Large-Scale Laboratory Testing of Geosynthetics in Roadway Applications

Third Task Report: Test Section Construction

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1 Introduction

This task report describes activities related to Task 3 of the project proposal. Task 3 involves the construction of the three test sections for the project. The test sections were constructed using the subgrade, base course, geosynthetics, and asphalt materials described in the Task 2 report. Instrumentation was installed in the subgrade and base course layers. Construction of the test sections was originally completed in June 2019 with trafficking beginning in late June. The sections were seen to rut more quickly than expected. The HMA and base layers were removed and replaced. This task report provides details of the construction and instrumentation for the final sections that were reconstructed.

2 Quality Control Testing Plan

Measurements were made on each layer during construction to provide quality control. Measurements were made using the methods and devices listed below.

- Elevation and thickness – surveys
- In-situ shear strength of the subgrade– hand-held vane shear
- In-situ moisture content – oven
- Dynamic stiffness – lightweight deflectometer (LWD)
- Strength – dynamic cone penetrometer (DCP) and in-field CBR
- Density – sand cone and nuclear densometer

Most of the QC measurements were concentrated in the center region within the anticipated wheel path. A list of the measurements made within each test section on the subgrade and base course are outlined in Table 2-1 and Table 2-2, respectively. Each of the three test sections were delineated into six 2-foot wide longitudinal segments (labeled A through F) to position the measurements made during construction. A plan view of the measurement locations within each test section and for each material type is provided in Appendix A. The only measurement made on the asphalt during construction was density using a nuclear densometer. Three density measurements were made on the asphalt in each of the sub-sections (A-F) for a total of 18 measurements per test section.

Eighteen survey measurements were made in each test section after each layer was constructed. The position of these measurements is provided in Appendix B. Elevations were taken by measuring down from a stiff steel member that spanned the concrete trench (Figure 2-1).

Table 2-1: Subgrade QC measurements in each test section during construction

Measurement Type	Layer	Measurements per Layer	Measurement Locations
In-situ shear strength	All	24	A, B, C, D, E, F
Moisture content	All	12	A, B, C, D, E, F
Bearing strength (CBR)	All	2	Variable
Dynamic stiffness (LWD)	4, 5, 6	6	A, B, C, D, E, F
Strength (DCP)	Final	6	A, B, C, D, E, F
Unit weight (sand cone)	Final	4	B-C, D-E

Table 2-2: Base course QC measurements in each test section during construction

Measurement Type	Layer	Measurements per Layer	Measurement Locations
Moisture content	All	3	B, C-D, E
Dynamic stiffness (LWD)	All	6	A, B, C, D, E, F
Strength (DCP)	Final	6	A, B, C, D, E, F
Unit weight (sand cone)	Final	2	B-C, D-E
Unit weight (nuclear densometer)	Final	2	B-C, D-E

Figure 2-1: Survey measurement technique during construction.

3 Subgrade Construction

The clay subgrade was built in six layers approximately 6 inches deep. The process began by mixing the subgrade using a skid-steer tractor and adding water to bring it to the target moisture content and shear strength associated with a bearing strength of 2.5% CBR. Periodic measures of moisture content and vane shear strength were taken during the mixing process to ensure uniformity. Once the subgrade had reached the target strength and moisture content, the skid-steer tractor was used to deposit, spread and track the prepared clay in the concrete-lined trench (Figure 3-1). Using this method, it took approximately three batches of clay to make one 6-inch layer across the entire the test area. The clay was kept covered with plastic to maintain its moisture content when not in use. Compaction of the subgrade was accomplished using a 54-inch smooth drum vibrating compactor (Hamm, Model H 5i), as shown in Figure 3-2. The sixth and final layer of the subgrade was leveled by hand to a tolerance of ± 0.20 inches (Figure 3-3). A small double smooth drum roller was used to smooth and finish the final top surface of the subgrade, which is shown in Figure 3-4.

Figure 3-1: Spread and tracked subgrade prior to compaction.

Figure 3-2: Compacting the subgrade.

Figure 3-3: Leveling the final surface of the subgrade.

Figure 3-4: Finished surface of the subgrade.

3.1 Vane Shear Strength

Average vane shear strengths for each compacted layer of subgrade are summarized in Table 3-1 for each test section. Averages for individual layers are based on 24 measurements per test section and the composite average is based on 144 measurements. Due to the proximity of the concrete wall associated with the end of the trench, measurements nearest the wall (first four vane shear strength measurements within sub-section A) within Test Section 1 were not used.

Table 3-1: Average vane shear strengths for the compacted subgrade

Layer†	Average Vane Shear Strength (kPa)		
	Test Section 1	Test Section 2	Test Section 3
All	107.4	104.3	105.1
6	147.1	138.4	141.8
5	97.8	91.4	94.5
4	103.9	99.4	99.2
3	103.4	107.5	104.0
2	103.4	99.5	103.2
1	88.7	89.7	88.0

† Layer 1 is at the bottom of the subgrade, and Layer 6 is at the top.

3.2 Moisture Content

Average moisture content results for each compacted layer of subgrade are summarized in Table 3-2 for each test section. Averages for individual layers are based on 12 measurements per test section and the composite average is based on 72 measurements. Due to the proximity of the concrete wall associated with the end of the trench, measurements nearest the wall (first two measurements within sub-section A) within Test Section 1 were not used in the average.

3.3 CBR Strength

In-field CBR tests were conducted in substantial accordance with ASTM D4429 using the minimum recommended surcharge of 30 lb. Two tests were conducted on each subgrade layer within each test section. The exact locations of these tests varied from layer to layer but were generally concentrated toward the center of each test section. The average CBR strengths are reported in Table 3-3.

Table 3-2: Average moisture content for the compacted subgrade

Layer†	Average Moisture Content (%)		
	Test Section 1	Test Section 2	Test Section 3
All	27.7	27.7	27.7
6	25.9	25.9	25.8
5	28.6	28.5	28.6
4	27.6	28.1	27.9
3	27.5	27.5	27.3
2	27.7	27.8	27.9
1	28.7	28.5	28.7

† Layer 1 is at the bottom of the subgrade, and Layer 6 is at the top.

Table 3-3: Average CBR strength for the compacted subgrade

Layer†	Average CBR (%)		
	Test Section 1	Test Section 2	Test Section 3
All	2.21	2.27	2.01
6	1.90	1.94	1.56
5	1.93	2.59	1.94
4	2.47	2.02	2.34
3	2.64	2.77	2.25
2	2.29	2.33	1.92
1	2.01	1.96	2.08

† Layer 1 is at the bottom of the subgrade, and Layer 6 is at the top.

3.4 Dynamic Stiffness

A Zorn ZFG 3000 Light Weight Deflectometer (LWD) was used to measure the dynamic stiffness of the last three layers of subgrade. Six LWD measurements were made in each test section. The LWD has a 1 foot diameter plate, 22 pound drop weight, and calculates stiffness by measuring the acceleration as the drop weight impacts the load plate resting on top of the soil. The average results of the LWD tests are summarized in Table 3-4. As previously mentioned, the measurements from

Test Section 1, sub-section A were not used in the results due to the proximity of the concrete end wall.

Table 3-4: Average dynamic stiffness of the compacted subgrade

Layer†	Average Dynamic Stiffness (MN/mm^2)		
	Test Section 1	Test Section 2	Test Section 3
6	6.73	5.74	6.09
5	5.05	4.56	4.64
4	6.36	5.95	5.71

† Layer 4 is near the center of the subgrade layer, and Layer 6 is at the top.

3.5 Strength (DCP)

A Kessler Dual Mass Dynamic Cone Penetrometer (DCP) with a magnetic ruler and a 10.1 pound hammer was used to evaluate the strength of the subgrade after it had been fully constructed. Six tests were conducted in each test section, the results of which are shown in Figure 3-5 in terms of CBR. The bearing strength of the subgrade was calculated as a function of depth using Equation 1 developed by Kleyn (1975). As before, the measurements from Test Section 1, sub-section A were not used in the results. Average strengths based on the DCP tests were as follows: Test Section 1 CBR = 2.27%, Test Section 2 CBR = 2.27%, and Test Section 3 CBR = 2.24%.

$$CBR = \frac{292}{(mm/blow)^{1.12}} \quad (1)$$

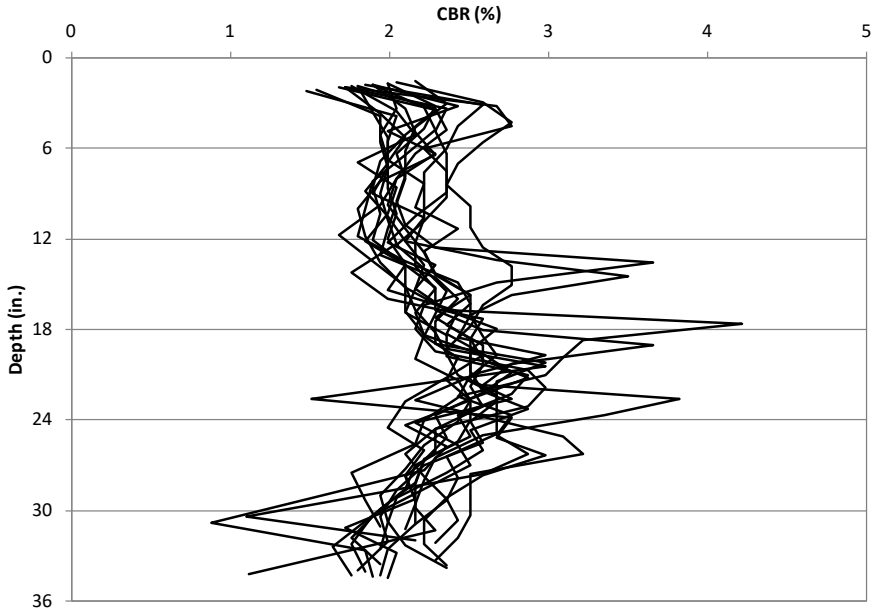


Figure 3-5: Subgrade DCP results as a function of depth

3.6 Unit Weight

In-place dry unit weight of the final layer of subgrade was measured using the sand cone method (ASTM D1556). Four measurements were made within each test section. The average dry unit weights for each test section were as follows: Test Section 1 = 96.3 lb/ft^3, Test Section 2 = 93.4 lb/ft^3, and Test Section 3 = 92.3 lb/ft^{3}In-field.

4 Instrumentation

Linear variable differential transducers (LVDTs) were installed to measure the displacement of subgrade and base course surfaces during trafficking. Three sensors were installed in the subgrade and three sensors were installed in the base course, as shown in the illustrations in Appendix C for each test section. The position of these measurements was designed to capture vertical movements caused by the load wheels during trafficking.

The first step during the installation process was to excavate a hole in the vicinity of the measurement point to allow each sensor to be inserted into the ground. The size of the access holes was kept as small as possible to minimize disturbance of the soil in the anticipated wheel path. All the soil that was extracted from each hole was temporarily stored in a sealed bucket so that it could be replaced once the sensor was in place. The datum for each displacement measurement was the bottom of the concrete trench, as illustrated in Figure 4-1. This was accomplished by driving a steel rod through the subgrade until it reached the trench floor (see Figure 4-2). A small piece of ¾ in. thick plastic was placed on the floor prior to constructing the

subgrade in the area where each of the metal anchors was to be located. A small nail was welded to the bottom of the steel rod so that when driven it would penetrate the plastic and keep the anchor from floating upward during construction and trafficking.

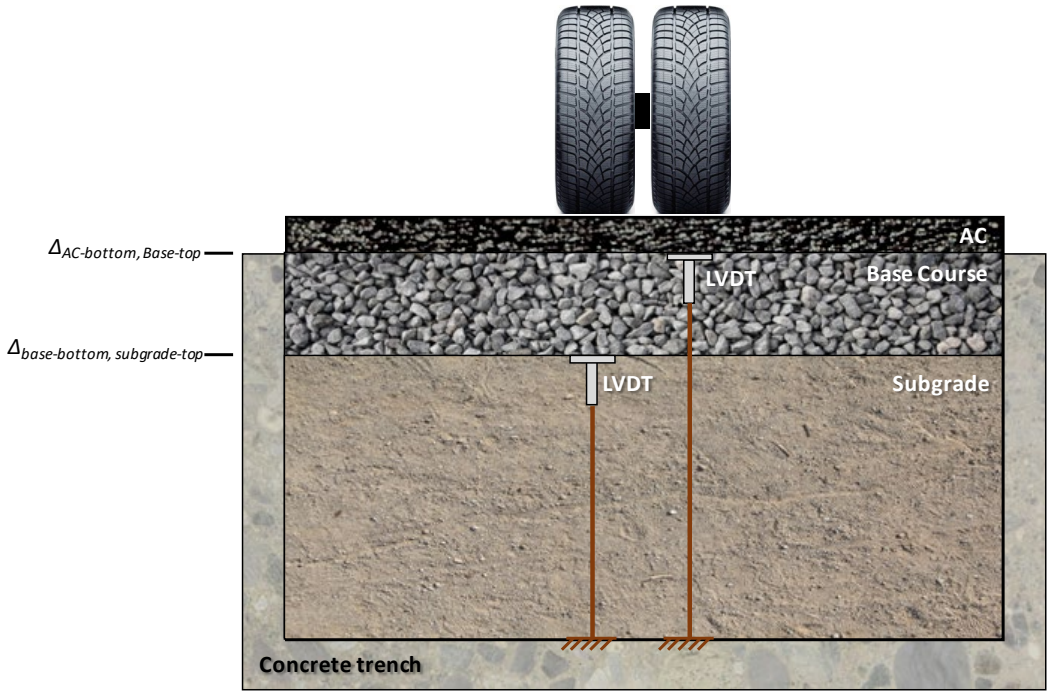


Figure 4-1: Cross-section of LVDT installation in the subgrade and base course.

Figure 4-2: Installing LVDT anchor.

The bodies of the LVDTs were attached to the anchors using two u-bolts that extended through a metal plate welded to the top of the anchor. Each LVDT was outfitted with a sealed mechanism that extended the core of the LVDT to a round plate that would be positioned at the point of measurement (top of subgrade or base course layers). This extension mechanism was designed to keep the soil from jamming the LVDT as it allowed free movement of the LVDT core throughout the duration of the test. A photo of a typical LVDT setup is shown in Figure 4-3 prior to installation. The body of the LVDT was positioned on the anchor plate so that the vertical alignment of the plate at the end of the LVDT was level with the surface of the subgrade or base course, as shown in Figure 4-4.

Sealed data cables extended from the bottoms of the LVDTs and through protective tubes outside of the trench. These wires were attached to the data acquisition system through individual signal conditioners.

Figure 4-3: LVDT sensor prior to installation.

Figure 4-4: Position of the measurement point with respect to the subgrade surface.

5 Geosynthetics

TenCate RS280i and Propex Geotex 801 were the two geotextile products used in this testing program. A roll of each material was obtained from the manufacturers. Pieces of each material were cut to 11 ft. wide to match the width of the concrete trench. Each test section was 12 ft. long. Test Section 1 was the Control (no geosynthetic), Test Section 2 was reinforced with TenCate RS280i, and Test Section 3 was reinforced with Propex Geotex 801. A cross-sectional illustration of the test section layout is shown in Figure 5-1. The geotextile materials between Test Sections 2 and 3 overlapped one another by 1 ft. (6 in. within each test section). The geotextiles were pulled taut to remove any wrinkles – no stakes or pins were used to hold the materials in place. A photo of the installed geosynthetics is shown in Figure 5-2.

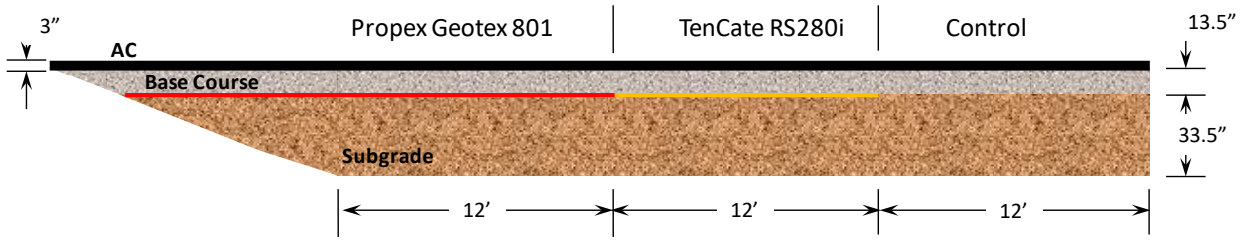


Figure 5-1: Cross-sectional view of constructed test sections.

Figure 5-2: Installed geosynthetics.

6 Crushed Aggregate Base Course

The base aggregate was shipped from Montana in 3000 lb. super sacks and stored on site until construction of the base course. Preparation of the base aggregate began by unloading three to four bags onto the lab floor, mixing with a skid-steer tractor, and adding water until it reached the target moisture content. The aggregate was deposited on the test area without driving on it and spread across the test sections by hand. The base course was constructed in two layers, each of which was screed to a uniform depth prior to compaction (Figure 6-1). Compaction was accomplished using a 54-inch smooth drum vibrating compactor (Hamm, Model H 5i), and a small double smooth drum roller was used to create a smooth, flat surface on the final lift (Figure 6-2). The final average thickness of the base course layer was 13.29 ± 0.20 inches. The target thickness was 13.5 in.

Figure 6-1: First layer of gravel screed to uniform depth.

Figure 6-2: Final compacted surface of the base course.

6.1 Moisture Content

Optimum moisture content of the base course aggregate was 7.7% based on the Modified Proctor results. The base aggregate was prepared to a moisture content of 1 to 2 percent below optimum to yield better compaction. Average moisture contents for each of the test sections and layers are summarized in Table 6-1.

Table 6-1: Average moisture content of the compacted base course.

Layer†	Average Moisture Content (%)		
	Test Section 1	Test Section 2	Test Section 3
3	5.9	5.8	6.4
2	6.4	6.3	7.0
1	6.6	6.4	6.5

† Layer 1 is the bottom base layer, and Layer 3 is the top layer.

6.2 Dynamic Stiffness

Six measures of dynamic stiffness were made within each test section within the anticipated rut path using the Zorn ZFG 3000 Light Weight Deflectometer (LWD). The measurements in sub-section 1A were not used in the average calculations because of the proximity of the end wall. Average dynamic stiffnesses for each layer within each test section are summarized in Table 6-2.

Table 6-2: Average dynamic stiffness of the compacted base course.

Layer†	Average Dynamic Stiffness (MN/mm^2)		
	Test Section 1	Test Section 2	Test Section 3
3	123.63	115.54	122.42
2	24.25	19.63	23.77
1	19.40	15.98	17.85

† Layer 1 is the bottom base layer, and Layer 3 is the top layer.

6.3 Strength (DCP)

Six DCP measurements were taken within each test section using the dual mass DCP device (drop hammer weight of 17.6 lb.) on the finished surface of the base course. These measurements were taken outside of the wheel path to keep from damaging the geosynthetics in the wheel track area.

The results from these tests are shown in the plot in Figure 6-3. The bearing strength (in terms of CBR) as a function of depth was calculated using Equation 1 developed by Kleyn (1975). The measurements from Test Section 1, sub-section A were not used in the results. Average CBR strengths were calculated using values between about 2 and 10 inches of depth to avoid areas near the top and bottom of the compacted layer. The average strengths were as follows: Test Section 1 CBR = 72.4%, Test Section 2 CBR = 73.9%, and Test Section 3 CBR = 73.8%.

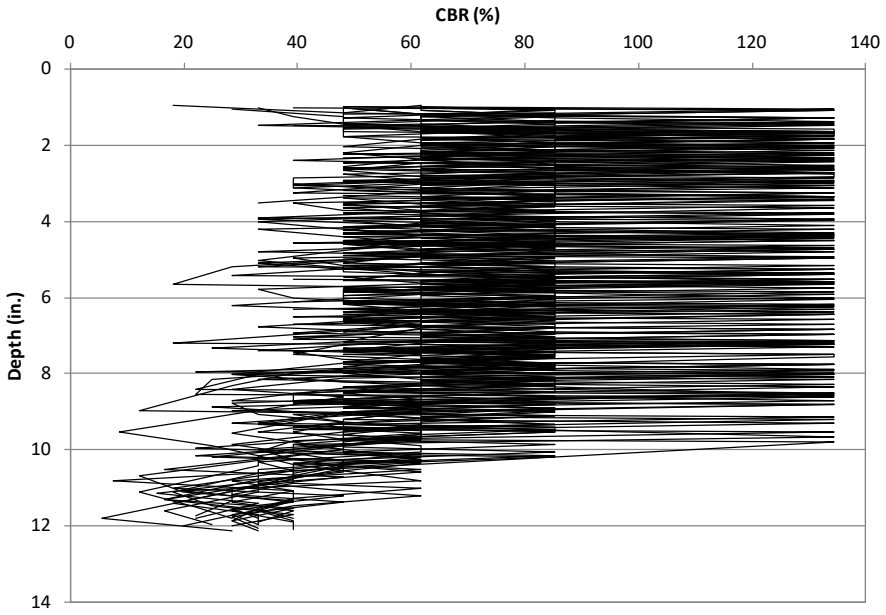


Figure 6-3: Base course DCP results as a function of depth.

6.4 Unit Weight

In-place dry unit weight of the final layer of base course was measured using the sand cone method (four measurements per test section) and a nuclear density gauge (eight measurements per test section). Nuclear density measurements were made at a probe depth of 8 inches. The average dry unit weights for each test section are summarized in Table 6-3. The full report for the nuclear density tests is provided in Appendix D.

Table 6-3: Average dry unit weights of the compacted subgrade.

Layer†	Average Dry Unit Weight (lb/ft^3) and Percent Compaction		
	Test Section 1	**Test Section 2**	**Test Section 3**
3 (nuclear)	137.5 (100.6%)	136.9 (100.1%)	137.7 (100.7%)
3 (sand cone)	137.7 (100.7%)	138.7 (101.5%)	137.5 (100.6%)
2	137.7 (100.7%)	137.9 (100.9%)	136.5 (99.9%)
1	136.0 (99.5%)	135.5 (99.1%)	137.4 (100.5%)

† Layer 1 is the bottom base layer, and Layer 3 is the top layer.

7 Asphalt

Surface C asphalt, according to the South Carolina DOT mix design, was purchased from a hot-mix plant (Rogers Group – Greer, SC) near the TRI Environmental laboratory. Properties of the mix were determined by the QC lab at the hot-mix plant during the morning that the paving was done and these results are provided in Appendix E. The asphalt was placed in a single lift that had an average thickness of 3.37 ± 0.13 in. It was placed using a full-size paving machine (Figure 7-1), and compacted using a tandem roller (Figure 7-2) and pneumatic roller (Figure 7-3).

Figure 7-1: Placement of the hot-mix asphalt.

Figure 7-2: Compaction of hot-mix asphalt using a smooth drum roller.

Figure 7-3: Compaction of hot-mix asphalt with a pneumatic roller.

Density measurements were made during construction using a nuclear density gauge to ensure adequate compaction. After compaction was complete, 36 measurements of density were made in each test section to fully evaluate the density of the asphalt mat (measurement positions are shown in Appendix A). The average density within each test section and the percent compaction compared to the maximum density of 152.9 lb/ft^3 are shown in Table 7-1. Individual nuclear density test results are provided in Appendix E.

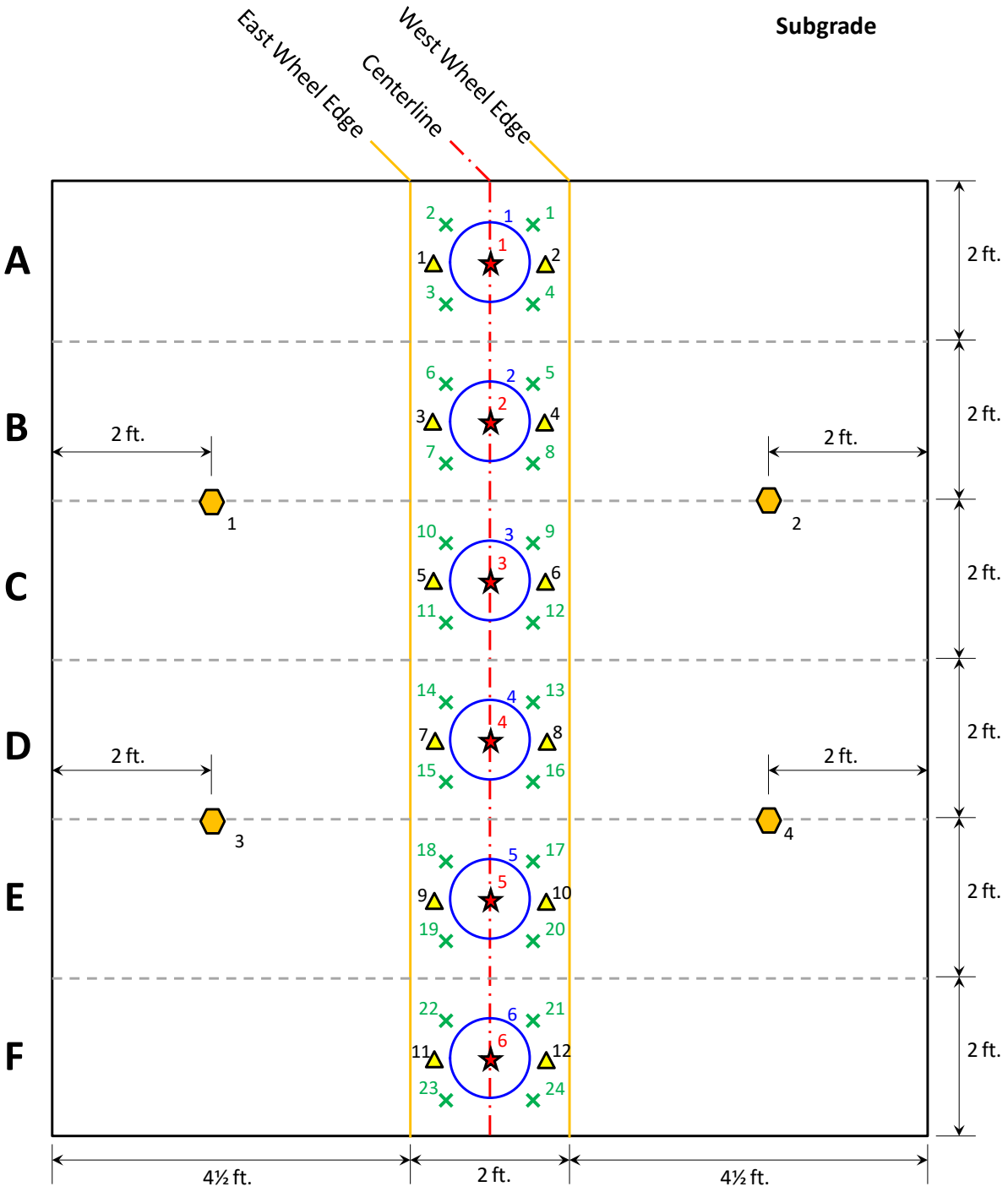
Table 7-1: Average density of the compacted asphalt layer from nuclear density tests.

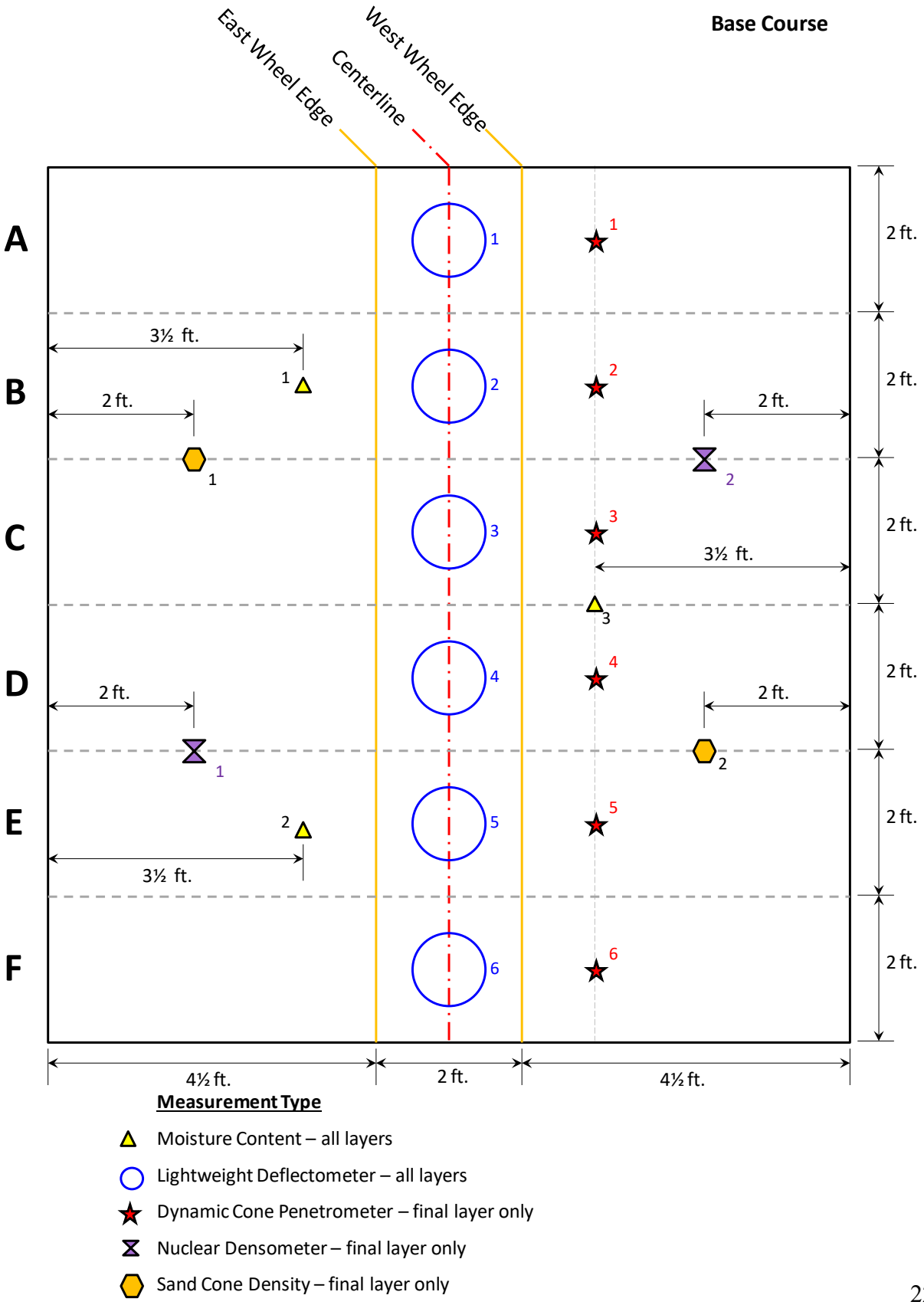
Nuclear Density	Average Density and Percent Compaction		
	Test Section 1	Test Section 2	Test Section 3
Density (lb/ft^3)	137.8	139.4	140.8
Percent Compaction (%)	90.1	91.2	92.1

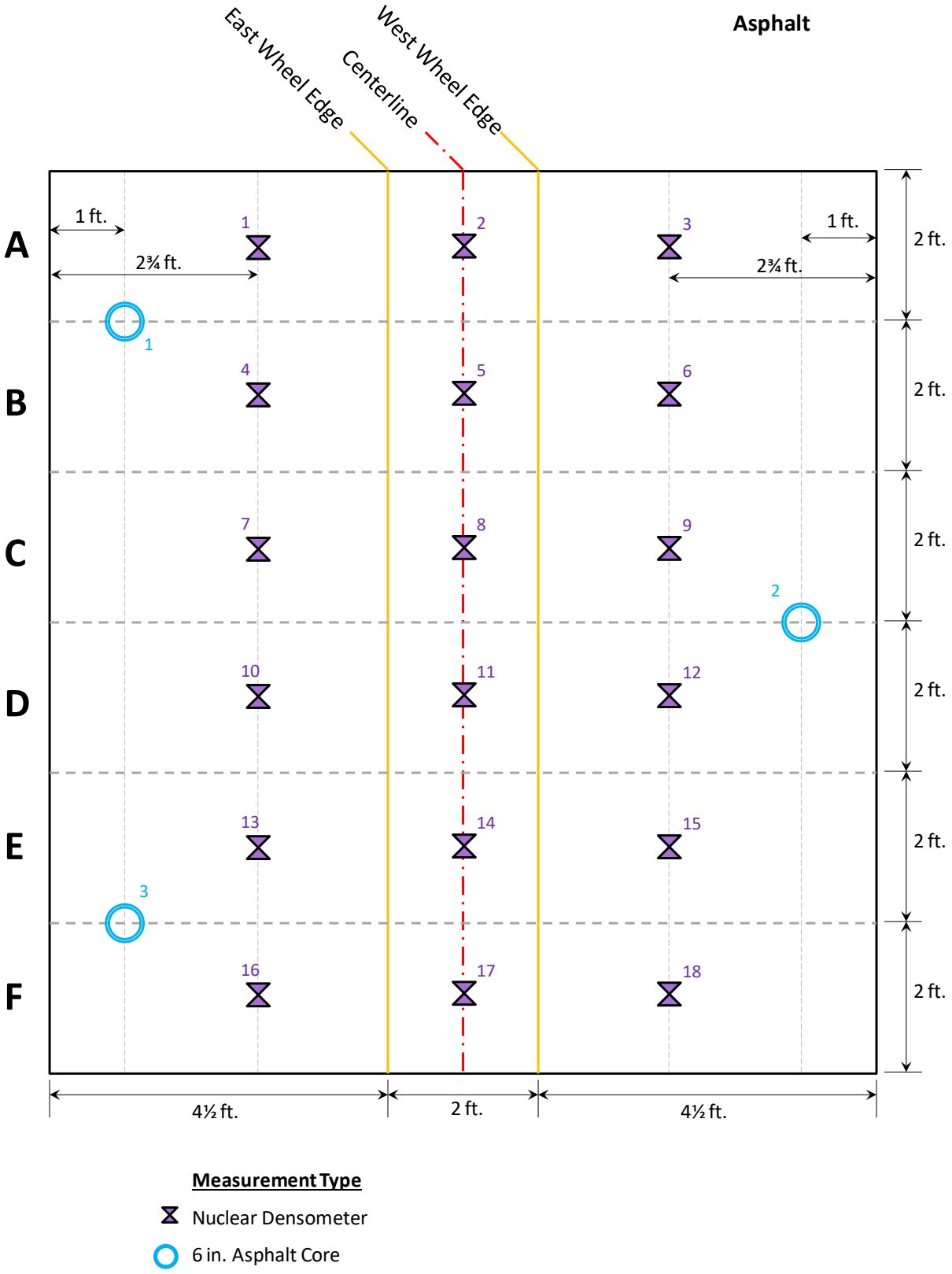
8 References

Kleyn, E.G. (1975) The Use of the Dynamic Cone Penetrometer (DCP), South Africa, Transvaal Roads Department, Materials Branch.

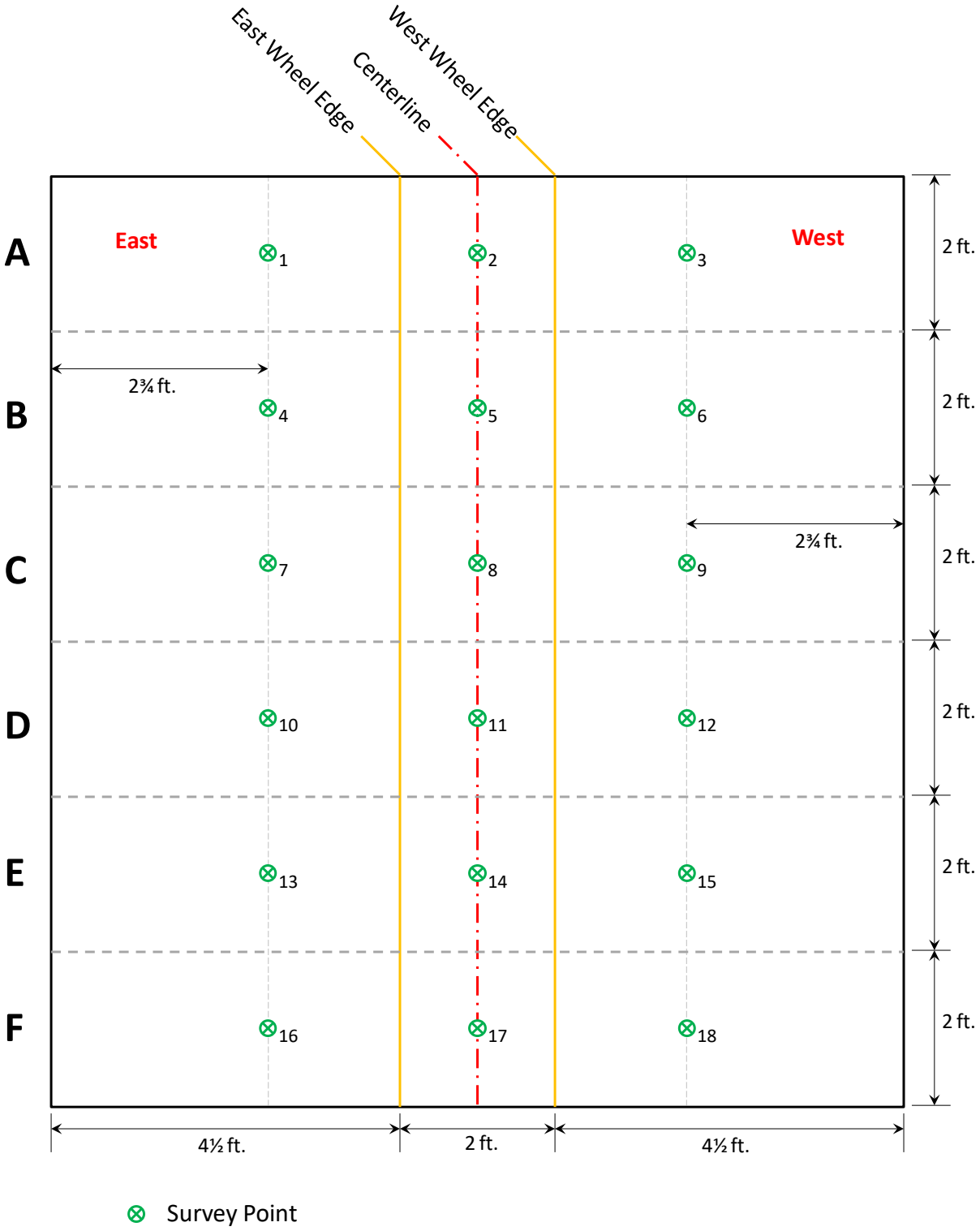
9 Appendix A: Layout of Construction QC Measurement Locations


Subgrade
East Wheel Edge
Centerline
West Wheel Edge
A
B
C
D
E
F
2 ft.
4½ ft.
Measurement Type
Vane Shear – all layers
Moisture Content – all layers
Lightweight Deflectometer – final 3 layers
Dynamic Cone Penetrometer – final layer only
Sand Cone Density – final layer only

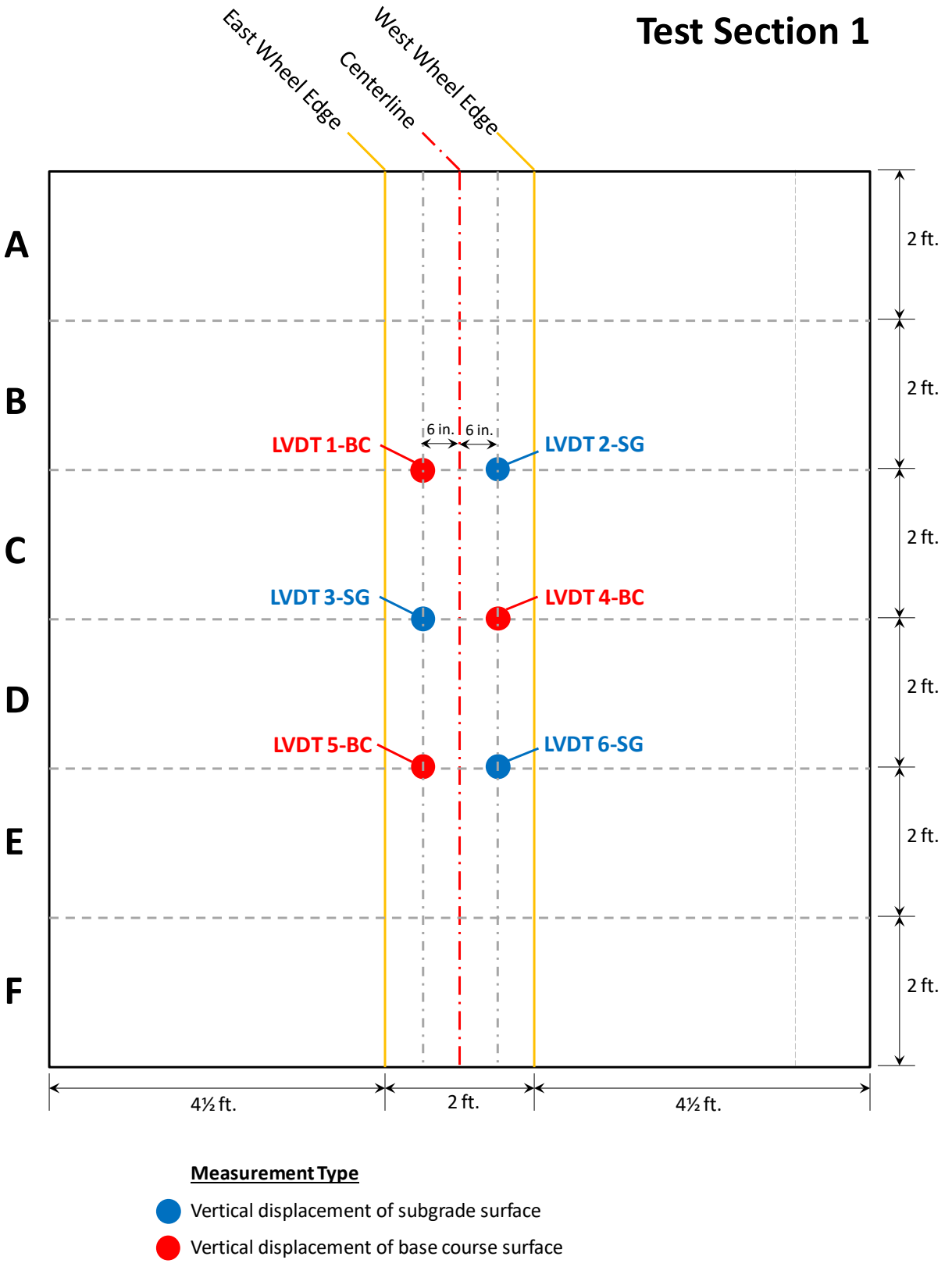

Base Course
East Wheel Edge
Centerline
West Wheel Edge
A
B
C
D
E
F
2 ft.
3½ ft.
4½ ft.
2 ft.
4½ ft.
Measurement Type
Moisture Content – all layers
Lightweight Deflectometer – all layers
Dynamic Cone Penetrometer – final layer only
Nuclear Densometer – final layer only
Sand Cone Density – final layer only

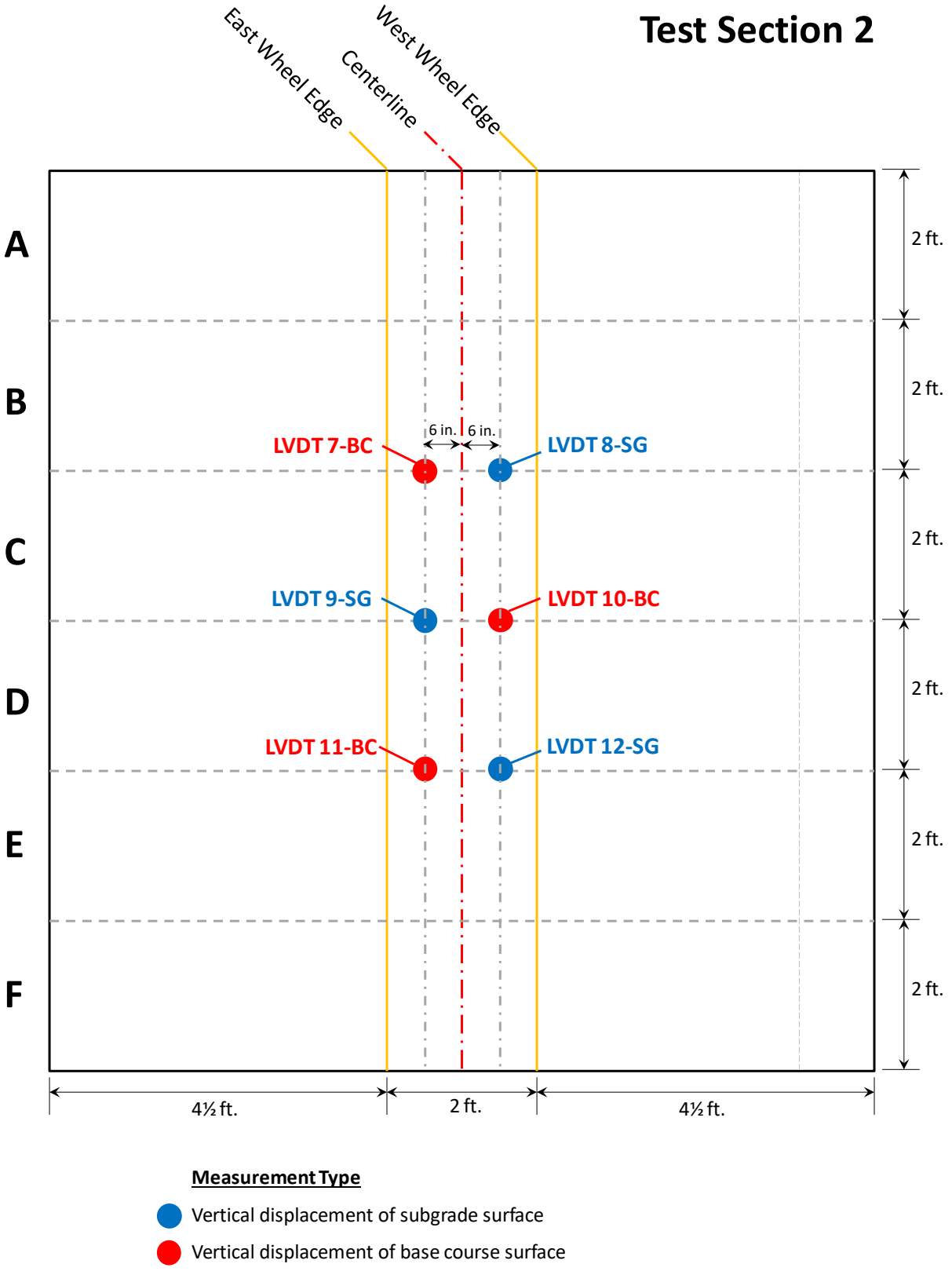

Asphalt
East Wheel Edge
Centerline
West Wheel Edge
A
B
C
D
E
F
1 ft.
2¾ ft.
1 ft.
2¾ ft.
2 ft.
2 ft.
2 ft.
2 ft.
2 ft.
2 ft.
4½ ft.
2 ft.
4½ ft.
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
1
2
3
Measurement Type
Nuclear Densometer
6 in. Asphalt Core

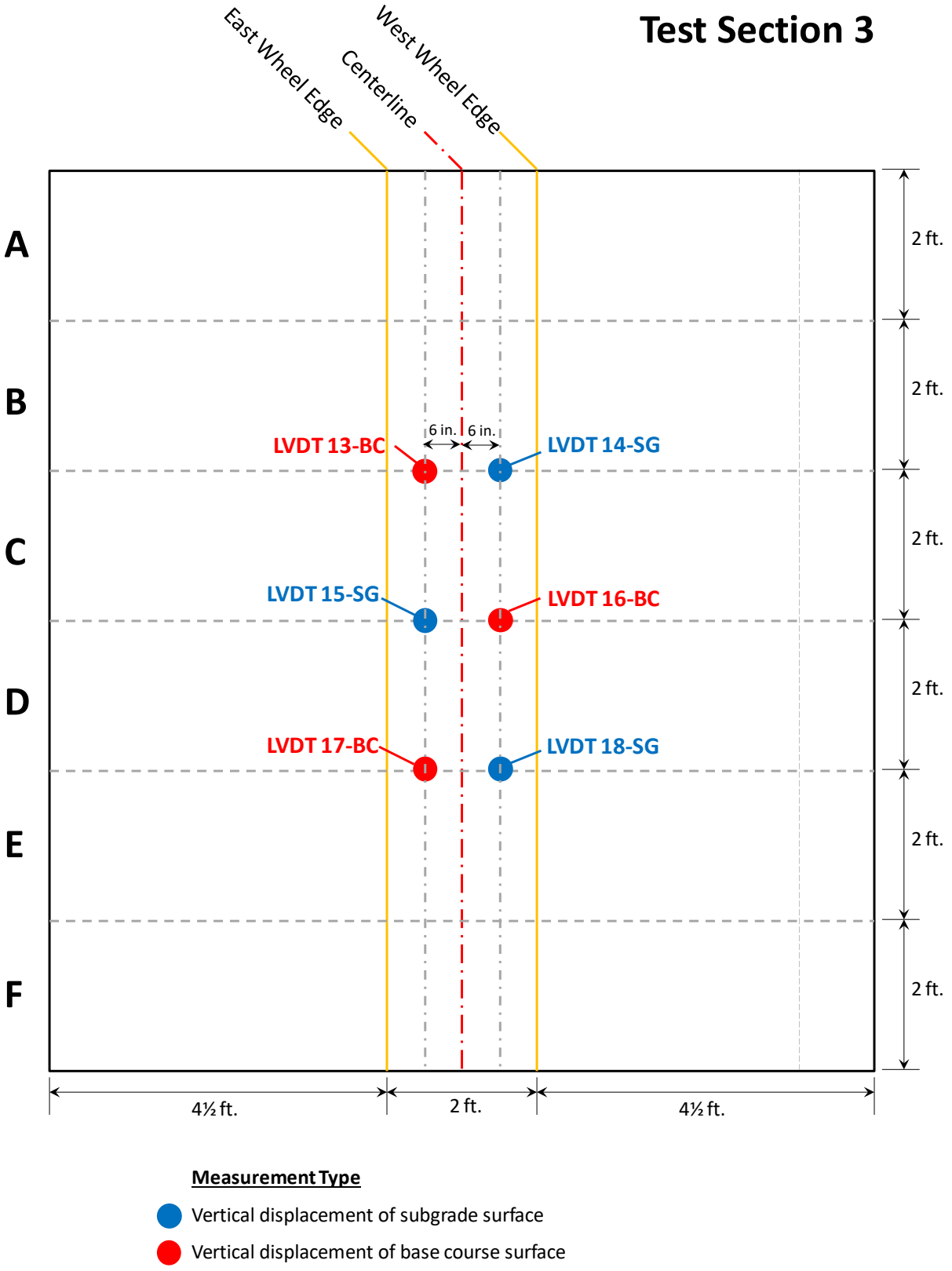
10 Appendix B: Layout of Elevation Measurements


East Wheel Edge
Centerline
West Wheel Edge
East
West
A
B
C
D
E
F
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
2¾ ft.
2¾ ft.
2 ft.
2 ft.
2 ft.
2 ft.
2 ft.
2 ft.
4½ ft.
2 ft.
4½ ft.
Survey Point

11 Appendix C: Position and Layout of Displacement Sensors within Each Test Section


Test Section 1
East Wheel Edge
Centerline
West Wheel Edge
A
B
C
D
E
F
2 ft.
2 ft.
2 ft.
2 ft.
2 ft.
2 ft.
6 in.
6 in.
LVDT 1-BC
LVDT 2-SG
LVDT 3-SG
LVDT 4-BC
LVDT 5-BC
LVDT 6-SG
4½ ft.
2 ft.
4½ ft.
Measurement Type
Vertical displacement of subgrade surface
Vertical displacement of base course surface


Test Section 2
East Wheel Edge
Centerline
West Wheel Edge
A
B
C
D
E
F
2 ft.
2 ft.
2 ft.
2 ft.
2 ft.
2 ft.
6 in.
6 in.
LVDT 7-BC
LVDT 8-SG
LVDT 9-SG
LVDT 10-BC
LVDT 11-BC
LVDT 12-SG
4½ ft.
2 ft.
4½ ft.
Measurement Type
Vertical displacement of subgrade surface
Vertical displacement of base course surface


Test Section 3
East Wheel Edge
Centerline
West Wheel Edge
A
B
C
D
E
F
2 ft.
2 ft.
2 ft.
2 ft.
2 ft.
2 ft.
6 in.
6 in.
LVDT 13-BC
LVDT 14-SG
LVDT 15-SG
LVDT 16-BC
LVDT 17-BC
LVDT 18-SG
4½ ft.
2 ft.
4½ ft.
Measurement Type
Vertical displacement of subgrade surface
Vertical displacement of base course surface

12 Appendix D: Nuclear Density Test Results for the Compacted Base Course

S&ME, Inc.
301 Zima Park Drive
Spartanburg, SC 29301
Phone: 864-574-2360 | Fax: 864-576-8730

DENSITY - NUCLEAR METHOD

Report #: SNG-000005
Report Date: 11/20/2019
Test Method: ASTM D 6938

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Remark
62		9/13/19	100	D698-C	GW	7.7	136.7	3.2	138.7	8	101	95	PASS
63		9/13/19	100	D698-C	GW	7.7	136.7	3.2	133.0	8	97	95	PASS
64		9/13/19	100	D698-C	GW	7.7	136.7	2.9	137.7	8	101	95	PASS
65		9/13/19	100	D698-C	GW	7.7	136.7	3.1	139.1	8	102	95	PASS
66		9/13/19	100	D698-C	GW	7.7	136.7	3.2	137.9	8	101	95	PASS
67		9/13/19	100	D698-C	GW	7.7	136.7	3.1	138.8	8	102	95	PASS
68		9/13/19	100	D698-C	GW	7.7	136.7	2.9	138.7	8	101	95	PASS
69		9/13/19	100	D698-C	GW	7.7	136.7	3.2	136.2	8	100	95	PASS

Test Information

Test #	Test Location	Elevation	Reference	Gauge Make / Model / SN / Calibrated	Field Technician
62	PAVEMENT - Base: Location 1	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
63	PAVEMENT - Base: Location 2	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
64	PAVEMENT - Base: Location 3	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
65	PAVEMENT - Base: Location 4	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
66	PAVEMENT - Base: Location 5	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
67	PAVEMENT - Base: Location 6	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
68	PAVEMENT - Base: Location 7	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
69	PAVEMENT - Base: Location 8	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN

Remarks	Comments
PASS: Density test results comply with specifications. Moisture Not Specified.	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter". Gauge calibration data on file with the testing agency.

The above tests were performed in general accordance with the applicable test method, except for known deviations noted above. The density determined represents the soil density at the test location at the time of the test. The test result relates only to the material tested.

S&ME, Inc.
301 Zima Park Drive
Spartanburg, SC 29301
Phone: 864-574-2360 | Fax: 864-576-8730

DENSITY - NUCLEAR METHOD

Report #: SNG-000005
Report Date: 11/20/2019
Test Method: ASTM D 6938

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Remark
70		9/13/19	100	D698-C	GW	7.7	136.7	2.9	138.5	8	101	95	PASS
71		9/13/19	100	D698-C	GW	7.7	136.7	2.8	134.7	8	99	95	PASS
72		9/13/19	100	D698-C	GW	7.7	136.7	2.9	135.8	8	99	95	PASS
73		9/13/19	100	D698-C	GW	7.7	136.7	2.6	138.5	8	101	95	PASS
74		9/13/19	100	D698-C	GW	7.7	136.7	3.5	137.3	8	100	95	PASS
75		9/13/19	100	D698-C	GW	7.7	136.7	3.8	133.7	8	98	95	PASS
76		9/13/19	100	D698-C	GW	7.7	136.7	3.6	137.0	8	100	95	PASS
77		9/13/19	100	D698-C	GW	7.7	136.7	3.1	139.7	8	102	95	PASS

Test Information

Test #	Test Location	Elevation	Reference	Gauge Make / Model / SN / Calibrated	Field Technician
70	PAVEMENT - Base: Location 9	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
71	PAVEMENT - Base: Location 10	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
72	PAVEMENT - Base: Location 11	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
73	PAVEMENT - Base: Location 12	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
74	PAVEMENT - Base: Location 13	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
75	PAVEMENT - Base: Location 14	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
76	PAVEMENT - Base: Location 15	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
77	PAVEMENT - Base: Location 16	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN

Remarks	Comments
PASS: Density test results comply with specifications. Moisture Not Specified.	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter". Gauge calibration data on file with the testing agency.

The above tests were performed in general accordance with the applicable test method, except for known deviations noted above. The density determined represents the soil density at the test location at the time of the test. The test result relates only to the material tested.

S&ME, Inc.
301 Zima Park Drive
Spartanburg, SC 29301
Phone: 864-574-2360 | Fax: 864-576-8730

DENSITY - NUCLEAR METHOD

Report #: SNG-000005
Report Date: 11/20/2019
Test Method: ASTM D 6938

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Remark
78		9/13/19	100	D698-C	GW	7.7	136.7	2.7	139.3	8	102	95	PASS
79		9/13/19	100	D698-C	GW	7.7	136.7	2.8	136.3	8	100	95	PASS
80		9/13/19	100	D698-C	GW	7.7	136.7	3.0	139.0	8	102	95	PASS
81		9/13/19	100	D698-C	GW	7.7	136.7	2.9	137.5	8	101	95	PASS
82		9/13/19	100	D698-C	GW	7.7	136.7	2.9	139.1	8	102	95	PASS
83		9/13/19	100	D698-C	GW	7.7	136.7	3.1	134.3	8	98	95	PASS
84		9/13/19	100	D698-C	GW	7.7	136.7	2.8	137.1	8	100	95	PASS
85		9/13/19	100	D698-C	GW	7.7	136.7	3.0	138.8	8	102	95	PASS

Test Information

Test #	Test Location	Elevation	Reference	Gauge Make / Model / SN / Calibrated	Field Technician
78	PAVEMENT - Base: Location 17	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
79	PAVEMENT - Base: Location 18	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
80	PAVEMENT - Base: Location 19	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
81	PAVEMENT - Base: Location 20	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
82	PAVEMENT - Base: Location 21	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
83	PAVEMENT - Base: Location 22	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
84	PAVEMENT - Base: Location 23	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN
85	PAVEMENT - Base: Location 24	0.0	SG	Troxler / 3411-B / 10156 / 11/27/2018	WILLIAM BRIAN VAUGHAN

Remarks	Comments
PASS: Density test results comply with specifications. Moisture Not Specified.	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter". Gauge calibration data on file with the testing agency.

The above tests were performed in general accordance with the applicable test method, except for known deviations noted above. The density determined represents the soil density at the test location at the time of the test. The test result relates only to the material tested.

13 Appendix E: Mix Properties and Nuclear Density Test Results for the Asphalt

ROGERS GROUP GREER - ASPHALT PLANT WORKSHEET NO. 1

File No.:	Project victory	Date:	9/23/19	SC-T-101:	73
Type Mix:	Surface C	Time:	08:30	Tonnage Taken:	80.00
Job Mix No.:	E0130	Sample No.:	8 - 1	Load Weight:	20.30
Temp. Corr. Factor:	0.23	Mix Temp.:	300º	Load No.:	4
Mix Corr. Factor:	0.03	Silo No.:	1		
Oven Type:	NCAT	Tested By:	jordan milford		

Extraction			
Weight of Basket and Sample	4468.4		
Weight of Basket	3191.4		
Weight of Sample	1277.0	Tolerance (-/+)	
% Asphalt Binder Content (PG 64-22)	5.55	5.34	6.06

MSG / ESG	Sample 1	Sample 2
(A) Weight of Bowl and Sample in Air	3670.5	3701.2
(B) Weight of Bowl in Air	2154.9	2204.2
(C) Weight of Sample in Air (A-B)	1515.6	1497.0
(D) Weight of Bowl and Sample under water	2258.0	2277.5
(E) Weight of Bowl under Water	1360.3	1391.9
(F) Weight of Sample under water (D-E)	897.7	885.6
Specific Gravity of Binder	1.034	1.034
MSG	2.453	2.448
ESG	2.668	2.662

Average MSG	2.451
Average ESG	2.665

Core Bulk SG Properties			
WEIGHT IN AIR, gms.	4740.6	4742.3	
WEIGHT IN WATER, gms.	2718.4	2721.8	
SSD WEIGHT, gms.	4742.0	4743.4	
VOLUME	2023.6	2021.6	
BSG	2.343	2.346	
MSG	2.451	2.451	
% AIR VOIDS	4.41	4.28	
% VMA	16.99	16.87	
STABILITY			

AVERAGE BSG	2.345			
AVERAGE DENSITY, pcf	146.33	Tolerance (-/+)		
AVERAGE % AIR VOIDS	4.35	3.21	-	5.51
AVERAGE % VMA	16.93	16.26	-	18.56
AVERAGE STABILITY				

Mix Gradation			Before Sieve Weight (SC-T-102)				1207.0				
SIEVE, mm	37.5mm	25.0mm	19.0mm	12.5mm	**9.5mm**	4.75mm	**2.36mm**	0.60mm	0.150mm	0.075mm	
SIEVE, Standard	1.5"	1"	3/4"	1/2"	**3/8"**	#4	**#8**	#30	#100	#200	
WEIGHT PASSING	1207.0	1207.0	1207.0	1185.3	1117.3	815.0	585.8	352.0	109.5	53.8	
PERCENT PASSING	100.0	100.0	100.0	98.2	***92.6***	67.5	***48.5***	29.2	9.1	4.46	D/A Ratio
JOB MIX TARGET	100.0	100.0	100.0	99.0	94.0	68.0	50.0	30.0	11.0	5.0	
JOB MIX USL	100.0	100.0	100.0	100.0	100.0	75.0	56.0	35.0	15.0	7.0	
JOB MIX LSL	100.0	100.0	100.0	97.0	87.0	61.0	44.0	25.0	7.0	3.0	
(PERCENT PASSING - TARGET)	0.00	0.00	0.00	(0.80)	(1.40)	(0.50)	(1.50)	(0.80)	(1.90)	(0.54)	0.80

PAY ITEMS:	% Binder	5.55	3/8 in. Sieve	92.6	No. 8 Sieve	48.5

Form No. 400.03

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S&ME, Inc.
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Phone: 864-574-2360 | Fax: 864-576-8730

ASPHALT PLACEMENT DENSITY

Report #: BNG-000007
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
55		9/23/19	PAVEMENT: Test Strip 1 A - West (1)	Surface	E0130		152.9	Supplied Value	140.6	Backscatter	92	92 / 95		31917	WESLEY EDWARDS
56		9/23/19	PAVEMENT: Test Strip 1 A - West (2)	Surface	E0130		152.9	Supplied Value	140.6	Backscatter	92	92 / 95		31917	WESLEY EDWARDS
57		9/23/19	PAVEMENT: Test Strip 1 A - Center (1)	Surface	E0130		152.9	Supplied Value	136.6	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS
58		9/23/19	PAVEMENT: Test Strip 1 A - Center (2)	Surface	E0130		152.9	Supplied Value	138.2	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
59		9/23/19	PAVEMENT: Test Strip 1 A - East (1)	Surface	E0130		152.9	Supplied Value	137.3	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
60		9/23/19	PAVEMENT: Test Strip 1 A - East (2)	Surface	E0130		152.9	Supplied Value	137.1	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

Reviewed/Prepared by:
WILLIAM BRIAN VAUGHAN
Nov 21, 2019

The above tests were performed in general accordance with the applicable test method, except for known deviations noted above.

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ASPHALT PLACEMENT DENSITY

Report #: BNG-000026
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
61		9/23/19	PAVEMENT: Test Strip 1 B - West (1)	Surface	E0130		152.9	Supplied Value	142.3	Backscatter	93	92 / 95		31917	WESLEY EDWARDS
62		9/23/19	PAVEMENT: Test Strip 1 B - West (2)	Surface	E0130		152.9	Supplied Value	138.1	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
63		9/23/19	PAVEMENT: Test Strip 1 B - Center (1)	Surface	E0130		152.9	Supplied Value	138.4	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
64		9/23/19	PAVEMENT: Test Strip 1 B - Center (2)	Surface	E0130		152.9	Supplied Value	139.7	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
65		9/23/19	PAVEMENT: Test Strip 1 B - East (1)	Surface	E0130		152.9	Supplied Value	139.1	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
66		9/23/19	PAVEMENT: Test Strip 1 B - East (2)	Surface	E0130		152.9	Supplied Value	139.2	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

Reviewed/Prepared by:
WILLIAM BRIAN VAUGHAN
Nov 21, 2019

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Spartanburg, SC 29301
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ASPHALT PLACEMENT DENSITY

Report #: BNG-000010
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
67		9/23/19	PAVEMENT: Test Strip1 C - West (1)	Surface	E0130		152.9	Supplied Value	136.1	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS
68		9/23/19	PAVEMENT: Test Strip 1 C - West (2)	Surface	E0130		152.9	Supplied Value	137.9	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
69		9/23/19	PAVEMENT: Test Strip 1 C - Center (1)	Surface	E0130		152.9	Supplied Value	136.5	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS
70		9/23/19	PAVEMENT: Test Strip 1 C - Center (2)	Surface	E0130		152.9	Supplied Value	135.1	Backscatter	88	92 / 95	FAIL	31917	WESLEY EDWARDS
71		9/23/19	PAVEMENT: Test Strip 1 C - East (1)	Surface	E0130		152.9	Supplied Value	139.2	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
72		9/23/19	PAVEMENT: Test Strip 1 C - East (2)	Surface	E0130		152.9	Supplied Value	137.9	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

Reviewed/Prepared by:
WILLIAM BRIAN VAUGHAN
Nov 21, 2019

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Spartanburg, SC 29301
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ASPHALT PLACEMENT DENSITY

Report #: BNG-000011
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
73		9/23/19	PAVEMENT: Test Strip 1 D - West (1)	Surface	E0130		152.9	Supplied Value	136.8	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS
74		9/23/19	PAVEMENT: Test Strip 1 D - West (2)	Surface	E0130		152.9	Supplied Value	136.9	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
75		9/23/19	PAVEMENT: Test Strip1 D - Center (1)	Surface	E0130		152.9	Supplied Value	137.5	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
76		9/23/19	PAVEMENT: Test Strip1 D - Center (2)	Surface	E0130		152.9	Supplied Value	135.8	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS
77		9/23/19	PAVEMENT: Test Strip 1 D - East (1)	Surface	E0130		152.9	Supplied Value	136.9	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
78		9/23/19	PAVEMENT: Test Strip 1 D - East (2)	Surface	E0130		152.9	Supplied Value	137.4	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

Reviewed/Prepared by:
WILLIAM BRIAN VAUGHAN
Nov 21, 2019

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ASPHALT PLACEMENT DENSITY

Report #: BNG-000012
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
79		9/23/19	PAVEMENT: Test Strip 1 E - West (1)	Surface	E0130		152.9	Supplied Value	139.2	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
80		9/23/19	PAVEMENT: Test Strip 1 E - West (2)	Surface	E0130		152.9	Supplied Value	138.5	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
81		9/23/19	PAVEMENT: Test Strip 1 E - Center (1)	Surface	E0130		152.9	Supplied Value	138.6	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
82		9/23/19	PAVEMENT: Test Strip 1 E - Center (2)	Surface	E0130		152.9	Supplied Value	136.5	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS
83		9/23/19	PAVEMENT: Test Strip 1 E - East (1)	Surface	E0130		152.9	Supplied Value	137.5	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
84		9/23/19	PAVEMENT: Test Strip 1 E - East (2)	Surface	E0130		152.9	Supplied Value	139.0	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

Reviewed/Prepared by:
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Nov 21, 2019

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ASPHALT PLACEMENT DENSITY

Report #: BNG-000013
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
85		9/23/19	PAVEMENT: Test Strip 1 F - West (1)	Surface	E0130		152.9	Supplied Value	136.6	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS
86		9/23/19	PAVEMENT: Test Strip 1 F - West (2)	Surface	E0130		152.9	Supplied Value	135.6	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS
87		9/23/19	PAVEMENT: Test Strip 1 F - Center (1)	Surface	E0130		152.9	Supplied Value	137.8	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
88		9/23/19	PAVEMENT: Test Strip 1 F - Center (2)	Surface	E0130		152.9	Supplied Value	137.9	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
89		9/23/19	PAVEMENT: Test Strip 1 F - East (1)	Surface	E0130		152.9	Supplied Value	136.7	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS
90		9/23/19	PAVEMENT: Test Strip 1 F - East (2)	Surface	E0130		152.9	Supplied Value	135.3	Backscatter	88	92 / 95	FAIL	31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

Reviewed/Prepared by:
WILLIAM BRIAN VAUGHAN
Nov 21, 2019

S&ME, Inc.
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ASPHALT PLACEMENT DENSITY

Report #: BNG-000014
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
91		9/23/19	PAVEMENT: Test Strip 2 A - West (1)	Surface	E0130		152.9	Supplied Value	141.3	Backscatter	92	92 / 95		31917	WESLEY EDWARDS
92		9/23/19	PAVEMENT: Test Strip 2 A - West (2)	Surface	E0130		152.9	Supplied Value	138.0	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
93		9/23/19	PAVEMENT: Test Strip 2 A - Center (1)	Surface	E0130		152.9	Supplied Value	136.3	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS
94		9/23/19	PAVEMENT: Test Strip 2 A - Center (2)	Surface	E0130		152.9	Supplied Value	136.3	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS
95		9/23/19	PAVEMENT: Test Strip 2 A - East (1)	Surface	E0130		152.9	Supplied Value	140.6	Backscatter	92	92 / 95		31917	WESLEY EDWARDS
96		9/23/19	PAVEMENT: Test Strip 2 A - East (2)	Surface	E0130		152.9	Supplied Value	143.7	Backscatter	94	92 / 95		31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

Reviewed/Prepared by:
WILLIAM BRIAN VAUGHAN
Nov 21, 2019

The above tests were performed in general accordance with the applicable test method, except for known deviations noted above.

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ASPHALT PLACEMENT DENSITY

Report #: BNG-000015
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
97		9/23/19	PAVEMENT: Test Strip 2 B - West (1)	Surface	E0130		152.9	Supplied Value	139.8	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
98		9/23/19	PAVEMENT: Test Strip 2 B - West (2)	Surface	E0130		152.9	Supplied Value	138.8	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
99		9/23/19	PAVEMENT: Test Strip 2 B - Center (1)	Surface	E0130		152.9	Supplied Value	143.1	Backscatter	94	92 / 95		31917	WESLEY EDWARDS
100		9/23/19	PAVEMENT: Test Strip 2 B - Center (2)	Surface	E0130		152.9	Supplied Value	140.9	Backscatter	92	92 / 95		31917	WESLEY EDWARDS
101		9/23/19	PAVEMENT: Test Strip 2 B - East (1)	Surface	E0130		152.9	Supplied Value	137.7	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
102		9/23/19	PAVEMENT: Test Strip 2 B - East (2)	Surface	E0130		152.9	Supplied Value	136.6	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

Reviewed/Prepared by:
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Nov 21, 2019

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ASPHALT PLACEMENT DENSITY

Report #: BNG-000016
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
103		9/23/19	PAVEMENT: Test Strip 2 C - West (1)	Surface	E0130		152.9	Supplied Value	139.3	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
104		9/23/19	PAVEMENT: Test Strip 2 C - West (2)	Surface	E0130		152.9	Supplied Value	138.1	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
105		9/23/19	PAVEMENT: Test Strip 2 C - Center (1)	Surface	E0130		152.9	Supplied Value	140.2	Backscatter	92	92 / 95		31917	WESLEY EDWARDS
106		9/23/19	PAVEMENT: Test Strip 2 C - Center (2)	Surface	E0130		152.9	Supplied Value	143.0	Backscatter	94	92 / 95		31917	WESLEY EDWARDS
107		9/23/19	PAVEMENT: Test Strip 2 C - East (1)	Surface	E0130		152.9	Supplied Value	140.5	Backscatter	92	92 / 95		31917	WESLEY EDWARDS
108		9/23/19	PAVEMENT: Test Strip 2 C - East (2)	Surface	E0130		152.9	Supplied Value	139.7	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

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ASPHALT PLACEMENT DENSITY

Report #: BNG-000017
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
109		9/23/19	PAVEMENT: Test Strip 2 D - West (1)	Surface	E0130		152.9	Supplied Value	137.0	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
110		9/23/19	PAVEMENT: Test Strip 2 D - West (2)	Surface	E0130		152.9	Supplied Value	136.7	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS
111		9/23/19	PAVEMENT: Test Strip 2 D - Center (1)	Surface	E0130		152.9	Supplied Value	138.0	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
112		9/23/19	PAVEMENT: Test Strip 2 D - Center (2)	Surface	E0130		152.9	Supplied Value	137.9	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
113		9/23/19	PAVEMENT: Test Strip 2 D - East (1)	Surface	E0130		152.9	Supplied Value	142.3	Backscatter	93	92 / 95		31917	WESLEY EDWARDS
114		9/23/19	PAVEMENT: Test Strip 2 D - East (2)	Surface	E0130		152.9	Supplied Value	140.7	Backscatter	92	92 / 95		31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

Reviewed/Prepared by:
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ASPHALT PLACEMENT DENSITY

Report #: BNG-000018
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
115		9/23/19	PAVEMENT: Test Strip 2 E - West (1)	Surface	E0130		152.9	Supplied Value	138.7	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
116		9/23/19	PAVEMENT: Test Strip 2 E - West (2)	Surface	E0130		152.9	Supplied Value	137.8	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
117		9/23/19	PAVEMENT: Test Strip 2 E - Center (1)	Surface	E0130		152.9	Supplied Value	139.4	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
118		9/23/19	PAVEMENT: Test Strip 2 E - Center (2)	Surface	E0130		152.9	Supplied Value	137.3	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
119		9/23/19	PAVEMENT: Test Strip 2 E - East (1)	Surface	E0130		152.9	Supplied Value	140.1	Backscatter	92	92 / 95		31917	WESLEY EDWARDS
120		9/23/19	PAVEMENT: Test Strip 2 E - East (2)	Surface	E0130		152.9	Supplied Value	142.4	Backscatter	93	92 / 95		31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

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ASPHALT PLACEMENT DENSITY

Report #: BNG-000019
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
121		9/23/19	PAVEMENT: Test Strip 2 F - West (1)	Surface	E0130		152.9	Supplied Value	138.3	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
122		9/23/19	PAVEMENT: Test Strip 2 F - West (2)	Surface	E0130		152.9	Supplied Value	139.0	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
123		9/23/19	PAVEMENT: Test Strip 2 F - Center (1)	Surface	E0130		152.9	Supplied Value	137.5	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
124		9/23/19	PAVEMENT: Test Strip 2 F - Center (2)	Surface	E0130		152.9	Supplied Value	139.0	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
125		9/23/19	PAVEMENT: Test Strip 2 F - East (1)	Surface	E0130		152.9	Supplied Value	143.1	Backscatter	94	92 / 95		31917	WESLEY EDWARDS
126		9/23/19	PAVEMENT: Test Strip 2 F - East (2)	Surface	E0130		152.9	Supplied Value	141.2	Backscatter	92	92 / 95		31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

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ASPHALT PLACEMENT DENSITY

Report #: BNG-000021
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
133		9/23/19	PAVEMENT: Test Strip 3 B - West (1)	Surface	E0130		152.9	Supplied Value	137.7	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
134		9/23/19	PAVEMENT: Test Strip 3 B - West (2)	Surface	E0130		152.9	Supplied Value	140.1	Backscatter	92	92 / 95		31917	WESLEY EDWARDS
135		9/23/19	PAVEMENT: Test Strip 3 B - Center (1)	Surface	E0130		152.9	Supplied Value	142.4	Backscatter	93	92 / 95		31917	WESLEY EDWARDS
136		9/23/19	PAVEMENT: Test Strip3 B - Center (2)	Surface	E0130		152.9	Supplied Value	140.7	Backscatter	92	92 / 95		31917	WESLEY EDWARDS
137		9/23/19	PAVEMENT: Test Strip3 B - East (1)	Surface	E0130		152.9	Supplied Value	145.0	Backscatter	95	92 / 95		31917	WESLEY EDWARDS
138		9/23/19	PAVEMENT: Test Strip 3 B - East (2)	Surface	E0130		152.9	Supplied Value	144.9	Backscatter	95	92 / 95		31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

Reviewed/Prepared by:
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ASPHALT PLACEMENT DENSITY

Report #: BNG-000022
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
139		9/23/19	PAVEMENT: Test Strip 3 C - West (1)	Surface	E0130		152.9	Supplied Value	141.1	Backscatter	92	92 / 95		31917	WESLEY EDWARDS
140		9/23/19	PAVEMENT: Test Strip 3 C - West (2)	Surface	E0130		152.9	Supplied Value	138.1	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
141		9/23/19	PAVEMENT: Test Strip 3 C - Center (1)	Surface	E0130		152.9	Supplied Value	138.4	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
142		9/23/19	PAVEMENT: Test Strip 3 C - Center (2)	Surface	E0130		152.9	Supplied Value	142.6	Backscatter	93	92 / 95		31917	WESLEY EDWARDS
143		9/23/19	PAVEMENT: Test Strip 3 C - East (1)	Surface	E0130		152.9	Supplied Value	139.1	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
144		9/23/19	PAVEMENT: Test Strip3 C - East (2)	Surface	E0130		152.9	Supplied Value	138.7	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

Reviewed/Prepared by:
WILLIAM BRIAN VAUGHAN
Nov 21, 2019

The above tests were performed in general accordance with the applicable test method, except for known deviations noted above.

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ASPHALT PLACEMENT DENSITY

Report #: BNG-000023
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
145		9/23/19	PAVEMENT: Test Strip3 D - West (1)	Surface	E0130		152.9	Supplied Value	143.5	Backscatter	94	92 / 95		31917	WESLEY EDWARDS
146		9/23/19	PAVEMENT: Test Strip 3 D - West (2)	Surface	E0130		152.9	Supplied Value	140.1	Backscatter	92	92 / 95		31917	WESLEY EDWARDS
147		9/23/19	PAVEMENT: Test Strip 3 D - Center (1)	Surface	E0130		152.9	Supplied Value	136.8	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS
148		9/23/19	PAVEMENT: Test Strip 3 D - Center (2)	Surface	E0130		152.9	Supplied Value	137.4	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
149		9/23/19	PAVEMENT: Test Strip 3 D - East (1)	Surface	E0130		152.9	Supplied Value	139.5	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
150		9/23/19	PAVEMENT: Test Strip 3 D - East (2)	Surface	E0130		152.9	Supplied Value	139.1	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

Reviewed/Prepared by:
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Nov 21, 2019

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ASPHALT PLACEMENT DENSITY

Report #: BNG-000024
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
151		9/23/19	PAVEMENT: Test Strip 3 E - West (1)	Surface	E0130		152.9	Supplied Value	137.4	Backscatter	90	92 / 95	FAIL	31917	WESLEY EDWARDS
152		9/23/19	PAVEMENT: Test Strip 3 E - West (2)	Surface	E0130		152.9	Supplied Value	139.4	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
153		9/23/19	PAVEMENT: Test Strip 3 E - Center (1)	Surface	E0130		152.9	Supplied Value	140.1	Backscatter	92	92 / 95		31917	WESLEY EDWARDS
154		9/23/19	PAVEMENT: Test Strip 3 E - Center (2)	Surface	E0130		152.9	Supplied Value	141.6	Backscatter	93	92 / 95		31917	WESLEY EDWARDS
155		9/23/19	PAVEMENT: Test Strip3 E - East (1)	Surface	E0130		152.9	Supplied Value	142.7	Backscatter	93	92 / 95		31917	WESLEY EDWARDS
156		9/23/19	PAVEMENT: Test Strip 3 E - East (2)	Surface	E0130		152.9	Supplied Value	143.9	Backscatter	94	92 / 95		31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
31917	Troxler	3430	1925	510	9/23/19	12/26/18	InstroTek Inc.

Reviewed/Prepared by:
WILLIAM BRIAN VAUGHAN
Nov 21, 2019

S&ME, Inc.
301 Zima Park Drive
Spartanburg, SC 29301
Phone: 864-574-2360 | Fax: 864-576-8730

ASPHALT PLACEMENT DENSITY

Report #: BNG-000025
Report Date: 11/21/2019
Test Method: ASTM D2950

Client:
TRI/Environmental, Inc.
4915 Clemson Blvd.
Anderson, SC 29621

Project:
142619038
TRI On-Call Lab Testing
Anderson
Anderson, SC 29621

Test Results

Test #	Retest Of	Test Date	Test Location	Material	Mix Design	Thickness (in)	Max Density (pcf)	Max Density Source	In Place Density (pcf)	Probe Depth (in)	Percent Comp.	Min/Max Comp. (%)	Remark	Gauge SN	Technician
157		9/23/19	PAVEMENT: Test Strip 3 F - West (1)	Surface	E0130		152.9	Supplied Value	136.2	Backscatter	89	92 / 95	FAIL	31917	WESLEY EDWARDS
158		9/23/19	PAVEMENT: Test Strip 3 F - West (2)	Surface	E0130		152.9	Supplied Value	138.8	Backscatter	91	92 / 95	FAIL	31917	WESLEY EDWARDS
159		9/23/19	PAVEMENT: Test Strip3 F - Center (1)	Surface	E0130		152.9	Supplied Value	145.6	Backscatter	95	92 / 95		31917	WESLEY EDWARDS
160		9/23/19	PAVEMENT: Test Strip 3 F - Center (2)	Surface	E0130		152.9	Supplied Value	144.0	Backscatter	94	92 / 95		31917	WESLEY EDWARDS
161		9/23/19	PAVEMENT: Test Strip 3 F - East (1)	Surface	E0130		152.9	Supplied Value	141.0	Backscatter	92	92 / 95		31917	WESLEY EDWARDS
162		9/23/19	PAVEMENT: Test Strip 3 F - East (2)	Surface	E0130		152.9	Supplied Value	141.8	Backscatter	93	92 / 95		31917	WESLEY EDWARDS

Remarks	Comments
FAIL: Tests results DO NOT comply with specifications	Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter"

Gauge Information

Gauge SN	Make	Model	Density Count	Moisture Count	Standard Count Date	Last Calibration Date	Last Calibrated By
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Reviewed/Prepared by:
WILLIAM BRIAN VAUGHAN
Nov 21, 2019

The above tests were performed in general accordance with the applicable test method, except for known deviations noted above.