

ARKANSAS DEPARTMENT OF TRANSPORTATION



SUBSURFACE INVESTIGATION

STATE JOB NO. 080648

FEDERAL AID PROJECT NO. ACNHPP-40-2(83)

HWY. 64 – HWY. 331 (S)

STATE HIGHWAY I-40 SECTION 21 & 22

IN JOHNSON & POPE COUNTY

The information contained herein was obtained by the Department for design and estimating purposes only. It is being furnished with the express understanding that said information does not constitute a part of the Proposal or Contract and represents only the best knowledge of the Department as to the location, character and depth of the materials encountered. The information is only included and made available so that bidders may have access to subsurface information obtained by the Department and is not intended to be a substitute for personal investigation, interpretation and judgment of the bidder. The bidder should be cognizant of the possibility that conditions affecting the cost and/or quantities of work to be performed may differ from those indicated herein.



ARKANSAS DEPARTMENT OF TRANSPORTATION

ArDOT.gov | IDriveArkansas.com | Lorie H. Tudor, P.E., Director

MATERIALS DIVISION

11301 West Baseline Road | P.O. Box 2261 | Little Rock, AR 72203-2261 | Phone: 501.569.2185 | Fax: 501.569.2368

December 7, 2022

TO: Mr. Trinity Smith, Roadway Design Engineer
SUBJECT: Job No. 080648
Slide Repair Concept
I-40 East Bound
Section 21, Log Mile 64.9

Introduction

Submitted herein are geotechnical recommendations and conceptual documents for remediation of the embankment slide on the east bound lanes of Interstate 40 near Lamar in Johnson County (Section 21, Log Mile 64.9). Based on conversations with RE86 personnel, pavement cracking was observed to initiate in 2017. Multiple remediations have been subsequently performed since the initial observation. It is understood the most recent remediation was performed in September 2022, which consisted of milling and inlay. Cracking of the newly repaired pavement was soon observed in October 2022, indicating apparent embankment sliding. A survey has been performed by RE86 and a cross section was provided to the Materials Division on November 3, 2022 for the purpose of developing a remediation concept.

Field Investigation

In addition to site visits, two borings were performed in 2018 by Materials Division and an inclinometer was installed in one of the borings. Information regarding the borings and inclinometer is included in the attached Supplemental Information.

Analyses, Conclusions, and Recommendations

The rapid cracking of newly repaired pavement indicates the embankment movement is on-going and active. It is also concluded the embankment slide is deep-seated based on evaluation of the borings and inclinometer results.

Multiple remediation alternatives have been evaluated. These alternatives include aggregate piers, drilled shafts, rock buttress, anchored soldier pile wall, etc. Timber piling is considered the most economical and suitable method for this slide repair. It is recommended the outer lane of the I-40 east bound and part of the side slope be densified and reinforced with timber piling. Based on site visits and information provided by RE86, an approximately 400-foot-long remediation zone (between Sta. 3434+30 and Sta. 3438+30) is recommended. This zone of repair should be field verified.

A 24-inch-thick Load Transfer Platform (LTP) is recommended to be constructed on top of pile heads to uniformly distribute pavement loading and to eliminate shadowing in the surface of the pavement.

Prior to piling, the pavement and subgrade should be saw-cut to the bottom of asphalt concrete and rubblized concrete or to an elevation at which the LTP and overlying pavement can be accommodated, whichever is deeper. The excavation depth should be field verified. For the



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purpose of planning and quantity estimate, an excavation depth of 4 feet below the pavement surface is recommended.

The pipe underdrain and outlet protector in the median within the zone of repair should be completely excavated and backfilled with low-permeability cohesive soil. Grades shall be revised to daylight water to nearby drop inlets. Suitability of the low-permeability cohesive soil can be consulted with Materials Division. Sandy or gravelly materials are not suitable for this use. In addition, ARDOT Materials Division should be notified at the time of underdrain obliteration, pavement cut, and the first pile driving.

Attachments

The following attachments are included in this submittal:

- Attachment A - Plan and Typical Section of Repair
- Attachment B - SP Timber Piling
- Attachment C - SP Load Transfer Platform
- Attachment D - Supplemental Information

Paul Tinsley
Materials Engineer

PT:yz:pwc

cc: State Maintenance Engineer
District 8 Engineer
Program Management
G. C. File

Attachment A
Plan and Typical Section of Repair

DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. RD. DIST. NO.	STATE	FED. RD. PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.		1	2
				JOB NO.		080648		
Timber Pile Layout								

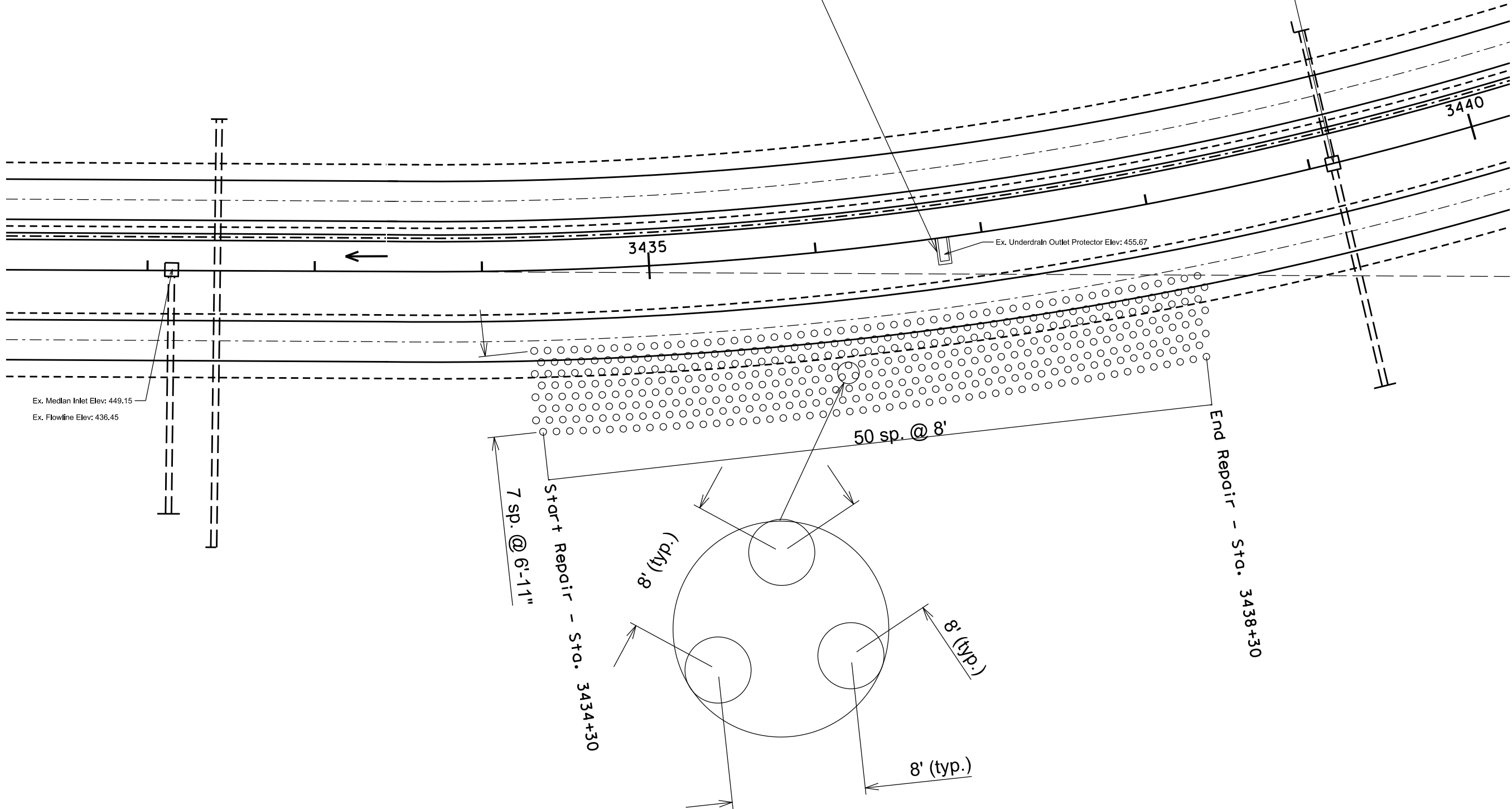
Completely excavate pipe underdrain and outlet protector and backfill with low-permeability cohesive soils (PI>10, % Passing No. 200 Sieve > 50).

Revise grades to direct water to positive discharge to nearby droplets.

Ex. Median Inlet Elev: 459.00
Ex. Flowline Elev: 454.75

Ex. Underdrain Outlet Protector Elev: 455.67

Ex. Median Inlet Elev: 449.15
Ex. Flowline Elev: 436.45



DATE REVISED	DATE FILMED	DATE REVISED	DATE FILMED	FED. RD. DIST. NO.	STATE	FED. RD. PROJ. NO.	SHEET NO.	TOTAL SHEETS
				6	ARK.		2	2
				JOB NO.		05064B		
Typical Section								

NOTE 1: ARDOT Materials Division shall be notified at the time of underdrain obliteration, pavement cut, and first pile driving.

NOTE 2: Pipe underdrain and outlet protector shall be completely excavated and backfilled with low-permeability cohesive soil. Grades shall be revised to daylight water to nearby drop inlets.

NOTE 3 Cut to bottom of asphalt concrete and rubblized concrete or to an elevation at which a Load Transfer Platform (LTP - 24") and new pavement section can be accommodated, whichever is deeper (approximately 4', field verify).

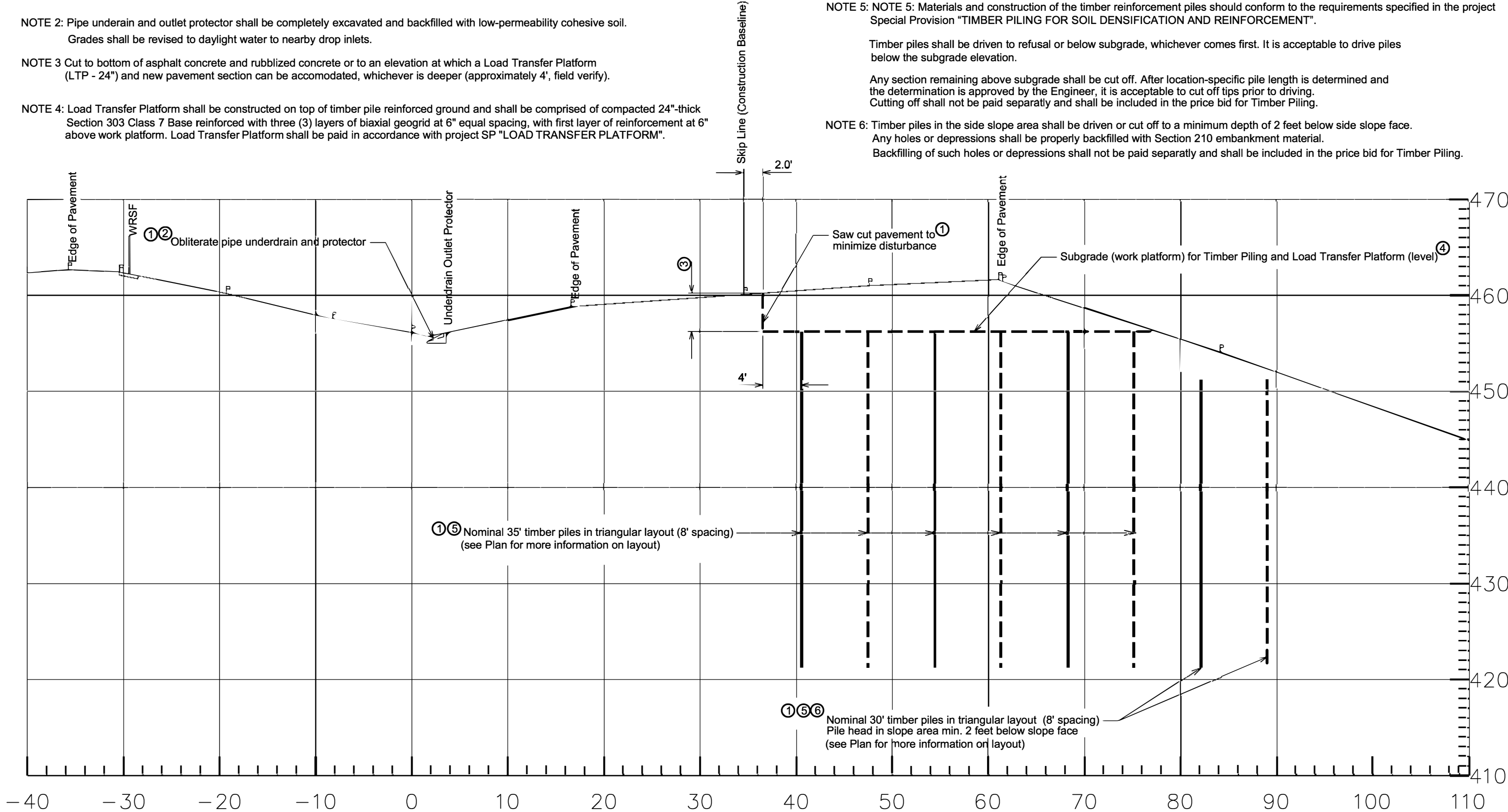
NOTE 4: Load Transfer Platform shall be constructed on top of timber pile reinforced ground and shall be comprised of compacted 24"-thick Section 303 Class 7 Base reinforced with three (3) layers of biaxial geogrid at 6" equal spacing, with first layer of reinforcement at 6" above work platform. Load Transfer Platform shall be paid in accordance with project SP "LOAD TRANSFER PLATFORM".

NOTE 5: NOTE 5: Materials and construction of the timber reinforcement piles should conform to the requirements specified in the project Special Provision "TIMBER PILING FOR SOIL DENSIFICATION AND REINFORCEMENT".

Timber piles shall be driven to refusal or below subgrade, whichever comes first. It is acceptable to drive piles below the subgrade elevation.

Any section remaining above subgrade shall be cut off. After location-specific pile length is determined and the determination is approved by the Engineer, it is acceptable to cut off tips prior to driving. Cutting off shall not be paid separately and shall be included in the price bid for Timber Piling.

NOTE 6: Timber piles in the side slope area shall be driven or cut off to a minimum depth of 2 feet below side slope face. Any holes or depressions shall be properly backfilled with Section 210 embankment material. Backfilling of such holes or depressions shall not be paid separately and shall be included in the price bid for Timber Piling.



Section @ 3436+95

Repair Station: I -40 East Bound Sta. 3434+30 to 3438+30 (total 400 feet)

Attachment B
Job SP - Timber Piling

ARKANSAS DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

JOB NO. 080648

TIMBER PILING FOR SOIL DENSIFICATION AND REINFORCEMENT

Description. This Special Provision (SP) covers Timber Piles driven through or under roadway embankments or bridge approach embankments, around intermediate bents, or at locations shown on the plans for the purpose of soil densification and/or reinforcement. This item shall consist of furnishing and driving treated piling according to this SP and conforming to the lines, grades, and spacing shown on the plans.

Materials. Materials for timber piling shall conform to the following requirements.

1. Piling shall be treated timber piles of Southern Yellow Pine or Douglas Fir.
2. Piles shall be of sound wood, free from decay or insect damage. Treated piling shall have a minimum amount of red heart. Sound knots shall be no larger than 4" or 1/3 of the diameter of the pile at the point where they occur, whichever is the smaller. The size of a knot shall be its diameter measured at right angles to the length of the pile. Piles may have unsound knots not exceeding 1/2 the permitted size of a sound knot, provided that the unsoundness extends to not more than 1 1/2" depth, and that the adjacent areas of the trunk are not affected. Cluster knots consisting of two or more knots grouped together, the fibers of the wood being deflected around the entire unit, are prohibited. The sum of sizes of all knots in any foot of length of the pile shall not exceed six times the size of the largest permitted single knot.
 - a. Holes of 1/2" or less in average diameter will be permitted, provided the sum of the average diameters of all holes in any square foot of pile surface does not exceed 1 1/2".
 - b. Twist of spiral grain in any 20' of length shall not exceed 1/2 of the circumference at the midpoint of the length measured.
 - c. Splits shall be no longer than the butt diameter. The length of any shake in the outer half of the radius of the butt of the pile, when measured along the curve of the annual ring, shall not exceed 1/3 of the circumference of the butt of the pile. The butts and tips shall be sawed square. The tips may be tapered to a point not less than 4" in diameter.
 - d. All piles shall be peeled by removing all rough bark and at least 80% of the inner bark. No strip of the inner bark remaining on the pile shall be over 3/4" wide and there shall be at least 1" of clean wood surface between any two such strips. At least 80% of the surface of any circumference shall be clean wood.
 - e. Timber to be used for piling shall be cut above the ground swell and shall taper from butt to tip. A line from the center of the tip to the center of the butt shall not fall outside of the center of the pile at any point more than 1% of the length of the pile. In short bends, the distance from the center of the pile to a line stretched from the center of the pile above the bend to the center of the pile below the bend

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TIMBER PILING FOR SOIL DENSIFICATION AND REINFORCEMENT

shall not exceed 4% of the length of the bend or a maximum of 2½". Knots shall be trimmed flush with the body of the pile.

3. Piles shall have a minimum diameter at the tip, measured under the bark, as follows:

<u>Length of Pile</u>	<u>Tip Diameter</u>
Less than 40'	8"
40' to 60'	6"

4. The minimum diameter of piles at sections 3' from the butt, measured under the bark, shall be as follows:

<u>Length of Pile</u>	<u>Diameter of Pile</u>
20' to 30'	12"
30' to 40'	12"
Over 40'	13"

The diameter of the pile at the butt shall not exceed 20". The diameter of a pile in cases where the tree is not exactly round shall be determined either by measuring the circumference and dividing the number of inches by 3.14 or by taking the average of the maximum and minimum diameters at the location specified.

Storage and Protection of Materials. Timber piles shall be stacked on supports at least 12" above the ground surface to avoid absorption of ground moisture. Piles shall be closely-stacked to prevent warping or sagging. The ground underneath and in the vicinity of material stacks shall be kept reasonably clear of vegetation.

Preservation Treatment of Timber Piles. Preservation treatment of timber piles shall be accomplished according to the requirements of Subsection 817.04 of the Standard Specifications.

Driving. Prior to beginning pile-driving operations the Contractor, shall field verify the location of all underground utilities and obtain approval from the Engineer to begin. The Contractor shall be responsible for all damages and/or claims arising out of the installation of Timber Piling for Soil Densification and/or Reinforcement. Driving equipment that damages the piling shall not be used. Hammers shall be capable of driving to the plan tip elevations or to refusal without damage to the pile. Driving shall be considered complete once the pile has reached the tip elevation shown on the plans or refusal in rock or intermediate geotechnical materials (IGM) is encountered, whichever is shallower.

1. **Hammers:** All piling shall be driven with an air, steam, or diesel hammer. Gravity hammers will be permitted only when shown on the plans or as elsewhere allowed by the specifications. Hammers shall develop a total energy of not less than 12,500 ft.-lbs.
 - a. The plant and equipment furnished for air or steam hammers shall have sufficient capacity to maintain, under working conditions, the pressure at the hammer specified by the manufacturer. Accurate pressure gauges shall be placed at the

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TIMBER PILING FOR SOIL DENSIFICATION AND REINFORCEMENT

boiler or tank and at the hammer so that the drop in pressure between the gauges can be determined.

- b. When a single acting diesel hammer is used, it shall be equipped with a stroke indicator or the Contractor must furnish a method approved by the Engineer for determining the actual stroke. When a double acting diesel hammer is used, it shall be equipped with a bounce chamber pressure gauge in good working order mounted near ground level so as to be conveniently read by the Engineer when monitoring energy output of the hammer. The Contractor shall provide charts that equate the chamber pressure to equivalent energy.
2. **Hammer Cushions:** All impact pile driving equipment except gravity hammers shall be equipped with a hammer cushion of suitable thickness to prevent damage to the hammer or pile and to ensure uniform driving behavior. Hammer cushions shall be made of durable, manufactured materials, complying with the hammer manufacturer's guidelines except that all wood, wire rope, and asbestos hammer cushions are specifically prohibited. A striker plate as recommended by the hammer manufacturer shall be placed on the hammer cushion to ensure uniform compression of the cushion material. The hammer cushion shall be inspected in the presence of the Engineer before beginning pile driving at each structure or after each 100 hours of pile driving, whichever is more frequent. When the thickness of a hammer cushion is reduced by more than 25% of its original thickness, the Contractor shall replace it before driving is permitted to continue.
3. **Pile Drive Head:** A pile driven with an impact hammer requires an adequate drive head to distribute the hammer blow to the pile head. The drive head shall be axially aligned with the hammer and the pile. The drive head shall be guided by the leads and shall not be free swinging. The drive head shall fit around the pile head in a manner that will prevent transfer of torsional forces during driving while maintaining proper alignment of hammer and pile. The pile heads shall be cut squarely and a drive head, as recommended by the hammer manufacturer, shall be provided to hold the axis of the pile in line with the axis of the hammer.
4. **Driving Equipment Information:** The Contractor shall submit to the Engineer, for information and record purposes, pile driving equipment information at least 30 days before driving piles. The information shall be submitted on a Pile and Driving Equipment Data Form, which will be supplied by the Engineer. Any change in the driving system will require the Contractor to submit a new Pile and Driving Equipment Data Form.
5. **Additional Equipment:** In case the required penetration is not obtained with a hammer complying with the above minimum requirements, the Contractor shall provide a different hammer and/or sufficient additional equipment at no cost to the Department. Additional equipment not otherwise provided for herein shall be approved by the

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Engineer prior to its use. Pile tips shall be used where it may be required to reach the minimum tip elevation and shall be at no additional cost to the Department.

6. **Leads:** Pile driver leads shall be constructed in such a manner as to provide freedom for vertical movement of the hammer and shall be held in position in such a manner as to ensure adequate support to the pile during driving. The axis of the leads and hammer shall coincide with the axis of the pile as nearly as practicable.
7. **Accuracy of Driving:** Pile shall be driven with a variation of not more than $\frac{1}{4}$ " per foot from the vertical. Piles spacing shall not differ from those shown on the plans by 1 foot. Piling shall be driven under the observation of the Engineer or his representative so that data may be obtained for determining the penetration.

Order List for Piles. The Contractor shall furnish piles according to an itemized list, which will be furnished by the Engineer, showing the number and length of piles. In determining lengths of piles for ordering and for quantities to be included in the Contract, the lengths given in the order list shall be based on the lengths that are assumed to be driven to minimum penetration and cut off at the elevation shown on the plans. The Contractor may, at no cost to the Department, increase the lengths given to provide for fresh heading and for such additional length as may be necessary to suit the Contractor's method of operation.

Defective Piles. The Contractor shall not subject piles to excessive abuse that will produce cracking, crushing, splitting, or deformation of the pile. Manipulation of piles to force them into proper position, considered by the Engineer to be excessive, will not be permitted. Any pile damaged because of internal defects or improper driving, or any pile driven out of its proper location or driven below the elevation fixed by the plans or the Engineer, shall be corrected at no cost to the Department by one of the following methods, as approved by the Engineer:

1. The pile may be withdrawn and replaced by a new, and if necessary, longer pile.
2. A second pile may be driven adjacent to the defective or low pile.
3. The pile may be spliced or built up as otherwise provided herein.

Piles pushed up by the driving of adjacent piles or by any other cause shall be re-driven to grade. Any crushed or damaged portion of piling may be cut off and built up or the pile completely replaced, as approved by the Engineer. Cutoff, buildup, and/or replacement of damaged piles shall be at no cost to the Department.

Cutting Off Timber Piles. Cut-offs shall be a minimum of 2 feet below roadway surface and embankment side slope faces. In addition, cut-off length shall be sufficient to permit the complete removal of any material damaged by driving.

Method of Measurement. Timber Piling will be measured by the actual number of linear feet of accepted pile remaining in the finished work after all cut-offs or build-ups have been made, based upon lengths shown on the plans or established by the Engineer.

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In case piles are driven to refusal in resistant rock or IGM that is present shallower than the plan tip elevations shown on plans, timber piles will be measured and paid by the plan lengths shown on plans, including any cut-off length.

No allowance for cut-off will be made on piling for any length in excess of the lengths shown on the plans or established by the Engineer. For piles furnished according to the lengths shown on the plans or established by the Engineer that are found to be too short and are spliced according to details shown in the plans, an allowance of 4 linear feet of piling will be made for each timber pile splice in addition to the actual length of accepted pile in place.

No allowance will be made for cut-off or build-up of any portion of a pile that has been damaged, for splices made for the convenience of the Contractor, for extra length ordered for the Contractor's convenience, or for cutback necessary for splicing. Cut-off material shall become the property and responsibility of the Contractor.

Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per linear foot for Timber Piling, which price shall be full compensation for furnishing, transporting, handling and storing material, driving, drilling, and excavation, for cut-off, splicing, and build-up in accordance with the requirements of these Specifications, and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item

Timber Piling

Pay Unit

Linear Foot

Attachment C
Job SP - Load Transfer Platform

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LOAD TRANSFER PLATFORM

Description. This work shall consist of constructing a geosynthetically reinforced granular fill designed to transfer the load of pavements, embankments or retained material to vertical columns.

Materials. (a) The granular fill shall meet the material and testing requirements of ARDOT Standard Specifications Section 303 Aggregate Base Course (Class 7).

(b) Geogrid Reinforcement (Biaxial) shall be manufactured as a single layer regular network of integrally connected longitudinal and transverse polymer tensile elements with geometry that permits significant mechanical interlock with the granular fill. The geogrid structure shall remain dimensionally stable under construction stresses and have a high resistance to damage during construction, to ultraviolet degradation, and to all forms of chemical and biological degradation encountered in the soil being reinforced.

Provide a geogrid with a minimum tensile strength, $T = 600 \text{ LBS/FT}$ in the Cross Machine Direction (CD) and $T = 400 \text{ LBS/FT}$ in the Machine Direction (MD) at 2% strain when tested in accordance with ASTM D6637 Method B.

Identify, store and handle geogrids according to ASTM D4873. Limit geogrid exposure to ultraviolet radiation to less than 10 days.

The Contractor shall furnish to the Engineer a production certification indicating the geogrid supplied meets the respective criteria set forth in these specifications. The certification shall state the name of the manufacturer, product name, style number, chemical composition of the filaments, ribs or yarns, and other information to fully describe the geogrid.

Construction Requirements. The load transfer platform shall be constructed as shown on the Load Transfer Platform Detail or as directed by the Engineer. Granular fill shall be placed in 6-inch increments. Geogrid Reinforcement (Biaxial) shall be unrolled and placed parallel to (in-line with) the roadway alignment. Grid shall be overlapped a minimum of 1 foot or connected as specified by the manufacturer. All geogrid shall be placed to lay flat, pulled tight and pinned or edged down to hold its position until subsequent granular material layers can be placed.

Method of Measurement. Geogrid Reinforcement (Biaxial) shall be measured by the square yard of surface area covered in each layer. Overlapped material will not be measured for payment. Class 7 Base Course shall be measured by the cubic yard in accordance with the Subsection 303.05 of the Standard Specifications.

Basis of Payment. Work completed and accepted and measured as provided will be paid for at the contract unit price per square yard for Geogrid Reinforcement (Biaxial) and per cubic yard of Class 7 Base Course which price shall be full compensation for furnishing, storing, and placing materials; for lapping and/or splicing; for necessary repairs; and for all labor, equipment, tools, and incidentals necessary to complete the work.

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JOB NO. 080648

LOAD TRANSFER PLATFORM

Payment will be made under:

Pay Item

Geogrid Reinforcement (Biaxial)
Aggregate Base Course (Class 7)

Pay Unit

Square Yard
Cubic Yard

Attachment D
Supplemental Information

Untitled Map

Write a description for your map.

Legend

D08247_Boring 1

D08247_Boring 2 & Inclinator

D08247_Google Earth Boring 1
11/2019



Boring 1

Google Earth

© 2022 Google

5.41 ft

D08247_Google Earth
Inclinometer

11/20/19

Boring 2 / Inclinometer

Google Earth

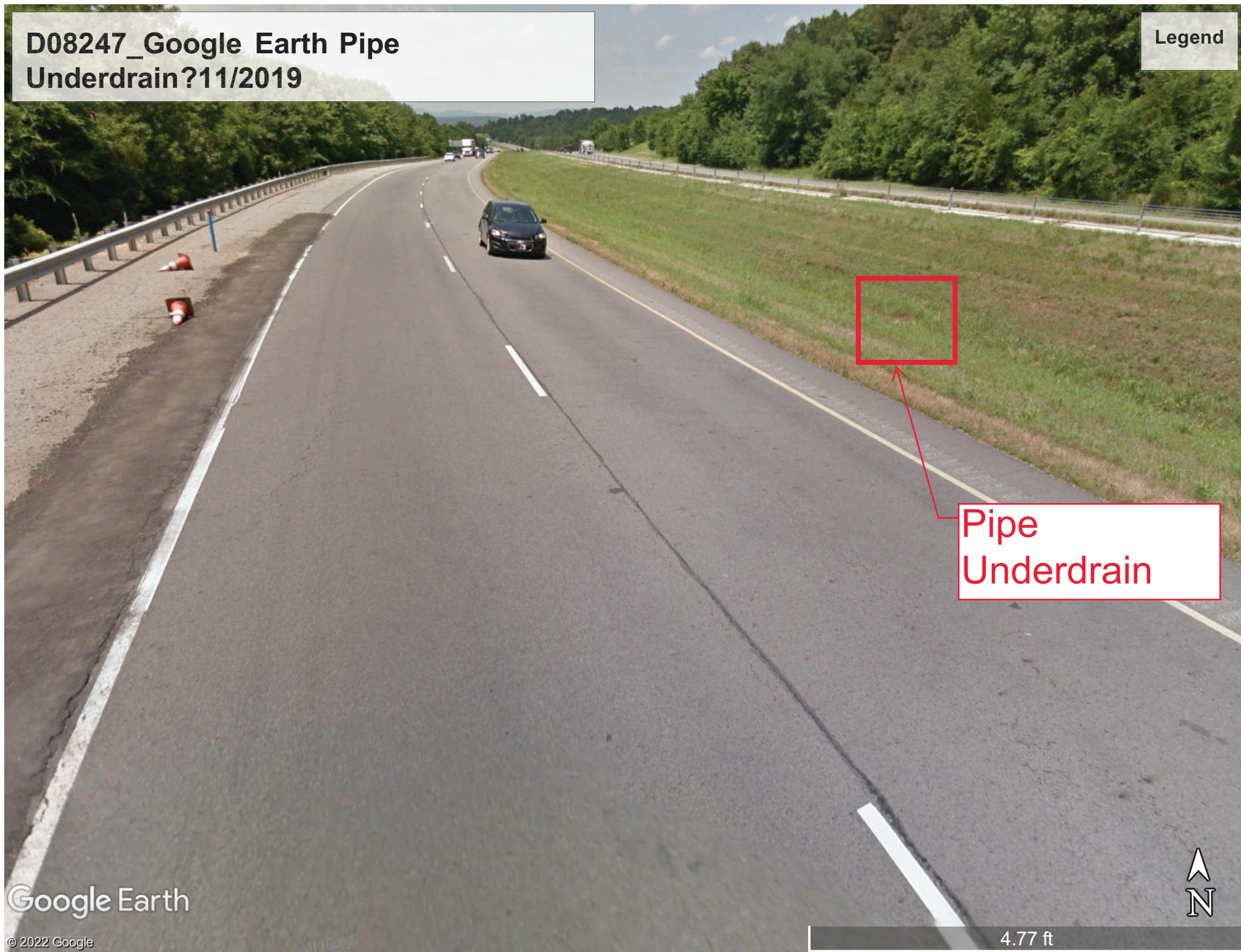
© 2022 Google

4.89 ft



D08247_Google Earth Pipe
Underdrain?11/2019

Legend



Google Earth

© 2022 Google

4.77 ft



**ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 1

PAGE 1 OF 2

JOB NO. D08247 Johnson County
JOB NAME: I-40 Lamar Slide and Inclinometer
Sec. 21, L.M. 64.9

DATE: March 12, 2018
TYPE OF DRILLING: Hollow Stem Auger

STATION: 3435+97

EQUIPMENT: Acker 1799

LOCATION:

LOGGED BY: Connor Bunton

HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 41.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% T C R	% R O D
			SURFACE ELEVATION: 22.2									
5			Asphalt and Base									
10			Moist, Medium Stiff, Brown Sandy Clay with Gravel (Rock Fragments)							2 4-3		
15			Moist, Soft, Brown Clay with Gravel*							1 2-2		
20			Moist, Medium Stiff, Brown Clay with Gravel (Rock Fragments)							1 3-2		
25			Moist, Stiff, Brown Clay with Some Gravel (Rock Fragments)							3 3-3		
30			Moist, Stiff, Brown Clay							3 5-8		
35										4 7-9		

REMARKS: *Logger noted an increase in moisture at approximately 12.9' below ground level.

**ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 1
PAGE 2 OF 2

JOB NO. D08247 Johnson County
JOB NAME: I-40 Lamar Slide and Inclinometer
Sec. 21, L.M. 64.9

DATE: March 12, 2018
TYPE OF DRILLING: Hollow Stem Auger

STATION:
LOCATION:
LOGGED BY: Connor Bunton

EQUIPMENT: Acker 1799

HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 41.5

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% T C R	% R D
			SURFACE ELEVATION: 64.9									
			Moist, Very Stiff, Brown Clay							5 10-13		
40			Moist, Very Hard, Clay with Gravel (Highly Weathered Shale)							27 24-60 (8.4")		
			Boring Terminated									
45												
50												
55												
60												
65												
70												

REMARKS: *Logger noted an increase in moisture at approximately 12.9' below ground level.

**ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 2

PAGE 1 OF 2

JOB NO. D08247 Johnson County
JOB NAME: I-40 Lamar Slide and Inclinator
Sec. 21, L.M. 64.9

DATE: March 12, 2018
TYPE OF DRILLING: Hollow Stem Auger

STATION:
LOCATION: 35.3987276, -93.3777822
LOGGED BY: Connor Bunton

EQUIPMENT: Acker 1799

HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 40.35

DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU. FT.	NO. OF BLOWS PER 6-IN.	% T C R	% R Q D
			SURFACE ELEVATION: 172.1									
5			Asphalt									
10			Dry, Medium Stiff, Gray Clay with Gravel (Asphalt Fragments)							3 3-3		
15			Moist, Medium Stiff, Dark Brown Clay with Gravel							2 3-2		
20												
25			Moist, Very Stiff, Brown Clay with Gravel							5 9-9		
30			Moist, Stiff, Brown Clay							3 8-6		
35			Wet, Very Stiff, Brown and Gray Clay							5 8-11		

REMARKS: 24-hour water elevation located at 20 feet below ground level. An Inclinator was installed at this boring.

**ARKANSAS DEPARTMENT OF TRANSPORTATION
MATERIALS DIVISION - GEOTECHNICAL SEC.**

BORING NO. 2
PAGE 2 OF 2

JOB NO. D08247 Johnson County
JOB NAME: I-40 Lamar Slide and Inclinometer
Sec. 21, L.M. 64.9

DATE: March 12, 2018
TYPE OF DRILLING: Hollow Stem Auger

STATION: **3436+72**
LOCATION: 35.3987276, -93.3777822
LOGGED BY: Connor Bunton

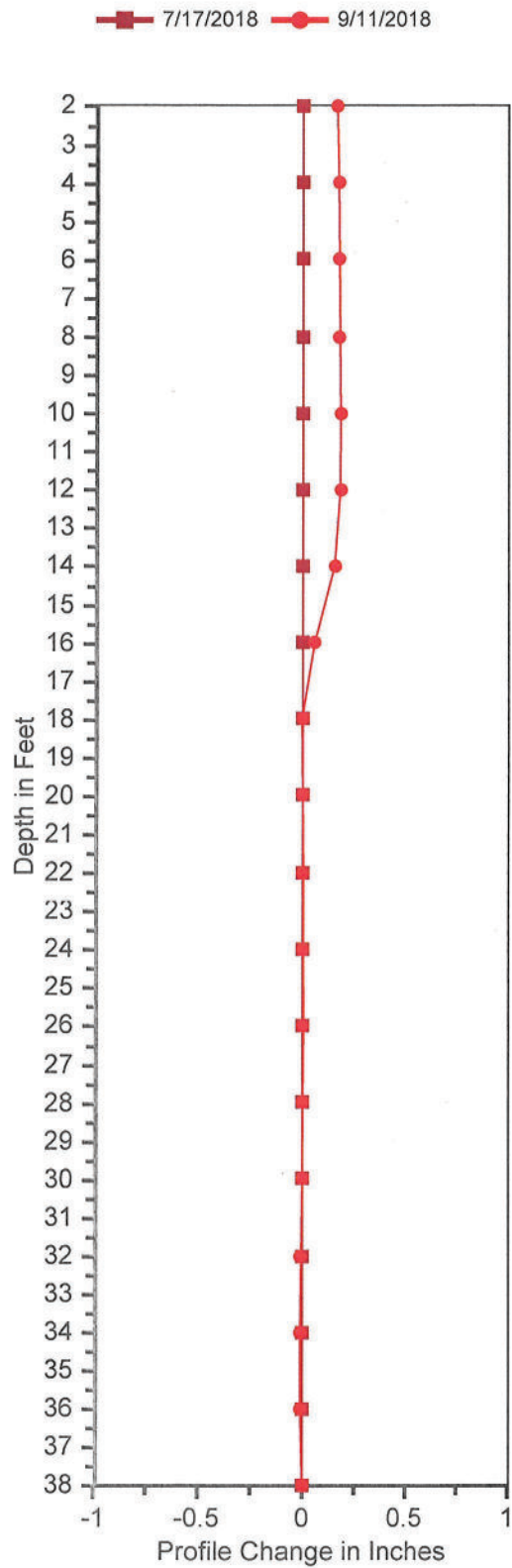
EQUIPMENT: Acker 1799
HAMMER CORRECTION FACTOR: N/A

COMPLETION DEPTH: 40.35

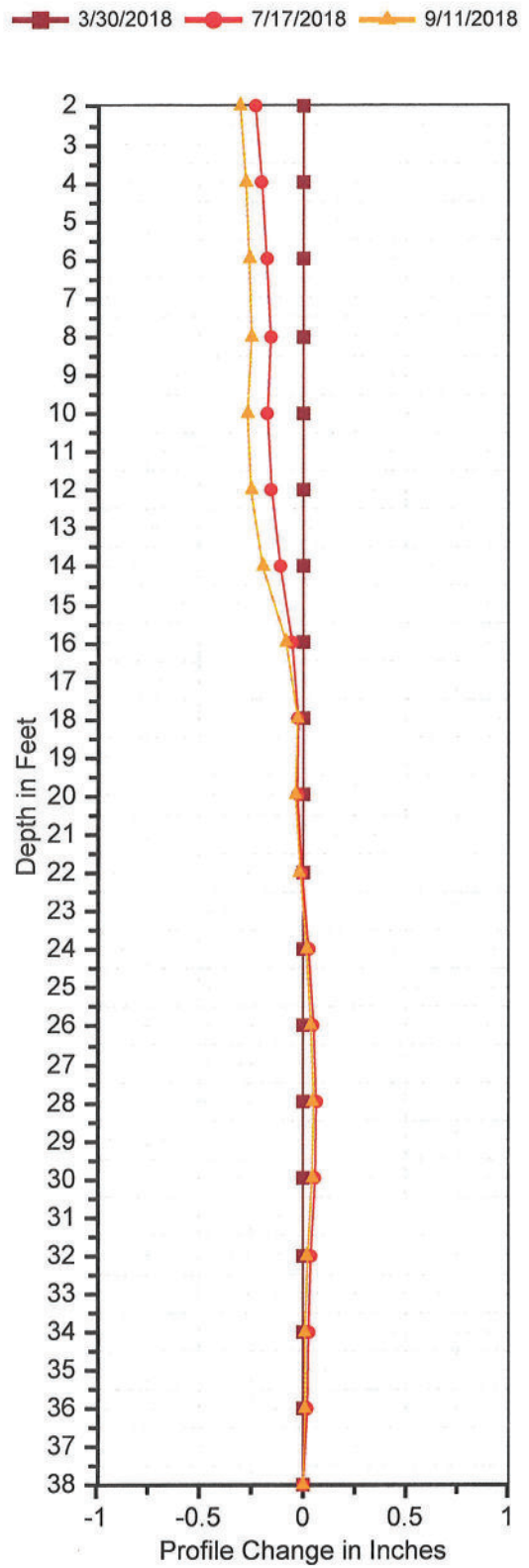
DEPTH FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SOIL GROUP	PLASTIC LIMIT	% MOIST.	LIQUID LIMIT	DRY WEIGHT	LBS PER CU.FT.	NO. OF BLOWS PER 6-IN.	% T C R	% R Q D
			SURFACE ELEVATION: 64.9									
			SHALE							37 50-13 (7")		
40			SHALE - Highly Weathered, Medium Hard, Dark Gray									
			Boring Terminated							60 (3")		
45												
50												
55												
60												
65												
70												

REMARKS: 24-hour water elevation located at 20 feet below ground level. An Inclinometer was installed at this boring.

D08247 1 A



D08247 1 B





Field PHOTO

Job No.: D08247

Job Name: I-40 E Bound Lamar



Looking East / North (2022-08-18)



Field PHOTO

Job No.: D08247

Job Name: I-40 E Bound Lamar



Looing East / North (2022-08-18)



Field PHOTO

Job No.: D08247

Job Name: I-40 E Bound Lamar



Clogged Pipe Underdrain in the Median (Slow Flowing to the East away from E Bound), Looking East (2022-08-18)



Field PHOTO

Job No.: D08247

Job Name: I-40 E Bound Lamar



Apparent Different Vegetation in a Rectangular Area, Looking West / North (2022-08-18)



Field PHOTO

Job No.: D08247

Job Name: I-40 E Bound Lamar



Inclined / Curved Trees in the Side Slope, Looking West / North (2022-08-18)



Field PHOTO

Job No.: D08247

Job Name: I-40 E Bound Lamar



Looking North / West (2020-09-01)