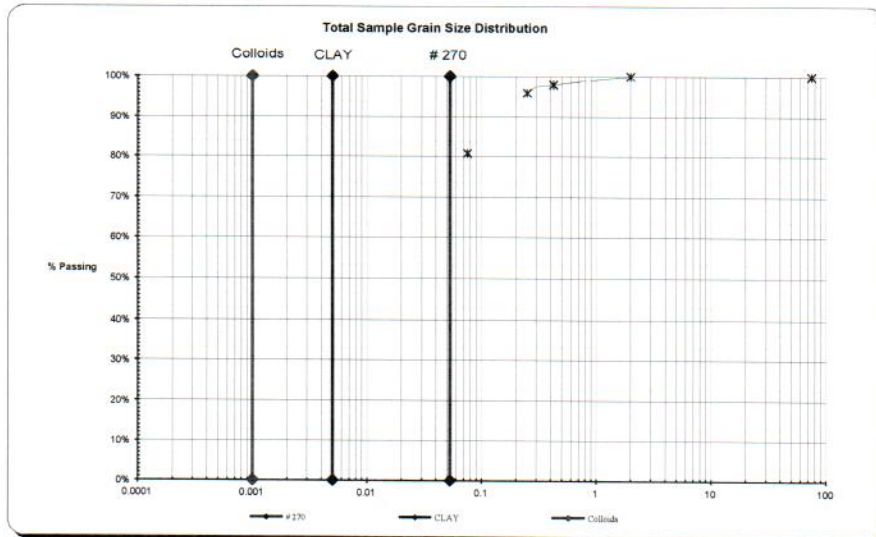
Sampled From 0-5' tupelo tower Distance From Grade \_\_\_\_\_

Sample Station No. \_\_\_\_\_ Station Offset \_\_\_\_\_ Lot Limit - Beg. \_\_\_\_\_ Lot Limit - End. \_\_\_\_\_

Status COMP This material has been tested in accordance with MDOT specifications and is satisfactory for use in MDOT projects.

Sieve Designation	% Passing	Spec. Ranges		Screen Result	REMARKS
		MAX.	MIN.		
3" (75 mm)	100				Sieve Gradation
1/2" (63 mm)					Lab #43865
2" (50 mm)					
1 3/4" (45 mm)					
1 1/2" (37.5 mm)					
1" (25 mm)					
1/2" (12.5 mm)					
3/8" (9.5 mm)					
#4 (4.75 mm)					
#10 (2.00 mm)	100				
Minus # 10 Results					
#40 (425 um)	98				Hydrometer
#60 (250 um)	96				
#200(75 um)	80.8				
#270(54 um)					
% Silt					
% Clay					Atterberg Limits
% Colloids					
Dust Ratio					
HCL reaction:					
Mica Content:					
Liquid Limit	46				
Plastic Limit	37				
Plasticity Index	9				
Shrinkage Limit	11.4				
Shrinkage Ratio	1.92				
Volume Change	64.7	60			
AASHTO	A5				FCH045
GROUP INDEX	10				
U. S. C.	ML				
Est. CBR	4				

TOTAL SAMPLE RESULT =



**MISSISSIPPI DEPARTMENT OF TRANSPORTATION  
SOIL REPORT**

Test Method AASHTO T11, AASHTO T27, AASHTO T88, And MT22

Contract ID	<u>MTL-DISTRCT-OCA</u>	Fed/State Proj. #	<u>                    </u>	For Charging Tests to District	FMS Proj. #	<u>DISTRICT1-OCA</u>
Sample Status	<u>COMP</u>			LAB ID	<u>D1001</u>	Sample ID <u>171130GLB0012</u>
Revising Sample Number	<u>                    </u>			Date Sampled	<u>2017-06-05</u>	Date Completed <u>2017-06-08</u>
Material Code	<u>070300153</u>	Material Name	<u>SOIL PROFILE(ORG)</u>	Sample Test Number	<u>2</u>	Date Authorized <u>                    </u>
Linked To Sample #	<u>                    </u>					

Sampled From 6-10' tupelo tower Distance From Grade                     

Sample Station No.                      Station Offset                      Lot Limit - Beg.                      Lot Limit - End.                     

Status COMP This material has been tested in accordance with MDOT specifications and is satisfactory for use in MDOT projects.

Sieve Designation	% Passing	Spec. Ranges		Screen Result	REMARKS
		MAX.	MIN.		
3" (75 mm)	100				Sieve Gradation Lab #43866
1/2" (63 mm)					
2" (50 mm)					
1 3/4" (45 mm)					
1 1/2" (37.5 mm)					
1" (25 mm)					
1/2" (12.5 mm)					
3/8" (9.5 mm)					
#4 (4.75 mm)					
#10 (2.00 mm)	100				
Minus # 10 Results					Hydrometer
#40 (425 um)	99				
#60 (250 um)	97				
#200(75 um)	86.1				
#270(54 um)					
% Silt					
% Clay					
% Colloids					
Dust Ratio					
HCL reaction:					Atterberg Limits Lab #43866 6-10'
Mica Content:					
Liquid Limit	69				
Plastic Limit	24				
Plasticity Index	45				
Shrinkage Limit	12.5				
Shrinkage Ratio	1.95				
Volume Change	108.4	60			
AASHTO	A7-6				FCH045
GROUP INDEX	42				
U. S. C.	CH				
Est. CBR	2				

TOTAL SAMPLE RESULT =



**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SOIL REPORT**

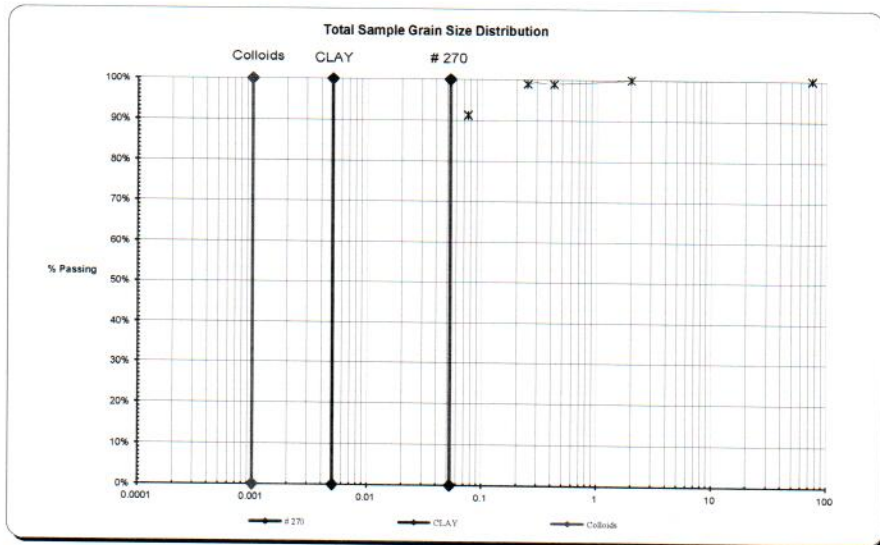
Test Method AASHTO T11, AASHTO T27, AASHTO T88, And MT22

Contract ID MTL-DISTRCT-OCA Fed/State Proj. # For Charging Tests to District FMS Proj. # DISTRICT1-OCA  
 Sample Status COMP LAB ID D1001 Sample ID 171130GLB0013  
 Revising Sample Number \_\_\_\_\_ Date Sampled 2017-06-05 Date Completed 2017-06-08  
 Material Code 070300153 Material Name SOIL PROFILE(ORG) Sample Test Number 3 Date Authorized \_\_\_\_\_  
 Linked To Sample # \_\_\_\_\_

Sampled From 11-15' tupelo tower Distance From Grade \_\_\_\_\_  
 Sample Station No. \_\_\_\_\_ Station Offset \_\_\_\_\_ Lot Limit - Beg. \_\_\_\_\_ Lot Limit - End. \_\_\_\_\_  
 Status COMP This material has been tested in accordance with MDOT specifications and is satisfactory for use in MDOT projects.

Sieve Designation	% Passing	Spec. Ranges		Screen Result	REMARKS
		MAX.	MIN.		
3" (75 mm)	100				
1/2" (63 mm)					
2" (50 mm)					Lab #43867
1 3/4" (45 mm)					
1 1/2" (37.5 mm)					
1" (25 mm)					
1/2" (12.5 mm)					
3/8" (9.5 mm)					
#4 (4.75 mm)					
#10 (2.00 mm)	100				
Minus # 10 Results					
#40 (425 um)	99				
#60 (250 um)	99				
#200(75 um)	91.3				
#270(54 um)					
% Silt					Hydrometer
% Clay					
% Colloids					
Dust Ratio					
HCL reaction:					
Mica Content:					
Liquid Limit	48				
Plastic Limit	18				
Plasticity Index	30				Atterberg Limits
Shrinkage Limit	14.4				Lab # 43867
Shrinkage Ratio	1.86				
Volume Change	63.4	60			
AASHTO	A7-6				
GROUP INDEX	29				FCH045
U. S. C.	CL				
Est. CBR	4				

TOTAL SAMPLE RESULT =



**MISSISSIPPI DEPARTMENT OF TRANSPORTATION  
SOIL REPORT**

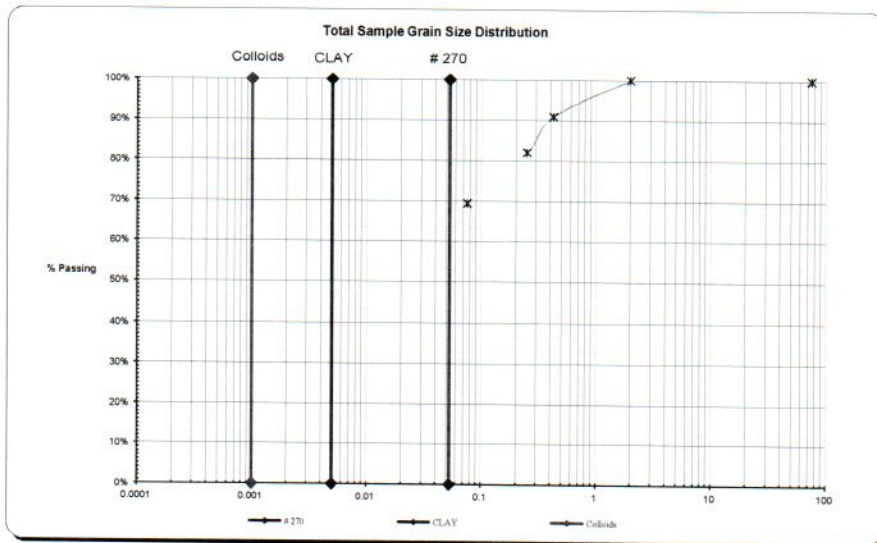
Test Method AASHTO T11, AASHTO T27, AASHTO T88, And MT22

Contract ID MTL-DISTRCT-OCA Fed/State Proj. # For Charging Tests to District FMS Proj. # DISTRICT1-OCA  
 Sample Status COMP LAB ID D1001 Sample ID 171130GLB0015  
 Revising Sample Number \_\_\_\_\_ Date Sampled 2017-06-05 Date Completed 2017-06-08  
 Material Code 070300153 Material Name SOIL PROFILE(ORG) Sample Test Number 4 Date Authorized \_\_\_\_\_  
 Linked To Sample # \_\_\_\_\_

Sampled From 16-22' tupelo tower Distance From Grade \_\_\_\_\_  
 Sample Station No. \_\_\_\_\_ Station Offset \_\_\_\_\_ Lot Limit - Beg. \_\_\_\_\_ Lot Limit - End. \_\_\_\_\_  
 Status COMP This material has been tested in accordance with MDOT specifications and is satisfactory for use in MDOT projects.

Sieve Designation	% Passing	Spec. Ranges		Screen Result	REMARKS
		MAX.	MIN.		
3" (75 mm)	100				Sieve Gradation Lab #43868
1/2" (63 mm)					
2" (50 mm)					
1 3/4" (45 mm)					
1 1/2" (37.5 mm)					
1" (25 mm)					
1/2" (12.5 mm)					
3/8" (9.5 mm)					
#4 (4.75 mm)					
#10 (2.00 mm)	100				
Minus # 10 Results					Hydrometer
#40 (425 um)	91				
#60 (250 um)	82				
#200(75 um)	69.5				
#270(54 um)					
% Silt					
% Clay					Atterberg Limits Lab #43868
% Colloids					
Dust Ratio					
HCL reaction:					
Mica Content:					
Liquid Limit	39				
Plastic Limit	14				
Plasticity Index	25				
Shrinkage Limit	13.5				
Shrinkage Ratio	1.9				
Volume Change	49.2	60			FCH045
AASHTO	A6				
GROUP INDEX	15				
U. S. C.	CL				
Est. CBR	8				

TOTAL SAMPLE RESULT =



MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SOIL REPORT

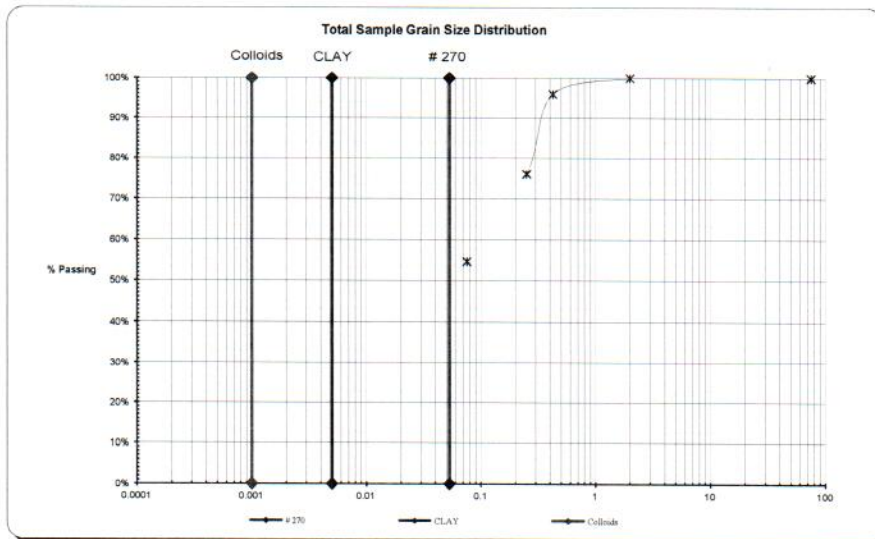
Test Method AASHTO T11, AASHTO T27, AASHTO T88, And MT22

Contract ID MTL-DISTRCT-OCA Fed/State Proj. # For Charging Tests to District FMS Proj. # DISTRICT1-OCA  
 Sample Status COMP LAB ID D1001 Sample ID 171130GLB0016  
 Revising Sample Number \_\_\_\_\_ Date Sampled 2017-06-05 Date Completed 2017-06-08  
 Material Code 070300153 Material Name SOIL PROFILE(ORG) Sample Test Number 5 Date Authorized \_\_\_\_\_  
 Linked To Sample # \_\_\_\_\_

Sampled From 23-30' tupelo tower Distance From Grade \_\_\_\_\_  
 Sample Station No. \_\_\_\_\_ Station Offset \_\_\_\_\_ Lot Limit - Beg. \_\_\_\_\_ Lot Limit - End. \_\_\_\_\_  
 Status COMP This material has been tested in accordance with MDOT specifications and is satisfactory for use in MDOT projects.

Sieve Designation	% Passing	Spec. Ranges		Screen Result	REMARKS
		MAX.	MIN.		
3" (75 mm)	100				Sieve Gradation
1/2" (63 mm)					
2" (50 mm)					
1 3/4" (45 mm)					
1 1/2" (37.5 mm)					
1" (25 mm)					
1/2" (12.5 mm)					
3/8" (9.5 mm)					
#4 (4.75 mm)					
#10 (2.00 mm)	100				
Minus # 10 Results					Hydrometer
#40 (425 um)	96				
#60 (250 um)	76				
#200(75 um)	54.7				
#270(54 um)					
% Silt					
% Clay					
% Colloids					
Dust Ratio					
HCL reaction:					
Mica Content:					Atterberg Limits
Liquid Limit	31				
Plastic Limit	13				
Plasticity Index	18			LAB NO.43869	
Shrinkage Limit	13.3				
Shrinkage Ratio	1.93				FCH045
Volume Change	34.9	60			
AASHTO	A6				
GROUP INDEX	6				
U. S. C.	CL				
Est. CBR	6				

TOTAL SAMPLE RESULT =



**MISSISSIPPI DEPARTMENT OF TRANSPORTATION  
SOIL REPORT**

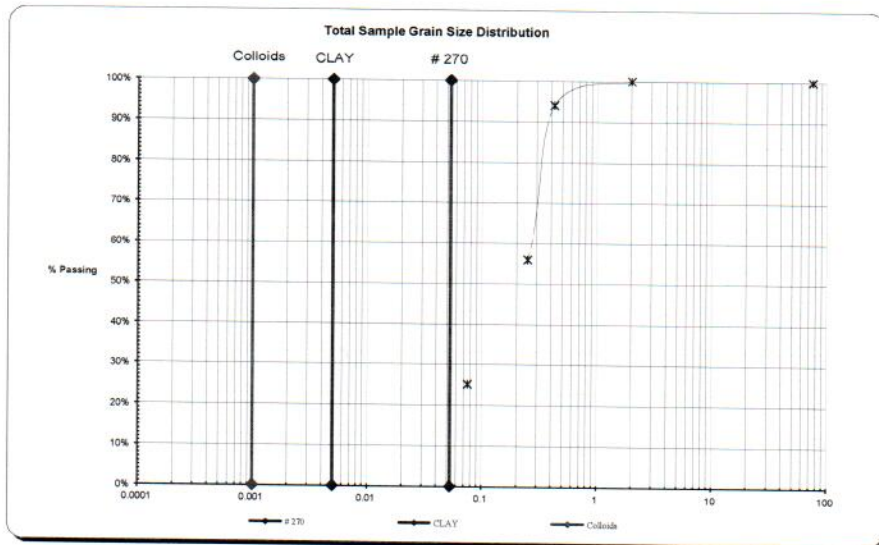
Test Method AASHTO T11, AASHTO T27, AASHTO T88, And MT22

Contract ID MTL-DISTRCT-OCA Fed/State Proj. #                      For Charging Tests to District                      FMS Proj. # DISTRICT1-OCA  
 Sample Status COMP LAB ID                      D1001 Sample ID 171130GLB0017  
 Revising Sample Number                      Date Sampled 2017-06-05 Date Completed 2017-06-08  
 Material Code 070300153 Material Name SOIL PROFILE(ORG) Sample Test Number 6 Date Authorized                       
 Linked To Sample #                     

Sampled From 31-35' tupelo tower Distance From Grade                       
 Sample Station No.                      Station Offset                      Lot Limit - Beg.                      Lot Limit - End.                       
 Status COMP This material has been tested in accordance with MDOT specifications and is satisfactory for use in MDOT projects.

Sieve Designation	% Passing	Spec. Ranges		Screen Result	REMARKS
		MAX.	MIN.		
3" (75 mm)	100				Sieve Gradation
1/2" (63 mm)					
2" (50 mm)					
1 3/4" (45 mm)					
1 1/2" (37.5 mm)					
1" (25 mm)					
1/2" (12.5 mm)					
3/8" (9.5 mm)					
#4 (4.75 mm)					
#10 (2.00 mm)	100				
Minus # 10 Results					Hydrometer
#40 (425 um)	94				
#60 (250 um)	56				
#200(75 um)	25.2				
#270(54 um)					
% Silt					Atterberg Limits
% Clay					
% Colloids					
Dust Ratio					
HCL reaction:					
Mica Content:					LAB NO.43870
Liquid Limit	OK				
Plastic Limit	---				
Plasticity Index	NP				
Shrinkage Limit					FCH045
Shrinkage Ratio					
Volume Change		60			
AASHTO GROUP INDEX	A2-4				
U. S. C.	SMd				
Est. CBR	20				

TOTAL SAMPLE RESULT =



**MISSISSIPPI DEPARTMENT OF TRANSPORTATION  
SOIL REPORT**

Test Method AASHTO T11, AASHTO T27, AASHTO T88, And MT22

Contract ID MTL-DISTRCT-OCA Fed/State Proj. # For Charging Tests to District FMS Proj. # DISTRICT1-OCA  
 Sample Status COMP LAB ID D1001 Sample ID 171130GLB0018  
 Revising Sample Number \_\_\_\_\_ Date Sampled 2017-06-05 Date Completed 2017-06-08  
 Material Code 070300153 Material Name SOIL PROFILE(ORG) Sample Test Number 7 Date Authorized \_\_\_\_\_  
 Linked To Sample # \_\_\_\_\_

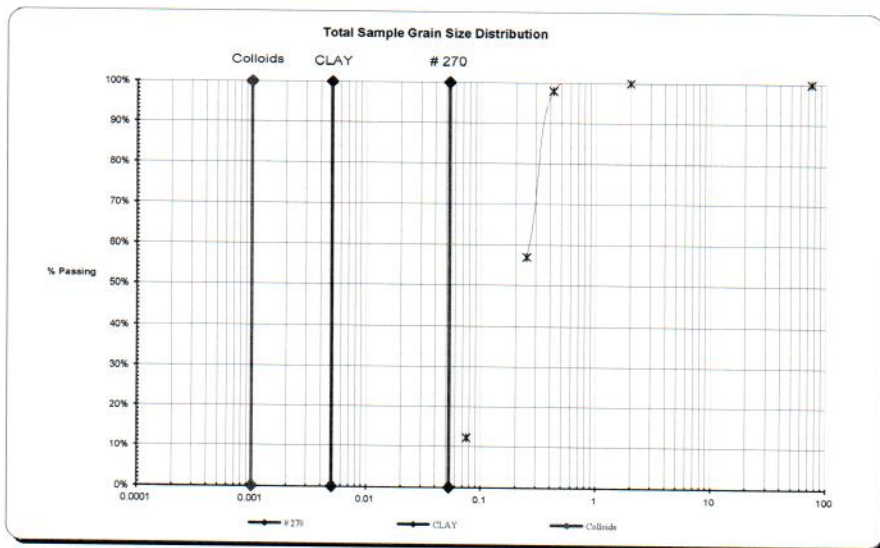
Sampled From 36-45'tupelo tower Distance From Grade \_\_\_\_\_

Sample Station No. \_\_\_\_\_ Station Offset \_\_\_\_\_ Lot Limit - Beg. \_\_\_\_\_ Lot Limit - End. \_\_\_\_\_

Status COMP This material has been tested in accordance with MDOT specifications and is satisfactory for use in MDOT projects.

Sieve Designation	% Passing	Spec. Ranges		Screen Result	REMARKS
		MAX	MIN.		
3" (75 mm)	100				Sieve Gradation
1/2" (63 mm)					
2" (50 mm)					
1 3/4" (45 mm)					
1 1/2" (37.5 mm)					
1" (25 mm)					
1/2" (12.5 mm)					
3/8" (9.5 mm)					
#4 (4.75 mm)					
#10 (2.00 mm)	100				
Minus # 10 Results					
#40 (425 um)	98				
#60 (250 um)	57				
#200(75 um)	12.3				
#270(54 um)					
% Silt					Hydrometer
% Clay					
% Colloids					
Dust Ratio					
HCL reaction:					Atterberg Limits
Mica Content:					
Liquid Limit	OK				
Plastic Limit	---				
Plasticity Index	NP			LAB NO.43871	
Shrinkage Limit					
Shrinkage Ratio					FCH045
Volume Change		60			
AASHTO	A2-4				
GROUP INDEX	0				
U. S. C.	SP-SM				
Est. CBR	20				

TOTAL SAMPLE RESULT =



MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SOIL REPORT

Test Method AASHTO T11, AASHTO T27, AASHTO T88, And MT22

Contract ID MTL-DISTRCT-OCA Fed/State Proj. # For Charging Tests to District FMS Proj. # DISTRICT1-OCA  
 Sample Status COMP LAB ID D1001 Sample ID 171130GLB0019  
 Revising Sample Number \_\_\_\_\_ Date Sampled 2017-06-05 Date Completed 2017-06-08  
 Material Code 070300153 Material Name SOIL PROFILE(ORG) Sample Test Number 8 Date Authorized \_\_\_\_\_  
 Linked To Sample # \_\_\_\_\_

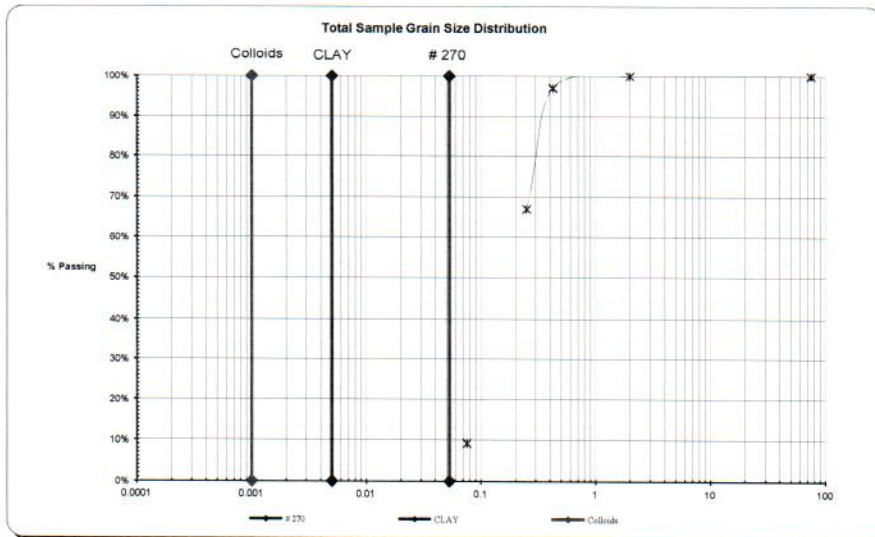
Sampled From 46-50' tupelo tower Distance From Grade \_\_\_\_\_

Sample Station No. \_\_\_\_\_ Station Offset \_\_\_\_\_ Lot Limit - Beg. \_\_\_\_\_ Lot Limit - End. \_\_\_\_\_

Status COMP This material has been tested in accordance with MDOT specifications and is satisfactory for use in MDOT projects.

Sieve Designation	% Passing	Spec. Ranges		Screen Result	REMARKS
		MAX.	MIN.		
3" (75 mm)	100				Sieve Gradation
1/2" (63 mm)					
2" (50 mm)					
1 3/4" (45 mm)					
1 1/2" (37.5 mm)					
1" (25 mm)					
1/2" (12.5 mm)					
3/8" (9.5 mm)					
#4 (4.75 mm)					
#10 (2.00 mm)	100				
Minus # 10 Results					
#40 (425 um)	97				
#80 (250 um)	67				
#200(75 um)	9.3				
#270(54 um)					
% Silt					Hydrometer
% Clay					
% Colloids					
Dust Ratio					
HCL reaction:					Atterberg Limits
Mica Content:					
Liquid Limit	OK				
Plastic Limit	---				
Plasticity Index	NP			LAB NO.43872	
Shrinkage Limit					
Shrinkage Ratio					
Volume Change		60			FCH045
AASHTO	A3				
GROUP INDEX	1				
U. S. C.	SP-SM				
Est. CBR	11				

TOTAL SAMPLE RESULT =





**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 259**

**CODE: (SP)**

**DATE: 7/17/2017**

**SUBJECT: Cooperation Between Contractors**

**PROJECT: SP-9999-01(007) / 107364301, 302 & 303 – Lee, Pontotoc & Union Counties**

The Bidder's attention is hereby called to Subsection 105.07, Cooperation between Contractors, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction.

The Bidder is advised that this project adjoins the following project that will be under construction:

**HSIP-2839-00(018) / 106953301 (MS 145 Corridor Upgrades in Tupelo).**

The Contractor shall cooperate in all respects and shall coordinate construction of all phases of work with the Contractor of the adjoining project.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 260**

**CODE: (SP)**

**DATE: 7/17/2017**

**SUBJECT: Pay Item Correction**

**PROJECT: SP-9999-01(007) / 107364301, 302 & 303 – Lee, Pontotoc & Union Counties**

Bidders are hereby advised that the Summary of Quantities sheets in the Plans do not include pay item no. 632-D009, Solid State Traffic Actuated Controller, Type 1. This is in error. A quantity of **3 Each** for this pay item has been added to the bid items.

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

**SECTION 904 - NOTICE TO BIDDERS NO. 261**

**CODE: (SP)**

**DATE: 07/14/2017**

**SUBJECT: Pre-Bid Meeting Clarifications, Questions and Answers**

**PROJECT: SP-9999-01(007) / 107364301, 302 & 303 – Lee, Pontotoc & Union Counties**

A Non-Mandatory Pre-Bid Meeting was held at 10:30 A.M. on Tuesday, **July 11, 2017** in the first floor Auditorium of the MDOT District 1 Headquarters Building located at 1909 North Gloster Street, Tupelo, MS. Introductions were made and statements were given concerning items to clarify or change in the Contract Documents by this Addendum. A visit was made to the District Headquarters portions of project. The Sign-In List is attached.

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Question: Who is the Project Engineer?

Answer: Will Davis.

Question: Who is the District One IT representative?

Answer: Brian Prochaska is the District One IT representative. The District One Office Number is 601-842-1122. Johnny Otts and Kerby McFarland in Jackson may also supply info. Bidders are reminded that the Project Engineer is the primary contact and should be contacted directly or included in correspondence as explained in the Standard Specifications.

Question: Is MDOT providing Type C switches? What buildings will they be in? Are they both going to be Cisco?

Answer: MDOT is providing Type C switches. There is one for the District Office Building and one for the hut. IS has agreed to supply these. They will both be Cisco Switches. The current plan set has been revised and this pay item is no longer in the plans.

Question: Is the Contractor responsible for providing fiber modules to make the fiber link? To make the plug in into the switch?

Answer: Yes. Yes.

Question: Will there be a Pendant Dome on the lowering device?

Answer: A Standard Dome PTZ.

Question: Is everything cleared as far as FAA decisions?

Answer: The FAA form is a standard that is filed with any modification. New designs are submitted with the referenced form. If the tower is the same height as the existing, no major revision should be required. See Special Provision 907-675-1 for more information.

Question: What is the "SEE NOTE" on Sheet Number 3010 referring to?

Answer: The Clearing and Grubbing note in the corner of the same sheet.

Question: Why does the intersection of W. Eason Blvd. & SR 145 not hop directly to the tower?

Answer: W. Eason Blvd. & SR 145 hops to SR 145 & Varsity. On this subject, the Line of Sight Survey states the following: In an effort to use the existing pole structure as a mounting location, an alternate site was visualized that could act as a repeater for this location as well as others. That alternate location is the intersection of SR145 & Varsity. An additional base station type solution will need to be installed at SR145 & Varsity in order to accomplish this alternative option.

Question: Is the Line of Sight Survey missing?

Answer: Notice to Bidders No. 237 is being updated to include this information.

Question: If existing equipment is not functioning, is MDOT replacing that or is it the responsibility of the project to make it work?

Answer: Existing equipment needs to function. A pay item for some controllers will be added so that old ones in question can be replaced if necessary in order to have full function at these locations. Pay Item No. 632-D009, Solid State Traffic Actuated Controller, Type 1, will be added by Addendum with a quantity of 3 Each. This pay item will be used as directed by the Engineer only in the event that a location has out of date traffic signal equipment that will not allow communication connectivity.

Question: There are some dial-up drops on Coley Road. Are they going to go away during the project?

Answer: These will not be needed once the new connection is made.

Question: Does this facility not already have a Leased Line Service?

Answer: It does not have what is currently desired. This project will add one new METRO-E. The specifications and plans reflect this.

Question: What is the TV Model Number in the first floor District Conference Room?

Answer: The model number is 65LB5200, but it is a discontinued product. Below are the specifications:

<http://www.lg.com/us/tvs/lg-65LB5200-led-tv>

Question: Can we get a summary of the TV sizes and their locations in the District Office?

Answer: Under this project, we are supplying the following:

- 2 - 60" video monitors in the District Conference Room with a PC that operates these.
- 1 Emergency Operations work station in the District Conference Room (Single Desktop with 2 - 32" monitors)

Question: There was a hole where a boring had been done near the existing tower. Do we have soil information?

Answer: Yes. Notice to Bidders No. 237 is being updated to include this information.

Question: Will the Tower have a Guy Wire?

Answer: No.

Question: Is there a possible conflict with the new tower foundation and the existing foundation?

Answer: There is not a conflict.

Question: Will there be any modifications to the Commissioner's office building under this project?

Answer: No.

Question: Is any work being done in the Lobby of the MDOT District 1 Headquarters Building under this project?

Answer: No.

Question: Is there any EOC software?

Answer: No.



**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 262**

**CODE: (SP)**

**DATE: 07/17/2017**

**SUBJECT: Project Number Change**

**PROJECT: SP-9999-01(007) / 107364301, 302 & 303 – Lee, Pontotoc & Union Counties**

Bidders are hereby advised that any references to Project Number SP-9999-01(007) / 107364301 in the plans or specifications shall be understood to mean Project Number SP-9999-01(007) / 107364301, 302 & 303.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 263**

**CODE: (SP)**

**DATE: 07/17/2017**

**SUBJECT: Pullbox Correction**

**PROJECT: SP-9999-01(007) / 107364301, 302 & 303 – Lee, Pontotoc & Union Counties**

Bidders are hereby advised that Sheet No. 3029 of the Contract Plans states that Type 2, 4 and 5 Pullboxes shall have a load rating of 15,000. This is in error. Tier 22 rated boxes with a corresponding load rating of 22,500 lb. are required. The Summary of Quantities and Bid Sheets are correct.



Construction of a Tower & ITS Field Device Deployment, known as State Project Nos. SP-9999-01(007) / 107364301, 302 & 303 in Lee, Pontotoc & Union Counties.

Line No.	Item Code	Adj Code	Quantity	Units	Description [Fixed Unit Price]
<b>Roadway Items</b>					
0010	201-A001		1	Lump Sum	Clearing and Grubbing
0020	202-A001		1	Lump Sum	Removal of Obstructions
0030	202-B261		1	Each	Removal of Antenna Tower Communication Hut
0040	216-A001		350	Square Yard	Solid Sodding
0050	219-A001		7	Thousand Gallon	Watering [\$20.00]
0060	234-A001		250	Linear Feet	Temporary Silt Fence
0070	618-A001		1	Lump Sum	Maintenance of Traffic
0080	619-D1001		80	Square Feet	Standard Roadside Construction Signs, Less than 10 Square Feet
0090	619-D2001		160	Square Feet	Standard Roadside Construction Signs, 10 Square Feet or More
0100	619-E1001		1	Each	Flashing Arrow Panel, Type C
0110	619-E3001		1	Each	Changeable Message Sign
0120	619-G4005		240	Linear Feet	Barricades, Type III, Single Faced
0130	619-G7001		10	Each	Warning Lights, Type "B"
0140	620-A001		1	Lump Sum	Mobilization
0145	632-D009		3	Each	Solid State Traffic Actuated Controller, Type 1
0150	634-B001		6	Each	Traffic Signal Equipment Pole Shaft Extension, 10-foot, Video Camera Mount
0160	634-E001		8	Each	Camera Pole with Foundation, 50' Pole
0170	634-E004		3	Each	Camera Pole with Foundation, 80' Pole
0180	634-F002		2	Each	Detector Pole with Foundation, 35' Pole
0190	634-I001		7	Each	Wood Pole, Class II Height 40'
0200	636-B034		3,475	Linear Feet	Electric Cable, Underground in Conduit, THHN, AWG #1, 3 Conductor
0210	636-B041		1,765	Linear Feet	Electric Cable, Underground in Conduit, THHN, AWG #2, 3 Conductor
0220	636-B048		2,125	Linear Feet	Electric Cable, Underground in Conduit, THHN, AWG #4, 3 Conductor
0230	636-E001		4,770	Linear Feet	Electric Cable, Underground in Conduit, Tracer Cable
0240	637-A009		31	Each	Pull Box Enclosure, Type 2, Tier 22
0250	637-A013		12	Each	Pull Box Enclosure, Type 4, Tier 22
0260	637-A015		12	Each	Pull Box Enclosure, Type 5, Tier 22
0270	637-I001		1,285	Linear Feet	Traffic Signal Conduit Bank, Underground, Drilled or Jacked, Rolled Pipe, 2 @ 2"
0280	637-I002		7,485	Linear Feet	Traffic Signal Conduit Bank, Underground, Drilled or Jacked, Rolled Pipe, 2"
0290	637-I004		380	Linear Feet	Traffic Signal Conduit Bank, Underground, Drilled or Jacked, Rolled Pipe, 4 @ 2"
0300	641-C001		3	Each	ITS Radar Detection, 1 Sensor

Line No.	Item Code	Adj Code	Quantity	Units	Description [Fixed Unit Price]
0310	641-D001		100	Linear Feet	Radar Detection Communication Cable
0320	660-A003		11	Each	Equipment Cabinet, Type B
0330	660-B001		12	Each	Cabinet Modifications
0340	662-B001		7	Each	Radio Interconnect, Installed in Existing Controller Cabinet
0350	662-D001		1	Each	Radio Interconnect, Broadband, Long Range
0360	662-D002		20	Each	Radio Interconnect, Broadband, Short Range
0370	699-A001		1	Lump Sum	Roadway Construction Stakes
0380	907-636-I001		2	Each	Ground Mounted Meter Enclosure
0390	907-636-I002		2	Each	Ground Mounted Transformer Enclosure
0400	907-650-A002		39	Each	On Street Video Equipment, Fixed Type
0410	907-650-A003		17	Each	On Street Video Equipment, PTZ Type
0420	907-659-A001		1	Lump Sum	Traffic Management Center Modifications
0430	907-659-C001		1	Lump Sum	Traffic Management Center Modifications - Training
0440	907-661-A004		2,920	Linear Feet	Fiber Optic Cable, 72 SM
0450	907-663-A001		8	Each	Network Switch, Type A
0460	907-663-A002		2	Each	Network Switch, Type B
0480	907-663-A006		12	Each	Network Switch, Type F
0490	907-663-B001		8	Each	Terminal Server
0500	907-663-D001		8,355	Linear Feet	Category 6 Cable, Installed in Conduit
0510	907-664-B001		1	Each	Communications Node Hut
0520	907-666-A001		6	Each	Bluetooth Detection System, Type A
0530	907-666-C001		6	Each	Bluetooth Detection System Server Licensing
0540	907-675-A001		1	Lump Sum	Antenna Tower