

**Geotechnical Investigation Report
37th Street and 65th Avenue Intersection Design Project
City of Evans, Colorado**

**RockSol Project No. 530.02
February 22, 2023**



Prepared for:

**City of Evans
1100 37th Street
Evans, Colorado 80620**

**Attention: Mark Oberschmidt, P.E.
City Engineer**

Prepared by:



**RockSol Consulting Group, Inc.
12076 Grant Street
Thornton, Colorado 80241
(303) 962-9300**

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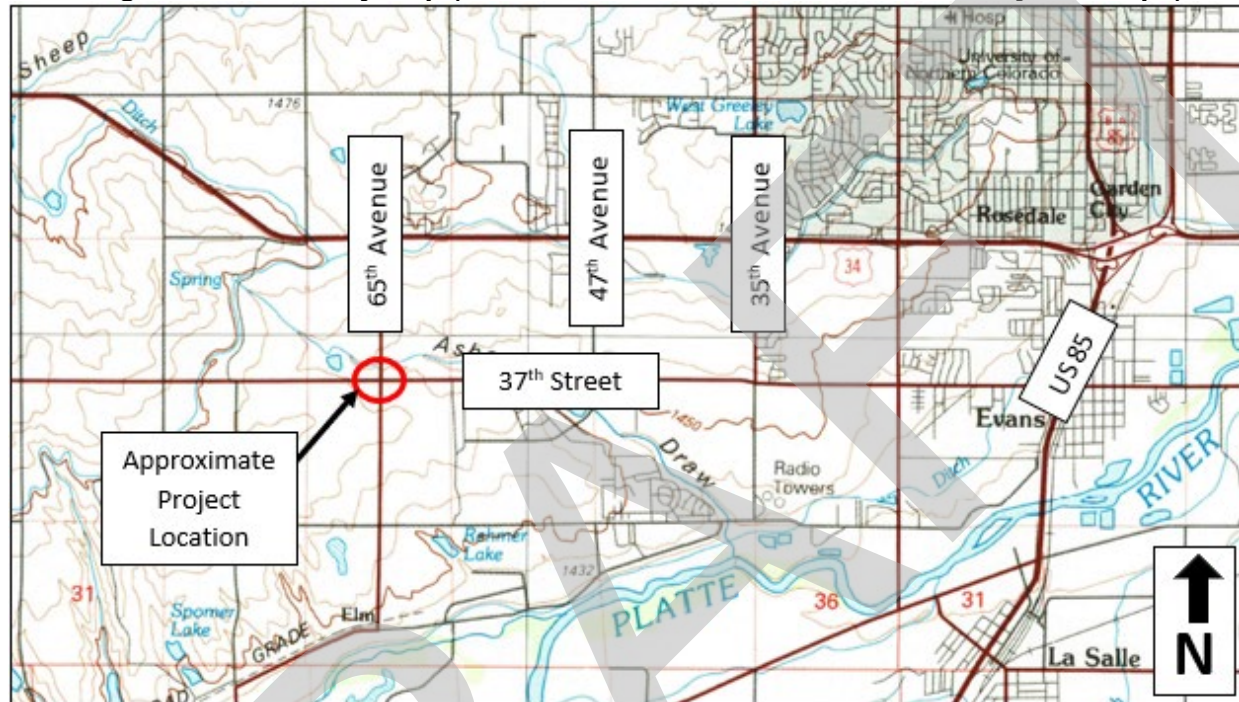
ATTACHMENTS

- Appendix A: Borehole Location Plan
- Appendix B: Legend and Borehole Logs
- Appendix C: Laboratory Test Result Summary and Test Result Sheets
- Appendix D: City of Evans 2018 Traffic Study Report
- Appendix E: M-E Pavement Design Output (37th Street, Flexible Design)
- Appendix F: M-E Pavement Design Output (37th Street, Rigid Design)
- Appendix G: M-E Pavement Design Output (65th Avenue, Flexible Design)
- Appendix H: M-E Pavement Design Output (65th Avenue, Rigid Design)
- Appendix I: M-E Pavement Design Output (37th Street & 65th Ave. Intersection, Flexible Design)
- Appendix J: M-E Pavement Design Output (37th Street & 65th Avenue Intersection, Rigid Design)

1.0 PROJECT PURPOSE AND DESCRIPTION

This report documents the geotechnical engineering investigation performed by RockSol Consulting Group, Inc. (RockSol) for the 37th Street and 65th Avenue Intersection Design Project in the City of Evans, Colorado (see Image 1, *Site Vicinity Map*).

Image 1 – Site Vicinity Map (Taken from USGS Bracewell and Greeley, CO Maps)



The purpose of this project is for the design of new intersection at 37th Street and 65th Avenue. A standard intersection with new traffic signals and turn lanes is being considered. Also being considered is a round-a-bout. The project will include widening 37th Street approximately 1,400 feet west of 65th Avenue with new pavement and widening 65th Avenue approximately 500 feet south of 37th Street with new pavement. Ancillary items such as striping modifications, signage installation, curb ramp installations and upgrades, landscape modifications, and grading/earthwork are also planned for the improvements project.

The geotechnical investigation was conducted by RockSol for the City of Evans. The scope of work for this geotechnical investigation included:

- Preparing a drilling program to perform a subsurface investigation and implementing the program to collect soil samples for laboratory testing.
- Performing laboratory tests and analyzing the data.
- Preparing a report that presents the field and laboratory data obtained, geological setting and conditions, geotechnical design parameters for traffic signal pole foundation and pavement thickness recommendations.

The subsurface investigation program was conducted to obtain information on the subsurface soil, groundwater, and bedrock conditions for the proposed structure, embankment, and new pavement construction. Surface and groundwater hydrology, hydraulic engineering, and environmental studies including contaminant characterization were not included in RockSol's geotechnical scope of work.

2.0 PROJECT SITE CONDITIONS

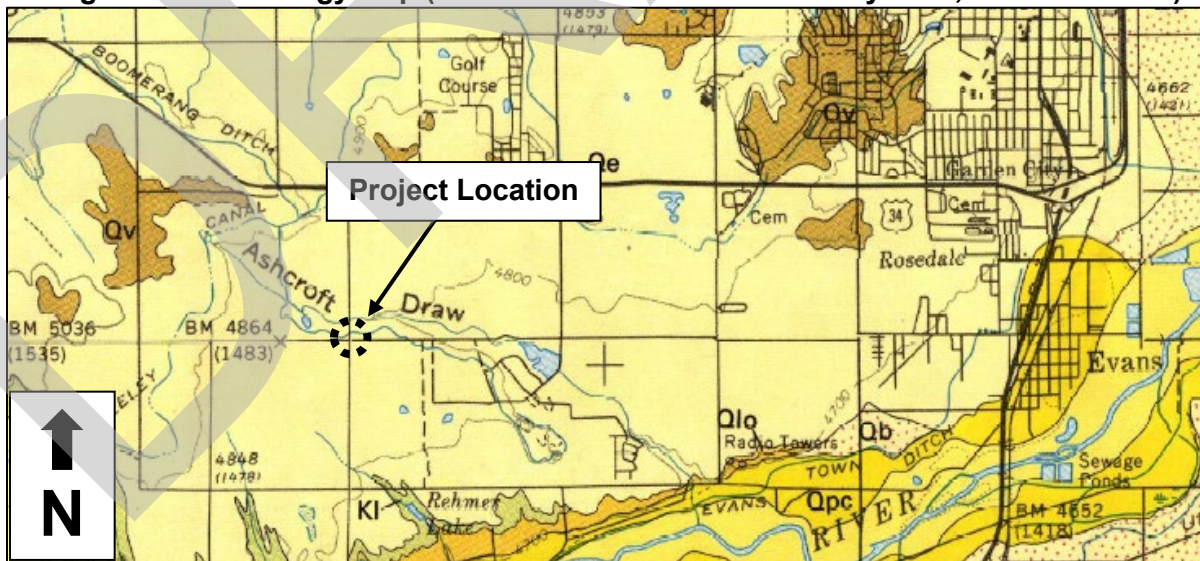
37th Street is part of a regionally significant east-west corridor known as the Freedom Parkway connecting I-25 on the west to the City of Evans on the east. 37th Street intersects US 85 approximately 4.8 miles east of the project limits. 65th Avenue is a minor principal arterial road running north-south and intersects 37th Street approximately 1.5 miles west of 47th Avenue. A combination of undeveloped land, agricultural land, and residential properties surround the project site limits.

Topography within the project limits generally consists of nearly flat slopes in all directions. Within the project limits, 37th Street currently consists of two lanes, one in each direction, with designated left turn lanes onto northbound and southbound 65th Avenue. South of 37th Street, 65th Avenue currently consisted of two lanes, one in each direction, with a designated left turn lane onto westbound 37th Street. North of 37th Street, 65th Avenue consists of 4 lanes, two in each direction, with a designated right turn lane onto westbound 37th Street, as well as bike lanes in each direction. The lanes are approximately 12 feet wide, surfaced with asphalt pavement. There are no paved shoulders within the project limits, and curb and gutters are only present on 65th Avenue in both directions north of 37th Street and in the southbound direction south of 37th street.

3.0 GEOLOGICAL CONDITIONS

Based on information presented in the United States Geological Survey (USGS) Geologic Map (See Image 3, *Site Geology Map*) of the Boulder-Fort Collins-Greeley Area, Colorado, by Roger B. Colton, dated 1978, Eolium (Qe) is mapped at or near the surface in the project limits. The Eolium generally consists of deposits of windblown clay, silt, and sand. Underlying the Eolium, claystone bedrock of the Laramie Formation (Kl) is mapped at or near the surface approximately one mile to the south of the project limits. The Laramie Formation is associated with upper cretaceous marine deposits, which generally consists of interbedded sandy shale, claystone, and scattered lenticular beds of sandstone and lignite. The Laramie Formation is generally poorly cemented and rippable with heavy excavation equipment.

Image 2 – Site Geology Map (Boulder – Fort Collins – Greeley Area, Colorado 1978)



4.0 SUBSURFACE EXPLORATION

For this investigation, RockSol completed four geotechnical boreholes identified as P-1 through P-4. P-1 is located on eastbound 37th Street approximately 0.25 miles west of 65th Avenue. P-2 is located on eastbound 37th Street approximately 200 feet west of 65th Avenue. P-3 is located at the southeast corner of the 37th Street and 65th Avenue intersection, and P-4 is located on southbound 65th Avenue approximately 300 feet south of 37th Street. The locations of the geotechnical investigation boreholes are shown in Image 3 and are presented on the Borehole Location Map found in Appendix A. The boreholes were completed on December 7, 2022.

Image 3 – Borehole Locations (Google Earth)



The borehole locations were marked in the field prior to drilling by RockSol personnel using a Global Positioning System (GPS) device and then overlaid onto survey topographic drawings for the purpose of obtaining approximate borehole surface elevations (see Appendix A).

A truck mounted CME-45 drill rig was used for drilling and sampling. Boreholes were advanced using a 4-inch outside diameter solid stem to depths of 10 to 20 feet below the existing grade. Subsurface materials were identified in the field by a representative of RockSol using visual-manual methods as described in ASTM D 2488. Each borehole was backfilled at the completion of drilling and groundwater level checks and patched with surface asphalt patch mix when located within existing pavement.

Subsurface materials were sampled using modified California barrel and standard split spoon samplers. The modified California barrel sampler has an outside diameter of approximately 2.5 inches and an inside diameter of 2 inches. The standard split spoon sampler used had an outside diameter of 2 inches and an inside diameter of 1 $\frac{3}{8}$ -inches. Brass tube liners are used with the modified California barrel sampler to retain samples for density, swell, and unconfined compressive strength testing. Sample retaining liners are not used with the standard split spoon sampler.

Standard Penetration Tests (SPT) and Penetration Tests (PT) were performed at selected intervals using automatic hammer lift systems. The standard split spoon sampling method is the SPT Test described by ASTM Method D-1586. PT Tests were performed using the modified California barrel sampler with a standard hammer weighing 140 pounds falling 30 inches per ASTM D3550. The modified California Barrel sampling method is similar to the SPT test with the

difference being the sampler dimensions and the number of 6-inch intervals driven with the hammer. It is RockSol's experience that blow counts obtained with the modified California sampler tend to be slightly greater than a standard split spoon sampler. Penetration resistance values (blow counts) were recorded for each sampling event. Blow counts, when properly evaluated, indicate the relative density or consistency of the soils.

Penetration resistance values (blow counts) were recorded for each sampling event. Blow counts, when properly evaluated, indicate the relative density or consistency of the soil and bedrock materials. Depths at which the samples were taken, the type of sampler used, and the blow counts that were obtained are shown on the Boring Logs (See Appendix B).

5.0 SURFACE AND SUBSURFACE CONDITIONS

The surface and subsurface materials encountered by RockSol at our borehole locations included asphaltic pavement, topsoil, aggregate base course, fill material, native soils, and sedimentary bedrock. Copies of the borehole logs are included in Appendix B.

5.1 Existing Asphalt Pavement Sections

Asphalt pavement was encountered at the surface of Boreholes P-1 and P-2 and ranged in thickness from 4-inches to 6-inches. Aggregate base course was noted under pavement with observed thicknesses of 3.5 to 10 inches, and generally consisted of a medium dense, slightly moist, sandy gravel. A summary of thickness encountered is presented in Table 5.1. Pavement section thicknesses are also shown on the individual borehole logs in Appendix B.

Table 5.1 – Existing Pavement Sections

Borehole I.D.	Pavement Type	Pavement Thickness (inches)	Aggregate Base Course Thickness (inches)
P-1	Hot Mix Asphalt	4	3.5
P-2	Hot Mix Asphalt	6	10

5.2 Topsoil

Topsoil was encountered at the surface of Boreholes P-3 and P-4 and generally consisted of approximately 3 inches of clayey sand with light vegetation cover, overlying native soils.

5.3 Fill Material

Fill material was encountered in Borehole P-2 and consisted of approximately 1.5 feet of medium dense, brown to dark brown, moist, silty in parts, clayey sand, overlying native soils.

5.4 Native Subgrade Soils

The native soils encountered generally consisted of loose to medium dense, light brown to brown, slightly moist to very moist, silty, sand overlying medium stiff to very stiff, light brown, moist to wet, sandy, clay. The native soil types encountered by RockSol are generally consistent with the eolium materials identified on the USGS Geological Map (See Image 2 – *Site Geology Map (Boulder – Fort Collins – Greeley Area, Colorado 1978)*, found in Section 3.0 of this report).

5.5 Sedimentary Bedrock

Sedimentary bedrock was encountered at Boreholes P-2 and P-3 and was encountered at depths of approximately 13 feet and 8 feet below existing grades, respectfully. The bedrock encountered consisted of very hard, light orange-brown to grayish brown, slightly moist, weathered, sandy,

claystone. See Table 5.2, *Approximate Groundwater and Bedrock Elevations and Depths* for approximate depths to bedrock, where encountered.

5.6 Groundwater

Groundwater was encountered at 3 borehole locations at approximate depths ranging from 5 to 13 feet below existing grades, at the time of drilling. Groundwater generally appears within native soils or sedimentary bedrock. See Table 5.2 for approximate elevations and depths to groundwater. Groundwater depths are subject to change depending on climatic conditions, stream stages in Ashcroft Draw, local irrigation practices, changes in local topography, and changes in surface storm water management.

Table 5.2 – Approximate Groundwater and Bedrock Elevations and Depths

Borehole I.D.	Approximate Ground Surface Elevation (ft)	Approximate Groundwater Depth (ft)	Approximate Groundwater Elevation (ft)	Approximate Bedrock Depth (ft)	Approximate Bedrock Elevation (ft)
P-1	4857.36	NE	NE	NE	NE
P-2	4837.07	13.0	4,824.07	13.0	4,824.07
P-3	4835.47	8.5	4,826.97	8.0	4,827.47
P-4	4837.82	5.0	4,832.82	NE	NE

Note: NE = Not Encountered

6.0 LABORATORY TESTING

Field logs and soil samples retrieved from the borehole locations were reviewed under the supervision of the project geotechnical engineer. Based on that review, laboratory tests were assigned on selected samples to characterize the appropriate engineering properties of the subsurface material encountered. For soil classification, RockSol conducted sieve analyses and Atterberg Limits tests. Swell tests were used to determine the swell or consolidation characteristics of the subsurface materials. Lab testing was also performed on selected samples to determine the water-soluble sulfate content of subsurface materials to assist with cement type recommendations.

The following tests were performed in accordance with the American Society for Testing and Materials (ASTM), American Association of State Highway and Transportation Officials (AASHTO), and current local practices:

- Natural Moisture Content (ASTM D-2216)
- Percent Passing No. 200 Sieve (ASTM D-1140)
- Liquid and Plastic Limits (ASTM D-4318)
- Dry Density (ASTM D-2937)
- Gradation (ASTM D 6913)
- Water-Soluble Sulfates (CDOT CP-L 2103)
- Soil Classification (ASTM D-2487 and AASHTO M145)
- Water-Soluble Chloride Content (HACH Method 8113)
- Standard Test Method for pH of Soils (ASTM D4972-01)
- Soil Resistivity (ASTM G187 - Soil Box)
- Resistance Value (AASHTO T-190)

Water-Soluble Chloride Content and one R-Value (Resistance Value) test were tested by Cesare, Inc. All other laboratory tests were performed by RockSol. Laboratory test results are presented in Appendix C and are also summarized on the Borehole Logs found in Appendix B.

7.0 SUBGRADE CHARACTERIZATION

Laboratory test results were used to characterize the engineering properties of the subsurface material encountered. For soil classification, RockSol conducted sieve analyses and Atterberg Limits tests. RockSol assigned R-Value testing based on the results of the soil classifications. Lab testing was also performed on selected samples to determine the water-soluble sulfate content of subsurface materials to assist with cement type recommendations. A summary of the physical and chemical test results is included in Appendix C.

7.1 Roadway Subgrade Soil Classifications and R-Value

Subgrade bulk samples within the upper four to nine feet were obtained at each borehole location and were tested for AASHTO soil classification. The subgrade soils tested classified as A-2-4 (0) and A-4 (0) AASHTO soil types.

The majority of subgrade soils classified as A-2-4 (0). This soil type typically provides good subgrade support for roadway pavement sections. A summary of soil classifications is presented in Table 7.1.

Table 7.1 – Subgrade Soil Classifications

Borehole I.D.	Sample Depth (ft)	AASHTO Classification	R-Value
P-1	0.62-4	A-2-4 (0)	Not Tested
P-2	1.33-5	A-2-4 (0)	75
P-3	0.25-9	A-4 (0)	Not Tested
P-4	0.25-4	A-2-4 (0)	Not Tested

7.2 Subgrade Support Test Results

To test the subgrade support characteristics, an R-Value laboratory test was performed on the bulk sample obtained from Borehole P-2 at approximate depth of 1.33 to 5 feet below the existing grade. An R-Value test result of 75 was obtained and the laboratory test results are presented in Table 7.1 as well as Appendix C. For pavement design purposes, a design R-Value of 40 is recommended for 37th Street and 65th Avenue.

7.3 Water-Soluble Sulfate Content

Cementitious material requirements for concrete in contact with site soils or groundwater is typically based on the percentage of water-soluble sulfate. Mix design requirements for concrete exposed to water-soluble sulfates in soils or water is considered by CDOT as shown in Table 7.2 and in the CDOT Standard Specifications for Road and Bridge Construction, dated 2021.

**Table 7.2 – Requirements to Protect Against Damage to Concrete
by Sulfate Attack from External Sources of Sulfate**

Severity of Sulfate Exposure	Water-soluble Sulfate (SO ₄), in Dry Soil, percent	Sulfate (SO ₄), in Water, ppm	Water Cementitious Ratio, Maximum	Cementitious Material Requirements
Class 0	0.00 to 0.10	0 to 150	0.45	Class 0
Class 1	0.11 to 0.20	151 to 1,500	0.45	Class 1
Class 2	0.21 to 2.0	1,501 to 10,000	0.45	Class 2
Class 3	2.01 or greater	10,001 or greater	0.40	Class 3

The concentration of water-soluble sulfates measured in 6 soil samples obtained from RockSol's exploratory boreholes resulted in 0.00 percent by weight. Based on the results of the water-soluble sulfate testing, concrete in contact with subgrade materials may be constructed with cement meeting the requirements for CDOT Exposure Class 0. Refer to CDOT's current Specifications Section 601 for concrete mixtures that satisfy appropriate sulfate exposure Class requirements.

7.4 Corrosion Resistance Levels

Water-soluble chloride content and pH tests were also performed on individual and bulk samples obtained from the boreholes and are summarized in Table 7.3.

Table 7.3 – Corrosivity Test Results

Borehole I.D.	Sample Depth (ft)	Water-Soluble Chloride (mg/L)	Water-Soluble Sulfate (% by weight)	pH	CR Level
P-1	0.62-4	48,388.0	0.00	9.0	CR 4
P-2	1.33-4	1,518,407.3	0.00	8.0	CR 0
P-2	13-15	417,144.9	0.00	7.9	CR 0
P-3	0.25-9	867,661.3	0.00	7.9	CR 0
P-3	10-14	166,857.9	0.00	8.0	CR 0
P-4	0.25-4	-	0.00	-	CR 0

Comparison of the test results of the sulfate, chloride, and pH testing performed with *Table 1 - Guidelines for Selection of Corrosion Resistance Levels as presented in the CDOT Pipe Materials Selection Guide*, dated April 30, 2019, suggests corrosion resistance (CR) levels of CR 0, with one instance of CR 4 at P-1. Of the three variables (water-soluble sulfate, water-soluble chloride, and pH) that are used in determining the CR level, pH appears to be the component affecting the CR level selection. In Table 7.3, "bold" text is used to identify the test result variable that is contributing to the CR Level above 0.

Comparing the test results of resistivity and pH tests performed with *Table 2 – minimum Pipe Thickness of Metal Pipes Based on the Resistivity and pH of the Adjacent Soil in the CDOT Pipe Materials Selection Guide*, dated April 30, 2019, suggests that 0.052 in (18 Gauge) polymer coated is the minimum required gauge thickness for metal pipe material. Table 7.4 summarizes the resistivity and pH test results performed on bulk samples.

Table 7.4 – Resistivity Test Results

Borehole I.D.	Sample Depth (ft)	Resistivity (Ohm-cm @ water content)	pH
P-1	0.62-4	1000 @ 14.0%	9.0
P-2	1.33-4	450 @ 15.5%	8.0
P-2	13-15	900 @ 17.9%	7.9
P-3	0.25-9	520 @ 18.1%	7.9
P-3	10-14	980 @ 18.8%	8.0
P-4	0.25-4	N/A	N/A

8.0 PAVEMENT DESIGN RECOMMENDATIONS

New pavement (full reconstruction) is planned for 65th Avenue south of 37th Street, as well as widening of 37th Street west of 65th Avenue, including the intersection or new roundabout of 37th Street and 65th Avenue.

Pavement thickness evaluation for development of pavement design recommendations within the City of Evans right of way (flexible and rigid pavement) was updated in accordance with the 2021 Colorado Department of Transportation (CDOT) M-E Pavement Design Manual.

M-E pavement design output sheets for the flexible and rigid pavement options for 37th Street, 65th Avenue, and the intersection or roundabout of 37th Street and 65th Avenue are included in Appendices E through J.

8.1 Traffic Information and M-E Distress Criteria

Total truck volumes from vehicle Class 4 through Class 13 obtained from the City of Evans Traffic Study conducted in 2018 were used to obtain the Average Annual Daily Truck Traffic (AADTT). A growth rate of 1.38% was applied to reach 2023 truck traffic counts for input into the M-E Pavement Design Program. A summary of traffic data information used for pavement design is included below in Table 8.1, and the 2018 traffic study report is included in Appendix D.

Table 8.1 – Traffic Summary Information

Roadway (Roadway Classification)	2018 Traffic Data	Growth Rate	2023 Traffic Data
	Total Trucks Class 4 - Class 13		Total Trucks Class 4 - Class 13
37 th Street (CDOT - Principal Arterial - Other)	2564	1.38%	2800
65 th Avenue (CDOT - Principal Arterial – Other)	1659		1800
37 th Street and 65 th Ave. Intersection (CDOT - Principal Arterial – Other)	4223		4600

Truck type distribution identified as Cluster 1 (as defined in Section 3.1.6.2 in the 2021 M-E Pavement Design Manual) is considered appropriate for both 37th Street and 65th Avenue.

CDOT M-E pavement design requires assignment of distress criteria based on the type of roadway. Roadway classifications based on CDOT are shown in Table 8.1. Distress criteria assigned to CDOT Principal Arterial – Other was used for our pavement design evaluation. All pavement designs were developed using current CDOT Database Mix Design parameters. All pavement materials shall meet CDOT requirements.

8.2 Pavement Subgrade Characterization

Subgrade bulk samples within the upper four to nine feet of existing roadway grades were obtained at each borehole location and were tested for AASHTO soil classification. The subgrade soils tested classified as A-2-4 (0) and A-4 (0) AASHTO soil types. These soil types typically provide good subgrade support for roadway pavement sections.

To test the subgrade support characteristics, R-Value laboratory tests were performed on the bulk sample obtained from Borehole P-2. An R-Value test result of 75 was obtained from the composite samples from the upper 4-feet of this borehole (See Section 7.2).

For pavement design purposes, a conservative design R-Value of 40 with corresponding subgrade resilient modulus (M_r) value of 9,493 psi when using equation 4.1 in CDOT's 2021 M-E Pavement Design Manual is recommended for the construction of new pavement on 37th Street, 65th Avenue, and the intersection or roundabout at 37th Street and 65th Avenue.

8.3 Pavement Section Recommendations (CDOT M-E Pavement Design)

Based on the CDOT M-E Pavement Design methodology the minimum calculated flexible pavement design thicknesses for a 20-year design life of 37th Street consists of **2.0 inches of S or SX (100) PG 64-28 over 7.0 inches of S or SX (75) PG 64-22 over 8.0 inches of aggregate base course**. The 30-year design life for rigid pavement alternative consists of **9.0 inches of concrete underlain by 6.0 inches of aggregate base course**.

Based on the CDOT M-E Pavement Design methodology the minimum calculated flexible pavement design thickness for a 20-year design life of 65th Avenue consists of **2.0 inches of S or SX (100) PG 64-28 over 6.0 inches of S or SX (75) PG 64-22 underlain by 8.0 inches of aggregate base course**. The 30-year design life for rigid pavement alternative is comprised of **9.0 inches of concrete underlain by 6.0 inches of aggregate base course**.

Based on the CDOT M-E Pavement Design methodology the minimum calculated flexible pavement design thicknesses for a 20-year design life of the intersection or roundabout at 37th Street and 65th Avenue consists of **2.0 inches of S or SX (100) PG 64-28 over 8.0 inches of S or SX (75) PG 64-22 over 8.0 inches of aggregate base course**. The 30-year design life for rigid pavement alternative consists of **9.0 inches of concrete over by 6.0 inches of aggregate base course**.

A summary of the minimum recommended pavement section thicknesses per the CDOT M-E Pavement Design methodology is presented in Table 8.2 and the M-E Pavement Design output sheets are included in Appendices E through J.

Table 8.2 – Minimum Pavement Section Thickness Recommendations

Roadway Section	Pavement Section/Material Type			Layer Thickness (Inches)	Design Output Location
37th Street	Flexible	Layer 1 (Top)	S or SX(100) PG 64-28	2.0	Appendix E
		Layer 2	S or SX(75) PG 64-22	7.0	
		Layer 3	CDOT Class 6 ABC	8.0	
	Rigid	Layer 1	PCCP	9.0	Appendix F
		Layer 2	CDOT Class 6 ABC	6.0	
65th Avenue	Flexible	Layer 1	S or SX(100) PG 64-28	2.0	Appendix G
		Layer 2	S or SX(75) PG 64-22	6.0	
		Layer 3	CDOT Class 6 ABC	8.0	
	Rigid	Layer 1	PCCP	9.0	Appendix H
		Layer 2	CDOT Class 6 ABC	6.0	
Intersection/ Roundabout 37th Street & 65th Avenue	Flexible	Layer 1	S or SX(100) PG 64-28	2.0	Appendix I
		Layer 2	S or SX(75) PG 64-22	8.0	
		Layer 3	CDOT Class 6 ABC	8.0	
	Rigid	Layer 1	PCCP	9.0	Appendix J
		Layer 2	CDOT Class 6 ABC	6.0	

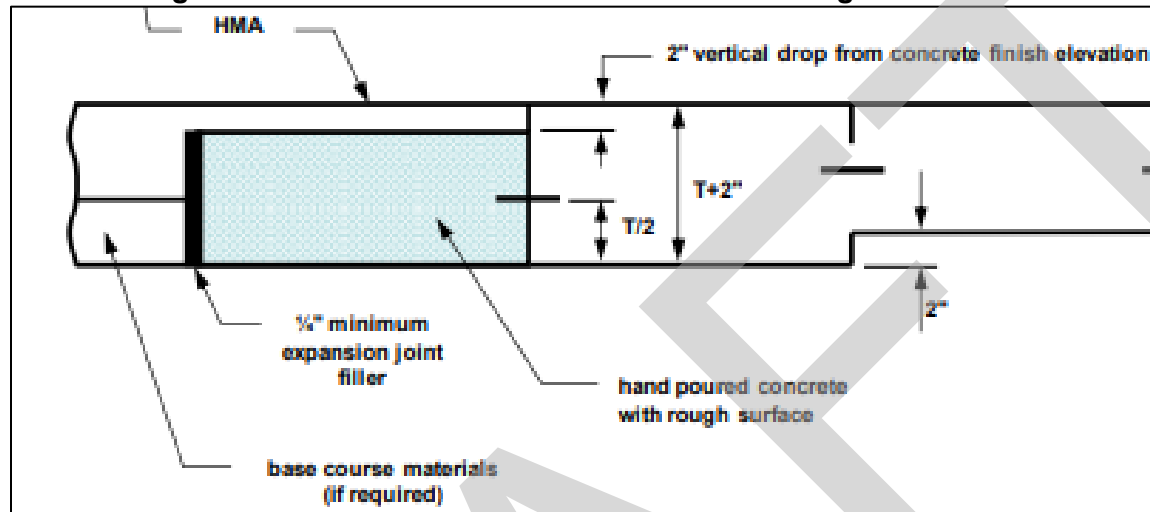
HMA = Hot Mix Asphalt; ABC = Aggregate Base Course; PCC = Portland Cement Concrete

Flexible pavement section layers presented in Table 8.2 must be constructed to meet lift thickness min/max requirements per *City of Evans Standards and Specifications, Table 3.02-11*. Both S and SX asphalt mixes may be used interchangeably with this pavement design.

If a roundabout design is chosen for the intersection of 37th Street and 65th Avenue, the minimum pavement section thickness recommendations outlined in Table 8.2 shall be maintained through the center of the roundabout to function as a truck apron.

Based on Figure 12.8 in CDOT's 2021 Pavement Design Manual, if the rigid pavement used for the construction of the intersection or roundabout at 37th Street and 65th Avenue should include a transition area as outlined in Image 4 between the rigid and flexible pavement to reduce the development of a bump in flexible pavement.

Image 4 – Transition Detail Between Flexible and Rigid Pavements



8.4 Minimum Pavement Sections (City of Evans Pavement Design Criteria)

The City of Evans has minimum flexible pavement section requirements that are presented in Table 3.02-11 of the City of Evans Design and Construction Standards and Specifications (August 2019). For the subject streets of 37th Street and 65th Avenue, a minimum section of 6 inches of asphalt pavement over 8 inches of aggregate base course (Class 5 or 6) is required.

The flexible pavement sections presented in Table 8.2 of this report are based on the CDOT M-E Pavement Design methodology and the use of M-E Pavement Design software, Version 2.2.6. The pavement sections presented in Table 8.2 satisfy City of Evans structural requirements for the subject roadways.

8.5 Subgrade Preparation (Prior to Pavement Construction)

Prior to construction of new pavements on subgrade soils, the underlying subgrade should be properly prepared by removal of all organic matter (topsoil), debris, loose material, and any deleterious material identified by the Project Engineer followed by scarification, moisture conditioning and recompaction. At a minimum, roadway subgrade moisture conditioning and compaction should meet the compaction specifications outlined in Table 8.3.

Prior to pavement section construction, subgrade proof rolling with pneumatic tire equipment shall be performed using a minimum axle load of 18 kips per axle after specified subgrade compaction has been obtained. Complete coverage of the proof rolling will be required. Areas found to be weak and those areas which exhibit soft spots, non-uniform deflection or excessive deflection as determined by the project engineer shall be ripped, scarified, wetted or dried if necessary, and re-compacted to the requirements for density and moisture. If soft, yielding subgrade soils are encountered that cannot be rectified through re-working, treatment with flyash, or stabilization with overexcavation and replacement using approved imported materials, and/or use of geotextile materials may be used.

All pavement subgrade preparation, pavement materials, and pavement construction shall conform to CDOT standards and specifications.

Table 8.3 –Roadway Subgrade Compaction Specifications

AASHTO Classification	Minimum Relative Compaction (Percentage of MDD), %	Moisture Content (Deviation from OMC)
A-1, A-2-4, A-2-5, A-3	95% of AASHTO T180	-2 to +2
A-4, A-5, A-6, and A-7	95% of AASHTO T99	OMC and above to achieve stability (Note 1)

Note 1: If the soils cannot be compacted and prove to be unstable at a moisture content equal to or above OMC, then the required moisture content for compaction may be reduced below OMC if approved by the Engineer.

Based on the results of our field and laboratory tests, A-2-4 and A-6 soils are anticipated to be encountered at existing pavement subgrade elevations within the project limits.

9.0 TRAFFIC SIGNAL POLE FOUNDATIONS

9.1 General Discussion

A signalized intersection design is being considered for the intersection of 37th Street and 65th Avenue. RockSol Boreholes P-2 and P-3 were utilized for development of traffic signal pole foundation geotechnical parameters. See Appendix A for the locations of Boreholes P-2 and P-3 and Appendix B for borehole logs.

RockSol understands that the foundations for the traffic signal poles may be constructed using standard details provided in the current CDOT S Standards for single or double mast arm traffic signal structures. The foundations may also need to be designed to satisfy site conditions not accounted for in the CDOT S Standards, or to satisfy other project requirements.

For this geotechnical report, we assume there will be a single traffic pole in each corner of the intersection and drilled shaft foundations will be used.

In Section 9.2, geotechnical soil parameters required for utilization of the CDOT S Standard pole foundation design are presented.

In Section 9.3, geotechnical soil parameters are presented for new design of the signal pole foundations.

9.2 CDOT S Standard Traffic Signal Foundation Design Geotechnical Parameters

Typically, lateral loading resistance is the determining factor in signal pole foundation design and not axial loading. The CDOT S Standard signal pole foundation designs are based on subsurface soil conditions meeting the following criteria:

- Minimum Soil Density = 110 pounds per cubic foot (pcf)
- Minimum Soil Cohesion = 750 pounds per square foot (psf) (medium stiff cohesive soil)
- Minimum Soil Friction Angle = 30 degrees (medium dense cohesionless soil)
- Minimum Factor of Safety (FOS) = 1.5 for Torsional Resistance
- Minimum FOS = 3.0 for Flexural Resistance

The Project Engineer shall be contacted if any of the following factors are encountered during construction:

1. The soil has a high organic content or consists of saturated silt or clay.
2. The site won't support the weight of the caisson drilling rig.
3. The foundation soils are not homogenous.
4. Firm bedrock is encountered.

Based on the subsurface conditions encountered in Boreholes P-2 and P-3, the minimum soil density and cohesion values necessary to utilize the CDOT Standard signal pole foundation design are present at the subject intersection. Highly organic soils and saturated silts or clays were not encountered. Relatively firm surficial soils were encountered and RockSol anticipates a standard caisson drill rig will be supported by the subgrade soils. Some minor soil rutting may occur from the drill rig, depending on recent precipitation events.

Per the CDOT S Standards, the minimum embedment length of the foundation caissons will be determined by the diameter required to satisfy the structure loading requirements. RockSol anticipates a minimum soil embedment length of at least 17 feet will be required. Based on the subsurface conditions encountered, claystone bedrock material will be encountered at depths ranging from 8 feet to 13 feet below existing grades. The lower portion of the signal pole foundation caissons will likely be embedded in the claystone bedrock. RockSol anticipates that typical caisson drill rigs will not encounter auger refusal in the claystone bedrock.

9.3 Non-Standard Traffic Signal Foundation Design Geotechnical Parameters

The soils encountered in Boreholes P-2 and P-3 are considered suitable bearing material for supporting structures such as the proposed traffic signal poles. If the signal pole foundations require designs not covered by the CDOT S Standard, the following geotechnical parameters are presented.

Based on our evaluation, recommended nominal (unfactored) base resistance and nominal (unfactored) side resistance values for the subsurface conditions are presented in Table 9.1 for use with Load and Resistance Factor Design (LRFD) methods. All resistance values were calculated using methods described in the Ninth Edition of the AASHTO LRFD Bridge Design Specifications, Section 10.8.3.5, Nominal Axial Compression Resistance of Single Drilled Shafts. Soils in Table 9.1 are reported with USCS Classification. Please refer to the borehole logs for P-2 and P-3 for development of drilled shaft axial and lateral load resistance requirements.

Table 9.1 — LRFD Base and Side Resistance Values for Drilled Shafts

Material Type	Ultimate (Nominal)		Service	
	Base (ksf)	Side (ksf)	Bearing (ksf)	Side (ksf)
(Native) clayey SAND	N/A	0.7	N/A	0.2
(Native) sandy CLAY	N/A	0.6	N/A	0.2
(Bedrock) CLAYSTONE	69.0	5.6	23.0	1.9

Note 1: If traffic signal pole foundation must extend below depth of borehole, use same values as the lowest material.

The side resistance is applicable to the portion of the shaft embedded in overburden soils. When evaluating the side resistance of the drilled shaft, the upper 5 feet of soil embedment should be

ignored. For LRFD strength limit state evaluation, a resistance factor of 0.50 is recommended for base/tip resistance. A resistance factor of 0.55 is recommended for side resistance evaluation.

The drilled shaft diameter shall be sufficient to satisfy axial, bending, and lateral load resistance requirements. In addition, the shaft diameter shall be sufficient to allow for use of casing, if required, and placement of reinforcement with adequate concrete cover.

Based on our evaluation, recommended lateral resistance parameter for the subsurface materials are presented in Table 9.2 for use with lateral load analysis.

**Table 9.2 — Drilled Shaft Lateral Resistance Parameters
Proposed Traffic Signal Foundations at 37th Street and 65th Avenue**

Borehole Material	L-Pile Soil Type	Undrained Shear Strength (psf)	Angle of Internal Friction (degrees)	Soil Modulus Parameter k, (pci)	Strain Factor ϵ_{50}, (%)	Unit Weight (pcf)
(Native) clayey SAND above water table	Sand	0	30	80	--	125 (Total)
(Native) sandy CLAY Above water table	Stiff Clay	1,000	22	500	0.01	125 (Total)
(Bedrock) CLAYSTONE	Stiff clay w/o free water	2,000	0	750	0.008	130 (Total)

Additional design and construction considerations for drilled shafts are presented below.

- The construction of the drilled shaft should follow the guidelines specified in the “CDOT Standard Specifications for Road and Bridge Construction (SSRBC), Section 503, 2021.”
- During construction of the drilled shaft, casing or slurry methods may be required to support the excavation where the hole side walls are unstable due to soil and groundwater conditions.
- Prior to the placement of the concrete, the drilled shaft excavation, including the bottom, should be cleaned of all loose material. For wet conditions (more than two inches of water), concrete placement by “tremie” methods should be used.

10.0 EARTHWORK

10.1 New Roadway Embankment

To accommodate improvements to the 37th Street/65th Avenue intersection, new embankment may be required. Materials used to construct embankments should meet requirements for soil embankment constructed with moisture density control as required in Chapter 3 of the City of Evans Design and Construction Standards and Specifications (August 2019).

The ground surface underlying all embankment fills should be carefully prepared by removing all organic matter (topsoil), scarification to a minimum depth of 6 inches and recompacting to the requirements for maximum dry density and moisture content listed in Table 10.1 of this report prior to fill placement.

To provide consistency with the existing roadway material type, RockSol recommends that new soil embankment consist of non-swelling material with an R-Value of at least 40 for 37th Street and 65th Avenue in the upper two feet of new embankment. Claystone materials shall not be used for construction of new embankment.

Broken concrete, broken asphalt, or other solid materials more than 6 inches in greatest dimension shall not be placed within embankment areas supporting the roadway shoulders and pavement structure.

10.2 Structure Backfill

Structure backfill (Class 1, Class 2, and Flow-Fill) shall meet the requirements of CDOT Section 206 and 703.

10.3 Aggregate Base Course

Aggregate Base Course (ABC) shall be crushed stone, crushed slag, crushed gravel, natural gravel, as indicated in the CDOT M-E Pavement Design Manual, Section 5.3. Where used as a structural base below pavement, the ABC shall have an R-Value greater than 78.

10.4 Utility Trench Backfill

Material excavated from utility trenches may be used for backfilling provided it does not contain unsuitable material or particles larger than 3 inches. Unsuitable material includes, but is limited to, topsoil, vegetation, brush, sod, trash, and other deleterious substances.

10.5 Compaction Specifications

Embankment material, structure backfill, and utility trench backfill shall be thoroughly compacted to the moisture and density specifications required for the material tested, in accordance with moisture conditioning and compaction specifications outlined in Table 10.1.

Table 10.1 – Compaction Specifications

Roadway Section	Minimum Relative Compaction (Percentage of MDD), %	Moisture Content (Deviation from OMC)
Aggregate Base Course	95% of AASHTO T180 or ASTM D-1557	-2 to +2
Embankment and Structural Backfill	95% of AASHTO T99 or ASTM D-698	-2 to +2

Note 1: If the embankment or subgrade soils cannot be compacted and prove to be unstable at a moisture content equal to or above OMC, then the required moisture content for compaction may be reduced below OMC if approved by the Engineer.

11.0 OTHER DESIGN AND CONSTRUCTION CONSIDERATIONS

Proper construction practices, in accordance with CDOT Standards and Specifications, should be followed during site preparation, earthwork, excavations, and embankment and retaining wall construction for the suitable long-term performance of the proposed improvements. Excavation support should be provided to maintain onsite safety and the stability of excavations and slopes. Excavations shall be constructed in accordance with local, state, and federal regulations including OSHA guidelines. The contractor must provide a competent person to determine compliance with OSHA excavation requirements. For preliminary planning, existing fill material and native soils may be considered as OSHA Type C soils.

Surface drainage patterns may be altered during construction and local landscape irrigation (if any) must be controlled to prevent excessive moisture infiltration into the subgrade soils during and after construction.

Environmentally contaminated material, if encountered, should be characterized, and removed under the direction of the project environmental consultant. Design and construction plans should be reviewed, and onsite construction should be observed by the professional engineers.

12.0 LIMITATIONS

This geotechnical investigation was conducted in general accordance with the scope of work. The geotechnical practices are similar to that used in the Colorado Front Range area with similar soil conditions and our understanding of the proposed work. This report has been prepared for use by RockSol, and the City of Evans for the project described in this report. The report is based on our exploratory boreholes and does not consider variations in the subsurface conditions that may exist between boreholes. Additional investigation is required to address such variation. If during construction activities, materials or water conditions appear to be different from those described herein, RockSol should be advised at once so that a re-evaluation of the recommendations presented in this report can be made. RockSol is not responsible for liability associated with interpretation of subsurface data by others.

APPENDIX A

BOREHOLE LOCATION PLAN



65th Avenue

37th Street

P-1
X4857.356

P-2
X4837.069

P-3
X4835.466

P-4
X4837.828

^
N

4860

4858

4856

4854

4852

4850

4848

4846

4846

4844

4842

4840

4838

4834
4836

4832

4836

4838

4840

APPENDIX B

LEGEND AND BOREHOLE LOGS

CLIENT City of Evans

PROJECT NAME 37th Street and 65th Avenue Intersection Design Project

PROJECT NUMBER 530.02

PROJECT LOCATION Evans, Colorado

LITHOLOGY

	Asphalt Pavement		Aggregate Base Course
	Fill - SAND, clayey to silty		TOPSOIL
	Native - SAND		Native - SAND, silty
	Native - SAND, clayey		Native - CLAY, sandy
	Bedrock - CLAYSTONE		

SAMPLE TYPE

 **BULK SAMPLE (Auger Cuttings)**

 **MODIFIED CALIFORNIA SAMPLER
2.5" O.D. AND 2" I.D.
WITH BRASS LINERS INCLUDED**

 **SPLIT SPOON SAMPLER
2" O.D. AND 1 3/8" I.D.
NO LINERS**

Fines Content indicates amount of material, by weight, passing the US No 200 Sieve (%)

15/12 Indicates 15 blows of a 140 pound hammer falling 30 inches was required to drive the sampler 12 inches.

50/11 Indicates 50 blows of a 140 pound hammer falling 30 inches was required to drive the sampler 11 inches.

5,5,5 Indicates 5 blows, 5 blows, 5 blows of a 140 pound hammer falling 30 inches was required to drive the sampler 18 inches.

 **GROUND WATER LEVEL AT TIME OF DRILLING**

CLIENT City of Evans
PROJECT NUMBER 530.02
DATE STARTED 12/7/22 **COMPLETED** 12/7/22
DRILLING CONTRACTOR Unlimited Access Drilling
DRILLING METHOD Solid Stem Auger **HOLE SIZE** 4.0"
LOGGED BY A. Moens **HAMMER TYPE** Automatic
NOTES ~2' N of pavement edge, right wheel path

PROJECT NAME 37th Street and 65th Avenue Intersection Design Project
PROJECT LOCATION Evans, Colorado
GROUND ELEVATION 4857.4 ft **STATION NO.**
NORTH **EAST**
BORING LOCATION: EB 37th St., ~0.25 mi W of 65th Ave
GROUND WATER LEVELS:
WATER DEPTH None Encountered on 12/7/22

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS	SWELL POTENTIAL (%)	SULFATE (%)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
4857.4	0.0		Asphalt pavement, approximately 4 inches thick										
			(Aggregate Base Course) GRAVEL, sandy, medium dense, approximately 4 inches thick										
			(Native) SAND, silty, slightly moist to moist, light brown, medium dense to loose	SS	13/9/14				6.1				13.3
			Approximate Bulk Depth 0.62-4 Liquid Limit= NP Plastic Limit= NP Plasticity Index= NP Fines Content= 29.2 Sulfate= 0.00	BULK			0.00			NP	NP	NP	29.2
4854.9	2.5												
				MC	7/12			101.8	11.7				
4852.4	5.0												
			(Native) CLAY, sandy with gravel, very moist, light brown, medium stiff										
4849.9	7.5												
				MC	6/12			94.0	23.5				
4847.4	10.0		Bottom of hole at 10.0 feet.										

CLIENT City of Evans **PROJECT NAME** 37th Street and 65th Avenue Intersection Design Project
PROJECT NUMBER 530.02 **PROJECT LOCATION** Evans, Colorado
DATE STARTED 12/7/22 **COMPLETED** 12/7/22 **GROUND ELEVATION** 4837.1 ft **STATION NO.** _____
DRILLING CONTRACTOR Unlimited Access Drilling **NORTH** _____ **EAST** _____
DRILLING METHOD Solid Stem Auger **HOLE SIZE** 4.0" **BORING LOCATION:** EB 37th St., ~200' W of 65th Ave
LOGGED BY A. Moens **HAMMER TYPE** Automatic **GROUND WATER LEVELS:**
NOTES Center of left turn lane **WATER DEPTH** 13.0 ft on 12/7/22

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS	SWELL POTENTIAL (%)	SULFATE (%)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
4837.1	0		Asphalt pavement, approximately 6 inches thick										
			(Aggregate Base Course) GRAVEL, sandy, slightly moist, brown, medium dense, approximately 10 inches thick	SS	14/11/12				4.2				12.5
			(Fill) SAND, clayey, silty in parts, moist, brown to dark brown, medium dense	BULK					8.6				30.7
			(Native) SAND, clayey, moist, brown, medium dense	BULK		0.00				22	16	6	25.5
4832.1	5		<u>Approximate Bulk Depth 1.33-4</u> Liquid Limit= 22 Plastic Limit= 16 Plasticity Index= 6 Fines Content= 25.5 Sulfate= 0.00	MC	17/12			119.0	14.5				
4827.1	10			MC	9/12			115.6	14.8				
4822.1	15		(Bedrock) CLAYSTONE, weathered, slightly moist, light orange brown to grayish brown, very hard	BULK		0.00				29	15	14	60.0
			<u>Approximate Bulk Depth 13-15</u> Liquid Limit= 29 Plastic Limit= 15 Plasticity Index= 14 Fines Content= 60.0 Sulfate= 0.00	MC	50/10			112.9	18.2				93.2
				MC	50/9			110.0	18.9	39	18	21	
			Bottom of hole at 19.8 feet.										

CLIENT City of Evans **PROJECT NAME** 37th Street and 65th Avenue Intersection Design Project
PROJECT NUMBER 530.02 **PROJECT LOCATION** Evans, Colorado
DATE STARTED 12/7/22 **COMPLETED** 12/7/22 **GROUND ELEVATION** 4835.5 ft **STATION NO.** _____
DRILLING CONTRACTOR Unlimited Access Drilling **NORTH** _____ **EAST** _____
DRILLING METHOD Solid Stem Auger **HOLE SIZE** 4.0" **BORING LOCATION:** SE corner of 37th St. and 65th Ave intersection, ~4' E of pavement edge
LOGGED BY A. Moens **HAMMER TYPE** Automatic **GROUND WATER LEVELS:**
NOTES Even with NB stop bar **WATER DEPTH** 8.5 ft on 12/7/22

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS	SWELL POTENTIAL (%)	SULFATE (%)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
4835.5	0		(Topsoil) SAND, clayey, light vegetation cover, approximately 3 inches thick (Native) SAND, silty, moist, light brown, medium dense										
				MC	11/12			105.5	10.6				
			(Native) SAND, clayey, moist, light brown, medium dense, slightly calcareous										
4830.5	5		Approximate Bulk Depth 0.25-9 Liquid Limit= 23 Plastic Limit= 17 Plasticity Index= 6 Fines Content= 42.6 Sulfate= 0.00	MC	8/12			101.8	19.8				
				BULK			0.00			23	17	6	42.6
			(Bedrock) CLAYSTONE, sandy, slightly silty, wet, grayish brown to light brown, hard, iron staining										
4825.5	10		Approximate Bulk Depth 10-14 Liquid Limit= 30 Plastic Limit= 17 Plasticity Index= 13 Fines Content= 67.2 Sulfate= 0.00	MC	31/12			106.9	20.4				
				BULK			0.00			30	17	13	67.2
			(Bedrock) CLAYSTONE, sandy, slightly moist, light brown, very hard, iron staining										
4820.5	15			MC	50/7			105.8	20.9				
				MC	50/8			109.4	18.3				
			Bottom of hole at 19.7 feet.										

CLIENT City of Evans
PROJECT NUMBER 530.02
DATE STARTED 12/7/22 **COMPLETED** 12/7/22
DRILLING CONTRACTOR Unlimited Access Drilling
DRILLING METHOD Solid Stem Auger **HOLE SIZE** 4.0"
LOGGED BY A. Moens **HAMMER TYPE** Automatic
NOTES ~5' W of pavement edge
PROJECT NAME 37th Street and 65th Avenue Intersection Design Project
PROJECT LOCATION Evans, Colorado
GROUND ELEVATION 4837.8 ft **STATION NO.**
NORTH **EAST**
BORING LOCATION: SB 65th Ave. shoulder, ~300' S of 37th St.
GROUND WATER LEVELS:
WATER DEPTH 5.0 ft on 12/7/22

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE	BLOW COUNTS	SWELL POTENTIAL (%)	SULFATE (%)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
4837.8	0.0		(Topsoil) SAND, clayey, light vegetation cover, approximately 3 inches thick (Native) SAND, silty, clayey in parts, very moist, brown, medium dense <u>Approximate Bulk Depth 0.25-4</u> Liquid Limit= 22 Plastic Limit= 15 Plasticity Index= 7 Fines Content= 32.1 Sulfate= 0.00	BULK			0.00			22	15	7	32.1
4835.3	2.5		(Native) SAND, silty, very moist to wet, brown, loose	MC	10/12			114.6	14.5				
4832.8	5.0		(Native) SAND, silty, wet, brown, loose	MC	4/12								
4830.3	7.5		(Native) CLAY, sandy, very moist, light brown, very stiff	MC	20/12			103.9	23.5				
4827.8	10.0		Bottom of hole at 10.0 feet.										

APPENDIX C

LABORATORY TEST RESULT SUMMARY AND TEST RESULT SHEETS

CLIENT City of Evans

PROJECT NAME 37th Street and 65th Avenue Intersection Design Project

PROJECT NUMBER 530.02

PROJECT LOCATION Evans, Colorado

Borehole	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	Swell Potential (%)	%<#200 Sieve	Classification		Water Content (%)	Dry Density (pcf)	Unconfined Compressive Strength (psi)	Sulfate (%)	Resistivity (ohm-cm)	pH	Chlorides (mg/L)	Proctor		
							USCS	AASHTO								S=Standard	M=Modified	
P-1	0.62-4	NP	NP	NP		29	SM	A-2-4 (0)				0.00	1000 @ 14.0%	9.0	48,388.0			
P-1	0.63					13			6.1									
P-1	4								11.7	101.8								
P-1	9								23.5	94.0								
P-2	0.5					12			4.2									
P-2	1.33-4	22	16	6		25	SC-SM	A-2-4 (0)				0.00	450 @ 15.5%	8.0	1,518,407.3			
P-2	1.34					31			8.6									
P-2	4								14.5	119.0								
P-2	9								14.8	115.6								
P-2	13-15	29	15	14		60	CL	A-6 (5)				0.00	900 @ 17.9%	7.9	417,144.9			
P-2	14					93			18.2	112.9								
P-2	19	39	18	21					18.9	110.0								
P-3	0.25-9	23	17	6		43	SC-SM	A-4 (0)				0.00	520 @ 18.1%	7.9	867,661.3			
P-3	2								10.6	105.5								
P-3	4								19.8	101.8								
P-3	9								20.4	106.9								
P-3	10-14	30	17	13		67	CL	A-6 (6)				0.00	980 @ 18.8%	8.0	166,857.9			
P-3	14								20.9	105.8								
P-3	19								18.3	109.4								
P-4	0.25-4	22	15	7		32	SC-SM	A-2-4 (0)				0.00						
P-4	2								14.5	114.6								
P-4	9								23.5	103.9								

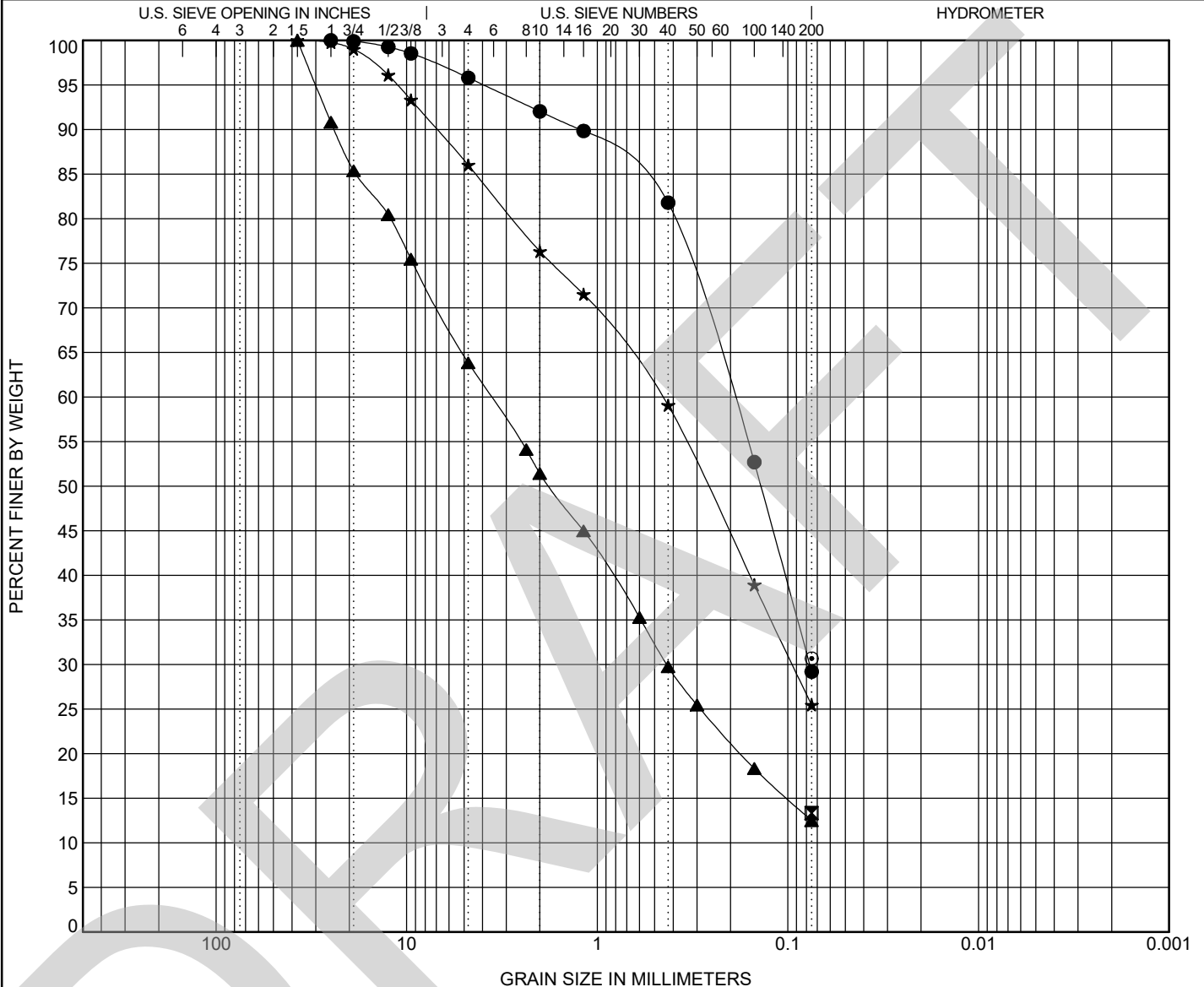
GRAIN SIZE DISTRIBUTION

CLIENT City of Evans

PROJECT NAME 37th Street and 65th Avenue Intersection Design Project

PROJECT NUMBER 530.02

PROJECT LOCATION Evans, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

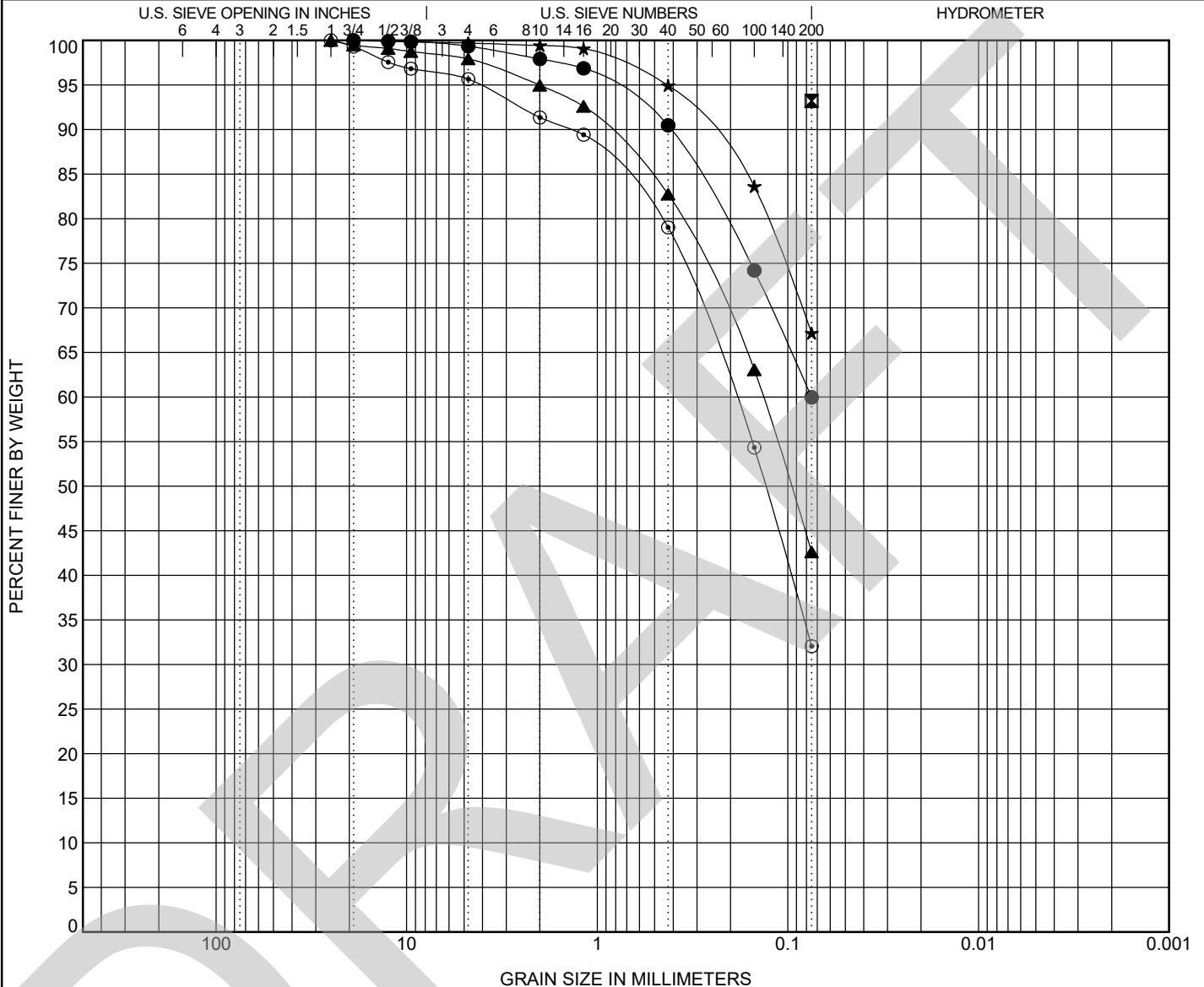
Specimen Identification			Classification					LL	PL	PI	Cc	Cu
●	P-1	0.6-4.0	SILTY SAND (SM) (A-2-4)					NP	NP	NP		
☒	P-1	0.6	(Native) SAND, silty									
▲	P-2	0.5	(ABC) GRAVEL, sandy to slightly silty								0.93	64.63
★	P-2	1.3-4.0	SILTY, CLAYEY SAND (SC-SM) (A-2-4)					22	16	6		
◎	P-2	1.3	(Fill) SAND, silty									
Specimen Identification			D100	D60	D30	D10	%Gravel	%Coarse Sand	%Fine Sand	%Silt	%Clay	
●	P-1	0.6-4.0	25	0.195	0.077		8.0	10.2	52.6	29.2		
☒	P-1	0.6	0.075							13.3		
▲	P-2	0.5	37.5	3.605	0.432		48.6	21.7	17.2	12.5		
★	P-2	1.3-4.0	37.5	0.458	0.095		23.7	17.2	33.6	25.5		
◎	P-2	1.3	0.075							30.7		

CLIENT City of Evans

PROJECT NAME 37th Street and 65th Avenue Intersection Design Project

PROJECT NUMBER 530.02

PROJECT LOCATION Evans, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification						LL	PL	PI	Cc	Cu
●	P-2	13.0-15.0	SANDY LEAN CLAY (CL) (A-6)						29	15	14		
☒	P-2	14.0	(Bedrock) CLAYSTONE										
▲	P-3	0.3-9.0	SILTY, CLAYEY SAND (SC-SM) (A-4)						23	17	6		
★	P-3	10.0-14.0	SANDY LEAN CLAY (CL) (A-6)						30	17	13		
⊙	P-4	0.3-4.0	SILTY, CLAYEY SAND (SC-SM) (A-2-4)						22	15	7		
Specimen Identification			D100	D60	D30	D10	%Gravel	%Coarse Sand	%Fine Sand	%Silt	%Clay		
●	P-2	13.0-15.0	19	0.075			2.1	7.4	30.5	60.0			
☒	P-2	14.0	0.075							93.2			
▲	P-3	0.3-9.0	25	0.135			5.0	12.2	40.1	42.6			
★	P-3	10.0-14.0	19				0.6	4.5	27.8	67.2			
⊙	P-4	0.3-4.0	25	0.19			8.6	12.3	47.0	32.1			

SOIL CHEMICAL TESTS

Project Number: 23.022, RockSol Consulting Date: 01/10/23
Project Name: 37th and 65th (RockSol Project No. 530.02) Technician: J. Wayne
Lab ID Number: 232010 Reviewer: G. Hoyos
Sample Location: P-1 at 7.5 inches to 4 feet
Visual Description: SAND, clayey, brown

Dish+Wet Soil (g): _____
Dish+Dry Soil (g): _____
Dish Wt. (g): _____
Air Dried Moisture
Content (%): _____

Water Soluble Sulfate (Colorado Procedure CP-L-2103)

Dilution	Reading, mg/L	Concentration, ppm	Concentration, %

pH (ASTM D 4972, 20g of -#10)

pH Meter Reading: _____

Water Soluble Chloride (HACH Method 8113, 100g of -#10)

Dilution	Reading (mg/L)	Result (mg/L)
Fifteenth	5.8	48,388.0

Resistivity (AASHTO T 288, -#10)

Readings (ohm*cm)

Lowest Resistivity

--

SOIL CHEMICAL TESTS

Project Number: 23.022, RockSol Consulting Date: 01/10/23
Project Name: 37th and 65th (RockSol Project No. 530.02) Technician: J. Wayne
Lab ID Number: 232011 Reviewer: G. Hoyos
Sample Location: P-2 at 16 inches to 4 feet
Visual Description: SAND, clayey, brown

Dish+Wet Soil (g): _____
Dish+Dry Soil (g): _____
Dish Wt. (g): _____
Air Dried Moisture
Content (%): _____

Water Soluble Sulfate (Colorado Procedure CP-L-2103)

Dilution	Reading, mg/L	Concentration, ppm	Concentration, %

pH (ASTM D 4972, 20g of -#10)

pH Meter Reading: _____

Water Soluble Chloride (HACH Method 8113, 100g of -#10)

Dilution	Reading (mg/L)	Result (mg/L)
Fifteenth	18.2	1,518,407.3

Resistivity (AASHTO T 288, -#10)

Readings (ohm*cm)

Lowest Resistivity

SOIL CHEMICAL TESTS

Project Number: 23.022, RockSol Consulting Date: 01/10/23
Project Name: 37th and 65th (RockSol Project No. 530.02) Technician: J. Wayne
Lab ID Number: 232012 Reviewer: G. Hoyos
Sample Location: P-2 at 13 to 15 feet
Visual Description: CLAY, sandy, brown

Dish+Wet Soil (g): _____
Dish+Dry Soil (g): _____
Dish Wt. (g): _____
Air Dried Moisture
Content (%): _____

Water Soluble Sulfate (Colorado Procedure CP-L-2103)

Dilution	Reading, mg/L	Concentration, ppm	Concentration, %

pH (ASTM D 4972, 20g of -#10)

pH Meter Reading: _____

Water Soluble Chloride (HACH Method 8113, 100g of -#10)

Dilution	Reading (mg/L)	Result (mg/L)
Fifteenth	5.0	417,144.9

Resistivity (AASHTO T 288, -#10)

Readings (ohm*cm)

Lowest Resistivity

SOIL CHEMICAL TESTS

Project Number: 23.022, RockSol Consulting Date: 01/10/23
Project Name: 37th and 65th (RockSol Project No. 530.02) Technician: J. Wayne
Lab ID Number: 232013 Reviewer: G. Hoyos
Sample Location: P-3 at 3 inches to 9 feet
Visual Description: SAND, clayey, brown

Dish+Wet Soil (g): _____
Dish+Dry Soil (g): _____
Dish Wt. (g): _____
Air Dried Moisture
Content (%): _____

Water Soluble Sulfate (Colorado Procedure CP-L-2103)

Dilution	Reading, mg/L	Concentration, ppm	Concentration, %

pH (ASTM D 4972, 20g of -#10)

pH Meter Reading: _____

Water Soluble Chloride (HACH Method 8113, 100g of -#10)

Dilution	Reading (mg/L)	Result (mg/L)
Fifteenth	10.4	867,661.3

Resistivity (AASHTO T 288, -#10)

Readings (ohm*cm)

Lowest Resistivity

--

SOIL CHEMICAL TESTS

Project Number: 23.022, RockSol Consulting Date: 01/10/23
Project Name: 37th and 65th (RockSol Project No. 530.02) Technician: J. Wayne
Lab ID Number: 232014 Reviewer: G. Hoyos
Sample Location: P-3 at 10 inches to 4 feet
Visual Description: CLAY, sandy, brown

Dish+Wet Soil (g): _____
Dish+Dry Soil (g): _____
Dish Wt. (g): _____
Air Dried Moisture
Content (%): _____

Water Soluble Sulfate (Colorado Procedure CP-L-2103)

Dilution	Reading, mg/L	Concentration, ppm	Concentration, %

pH (ASTM D 4972, 20g of -#10)

pH Meter Reading: _____

Water Soluble Chloride (HACH Method 8113, 100g of -#10)

Dilution	Reading (mg/L)	Result (mg/L)
Fifteenth	2.0	166,857.9

Resistivity (AASHTO T 288, -#10)

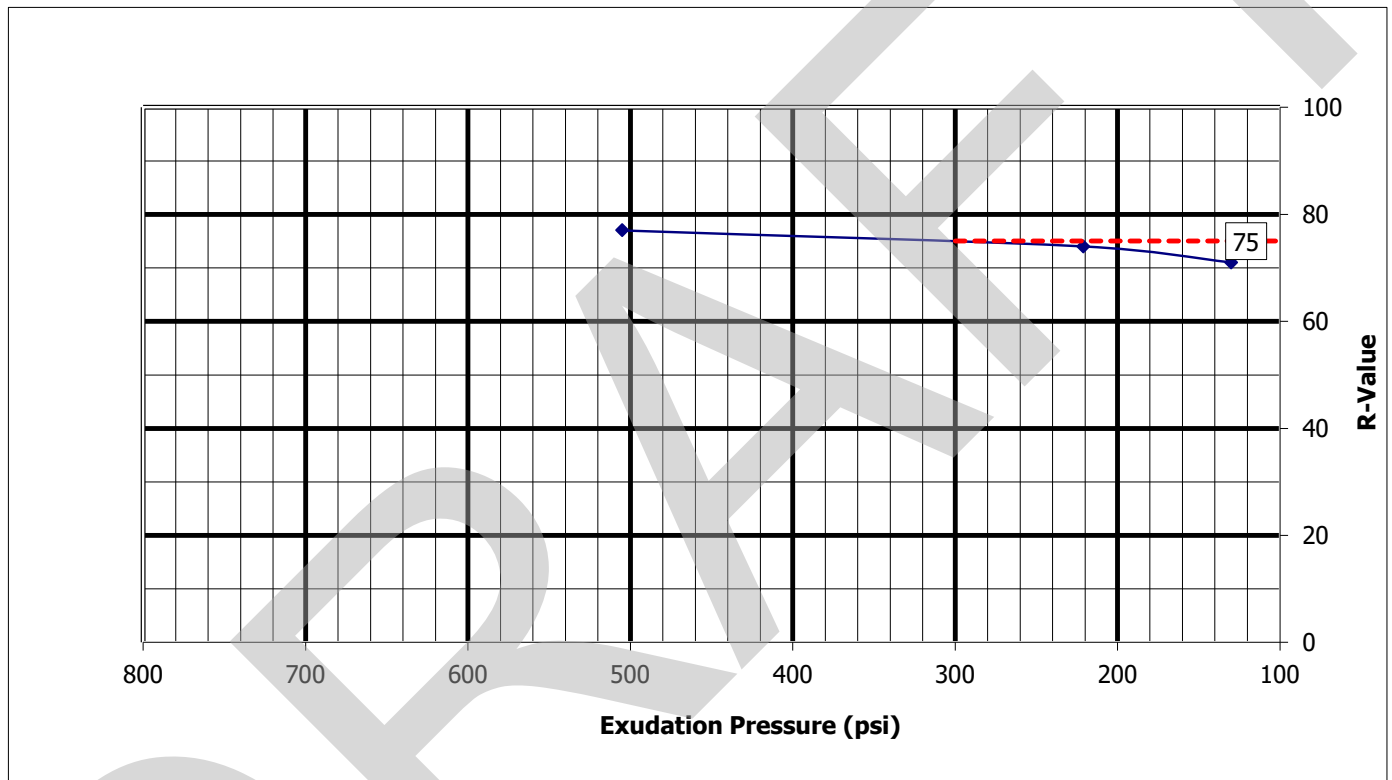
Readings (ohm*cm)

Lowest Resistivity

--

R-VALUE TEST GRAPH (AASHTO T190)

Project Number:	23.022, RockSol Consulting	Date:	01/16/23
Project Name:	City of Evans - 37th Street and 65th Avenue (RockSol Project No. 530.02)	Technician:	J. De Los Santos
Lab ID Number:	232032	Reviewer:	G. Hoyos
Sample Location:	B-2 at 1 to 5 feet		
Visual Description:	SAND, clayey, brown		



R-Value @ Exudation Pressure 300 psi: 75
Specification:

CDOT Pavement Design Manual, 2011.
 Eq. 2.1 & 2.2, page 2-3.

$S_1 = [(R-5)/11.29] + 3$
 $M_R = 10^{[(S_1 + 18.72)/6.24]}$
 M_R = Resilient Modulus, psi
 S_1 = the Soil Support Value
 R = the R-Value obtained

$S_1 = 9.20$
 $M_R = 29,812$

Test Specimen:	1	2	3
Moisture Content, %:	6.8	7.1	7.5
Expansion Pressure, psi:	0.36	0.24	-0.21
Dry Density, pcf:	134.1	133.8	133.0
R-Value:	77	74	71
Exudation Pressure, psi:	505	221	130

Note: The R-Value is measured; the M_R is an approximation from correlation formulas.

APPENDIX D

CITY OF EVANS 2018 TRAFFIC STUDY REPORT

65th Ave SB North Side of 37th

65th Ave NB North Side of 37th

37th St WB West Side of 65th Ave

37th St WB East Side of 65th Ave

37th St

37th St EB West Side of 65th Ave

37th St EB East Side of 65th Ave

65th Ave SB South Side of 37th

65th Ave NB South Side of 37th



Vicinity Map: City of Evans
37th St and 65th Ave
2018 Weekly Vehicle Counts



0 25 50
Feet

MetroCount Traffic Executive Weekly Vehicle Counts

WeeklyVehicle-483 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 65th Ave NB southside of 37th St
Attribute: northbound
Direction: 1 - North bound, A trigger first. **Lane:** 1
Survey Duration: 7:32 Monday, August 27, 2018 => 11:52 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1153.EC1 (Plus)
Identifier: EA114CNS MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = North
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 8263 / 19436 (42.51%)

Weekly Vehicle Counts

WeeklyVehicle-483**Site:** 37th St / 65th Ave.1.0N**Description:** 65th Ave NB southside of 37th St**Filter time:** 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018**Scheme:** Vehicle classification (Scheme F3)**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

	Sun 26 Aug	Mon 27 Aug	Tue 28 Aug	Wed 29 Aug	Thu 30 Aug	Fri 31 Aug	Sat 01 Sep	Averages	
Hour								1 - 5	1 - 7
0000-0100	*	*	15	13	16	*	*	14.7	14.7
0100-0200	*	*	9	8	9	*	*	8.7	8.7
0200-0300	*	*	5	6	2	*	*	4.3	4.3
0300-0400	*	*	6	9	7	*	*	7.3	7.3
0400-0500	*	*	20	10	13	*	*	14.3	14.3
0500-0600	*	*	61	72	75	*	*	69.3	69.3
0600-0700	*	*	165	157	157	*	*	159.7	159.7
0700-0800	*	*	260	275	264	*	*	266.3	266.3
0800-0900	*	*	176	190	177	*	*	181.0	181.0
0900-1000	*	*	147	155	147	*	*	149.7	149.7
1000-1100	*	*	137	146	125	*	*	136.0	136.0
1100-1200	*	*	134	111	144	*	*	129.7	129.7
1200-1300	*	*	121	136	139	*	*	132.0	132.0
1300-1400	*	*	118	122	129	*	*	123.0	123.0
1400-1500	*	*	146	183	162	*	*	163.7	163.7
1500-1600	*	*	194	194	179	*	*	189.0	189.0
1600-1700	*	*	247	214	259	*	*	240.0	240.0
1700-1800	*	*	278	278	242	*	*	266.0	266.0
1800-1900	*	*	198	218	193	*	*	203.0	203.0
1900-2000	*	*	127	107	132	*	*	122.0	122.0
2000-2100	*	*	80	91	84	*	*	85.0	85.0
2100-2200	*	*	52	38	60	*	*	50.0	50.0
2200-2300	*	*	21	27	23	*	*	23.7	23.7
2300-2400	*	*	18	16	14	*	*	16.0	16.0
Totals									
0700-1900	*	*	2156	2222	2160	*	*	2179.3	2179.3
0600-2200	*	*	2580	2615	2593	*	*	2596.0	2596.0
0600-0000	*	*	2619	2658	2630	*	*	2635.7	2635.7
0000-0000	*	*	2735	2776	2752	*	*	2754.3	2754.3
AM Peak									
	*	*	0700	0700	0700	*	*		
	*	*	260	275	264	*	*		
PM Peak									
	*	*	1700	1700	1600	*	*		
	*	*	278	278	259	*	*		

* - No data.

MetroCount Traffic Executive **Vehicle Counts**

VehicleCount-484 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 65th Ave NB southside of 37th St
Attribute: northbound
Direction: 1 - North bound, A trigger first. **Lane:** 1
Survey Duration: 7:32 Monday, August 27, 2018 => 11:52 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1153.EC1 (Plus)
Identifier: EA114CNS MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = North
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 8263 / 19436 (42.51%)

* Tuesday, August 28, 2018 - Total=2735, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
15	9	5	6	20	61	165	260	176	147	137	134	121	118	146	194	247	278	198	127	80	52	21	18
4	4	2	0	0	8	28	63	53	37	27	27	22	28	41	47	69	73	53	43	26	14	8	4
4	4	0	1	4	12	47	78	42	37	39	38	38	27	27	49	57	78	53	18	15	19	2	5
3	0	1	0	9	29	38	72	46	33	35	35	30	35	39	49	64	63	53	30	26	15	7	4
4	1	2	5	7	12	52	47	35	40	36	34	31	28	39	49	57	64	39	36	13	4	4	5

AM Peak 0645 - 0745 (265), AM PHF=0.85 PM Peak 1700 - 1800 (278), PM PHF=0.89

* Wednesday, August 29, 2018 - Total=2776, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
13	8	6	9	10	72	157	275	190	155	146	111	136	122	183	194	214	278	218	107	91	38	27	16
3	5	2	1	0	12	29	68	52	41	31	20	32	35	40	50	57	70	67	35	30	10	9	4
3	1	2	1	2	13	43	69	42	28	36	35	23	34	28	38	50	78	60	22	24	18	7	3
5	0	0	3	4	25	39	81	49	39	37	28	40	31	55	53	49	78	49	27	21	6	6	3
2	2	2	4	4	22	46	57	47	47	42	28	41	22	60	53	58	52	42	23	16	4	5	6

AM Peak 0700 - 0800 (275), AM PHF=0.85 PM Peak 1645 - 1745 (284), PM PHF=0.91

* Thursday, August 30, 2018 - Total=2752, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
16	9	2	7	13	75	157	264	177	147	125	144	139	129	162	179	259	242	193	132	84	60	23	14
5	4	0	1	1	10	24	57	45	46	31	40	38	33	40	42	58	62	51	31	30	18	9	7
2	0	0	3	3	14	43	74	37	42	27	32	36	27	24	40	62	57	49	50	21	13	4	3
6	2	0	3	5	23	43	60	54	27	32	38	32	33	48	49	78	57	52	26	11	12	7	2
3	3	2	0	4	28	47	73	41	32	35	34	33	36	50	48	61	66	41	25	22	17	3	2

AM Peak 0700 - 0800 (264), AM PHF=0.89

MetroCount Traffic Executive
Speed Statistics by Hour

SpeedStatHour-485 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 65th Ave NB southside of 37th St

Attribute: northbound

Direction: 1 - North bound, A trigger first. Lane: 1

Survey Duration: 7:32 Monday, August 27, 2018 => 11:52 Tuesday, September 4, 2018,

Zone:

File: 37th St_ 65th Ave 0 2018-09-04 1153.EC1 (Plus)

Identifier: EA114CNS MC56-L5 [MC55] (c)Microcom 19Oct04

Algorithm: Factory default axle (v4.06)

Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:

Included classes:

Speed range:

Direction:

Separation:

Name:

Scheme:

Units:

In profile:

0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

6 - 99 mph.

North, East, South, West (bound), P = North

Headway > 0 sec, Span 0 - 328.084 ft

Default Profile

Vehicle classification (Scheme F3)

Non metric (ft, mi, ft/s, mph, lb, ton)

Vehicles = 8263 / 19436 (42.51%)

Time	Bin	Min	Max	Mean	Median	85%	95%	>PSL 35 mph
0000	44	17.1	39.4	29.0	29.1	33.1	36.0	5
0100	26	21.9	38.3	28.8	28.2	32.2	33.3	1
0200	13	20.5	32.2	26.3	26.2	30.0	30.6	0
0300	22	21.4	35.0	29.8	30.2	32.4	34.7	0
0400	43	18.0	37.6	29.3	29.1	33.3	36.7	5
0500	208	17.6	50.8	29.2	29.1	34.0	36.7	18
0600	479	9.3	50.8	27.3	27.5	31.8	34.9	24
0700	799	6.4	41.3	23.1	23.7	29.1	32.4	19
0800	543	6.6%	38.0	26.4	26.4	30.9	33.8	16
0900	449	5.4%	39.8	27.0	27.1	31.1	33.1	12
1000	408	4.9%	44.8	26.8	27.3	31.3	33.8	11
1100	389	4.7%	49.2	26.9	27.3	30.9	33.6	13
1200	396	4.8%	43.9	27.4	27.1	31.5	34.0	22
1300	369	4.5%	42.6	27.1	27.1	31.5	34.0	9
1400	491	5.9%	38.7	26.2	26.2	31.3	33.8	17
1500	567	6.9%	40.9	24.7	25.1	29.8	32.2	7
1600	720	8.7%	43.7	22.3	22.6	28.6	31.3	11
1700	798	9.7%	40.3	21.2	21.5	28.0	31.3	14
1800	609	7.4%	45.2	24.6	25.3	30.6	34.0	21
1900	366	4.4%	41.1	27.3	27.1	31.8	34.2	16
2000	255	3.1%	42.4	26.4	26.4	31.1	33.8	8
2100	150	1.8%	37.3	27.7	27.5	31.1	33.3	4
2200	71	0.9%	42.9	29.2	28.4	33.6	35.8	7
2300	48	0.6%	39.6	28.2	28.2	32.7	35.8	4
----	8253	100.0%	50.8	25.4	25.9	30.9	33.8	264

MetroCount Traffic Executive **Speed Bin Chart**

SpeedBin-486 -- English (ENU)

Datasets:

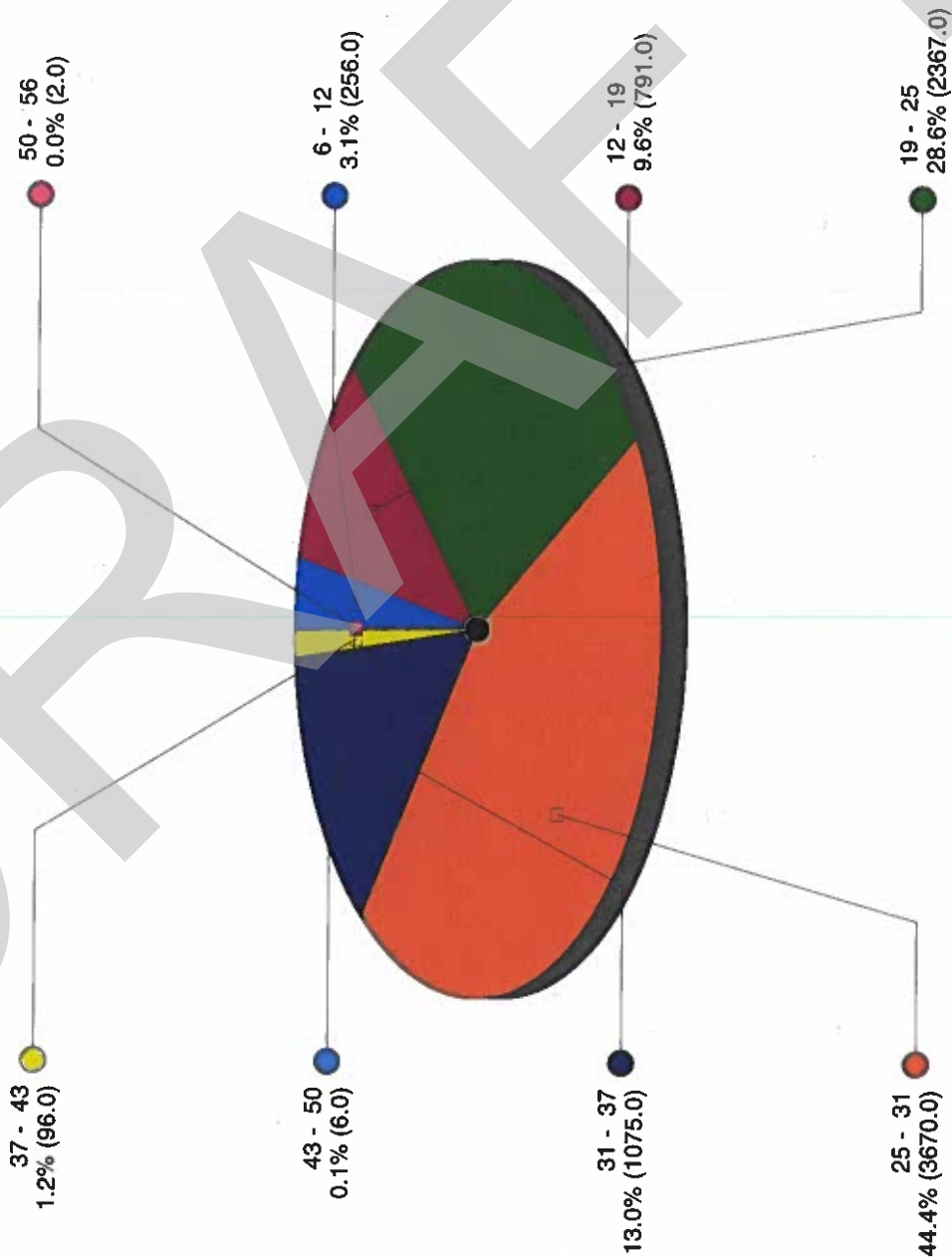
Site: [37th St / 65th Ave] 65th Ave NB southside of 37th St
Attribute: northbound
Direction: 1 - North bound, A trigger first. **Lane:** 1
Survey Duration: 7:32 Monday, August 27, 2018 => 11:52 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1153.EC1 (Plus)
Identifier: EA114CNS MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = North
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 8263 / 19436 (42.51%)

Speed Bin Chart

SpeedBin-486 (Non metric) Site:37th St / 65th Ave.1.ON
Description: 65th Ave NB southside of 37th St
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)
Scheme: Vehicle classification (Scheme F3)
Total=8263



Speed Bins

Speed	Bin	vMult	n * vMult
0 - 6	-	-	-
6 - 12	256 3.1%	0.00	0.00
12 - 19	791 9.6%	0.00	0.00
19 - 25	2367 28.6%	0.00	0.00
25 - 31	3670 44.4%	0.00	0.00
31 - 37	1075 13.0%	0.00	0.00
37 - 43	96 1.2%	0.00	0.00
43 - 50	6 0.1%	0.00	0.00
50 - 56	2 0.0%	0.00	0.00
56 - 62	0 0.0%	0.00	0.00
62 - 68	0 0.0%	0.00	0.00
68 - 75	0 0.0%	0.00	0.00
75 - 81	0 0.0%	0.00	0.00
81 - 87	0 0.0%	0.00	0.00
87 - 93	0 0.0%	0.00	0.00
93 - 99	0 0.0%	0.00	0.00
99 - 106	-	-	-
106 - 112	-	-	-
112 - 118	-	-	-
118 - 124	-	-	-

Total Speed Rating = 0.00

MetroCount Traffic Executive Class Bin Chart

ClassBin-487 -- English (ENU)

Datasets:

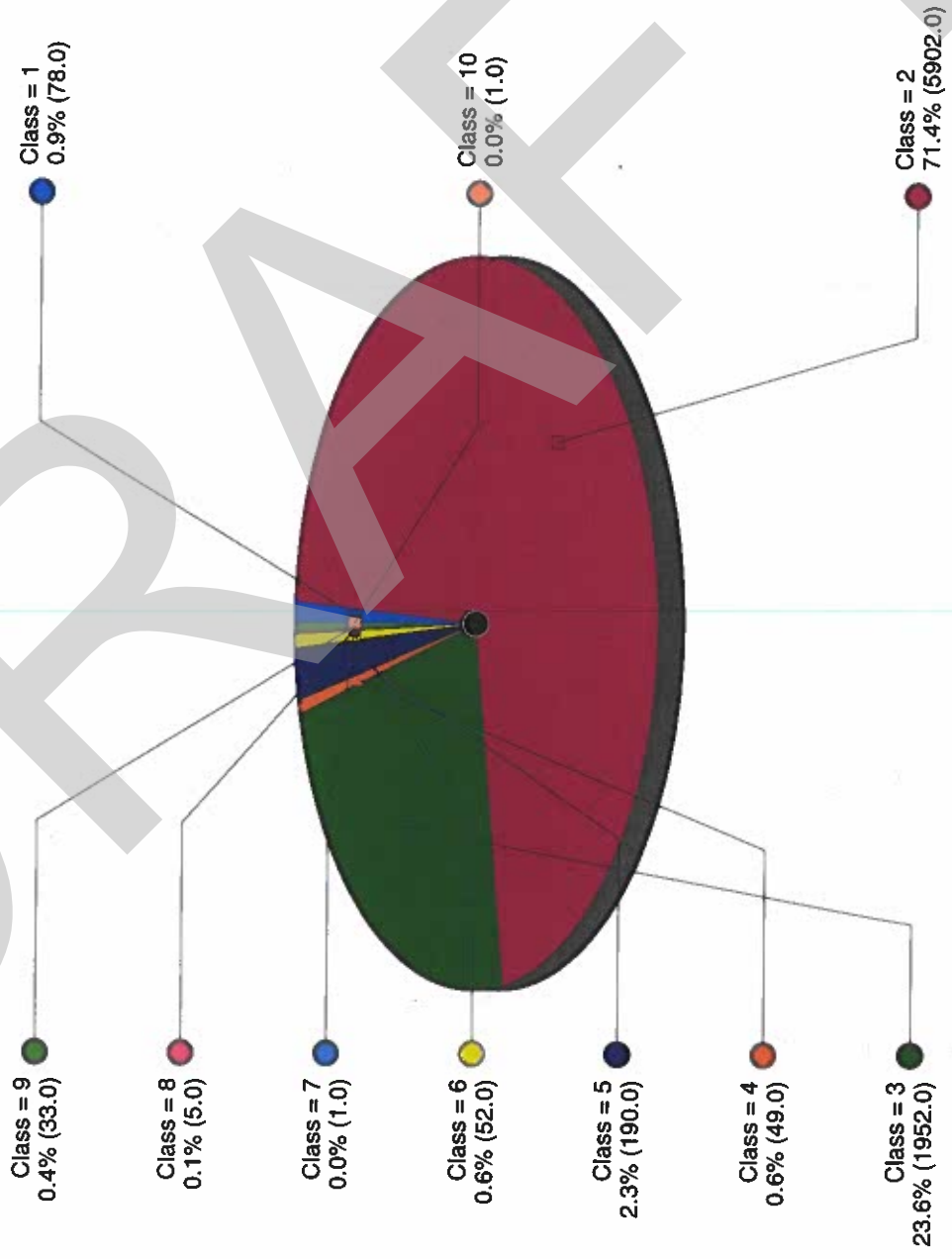
Site: [37th St / 65th Ave] 65th Ave NB southside of 37th St
Attribute: northbound
Direction: 1 - North bound, A trigger first. **Lane:** 1
Survey Duration: 7:32 Monday, August 27, 2018 => 11:52 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1153.EC1 (Plus)
Identifier: EA114CNS MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = North
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 8263 / 19436 (42.51%)

Class Bin Chart

ClassBin-487 (Non metric) Site:37th St / 65th Ave.1.ON
Description: 65th Ave NB southside of 37th St
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)
Scheme: Vehicle classification (Scheme F3)
Total=8263



FHWA Vehicle Classifications

1. Motorcycles
2 axles, 2 or 3 tires



2. Passenger Cars
2 axles, can have 1- or 2-axle trailers



3. Pickups, Panels, Vans
2 axles, 4-tire single units
Can have 1 or 2 axle trailers



4. Buses
2 or 3 axles, full length



5. Single Unit 2-Axle Trucks
2 axles, 6 tires (dual rear tires), single-unit



6. Single Unit 3-Axle Trucks
3 axles, single unit



7. Single Unit 4 or More-Axle Trucks
4 or more axles, single unit



8. Single Trailer 3- or 4-Axle Trucks
3 or 4 axles, single trailer



9. Single Trailer 5-Axle Trucks
5 axles, single trailer



10. Single Trailer 6 or More-Axle Trucks
6 or more axles, single trailer



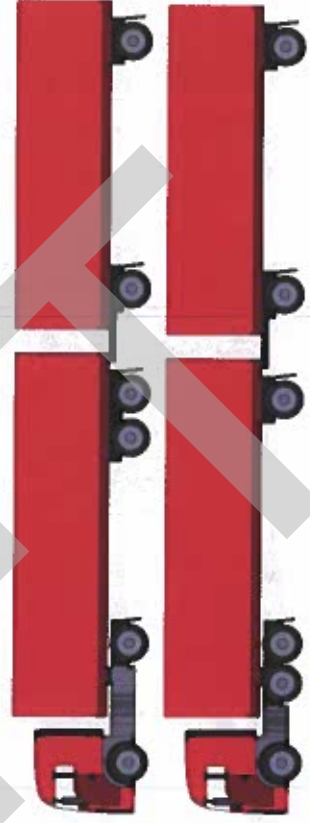
11. Multi-Trailer 5 or Less-Axle Trucks
5 or less axles, multiple trailers



13. Multi-Trailer 7 or More-Axle Trucks
7 or more axles, multiple trailers



12. Multi-Trailer 6-Axle Trucks
6 axles, multiple trailers



Class Bins

Class 1 - 78 (0.94%)
Class 2 - 5902 (71.43%)
Class 3 - 1952 (23.62%)
Class 4 - 49 (0.59%)
Class 5 - 190 (2.30%)
Class 6 - 52 (0.63%)
Class 7 - 1 (0.01%)
Class 8 - 5 (0.06%)
Class 9 - 33 (0.40%)
Class 10 - 1 (0.01%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)
Class 13 - 0 (0.00%)

MetroCount Traffic Executive Weekly Vehicle Counts

WeeklyVehicle-478 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 65th Ave SB southside 37th St
Attribute: southbound
Direction: 3 - South bound, A trigger first. **Lane:** 2
Survey Duration: 7:31 Monday, August 27, 2018 => 12:20 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1220.EC2 (Plus)
Identifier: EF93WE5R MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = South
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 8656 / 19629 (44.10%)

Weekly Vehicle Counts

WeeklyVehicle-478

Site: 37th St / 65th Ave.2.0S
Description: 65th Ave SB southside 37th St
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Scheme: Vehicle classification (Scheme F3)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

	Sun 26 Aug	Mon 27 Aug	Tue 28 Aug	Wed 29 Aug	Thu 30 Aug	Fri 31 Aug	Sat 01 Sep	Averages	
Hour								1 - 5	1 - 7
0000-0100	*	*	8	13	12	*	*	11.0	11.0
0100-0200	*	*	8	5	9	*	*	7.3	7.3
0200-0300	*	*	9	11	9	*	*	9.7	9.7
0300-0400	*	*	14	18	25	*	*	19.0	19.0
0400-0500	*	*	28	28	28	*	*	28.0	28.0
0500-0600	*	*	100	114	107	*	*	107.0	107.0
0600-0700	*	*	169	160	173	*	*	167.3	167.3
0700-0800	*	*	194	211	184	*	*	196.3	196.3
0800-0900	*	*	264	246	237	*	*	249.0	249.0
0900-1000	*	*	91	105	114	*	*	103.3	103.3
1000-1100	*	*	110	98	101	*	*	103.0	103.0
1100-1200	*	*	128	119	126	*	*	124.3	124.3
1200-1300	*	*	138	121	142	*	*	133.7	133.7
1300-1400	*	*	127	124	126	*	*	125.7	125.7
1400-1500	*	*	161	166	156	*	*	161.0	161.0
1500-1600	*	*	266	270	286	*	*	274.0	274.0
1600-1700	*	*	280	265	255	*	*	266.7	266.7
1700-1800	*	*	273	274	238	*	*	261.7	261.7
1800-1900	*	*	190	217	193	*	*	200.0	200.0
1900-2000	*	*	122	114	115	*	*	117.0	117.0
2000-2100	*	*	97	111	94	*	*	100.7	100.7
2100-2200	*	*	60	68	75	*	*	67.7	67.7
2200-2300	*	*	34	27	38	*	*	33.0	33.0
2300-2400	*	*	16	19	22	*	*	19.0	19.0
Totals									
0700-1900	*	*	2222	2216	2158	*	*	2198.7	2198.7
0600-2200	*	*	2670	2669	2615	*	*	2651.3	2651.3
0600-0000	*	*	2720	2715	2675	*	*	2703.3	2703.3
0000-0000	*	*	2887	2904	2865	*	*	2885.3	2885.3
AM Peak									
	*	*	0800	0800	0800	*	*		
	*	*	264	246	237	*	*		
PM Peak									
	*	*	1600	1700	1500	*	*		
	*	*	280	274	286	*	*		

* - No data.

MetroCount Traffic Executive Vehicle Counts

VehicleCount-479 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 65th Ave SB southside 37th St
Attribute: southbound
Direction: 3 - South bound, A trigger first. **Lane:** 2
Survey Duration: 7:31 Monday, August 27, 2018 => 12:20 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1220.EC2 (Plus)
Identifier: EF93WE5R MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = South
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 8656 / 19629 (44.10%)

* Tuesday, August 28, 2018 - Total=2887, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
8	8	9	14	28	100	169	194	264	91	110	128	138	127	161	266	280	273	190	122	97	60	34	16	
3	2	4	4	2	14	41	53	92	22	38	35	33	39	28	43	82	52	55	38	25	14	12	5	4
2	3	2	1	6	32	39	41	99	20	17	25	32	30	40	42	66	59	56	28	23	23	6	4	5
3	2	0	4	9	25	46	35	38	23	23	33	39	22	50	79	71	70	38	31	22	13	7	5	3
0	1	3	5	11	29	43	65	35	26	32	35	34	36	43	102	61	92	41	25	27	10	9	2	1

AM Peak 0745 - 0845 (294), AM PHF=0.74 PM Peak 1530 - 1630 (329), PM PHF=0.81

* Wednesday, August 29, 2018 - Total=2904, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
13	5	11	18	28	114	160	211	246	105	98	119	121	124	166	270	265	274	217	114	111	68	27	19	
4	1	2	3	6	17	39	46	85	33	25	30	27	37	35	42	91	61	61	35	21	22	9	7	3
5	1	2	3	4	35	37	61	91	20	32	29	35	25	45	44	48	67	52	18	38	18	5	4	4
3	1	4	3	9	30	46	41	48	27	25	26	31	28	46	72	63	65	47	30	23	20	5	5	2
1	2	3	9	9	32	38	63	22	25	16	34	28	34	40	112	63	81	57	31	29	8	8	3	3

AM Peak 0745 - 0845 (287), AM PHF=0.79 PM Peak 1530 - 1630 (323), PM PHF=0.72

* Thursday, August 30, 2018 - Total=2865, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
12	9	9	25	28	107	173	184	237	114	101	126	142	126	156	286	255	238	193	115	94	75	38	22	
3	2	2	3	3	15	35	35	87	29	15	22	26	31	34	42	87	50	64	36	30	30	12	7	-
4	3	4	8	6	27	41	35	82	29	35	21	38	27	33	53	48	63	54	26	25	20	11	8	-
2	2	2	6	8	35	52	42	39	26	24	42	38	23	45	75	66	56	49	31	22	16	10	2	-
3	2	1	8	11	30	45	72	29	30	27	41	40	45	44	116	54	69	26	22	17	9	5	5	-

AM Peak 0730 - 0830 (283), AM PHF=0.81

**MetroCount Traffic Executive
Speed Statistics by Hour**

SpeedStatHour-480 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 65th Ave SB southside 37th St southbound
Attribute: 3 - South bound, A trigger first. Lane: 2
Direction: 7:31 Monday, August 27, 2018 => 12:20 Tuesday, September 4, 2018,
Survey Duration:
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1220.EC2 (Plus)
Identifier: EF93WE5R MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = South
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 8656 / 19629 (44.10%)

Speed Statistics by Hour

SpeedStatHour-480

Site: 37th St / 65th Ave.2.0S
Description: 65th Ave SB southside 37th St
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Scheme: Vehicle classification (Scheme F3)
Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

Vehicles = 8656

Posted speed limit = 35 mph, Exceeding = 761 (8.79%), Mean Exceeding = 37.92 mph

Maximum = 50.9 mph, Minimum = 8.0 mph, Mean = 30.1 mph

85% Speed = 33.6 mph, 95% Speed = 36.2 mph, Median = 29.8 mph

12 mph Pace = 24 - 36, Number in Pace = 7793 (90.03%)

Variance = 15.43, Standard Deviation = 3.93 mph

Hour Bins

Time	Bin	Min	Max	Mean	Median	85%	95%	>PSL 35 mph
0000	33	0.4%	22.6	38.8	30.8	34.2	36.7	4
0100	22	0.3%	22.8	35.2	29.2	31.3	33.6	1
0200	29	0.3%	16.0	35.6	30.4	33.3	35.3	3
0300	57	0.7%	22.2	37.8	30.2	33.8	35.3	5
0400	84	1.0%	19.0	37.8	30.4	32.9	35.3	7
0500	321	3.7%	14.2	47.2	30.2	33.3	35.3	25
0600	502	5.8%	10.5	48.0	31.0	34.2	37.4	58
0700	589	6.8%	19.9	46.5	29.9	33.3	36.2	47
0800	747	8.6%	15.6	48.2	29.1	32.2	35.8	49
0900	310	3.6%	16.3	49.2	30.1	32.9	35.1	17
1000	309	3.6%	20.2	44.5	30.2	33.6	35.8	22
1100	373	4.3%	14.5	43.8	29.8	33.6	36.5	29
1200	401	4.6%	16.2	50.9	30.2	33.6	36.2	37
1300	377	4.4%	12.5	40.0	29.8	33.8	35.8	31
1400	483	5.6%	15.9	46.9	31.4	34.9	37.4	71
1500	822	9.5%	13.4	50.0	29.9	33.3	36.7	72
1600	800	9.2%	16.5	47.1	29.2	32.9	35.3	53
1700	785	9.1%	15.5	47.2	30.7	34.0	38.5	91
1800	600	6.9%	8.0	44.2	30.1	33.3	36.2	47
1900	351	4.1%	10.2	44.9	30.8	34.0	36.7	35
2000	302	3.5%	16.8	50.0	30.5	33.3	36.9	30
2100	203	2.3%	21.1	44.5	30.6	33.8	36.5	19
2200	99	1.1%	17.5	37.9	29.6	32.7	34.4	3
2300	57	0.7%	21.4	50.6	30.5	33.1	35.8	5
----	8656	100.0%	8.0	50.9	30.1	33.6	36.2	761

MetroCount Traffic Executive Speed Bin Chart

SpeedBin-481 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 65th Ave SB southside 37th St
Attribute: southbound
Direction: 3 - South bound, A trigger first. **Lane:** 2
Survey Duration: 7:31 Monday, August 27, 2018 => 12:20 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1220.EC2 (Plus)
Identifier: EF93WE5R MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = South
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 8656 / 19629 (44.10%)

Speed Bin Chart

SpeedBin-481 (Non metric) Site:37th St / 65th Ave.2.0S

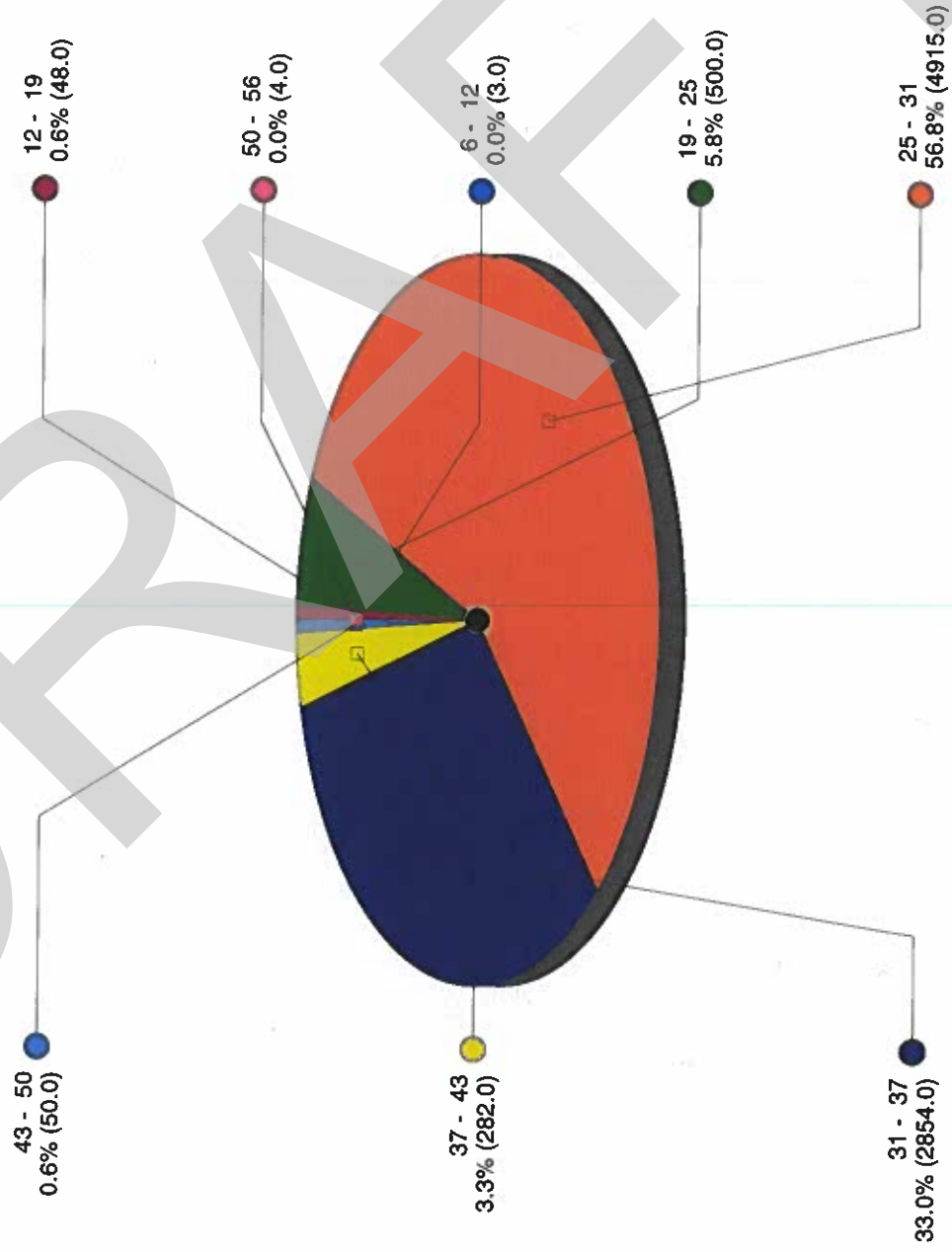
Description: 65th Ave SB southside 37th St

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018

Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

Scheme: Vehicle classification (Scheme F3)

Total=8656



Speed Bins

Speed	Bin	vMult	n * vMult
0 - 6	- -	-	-
6 - 12	3 0.0%	0.00	0.00
12 - 19	48 0.6%	0.00	0.00
19 - 25	500 5.8%	0.00	0.00
25 - 31	4915 56.8%	0.00	0.00
31 - 37	2854 33.0%	0.00	0.00
37 - 43	282 3.3%	0.00	0.00
43 - 50	50 0.6%	0.00	0.00
50 - 56	4 0.0%	0.00	0.00
56 - 62	0 0.0%	0.00	0.00
62 - 68	0 0.0%	0.00	0.00
68 - 75	0 0.0%	0.00	0.00
75 - 81	0 0.0%	0.00	0.00
81 - 87	0 0.0%	0.00	0.00
87 - 93	0 0.0%	0.00	0.00
93 - 99	0 0.0%	0.00	0.00
99 - 106	- -	-	-
106 - 112	- -	-	-
112 - 118	- -	-	-
118 - 124	- -	-	-

Total Speed Rating = 0.00

MetroCount Traffic Executive Class Bin Chart

ClassBin-482 -- English (ENU)

Datasets:

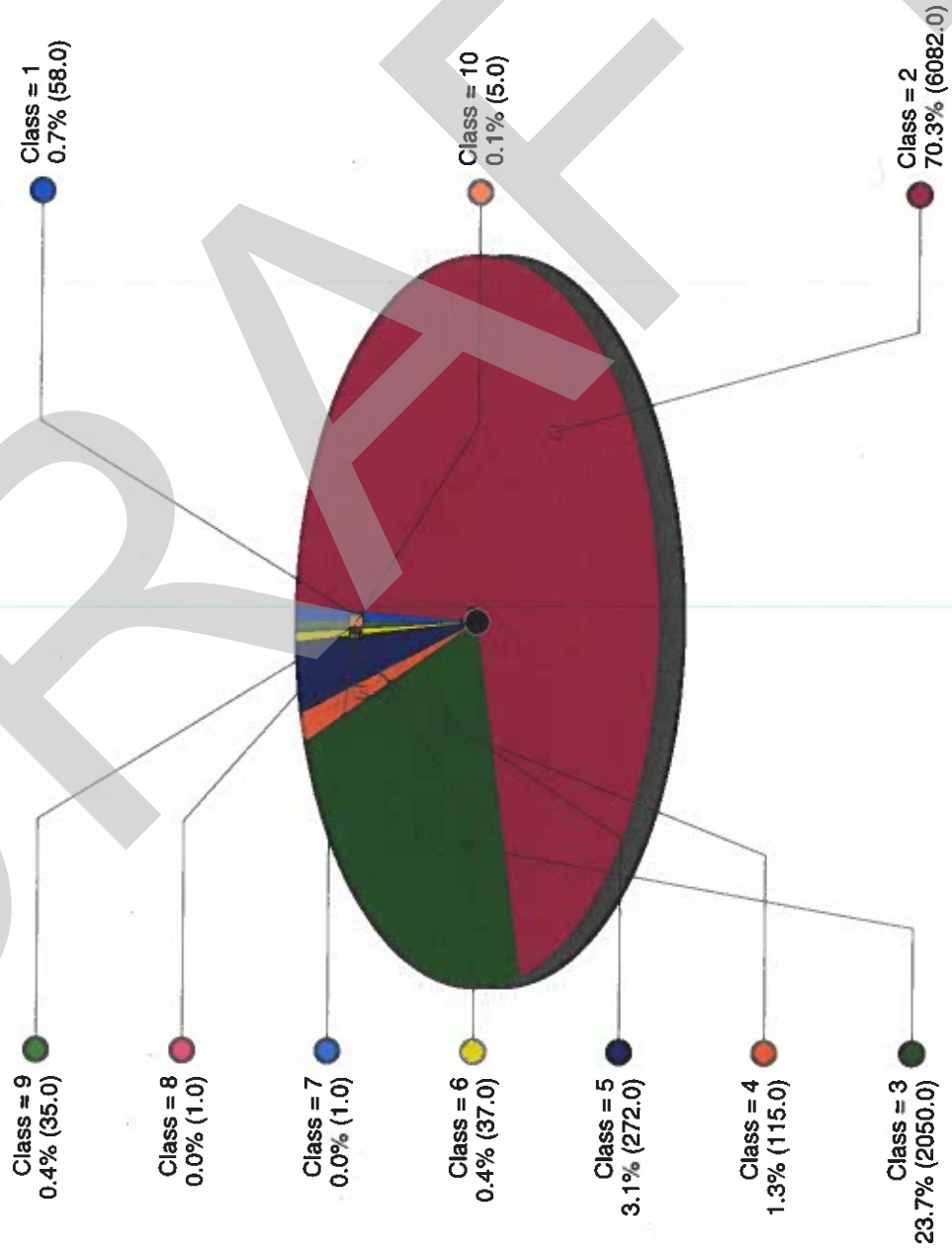
Site: [37th St / 65th Ave] 65th Ave SB southside 37th St
Attribute: southbound
Direction: 3 - South bound, A trigger first. **Lane:** 2
Survey Duration: 7:31 Monday, August 27, 2018 => 12:20 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1220.EC2 (Plus)
Identifier: EF93WE5R MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = South
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 8656 / 19629 (44.10%)

Class Bin Chart

ClassBin-482 (Non metric) Site:37th St / 65th Ave.2.0S
Description: 65th Ave SB southside 37th St
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)
Scheme: Vehicle classification (Scheme F3)
Total=8656



FHWA Vehicle Classifications

1. Motorcycles
2 axles, 2 or 3 tires



2. Passenger Cars
2 axles, can have 1- or 2-axle trailers



3. Pickups, Panels, Vans
2 axles, 4-tire single units
Can have 1 or 2 axle trailers



4. Buses
2 or 3 axles, full length



5. Single Unit 2-Axle Trucks
2 axles, 6 tires (dual rear tires), single-unit



6. Single Unit 3-Axle Trucks
3 axles, single unit



7. Single Unit 4 or More-Axle Trucks
4 or more axles, single unit



8. Single Trailer 3- or 4-Axle Trucks
3 or 4 axles, single trailer



9. Single Trailer 5-Axle Trucks
5 axles, single trailer



10. Single Trailer 6 or More-Axle Trucks
6 or more axles, single trailer



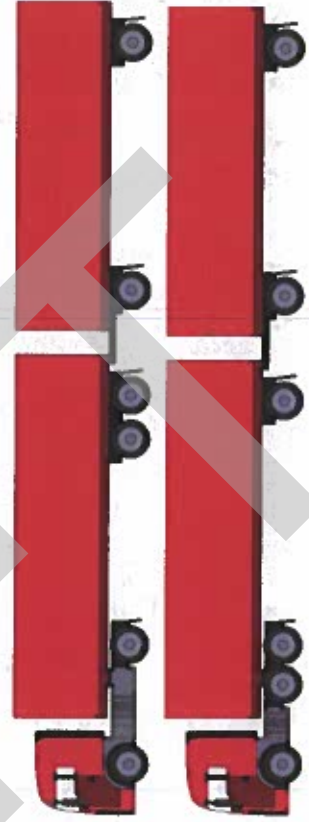
11. Multi-Trailer 5 or Less-Axle Trucks
5 or less axles, multiple trailers



13. Multi-Trailer 7 or More-Axle Trucks
7 or more axles, multiple trailers



12. Multi-Trailer 6-Axle Trucks
6 axles, multiple trailers



Class Bins

Class 1 - 58 (0.67%)
Class 2 - 6082 (70.26%)
Class 3 - 2050 (23.68%)
Class 4 - 115 (1.33%)
Class 5 - 272 (3.14%)
Class 6 - 37 (0.43%)
Class 7 - 1 (0.01%)
Class 8 - 1 (0.01%)
Class 9 - 35 (0.40%)
Class 10 - 5 (0.06%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)
Class 13 - 0 (0.00%)

MetroCount Traffic Executive **Weekly Vehicle Counts**

WeeklyVehicle-488 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St EB westside 65th Ave
Attribute: eastbound
Direction: 2 - East bound, A trigger first. **Lane:** 3
Survey Duration: 7:25 Monday, August 27, 2018 => 12:26 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1226.EC3 (Plus)
Identifier: EF864NZS MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 11920 / 27261 (43.73%)

Weekly Vehicle Counts

WeeklyVehicle-488

Site: 37th St / 65th Ave.3.0E

Description: 37th St EB westside 65th Ave

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018

Scheme: Vehicle classification (Scheme F3)

Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

	Sun 26 Aug	Mon 27 Aug	Tue 28 Aug	Wed 29 Aug	Thu 30 Aug	Fri 31 Aug	Sat 01 Sep	Averages 1 - 5	1 - 7
Hour									
0000-0100	*	*	14	13	22	*	*	16.3	16.3
0100-0200	*	*	7	8	11	*	*	8.7	8.7
0200-0300	*	*	12	9	10	*	*	10.3	10.3
0300-0400	*	*	5	10	10	*	*	8.3	8.3
0400-0500	*	*	16	17	12	*	*	15.0	15.0
0500-0600	*	*	57	61	60	*	*	59.3	59.3
0600-0700	*	*	151	171	150	*	*	157.3	157.3
0700-0800	*	*	254	240	261	*	*	251.7	251.7
0800-0900	*	*	321	278	293	*	*	297.3	297.3
0900-1000	*	*	154	158	169	*	*	160.3	160.3
1000-1100	*	*	163	139	151	*	*	151.0	151.0
1100-1200	*	*	160	153	160	*	*	157.7	157.7
1200-1300	*	*	172	170	151	*	*	164.3	164.3
1300-1400	*	*	182	159	165	*	*	168.7	168.7
1400-1500	*	*	208	233	222	*	*	221.0	221.0
1500-1600	*	*	321	348	344	*	*	337.7	337.7
1600-1700	*	*	463	532	495	*	*	496.7	496.7
1700-1800	*	*	398	461	462	*	*	440.3	440.3
1800-1900	*	*	400	364	398	*	*	387.3	387.3
1900-2000	*	*	200	208	211	*	*	206.3	206.3
2000-2100	*	*	121	96	111	*	*	109.3	109.3
2100-2200	*	*	79	65	66	*	*	70.0	70.0
2200-2300	*	*	43	40	49	*	*	44.0	44.0
2300-2400	*	*	36	37	30	*	*	34.3	34.3
Totals									
0700-1900	*	*	3196	3235	3271	*	*	3234.0	3234.0
0600-2200	*	*	3747	3775	3809	*	*	3777.0	3777.0
0600-0000	*	*	3826	3852	3888	*	*	3855.3	3855.3
0000-0000	*	*	3937	3970	4013	*	*	3973.3	3973.3
AM Peak	*	*	0800	0800	0800	*	*		
	*	*	321	278	293	*	*		
PM Peak	*	*	1600	1600	1600	*	*		
	*	*	463	532	495	*	*		

* - No data.

MetroCount Traffic Executive **Vehicle Counts**

VehicleCount-489 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St EB westside 65th Ave
Attribute: eastbound
Direction: 2 - East bound, A trigger first. **Lane:** 3
Survey Duration: 7:25 Monday, August 27, 2018 => 12:26 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1226.EC3 (Plus)
Identifier: EF864NZS MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 11920 / 27261 (43.73%)

* Tuesday, August 28, 2018 - Total=3937, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
14	7	12	5	16	57	151	254	321	154	163	160	172	182	208	321	463	398	400	200	121	79	43	36
8	2	3	1	4	4	23	40	85	41	42	31	40	63	41	66	145	100	128	71	33	24	12	12
2	3	2	0	1	9	35	69	116	41	39	36	39	27	50	69	107	93	118	40	36	27	12	8
2	1	3	3	6	16	47	75	69	35	48	39	54	50	54	76	103	117	99	52	41	14	13	5
2	1	4	1	5	28	46	70	51	37	34	54	39	42	63	110	108	88	55	37	11	14	6	11

AM Peak 0730 - 0830 (346), AM PHF=0.75 PM Peak 1545 - 1645 (465), PM PHF=0.80

* Wednesday, August 29, 2018 - Total=3970, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
13	8	9	10	17	61	171	240	278	158	139	153	170	159	233	348	532	461	364	208	96	65	40	37
2	2	5	1	2	9	26	32	70	38	38	40	40	37	51	68	170	131	110	79	31	25	8	14
5	2	2	1	4	12	33	70	113	39	39	49	37	35	51	85	130	128	128	52	31	16	8	12
3	2	2	1	7	14	48	65	56	42	30	32	51	39	65	96	118	99	77	37	19	11	11	10
3	2	0	7	4	26	64	73	39	39	32	32	42	48	66	99	114	103	49	40	15	13	13	1

AM Peak 0730 - 0830 (321), AM PHF=0.71 PM Peak 1600 - 1700 (532), PM PHF=0.78

* Thursday, August 30, 2018 - Total=4013, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
22	11	10	10	12	60	150	261	293	169	151	160	151	165	222	344	495	462	398	211	111	66	49	30
6	4	3	2	1	8	20	52	99	39	37	38	40	37	42	77	177	106	131	82	30	17	12	10
3	2	4	2	4	13	38	69	96	43	42	31	33	40	64	83	100	120	115	56	31	24	15	8
6	3	3	3	3	16	47	64	49	41	31	47	37	46	53	91	104	118	90	34	23	12	11	7
7	2	0	3	4	23	45	76	49	46	41	44	41	42	63	93	114	118	62	39	27	13	11	5

AM Peak 0730 - 0830 (335), AM PHF=0.85

**MetroCount Traffic Executive
Speed Statistics by Hour**

SpeedStatHour-490 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St EB westside 65th Ave
Attribute: eastbound
Direction: 2 - East bound, A trigger first. Lane: 3
Survey Duration: 7:25 Monday, August 27, 2018 => 12:26 Tuesday, September 4, 2018,
Zone:
File: 37th St_65th Ave 0 2018-09-04 1226.EC3 (Plus)
Identifier: EF864NZS MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 11920 / 27261 (43.73%)

Speed Statistics by Hour

SpeedStatHour-490

Site: 37th St / 65th Ave.3.0E
Description: 37th St EB westside 65th Ave
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Scheme: Vehicle classification (Scheme F3)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

Vehicles = 11920

Posted speed limit = 35 mph, Exceeding = 8011 (67.21%), Mean Exceeding = 41.66 mph

Maximum = 65.7 mph, Minimum = 6.8 mph, Mean = 37.6 mph

85% Speed = 44.7 mph, 95% Speed = 48.8 mph, Median = 38.0 mph

12 mph Pace = 33 - 45, Number in Pace = 7381 (61.92%)

Variance = 54.51, Standard Deviation = 7.38 mph

Hour Bins

Time	Bin	Min	Max	Mean	Median	85%	95%	>PSL 35 mph
0000	49 0.4%	30.0	61.3	41.2	40.3	45.6	54.8	43 87.8%
0100	26 0.2%	29.9	59.0	42.0	39.6	48.1	55.0	24 92.3%
0200	31 0.3%	24.5	64.6	40.3	40.5	45.2	48.3	25 80.6%
0300	25 0.2%	22.7	51.5	38.7	36.7	47.4	51.2	20 80.0%
0400	45 0.4%	27.6	60.6	42.9	42.9	48.1	54.1	42 93.3%
0500	178 1.5%	26.0	60.7	41.4	40.5	47.9	51.7	158 88.8%
0600	472 4.0%	24.1	62.3	41.7	41.2	47.0	51.7	421 89.2%
0700	755 6.3%	20.2	64.6	38.5	38.0	44.7	48.5	516 68.3%
0800	892 7.5%	12.8	56.0	34.2	33.3	42.7	46.5	391 43.8%
0900	481 4.0%	22.0	61.0	40.5	39.6	47.2	51.9	399 83.0%
1000	453 3.8%	18.8	65.7	40.1	40.0	46.1	49.9	368 81.2%
1100	473 4.0%	14.7	59.9	40.5	40.5	47.4	51.2	378 79.9%
1200	493 4.1%	19.4	58.5	40.7	40.7	47.4	50.1	397 80.5%
1300	506 4.2%	24.8	58.1	39.5	39.8	45.2	49.7	383 75.7%
1400	663 5.6%	25.1	55.7	40.2	39.8	46.1	49.9	552 83.3%
1500	1013 8.5%	10.3	58.1	37.2	37.6	42.7	47.0	684 67.5%
1600	1490 12.5%	6.8	58.7	32.7	33.6	41.4	45.0	680 45.6%
1700	1321 11.1%	10.8	60.6	36.7	36.7	43.2	46.8	814 61.6%
1800	1162 9.7%	7.8	59.0	35.8	36.0	43.6	47.2	631 54.3%
1900	619 5.2%	19.9	58.5	39.2	39.6	45.6	48.5	461 74.5%
2000	328 2.8%	20.7	56.1	39.4	39.1	44.3	48.5	267 81.4%
2100	210 1.8%	25.8	59.0	40.0	39.6	45.0	49.0	173 82.4%
2200	132 1.1%	23.3	57.7	40.0	39.6	46.3	49.0	105 79.5%
2300	103 0.9%	24.7	52.7	38.3	38.5	43.2	47.4	79 76.7%
----	11920 100.0%	6.8	65.7	37.6	38.0	44.7	48.8	8011 67.2%

MetroCount Traffic Executive Speed Bin Chart

SpeedBin-491 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St EB westside 65th Ave
Attribute: eastbound
Direction: 2 - East bound, A trigger first. **Lane:** 3
Survey Duration: 7:25 Monday, August 27, 2018 => 12:26 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1226.EC3 (Plus)
Identifier: EF864NZS MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 11920 / 27261 (43.73%)

Speed Bin Chart

SpeedBin-491 (Non metric) Site:37th St / 65th Ave.3.0E

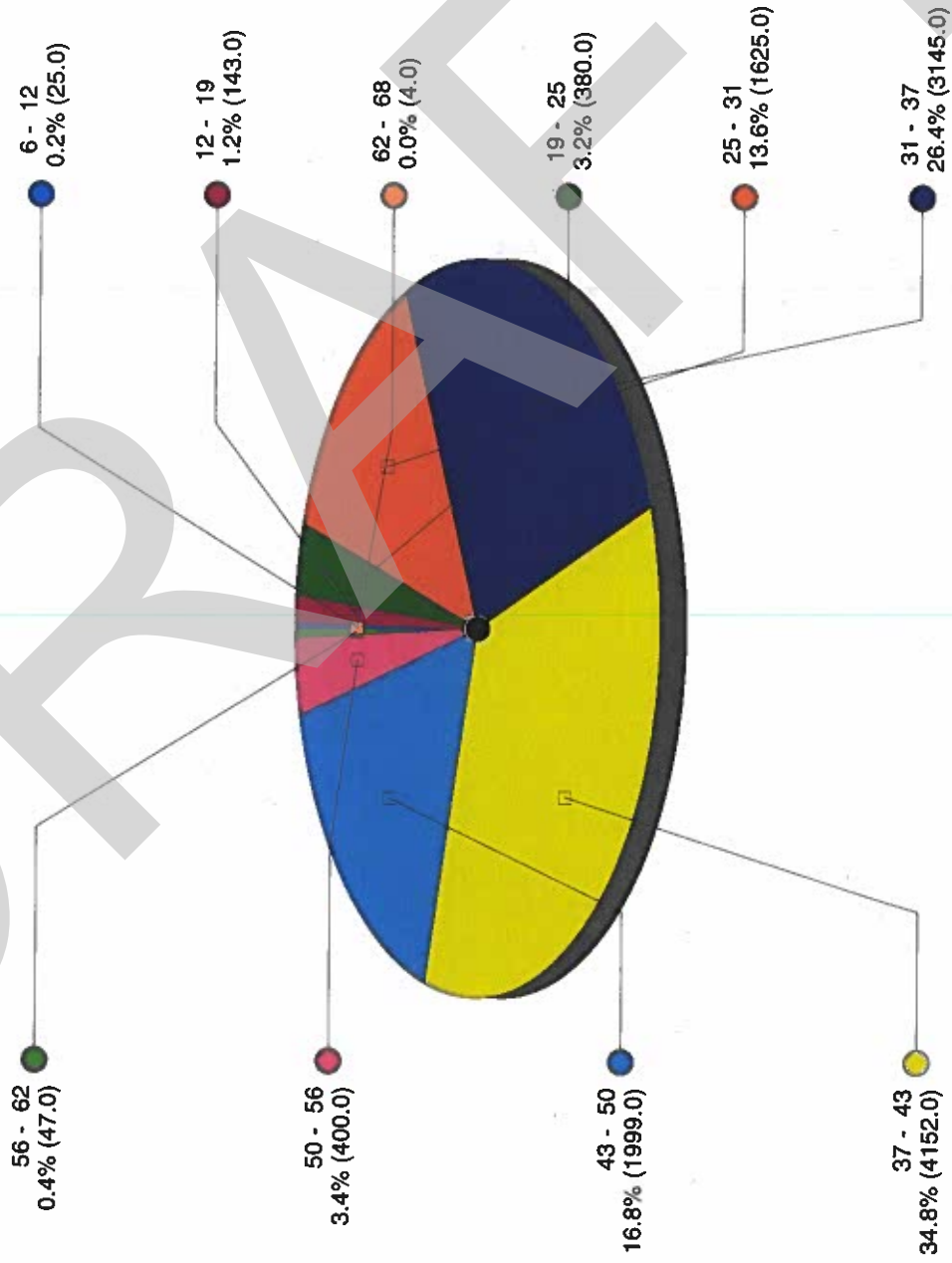
Description: 37th St EB westside 65th Ave

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018

Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

Scheme: Vehicle classification (Scheme F3)

Total=11920



Speed Bins

Speed	Bin	vMult	n * vMult
0 - 6	- -	-	-
6 - 12	25 0.2%	0.00	0.00
12 - 19	143 1.2%	0.00	0.00
19 - 25	380 3.2%	0.00	0.00
25 - 31	1625 13.6%	0.00	0.00
31 - 37	3145 26.4%	0.00	0.00
37 - 43	4152 34.8%	0.00	0.00
43 - 50	1999 16.8%	0.00	0.00
50 - 56	400 3.4%	0.00	0.00
56 - 62	47 0.4%	0.00	0.00
62 - 68	4 0.0%	0.00	0.00
68 - 75	0 0.0%	0.00	0.00
75 - 81	0 0.0%	0.00	0.00
81 - 87	0 0.0%	0.00	0.00
87 - 93	0 0.0%	0.00	0.00
93 - 99	0 0.0%	0.00	0.00
99 - 106	- -	-	-
106 - 112	- -	-	-
112 - 118	- -	-	-
118 - 124	- -	-	-

Total Speed Rating = 0.00

MetroCount Traffic Executive Class Bin Chart

ClassBin-492 -- English (ENU)

Datasets:

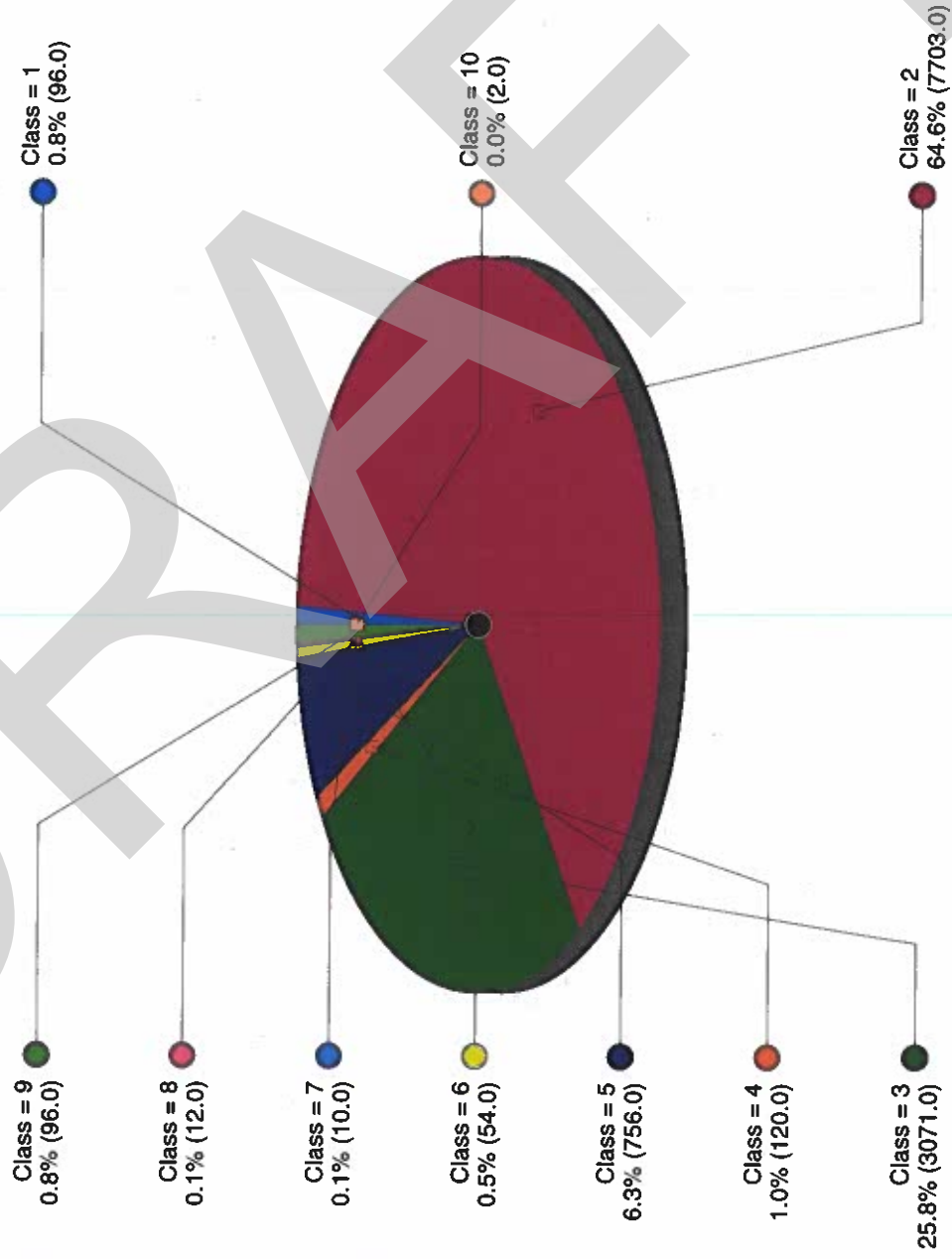
Site: [37th St / 65th Ave] 37th St EB westside 65th Ave
Attribute: eastbound
Direction: 2 - East bound, A trigger first. Lane: 3
Survey Duration: 7:25 Monday, August 27, 2018 => 12:26 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1226.EC3 (Plus)
Identifier: EF864NZS MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 11920 / 27261 (43.73%)

Class Bin Chart

ClassBin-492 (Non metric) **Site:**37th St / 65th Ave.3.0E
Description: 37th St EB westside 65th Ave
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)
Scheme: Vehicle classification (Scheme F3)
Total=11920



FHWA Vehicle Classifications

1. Motorcycles
2 axles, 2 or 3 tires



2. Passenger Cars
2 axles, can have 1- or 2-axle trailers



3. Pickups, Panels, Vans
2 axles, 4-tire single units
Can have 1 or 2 axle trailers



4. Buses
2 or 3 axles, full length



5. Single Unit 2-Axle Trucks
2 axles, 6 tires (dual rear tires), single-unit



6. Single Unit 3-Axle Trucks
3 axles, single unit



7. Single Unit 4 or More-Axle Trucks
4 or more axles, single unit



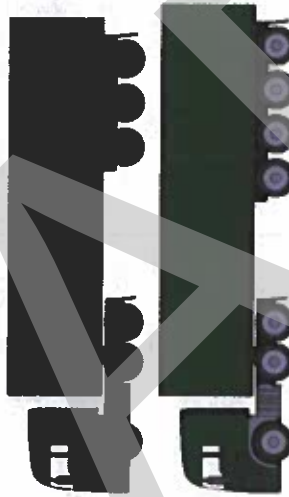
8. Single Trailer 3- or 4-Axle Trucks
3 or 4 axles, single trailer



9. Single Trailer 5-Axle Trucks
5 axles, single trailer



10. Single Trailer 6 or More-Axle Trucks
6 or more axles, single trailer



11. Multi-Trailer 5 or Less-Axle Trucks
5 or less axles, multiple trailers



13. Multi-Trailer 7 or More-Axle Trucks
7 or more axles, multiple trailers



12. Multi-Trailer 6-Axle Trucks
6 axles, multiple trailers



Class Bins

Class 1 - 96 (0.81%)
Class 2 - 7703 (64.62%)
Class 3 - 3071 (25.76%)
Class 4 - 120 (1.01%)
Class 5 - 756 (6.34%)
Class 6 - 54 (0.45%)
Class 7 - 10 (0.08%)
Class 8 - 12 (0.10%)
Class 9 - 96 (0.81%)
Class 10 - 2 (0.02%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)
Class 13 - 0 (0.00%)

DRAFT

MetroCount Traffic Executive Weekly Vehicle Counts

WeeklyVehicle-493 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St WB westside 65th Ave
Attribute: westbound
Direction: 4 - West bound, A trigger first. **Lane:** 4
Survey Duration: 7:26 Monday, August 27, 2018 => 12:31 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1232.EC4 (Plus)
Identifier: EA27RV9M MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = West
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 12861 / 29477 (43.63%)

Weekly Vehicle Counts

WeeklyVehicle-493**Site:** 37th St / 65th Ave.4.0W**Description:** 37th St WB westside 65th Ave**Filter time:** 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018**Scheme:** Vehicle classification (Scheme F3)**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Averages	
	26 Aug	27 Aug	28 Aug	29 Aug	30 Aug	31 Aug	01 Sep	1 - 5	1 - 7
Hour									
0000-0100	*	*	8	14	14	*	*	12.0	12.0
0100-0200	*	*	5	6	10	*	*	7.0	7.0
0200-0300	*	*	7	6	13	*	*	8.7	8.7
0300-0400	*	*	20	20	19	*	*	19.7	19.7
0400-0500	*	*	76	70	68	*	*	71.3	71.3
0500-0600	*	*	245	242	241	*	*	242.7	242.7
0600-0700	*	*	414	442	409	*	*	421.7	421.7
0700-0800	*	*	532	480	465	*	*	492.3	492.3
0800-0900	*	*	271	278	246	*	*	265.0	265.0
0900-1000	*	*	169	182	181	*	*	177.3	177.3
1000-1100	*	*	161	172	178	*	*	170.3	170.3
1100-1200	*	*	151	175	178	*	*	168.0	168.0
1200-1300	*	*	175	170	162	*	*	169.0	169.0
1300-1400	*	*	193	215	187	*	*	198.3	198.3
1400-1500	*	*	214	191	249	*	*	218.0	218.0
1500-1600	*	*	288	292	320	*	*	300.0	300.0
1600-1700	*	*	344	371	365	*	*	360.0	360.0
1700-1800	*	*	421	418	404	*	*	414.3	414.3
1800-1900	*	*	215	245	234	*	*	231.3	231.3
1900-2000	*	*	124	153	121	*	*	132.7	132.7
2000-2100	*	*	102	101	98	*	*	100.3	100.3
2100-2200	*	*	69	49	65	*	*	61.0	61.0
2200-2300	*	*	26	32	29	*	*	29.0	29.0
2300-2400	*	*	19	15	17	*	*	17.0	17.0
Totals									
0700-1900	*	*	3134	3189	3169	*	*	3164.0	3164.0
0600-2200	*	*	3843	3934	3862	*	*	3879.7	3879.7
0600-0000	*	*	3888	3981	3908	*	*	3925.7	3925.7
0000-0000	*	*	4249	4339	4273	*	*	4287.0	4287.0
AM Peak	*	*	0700	0700	0700	*	*		
	*	*	532	480	465	*	*		
PM Peak	*	*	1700	1700	1700	*	*		
	*	*	421	418	404	*	*		

* - No data.

MetroCount Traffic Executive Vehicle Counts

VehicleCount-494 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St WB westside 65th Ave
Attribute: westbound
Direction: 4 - West bound, A trigger first. **Lane:** 4
Survey Duration: 7:26 Monday, August 27, 2018 => 12:31 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1232.EC4 (Plus)
Identifier: EA27RV9M MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = West
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 12861 / 29477 (43.63%)

*** Tuesday, August 28, 2018 - Total=4249, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
8	5	7	20	76	245	414	532	271	169	161	151	175	193	214	288	344	421	215	124	102	69	26	19	
2	2	3	1	8	48	86	129	90	43	30	35	47	48	54	53	72	116	66	37	28	22	7	5	3
2	1	1	10	16	59	101	134	61	49	50	45	32	46	52	76	86	116	73	34	33	16	12	7	3
1	2	2	3	23	64	115	148	59	44	43	37	56	60	52	71	96	82	39	26	22	15	6	7	6
3	0	1	6	29	74	112	121	61	33	38	34	40	39	56	88	90	107	37	27	19	16	1	0	2

AM Peak 0700 - 0800 (532), AM PHF=0.90 PM Peak 1700 - 1800 (421), PM PHF=0.91

*** Wednesday, August 29, 2018 - Total=4339, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
14	6	6	20	70	242	442	480	278	182	172	175	170	215	191	292	371	418	245	153	101	49	32	15	
3	1	4	2	11	54	98	117	80	55	45	40	41	51	41	73	87	118	76	42	30	11	8	3	4
3	1	2	8	13	49	129	136	72	51	50	49	40	44	55	52	85	101	73	40	25	19	13	4	5
6	3	0	4	23	78	114	135	61	29	39	41	46	63	57	74	105	103	58	37	20	12	7	3	4
2	1	0	6	23	61	101	92	65	47	38	45	43	57	38	93	94	96	38	34	26	7	4	5	1

AM Peak 0645 - 0745 (489), AM PHF=0.90 PM Peak 1630 - 1730 (418), PM PHF=0.89

*** Thursday, August 30, 2018 - Total=4273, 15 minute drops**

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
14	10	13	19	68	241	409	465	246	181	178	178	162	187	249	320	365	404	234	121	98	65	29	17
4	2	3	0	12	54	82	106	73	52	42	38	40	50	63	71	87	113	76	36	32	28	12	3
5	4	4	6	11	60	106	144	76	48	45	51	41	49	53	72	108	116	64	24	25	15	6	7
4	2	3	9	25	64	115	120	46	40	44	47	45	36	64	94	81	100	49	32	20	14	6	4
1	2	3	4	20	63	106	95	51	41	47	42	36	52	69	83	89	75	45	29	21	8	5	3
AM Peak 0645 - 0745 (476). AM PHF=0.83																							

AM Peak 0645 - 0745 (476), AM PHF=0.83

MetroCount Traffic Executive
Speed Statistics by Hour

SpeedStatHour-495 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St WB westside 65th Ave
Attribute: westbound
Direction: 4 - West bound, A trigger first. **Lane:** 4
Survey Duration: 7:26 Monday, August 27, 2018 => 12:31 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1232.EC4 (Plus)
Identifier: EA27RV9M MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = West
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 12861 / 29477 (43.63%)

Speed Statistics by Hour

SpeedStatHour-495

Site: 37th St / 65th Ave.4.0W
 Description: 37th St WB westside 65th Ave
 Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
 Scheme: Vehicle classification (Scheme F3)
 Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

Vehicles = 12861
 Posted speed limit = 35 mph, Exceeding = 11496 (89.39%), Mean Exceeding = 43.61 mph
 Maximum = 91.9 mph, Minimum = 8.1 mph, Mean = 42.1 mph
 85% Speed = 47.9 mph, 95% Speed = 51.2 mph, Median = 42.5 mph
 12 mph Pace = 37 - 49, Number in Pace = 9425 (73.28%)
 Variance = 41.74, Standard Deviation = 6.46 mph

Hour Bins

Time	Bin	Min	Max	Mean	Median	85%	95%	>PSL 35 mph
0000	36	0.3%	27.4	43.8	42.3	50.3	56.8	32 88.9%
0100	21	0.2%	37.1	45.1	44.7	51.4	53.0	21 100.0%
0200	26	0.2%	35.3	45.1	44.5	50.3	55.9	26 100.0%
0300	59	0.5%	22.9	42.0	42.3	47.2	49.9	52 88.1%
0400	214	1.7%	35.9	44.2	43.2	49.7	53.9	214 100.0%
0500	728	5.7%	27.4	44.5	44.5	49.7	52.8	706 97.0%
0600	1265	9.8%	17.9	43.3	43.2	48.3	51.0	1210 95.7%
0700	1477	11.5%	12.0	40.7	41.4	46.3	49.7	1244 84.2%
0800	795	6.2%	9.5	40.9	41.4	46.3	50.6	675 84.9%
0900	532	4.1%	20.9	42.8	42.5	48.3	52.6	490 92.1%
1000	511	4.0%	20.7	42.5	42.7	48.1	51.4	465 91.0%
1100	504	3.9%	15.6	43.4	43.4	48.3	52.8	473 93.8%
1200	507	3.9%	14.1	43.0	43.4	49.2	52.3	458 90.3%
1300	595	4.6%	13.8	43.2	42.9	48.1	52.6	565 95.0%
1400	654	5.1%	8.6	43.2	43.2	48.1	51.7	622 95.1%
1500	900	7.0%	11.3	41.2	41.8	47.6	50.1	765 85.0%
1600	1080	8.4%	8.1	40.4	41.4	46.5	49.4	914 84.6%
1700	1243	9.7%	11.3	41.2	42.1	47.0	49.9	1058 85.1%
1800	694	5.4%	12.3	39.8	41.4	47.2	50.8	533 76.8%
1900	398	3.1%	21.9	43.1	42.9	48.3	51.7	374 94.0%
2000	301	2.3%	29.5	43.6	43.4	47.9	51.7	294 97.7%
2100	183	1.4%	25.6	43.8	43.4	49.4	53.0	178 97.3%
2200	87	0.7%	28.4	43.7	42.9	49.4	53.2	83 95.4%
2300	51	0.4%	27.2	42.2	41.8	47.2	49.7	44 86.3%
----	12861	100.0%	8.1	42.1	42.5	47.9	51.2	11496 89.4%

MetroCount Traffic Executive Speed Bin Chart

SpeedBin-496 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St WB westside 65th Ave
Attribute: westbound
Direction: 4 - West bound, A trigger first. **Lane:** 4
Survey Duration: 7:26 Monday, August 27, 2018 => 12:31 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1232.EC4 (Plus)
Identifier: EA27RV9M MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = West
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 12861 / 29477 (43.63%)

Speed Bin Chart

SpeedBin-496 (Non metric) Site:37th St / 65th Ave.4.0W

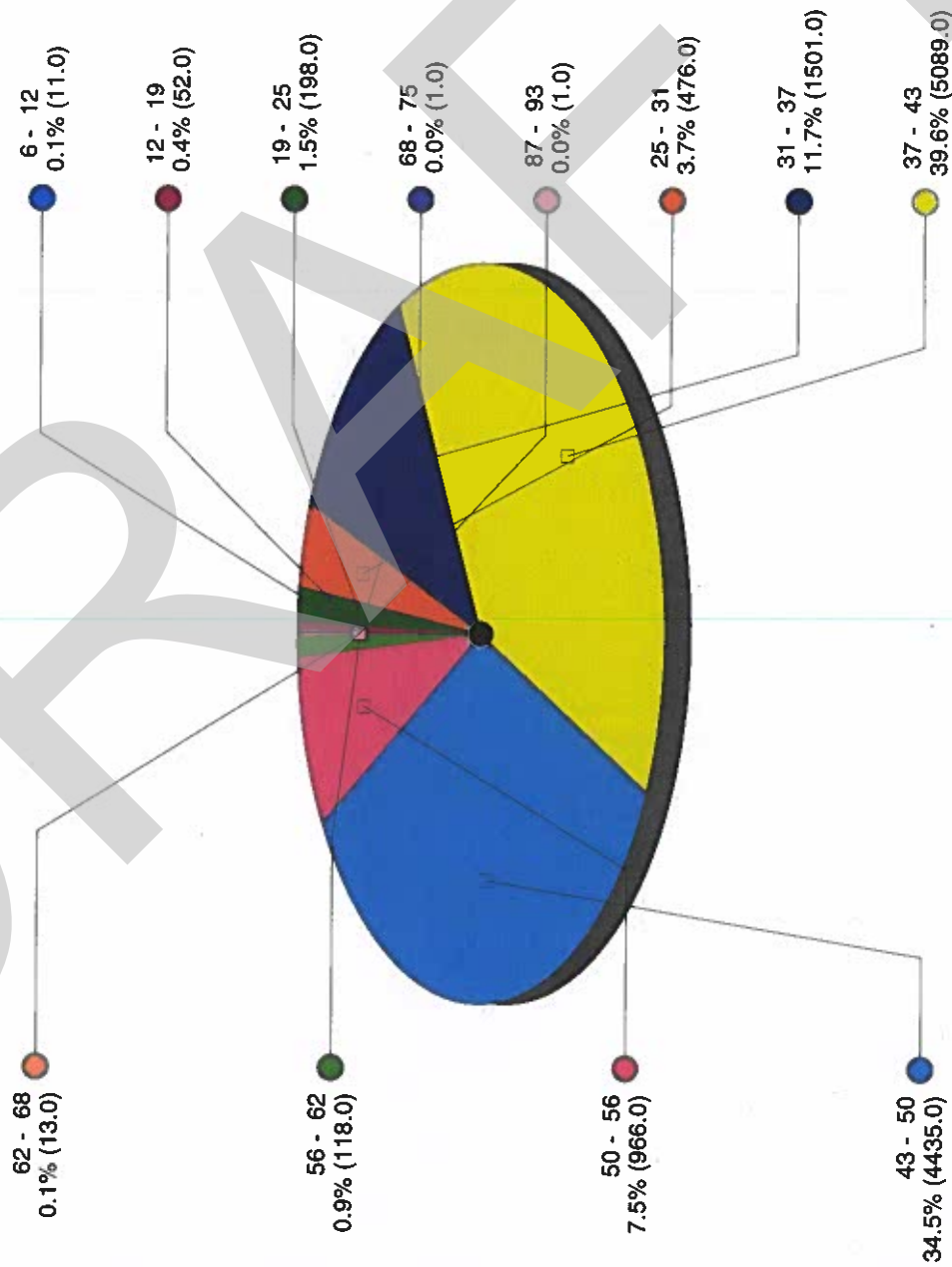
Description: 37th St WB westside 65th Ave

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018

Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

Scheme: Vehicle classification (Scheme F3)

Total=12861



Speed Bins

Speed	Bin	vMult	n * vMult
0 - 6	- -	-	-
6 - 12	11 0.1%	0.00	0.00
12 - 19	52 0.4%	0.00	0.00
19 - 25	198 1.5%	0.00	0.00
25 - 31	476 3.7%	0.00	0.00
31 - 37	1501 11.7%	0.00	0.00
37 - 43	5089 39.6%	0.00	0.00
43 - 50	4435 34.5%	0.00	0.00
50 - 56	966 7.5%	0.00	0.00
56 - 62	118 0.9%	0.00	0.00
62 - 68	13 0.1%	0.00	0.00
68 - 75	1 0.0%	0.00	0.00
75 - 81	0 0.0%	0.00	0.00
81 - 87	0 0.0%	0.00	0.00
87 - 93	1 0.0%	0.00	0.00
93 - 99	0 0.0%	0.00	0.00
99 - 106	- -	-	-
106 - 112	- -	-	-
112 - 118	- -	-	-
118 - 124	- -	-	-

Total Speed Rating = 0.00

MetroCount Traffic Executive Class Bin Chart

ClassBin-497 -- English (ENU)

Datasets:

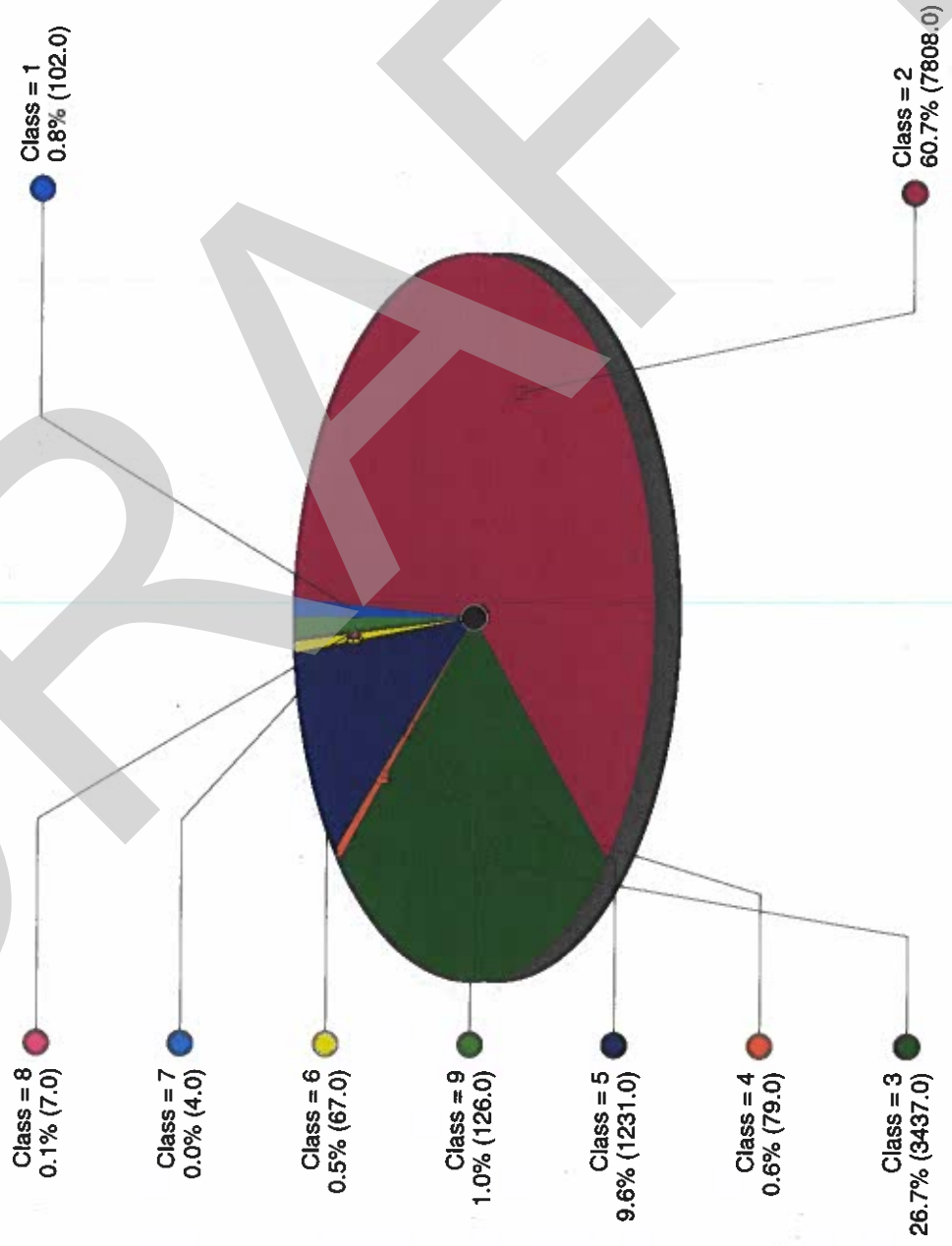
Site: [37th St / 65th Ave] 37th St WB westside 65th Ave
Attribute: westbound
Direction: 4 - West bound, A trigger first. Lane: 4
Survey Duration: 7:26 Monday, August 27, 2018 => 12:31 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1232.EC4 (Plus)
Identifier: EA27RV9M MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = West
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 12861 / 29477 (43.63%)

Class Bin Chart

ClassBin-497 (Non metric) **Site:**37th St / 65th Ave.4.0W
Description: 37th St WB westside 65th Ave
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)
Scheme: Vehicle classification (Scheme F3)
Total:12861



FHWA Vehicle Classifications

1. Motorcycles
2 axles, 2 or 3 tires



2. Passenger Cars
2 axles, can have 1- or 2-axle trailers



3. Pickups, Panels, Vans
2 axles, 4-tire single units
Can have 1 or 2 axle trailers



4. Buses
2 or 3 axles, full length



5. Single Unit 2-Axle Trucks
2 axles, 6 tires (dual rear tires), single-unit



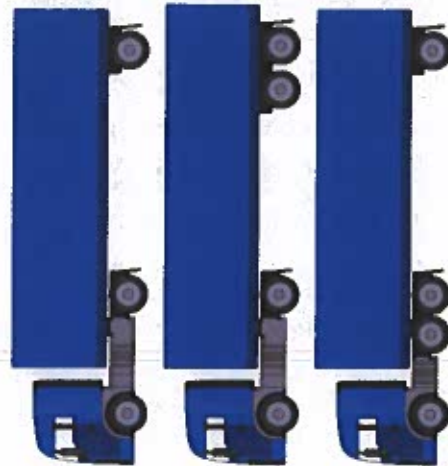
6. Single Unit 3-Axle Trucks
3 axles, single unit



7. Single Unit 4 or More-Axle Trucks
4 or more axles, single unit



8. Single Trailer 3- or 4-Axle Trucks
3 or 4 axles, single trailer



9. Single Trailer 5-Axle Trucks
5 axles, single trailer



10. Single Trailer 6 or More-Axle Trucks
6 or more axles, single trailer



11. Multi-Trailer 5 or Less-Axle Trucks
5 or less axles, multiple trailers



13. Multi-Trailer 7 or More-Axle Trucks
7 or more axles, multiple trailers



12. Multi-Trailer 6-Axle Trucks
6 axles, multiple trailers



Class Bins

Class 1 - 102 (0.79%)
Class 2 - 7808 (60.71%)
Class 3 - 3437 (26.72%)
Class 4 - 79 (0.61%)
Class 5 - 1231 (9.57%)
Class 6 - 67 (0.52%)
Class 7 - 4 (0.03%)
Class 8 - 7 (0.05%)
Class 9 - 126 (0.98%)
Class 10 - 0 (0.00%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)
Class 13 - 0 (0.00%)

DRAFT

MetroCount Traffic Executive Weekly Vehicle Counts

WeeklyVehicle-498 -- English (ENU)

Datasets:

Site: [65th Ave / 49th St] 65th Ave SB northside 37th St
Attribute: southbound
Direction: 3 - South bound, A trigger first. **Lane:** 5
Survey Duration: 7:27 Monday, August 27, 2018 => 12:34 Tuesday, September 4, 2018,
Zone:
File: 65th Ave _ 49th St 0 2018-09-04 1235.EC5 (Plus)
Identifier: EA14NKKJ5 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = South
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 12109 / 26763 (45.25%)

Weekly Vehicle Counts

WeeklyVehicle-498

Site: 65th Ave / 49th St.5.0S
Description: 65th Ave SB northside 37th St
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Scheme: Vehicle classification (Scheme F3)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Averages	
	26 Aug	27 Aug	28 Aug	29 Aug	30 Aug	31 Aug	01 Sep	1 - 5	1 - 7
Hour									
0000-0100	*	*	10	17	79	*	*	35.3	35.3
0100-0200	*	*	12	4	22	*	*	12.7	12.7
0200-0300	*	*	7	11	12	*	*	10.0	10.0
0300-0400	*	*	18	18	29	*	*	21.7	21.7
0400-0500	*	*	46	41	47	*	*	44.7	44.7
0500-0600	*	*	133	150	136	*	*	139.7	139.7
0600-0700	*	*	246	241	242	*	*	243.0	243.0
0700-0800	*	*	354	367	344	*	*	355.0	355.0
0800-0900	*	*	253	232	248	*	*	244.3	244.3
0900-1000	*	*	161	136	160	*	*	152.3	152.3
1000-1100	*	*	154	150	153	*	*	152.3	152.3
1100-1200	*	*	171	148	164	*	*	161.0	161.0
1200-1300	*	*	190	175	189	*	*	184.7	184.7
1300-1400	*	*	193	192	165	*	*	183.3	183.3
1400-1500	*	*	221	238	241	*	*	233.3	233.3
1500-1600	*	*	358	374	389	*	*	373.7	373.7
1600-1700	*	*	366	360	345	*	*	357.0	357.0
1700-1800	*	*	396	364	352	*	*	370.7	370.7
1800-1900	*	*	238	275	249	*	*	254.0	254.0
1900-2000	*	*	162	161	170	*	*	164.3	164.3
2000-2100	*	*	129	175	135	*	*	146.3	146.3
2100-2200	*	*	65	80	84	*	*	76.3	76.3
2200-2300	*	*	35	98	40	*	*	57.7	57.7
2300-2400	*	*	12	154	23	*	*	63.0	63.0
Totals									
0700-1900	*	*	3055	3011	2999	*	*	3021.7	3021.7
0600-2200	*	*	3657	3668	3630	*	*	3651.7	3651.7
0600-0000	*	*	3704	3920	3693	*	*	3772.3	3772.3
0000-0000	*	*	3930	4161	4018	*	*	4036.3	4036.3
AM Peak	*	*	0700	0700	0700	*	*		
	*	*	354	367	344	*	*		
PM Peak	*	*	1700	1500	1500	*	*		
	*	*	396	374	389	*	*		

* - No data.

MetroCount Traffic Executive Vehicle Counts

VehicleCount-499 -- English (ENU)

Datasets:

Site: [65th Ave / 49th St] 65th Ave SB northside 37th St
Attribute: southbound
Direction: 3 - South bound, A trigger first. **Lane:** 5
Survey Duration: 7:27 Monday, August 27, 2018 => 12:34 Tuesday, September 4, 2018,
Zone:
File: 65th Ave _ 49th St 0 2018-09-04 1235.EC5 (Plus)
Identifier: EA14NKJ5 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = South
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 12109 / 26763 (45.25%)

* Tuesday, August 28, 2018 - Total=3930, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
10	12	7	18	46	133	246	354	253	161	154	171	190	193	221	358	366	396	238	162	129	65	35	12
2	5	5	1	3	27	47	83	95	42	48	49	34	62	32	69	90	106	70	49	33	15	9	2
2	3	1	7	10	31	51	96	73	33	40	44	44	32	51	68	82	91	74	40	30	25	10	4
4	3	0	4	14	35	78	90	39	37	34	42	63	47	80	105	105	88	51	40	30	13	8	3
2	1	1	6	19	40	70	85	46	49	32	36	49	52	58	116	89	111	43	33	36	12	8	3

AM Peak 0715 - 0815 (366), AM PHF=0.95 PM Peak 1700 - 1800 (396), PM PHF=0.89

* Wednesday, August 29, 2018 - Total=4161, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
17	4	11	18	41	150	241	367	232	136	150	148	175	192	238	374	360	364	275	161	175	80	98	154
8	0	5	2	7	35	43	88	83	28	36	48	46	54	46	60	105	85	78	43	41	31	13	44
4	2	3	4	9	30	69	109	73	34	44	27	41	39	62	75	82	100	81	44	45	17	10	44
2	0	3	5	12	40	65	92	48	39	37	41	48	44	77	125	85	89	57	37	44	22	23	28
3	2	0	7	13	45	64	78	28	35	33	32	40	55	53	114	88	90	59	37	45	10	52	38

AM Peak 0700 - 0800 (367), AM PHF=0.84 PM Peak 1530 - 1630 (426), PM PHF=0.85

* Thursday, August 30, 2018 - Total=4018, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
79	22	12	29	47	136	242	344	248	160	153	164	189	165	241	389	345	352	249	170	135	84	40	23
25	7	3	3	4	36	42	79	88	45	41	40	30	36	55	73	103	94	82	50	41	33	12	9
20	11	5	9	8	31	64	95	75	40	32	33	52	35	36	77	84	82	66	40	36	23	13	9
20	3	4	7	14	34	65	97	47	33	35	45	54	44	66	125	78	85	60	49	25	17	9	3
14	1	0	10	21	35	71	73	38	42	45	46	53	50	84	114	80	91	41	31	33	11	6	2

AM Peak 0715 - 0815 (353), AM PHF=0.91

**MetroCount Traffic Executive
Speed Statistics by Hour**

SpeedStatHour-500 -- English (ENU)

Datasets:

Site: [65th Ave / 49th St] 65th Ave SB northside 37th St
Attribute: southbound
Direction: 3 - South bound, A trigger first. Lane: 5
Survey Duration: 7:27 Monday, August 27, 2018 => 12:34 Tuesday, September 4, 2018,
Zone:
File: 65th Ave _ 49th St 0 2018-09-04 1235.EC5 (Plus)
Identifier: EA14NKJ5 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = South
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 12109 / 26763 (45.25%)

Speed Statistics by Hour**SpeedStatHour-500**

Site: 65th Ave / 49th St.5.0S
Description: 65th Ave SB northside 37th St
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Scheme: Vehicle classification (Scheme F3)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

Vehicles = 12109

Posted speed limit = 35 mph, Exceeding = 10322 (85.24%), Mean Exceeding = 40.63 mph

Maximum = 67.7 mph, Minimum = 8.6 mph, Mean = 39.4 mph

85% Speed = 43.6 mph, 95% Speed = 46.8 mph, Median = 39.1 mph

12 mph Pace = 33 - 45, Number in Pace = 10101 (83.42%)

Variance = 21.29, Standard Deviation = 4.61 mph

Hour Bins

Time	Bin	Min	Max	Mean	Median	85%	95%	>PSL 35 mph
0000	106	0.9%	27.3	37.5	36.7	42.3	45.2	74 69.8%
0100	38	0.3%	31.5	38.4	37.6	42.1	44.7	31 81.6%
0200	30	0.2%	30.3	41.0	40.5	46.8	47.9	27 90.0%
0300	65	0.5%	25.0	39.7	39.6	43.4	47.0	59 90.8%
0400	134	1.1%	28.5	39.8	39.8	43.6	46.1	116 86.6%
0500	419	3.5%	25.4	39.8	40.0	43.8	46.1	365 87.1%
0600	729	6.0%	17.1	40.1	39.8	44.5	47.9	633 86.8%
0700	1065	8.8%	12.4	39.0	38.7	42.9	45.9	909 85.4%
0800	733	6.1%	12.1	38.8	38.7	43.4	46.3	593 80.9%
0900	457	3.8%	19.8	39.7	39.4	43.4	47.0	408 89.3%
1000	457	3.8%	27.8	39.8	39.6	43.6	47.0	399 87.3%
1100	483	4.0%	28.6	39.7	39.6	44.1	46.3	417 86.3%
1200	554	4.6%	19.1	39.6	39.6	44.3	46.5	474 85.6%
1300	550	4.5%	17.0	40.3	40.0	44.5	47.6	501 91.1%
1400	700	5.8%	26.6	40.8	40.5	45.6	48.5	630 90.0%
1500	1121	9.3%	16.6	39.3	39.1	43.6	47.4	940 83.9%
1600	1071	8.8%	8.6	39.0	39.1	43.4	45.6	891 83.2%
1700	1112	9.2%	22.2	39.7	39.6	43.8	46.3	981 88.2%
1800	762	6.3%	15.5	39.7	39.4	43.8	47.2	660 86.6%
1900	493	4.1%	26.1	38.8	38.5	42.5	45.2	412 83.6%
2000	439	3.6%	17.2	38.5	38.3	42.3	45.9	363 82.7%
2100	229	1.9%	19.5	38.3	38.0	42.7	45.2	187 81.7%
2200	173	1.4%	21.2	37.5	37.4	42.1	45.6	125 72.3%
2300	189	1.6%	13.1	37.3	36.9	41.6	45.0	127 67.2%
----	12109	100.0%	8.6	39.4	39.1	43.6	46.8	10322 85.2%

MetroCount Traffic Executive Speed Bin Chart

SpeedBin-501 -- English (ENU)

Datasets:

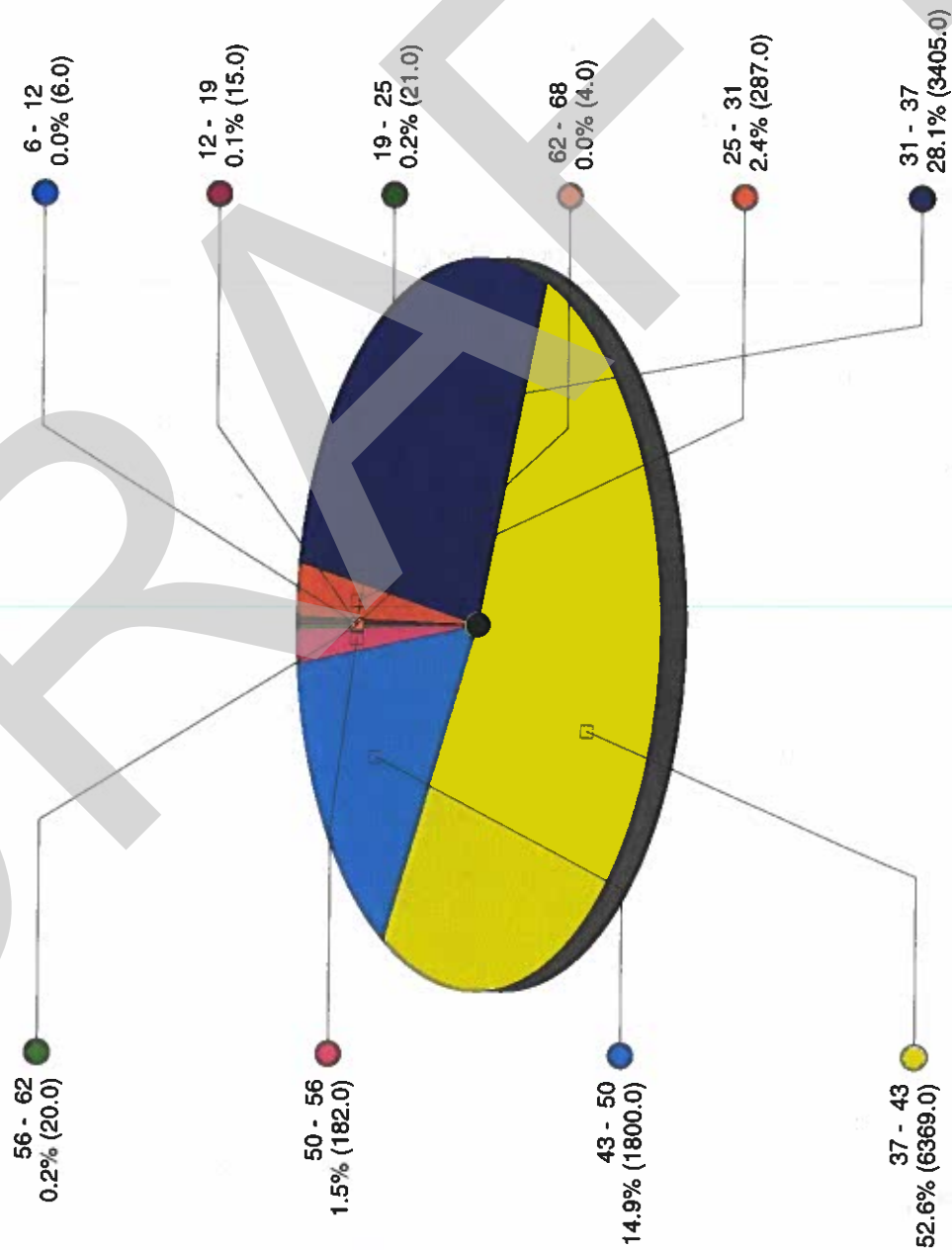
Site: [65th Ave / 49th St] 65th Ave SB northside 37th St
Attribute: southbound
Direction: 3 - South bound, A trigger first. **Lane:** 5
Survey Duration: 7:27 Monday, August 27, 2018 => 12:34 Tuesday, September 4, 2018,
Zone:
File: 65th Ave _ 49th St 0 2018-09-04 1235.EC5 (Plus)
Identifier: EA14NKJ5 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = South
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 12109 / 26763 (45.25%)

Speed Bin Chart

SpeedBin-501 (Non metric) **Site:**65th Ave / 49th St.5.0S
Description: 65th Ave SB northside 37th St
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)
Scheme: Vehicle classification (Scheme F3)
Total=12109



Speed Bins

Speed	Bin	vMult	n * vMult
0 - 6	-	-	-
6 - 12	6 0.0%	0.00	0.00
12 - 19	15 0.1%	0.00	0.00
19 - 25	21 0.2%	0.00	0.00
25 - 31	287 2.4%	0.00	0.00
31 - 37	3405 28.1%	0.00	0.00
37 - 43	6369 52.6%	0.00	0.00
43 - 50	1800 14.9%	0.00	0.00
50 - 56	182 1.5%	0.00	0.00
56 - 62	20 0.2%	0.00	0.00
62 - 68	4 0.0%	0.00	0.00
68 - 75	0 0.0%	0.00	0.00
75 - 81	0 0.0%	0.00	0.00
81 - 87	0 0.0%	0.00	0.00
87 - 93	0 0.0%	0.00	0.00
93 - 99	0 0.0%	0.00	0.00
99 - 106	-	-	-
106 - 112	-	-	-
112 - 118	-	-	-
118 - 124	-	-	-

Total Speed Rating = 0.00

MetroCount Traffic Executive Class Bin Chart

ClassBin-502 -- English (ENU)

Datasets:

Site: [65th Ave / 49th St] 65th Ave SB northside 37th St
Attribute: southbound
Direction: 3 - South bound, A trigger first. **Lane:** 5
Survey Duration: 7:27 Monday, August 27, 2018 => 12:34 Tuesday, September 4, 2018,
Zone:
File: 65th Ave _ 49th St 0 2018-09-04 1235.EC5 (Plus)
Identifier: EA14NKJ5 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = South
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 12109 / 26763 (45.25%)

Class Bin Chart

ClassBin-502 (Non metric) Site:65th Ave / 49th St.5.0S

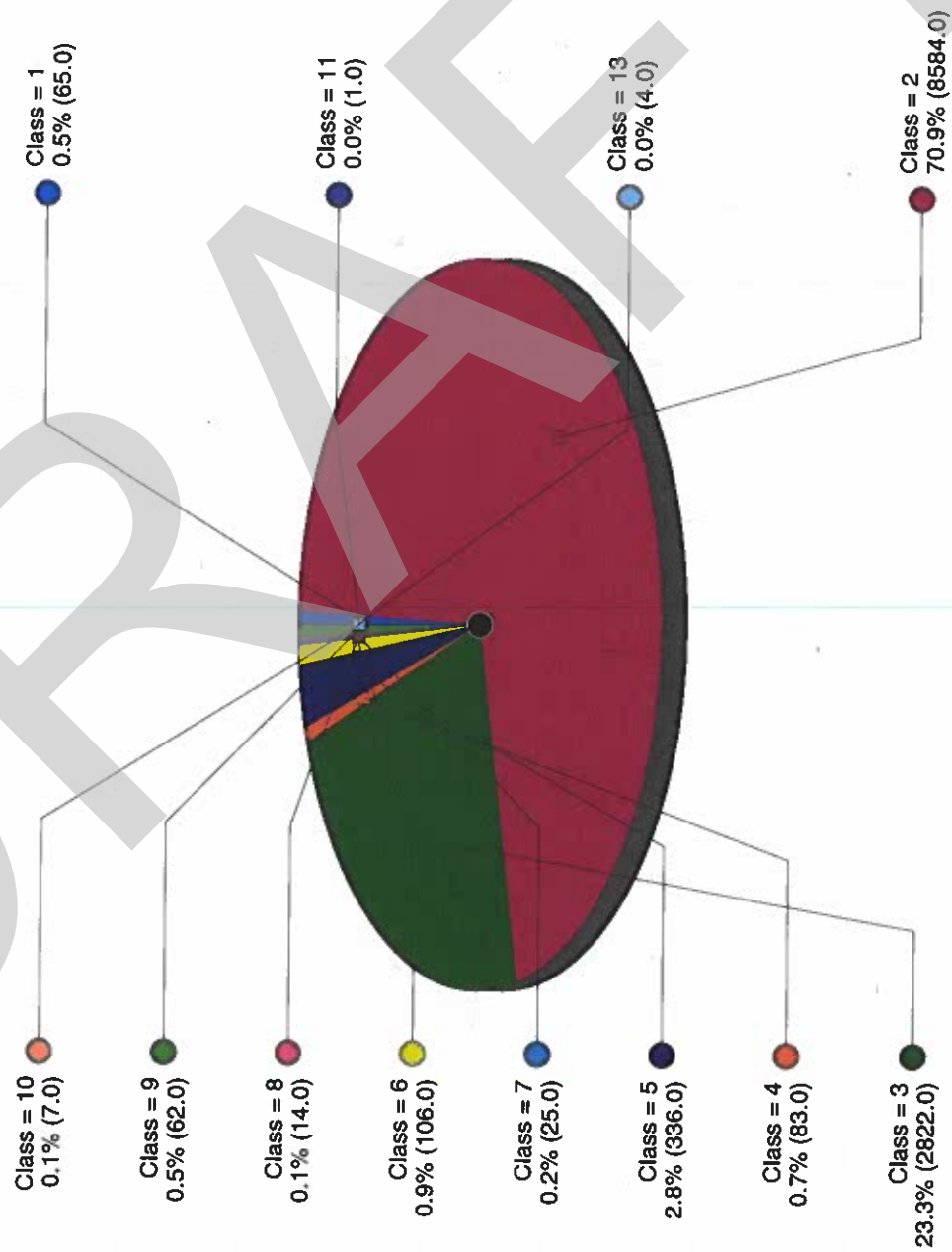
Description: 65th Ave SB northside 37th St

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018

Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

Scheme: Vehicle classification (Scheme F3)

Total=12109



FHWA Vehicle Classifications

1. Motorcycles
2 axles, 2 or 3 tires



2. Passenger Cars
2 axles, can have 1- or 2-axle trailers



3. Pickups, Panels, Vans
2 axles, 4-tire single units
Can have 1 or 2 axle trailers



4. Buses
2 or 3 axles, full length



5. Single Unit 2-Axle Trucks
2 axles, 6 tires (dual rear tires), single-unit



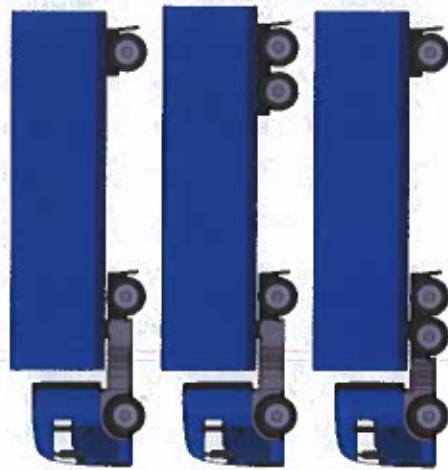
6. Single Unit 3-Axle Trucks
3 axles, single unit



7. Single Unit 4 or More-Axle Trucks
4 or more axles, single unit



8. Single Trailer 3- or 4-Axle Trucks
3 or 4 axles, single trailer



9. Single Trailer 5-Axle Trucks
5 axles, single trailer



10. Single Trailer 6 or More-Axle Trucks
6 or more axles, single trailer



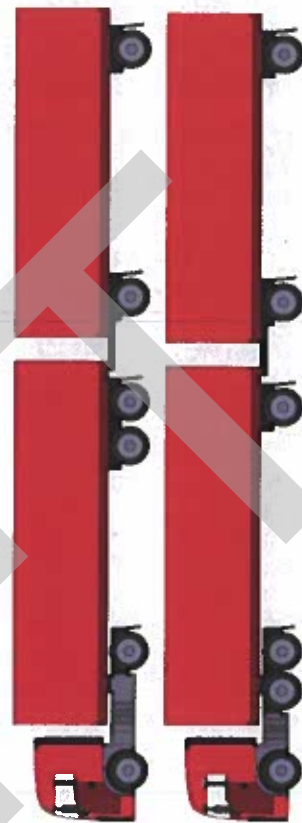
11. Multi-Trailer 5 or Less-Axle Trucks
5 or less axles, multiple trailers



13. Multi-Trailer 7 or More-Axle Trucks
7 or more axles, multiple trailers



12. Multi-Trailer 6-Axle Trucks
6 axles, multiple trailers



Class Bins

Class 1 - 65 (0.54%)
Class 2 - 8584 (70.89%)
Class 3 - 2822 (23.30%)
Class 4 - 83 (0.69%)
Class 5 - 336 (2.77%)
Class 6 - 106 (0.88%)
Class 7 - 25 (0.21%)
Class 8 - 14 (0.12%)
Class 9 - 62 (0.51%)
Class 10 - 7 (0.06%)
Class 11 - 1 (0.01%)
Class 12 - 0 (0.00%)
Class 13 - 4 (0.03%)

DRAFT

MetroCount Traffic Executive Weekly Vehicle Counts

WeeklyVehicle-503 -- English (ENU)

Datasets:

Site: [37th St / 1st Ave] 1st Ave NB northside 37th St
Attribute: northbound
Direction: 1 - North bound, A trigger first. **Lane:** 6
Survey Duration: 8:46 Monday, April 16, 2018 => 9:22 Monday, April 23, 2018,
Zone:
File: 37th St _ 1st Ave 0 2018-04-23 0923.EC6 (Plus)
Identifier: EG00NB98 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, April 17, 2018 => 0:00 Friday, April 20, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = North
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 4848 / 9804 (49.45%)

Weekly Vehicle Counts

WeeklyVehicle-503

Site: 37th St / 1st Ave.6.0N
Description: 1st Ave NB northside 37th St
Filter time: 0:00 Tuesday, April 17, 2018 => 0:00 Friday, April 20, 2018
Scheme: Vehicle classification (Scheme F3)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Averages	
	15 Apr	16 Apr	17 Apr	18 Apr	19 Apr	20 Apr	21 Apr	1 - 5	1 - 7
Hour									
0000-0100	*	*	7	11	5	*	*	7.7	7.7
0100-0200	*	*	5	4	3	*	*	4.0	4.0
0200-0300	*	*	1	3	5	*	*	3.0	3.0
0300-0400	*	*	5	7	4	*	*	5.3	5.3
0400-0500	*	*	12	18	18	*	*	16.0	16.0
0500-0600	*	*	63	63	65	*	*	63.7	63.7
0600-0700	*	*	97	100	112	*	*	103.0	103.0
0700-0800	*	*	128	168	136	*	*	144.0	144.0
0800-0900	*	*	83	72	79	*	*	78.0	78.0
0900-1000	*	*	66	50	55	*	*	57.0	57.0
1000-1100	*	*	62	54	64	*	*	60.0	60.0
1100-1200	*	*	76	63	59	*	*	66.0	66.0
1200-1300	*	*	73	60	84	*	*	72.3	72.3
1300-1400	*	*	89	87	83	*	*	86.3	86.3
1400-1500	*	*	108	87	68	*	*	87.7	87.7
1500-1600	*	*	124	133	118	*	*	125.0	125.0
1600-1700	*	*	151	171	168	*	*	163.3	163.3
1700-1800	*	*	147	186	182	*	*	171.7	171.7
1800-1900	*	*	116	128	125	*	*	123.0	123.0
1900-2000	*	*	61	92	79	*	*	77.3	77.3
2000-2100	*	*	47	57	50	*	*	51.3	51.3
2100-2200	*	*	26	21	36	*	*	27.7	27.7
2200-2300	*	*	11	18	17	*	*	15.3	15.3
2300-2400	*	*	4	8	10	*	*	7.3	7.3
Totals									
0700-1900	*	*	1223	1259	1221	*	*	1234.3	1234.3
0600-2200	*	*	1454	1529	1498	*	*	1493.7	1493.7
0600-0000	*	*	1469	1555	1525	*	*	1516.3	1516.3
0000-0000	*	*	1562	1661	1625	*	*	1616.0	1616.0
AM Peak	*	*	0700	0700	0700	*	*		
	*	*	128	168	136	*	*		
PM Peak	*	*	1600	1700	1700	*	*		
	*	*	151	186	182	*	*		

* - No data.

MetroCount Traffic Executive Vehicle Counts

VehicleCount-504 -- English (ENU)

Datasets:

Site: [37th St / 1st Ave] 1st Ave NB northside 37th St
Attribute: northbound
Direction: 1 - North bound, A trigger first. **Lane:** 6
Survey Duration: 8:46 Monday, April 16, 2018 => 9:22 Monday, April 23, 2018,
Zone:
File: 37th St _ 1st Ave 0 2018-04-23 0923.EC6 (Plus)
Identifier: EG00NB98 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, April 17, 2018 => 0:00 Friday, April 20, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = North
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 4848 / 9804 (49.45%)

* Tuesday, April 17, 2018 - Total=1562, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
7	5	1	5	12	63	97	128	83	66	62	76	73	89	108	124	151	147	116	61	47	26	11	4	
3	3	0	1	1	8	15	28	29	21	18	14	15	19	29	31	34	45	41	12	12	6	4	1	1
1	1	0	2	4	19	25	20	17	8	13	24	18	22	31	31	38	32	25	23	12	8	4	1	2
1	0	0	1	2	18	23	38	23	22	18	21	16	19	18	39	40	33	22	13	14	8	1	0	5
2	1	1	1	5	18	34	42	14	15	13	17	24	29	30	23	39	37	28	13	9	4	2	2	3

AM Peak 0715 - 0815 (129), AM PHF=0.77 PM Peak 1615 - 1715 (162), PM PHF=0.90

* Wednesday, April 18, 2018 - Total=1661, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
11	4	3	7	18	63	100	168	72	50	54	63	60	87	87	133	171	186	128	92	57	21	18	8	
1	2	0	1	1	13	10	41	21	11	15	13	14	27	21	18	36	52	40	23	19	8	8	4	3
2	0	1	3	2	18	22	47	21	5	9	17	15	17	20	31	37	45	24	30	22	4	5	2	0
5	1	0	1	4	20	32	38	17	15	15	17	20	14	19	32	45	51	32	27	10	4	5	1	1
3	1	2	2	11	12	36	42	13	19	15	16	11	29	27	52	53	38	32	12	6	5	0	1	1

AM Peak 0700 - 0800 (168), AM PHF=0.89 PM Peak 1645 - 1745 (201), PM PHF=0.95

* Thursday, April 19, 2018 - Total=1625, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	
5	3	5	4	18	65	112	136	79	55	64	59	84	83	68	118	168	182	125	79	50	36	17	10	
3	2	2	1	0	9	24	24	24	10	19	18	18	23	17	21	40	50	42	22	18	13	4	4	
0	0	0	0	6	17	24	31	21	13	20	9	18	13	21	37	43	51	36	21	12	5	6	2	
1	0	0	2	8	18	27	42	19	16	13	13	21	26	14	27	37	42	22	24	17	7	6	2	
1	1	3	1	4	21	37	39	15	16	12	19	27	21	16	33	48	39	25	12	3	11	1	2	

AM Peak 0700 - 0800 (136), AM PHF=0.81

MetroCount Traffic Executive
Speed Statistics by Hour

SpeedStatHour-505 -- English (ENU)

Datasets:

Site: [37th St / 1st Ave] 1st Ave NB northside 37th St
northbound
Attribute: 1 - North bound, A trigger first. Lane: 6
Direction: 8:46 Monday, April 16, 2018 => 9:22 Monday, April 23, 2018,
Survey Duration:
Zone:
File: 37th St _ 1st Ave 0 2018-04-23 0923.EC6 (Plus)
Identifier: EG00NB98 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, April 17, 2018 => 0:00 Friday, April 20, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = North
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 4848 / 9804 (49.45%)

Speed Statistics by Hour

SpeedStatHour-505

Site: 37th St / 1st Ave.6.0N
Description: 1st Ave NB northside 37th St
Filter time: 0:00 Tuesday, April 17, 2018 => 0:00 Friday, April 20, 2018
Scheme: Vehicle classification (Scheme F3)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

Vehicles = 4848

Posted speed limit = 35 mph, Exceeding = 281 (5.80%), Mean Exceeding = 36.77 mph

Maximum = 43.2 mph, Minimum = 7.7 mph, Mean = 29.3 mph

85% Speed = 32.9 mph, 95% Speed = 35.1 mph, Median = 29.5 mph

12 mph Pace = 23 - 35, Number in Pace = 4286 (88.41%)

Variance = 15.78, Standard Deviation = 3.97 mph

Hour Bins

Time	Bin	Min	Max	Mean	Median	85%	95%	>PSL 35 mph
0000	23	0.5%	25.5	35.0	30.5	30.6	34.0	0
0100	12	0.2%	21.9	35.8	27.7	26.2	30.4	1
0200	9	0.2%	20.8	32.2	25.7	24.4	30.4	0
0300	16	0.3%	19.2	33.8	28.7	28.9	32.2	0
0400	48	1.0%	17.7	39.8	28.9	29.3	32.7	2
0500	191	3.9%	19.6	37.3	29.5	29.5	32.7	7
0600	309	6.4%	13.8	36.9	28.9	29.3	32.2	9
0700	432	8.9%	18.3	42.0	30.0	33.6	35.8	35
0800	234	4.8%	11.6	40.7	29.4	29.3	33.6	19
0900	171	3.5%	12.0	37.5	28.1	28.4	32.0	6
1000	180	3.7%	8.6	39.2	28.8	28.9	32.9	13
1100	198	4.1%	7.7	40.8	28.6	29.3	32.7	6
1200	217	4.5%	17.0	35.9	28.7	28.9	32.4	5
1300	259	5.3%	15.7	41.5	28.4	28.9	32.7	14
1400	263	5.4%	14.6	37.9	29.2	29.1	33.3	16
1500	375	7.7%	14.5	42.3	29.5	29.5	33.6	26
1600	490	10.1%	8.4	43.2	29.6	29.5	33.3	33
1700	515	10.6%	18.6	42.6	29.9	30.0	33.1	35
1800	369	7.6%	21.2	42.1	30.0	30.2	33.3	27
1900	232	4.8%	14.3	42.0	28.7	28.9	32.4	12
2000	154	3.2%	12.9	41.0	29.1	28.9	32.4	9
2100	83	1.7%	12.5	36.4	28.8	29.5	32.4	2
2200	46	0.9%	14.6	38.5	29.4	29.5	32.9	3
2300	22	0.5%	21.8	40.4	29.7	29.8	32.9	1
----	4848	100.0%	7.7	43.2	29.3	29.5	32.9	281

MetroCount Traffic Executive **Speed Bin Chart**

SpeedBin-506 -- English (ENU)

Datasets:

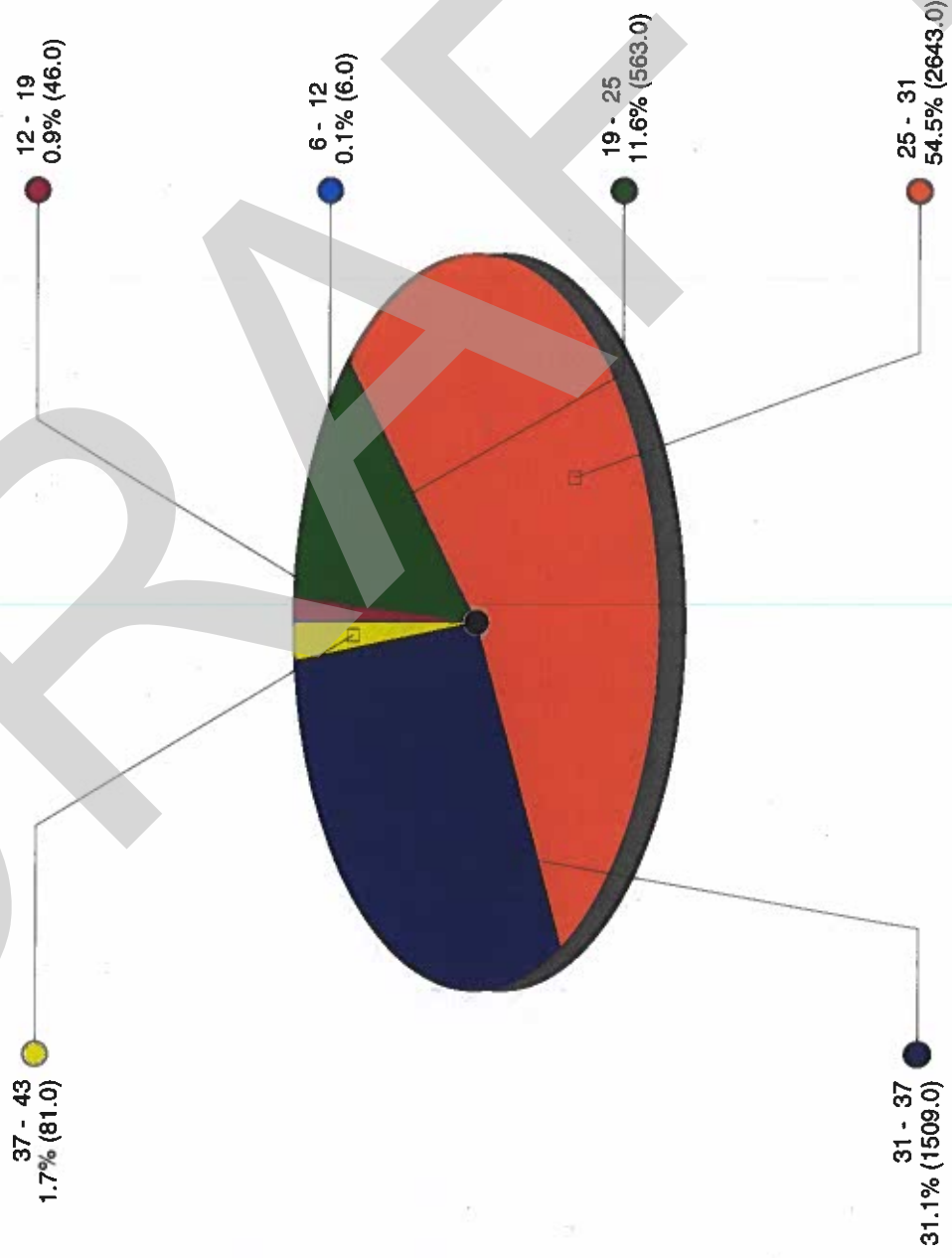
Site: [37th St / 1st Ave] 1st Ave NB northside 37th St
Attribute: northbound
Direction: 1 - North bound, A trigger first. **Lane:** 6
Survey Duration: 8:46 Monday, April 16, 2018 => 9:22 Monday, April 23, 2018,
Zone:
File: 37th St _ 1st Ave 0 2018-04-23 0923.EC6 (Plus)
Identifier: EG00NB98 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, April 17, 2018 => 0:00 Friday, April 20, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = North
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 4848 / 9804 (49.45%)

Speed Bin Chart

SpeedBin-506 (Non metric) **Site:**37th St / 1st Ave.6.ON
Description: 1st Ave NB northside 37th St
Filter time: 0:00 Tuesday, April 17, 2018 => 0:00 Friday, April 20, 2018
Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)
Scheme: Vehicle classification (Scheme F3)
Total=4848



Speed Bins

Speed	Bin	vMult	n * vMult
0 - 6	- -	-	-
6 - 12	6 0.1%	0.00	0.00
12 - 19	46 0.9%	0.00	0.00
19 - 25	563 11.6%	0.00	0.00
25 - 31	2643 54.5%	0.00	0.00
31 - 37	1509 31.1%	0.00	0.00
37 - 43	81 1.7%	0.00	0.00
43 - 50	0 0.0%	0.00	0.00
50 - 56	0 0.0%	0.00	0.00
56 - 62	0 0.0%	0.00	0.00
62 - 68	0 0.0%	0.00	0.00
68 - 75	0 0.0%	0.00	0.00
75 - 81	0 0.0%	0.00	0.00
81 - 87	0 0.0%	0.00	0.00
87 - 93	0 0.0%	0.00	0.00
93 - 99	0 0.0%	0.00	0.00
99 - 106	- -	-	-
106 - 112	- -	-	-
112 - 118	- -	-	-
118 - 124	- -	-	-

Total Speed Rating = 0.00

MetroCount Traffic Executive Class Bin Chart

ClassBin-507 -- English (ENU)

Datasets:

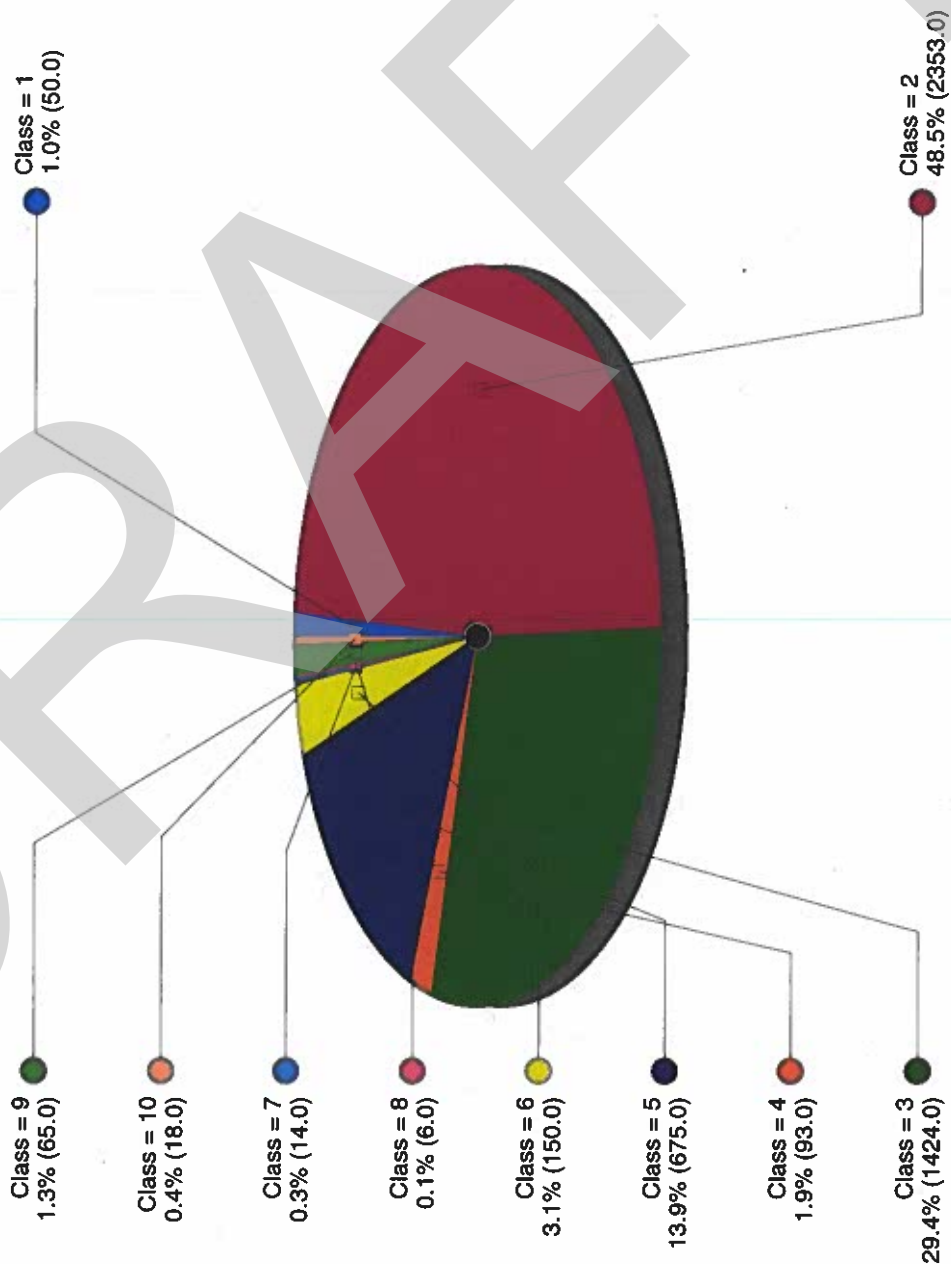
Site: [37th St / 1st Ave] 1st Ave NB northside 37th St
Attribute: northbound
Direction: 1 - North bound, A trigger first. **Lane:** 6
Survey Duration: 8:46 Monday, April 16, 2018 => 9:22 Monday, April 23, 2018,
Zone:
File: 37th St _ 1st Ave 0 2018-04-23 0923.EC6 (Plus)
Identifier: EG00NB98 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, April 17, 2018 => 0:00 Friday, April 20, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = North
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 4848 / 9804 (49.45%)

Class Bin Chart

ClassBin-507 (Non metric) Site:37th St / 1st Ave.6.ON
Description: 1st Ave NB northside 37th St
Filter time: 0:00 Tuesday, April 17, 2018 => 0:00 Friday, April 20, 2018
Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)
Scheme: Vehicle classification (Scheme F3)
Total=4848



FHWA Vehicle Classifications

1. Motorcycles
2 axles, 2 or 3 tires



2. Passenger Cars
2 axles, can have 1- or 2-axle trailers



3. Pickups, Panels, Vans
2 axles, 4-tire single units
Can have 1 or 2 axle trailers



4. Buses
2 or 3 axles, full length



5. Single Unit 2-Axle Trucks
2 axles, 6 tires (dual rear tires), single-unit



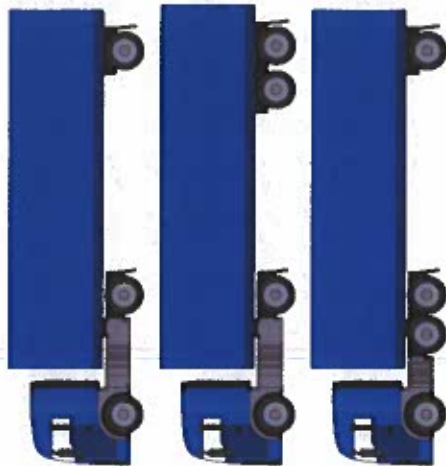
6. Single Unit 3-Axle Trucks
3 axles, single unit



7. Single Unit 4 or More-Axle Trucks
4 or more axles, single unit



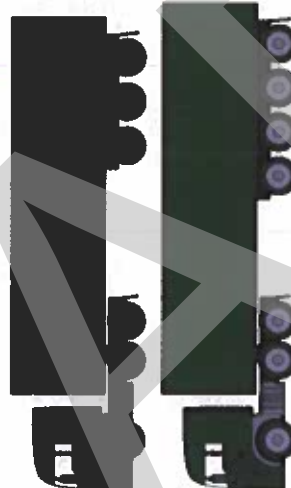
8. Single Trailer 3- or 4-Axle Trucks
3 or 4 axles, single trailer



9. Single Trailer 5-Axle Trucks
5 axles, single trailer



10. Single Trailer 6 or More-Axle Trucks
6 or more axles, single trailer



11. Multi-Trailer 5 or Less-Axle Trucks
5 or less axles, multiple trailers



13. Multi-Trailer 7 or More-Axle Trucks
7 or more axles, multiple trailers



12. Multi-Trailer 6-Axle Trucks
6 axles, multiple trailers



Class Bins

Class 1 - 50 (1.03%)
Class 2 - 2353 (48.54%)
Class 3 - 1424 (29.37%)
Class 4 - 93 (1.92%)
Class 5 - 675 (13.92%)
Class 6 - 150 (3.09%)
Class 7 - 14 (0.29%)
Class 8 - 6 (0.12%)
Class 9 - 65 (1.34%)
Class 10 - 18 (0.37%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)
Class 13 - 0 (0.00%)

DRAFT

MetroCount Traffic Executive **Weekly Vehicle Counts**

WeeklyVehicle-508 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St WB eastside 65th Ave
Attribute: westbound
Direction: 4 - West bound, A trigger first. **Lane:** 7
Survey Duration: 7:29 Monday, August 27, 2018 => 12:45 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1245.EC7 (Plus)
Identifier: CH49G261 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = West
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 17244 / 39529 (43.62%)

Weekly Vehicle Counts

WeeklyVehicle-508

Site: 37th St / 65th Ave.7.0W
Description: 37th St WB eastside 65th Ave
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Scheme: Vehicle classification (Scheme F3)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Averages	
	26 Aug	27 Aug	28 Aug	29 Aug	30 Aug	31 Aug	01 Sep	1 - 5	1 - 7
Hour									
0000-0100	*	*	11	19	24	*	*	18.0	18.0
0100-0200	*	*	6	14	20	*	*	13.3	13.3
0200-0300	*	*	11	8	14	*	*	11.0	11.0
0300-0400	*	*	24	21	18	*	*	21.0	21.0
0400-0500	*	*	72	72	66	*	*	70.0	70.0
0500-0600	*	*	251	253	242	*	*	248.7	248.7
0600-0700	*	*	484	492	479	*	*	485.0	485.0
0700-0800	*	*	673	619	642	*	*	644.7	644.7
0800-0900	*	*	405	398	385	*	*	396.0	396.0
0900-1000	*	*	227	249	259	*	*	245.0	245.0
1000-1100	*	*	246	242	241	*	*	243.0	243.0
1100-1200	*	*	225	252	252	*	*	243.0	243.0
1200-1300	*	*	250	244	239	*	*	244.3	244.3
1300-1400	*	*	245	287	274	*	*	268.7	268.7
1400-1500	*	*	304	263	295	*	*	287.3	287.3
1500-1600	*	*	450	473	476	*	*	466.3	466.3
1600-1700	*	*	468	461	474	*	*	467.7	467.7
1700-1800	*	*	520	528	502	*	*	516.7	516.7
1800-1900	*	*	316	355	328	*	*	333.0	333.0
1900-2000	*	*	208	240	190	*	*	212.7	212.7
2000-2100	*	*	149	150	140	*	*	146.3	146.3
2100-2200	*	*	82	81	109	*	*	90.7	90.7
2200-2300	*	*	44	47	51	*	*	47.3	47.3
2300-2400	*	*	30	25	30	*	*	28.3	28.3
Totals									
0700-1900	*	*	4329	4371	4367	*	*	4355.7	4355.7
0600-2200	*	*	5252	5334	5285	*	*	5290.3	5290.3
0600-0000	*	*	5326	5406	5366	*	*	5366.0	5366.0
0000-0000	*	*	5701	5793	5750	*	*	5748.0	5748.0
AM Peak	*	*	0700	0700	0700	*	*		
	*	*	673	619	642	*	*		
PM Peak	*	*	1700	1700	1700	*	*		
	*	*	520	528	502	*	*		

* - No data.

MetroCount Traffic Executive Vehicle Counts

VehicleCount-509 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St WB eastside 65th Ave
Attribute: westbound
Direction: 4 - West bound, A trigger first. **Lane:** 7
Survey Duration: 7:29 Monday, August 27, 2018 => 12:45 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1245.EC7 (Plus)
Identifier: CH49G261 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = West
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 17244 / 39529 (43.62%)

* Tuesday, August 28, 2018 - Total=5701, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
11	6	11	24	72	251	484	673	405	227	246	225	250	245	304	450	468	520	316	208	149	82	44	30
4	3	5	7	12	42	102	160	132	57	57	64	68	59	70	78	117	126	101	68	40	33	16	9
4	2	1	6	13	67	116	156	112	67	72	52	49	61	77	114	110	134	85	52	45	16	17	11
3	1	2	5	20	68	130	175	81	64	55	53	66	74	75	118	120	119	61	47	37	16	8	6
0	0	3	6	27	74	136	182	80	39	62	56	67	51	82	140	121	141	69	41	27	17	3	4

AM Peak 0700 - 0800 (673), AM PHF=0.92 PM Peak 1700 - 1800 (520), PM PHF=0.92

* Wednesday, August 29, 2018 - Total=5793, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
19	14	8	21	72	253	492	619	398	249	242	252	244	287	263	473	461	528	355	240	150	81	47	25
3	6	3	2	13	44	114	147	122	69	58	48	59	79	62	110	111	136	99	68	44	15	10	5
6	1	1	7	10	54	114	158	118	63	70	77	64	60	63	91	103	132	102	57	37	30	14	8
7	4	1	5	23	89	130	158	80	56	57	60	68	79	73	116	116	124	76	59	38	20	13	9
3	3	3	7	26	66	134	156	78	61	57	67	53	69	65	156	131	136	78	56	31	16	10	3

AM Peak 0700 - 0800 (619), AM PHF=0.98 PM Peak 1700 - 1800 (528), PM PHF=0.97

* Thursday, August 30, 2018 - Total=5750, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
24	20	14	18	66	242	479	642	385	259	241	252	239	274	295	476	474	502	328	190	140	109	51	30
6	8	2	1	9	37	95	144	115	55	50	58	63	74	71	97	127	115	117	58	54	44	21	7
8	8	4	4	13	58	122	164	129	77	65	51	53	65	74	115	116	148	85	42	33	24	14	9
6	1	2	9	23	75	127	167	58	62	60	75	62	59	78	119	105	130	63	48	29	28	9	7
4	3	6	4	21	72	135	167	83	65	66	68	61	76	72	145	126	109	63	42	24	13	7	7

AM Peak 0700 - 0800 (642), AM PHF=0.96

MetroCount Traffic Executive
Speed Statistics by Hour

SpeedStatHour-510 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St WB eastside 65th Ave
Attribute: westbound
Direction: 4 - West bound, A trigger first. Lane: 7
Survey Duration: 7:29 Monday, August 27, 2018 => 12:45 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1245.EC7 (Plus)
Identifier: CH49G261 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = West
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 17244 / 39529 (43.62%)

Speed Statistics by Hour

SpeedStatHour-510

Site: 37th St / 65th Ave. 7.0W

Description: 37th St WB eastside 65th Ave

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018

Scheme:

Filter:

Vehicles = 17244

Posted speed limit = 35 mph, Exceeding = 4363 (25.30%), Mean Exceeding = 39.05 mph

Maximum = 59.1 mph, Minimum = 6.4 mph, Mean = 29.9 mph

85% Speed = 37.4 mph, 95% Speed = 41.6 mph, Median = 30.6 mph

12 mph Pace = 25 - 37, Number in Pace = 10156 (58.90%)

Variance = 59.20, Standard Deviation = 7.69 mph

Hour Bins

Time	Bin	Min	Max	Mean	Median	85%	95%	>PSL 35 mph
0000	54	19.8	46.0	33.9	34.2	38.5	41.4	21 38.9%
0100	40	21.8	43.0	33.8	32.9	38.5	41.8	15 37.5%
0200	33	20.3	49.7	35.1	34.4	41.4	44.7	15 45.5%
0300	63	17.9	51.3	34.9	33.8	41.4	46.3	27 42.9%
0400	210	12.0	51.7	34.9	34.9	40.7	44.3	107 51.0%
0500	746	4.3%	57.0	34.5	34.4	41.2	44.5	352 47.2%
0600	1455	8.4%	58.9	29.9	30.6	38.3	42.1	394 27.1%
0700	1934	11.2%	47.5	24.7	24.6	33.3	36.7	186 9.6%
0800	1188	6.9%	8.1	29.1	29.8	35.8	39.6	215 18.1%
0900	735	4.3%	10.1	32.4	32.7	39.1	42.7	251 34.1%
1000	729	4.2%	57.0	32.2	32.2	38.3	41.6	237 32.5%
1100	729	4.2%	50.6	32.7	32.7	38.3	42.3	248 34.0%
1200	733	4.3%	52.2	33.2	33.3	39.1	42.5	287 39.2%
1300	806	4.7%	53.3	31.6	32.0	38.5	42.3	240 29.8%
1400	862	5.0%	47.9	31.4	31.8	38.5	41.6	265 30.7%
1500	1399	8.1%	49.8	28.0	28.9	35.1	39.1	218 15.6%
1600	1403	8.1%	6.9	26.8	27.1	35.1	40.5	223 15.9%
1700	1550	9.0%	53.4	28.0	28.6	36.0	40.0	299 19.3%
1800	999	5.8%	48.9	30.4	30.9	37.8	41.6	263 26.3%
1900	638	3.7%	11.1	32.3	32.4	37.6	41.2	194 30.4%
2000	439	2.5%	48.6	32.3	31.3	38.0	41.2	121 27.6%
2100	272	1.6%	59.1	34.2	33.6	39.4	43.8	111 40.8%
2200	142	0.8%	20.8	33.3	32.4	38.3	42.5	44 31.0%
2300	85	0.5%	49.7	34.4	33.6	38.9	46.5	30 35.3%
----	17244	100.0%	59.1	29.9	30.6	37.4	41.6	4363 25.3%

MetroCount Traffic Executive Speed Bin Chart

SpeedBin-511 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St WB eastside 65th Ave
Attribute: westbound
Direction: 4 - West bound, A trigger first. Lane: 7
Survey Duration: 7:29 Monday, August 27, 2018 => 12:45 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1245.EC7 (Plus)
Identifier: CH49G261 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = West
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 17244 / 39529 (43.62%)

Speed Bin Chart

SpeedBin-511 (Non metric) Site:37th St / 65th Ave.7.0W

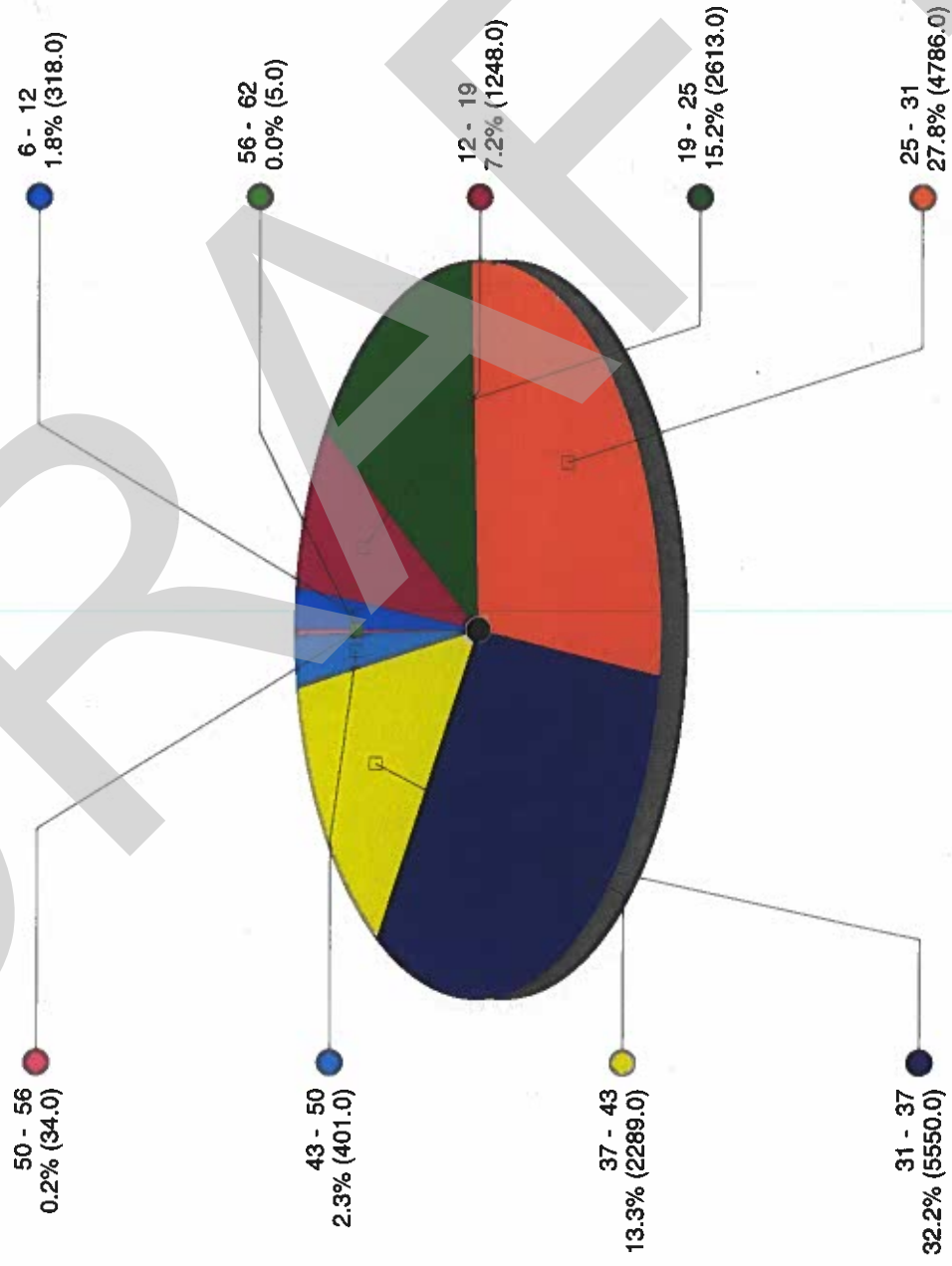
Description: 37th St WB eastside 65th Ave

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018

Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

Scheme: Vehicle classification (Scheme F3)

Total=17244



Speed Bins

Speed	Bin	vMult	n * vMult
0 - 6	-	-	-
6 - 12	318 1.8%	0.00	0.00
12 - 19	1248 7.2%	0.00	0.00
19 - 25	2613 15.2%	0.00	0.00
25 - 31	4786 27.8%	0.00	0.00
31 - 37	5550 32.2%	0.00	0.00
37 - 43	2289 13.3%	0.00	0.00
43 - 50	401 2.3%	0.00	0.00
50 - 56	34 0.2%	0.00	0.00
56 - 62	5 0.0%	0.00	0.00
62 - 68	0 0.0%	0.00	0.00
68 - 75	0 0.0%	0.00	0.00
75 - 81	0 0.0%	0.00	0.00
81 - 87	0 0.0%	0.00	0.00
87 - 93	0 0.0%	0.00	0.00
93 - 99	0 0.0%	0.00	0.00
99 - 106	-	-	-
106 - 112	-	-	-
112 - 118	-	-	-
118 - 124	-	-	-

Total Speed Rating = 0.00

MetroCount Traffic Executive Class Bin Chart

ClassBin-512 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St WB eastside 65th Ave
Attribute: westbound
Direction: 4 - West bound, A trigger first. Lane: 7
Survey Duration: 7:29 Monday, August 27, 2018 => 12:45 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1245.EC7 (Plus)
Identifier: CH49G261 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = West
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 17244 / 39529 (43.62%)

Class Bin Chart

ClassBin-512 (Non metric) Site:37th St / 65th Ave.7.0W

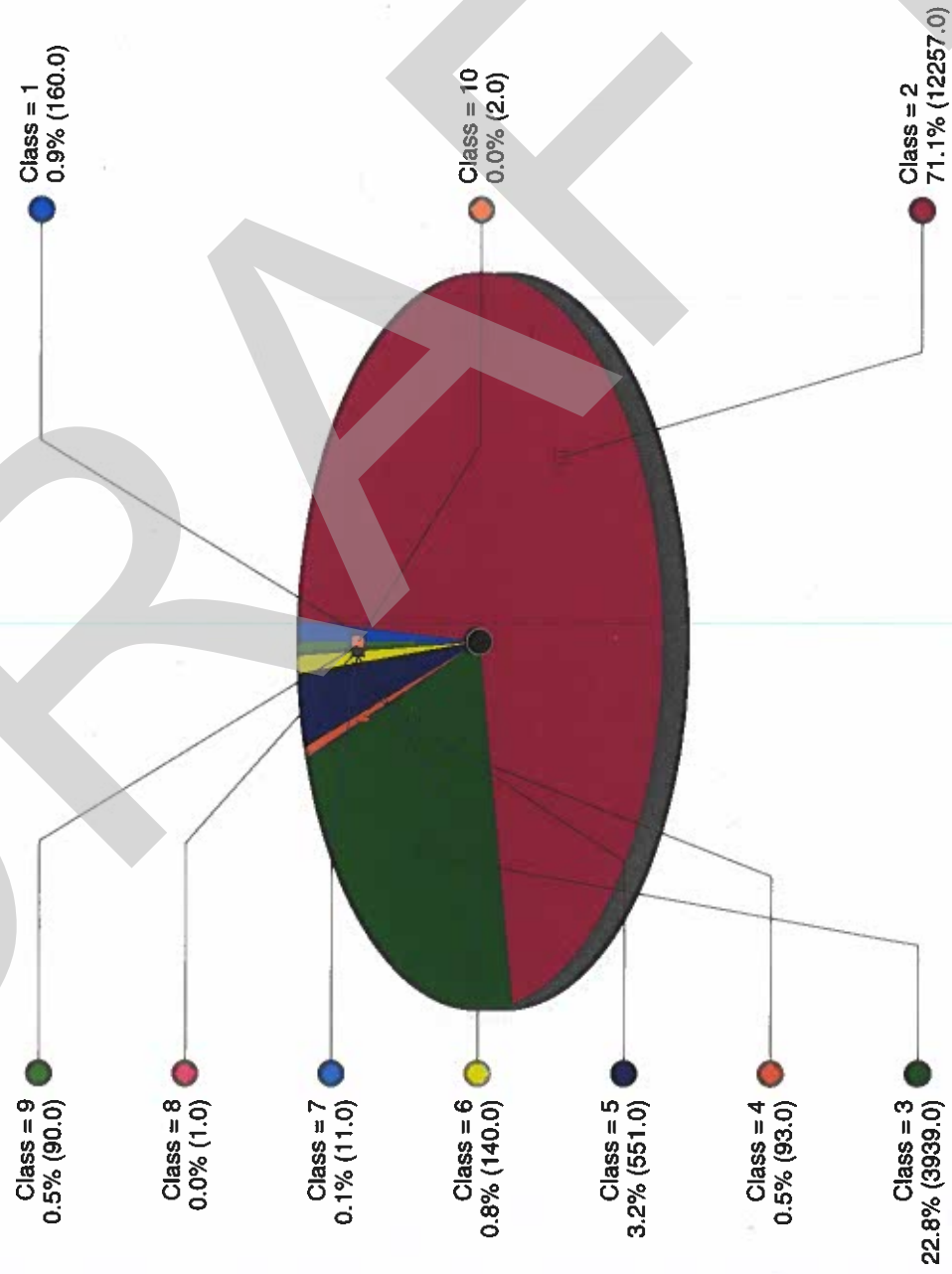
Description: 37th St WB eastside 65th Ave

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018

Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

Scheme: Vehicle classification (Scheme F3)

Total=17244



FHWA Vehicle Classifications

1. Motorcycles
2 axles, 2 or 3 tires



2. Passenger Cars
2 axles, can have 1- or 2-axle trailers



3. Pickups, Panels, Vans
2 axles, 4-tire single units
Can have 1 or 2 axle trailers



4. Buses
2 or 3 axles, full length



5. Single Unit 2-Axle Trucks
2 axles, 6 tires (dual rear tires), single-unit



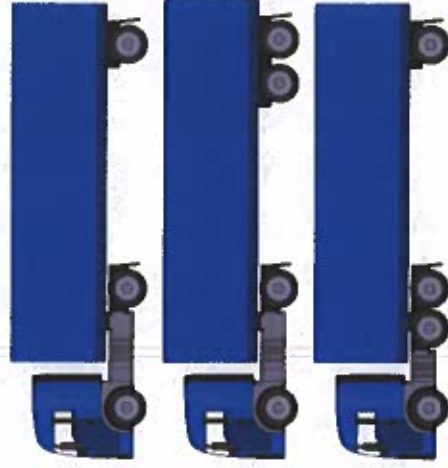
6. Single Unit 3-Axle Trucks
3 axles, single unit



7. Single Unit 4 or More-Axle Trucks
4 or more axles, single unit



8. Single Trailer 3- or 4-Axle Trucks
3 or 4 axles, single trailer



9. Single Trailer 5-Axle Trucks
5 axles, single trailer



10. Single Trailer 6 or More-Axle Trucks
6 or more axles, single trailer



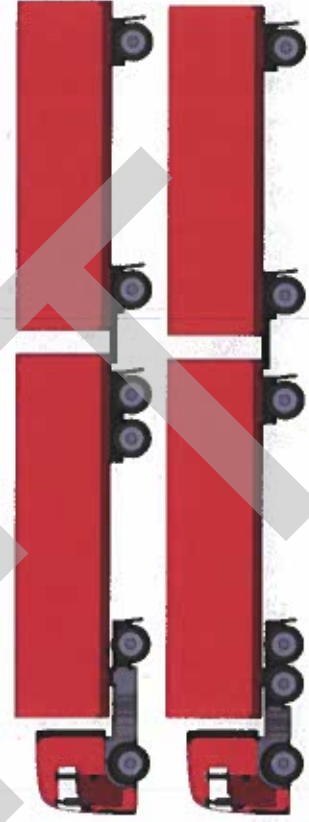
11. Multi-Trailer 5 or Less-Axle Trucks
5 or less axles, multiple trailers



13. Multi-Trailer 7 or More-Axle Trucks
7 or more axles, multiple trailers



12. Multi-Trailer 6-Axle Trucks
6 axles, multiple trailers



Class Bins

Class 1 - 160 (0.93%)
Class 2 - 12257 (71.08%)
Class 3 - 3939 (22.84%)
Class 4 - 93 (0.54%)
Class 5 - 551 (3.20%)
Class 6 - 140 (0.81%)
Class 7 - 11 (0.06%)
Class 8 - 1 (0.01%)
Class 9 - 90 (0.52%)
Class 10 - 2 (0.01%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)
Class 13 - 0 (0.00%)

MetroCount Traffic Executive Weekly Vehicle Counts

WeeklyVehicle-513 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St EB eastside 65th Ave
Attribute: eastbound
Direction: 2 - East bound, A trigger first. **Lane:** 8
Survey Duration: 7:30 Monday, August 27, 2018 => 12:48 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1249.EC8 (Plus)
Identifier: EA15HZT4 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 15680 / 35922 (43.65%)

Weekly Vehicle Counts**WeeklyVehicle-513**

Site: 37th St / 65th Ave.8.0E
Description: 37th St EB eastside 65th Ave
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Scheme: Vehicle classification (Scheme F3)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

	Sun 26 Aug	Mon 27 Aug	Tue 28 Aug	Wed 29 Aug	Thu 30 Aug	Fri 31 Aug	Sat 01 Sep	Averages	
Hour								1 - 5	1 - 7
0000-0100	*	*	17	16	96	*	*	43.0	43.0
0100-0200	*	*	10	8	27	*	*	15.0	15.0
0200-0300	*	*	11	11	11	*	*	11.0	11.0
0300-0400	*	*	6	9	9	*	*	8.0	8.0
0400-0500	*	*	21	18	16	*	*	18.3	18.3
0500-0600	*	*	59	65	62	*	*	62.0	62.0
0600-0700	*	*	195	185	181	*	*	187.0	187.0
0700-0800	*	*	391	374	411	*	*	392.0	392.0
0800-0900	*	*	355	301	331	*	*	329.0	329.0
0900-1000	*	*	206	217	222	*	*	215.0	215.0
1000-1100	*	*	210	202	208	*	*	206.7	206.7
1100-1200	*	*	233	222	228	*	*	227.7	227.7
1200-1300	*	*	236	246	233	*	*	238.3	238.3
1300-1400	*	*	241	213	231	*	*	228.3	228.3
1400-1500	*	*	278	317	295	*	*	296.7	296.7
1500-1600	*	*	442	461	459	*	*	454.0	454.0
1600-1700	*	*	555	599	575	*	*	576.3	576.3
1700-1800	*	*	550	547	564	*	*	553.7	553.7
1800-1900	*	*	482	459	473	*	*	471.3	471.3
1900-2000	*	*	277	273	294	*	*	281.3	281.3
2000-2100	*	*	163	176	166	*	*	168.3	168.3
2100-2200	*	*	94	81	100	*	*	91.7	91.7
2200-2300	*	*	56	108	58	*	*	74.0	74.0
2300-2400	*	*	35	163	36	*	*	78.0	78.0
Totals									
0700-1900	*	*	4179	4158	4230	*	*	4189.0	4189.0
0600-2200	*	*	4908	4873	4971	*	*	4917.3	4917.3
0600-0000	*	*	4999	5144	5065	*	*	5069.3	5069.3
0000-0000	*	*	5123	5271	5286	*	*	5226.7	5226.7
AM Peak									
	*	*	0700	0700	0700	*	*		
	*	*	391	374	411	*	*		
PM Peak									
	*	*	1600	1600	1600	*	*		
	*	*	555	599	575	*	*		

* - No data.

MetroCount Traffic Executive Vehicle Counts

VehicleCount-514 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St EB eastside 65th Ave
Attribute: eastbound
Direction: 2 - East bound, A trigger first. **Lane:** 8
Survey Duration: 7:30 Monday, August 27, 2018 => 12:48 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1249.EC8 (Plus)
Identifier: EA15HZT4 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 15680 / 35922 (43.65%)

* Tuesday, August 28, 2018 - Total=5123, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
17	10	11	6	21	59	195	391	355	206	210	233	236	241	278	442	555	550	482	277	163	94	56	35
9	4	4	1	3	3	21	68	106	60	55	54	50	79	55	80	181	142	130	99	44	28	16	13
2	5	1	1	2	8	42	127	112	45	57	52	52	45	66	110	124	132	142	53	49	34	13	8
4	1	3	2	8	19	64	108	75	48	58	64	71	63	71	119	117	153	135	62	48	14	19	4
2	0	3	2	8	29	68	88	62	53	40	63	63	54	86	133	133	123	75	63	22	18	8	10

AM Peak 0715 - 0815 (429), AM PHF=0.84 PM Peak 1645 - 1745 (560), PM PHF=0.92

* Wednesday, August 29, 2018 - Total=5271, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
16	8	11	9	18	65	185	374	301	217	202	222	246	213	317	461	599	547	459	273	176	81	108	163
7	1	5	1	1	13	27	59	93	38	51	48	58	55	67	90	170	138	124	85	55	27	12	43
5	3	3	0	6	8	38	117	108	44	57	75	50	52	59	111	146	139	160	81	44	19	12	52
1	1	2	1	6	16	52	106	57	75	39	54	73	49	94	139	134	137	99	50	39	18	27	37
3	3	1	7	5	28	68	92	43	60	55	45	65	57	97	121	149	133	76	57	38	17	57	31

AM Peak 0715 - 0815 (408), AM PHF=0.87 PM Peak 1600 - 1700 (599), PM PHF=0.88

* Thursday, August 30, 2018 - Total=5286, 15 minute drops

0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
96	27	11	9	16	62	181	411	331	222	208	228	233	231	295	459	575	564	473	294	166	100	58	36
36	11	2	2	1	9	21	75	103	53	56	62	61	41	61	98	186	129	143	92	51	34	17	12
17	9	2	2	5	10	34	130	93	66	49	43	58	60	71	114	126	126	126	89	45	27	15	11
24	4	7	3	4	14	53	117	71	51	48	65	52	64	71	136	121	155	116	59	33	19	11	8
19	3	0	2	6	29	73	89	64	52	55	58	62	66	92	111	142	154	88	54	37	20	15	5

AM Peak 0715 - 0815 (439), AM PHF=0.84

**MetroCount Traffic Executive
Speed Statistics by Hour**

SpeedStatHour-515 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St EB eastside 65th Ave
Attribute: eastbound
Direction: 2 - East bound, A trigger first. Lane: 8
Survey Duration: 7:30 Monday, August 27, 2018 => 12:48 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1249.EC8 (Plus)
Identifier: EA15HJT4 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 15680 / 35922 (43.65%)

Speed Statistics by Hour

SpeedStatHour-515

Site: 37th St / 65th Ave 8.0E
Description: 37th St EB eastside 65th Ave
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Scheme: Vehicle classification (Scheme F3)
Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

Vehicles = 15680

Posted speed limit = 35 mph, Exceeding = 8614 (54.94%), Mean Exceeding = 38.77 mph

Maximum = 68.6 mph, Minimum = 11.9 mph, Mean = 35.7 mph

85% Speed = 39.8 mph, 95% Speed = 43.4 mph, Median = 35.3 mph

12 mph Pace = 30 - 42, Number in Pace = 13292 (84.77%)

Variance = 21.36, Standard Deviation = 4.62 mph

Hour Bins

Time	Bin	Min	Max	Mean	Median	85%	95%	>PSL 35 mph
0000	129	0.8%	19.6	35.3	34.4	40.5	44.7	60
0100	45	0.3%	26.0	36.1	36.0	40.3	44.7	26
0200	33	0.2%	20.3	36.9	36.7	40.9	47.0	20
0300	24	0.2%	28.4	37.4	36.5	42.1	46.3	16
0400	55	0.4%	25.8	38.5	37.6	44.5	47.6	41
0500	186	1.2%	17.0	37.2	37.1	41.4	46.1	130
0600	561	3.6%	22.5	36.3	35.8	40.5	44.7	336
0700	1176	7.5%	19.4	35.6	35.3	39.1	42.9	642
0800	987	6.3%	17.7	34.7	34.9	38.9	41.8	496
0900	645	4.1%	17.2	35.9	35.6	40.7	44.3	369
1000	620	4.0%	19.6	36.2	36.0	40.9	45.2	365
1100	683	4.4%	20.9	36.0	35.8	40.5	44.1	394
1200	715	4.6%	19.4	36.0	35.6	40.7	45.4	413
1300	685	4.4%	13.0	36.1	35.3	40.7	45.2	382
1400	890	5.7%	19.5	36.2	35.8	40.0	44.3	525
1500	1362	8.7%	15.1	35.1	35.1	39.1	42.1	720
1600	1729	11.0%	23.6	35.3	35.1	38.7	41.4	885
1700	1661	10.6%	11.9	35.5	35.1	38.9	42.1	892
1800	1414	9.0%	23.4	35.8	35.1	39.6	42.5	758
1900	844	5.4%	17.9	36.0	35.6	40.5	43.8	466
2000	505	3.2%	20.0	36.2	35.8	40.5	44.1	296
2100	275	1.8%	21.0	36.8	36.2	42.5	45.0	163
2200	222	1.4%	18.6	35.5	34.9	41.4	45.2	112
2300	234	1.5%	19.8	34.8	34.4	40.0	42.7	107
----	15680	100.0%	11.9	35.7	35.3	39.8	43.4	8614

MetroCount Traffic Executive Speed Bin Chart

SpeedBin-516 -- English (ENU)

Datasets:

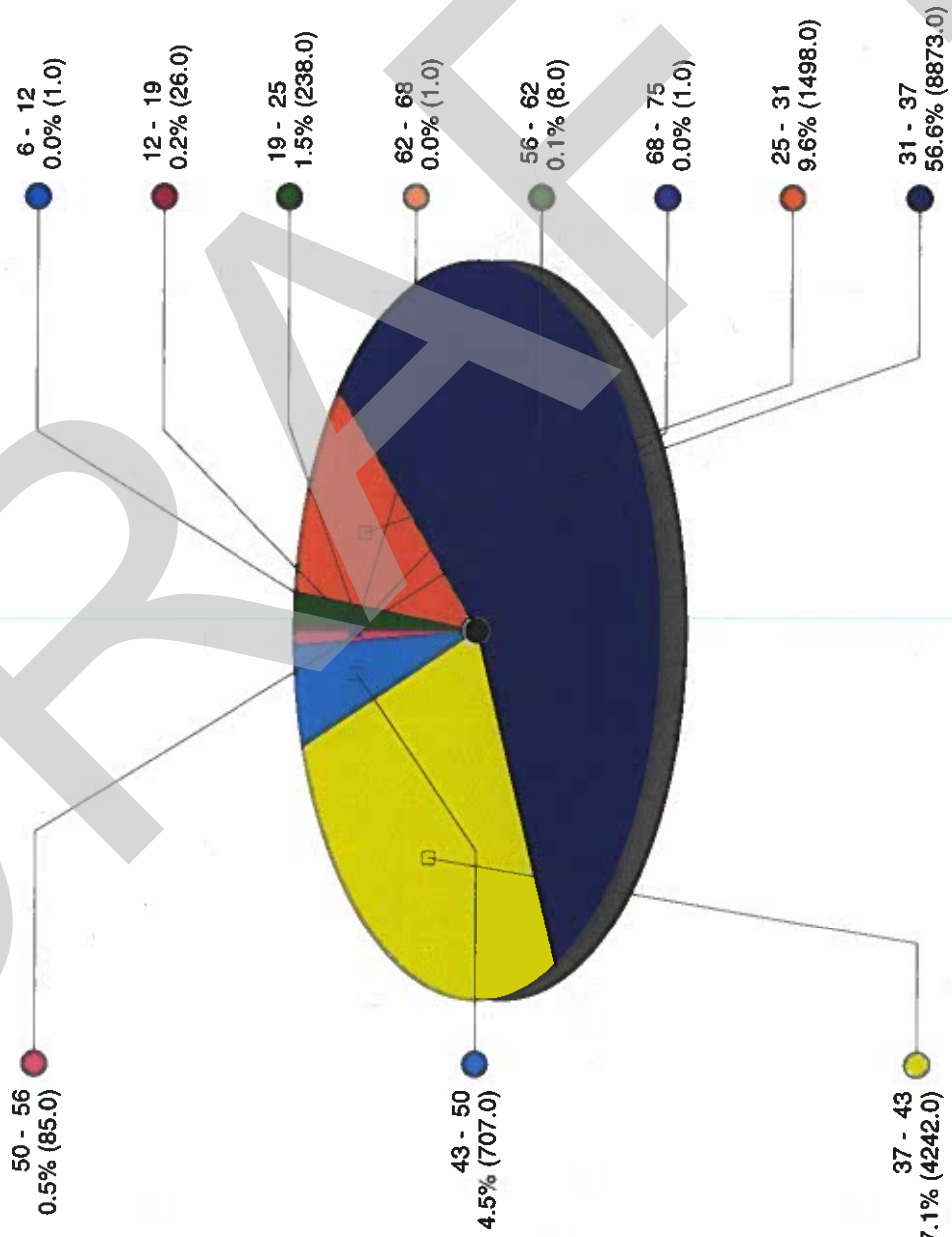
Site: [37th St / 65th Ave] 37th St EB eastside 65th Ave
Attribute: eastbound
Direction: 2 - East bound, A trigger first. **Lane:** 8
Survey Duration: 7:30 Monday, August 27, 2018 => 12:48 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1249.EC8 (Plus)
Identifier: EA15HZT4 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 15680 / 35922 (43.65%)

Speed Bin Chart

SpeedBin-516 (Non metric) Site:37th St / 65th Ave.8.OE
Description: 37th St EB eastside 65th Ave
Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018
Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)
Scheme: Vehicle classification (Scheme F3)
Total=15680



Speed Bins

Speed	Bin	vMult	n * vMult
0 - 6	- -	-	-
6 - 12	1 0.0%	0.00	0.00
12 - 19	26 0.2%	0.00	0.00
19 - 25	238 1.5%	0.00	0.00
25 - 31	1498 9.6%	0.00	0.00
31 - 37	8873 56.6%	0.00	0.00
37 - 43	4242 27.1%	0.00	0.00
43 - 50	707 4.5%	0.00	0.00
50 - 56	85 0.5%	0.00	0.00
56 - 62	8 0.1%	0.00	0.00
62 - 68	1 0.0%	0.00	0.00
68 - 75	1 0.0%	0.00	0.00
75 - 81	0 0.0%	0.00	0.00
81 - 87	0 0.0%	0.00	0.00
87 - 93	0 0.0%	0.00	0.00
93 - 99	0 0.0%	0.00	0.00
99 - 106	- -	-	-
106 - 112	- -	-	-
112 - 118	- -	-	-
118 - 124	- -	-	-

Total Speed Rating = 0.00

MetroCount Traffic Executive **Class Bin Chart**

ClassBin-517 -- English (ENU)

Datasets:

Site: [37th St / 65th Ave] 37th St EB eastside 65th Ave
Attribute: eastbound
Direction: 2 - East bound, A trigger first. Lane: 8
Survey Duration: 7:30 Monday, August 27, 2018 => 12:48 Tuesday, September 4, 2018,
Zone:
File: 37th St _ 65th Ave 0 2018-09-04 1249.EC8 (Plus)
Identifier: EA15HZT4 MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018 (3)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 6 - 99 mph.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 328.084 ft
Name: Default Profile
Scheme: Vehicle classification (Scheme F3)
Units: Non metric (ft, mi, ft/s, mph, lb, ton)
In profile: Vehicles = 15680 / 35922 (43.65%)

Class Bin Chart

ClassBin-517 (Non metric) Site:37th St / 65th Ave.8.0E

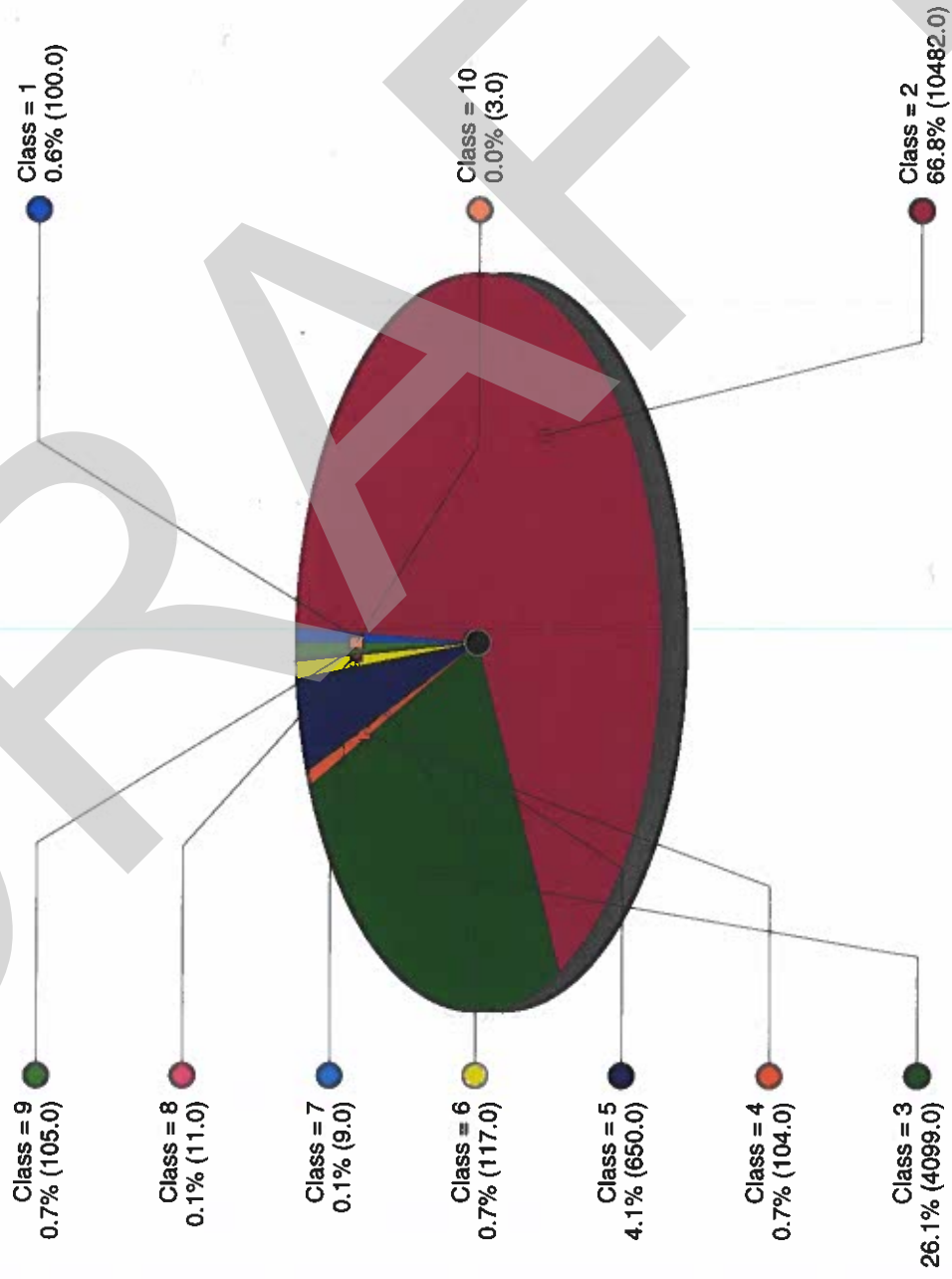
Description: 37th St EB eastside 65th Ave

Filter time: 0:00 Tuesday, August 28, 2018 => 0:00 Friday, August 31, 2018

Filter: CIs(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(6,99) Headway(>0) Span(0 - 328.084)

Scheme: Vehicle classification (Scheme F3)

Total=15680



FHWA Vehicle Classifications

1. Motorcycles
2 axles, 2 or 3 tires



2. Passenger Cars
2 axles, can have 1- or 2-axle trailers



3. Pickups, Panels, Vans
2 axles, 4-tire single units
Can have 1 or 2 axle trailers



4. Buses
2 or 3 axles, full length



5. Single Unit 2-Axle Trucks
2 axles, 6 tires (dual rear tires), single-unit



6. Single Unit 3-Axle Trucks
3 axles, single unit



7. Single Unit 4 or More-Axle Trucks
4 or more axles, single unit



8. Single Trailer 3- or 4-Axle Trucks
3 or 4 axles, single trailer



9. Single Trailer 5-Axle Trucks
5 axles, single trailer



10. Single Trailer 6 or More-Axle Trucks
6 or more axles, single trailer



11. Multi-Trailer 5 or Less-Axle Trucks
5 or less axles, multiple trailers



13. Multi-Trailer 7 or More-Axle Trucks
7 or more axles, multiple trailers



12. Multi-Trailer 6-Axle Trucks
6 axles, multiple trailers



Class Bins

Class 1 - 100 (0.64%)
Class 2 - 10482 (66.85%)
Class 3 - 4099 (26.14%)
Class 4 - 104 (0.66%)
Class 5 - 650 (4.15%)
Class 6 - 117 (0.75%)
Class 7 - 9 (0.06%)
Class 8 - 11 (0.07%)
Class 9 - 105 (0.67%)
Class 10 - 3 (0.02%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)
Class 13 - 0 (0.00%)

APPENDIX E

M-E PAVEMENT DESIGN OUTPUT

37th STREET - FLEXIBLE DESIGN



37th St-flexible

File Name: C:\Users\RSGeoTech\Desktop\PMED Projects\530.02\37th St-flexible.dgpx



Design Inputs

Design Life: 20 years

Design Type: FLEXIBLE

Base construction: May, 2024

Pavement construction: June, 2024

Traffic opening: September, 2024

Climate Data Sources (Lat/Lon) 40.436, -104.618

Design Structure

Layer type	Material Type	Thickness (in)
Flexible	R3 Level 1 SX(100) PG 64-28	2.0
Flexible	R2 Level 1 SX(75) PG 64-22	7.0
NonStabilized	Crushed stone	8.0
Subgrade	A-2-4	Semi-infinite

Volumetric at Construction:	
Effective binder content (%)	10.7
Air voids (%)	5.7

Traffic

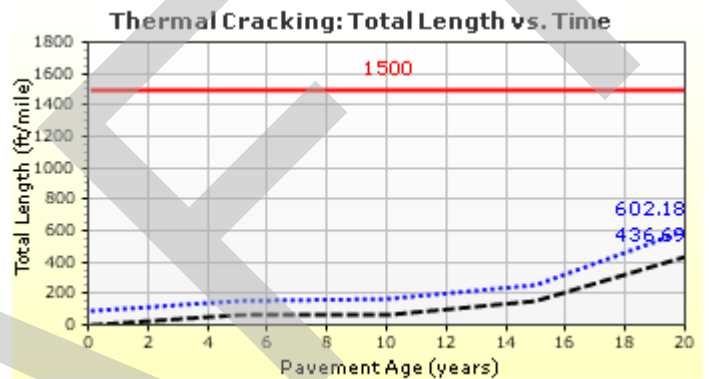
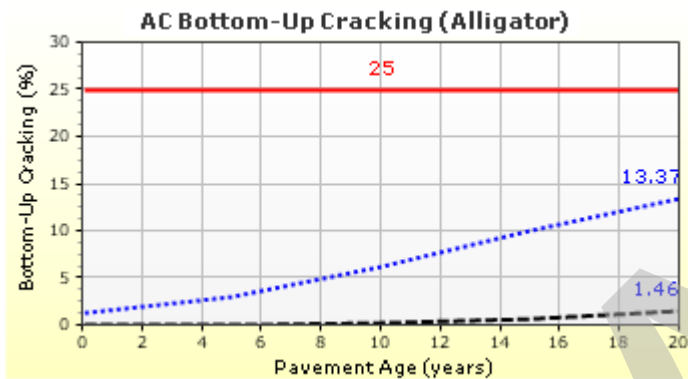
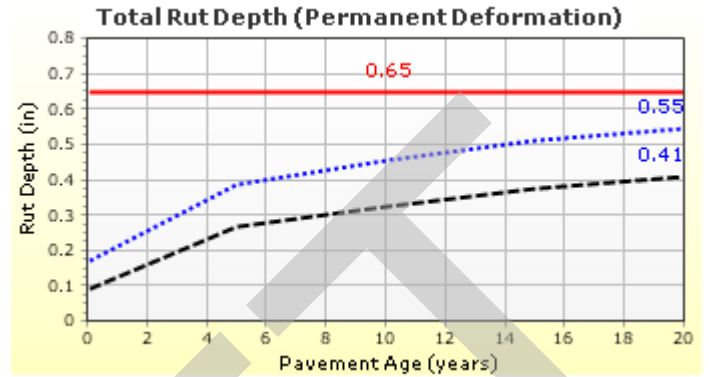
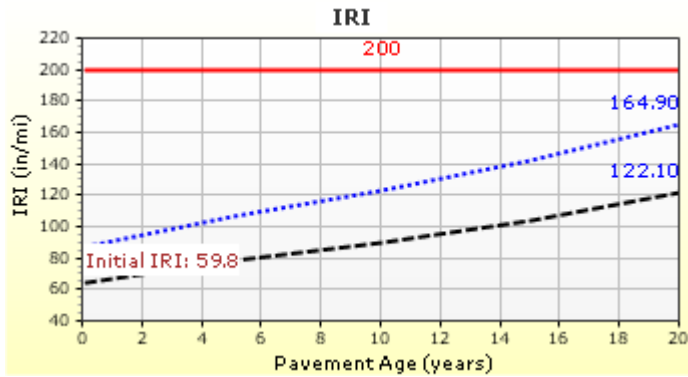
Age (year)	Heavy Trucks (cumulative)
2024 (initial)	2,800
2034 (10 years)	6,531,630
2044 (20 years)	14,022,700

Design Outputs

Distress Prediction Summary

Distress Type	Distress @ Specified Reliability		Reliability (%)		Criterion Satisfied?
	Target	Predicted	Target	Achieved	
Terminal IRI (in/mile)	200.00	164.94	90.00	99.01	Pass
Permanent deformation - total pavement (in)	0.65	0.55	90.00	98.79	Pass
AC bottom-up fatigue cracking (% lane area)	25.00	13.37	90.00	99.43	Pass
AC thermal cracking (ft/mile)	1500.00	602.18	90.00	100.00	Pass
AC top-down fatigue cracking (ft/mile)	2500.00	271.75	90.00	100.00	Pass
Permanent deformation - AC only (in)	0.50	0.41	90.00	98.53	Pass

Distress Charts



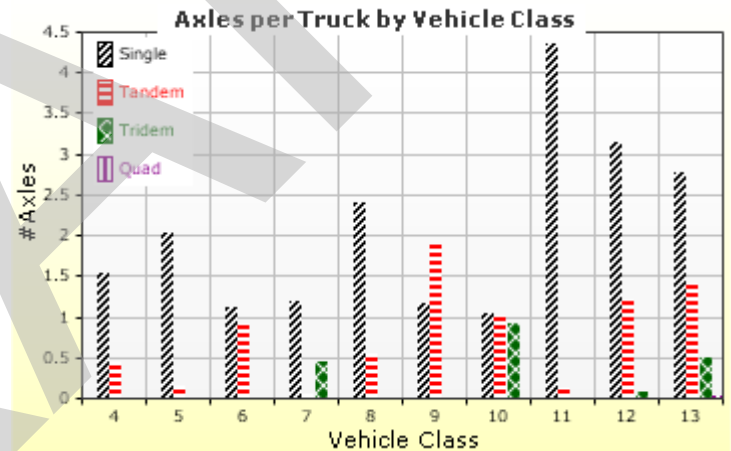
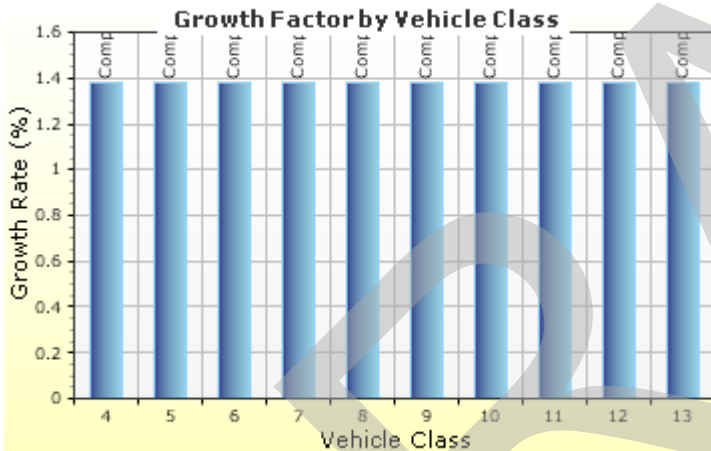
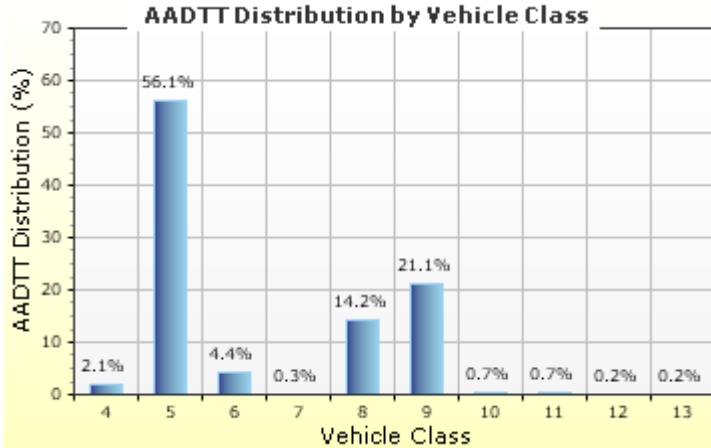
— Threshold Value @ Specified Reliability --- @ 50% Reliability

Traffic Inputs

Graphical Representation of Traffic Inputs

Initial two-way AADTT: 2,800
Number of lanes in design direction: 2

Percent of trucks in design direction (%): 60.0
Percent of trucks in design lane (%): 100.0
Operational speed (mph): 35.0



Traffic Volume Monthly Adjustment Factors



Tabular Representation of Traffic Inputs

Volume Monthly Adjustment Factors

Level 3: Default MAF

Month	Vehicle Class									
	4	5	6	7	8	9	10	11	12	13
January	0.9	0.8	0.8	0.7	0.8	0.9	0.9	0.9	0.9	0.9
February	0.9	0.8	0.8	0.8	0.9	0.9	0.9	0.9	1.0	0.8
March	1.0	0.9	0.8	1.1	1.0	1.0	1.0	1.0	0.9	0.9
April	1.0	1.0	0.9	1.0	1.0	1.0	1.1	1.0	1.0	1.1
May	1.1	1.1	1.0	1.3	1.1	1.0	1.1	1.1	1.1	1.0
June	1.1	1.1	1.2	1.1	1.1	1.0	1.1	1.0	1.1	1.0
July	1.1	1.2	1.5	1.3	1.2	1.0	1.1	1.1	1.1	1.3
August	1.1	1.2	1.3	1.0	1.1	1.0	1.1	1.1	1.1	1.0
September	1.1	1.1	1.1	1.0	1.1	1.0	1.1	1.1	1.0	1.1
October	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.1
November	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0
December	0.9	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.9	0.9

Distributions by Vehicle Class

Vehicle Class	AADTT Distribution (%) (Level 3)	Growth Factor	
		Rate (%)	Function
Class 4	2.1%	1.38%	Compound
Class 5	56.1%	1.38%	Compound
Class 6	4.4%	1.38%	Compound
Class 7	0.3%	1.38%	Compound
Class 8	14.2%	1.38%	Compound
Class 9	21.1%	1.38%	Compound
Class 10	0.7%	1.38%	Compound
Class 11	0.7%	1.38%	Compound
Class 12	0.2%	1.38%	Compound
Class 13	0.2%	1.38%	Compound

Truck Distribution by Hour does not apply

Axle Configuration

Traffic Wander	
Mean wheel location (in)	18.0
Traffic wander standard deviation (in)	10.0
Design lane width (ft)	12.0

Axle Configuration	
Average axle width (ft)	8.5
Dual tire spacing (in)	12.0
Tire pressure (psi)	120.0

Average Axle Spacing	
Tandem axle spacing (in)	51.6
Tridem axle spacing (in)	49.2
Quad axle spacing (in)	49.2

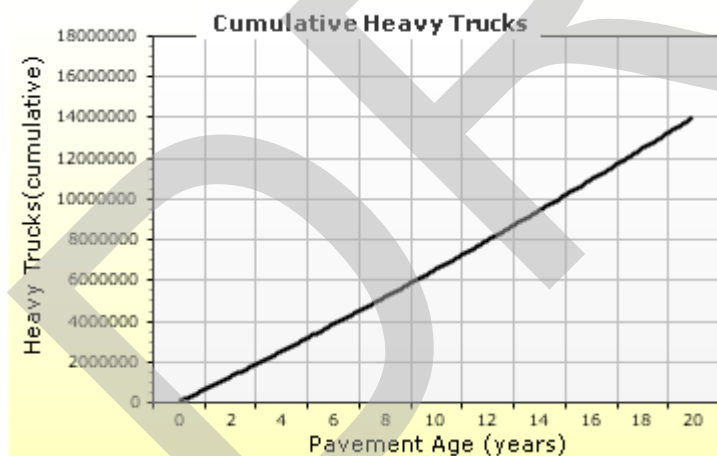
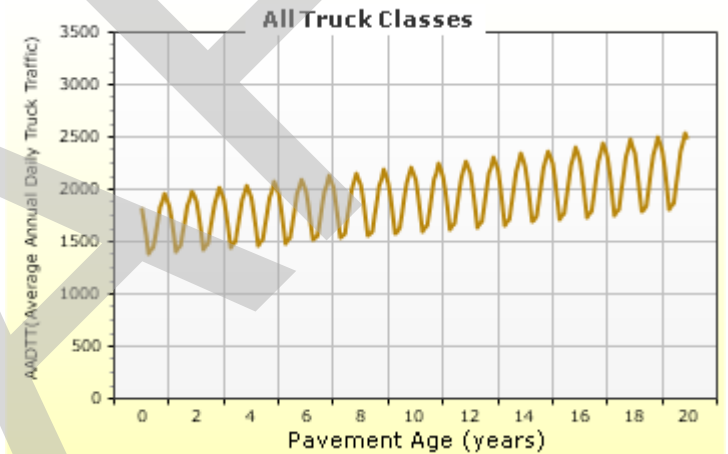
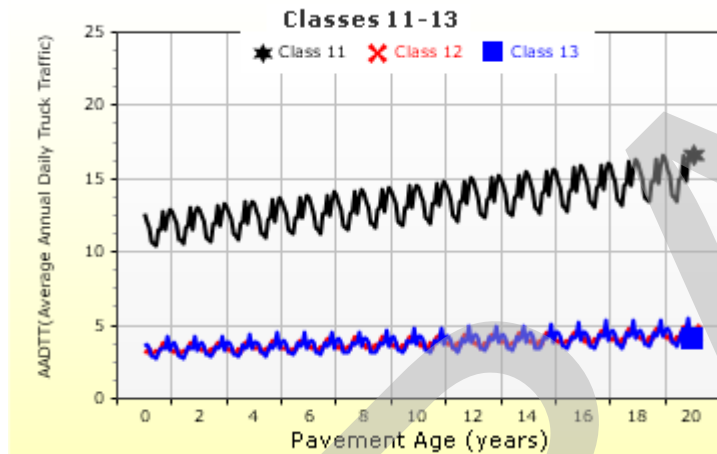
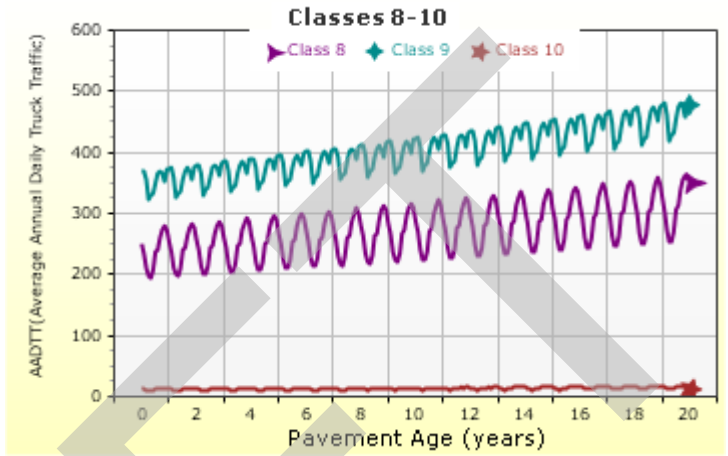
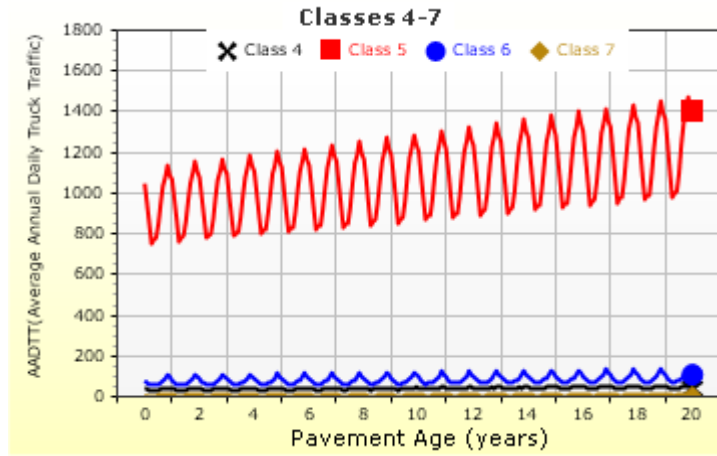
Wheelbase does not apply

Number of Axles per Truck

Vehicle Class	Single Axle	Tandem Axle	Tridem Axle	Quad Axle
Class 4	1.53	0.45	0	0
Class 5	2.02	0.16	0.02	0
Class 6	1.12	0.93	0	0
Class 7	1.19	0.07	0.45	0.02
Class 8	2.41	0.56	0.02	0
Class 9	1.16	1.88	0.01	0
Class 10	1.05	1.01	0.93	0.02
Class 11	4.35	0.13	0	0
Class 12	3.15	1.22	0.09	0
Class 13	2.77	1.4	0.51	0.04

AADTT (Average Annual Daily Truck Traffic) Growth

* Traffic cap is not enforced



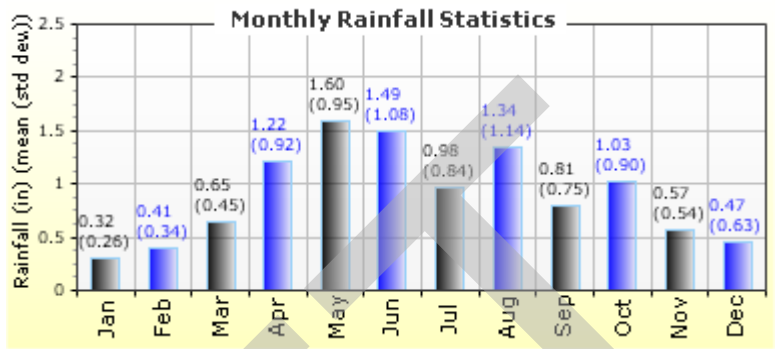
Climate Inputs

Climate Data Sources:

Climate Station Cities: Location (lat lon elevation(ft))
GREELEY, CO 40.43600 -104.61800 4649

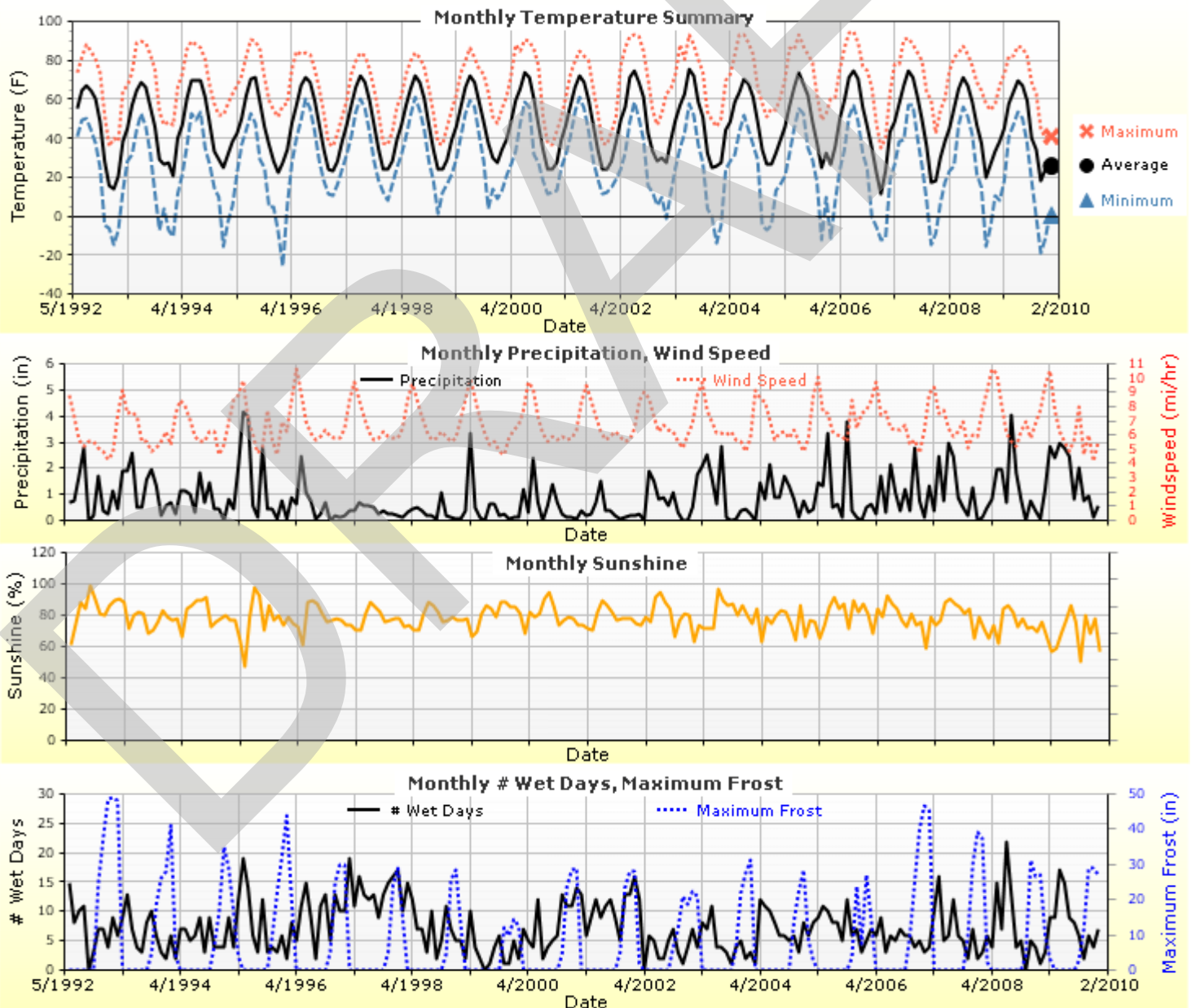
Annual Statistics:

Mean annual air temperature (°F) 47.82
 Mean annual precipitation (in) 10.98
 Freezing index (°F - days) 684.18
 Average annual number of freeze/thaw cycles: 94.81

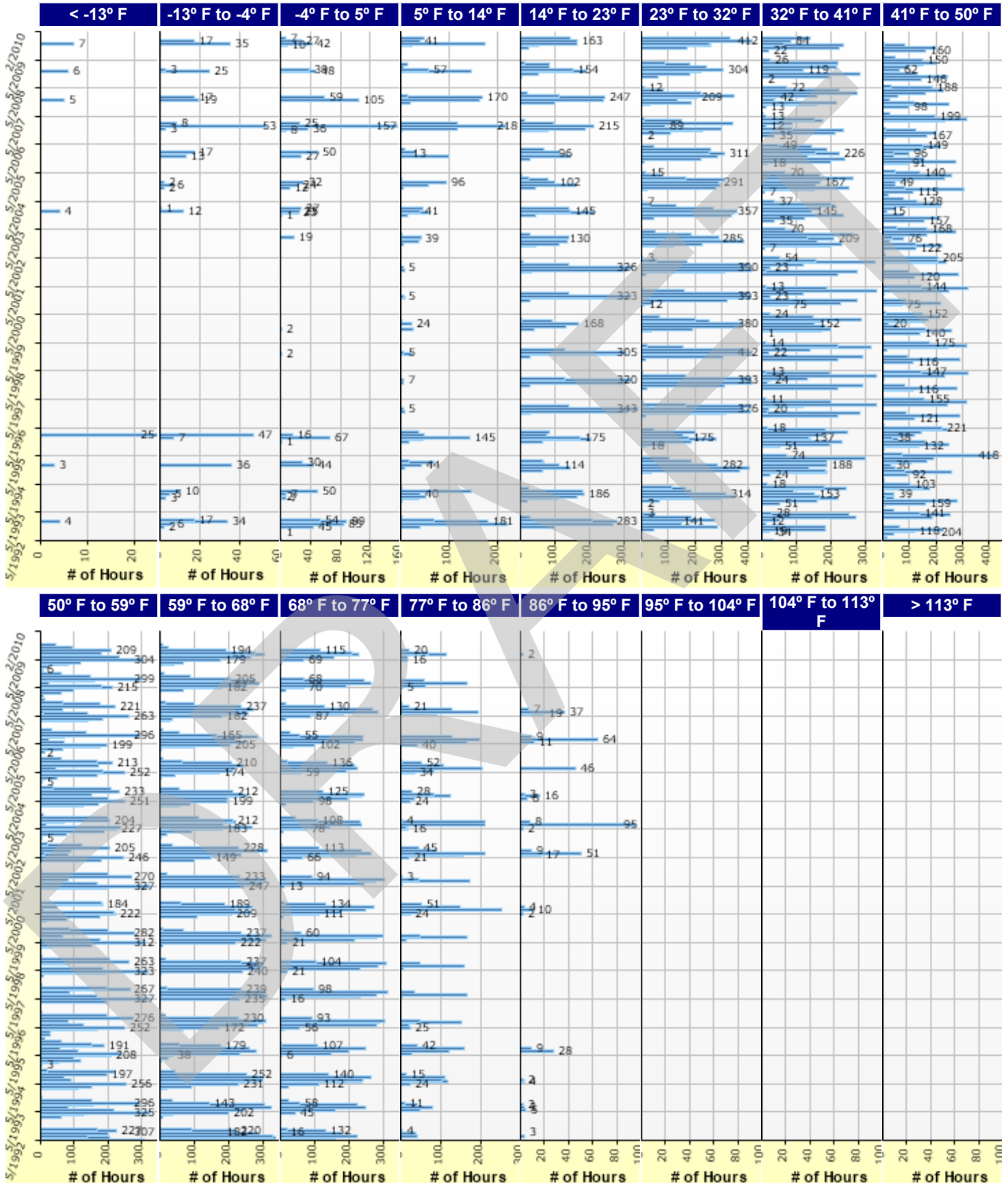


Water table depth (ft) 5.00

Monthly Climate Summary:



Hourly Air Temperature Distribution by Month:





37th St-flexible

File Name: C:\Users\RSGeoTech\Desktop\PMED Projects\530.02\37th St-flexible.dgpx



Design Properties

HMA Design Properties

Use Multilayer Rutting Model	False
Using G* based model (not nationally calibrated)	False
Is NCHRP 1-37A HMA Rutting Model Coefficients	True
Endurance Limit	-
Use Reflective Cracking	True

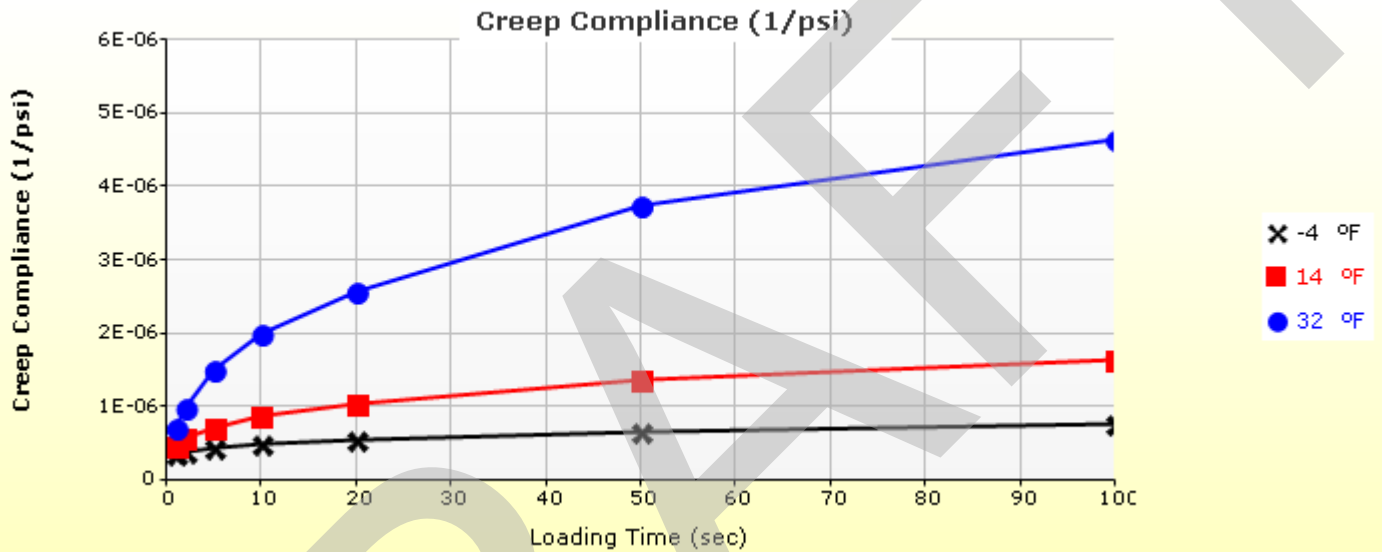
Structure - ICM Properties	
AC surface shortwave absorptivity	0.85

Layer Name	Layer Type	Interface Friction
Layer 1 Flexible : R3 Level 1 SX (100) PG 64-28	Flexible (1)	1.00
Layer 2 Flexible : R2 Level 1 SX (75) PG 64-22	Flexible (1)	1.00
Layer 3 Non-stabilized Base : Crushed stone	Non-stabilized Base (4)	1.00
Layer 4 Subgrade : A-2-4	Subgrade (5)	-

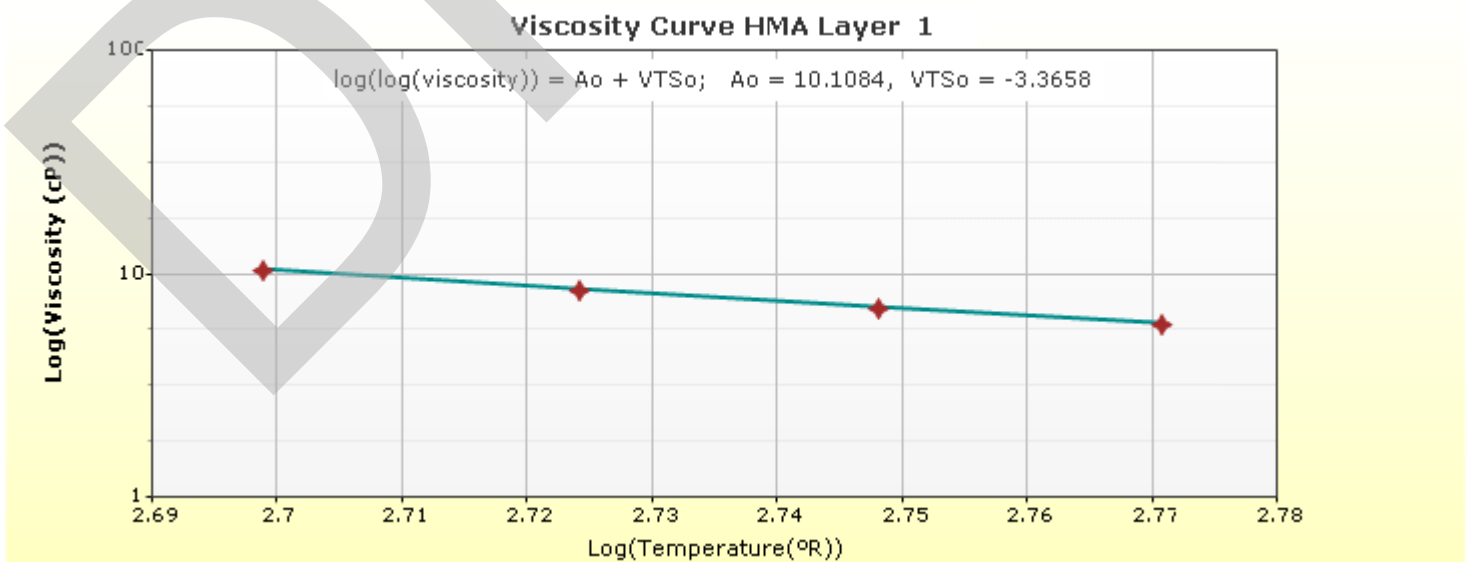
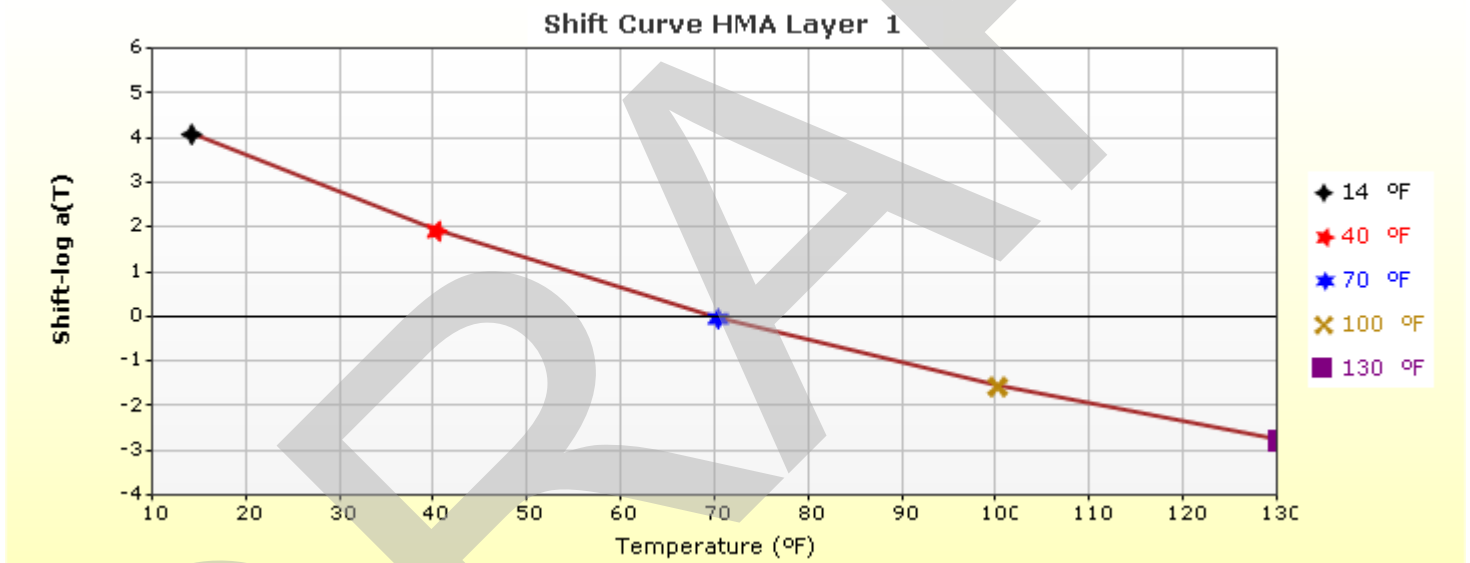
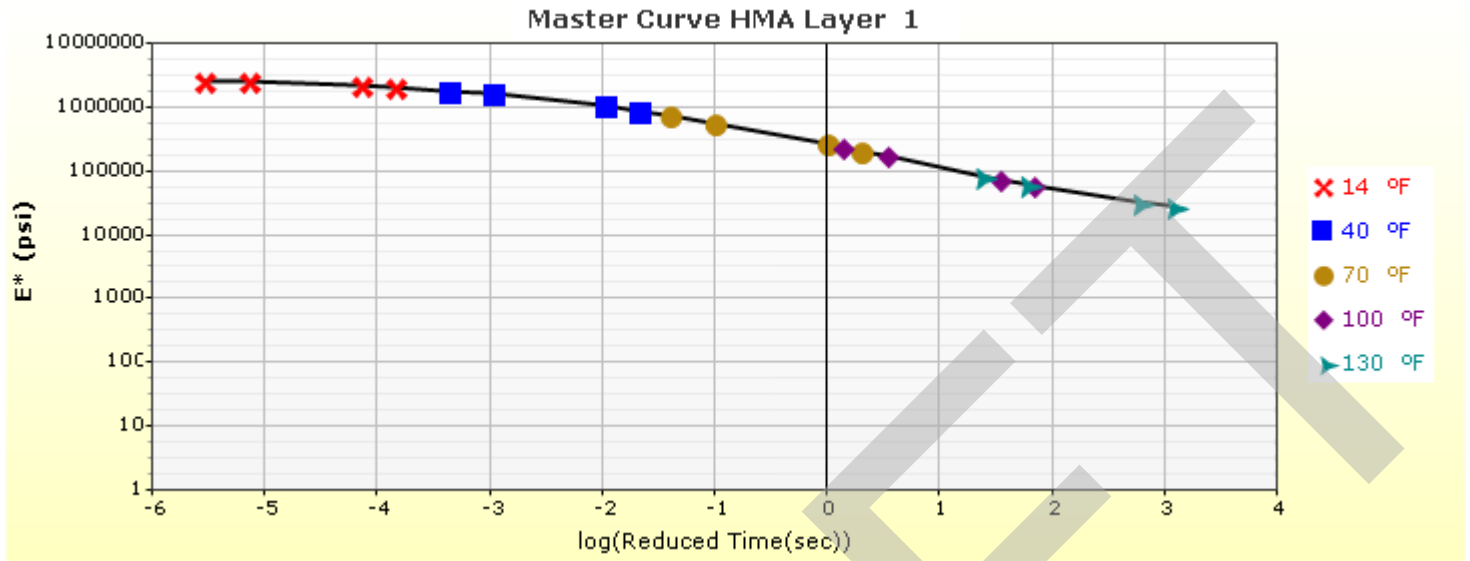
Thermal Cracking (Input Level: 1)

Indirect tensile strength at 14 °F (psi)	519.00
Thermal Contraction	
Is thermal contraction calculated?	True
Mix coefficient of thermal contraction (in/in/°F)	-
Aggregate coefficient of thermal contraction (in/in/°F)	5.0e-006
Voids in Mineral Aggregate (%)	16.4

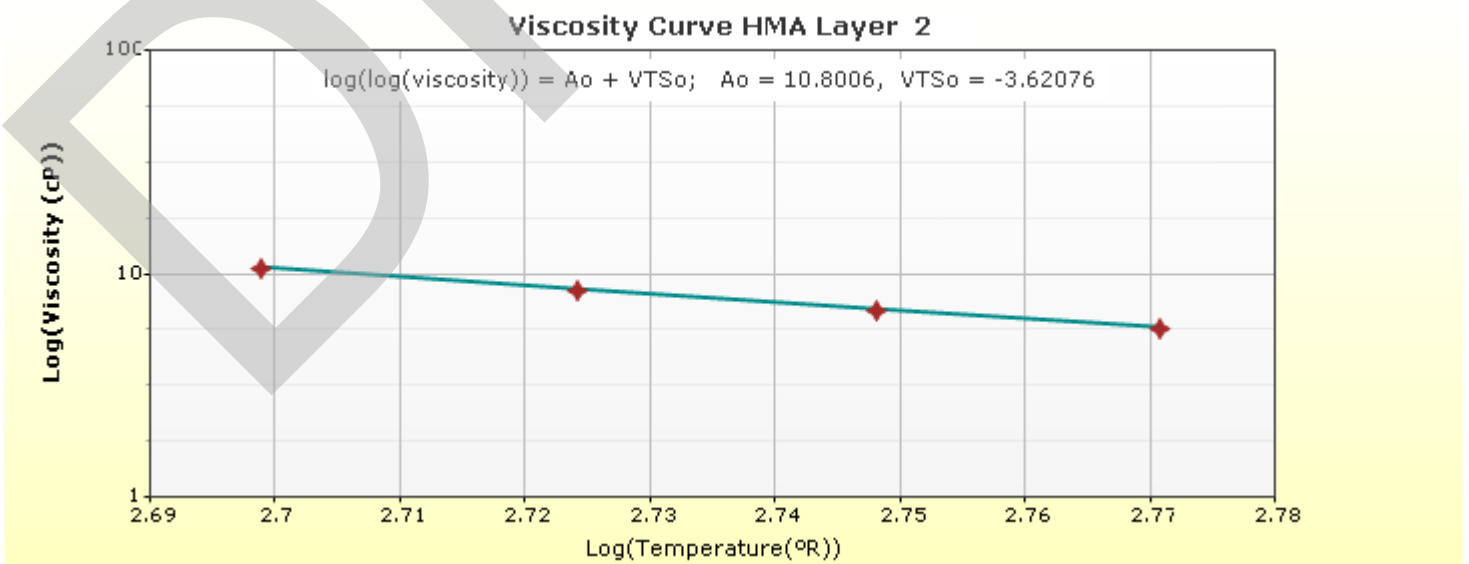
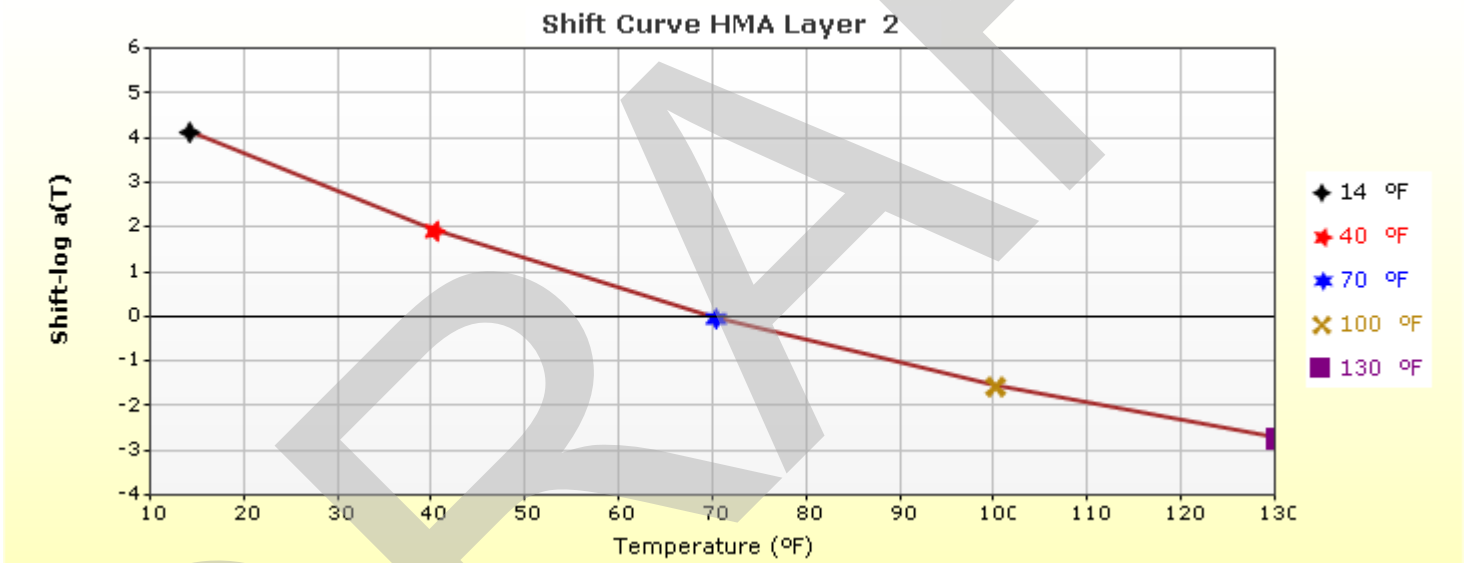
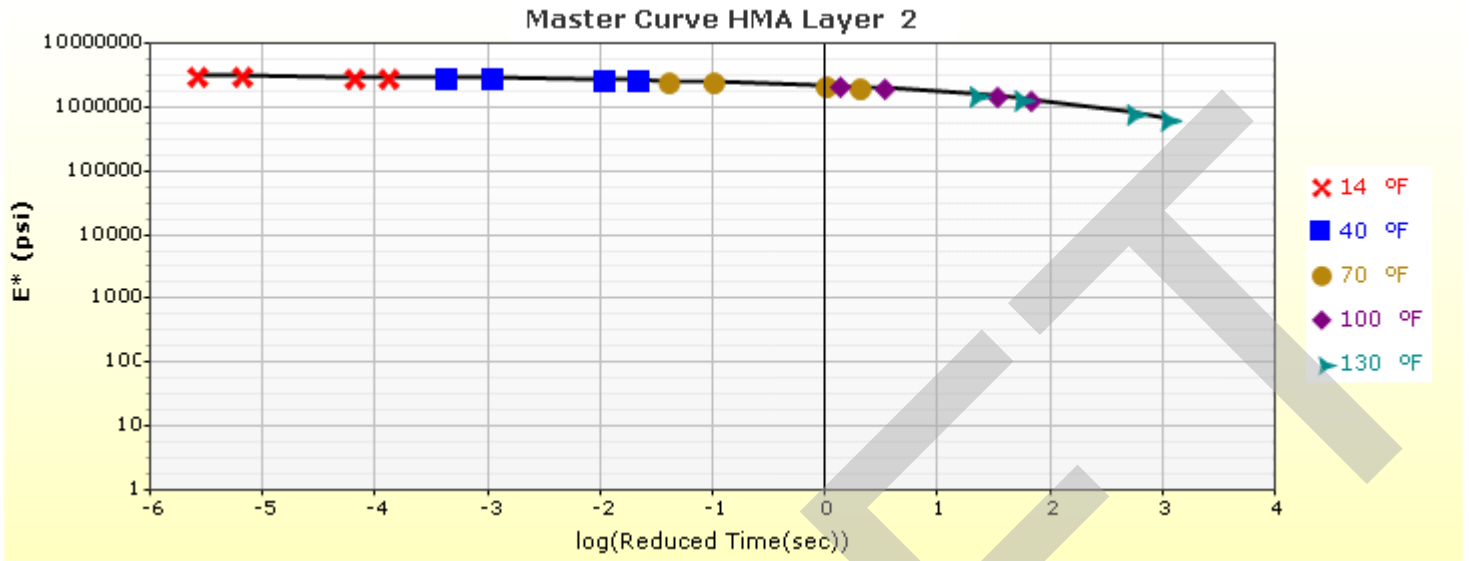
Loading time (sec)	Creep Compliance (1/psi)		
	-4 °F	14 °F	32 °F
1	3.61e-007	4.73e-007	7.12e-007
2	4.04e-007	5.74e-007	9.97e-007
5	4.51e-007	7.35e-007	1.52e-006
10	5.11e-007	8.78e-007	1.99e-006
20	5.67e-007	1.04e-006	2.59e-006
50	6.57e-007	1.37e-006	3.75e-006
100	7.68e-007	1.66e-006	4.66e-006



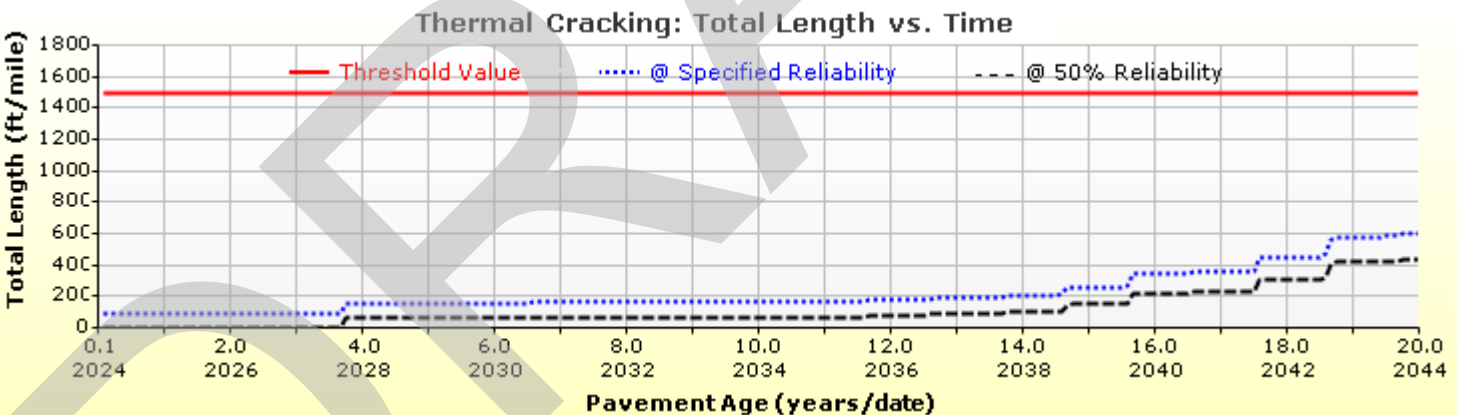
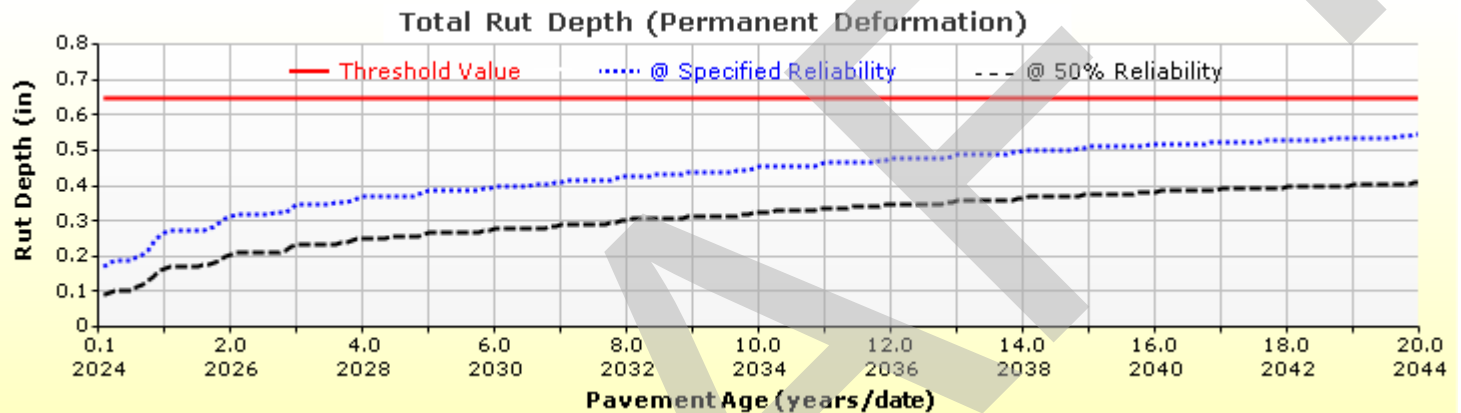
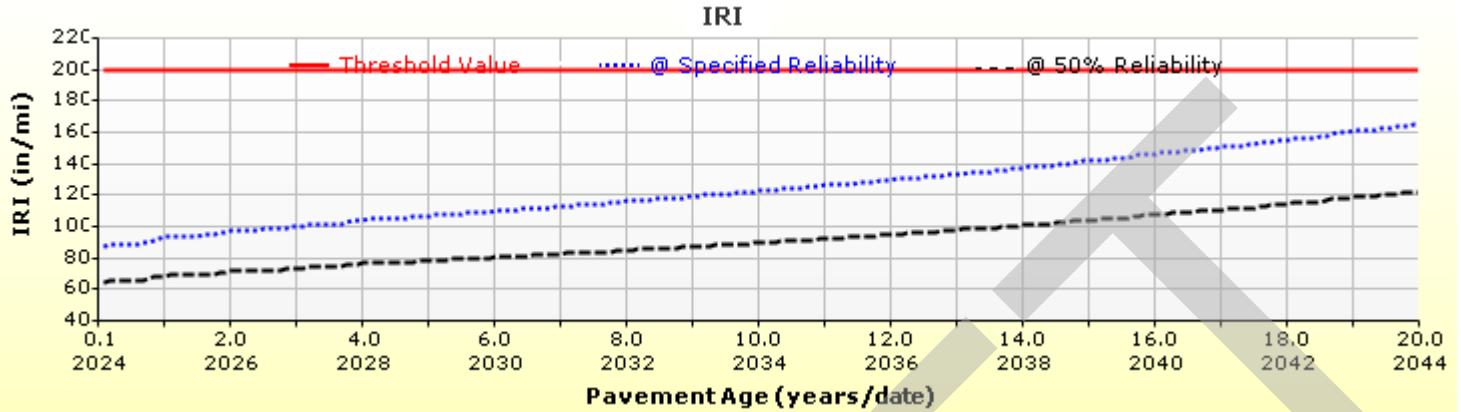
HMA Layer 1: Layer 1 Flexible : R3 Level 1 SX(100) PG 64-28

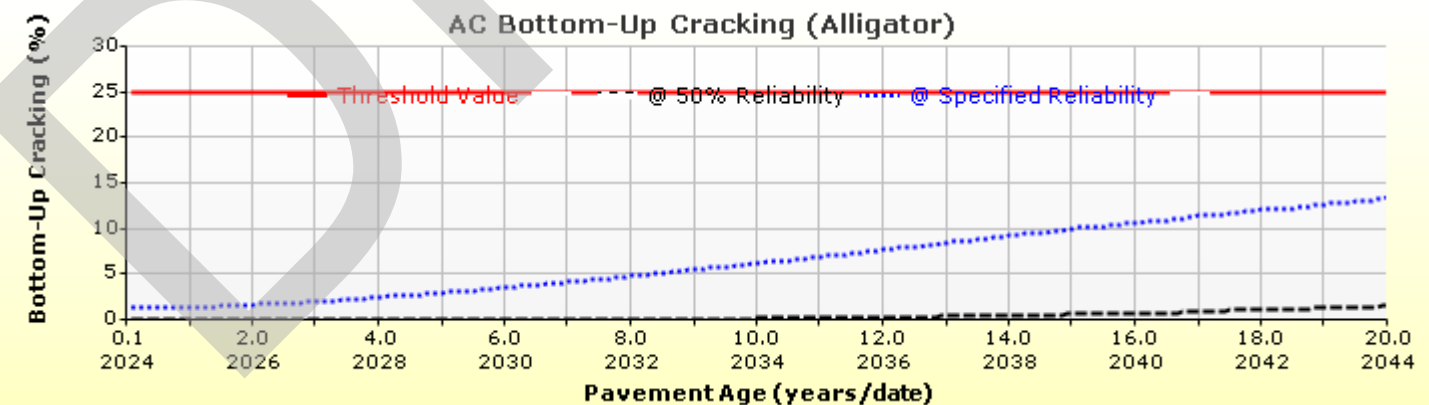
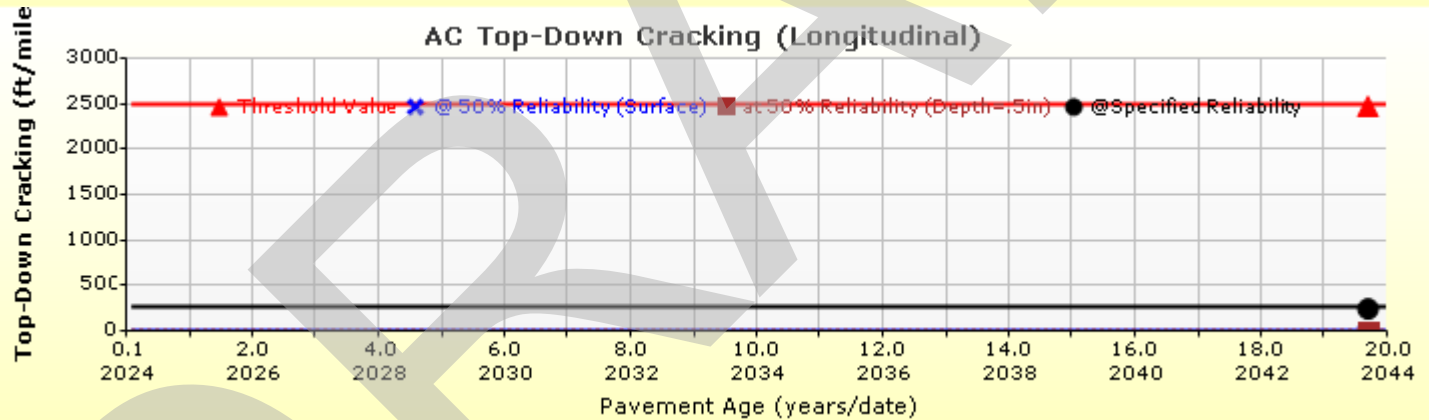
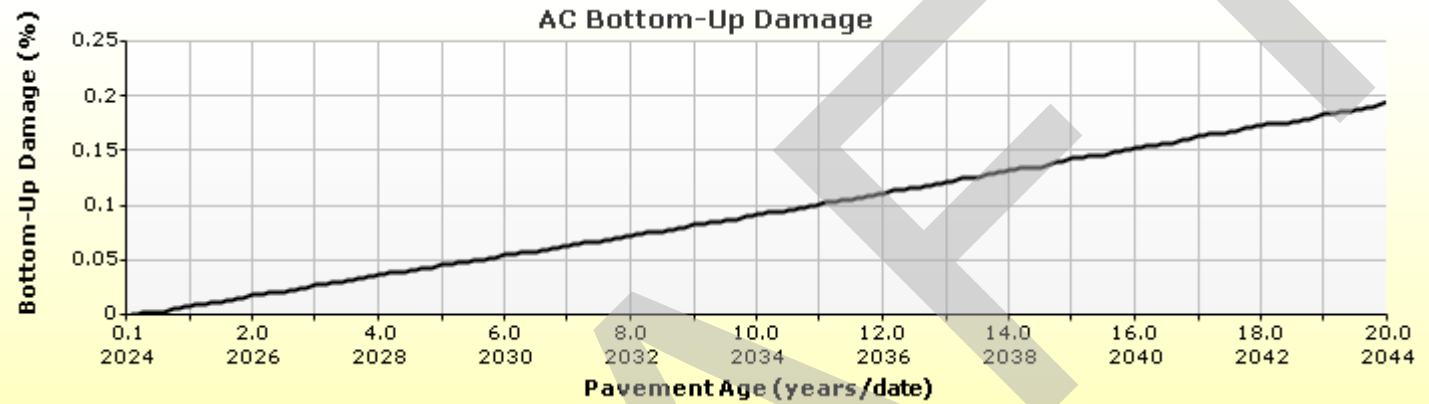
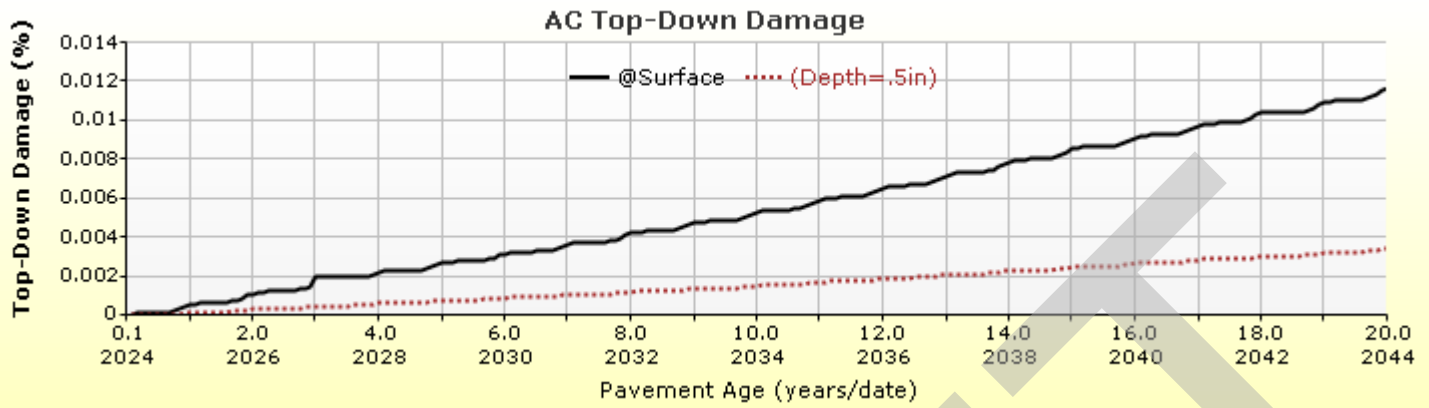


HMA Layer 2: Layer 2 Flexible : R2 Level 1 SX(75) PG 64-22

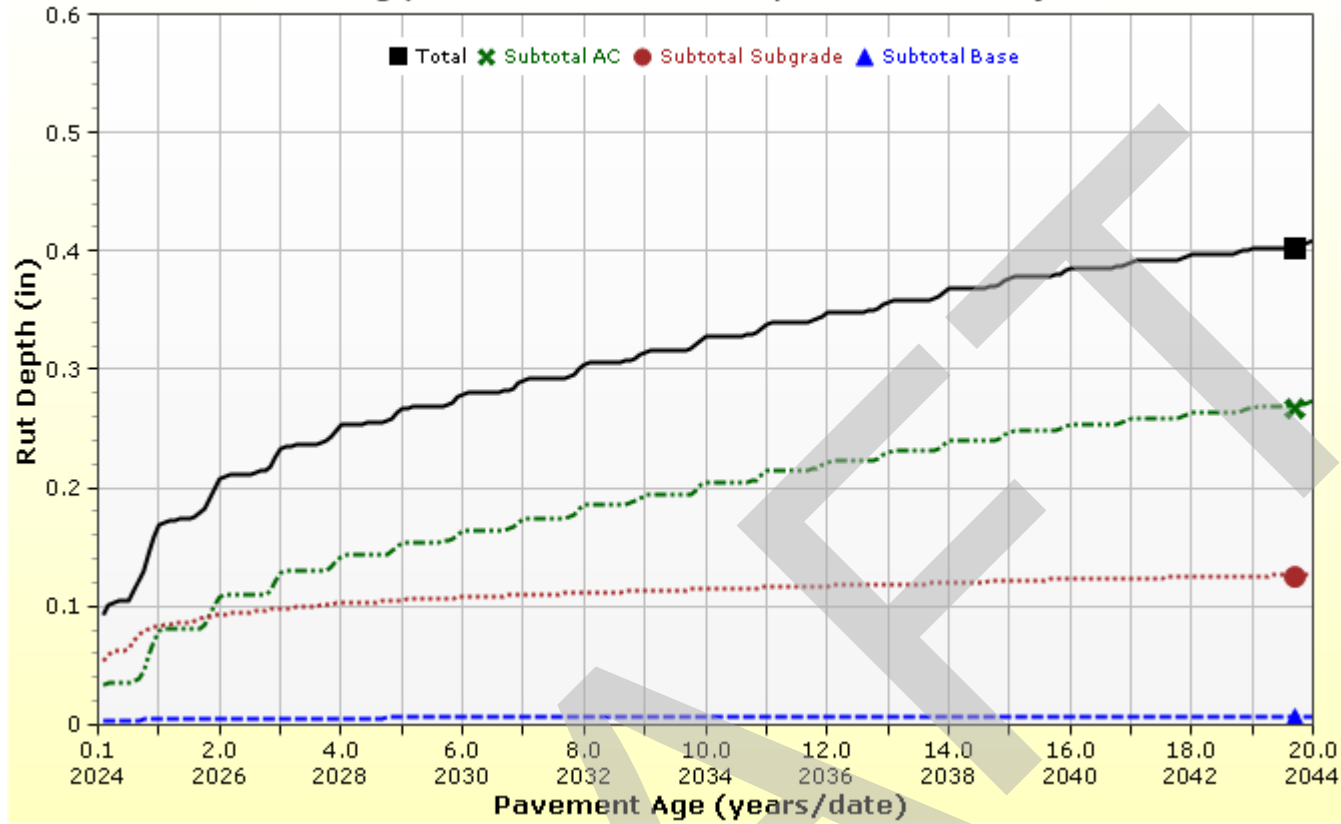


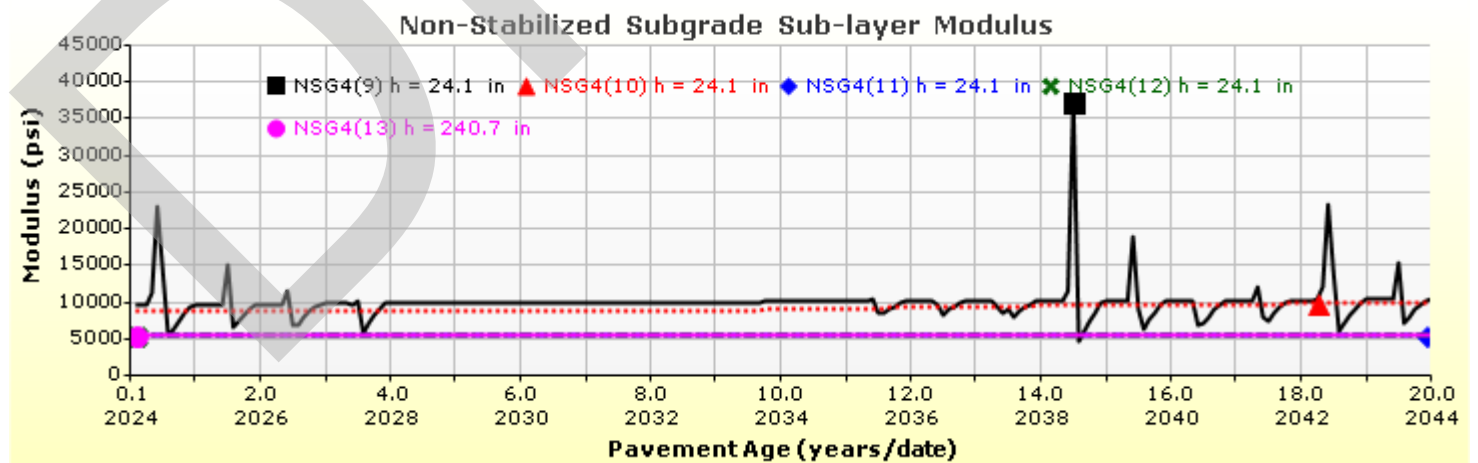
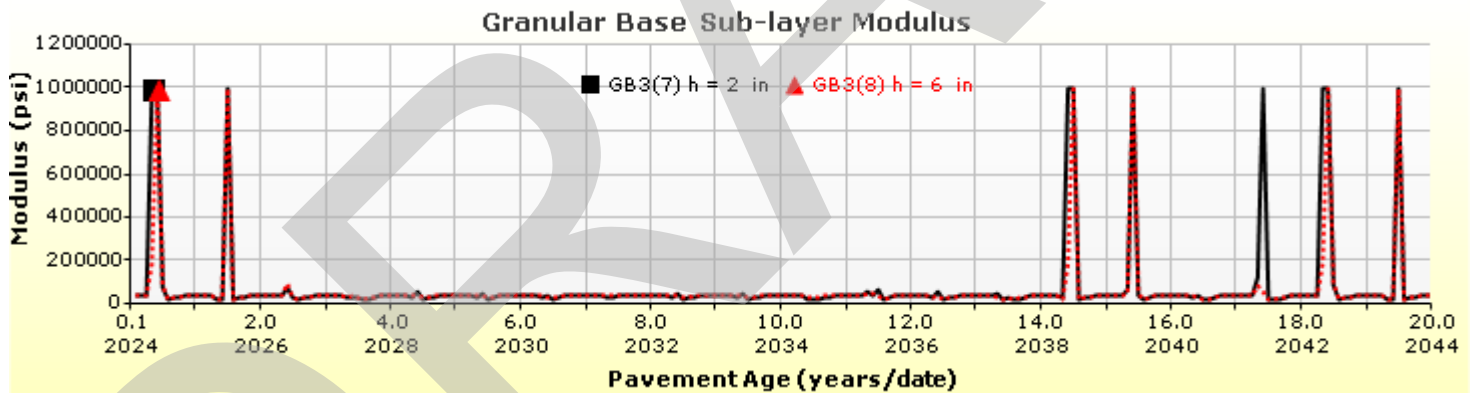
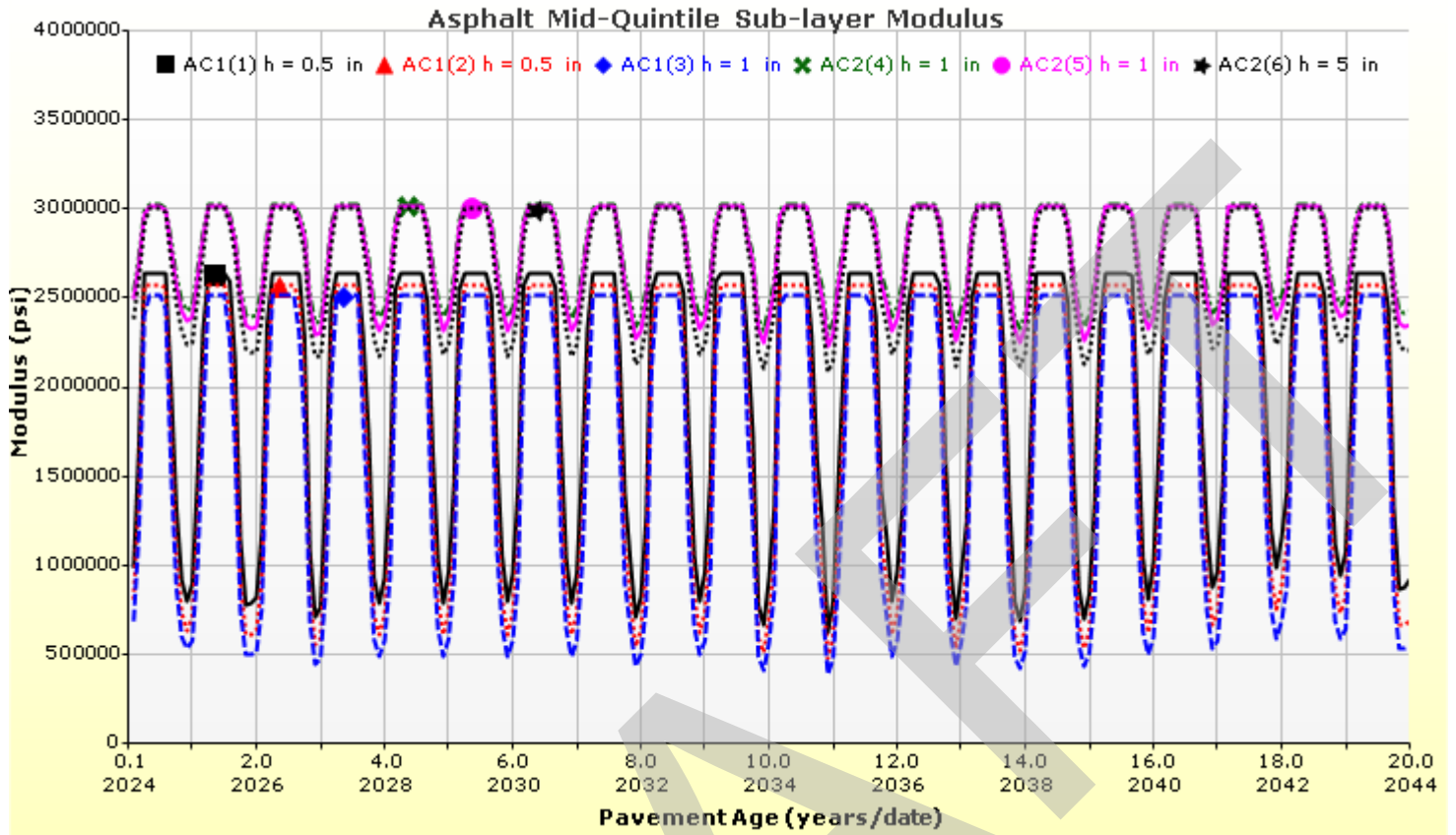
Analysis Output Charts





Rutting (Permanent Deformation) at 50% Reliability







37th St-flexible

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Layer Information

Layer 1 Flexible : R3 Level 1 SX(100) PG 64-28

Asphalt		
Thickness (in)	2.0	
Unit weight (pcf)	145.0	
Poisson's ratio	Is Calculated?	False
	Ratio	0.35
	Parameter A	-
	Parameter B	-

Asphalt Dynamic Modulus (Input Level: 1)

T (°F)	0.5 Hz	1 Hz	10 Hz	25 Hz
14	1687360	2134249	2493389	2608869
40	697463	1127680	1612900	1802220
70	173403	334774	616373	765125
100	54259	93163	175106	227742
130	27890	38645	60413	74657

Asphalt Binder

Temperature (°F)	Binder Gstar (Pa)	Phase angle (deg)
147.2	3051	81.6
158	1495	83.1
168.8	772	85

General Info

Name	Value
Reference temperature (°F)	70
Effective binder content (%)	10.7
Air voids (%)	5.7
Thermal conductivity (BTU/hr-ft-°F)	0.67
Heat capacity (BTU/lb-°F)	0.23

Identifiers

Field	Value
Display name/identifier	R3 Level 1 SX(100) PG 64-28
Description of object	Mix ID # FS1959
Author	CDOT
Date Created	4/3/2013 12:00:00 AM
Approver	CDOT
Date approved	4/3/2013 12:00:00 AM
State	Colorado
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	SX
User defined field 2	
User defined field 3	
Revision Number	0



37th St-flexible

File Name: C:\Users\RSGeoTech\Desktop\PMED Projects\530.02\37th St-flexible.dgpx



Layer 2 Flexible : R2 Level 1 SX(75) PG 64-22

Asphalt

Thickness (in)	7.0	
Unit weight (pcf)	140.5	
Poisson's ratio	Is Calculated?	False
	Ratio	0.35
	Parameter A	-
	Parameter B	-

Asphalt Dynamic Modulus (Input Level: 1)

T (°F)	0.5 Hz	1 Hz	10 Hz	25 Hz
14	2910500	2947100	3034800	3058600
40	2620500	2695700	2882400	2934800
70	2057300	2190500	2549800	2658300
100	1334300	1500400	2017600	2195500
130	697600	836500	1365200	1584000

Asphalt Binder

Temperature (°F)	Binder Gstar (Pa)	Phase angle (deg)
168.8	451	85
147.2	1857	81.6
158	889	83.1

General Info

Name	Value
Reference temperature (°F)	70
Effective binder content (%)	11.8
Air voids (%)	6.9
Thermal conductivity (BTU/hr-ft-°F)	0.67
Heat capacity (BTU/lb-°F)	0.23

Identifiers

Field	Value
Display name/identifier	R2 Level 1 SX(75) PG 64-22
Description of object	Mix ID # 19127A
Author	CDOT
Date Created	4/3/2013 12:00:00 AM
Approver	CDOT
Date approved	4/3/2013 12:00:00 AM
State	Colorado
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	SX
User defined field 2	
User defined field 3	
Revision Number	0

Layer 3 Non-stabilized Base : Crushed stone

Unbound

Layer thickness (in)	8.0
Poisson's ratio	0.35
Coefficient of lateral earth pressure (k0)	0.5

Modulus (Input Level: 3)

Analysis Type:	Modify input values by temperature/moisture
Method:	Resilient Modulus (psi)

Resilient Modulus (psi)

25000.0

Use Correction factor for NDT modulus?	-
NDT Correction Factor:	-

Identifiers

Field	Value
Display name/identifier	Crushed stone
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	20

Sieve

Liquid Limit	6.0
Plasticity Index	1.0
Is layer compacted?	True

	Is User Defined?	Value
Maximum dry unit weight (pcf)	False	127.7
Saturated hydraulic conductivity (ft/hr)	False	5.054e-02
Specific gravity of solids	False	2.7
Water Content (%)	False	7.4

User-defined Soil Water Characteristic Curve (SWCC)

Is User Defined?	False
af	7.2555
bf	1.3328
cf	0.8242
hr	117.4000

Sieve Size	% Passing
0.001mm	
0.002mm	
0.020mm	
#200	8.7
#100	
#80	12.9
#60	
#50	
#40	20.0
#30	
#20	
#16	
#10	33.8
#8	
#4	44.7
3/8-in.	57.2
1/2-in.	63.1
3/4-in.	72.7
1-in.	78.8
1 1/2-in.	85.8
2-in.	91.6
2 1/2-in.	
3-in.	
3 1/2-in.	97.6

Layer 4 Subgrade : A-2-4

Unbound

Layer thickness (in)	Semi-infinite
Poisson's ratio	0.35
Coefficient of lateral earth pressure (k0)	0.5

Modulus (Input Level: 3)

Analysis Type:	Modify input values by temperature/moisture
Method:	Resilient Modulus (psi)

Resilient Modulus (psi)

9493.0

Use Correction factor for NDT modulus?	-
NDT Correction Factor:	-

Identifiers

Field	Value
Display name/identifier	A-2-4
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	0

Sieve

Liquid Limit	14.0
Plasticity Index	2.0
Is layer compacted?	True

	Is User Defined?	Value
Maximum dry unit weight (pcf)	False	124.6
Saturated hydraulic conductivity (ft/hr)	False	5.852e-04
Specific gravity of solids	False	2.7
Water Content (%)	False	9

User-defined Soil Water Characteristic Curve (SWCC)

Is User Defined?	False
af	9.5043
bf	0.6439
cf	3.0636
hr	189.6000

Sieve Size	% Passing
0.001mm	
0.002mm	
0.020mm	
#200	22.4
#100	
#80	42.3
#60	
#50	
#40	67.2
#30	
#20	
#16	
#10	82.5
#8	
#4	87.2
3/8-in.	91.6
1/2-in.	93.5
3/4-in.	95.9
1-in.	97.2
1 1/2-in.	98.5
2-in.	99.0
2 1/2-in.	
3-in.	
3 1/2-in.	99.6

Calibration Coefficients

AC Fatigue

$N_f = 0.00432 * C * \beta_{f1} k_1 \left(\frac{1}{\varepsilon_1}\right)^{k_2 \beta_{f2}} \left(\frac{1}{E}\right)^{k_3 \beta_{f3}}$	k1: 0.007566
$C = 10^M$	k2: 3.9492
$M = 4.84 \left(\frac{V_b}{V_a + V_b} - 0.69\right)$	k3: 1.281
	Bf1: 130.3674
	Bf2: 1
	Bf3: 1.217799

AC Rutting

$\frac{\varepsilon_p}{\varepsilon_r} = k_z \beta_{r1} 10^{k_1 T^{k_2 \beta_{r2}} N^{k_3 \beta_{r3}}}$ $k_z = (C_1 + C_2 * depth) * 0.328196^{depth}$ $C_1 = -0.1039 * H_a^2 + 2.4868 * H_a - 17.342$ $C_2 = 0.0172 * H_a^2 - 1.7331 * H_a + 27.428$ Where: $H_{ac} = \text{total AC thickness(in)}$	$\varepsilon_p = \text{plastic strain(in/in)}$ $\varepsilon_r = \text{resilient strain(in/in)}$ $T = \text{layer temperature(}^\circ\text{F)}$ $N = \text{number of load repetitions}$
AC Rutting Standard Deviation	0.1414 * Pow(RUT,0.25) + 0.001
AC Layer	K1:-3.35412 K2:1.5606 K3:0.3791 Br1:4.3 Br2:1 Br3:1

Thermal Fracture

$C_f = 400 * N \left(\frac{\log C / h_{ac}}{\sigma} \right)$ $\Delta C = (k * \beta_t)^{n+1} * A * \Delta K^n$ $A = 10^{(4.389 - 2.52 * \log(E * \sigma_m * n))}$	$C_f = \text{observed amount of thermal cracking(ft/500ft)}$ $k = \text{refression coefficient determined through field calibration}$ $N() = \text{standard normal distribution evaluated at()}$ $\sigma = \text{standard deviation of the log of the depth of cracks in the pavments}$ $C = \text{crack depth(in)}$ $h_{ac} = \text{thickness of asphalt layer(in)}$ $\Delta C = \text{Change in the crack depth due to a cooling cycle}$ $\Delta K = \text{Change in the stress intensity factor due to a cooling cycle}$ $A, n = \text{Fracture parameters for the asphalt mixture}$ $E = \text{mixture stiffness}$ $\sigma_m = \text{Undamaged mixture tensile strength}$ $\beta_t = \text{Calibration parameter}$
Level 1 K: 6.3	Level 1 Standard Deviation: 0.1468 * THERMAL + 65.027
Level 2 K: 0.5	Level 2 Standard Deviation: 0.2841 * THERMAL + 55.462
Level 3 K: 6.3	Level 3 Standard Deviation: 0.3972 * THERMAL + 20.422

CSM Fatigue

$N_f = 10^{\left(\frac{k_1 \beta_{c1} \left(\frac{\sigma_s}{M_r} \right)}{k_2 \beta_{c2}} \right)}$	$N_f = \text{number of repetitions to fatigue cracking}$ $\sigma_s = \text{Tensile stress(psi)}$ $M_r = \text{modulus of rupture(psi)}$
k1: 1	k2: 1
Bc1: 0.75	Bc2: 1.1

Subgrade Rutting

$$\delta_a(N) = \beta_{s_1} k_1 \varepsilon_v h \left(\frac{\varepsilon_0}{\varepsilon_r} \right) \left| e^{-\left(\frac{\rho}{N} \right)^\beta} \right|$$

δ_a = permanent deformation for the layer
 N = number of repetitions
 ε_v = average vertical strain(in/in)
 $\varepsilon_0, \beta, \rho$ = material properties
 ε_r = resilient strain(in/in)

Granular

k1: 2.03

Bs1: 0.22

Standard Deviation (BASERUT)

0.0104 * Pow(BASERUT,0.67) + 0.001

Fine

k1: 1.35

Bs1: 0.37

Standard Deviation (BASERUT)

0.0663 * Pow(SUBRUT,0.5) + 0.001

AC Cracking

AC Top Down Cracking

$$FC_{top} = \left(\frac{C_4}{1 + e^{(C_1 - C_2 \log_{10}(Damage))}} \right) * 10.56$$

AC Bottom Up Cracking

$$FC = \left(\frac{6000}{1 + e^{(C_1 * C'_1 + C_2 * C'_2 \log_{10}(D * 100))}} \right) * \left(\frac{1}{60} \right)$$

$$C'_2 = -2.40874 - 39.748 * (1 + h_{ac})^{-2.856}$$

$$C'_1 = -2 * C'_2$$

c1: 7

c2: 3.5

c3: 0

c4: 1000

c1: 0.021

c2: 2.35

c3: 6000

AC Cracking Top Standard Deviation

200 + 2300/(1+exp(1.072-2.1654*LOG10
(TOP+0.0001)))

AC Cracking Bottom Standard Deviation

1 + 15/(1+exp(-3.1472-4.1349*LOG10
(BOTTOM+0.0001)))

CSM Cracking

$$FC_{ctb} = C_1 + \frac{C_2}{1 + e^{C_3 - C_4(Damage)}}$$

C1: 0

C2: 75

C3: 5

C4: 3

IRI Flexible Pavements

C1 - Rutting

C3 - Transverse Crack

C2 - Fatigue Crack

C4 - Site Factors

C1: 50

C2: 0.55

C3: 0.0111

C4: 0.02

CSM Standard Deviation

CTB*1

APPENDIX F

M-E PAVEMENT DESIGN OUTPUT

37th STREET - RIGID DESIGN

Design Inputs

Design Life: 30 years
Design Type: JPCP

Existing construction: -
Pavement construction: May, 2023
Traffic opening: August, 2023

Climate Data 40.436, -104.618
Sources (Lat/Lon)

Design Structure

Layer type	Material Type	Thickness (in)
PCC	R4 Level 1 Lawson	9.0
NonStabilized	Crushed stone	6.0
Subgrade	A-2-4	Semi-infinite

Joint Design:

Joint spacing (ft)	15.0
Dowel diameter (in)	1.25
Slab width (ft)	12.0

Traffic

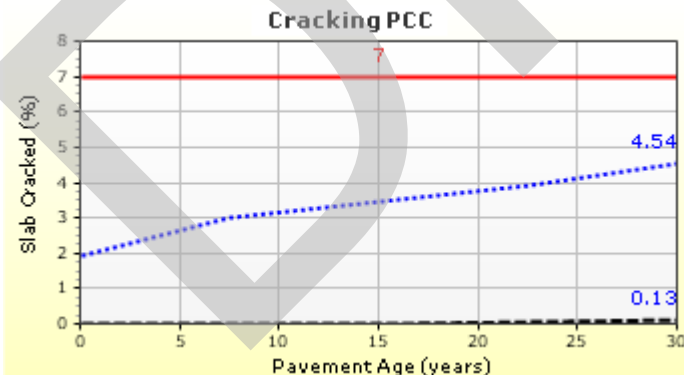
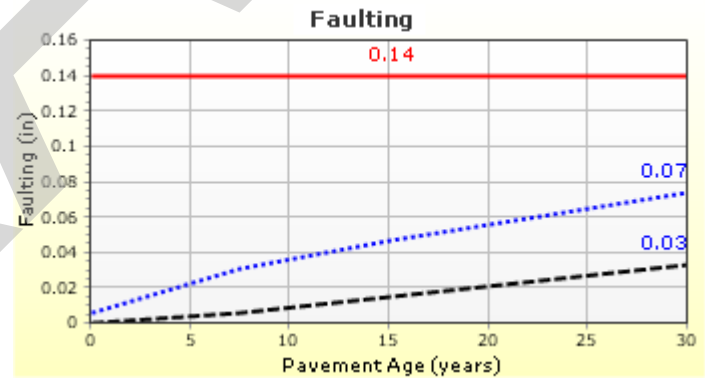
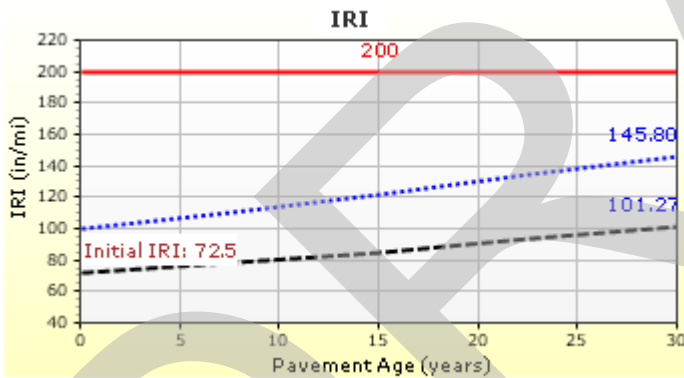
Age (year)	Heavy Trucks (cumulative)
2023 (initial)	2,800
2038 (15 years)	10,148,900
2053 (30 years)	22,614,200

Design Outputs

Distress Prediction Summary

Distress Type	Distress @ Specified Reliability		Reliability (%)		Criterion Satisfied?
	Target	Predicted	Target	Achieved	
Terminal IRI (in/mile)	200.00	145.80	90.00	99.78	Pass
Mean joint faulting (in)	0.14	0.07	90.00	99.97	Pass
JPCP transverse cracking (percent slabs)	7.00	4.54	90.00	97.72	Pass

Distress Charts



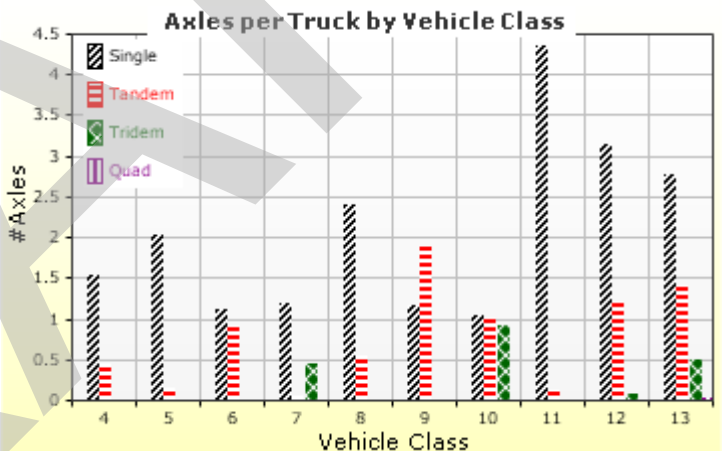
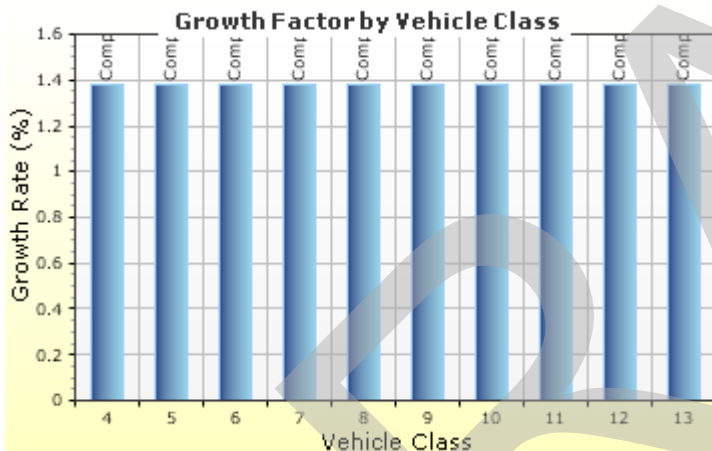
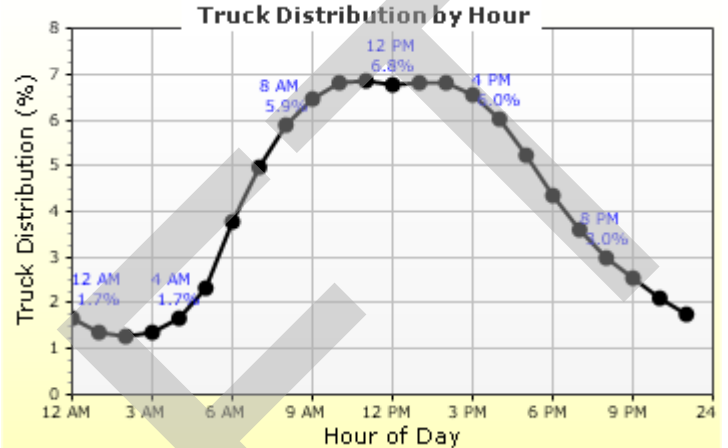
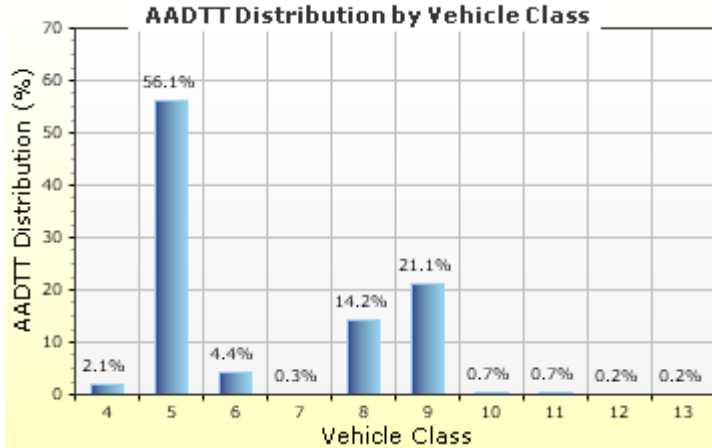
— Threshold Value @ Specified Reliability --- @ 50% Reliability

Traffic Inputs

Graphical Representation of Traffic Inputs

Initial two-way AADTT: **2,800**
 Number of lanes in design direction: **2**

Percent of trucks in design direction (%): **60.0**
 Percent of trucks in design lane (%): **100.0**
 Operational speed (mph): **35.0**



Traffic Volume Monthly Adjustment Factors



Tabular Representation of Traffic Inputs

Volume Monthly Adjustment Factors

Level 3: Default MAF

Month	Vehicle Class									
	4	5	6	7	8	9	10	11	12	13
January	0.9	0.8	0.8	0.7	0.8	0.9	0.9	0.9	0.9	0.9
February	0.9	0.8	0.8	0.8	0.9	0.9	0.9	0.9	1.0	0.8
March	1.0	0.9	0.8	1.1	1.0	1.0	1.0	1.0	0.9	0.9
April	1.0	1.0	0.9	1.0	1.0	1.0	1.1	1.0	1.0	1.1
May	1.1	1.1	1.0	1.3	1.1	1.0	1.1	1.1	1.1	1.0
June	1.1	1.1	1.2	1.1	1.1	1.0	1.1	1.0	1.1	1.0
July	1.1	1.2	1.5	1.3	1.2	1.0	1.1	1.1	1.1	1.3
August	1.1	1.2	1.3	1.0	1.1	1.0	1.1	1.1	1.1	1.0
September	1.1	1.1	1.1	1.0	1.1	1.0	1.1	1.1	1.0	1.1
October	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.1
November	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0
December	0.9	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.9	0.9

Distributions by Vehicle Class

Vehicle Class	AADTT Distribution (%) (Level 3)	Growth Factor	
		Rate (%)	Function
Class 4	2.1%	1.38%	Compound
Class 5	56.1%	1.38%	Compound
Class 6	4.4%	1.38%	Compound
Class 7	0.3%	1.38%	Compound
Class 8	14.2%	1.38%	Compound
Class 9	21.1%	1.38%	Compound
Class 10	0.7%	1.38%	Compound
Class 11	0.7%	1.38%	Compound
Class 12	0.2%	1.38%	Compound
Class 13	0.2%	1.38%	Compound

Truck Distribution by Hour

Hour	Distribution (%)	Hour	Distribution (%)
12 AM	1.65%	12 PM	6.75%
1 AM	1.37%	1 PM	6.81%
2 AM	1.28%	2 PM	6.83%
3 AM	1.36%	3 PM	6.56%
4 AM	1.66%	4 PM	6.02%
5 AM	2.32%	5 PM	5.23%
6 AM	3.8%	6 PM	4.35%
7 AM	4.95%	7 PM	3.59%
8 AM	5.9%	8 PM	2.98%
9 AM	6.48%	9 PM	2.56%
10 AM	6.83%	10 PM	2.12%
11 AM	6.85%	11 PM	1.75%
Total		100%	

Axle Configuration

Traffic Wander	
Mean wheel location (in)	18.0
Traffic wander standard deviation (in)	10.0
Design lane width (ft)	12.0

Axle Configuration	
Average axle width (ft)	8.5
Dual tire spacing (in)	12.0
Tire pressure (psi)	120.0

Average Axle Spacing	
Tandem axle spacing (in)	51.6
Tridem axle spacing (in)	49.2
Quad axle spacing (in)	49.2

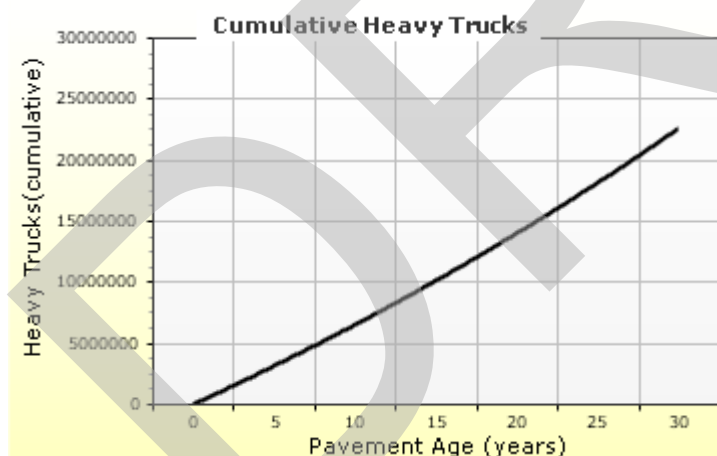
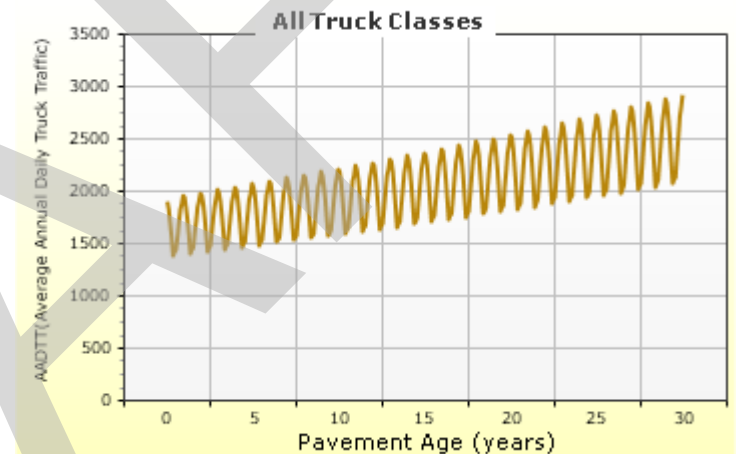
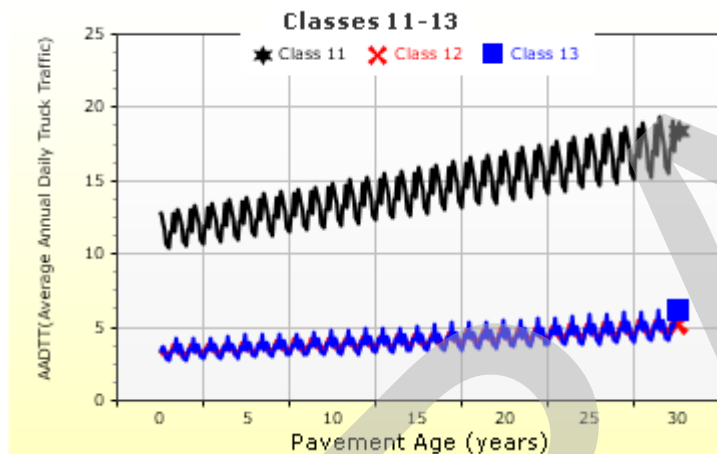
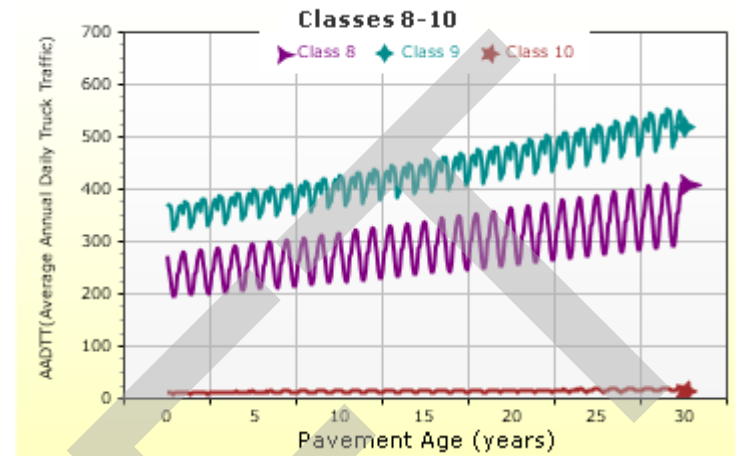
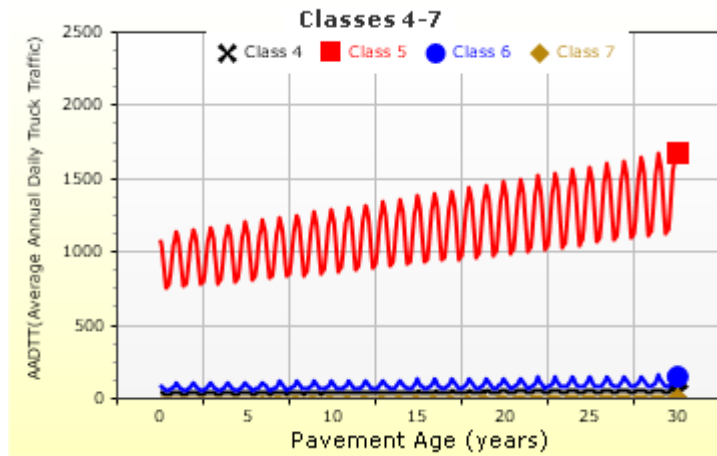
Wheelbase				
Value Type	Axle Type	Short	Medium	Long
Average spacing of axles (ft)		12.0	15.0	18.0
Percent of Trucks (%)		17.0	22.0	61.0

Number of Axles per Truck

Vehicle Class	Single Axle	Tandem Axle	Tridem Axle	Quad Axle
Class 4	1.53	0.45	0	0
Class 5	2.02	0.16	0.02	0
Class 6	1.12	0.93	0	0
Class 7	1.19	0.07	0.45	0.02
Class 8	2.41	0.56	0.02	0
Class 9	1.16	1.88	0.01	0
Class 10	1.05	1.01	0.93	0.02
Class 11	4.35	0.13	0	0
Class 12	3.15	1.22	0.09	0
Class 13	2.77	1.4	0.51	0.04

AADTT (Average Annual Daily Truck Traffic) Growth

* Traffic cap is not enforced



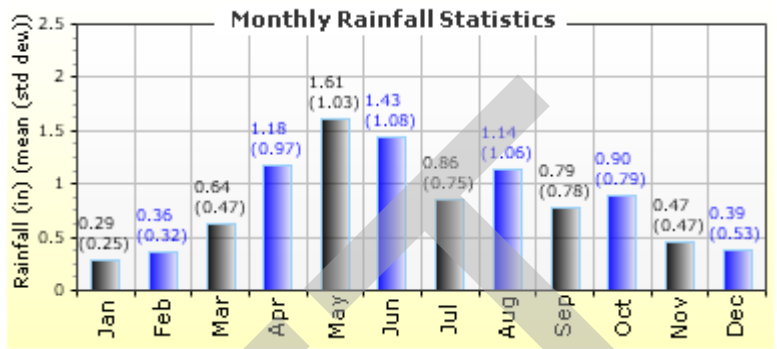
Climate Inputs

Climate Data Sources:

Climate Station Cities: Location (lat lon elevation(ft))
GREELEY, CO 40.43600 -104.61800 4649

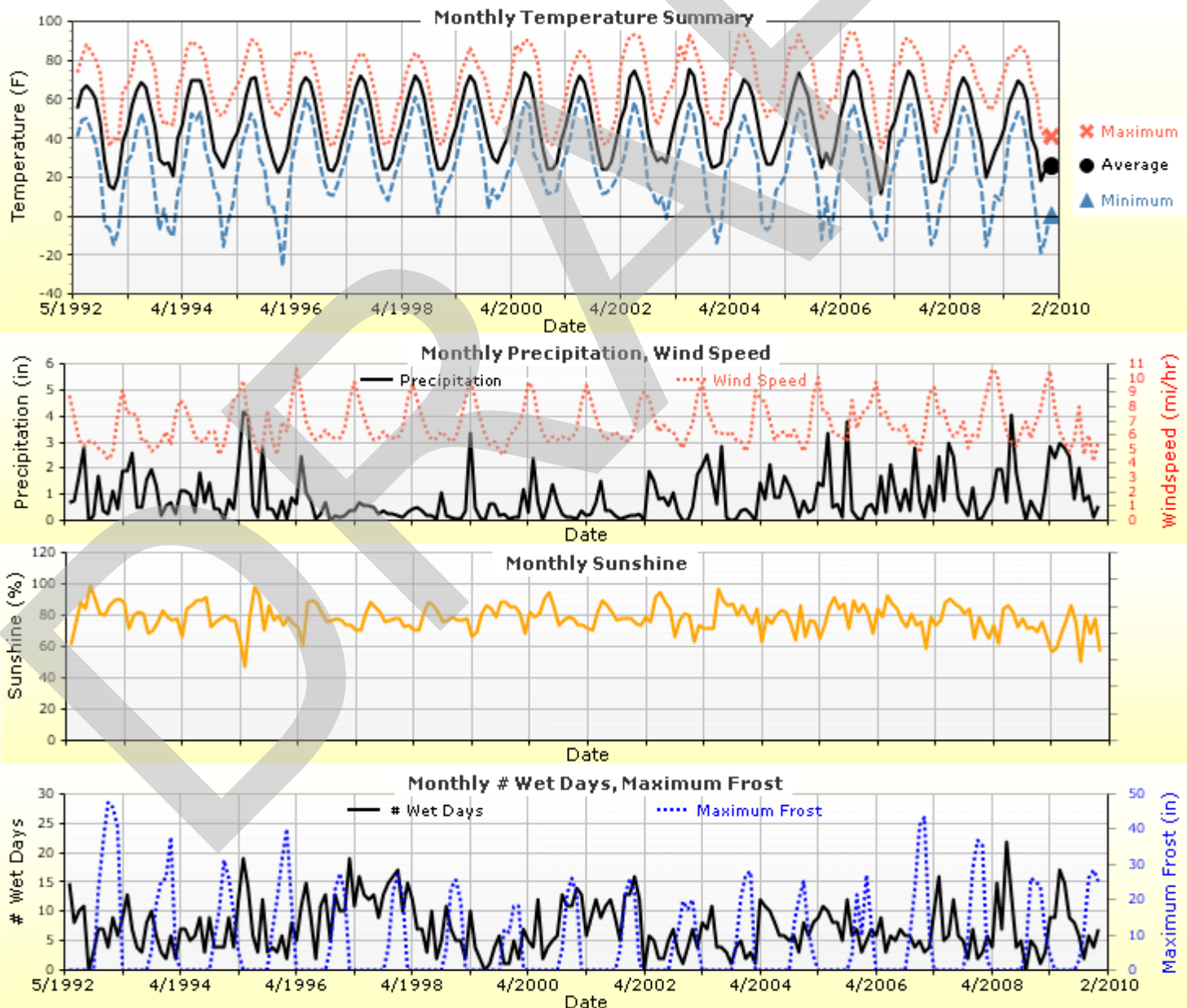
Annual Statistics:

Mean annual air temperature (°F) 47.87
 Mean annual precipitation (in) 10.12
 Freezing index (°F - days) 634.63
 Average annual number of freeze/thaw cycles: 94.81

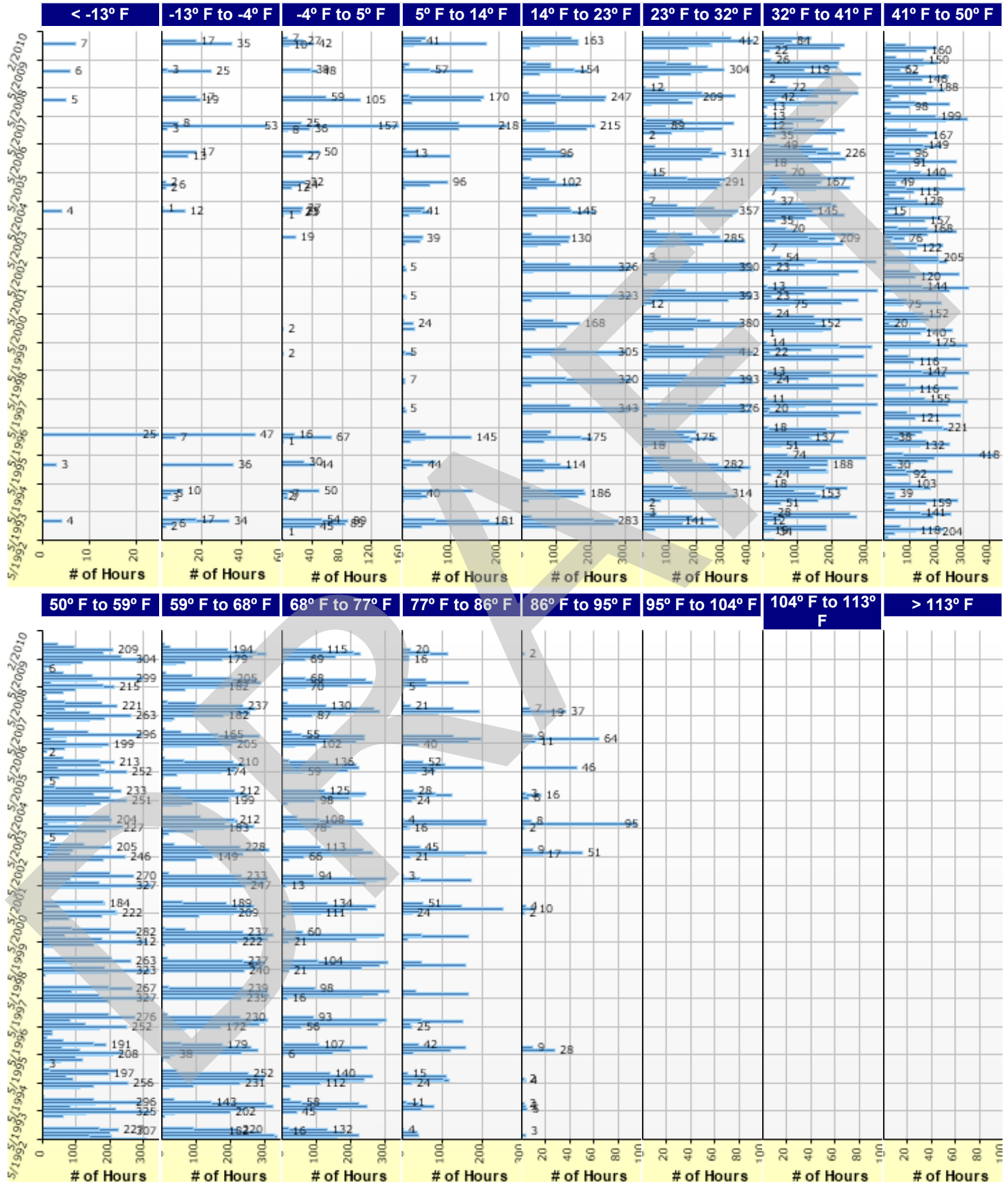


Water table depth (ft) 5.00

Monthly Climate Summary:



Hourly Air Temperature Distribution by Month:



Design Properties

JPCP Design Properties

Structure - ICM Properties	
PCC surface shortwave absorptivity	0.85

PCC joint spacing (ft)	
Is joint spacing random ?	False
Joint spacing (ft)	15.00

Doweled Joints	
Is joint doweled ?	True
Dowel diameter (in)	1.25
Dowel spacing (in)	12.00

Widened Slab	
Is slab widened ?	False
Slab width (ft)	12.00

Sealant type	Other(Including No Sealant... Liquid... Silicone)
--------------	---

Tied Shoulders	
Tied shoulders	True
Load transfer efficiency (%)	50.00

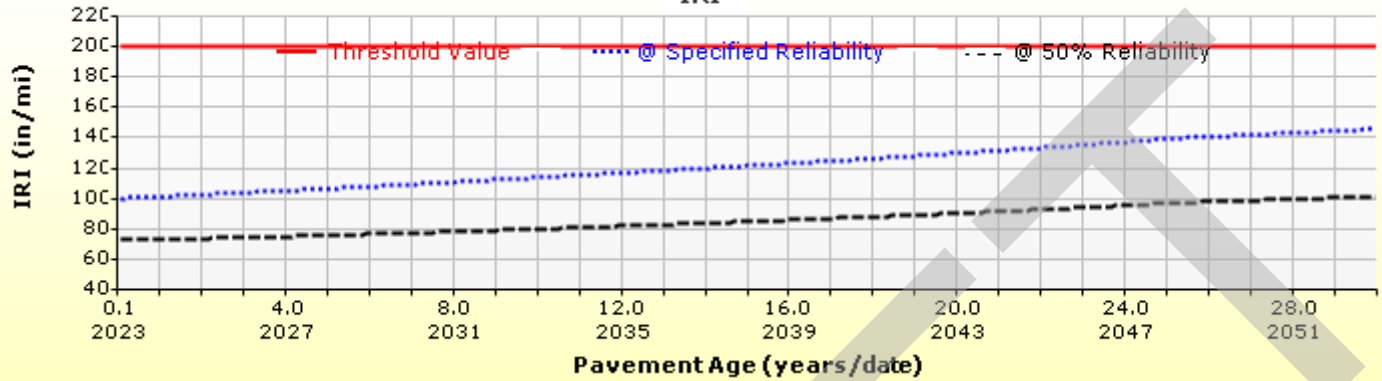
PCC-Base Contact Friction	
PCC-Base full friction contact	True
Months until friction loss	360.00

Erodibility index	4
-------------------	---

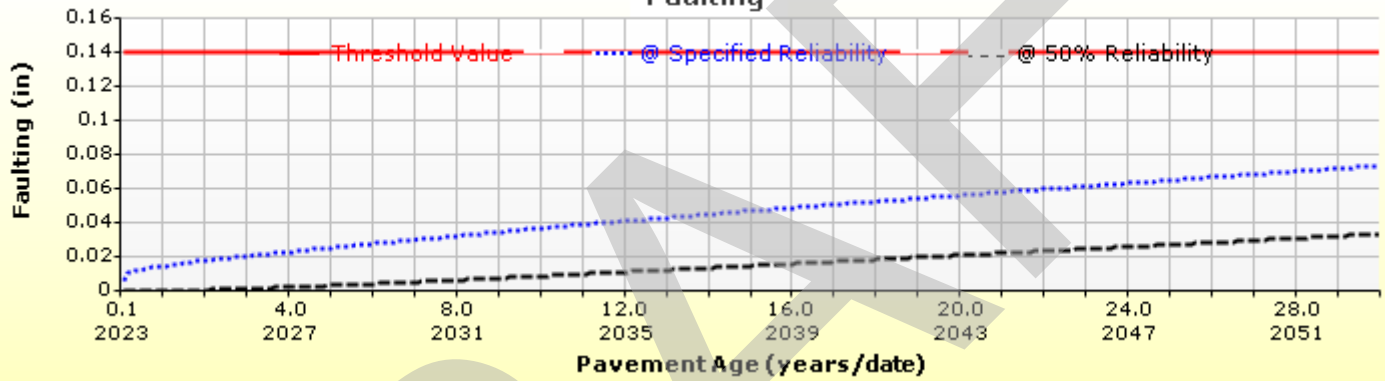
Permanent curl/warp effective temperature difference (°F)	-10.00
---	--------

Analysis Output Charts

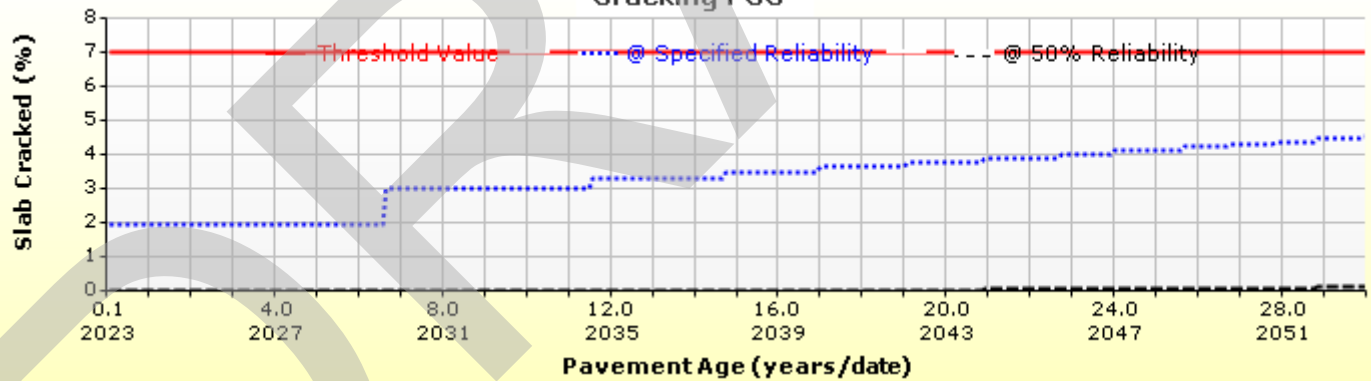
IRI



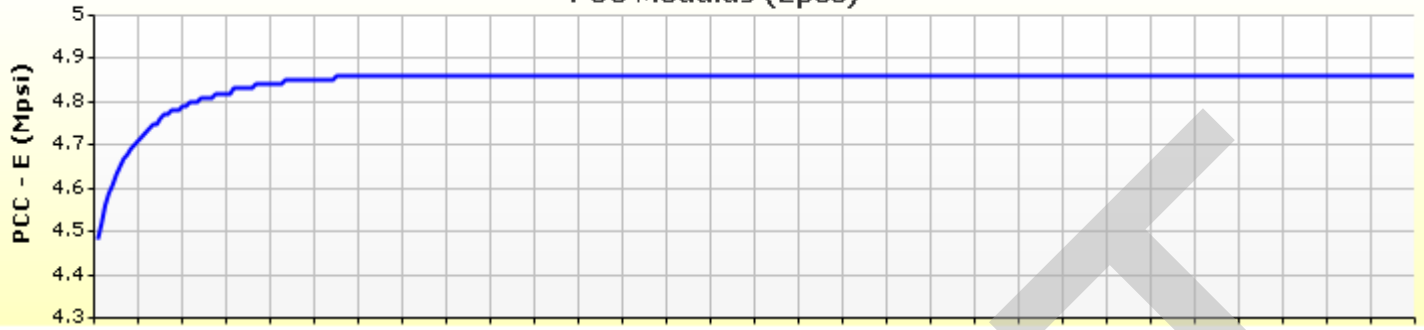
Faulting



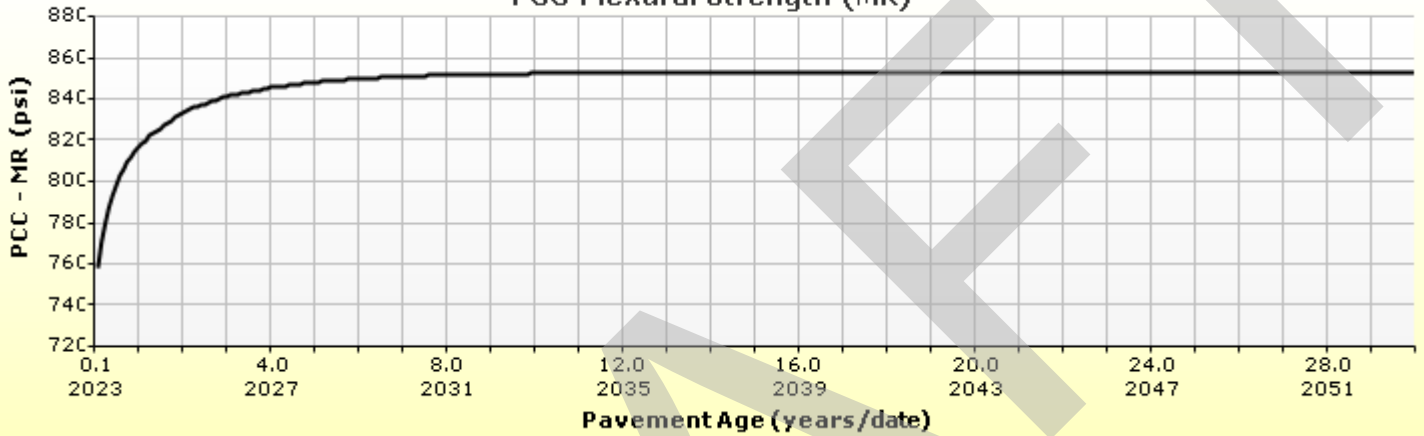
Cracking PCC



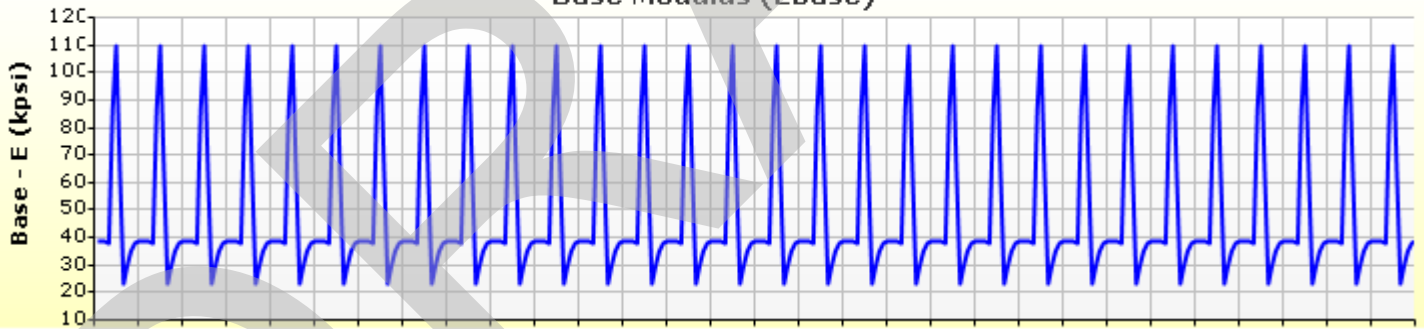
PCC Modulus (Epcc)



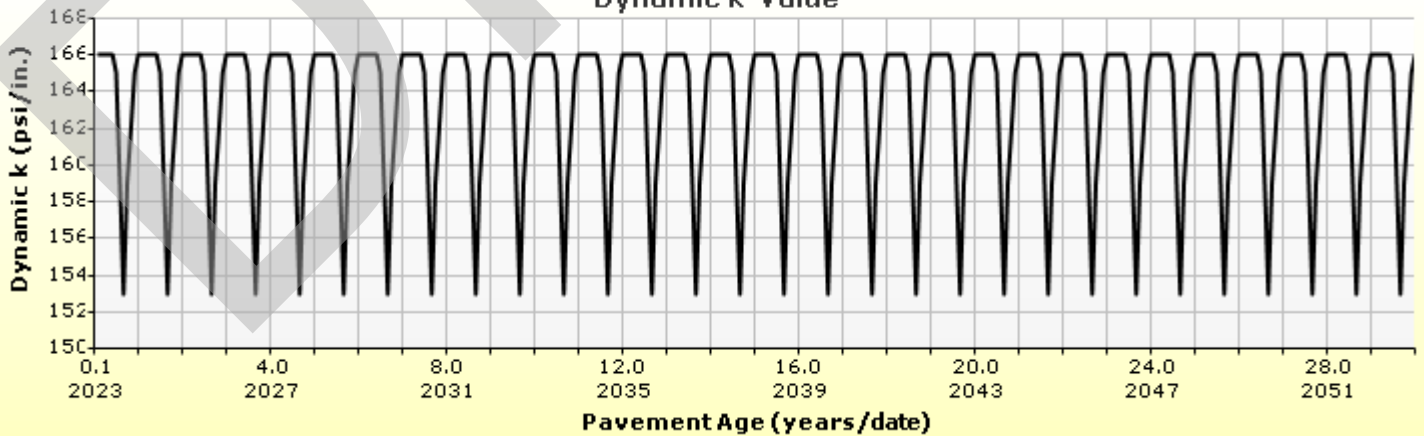
PCC Flexural Strength (MR)



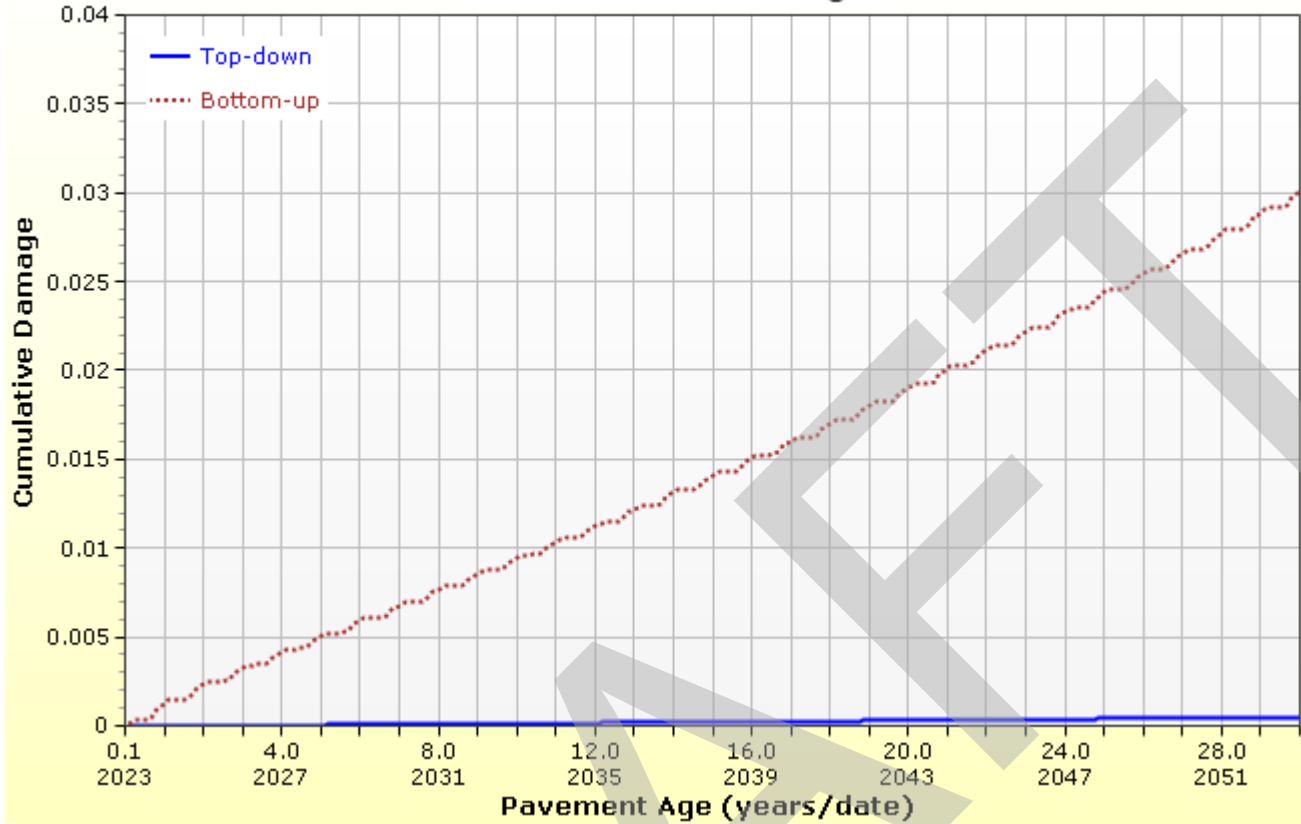
Base Modulus (Ebase)



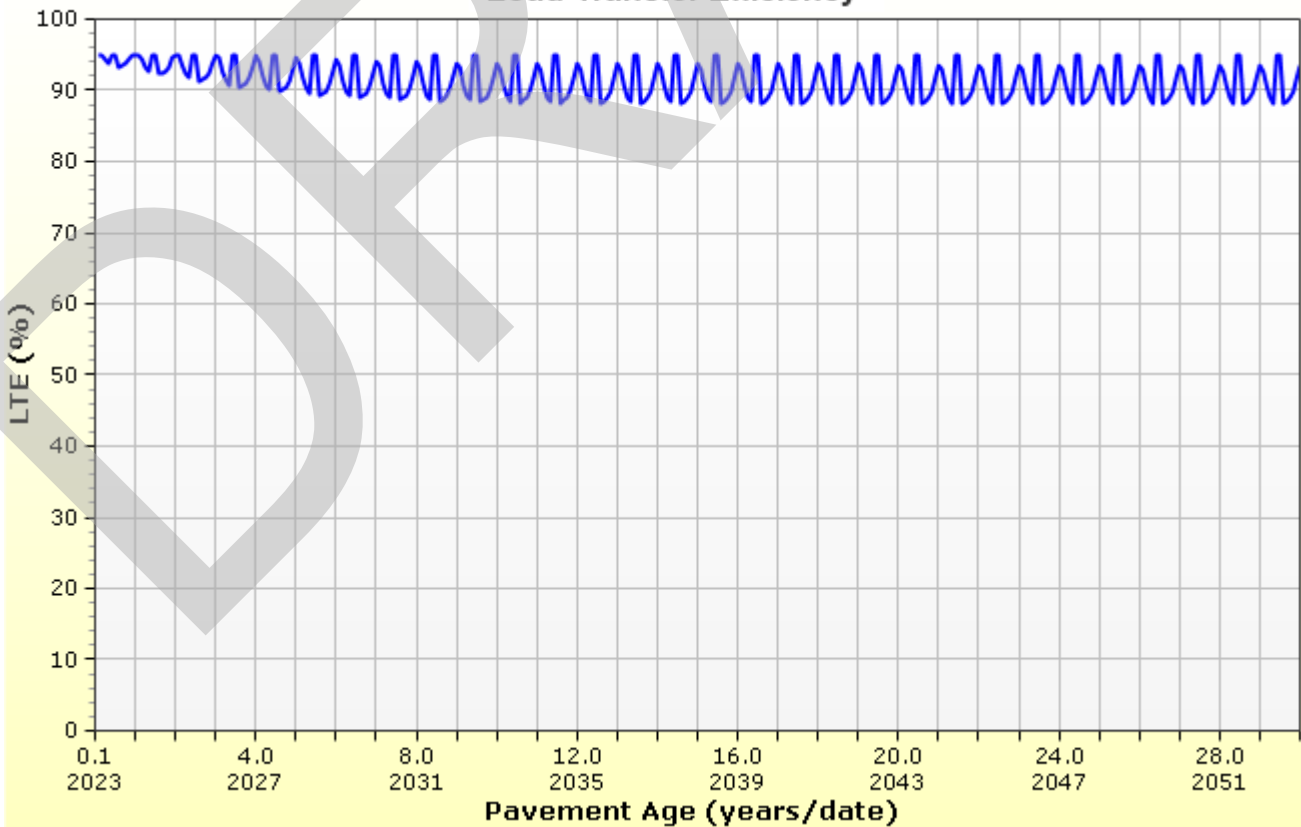
Dynamic k-Value



PCC Cumulative Damage



Load Transfer Efficiency



Layer Information

Layer 1 PCC : R4 Level 1 Lawson

PCC

Thickness (in)	9.0
Unit weight (pcf)	140.6
Poisson's ratio	0.2

Thermal

PCC coefficient of thermal expansion (in/in/°F x 10 ⁻⁶)	4.86
PCC thermal conductivity (BTU/hr-ft-°F)	1.25
PCC heat capacity (BTU/lb-°F)	0.28

Mix

Cement type		Type I (1)
Cementitious material content (lb/yd^3)		563
Water to cement ratio		0.36
Aggregate type		Dolomite (2)
PCC zero-stress temperature (°F)	Calculated Internally?	True
	User Value	-
	Calculated Value	82.8
Ultimate shrinkage (microstrain)	Calculated Internally?	True
	User Value	-
	Calculated Value	516.0
Reversible shrinkage (%)		50
Time to develop 50% of ultimate shrinkage (days)		35
Curing method		Curing Compound

Identifiers

Field	Value
Display name/identifier	R4 Level 1 Lawson
Description of object	Mix ID # 2009105
Author	CDOT
Date Created	4/3/2013 12:00:00 AM
Approver	CDOT
Date approved	4/3/2013 12:00:00 AM
State	Colorado
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	Region 4/1/6
User defined field 2	
User defined field 3	
Revision Number	0

PCC strength and modulus (Input Level: 1)

Time	Modulus of rupture (psi)	Elastic modulus (psi)
7-day	560	3230000
14-day	620	3500000
28-day	710	4030000
90-day	730	4240000
20-year/28-day	1.2	1.2

Layer 2 Non-stabilized Base : Crushed stone

Unbound

Layer thickness (in)	6.0
Poisson's ratio	0.35
Coefficient of lateral earth pressure (k0)	0.5

Modulus (Input Level: 3)

Analysis Type:	Modify input values by temperature/moisture
Method:	Resilient Modulus (psi)

Resilient Modulus (psi)

25000.0

Use Correction factor for NDT modulus?	-
NDT Correction Factor:	-

Identifiers

Field	Value
Display name/identifier	Crushed stone
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	20

Sieve

Liquid Limit	6.0
Plasticity Index	1.0
Is layer compacted?	True

	Is User Defined?	Value
Maximum dry unit weight (pcf)	False	127.7
Saturated hydraulic conductivity (ft/hr)	False	5.054e-02
Specific gravity of solids	False	2.7
Water Content (%)	False	7.4

User-defined Soil Water Characteristic Curve (SWCC)

Is User Defined?	False
af	7.2555
bf	1.3328
cf	0.8242
hr	117.4000

Sieve Size	% Passing
0.001mm	
0.002mm	
0.020mm	
#200	8.7
#100	
#80	12.9
#60	
#50	
#40	20.0
#30	
#20	
#16	
#10	33.8
#8	
#4	44.7
3/8-in.	57.2
1/2-in.	63.1
3/4-in.	72.7
1-in.	78.8
1 1/2-in.	85.8
2-in.	91.6
2 1/2-in.	
3-in.	
3 1/2-in.	97.6

Layer 3 Subgrade : A-2-4

Unbound

Layer thickness (in)	Semi-infinite
Poisson's ratio	0.35
Coefficient of lateral earth pressure (k0)	0.5

Modulus (Input Level: 3)

Analysis Type:	Modify input values by temperature/moisture
Method:	Resilient Modulus (psi)

Resilient Modulus (psi)

9493.0

Use Correction factor for NDT modulus?	-
NDT Correction Factor:	-

Identifiers

Field	Value
Display name/identifier	A-2-4
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	0

Sieve

Liquid Limit	14.0
Plasticity Index	2.0
Is layer compacted?	True

	Is User Defined?	Value
Maximum dry unit weight (pcf)	False	124.6
Saturated hydraulic conductivity (ft/hr)	False	5.852e-04
Specific gravity of solids	False	2.7
Water Content (%)	False	9

User-defined Soil Water Characteristic Curve (SWCC)

Is User Defined?	False
af	9.5043
bf	0.6439
cf	3.0636
hr	189.6000

Sieve Size	% Passing
0.001mm	
0.002mm	
0.020mm	
#200	22.4
#100	
#80	42.3
#60	
#50	
#40	67.2
#30	
#20	
#16	
#10	82.5
#8	
#4	87.2
3/8-in.	91.6
1/2-in.	93.5
3/4-in.	95.9
1-in.	97.2
1 1/2-in.	98.5
2-in.	99.0
2 1/2-in.	
3-in.	
3 1/2-in.	99.6

Calibration Coefficients

PCC Faulting

$C_{12} = C_1 + (C_2 * FR^{0.25})$ $C_{34} = C_3 + (C_4 * FR^{0.25})$ $FaultMax_0 = C_{12} * \delta_{curling} * \left[\log(1 + C_5 * 5.0^{EROD}) * \log\left(P_{200} * \frac{WetDays}{p_s}\right) \right]^{C_6}$ $FaultMax_i = FaultMax_0 + C_7 * \sum_{j=1}^m DE_j * \log(1 + C_5 * 5.0^{EROD})^{C_6}$ $\Delta Fault_i = C_{34} * (FaultMax_{i-1} - Fault_{i-1})^2 * DE_i$ $C_8 = DowelDeterioration$			
C1: 0.5104	C2: 0.00838	C3: 0.00147	C4: 0.008345
C5: 5999	C6: 0.8404	C7: 5.9293	C8: 400
PCC Reliability Faulting Standard Deviation			
0.0831*Pow(FAULT,0.3426) + 0.00521			

IRI-jpcp

C1 - Cracking	C1: 0.8203	C2: 0.4417
C2 - Spalling	C3: 1.4929	C4: 25.24
C3 - Faulting	Reliability Standard Deviation	
C4 - Site Factor	5.4	

PCC Cracking

$\log(N) = C1 * \left(\frac{MR}{\sigma}\right)^{C2}$ $CRK = \frac{100}{1 + C4 * FD^{C5}}$	Fatigue Coefficients		Cracking Coefficients	
	C1: 2	C2: 1.22	C4: 0.6	C5: -2.05
PCC Reliability Cracking Standard Deviation				
Pow(57.08*CRACK,0.33) + 1.5				

APPENDIX G

M-E PAVEMENT DESIGN OUTPUT

65TH AVENUE - FLEXIBLE DESIGN



65th Ave-flexible

File Name: C:\Users\RSGeoTech\Desktop\PMED Projects\530.02\65th Ave-flexible.dgpx



Design Inputs

Design Life: 20 years
Design Type: FLEXIBLE

Base construction: May, 2024
Pavement construction: June, 2024
Traffic opening: September, 2024

Climate Data 40.436, -104.618
Sources (Lat/Lon)

Design Structure

Layer type	Material Type	Thickness (in)
Flexible	R3 Level 1 SX(100) PG 64-28	2.0
Flexible	R2 Level 1 SX(75) PG 64-22	6.0
NonStabilized	Crushed stone	8.0
Subgrade	A-2-4	Semi-infinite

Volumetric at Construction:	
Effective binder content (%)	10.7
Air voids (%)	5.7

Traffic

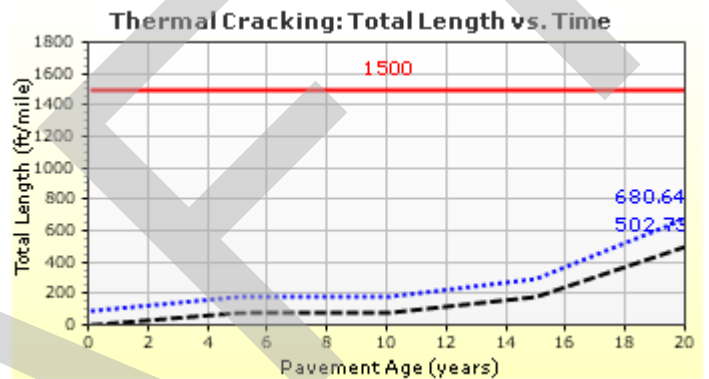
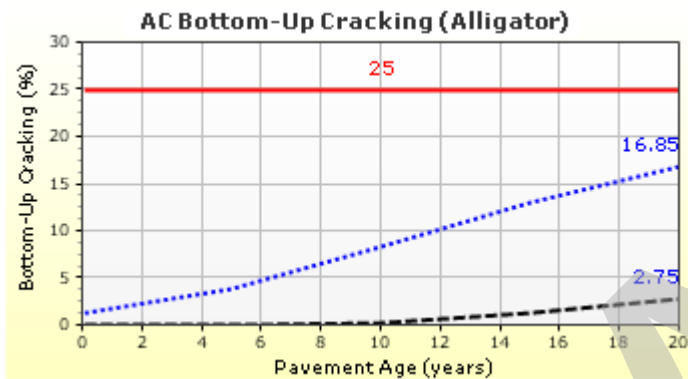
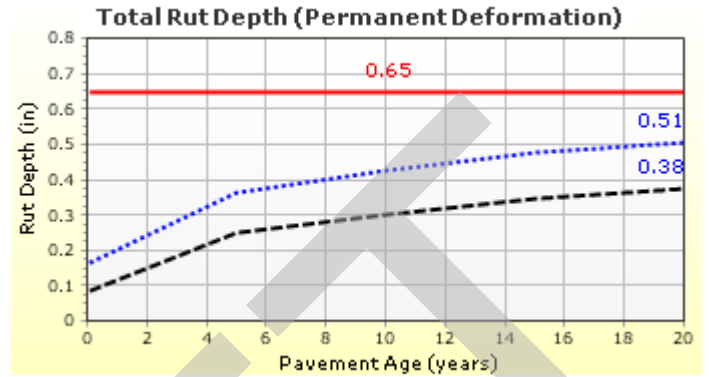
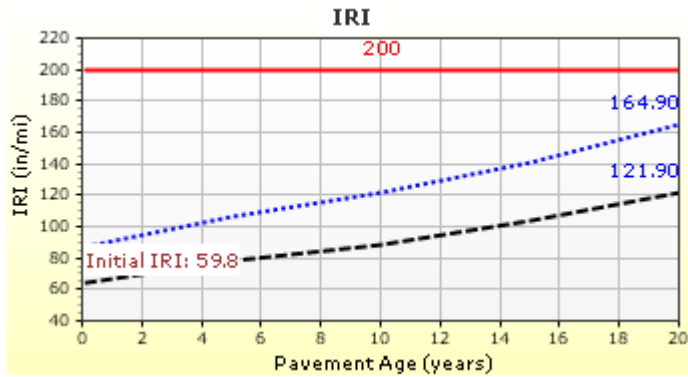
Age (year)	Heavy Trucks (cumulative)
2024 (initial)	1,800
2034 (10 years)	4,198,900
2044 (20 years)	9,014,590

Design Outputs

Distress Prediction Summary

Distress Type	Distress @ Specified Reliability		Reliability (%)		Criterion Satisfied?
	Target	Predicted	Target	Achieved	
Terminal IRI (in/mile)	200.00	164.95	90.00	99.00	Pass
Permanent deformation - total pavement (in)	0.65	0.51	90.00	99.59	Pass
AC bottom-up fatigue cracking (% lane area)	25.00	16.85	90.00	97.84	Pass
AC thermal cracking (ft/mile)	1500.00	680.64	90.00	100.00	Pass
AC top-down fatigue cracking (ft/mile)	2500.00	295.47	90.00	100.00	Pass
Permanent deformation - AC only (in)	0.50	0.37	90.00	99.57	Pass

Distress Charts



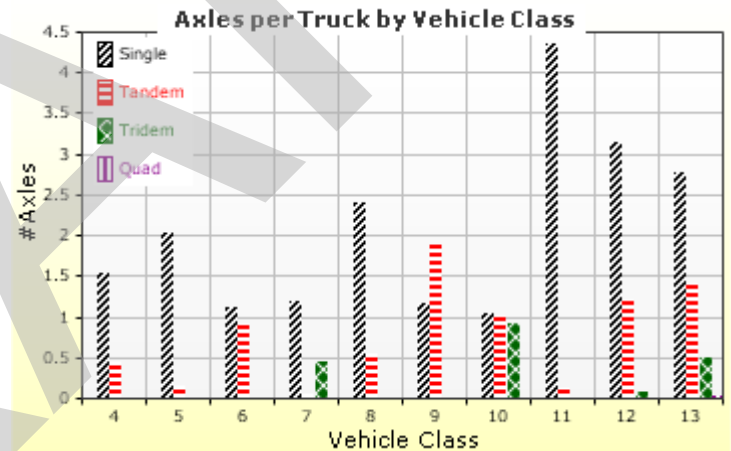
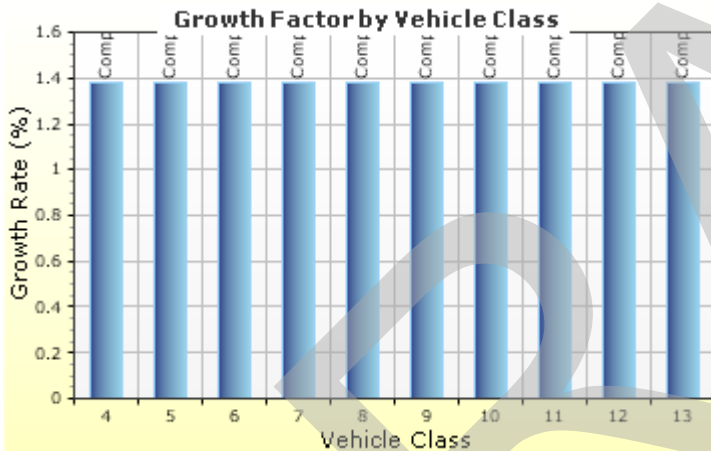
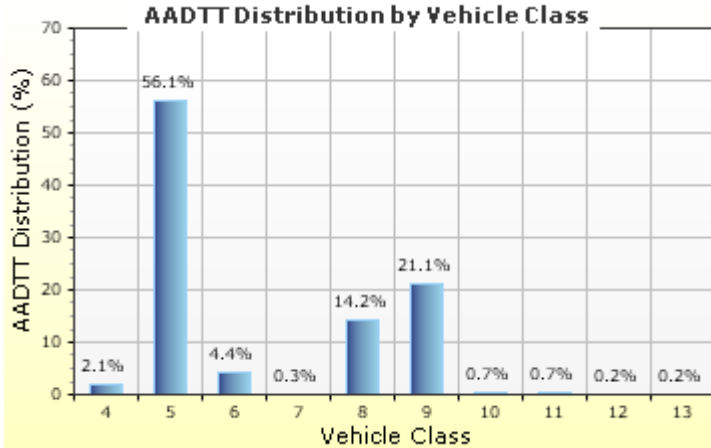
— Threshold Value @ Specified Reliability --- @ 50% Reliability

Traffic Inputs

Graphical Representation of Traffic Inputs

Initial two-way AADTT: 1,800
Number of lanes in design direction: 2

Percent of trucks in design direction (%): 60.0
Percent of trucks in design lane (%): 100.0
Operational speed (mph): 35.0



Traffic Volume Monthly Adjustment Factors



Tabular Representation of Traffic Inputs

Volume Monthly Adjustment Factors

Level 3: Default MAF

Month	Vehicle Class									
	4	5	6	7	8	9	10	11	12	13
January	0.9	0.8	0.8	0.7	0.8	0.9	0.9	0.9	0.9	0.9
February	0.9	0.8	0.8	0.8	0.9	0.9	0.9	0.9	1.0	0.8
March	1.0	0.9	0.8	1.1	1.0	1.0	1.0	1.0	0.9	0.9
April	1.0	1.0	0.9	1.0	1.0	1.0	1.1	1.0	1.0	1.1
May	1.1	1.1	1.0	1.3	1.1	1.0	1.1	1.1	1.1	1.0
June	1.1	1.1	1.2	1.1	1.1	1.0	1.1	1.0	1.1	1.0
July	1.1	1.2	1.5	1.3	1.2	1.0	1.1	1.1	1.1	1.3
August	1.1	1.2	1.3	1.0	1.1	1.0	1.1	1.1	1.1	1.0
September	1.1	1.1	1.1	1.0	1.1	1.0	1.1	1.1	1.0	1.1
October	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.1
November	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0
December	0.9	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.9	0.9

Distributions by Vehicle Class

Vehicle Class	AADTT Distribution (%) (Level 3)	Growth Factor	
		Rate (%)	Function
Class 4	2.1%	1.38%	Compound
Class 5	56.1%	1.38%	Compound
Class 6	4.4%	1.38%	Compound
Class 7	0.3%	1.38%	Compound
Class 8	14.2%	1.38%	Compound
Class 9	21.1%	1.38%	Compound
Class 10	0.7%	1.38%	Compound
Class 11	0.7%	1.38%	Compound
Class 12	0.2%	1.38%	Compound
Class 13	0.2%	1.38%	Compound

Truck Distribution by Hour does not apply

Axle Configuration

Traffic Wander	
Mean wheel location (in)	18.0
Traffic wander standard deviation (in)	10.0
Design lane width (ft)	12.0

Axle Configuration	
Average axle width (ft)	8.5
Dual tire spacing (in)	12.0
Tire pressure (psi)	120.0

Average Axle Spacing	
Tandem axle spacing (in)	51.6
Tridem axle spacing (in)	49.2
Quad axle spacing (in)	49.2

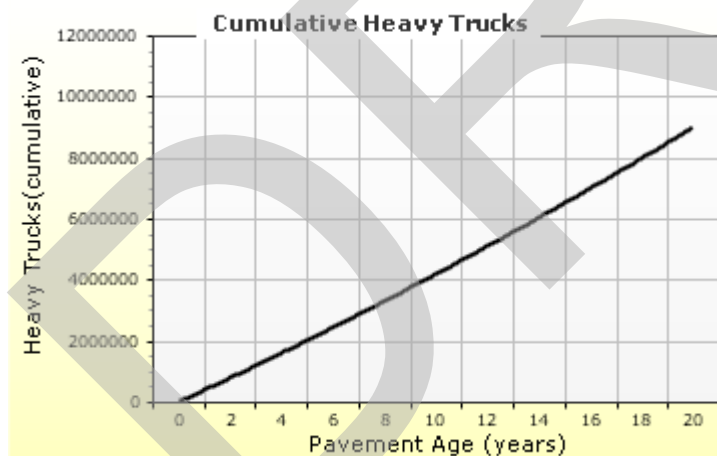
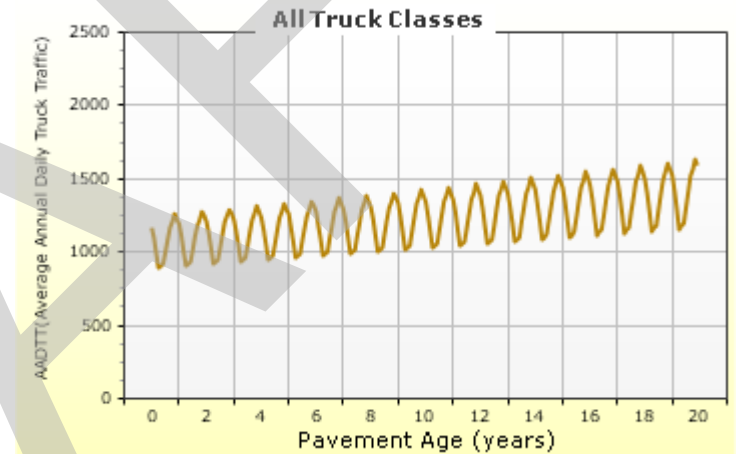
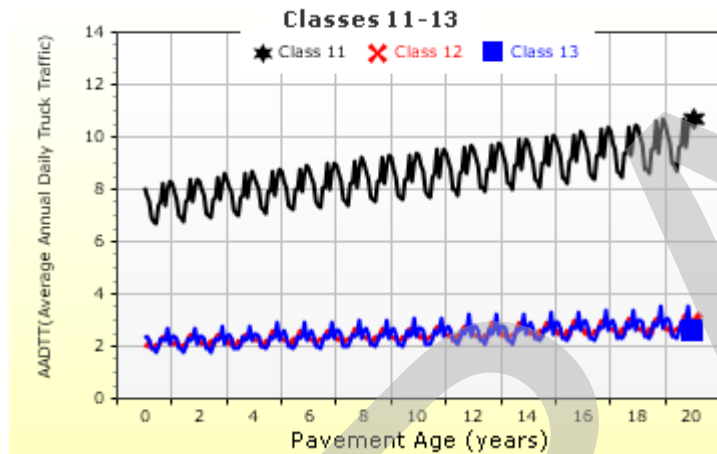
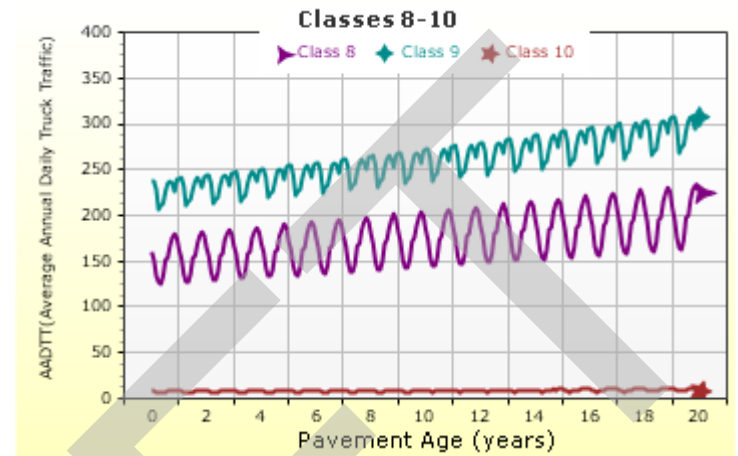
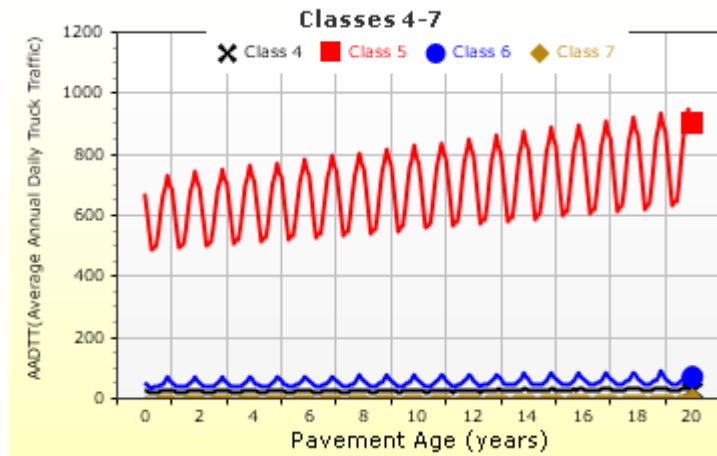
Wheelbase does not apply

Number of Axles per Truck

Vehicle Class	Single Axle	Tandem Axle	Tridem Axle	Quad Axle
Class 4	1.53	0.45	0	0
Class 5	2.02	0.16	0.02	0
Class 6	1.12	0.93	0	0
Class 7	1.19	0.07	0.45	0.02
Class 8	2.41	0.56	0.02	0
Class 9	1.16	1.88	0.01	0
Class 10	1.05	1.01	0.93	0.02
Class 11	4.35	0.13	0	0
Class 12	3.15	1.22	0.09	0
Class 13	2.77	1.4	0.51	0.04

AADTT (Average Annual Daily Truck Traffic) Growth

* Traffic cap is not enforced



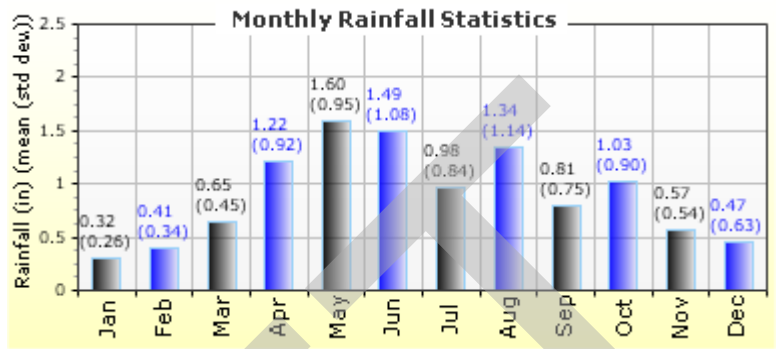
Climate Inputs

Climate Data Sources:

Climate Station Cities: Location (lat lon elevation(ft))
GREELEY, CO 40.43600 -104.61800 4649

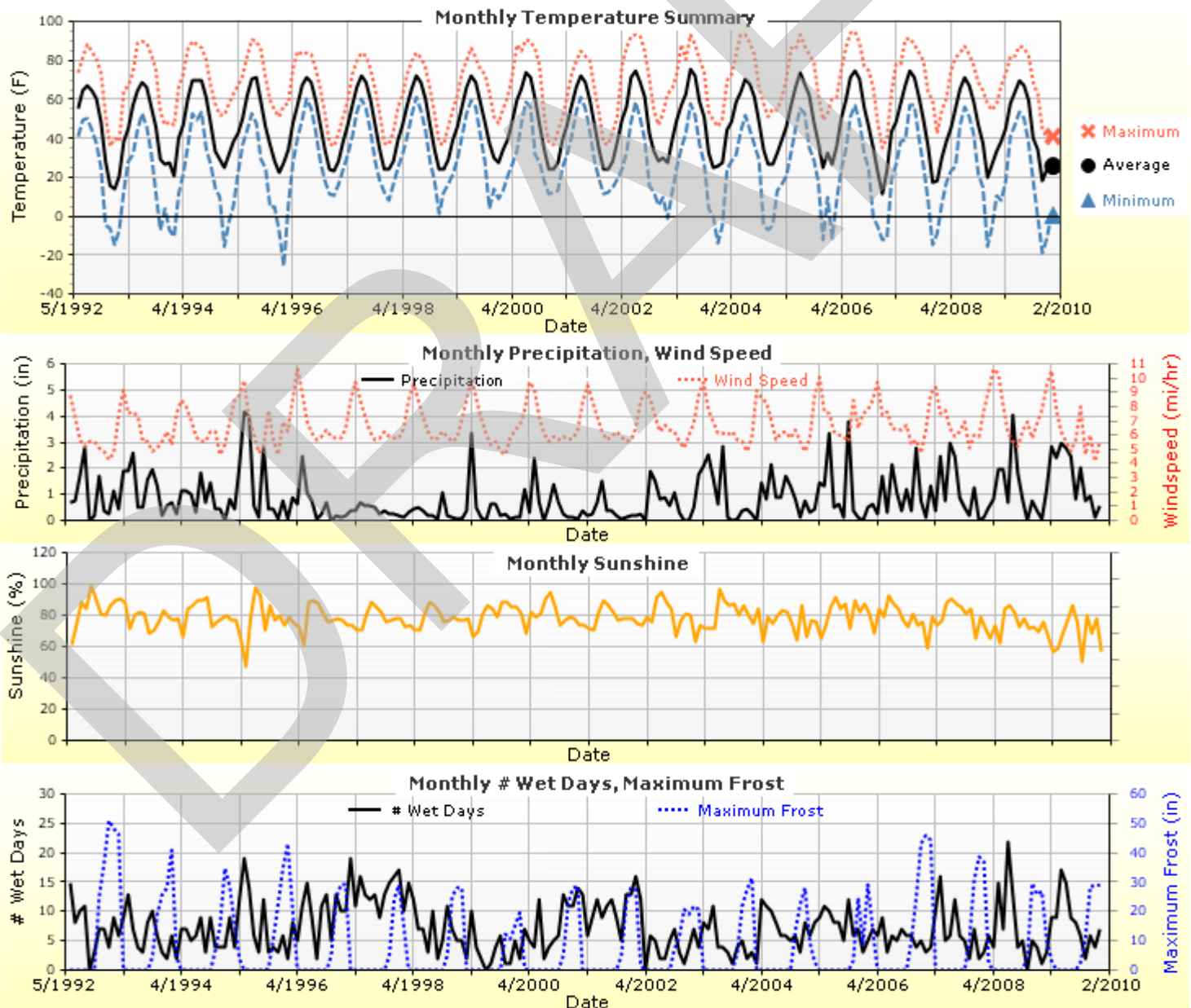
Annual Statistics:

Mean annual air temperature (°F) 47.82
 Mean annual precipitation (in) 10.98
 Freezing index (°F - days) 684.18
 Average annual number of freeze/thaw cycles: 94.81

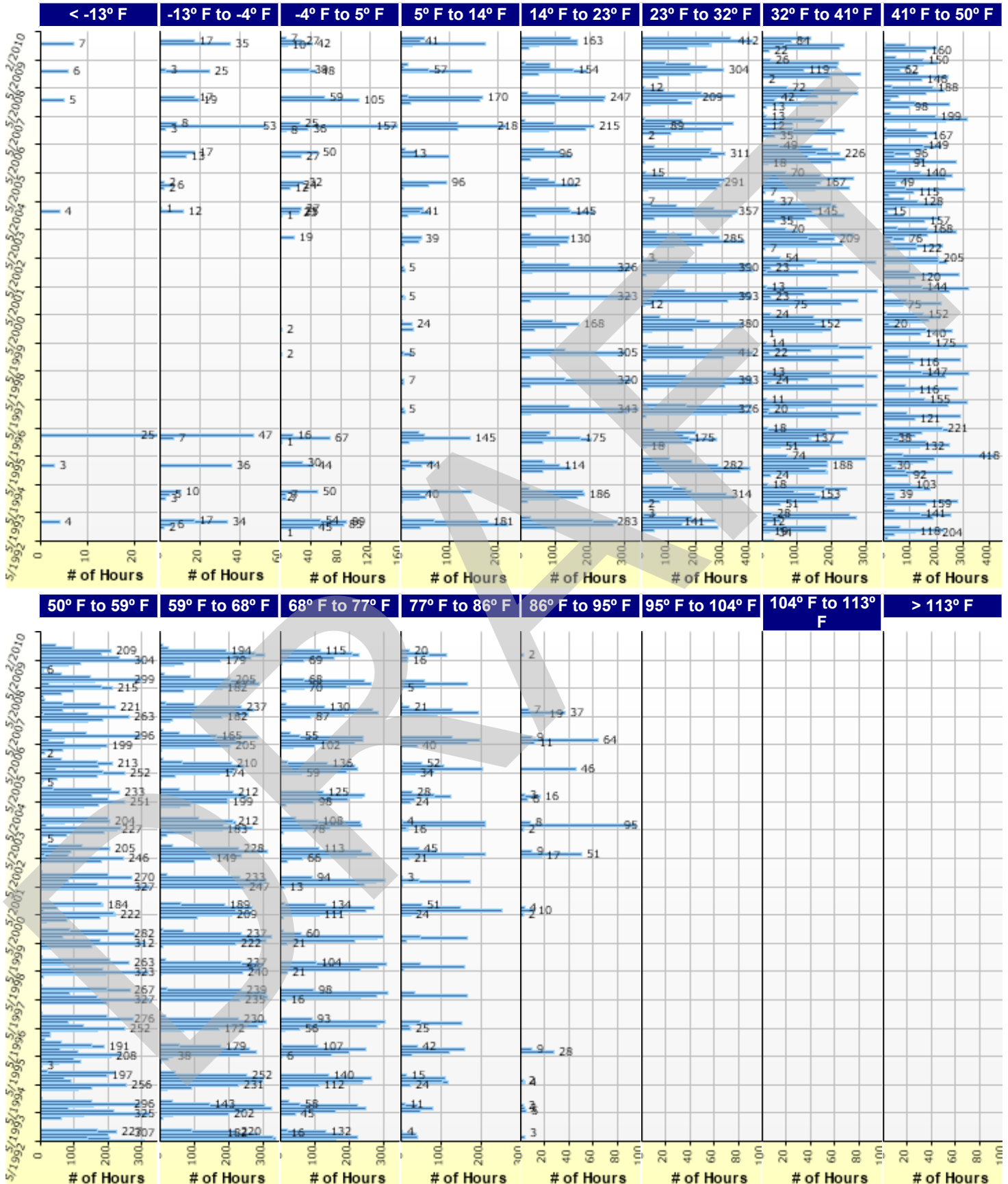


Water table depth (ft) 5.00

Monthly Climate Summary:



Hourly Air Temperature Distribution by Month:





Design Properties

HMA Design Properties

Use Multilayer Rutting Model	False
Using G* based model (not nationally calibrated)	False
Is NCHRP 1-37A HMA Rutting Model Coefficients	True
Endurance Limit	-
Use Reflective Cracking	True

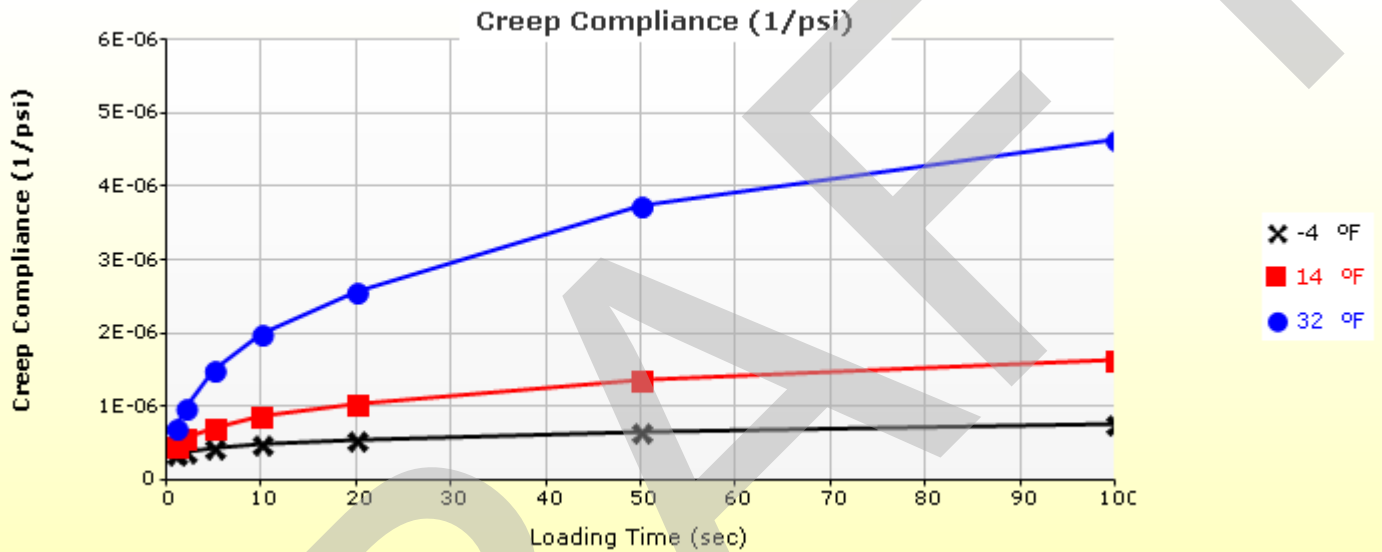
Structure - ICM Properties	
AC surface shortwave absorptivity	0.85

Layer Name	Layer Type	Interface Friction
Layer 1 Flexible : R3 Level 1 SX (100) PG 64-28	Flexible (1)	1.00
Layer 2 Flexible : R2 Level 1 SX (75) PG 64-22	Flexible (1)	1.00
Layer 3 Non-stabilized Base : Crushed stone	Non-stabilized Base (4)	1.00
Layer 4 Subgrade : A-2-4	Subgrade (5)	-

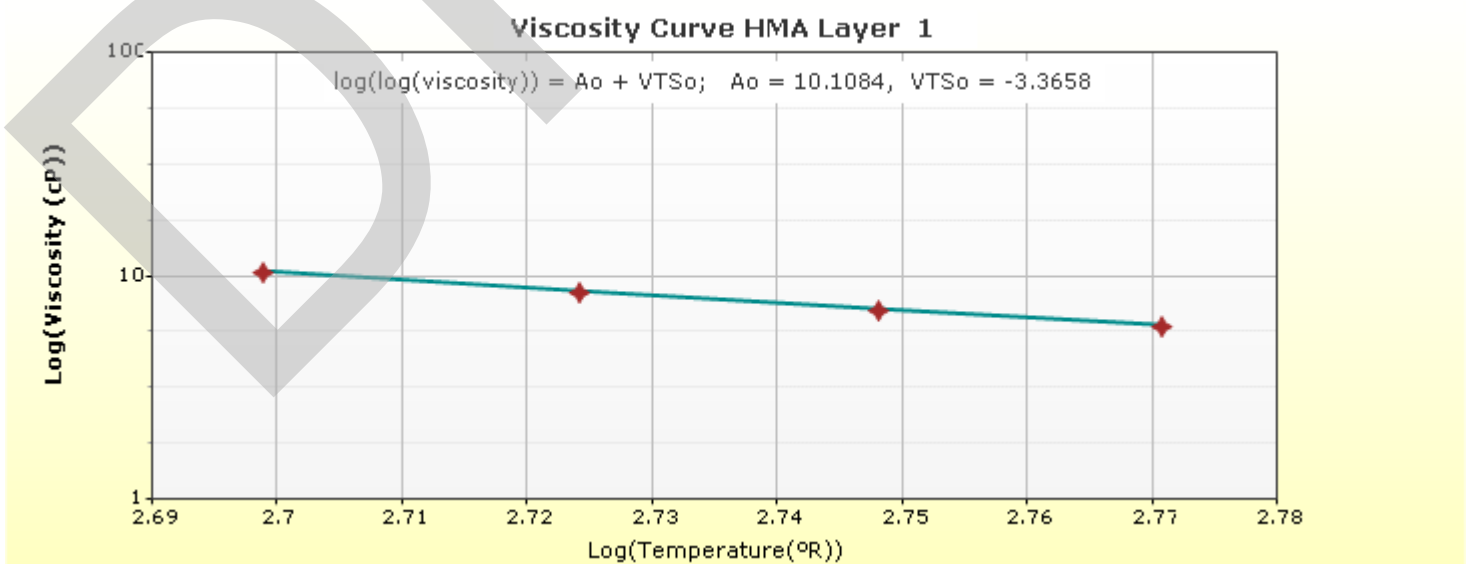
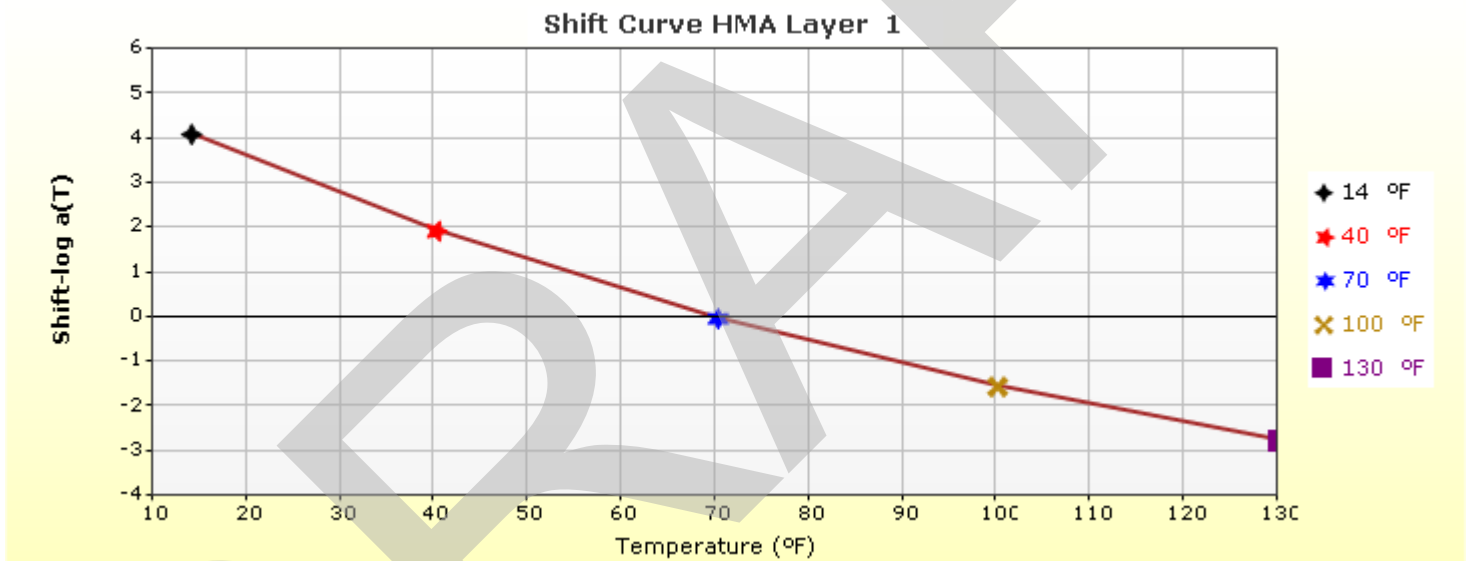
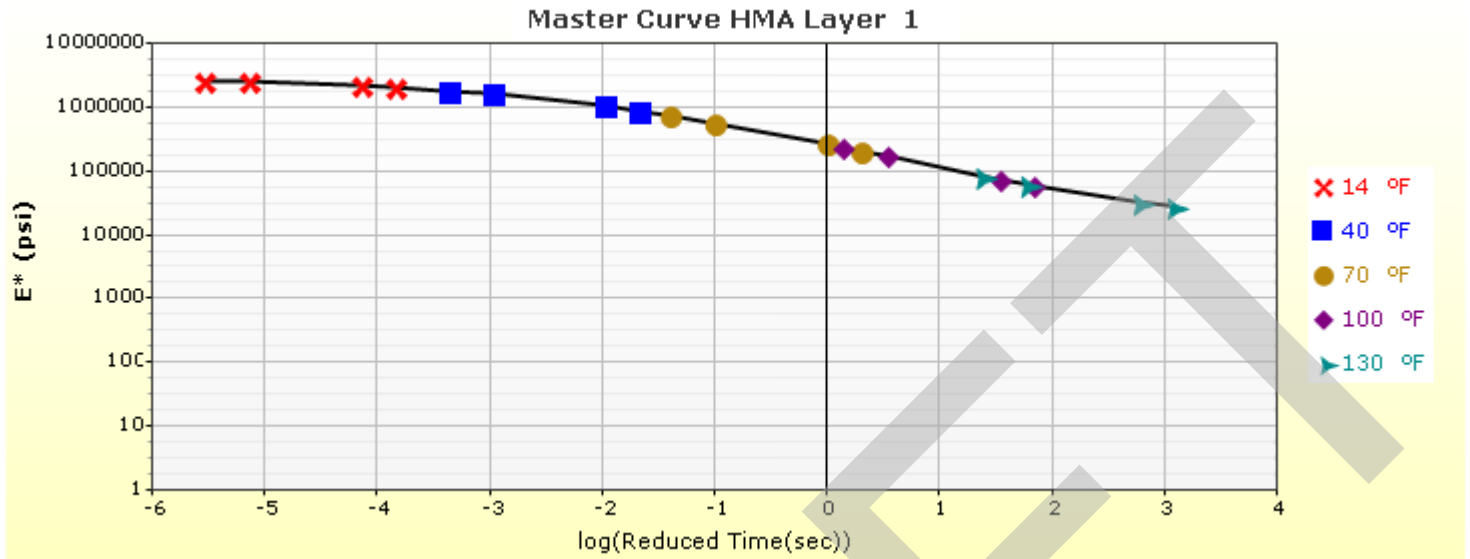
Thermal Cracking (Input Level: 1)

Indirect tensile strength at 14 °F (psi)	519.00
Thermal Contraction	
Is thermal contraction calculated?	True
Mix coefficient of thermal contraction (in/in/°F)	-
Aggregate coefficient of thermal contraction (in/in/°F)	5.0e-006
Voids in Mineral Aggregate (%)	16.4

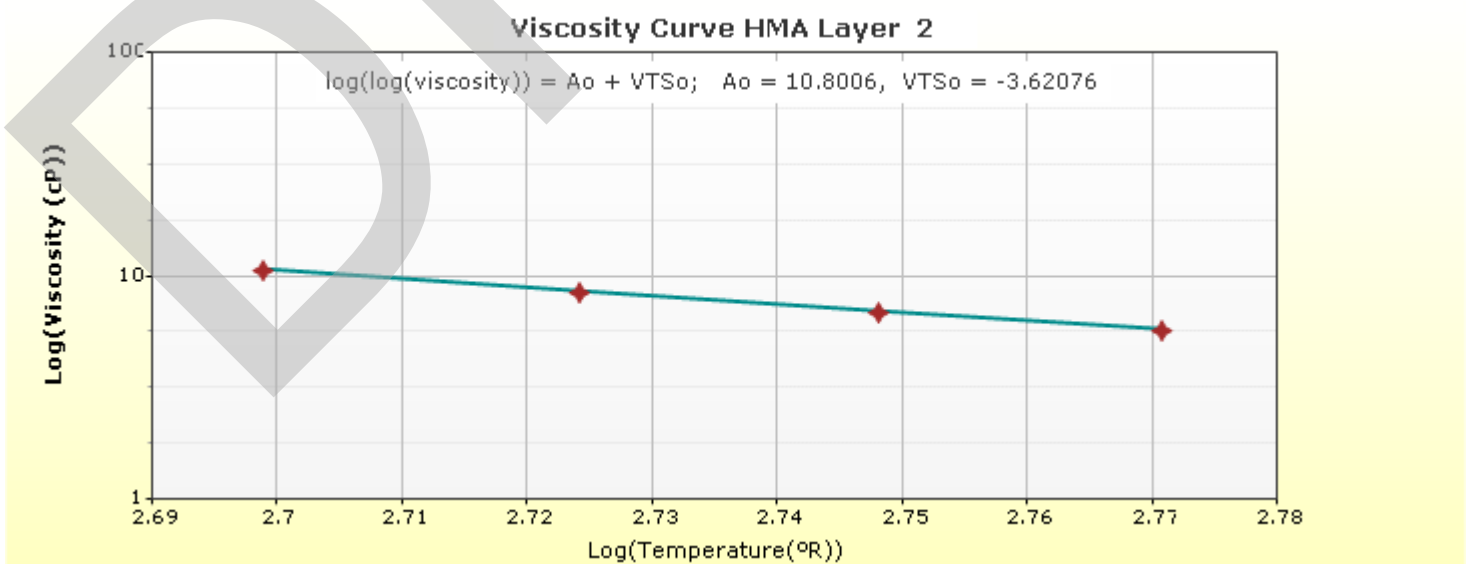
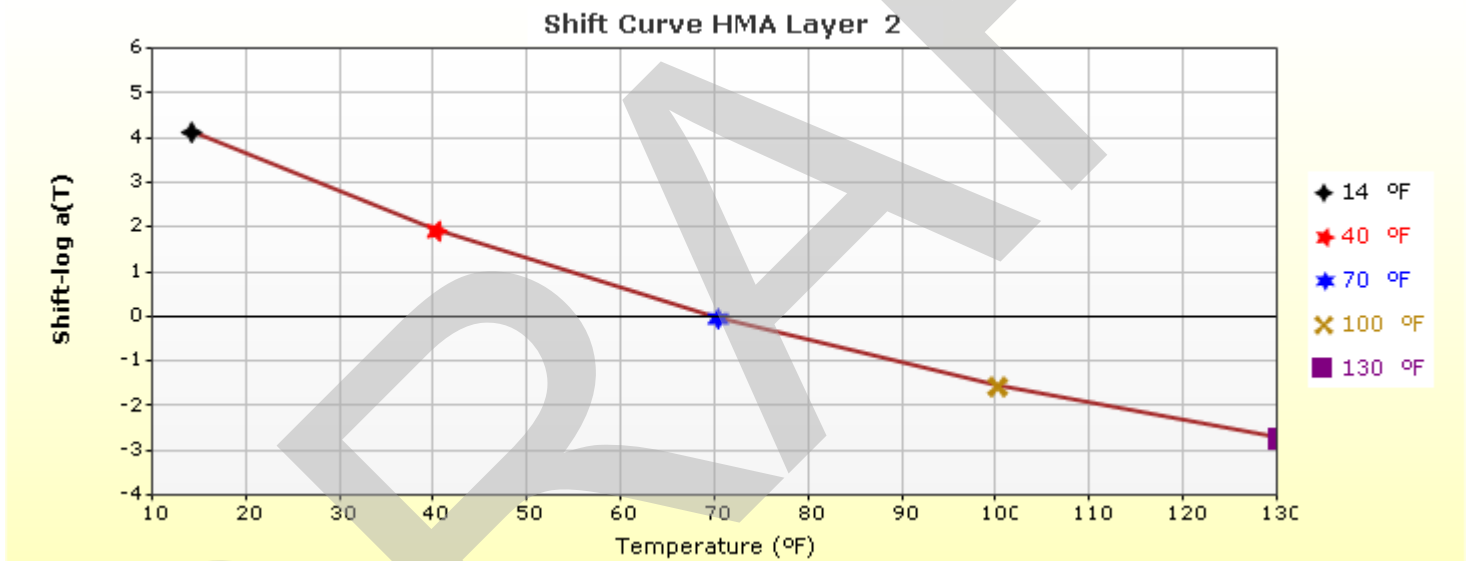
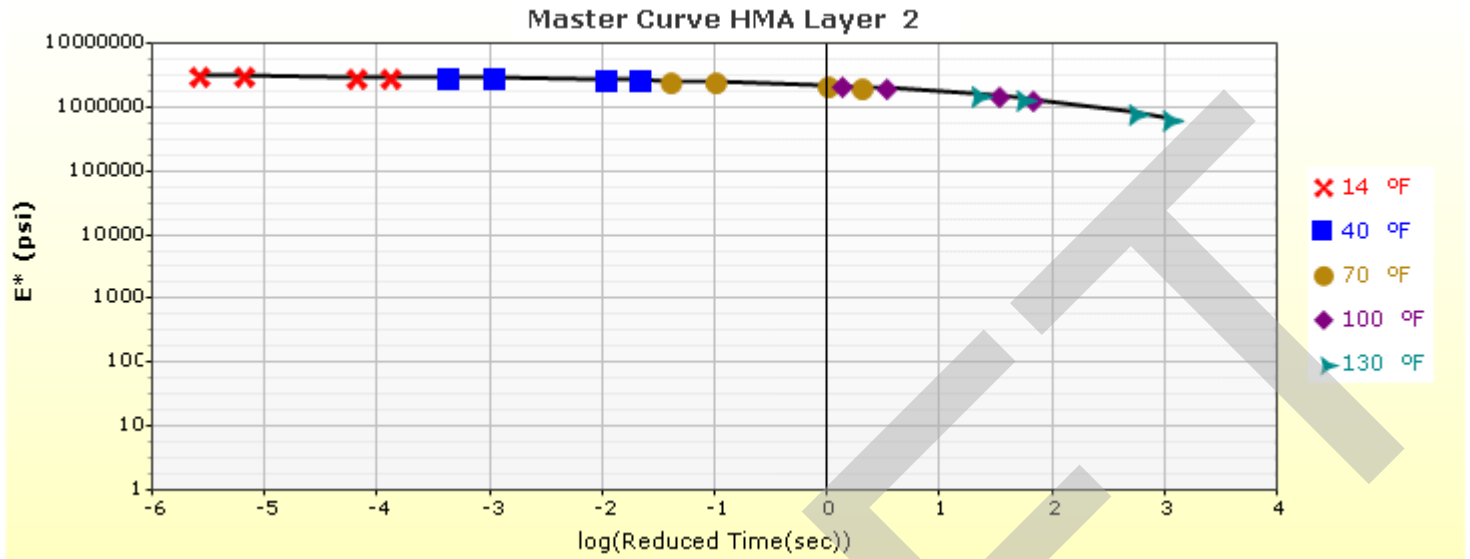
Loading time (sec)	Creep Compliance (1/psi)		
	-4 °F	14 °F	32 °F
1	3.61e-007	4.73e-007	7.12e-007
2	4.04e-007	5.74e-007	9.97e-007
5	4.51e-007	7.35e-007	1.52e-006
10	5.11e-007	8.78e-007	1.99e-006
20	5.67e-007	1.04e-006	2.59e-006
50	6.57e-007	1.37e-006	3.75e-006
100	7.68e-007	1.66e-006	4.66e-006



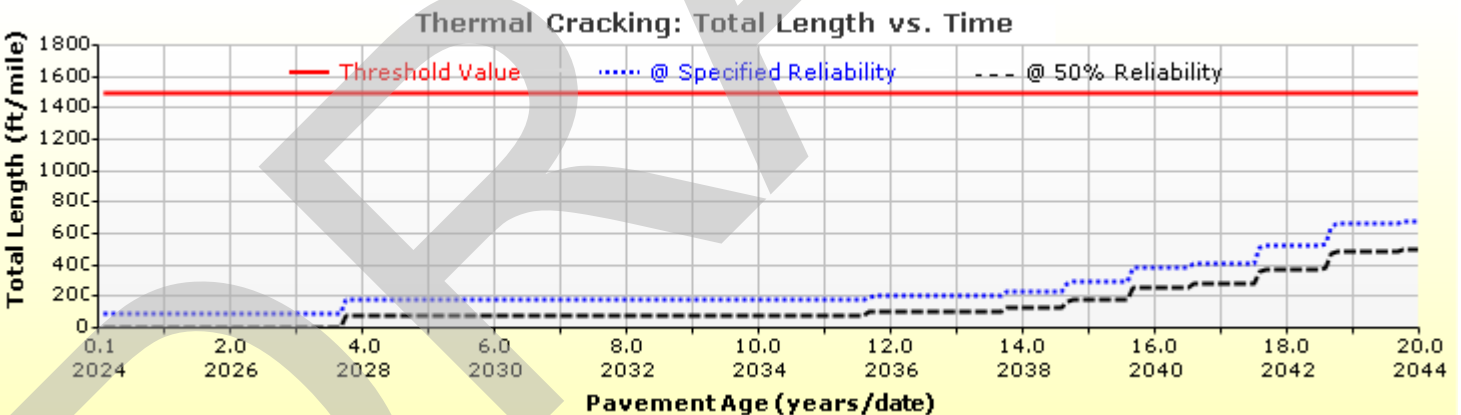
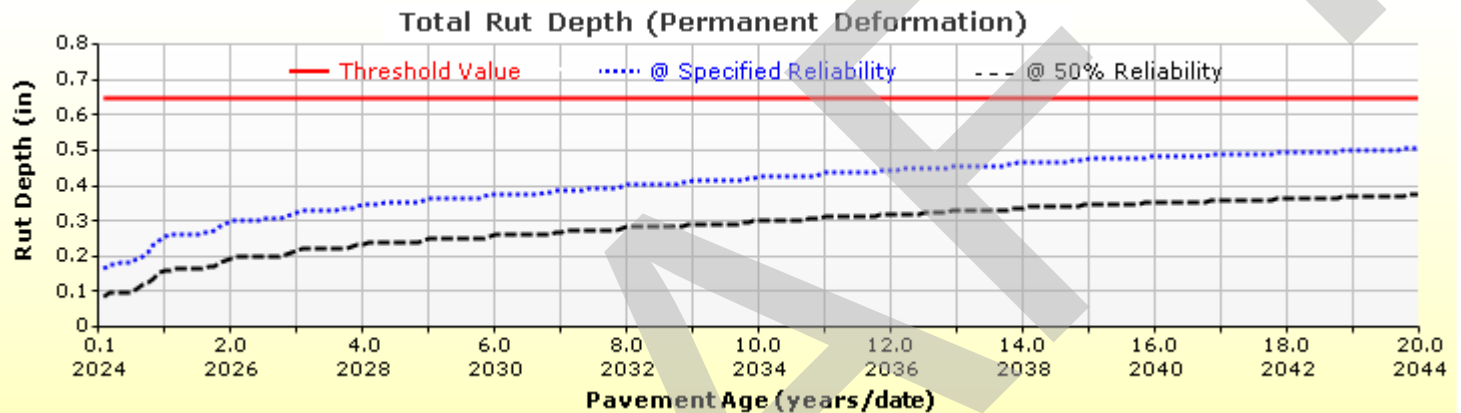
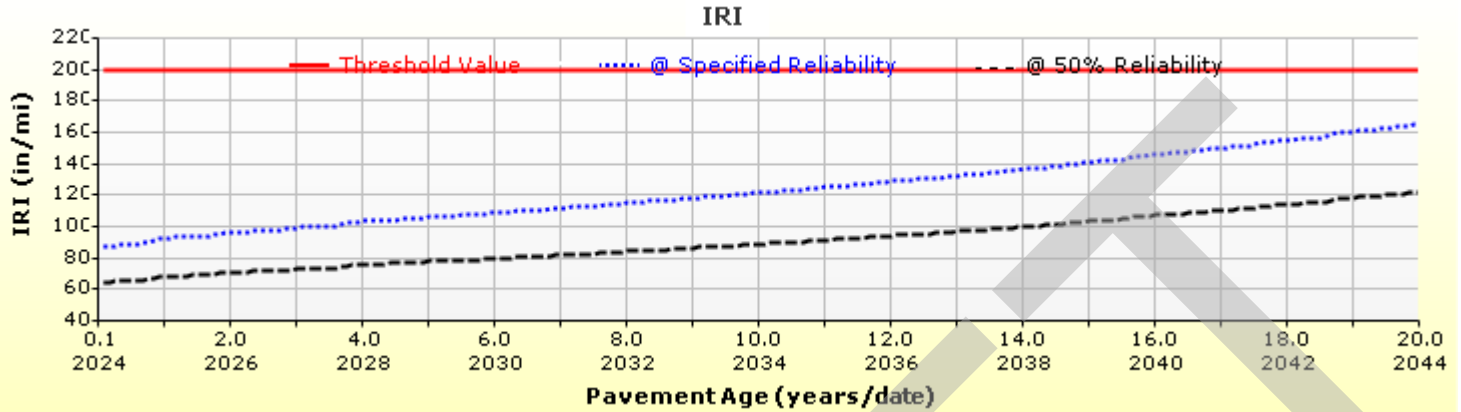
HMA Layer 1: Layer 1 Flexible : R3 Level 1 SX(100) PG 64-28

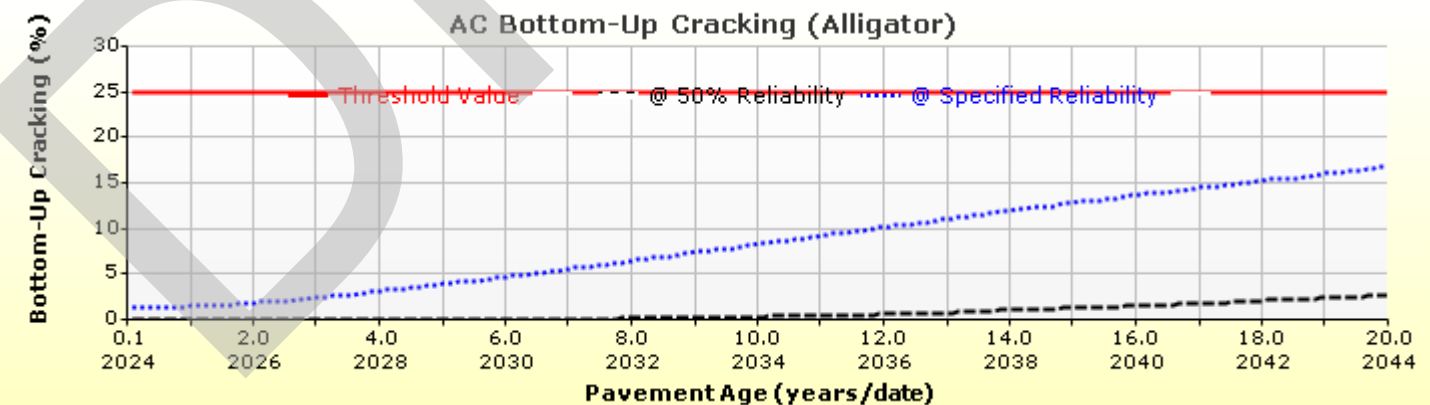
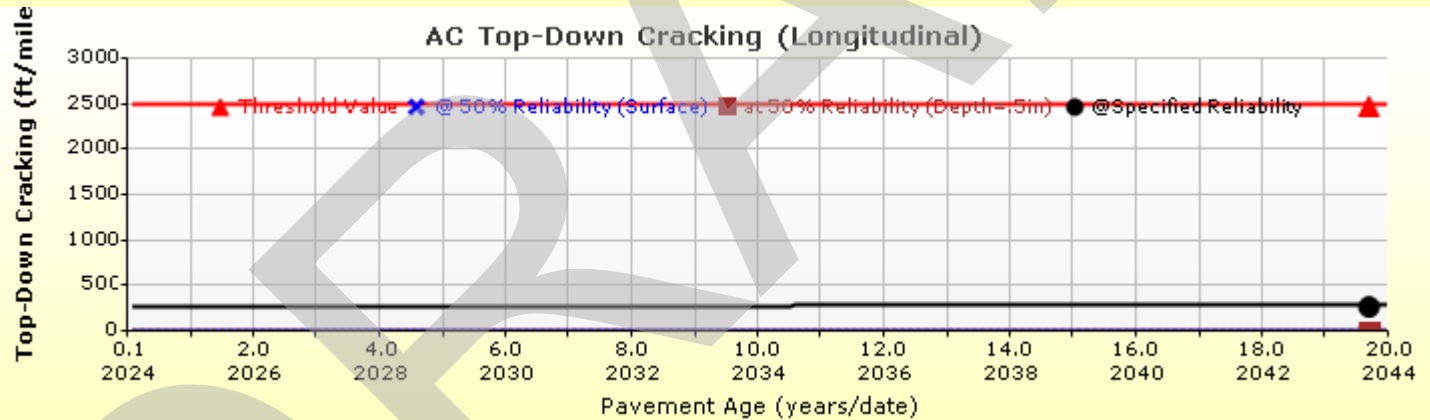
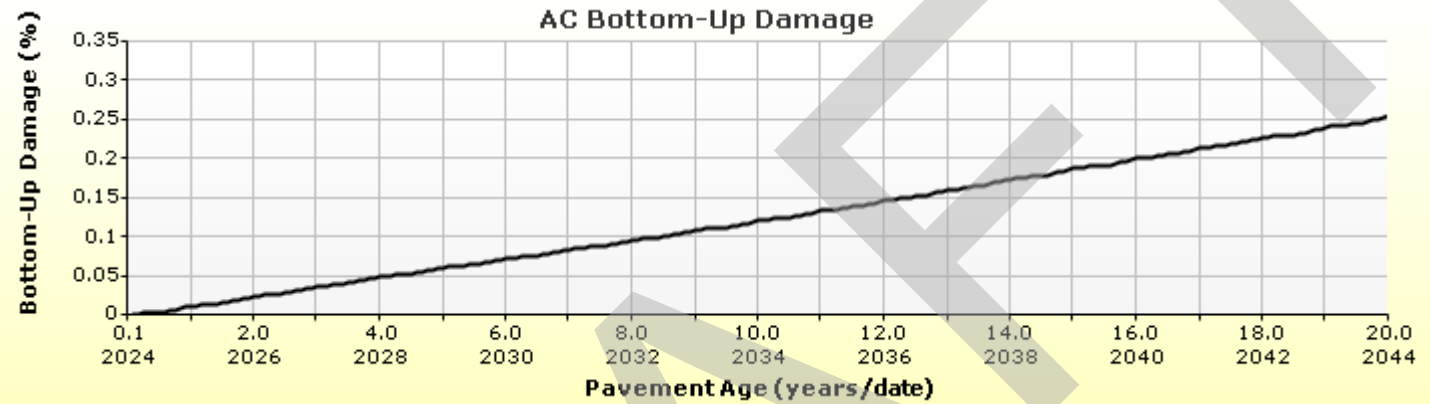
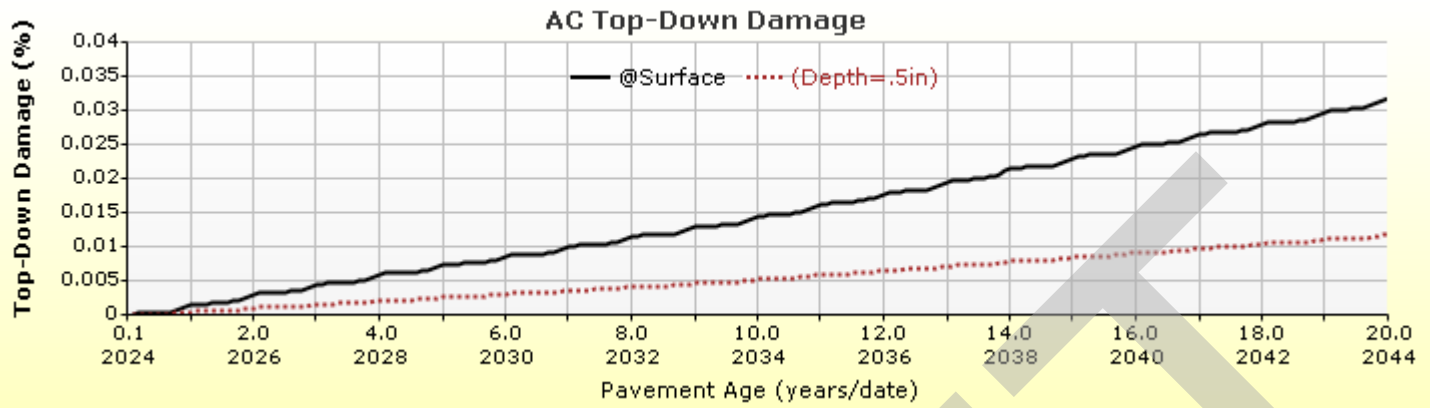


HMA Layer 2: Layer 2 Flexible : R2 Level 1 SX(75) PG 64-22

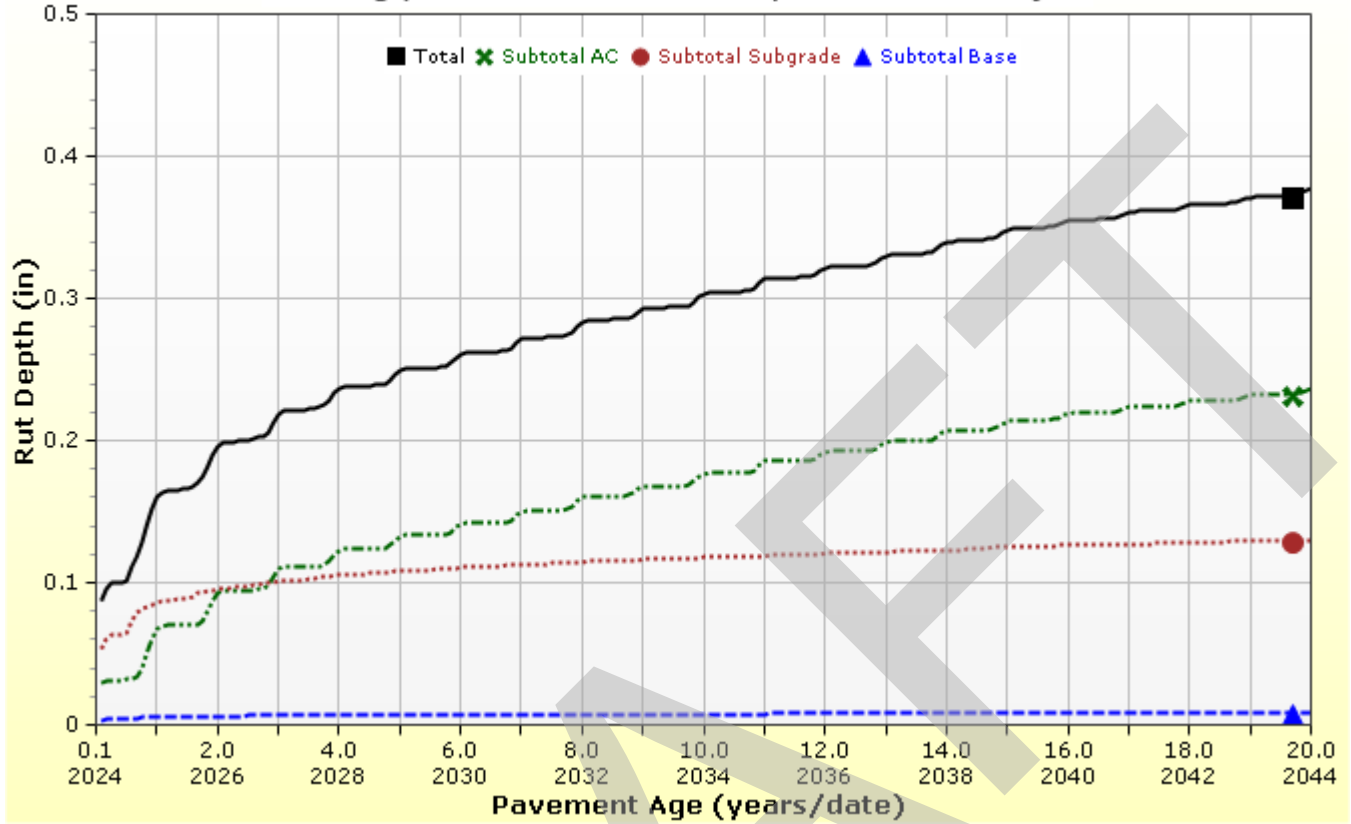


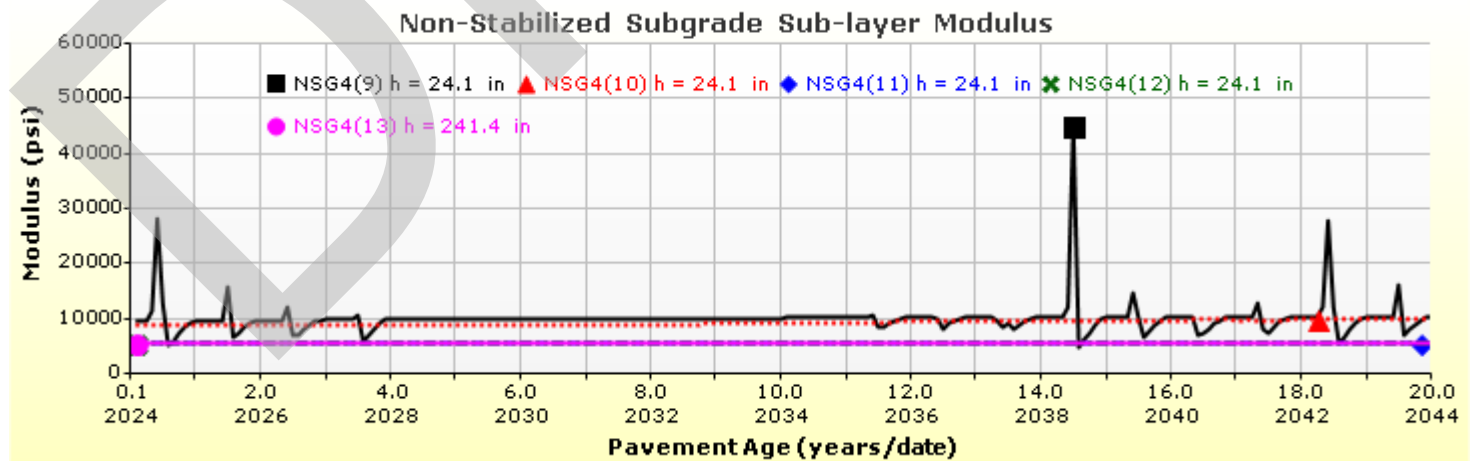
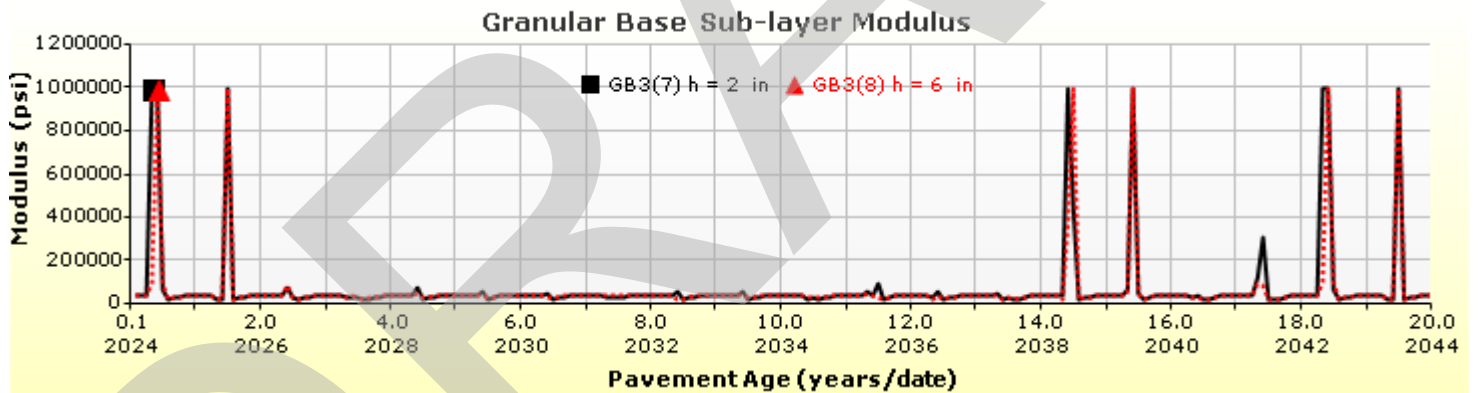
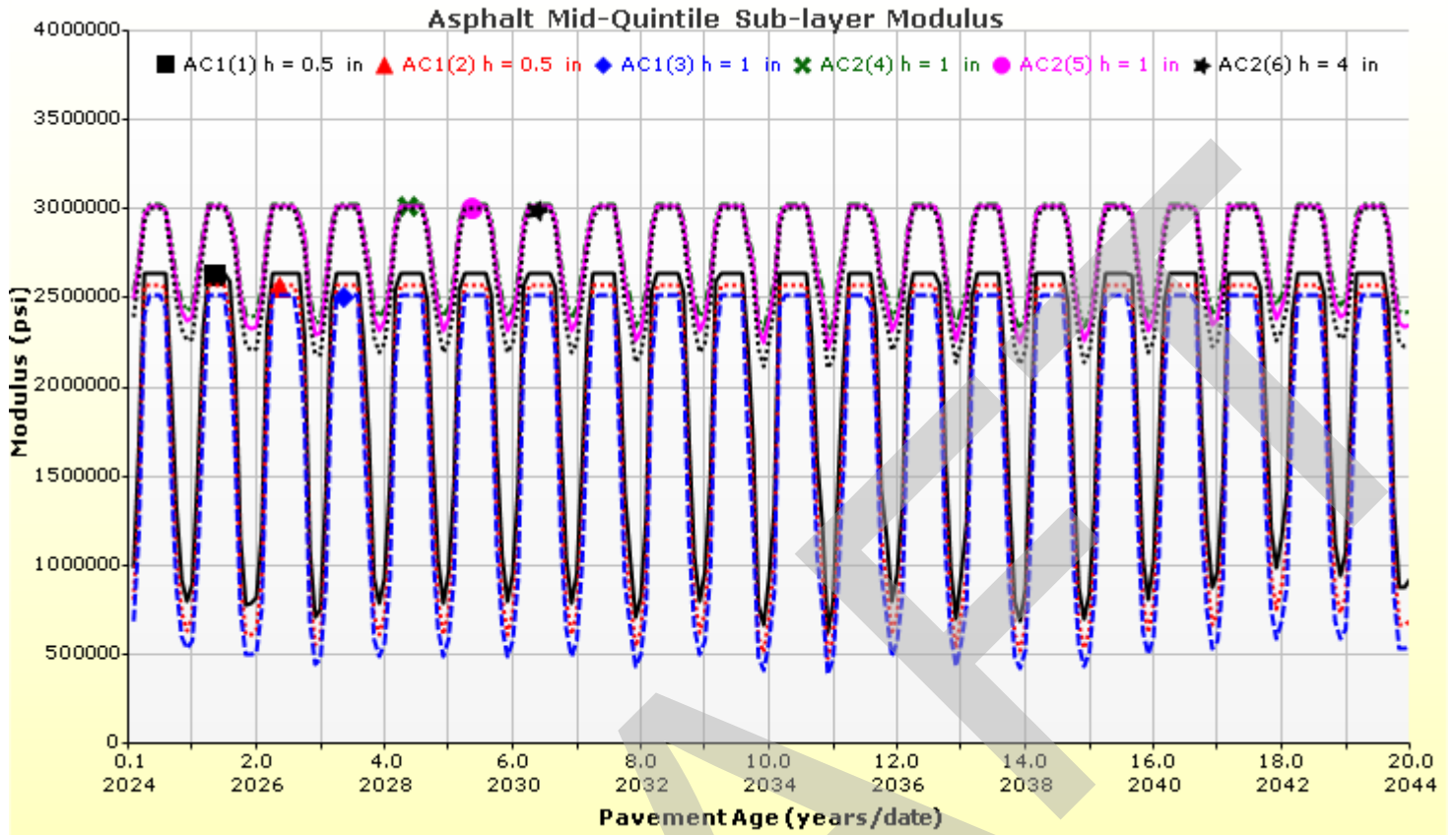
Analysis Output Charts





Rutting (Permanent Deformation) at 50% Reliability





Layer Information

Layer 1 Flexible : R3 Level 1 SX(100) PG 64-28

Asphalt		
Thickness (in)	2.0	
Unit weight (pcf)	145.0	
Poisson's ratio	Is Calculated?	False
	Ratio	0.35
	Parameter A	-
	Parameter B	-

Asphalt Dynamic Modulus (Input Level: 1)

T (°F)	0.5 Hz	1 Hz	10 Hz	25 Hz
14	1687360	2134249	2493389	2608869
40	697463	1127680	1612900	1802220
70	173403	334774	616373	765125
100	54259	93163	175106	227742
130	27890	38645	60413	74657

Asphalt Binder

Temperature (°F)	Binder Gstar (Pa)	Phase angle (deg)
147.2	3051	81.6
158	1495	83.1
168.8	772	85

General Info

Name	Value
Reference temperature (°F)	70
Effective binder content (%)	10.7
Air voids (%)	5.7
Thermal conductivity (BTU/hr-ft-°F)	0.67
Heat capacity (BTU/lb-°F)	0.23

Identifiers

Field	Value
Display name/identifier	R3 Level 1 SX(100) PG 64-28
Description of object	Mix ID # FS1959
Author	CDOT
Date Created	4/3/2013 12:00:00 AM
Approver	CDOT
Date approved	4/3/2013 12:00:00 AM
State	Colorado
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	SX
User defined field 2	
User defined field 3	
Revision Number	0



65th Ave-flexible

File Name: C:\Users\RSGeoTech\Desktop\PMED Projects\530.02\65th Ave-flexible.dgpx



Layer 2 Flexible : R2 Level 1 SX(75) PG 64-22

Asphalt

Thickness (in)	6.0	
Unit weight (pcf)	140.5	
Poisson's ratio	Is Calculated?	False
	Ratio	0.35
	Parameter A	-
	Parameter B	-

Asphalt Dynamic Modulus (Input Level: 1)

T (°F)	0.5 Hz	1 Hz	10 Hz	25 Hz
14	2910500	2947100	3034800	3058600
40	2620500	2695700	2882400	2934800
70	2057300	2190500	2549800	2658300
100	1334300	1500400	2017600	2195500
130	697600	836500	1365200	1584000

Asphalt Binder

Temperature (°F)	Binder Gstar (Pa)	Phase angle (deg)
168.8	451	85
147.2	1857	81.6
158	889	83.1

General Info

Name	Value
Reference temperature (°F)	70
Effective binder content (%)	11.8
Air voids (%)	6.9
Thermal conductivity (BTU/hr-ft-°F)	0.67
Heat capacity (BTU/lb-°F)	0.23

Identifiers

Field	Value
Display name/identifier	R2 Level 1 SX(75) PG 64-22
Description of object	Mix ID # 19127A
Author	CDOT
Date Created	4/3/2013 12:00:00 AM
Approver	CDOT
Date approved	4/3/2013 12:00:00 AM
State	Colorado
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	SX
User defined field 2	
User defined field 3	
Revision Number	0

Layer 3 Non-stabilized Base : Crushed stone

Unbound

Layer thickness (in)	8.0
Poisson's ratio	0.35
Coefficient of lateral earth pressure (k0)	0.5

Modulus (Input Level: 3)

Analysis Type:	Modify input values by temperature/moisture
Method:	Resilient Modulus (psi)

Resilient Modulus (psi)

25000.0

Use Correction factor for NDT modulus?	-
NDT Correction Factor:	-

Identifiers

Field	Value
Display name/identifier	Crushed stone
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	20

Sieve

Liquid Limit	6.0
Plasticity Index	1.0
Is layer compacted?	True

	Is User Defined?	Value
Maximum dry unit weight (pcf)	False	127.7
Saturated hydraulic conductivity (ft/hr)	False	5.054e-02
Specific gravity of solids	False	2.7
Water Content (%)	False	7.4

User-defined Soil Water Characteristic Curve (SWCC)

Is User Defined?	False
af	7.2555
bf	1.3328
cf	0.8242
hr	117.4000

Sieve Size	% Passing
0.001mm	
0.002mm	
0.020mm	
#200	8.7
#100	
#80	12.9
#60	
#50	
#40	20.0
#30	
#20	
#16	
#10	33.8
#8	
#4	44.7
3/8-in.	57.2
1/2-in.	63.1
3/4-in.	72.7
1-in.	78.8
1 1/2-in.	85.8
2-in.	91.6
2 1/2-in.	
3-in.	
3 1/2-in.	97.6

Layer 4 Subgrade : A-2-4

Unbound

Layer thickness (in)	Semi-infinite
Poisson's ratio	0.35
Coefficient of lateral earth pressure (k0)	0.5

Modulus (Input Level: 3)

Analysis Type:	Modify input values by temperature/moisture
Method:	Resilient Modulus (psi)

Resilient Modulus (psi)

9493.0

Use Correction factor for NDT modulus?	-
NDT Correction Factor:	-

Identifiers

Field	Value
Display name/identifier	A-2-4
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	0

Sieve

Liquid Limit	14.0
Plasticity Index	2.0
Is layer compacted?	True

	Is User Defined?	Value
Maximum dry unit weight (pcf)	False	124.6
Saturated hydraulic conductivity (ft/hr)	False	5.852e-04
Specific gravity of solids	False	2.7
Water Content (%)	False	9

User-defined Soil Water Characteristic Curve (SWCC)

Is User Defined?	False
af	9.5043
bf	0.6439
cf	3.0636
hr	189.6000

Sieve Size	% Passing
0.001mm	
0.002mm	
0.020mm	
#200	22.4
#100	
#80	42.3
#60	
#50	
#40	67.2
#30	
#20	
#16	
#10	82.5
#8	
#4	87.2
3/8-in.	91.6
1/2-in.	93.5
3/4-in.	95.9
1-in.	97.2
1 1/2-in.	98.5
2-in.	99.0
2 1/2-in.	
3-in.	
3 1/2-in.	99.6

Calibration Coefficients

AC Fatigue

$N_f = 0.00432 * C * \beta_{f1} k_1 \left(\frac{1}{\varepsilon_1}\right)^{k_2 \beta_{f2}} \left(\frac{1}{E}\right)^{k_3 \beta_{f3}}$	k1: 0.007566
$C = 10^M$	k2: 3.9492
$M = 4.84 \left(\frac{V_b}{V_a + V_b} - 0.69\right)$	k3: 1.281
	Bf1: 130.3674
	Bf2: 1
	Bf3: 1.217799

AC Rutting

$\frac{\varepsilon_p}{\varepsilon_r} = k_z \beta_{r1} 10^{k_1 T} k_2 \beta_{r2} N^{k_3 \beta_{r3}}$ $k_z = (C_1 + C_2 * depth) * 0.328196^{depth}$ $C_1 = -0.1039 * H_a^2 + 2.4868 * H_a - 17.342$ $C_2 = 0.0172 * H_a^2 - 1.7331 * H_a + 27.428$ Where: $H_{ac} = \text{total AC thickness(in)}$	$\varepsilon_p = \text{plastic strain(in/in)}$ $\varepsilon_r = \text{resilient strain(in/in)}$ $T = \text{layer temperature(}^\circ\text{F)}$ $N = \text{number of load repetitions}$
AC Rutting Standard Deviation	0.1414 * Pow(RUT,0.25) + 0.001
AC Layer	K1:-3.35412 K2:1.5606 K3:0.3791 Br1:4.3 Br2:1 Br3:1

Thermal Fracture

$C_f = 400 * N \left(\frac{\log C / h_{ac}}{\sigma} \right)$ $\Delta C = (k * \beta_t)^{n+1} * A * \Delta K^n$ $A = 10^{(4.389 - 2.52 * \log(E * \sigma_m * n))}$	$C_f = \text{observed amount of thermal cracking(ft/500ft)}$ $k = \text{refression coefficient determined through field calibration}$ $N() = \text{standard normal distribution evaluated at()}$ $\sigma = \text{standard deviation of the log of the depth of cracks in the pavments}$ $C = \text{crack depth(in)}$ $h_{ac} = \text{thickness of asphalt layer(in)}$ $\Delta C = \text{Change in the crack depth due to a cooling cycle}$ $\Delta K = \text{Change in the stress intensity factor due to a cooling cycle}$ $A, n = \text{Fracture parameters for the asphalt mixture}$ $E = \text{mixture stiffness}$ $\sigma_m = \text{Undamaged mixture tensile strength}$ $\beta_t = \text{Calibration parameter}$
Level 1 K: 6.3	Level 1 Standard Deviation: 0.1468 * THERMAL + 65.027
Level 2 K: 0.5	Level 2 Standard Deviation: 0.2841 * THERMAL + 55.462
Level 3 K: 6.3	Level 3 Standard Deviation: 0.3972 * THERMAL + 20.422

CSM Fatigue

$N_f = 10^{\left(\frac{k_1 \beta_{c1} \left(\frac{\sigma_s}{M_r} \right)}{k_2 \beta_{c2}} \right)}$	$N_f = \text{number of repetitions to fatigue cracking}$ $\sigma_s = \text{Tensile stress(psi)}$ $M_r = \text{modulus of rupture(psi)}$
k1: 1	k2: 1
Bc1: 0.75	Bc2:1.1

Subgrade Rutting			
$\delta_a(N) = \beta_{s_1} k_1 \varepsilon_v h \left(\frac{\varepsilon_0}{\varepsilon_r} \right) \left e^{-\left(\frac{\rho}{N} \right)^\beta} \right $		δ_a = permanent deformation for the layer N = number of repetitions ε_v = average vertical strain(in/in) $\varepsilon_0, \beta, \rho$ = material properties ε_r = resilient strain(in/in)	
Granular		Fine	
k1: 2.03	Bs1: 0.22	k1: 1.35	Bs1: 0.37
Standard Deviation (BASERUT) 0.0104 * Pow(BASERUT,0.67) + 0.001		Standard Deviation (BASERUT) 0.0663 * Pow(SUBRUT,0.5) + 0.001	

AC Cracking			
AC Top Down Cracking		AC Bottom Up Cracking	
$FC_{top} = \left(\frac{C_4}{1 + e^{(C_1 - C_2 * \log_{10}(Damage))}} \right) * 10.56$		$FC = \left(\frac{6000}{1 + e^{(C_1 * C'_1 + C_2 * C'_2 * \log_{10}(D * 100))}} \right) * \left(\frac{1}{60} \right)$ $C'_2 = -2.40874 - 39.748 * (1 + h_{ac})^{-2.856}$ $C'_1 = -2 * C'_2$	
c1: 7	c2: 3.5	c3: 0	c4: 1000
AC Cracking Top Standard Deviation 200 + 2300/(1+exp(1.072-2.1654*LOG10 (TOP+0.0001)))		AC Cracking Bottom Standard Deviation 1 + 15/(1+exp(-3.1472-4.1349*LOG10 (BOTTOM+0.0001)))	

CSM Cracking		IRI Flexible Pavements	
$FC_{ctb} = C_1 + \frac{C_2}{1 + e^{C_3 - C_4(Damage)}}$		C1 - Rutting C3 - Transverse Crack C2 - Fatigue Crack C4 - Site Factors	
C1: 0	C2: 75	C3: 5	C4: 3
CSM Standard Deviation CTB*1		C1: 50	C2: 0.55
		C3: 0.0111	C4: 0.02

APPENDIX H

M-E PAVEMENT DESIGN OUTPUT

65TH AVENUE - RIGID DESIGN

Design Inputs

Design Life: 30 years
Design Type: JPCP

Existing construction: -
Pavement construction: May, 2024
Traffic opening: August, 2024

Climate Data 40.436, -104.618
Sources (Lat/Lon)

Design Structure

Layer type	Material Type	Thickness (in)
PCC	R4 Level 1 Lawson	9.0
NonStabilized	Crushed stone	6.0
Subgrade	A-2-4	Semi-infinite

Joint Design:	
Joint spacing (ft)	15.0
Dowel diameter (in)	1.25
Slab width (ft)	12.0

Traffic

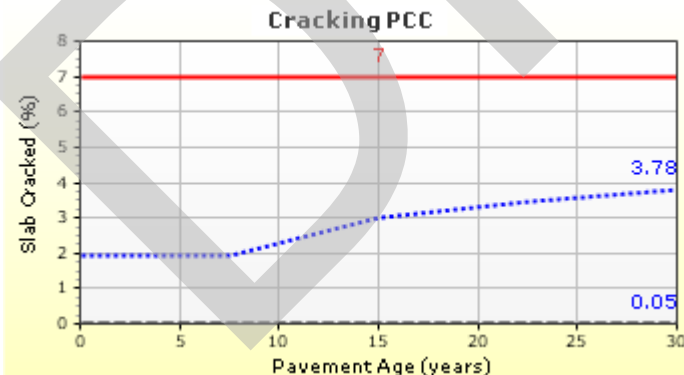
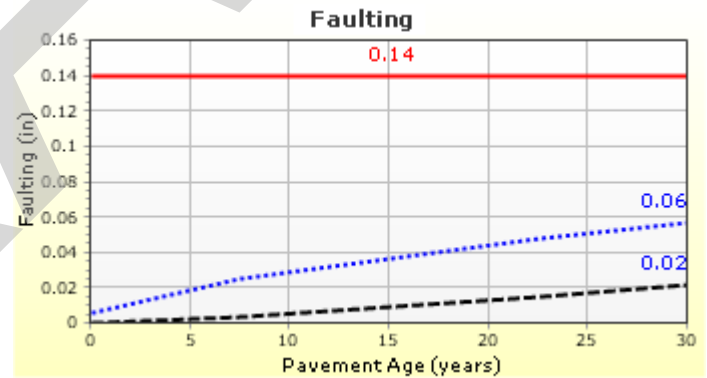
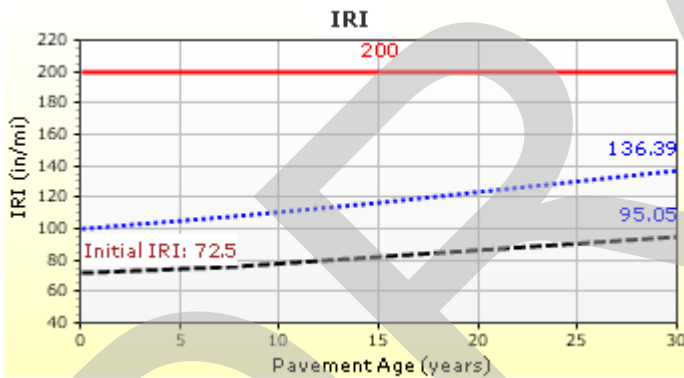
Age (year)	Heavy Trucks (cumulative)
2024 (initial)	1,800
2039 (15 years)	6,524,280
2054 (30 years)	14,537,700

Design Outputs

Distress Prediction Summary

Distress Type	Distress @ Specified Reliability		Reliability (%)		Criterion Satisfied?
	Target	Predicted	Target	Achieved	
Terminal IRI (in/mile)	200.00	136.39	90.00	99.94	Pass
Mean joint faulting (in)	0.14	0.06	90.00	100.00	Pass
JPCP transverse cracking (percent slabs)	7.00	3.78	90.00	99.15	Pass

Distress Charts



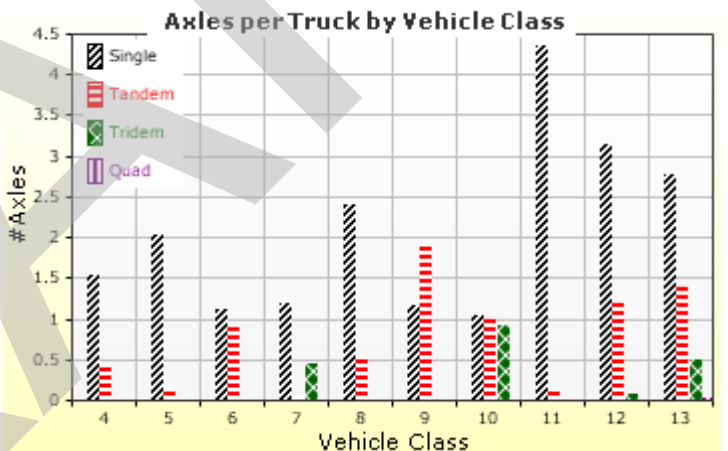
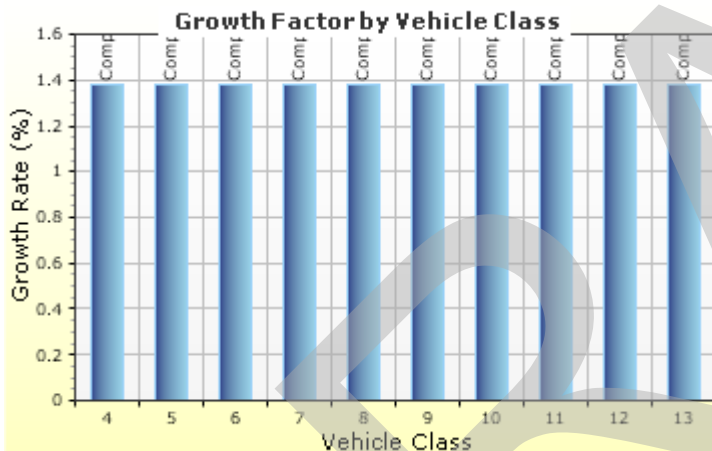
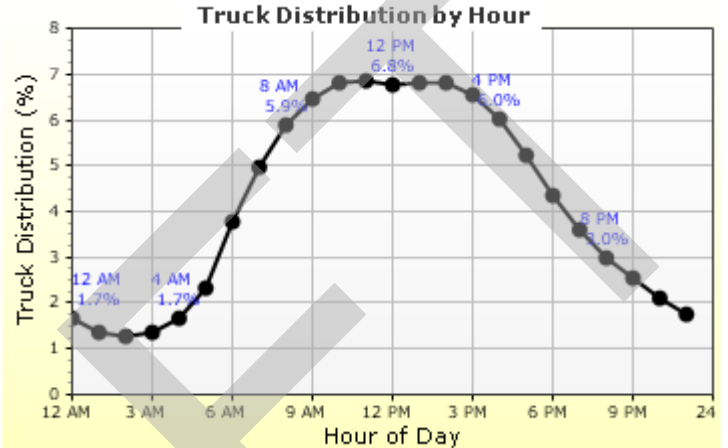
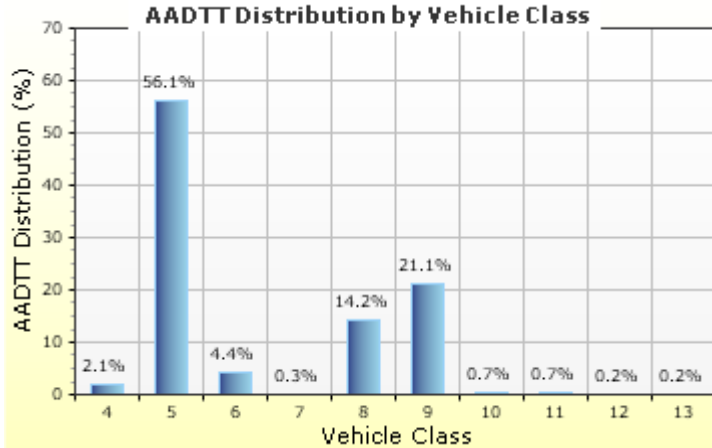
— Threshold Value @ Specified Reliability --- @ 50% Reliability

Traffic Inputs

Graphical Representation of Traffic Inputs

Initial two-way AADTT: 1,800
Number of lanes in design direction: 2

Percent of trucks in design direction (%): 60.0
Percent of trucks in design lane (%): 100.0
Operational speed (mph): 35.0



Traffic Volume Monthly Adjustment Factors



Tabular Representation of Traffic Inputs

Volume Monthly Adjustment Factors

Level 3: Default MAF

Month	Vehicle Class									
	4	5	6	7	8	9	10	11	12	13
January	0.9	0.8	0.8	0.7	0.8	0.9	0.9	0.9	0.9	0.9
February	0.9	0.8	0.8	0.8	0.9	0.9	0.9	0.9	1.0	0.8
March	1.0	0.9	0.8	1.1	1.0	1.0	1.0	1.0	0.9	0.9
April	1.0	1.0	0.9	1.0	1.0	1.0	1.1	1.0	1.0	1.1
May	1.1	1.1	1.0	1.3	1.1	1.0	1.1	1.1	1.1	1.0
June	1.1	1.1	1.2	1.1	1.1	1.0	1.1	1.0	1.1	1.0
July	1.1	1.2	1.5	1.3	1.2	1.0	1.1	1.1	1.1	1.3
August	1.1	1.2	1.3	1.0	1.1	1.0	1.1	1.1	1.1	1.0
September	1.1	1.1	1.1	1.0	1.1	1.0	1.1	1.1	1.0	1.1
October	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.1
November	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0
December	0.9	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.9	0.9

Distributions by Vehicle Class

Vehicle Class	AADTT Distribution (%) (Level 3)	Growth Factor	
		Rate (%)	Function
Class 4	2.1%	1.38%	Compound
Class 5	56.1%	1.38%	Compound
Class 6	4.4%	1.38%	Compound
Class 7	0.3%	1.38%	Compound
Class 8	14.2%	1.38%	Compound
Class 9	21.1%	1.38%	Compound
Class 10	0.7%	1.38%	Compound
Class 11	0.7%	1.38%	Compound
Class 12	0.2%	1.38%	Compound
Class 13	0.2%	1.38%	Compound

Truck Distribution by Hour

Hour	Distribution (%)	Hour	Distribution (%)
12 AM	1.65%	12 PM	6.75%
1 AM	1.37%	1 PM	6.81%
2 AM	1.28%	2 PM	6.83%
3 AM	1.36%	3 PM	6.56%
4 AM	1.66%	4 PM	6.02%
5 AM	2.32%	5 PM	5.23%
6 AM	3.8%	6 PM	4.35%
7 AM	4.95%	7 PM	3.59%
8 AM	5.9%	8 PM	2.98%
9 AM	6.48%	9 PM	2.56%
10 AM	6.83%	10 PM	2.12%
11 AM	6.85%	11 PM	1.75%
Total		100%	

Axle Configuration

Traffic Wander	
Mean wheel location (in)	18.0
Traffic wander standard deviation (in)	10.0
Design lane width (ft)	12.0

Axle Configuration	
Average axle width (ft)	8.5
Dual tire spacing (in)	12.0
Tire pressure (psi)	120.0

Average Axle Spacing	
Tandem axle spacing (in)	51.6
Tridem axle spacing (in)	49.2
Quad axle spacing (in)	49.2

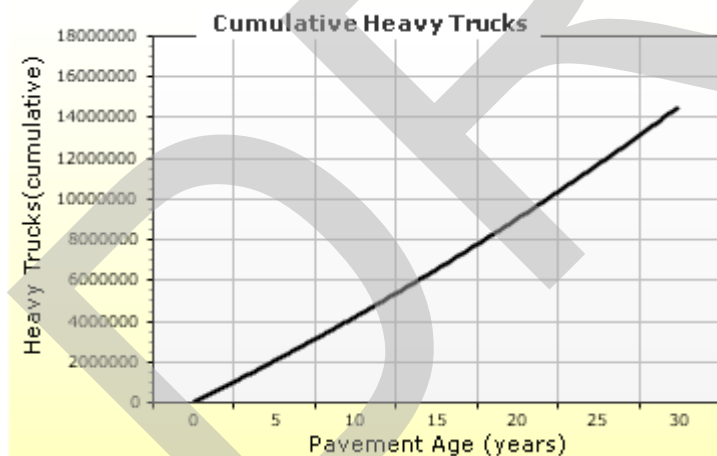
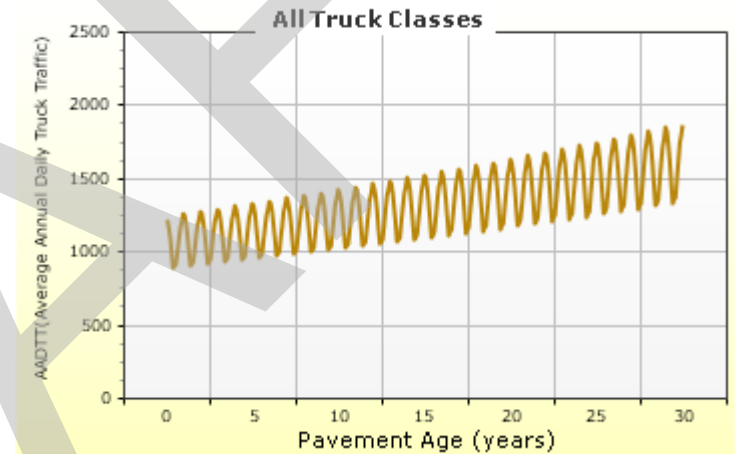
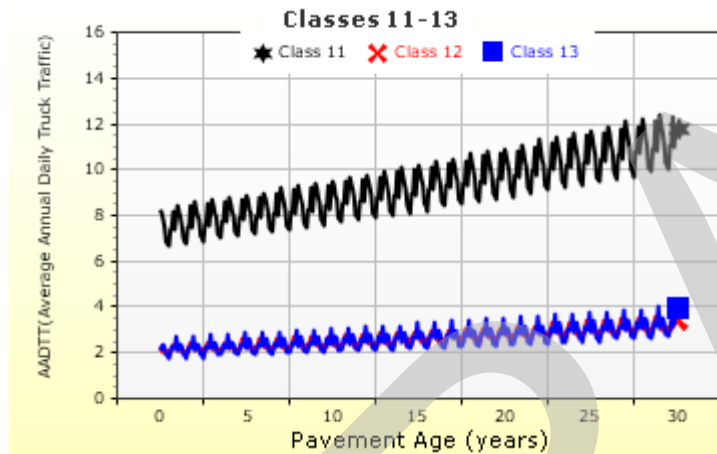
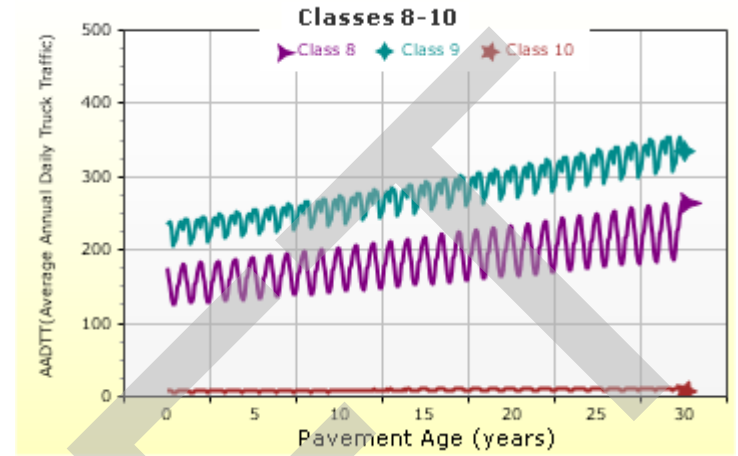
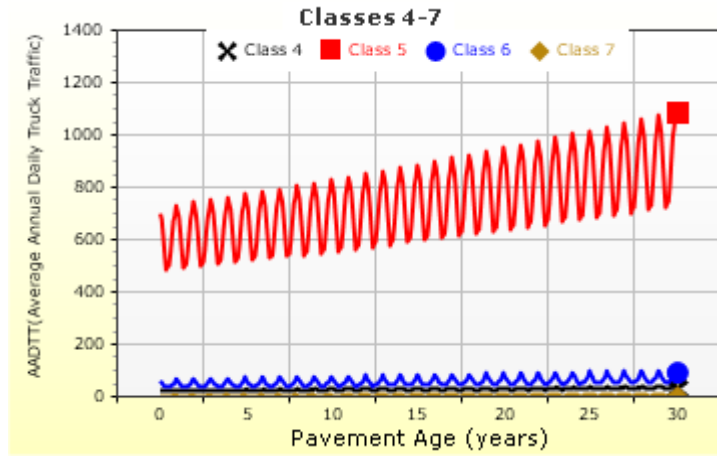
Wheelbase				
Value Type	Axle Type	Short	Medium	Long
Average spacing of axles (ft)		12.0	15.0	18.0
Percent of Trucks (%)		17.0	22.0	61.0

Number of Axles per Truck

Vehicle Class	Single Axle	Tandem Axle	Tridem Axle	Quad Axle
Class 4	1.53	0.45	0	0
Class 5	2.02	0.16	0.02	0
Class 6	1.12	0.93	0	0
Class 7	1.19	0.07	0.45	0.02
Class 8	2.41	0.56	0.02	0
Class 9	1.16	1.88	0.01	0
Class 10	1.05	1.01	0.93	0.02
Class 11	4.35	0.13	0	0
Class 12	3.15	1.22	0.09	0
Class 13	2.77	1.4	0.51	0.04

AADTT (Average Annual Daily Truck Traffic) Growth

* Traffic cap is not enforced



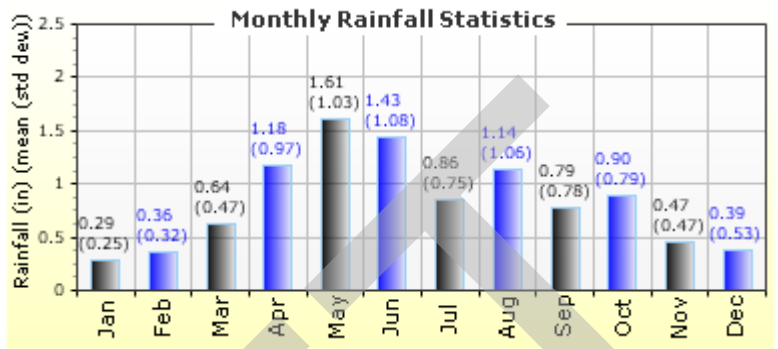
Climate Inputs

Climate Data Sources:

Climate Station Cities: Location (lat lon elevation(ft))
GREELEY, CO 40.43600 -104.61800 4649

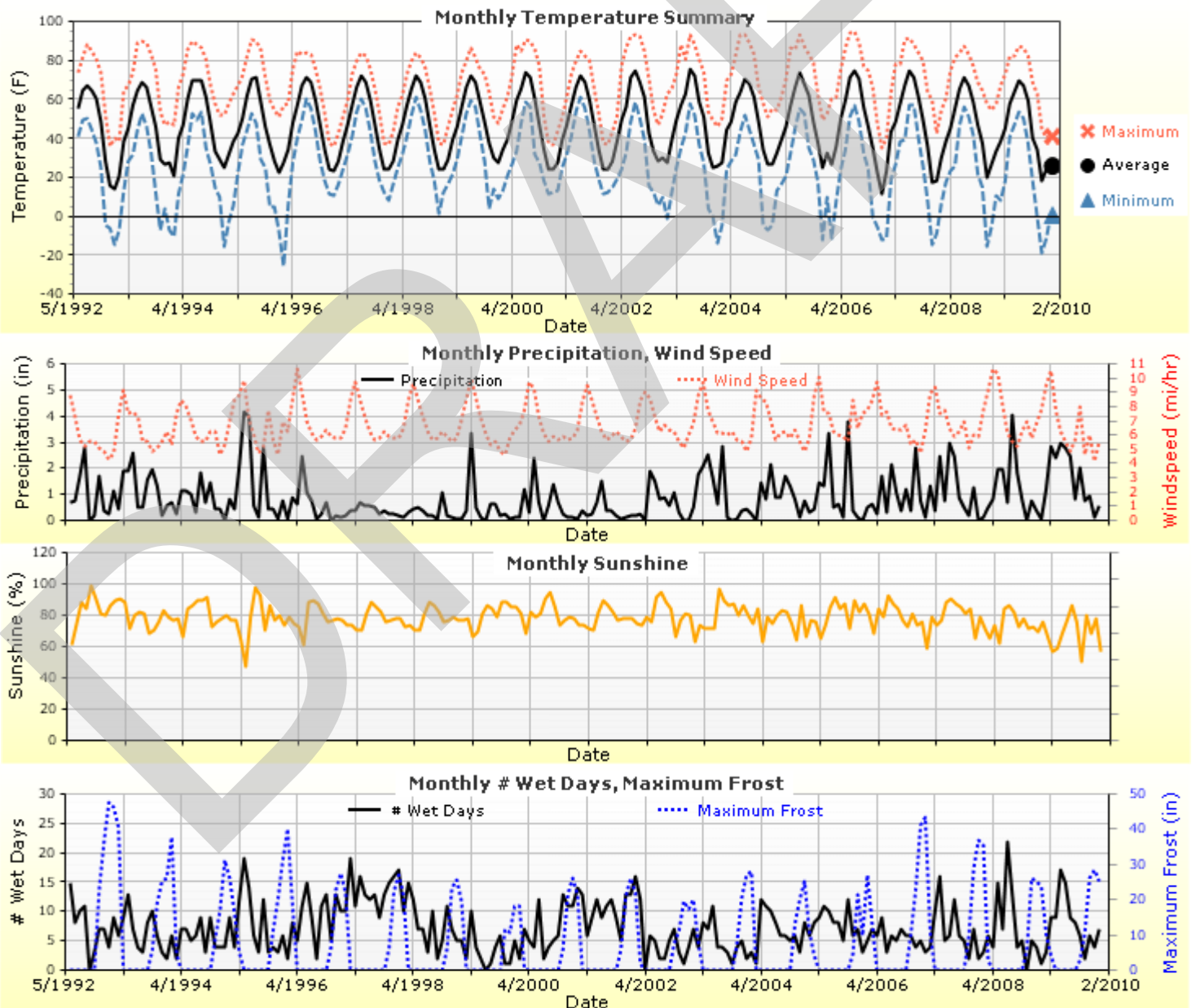
Annual Statistics:

Mean annual air temperature (°F) 47.87
 Mean annual precipitation (in) 10.12
 Freezing index (°F - days) 634.63
 Average annual number of freeze/thaw cycles: 94.81

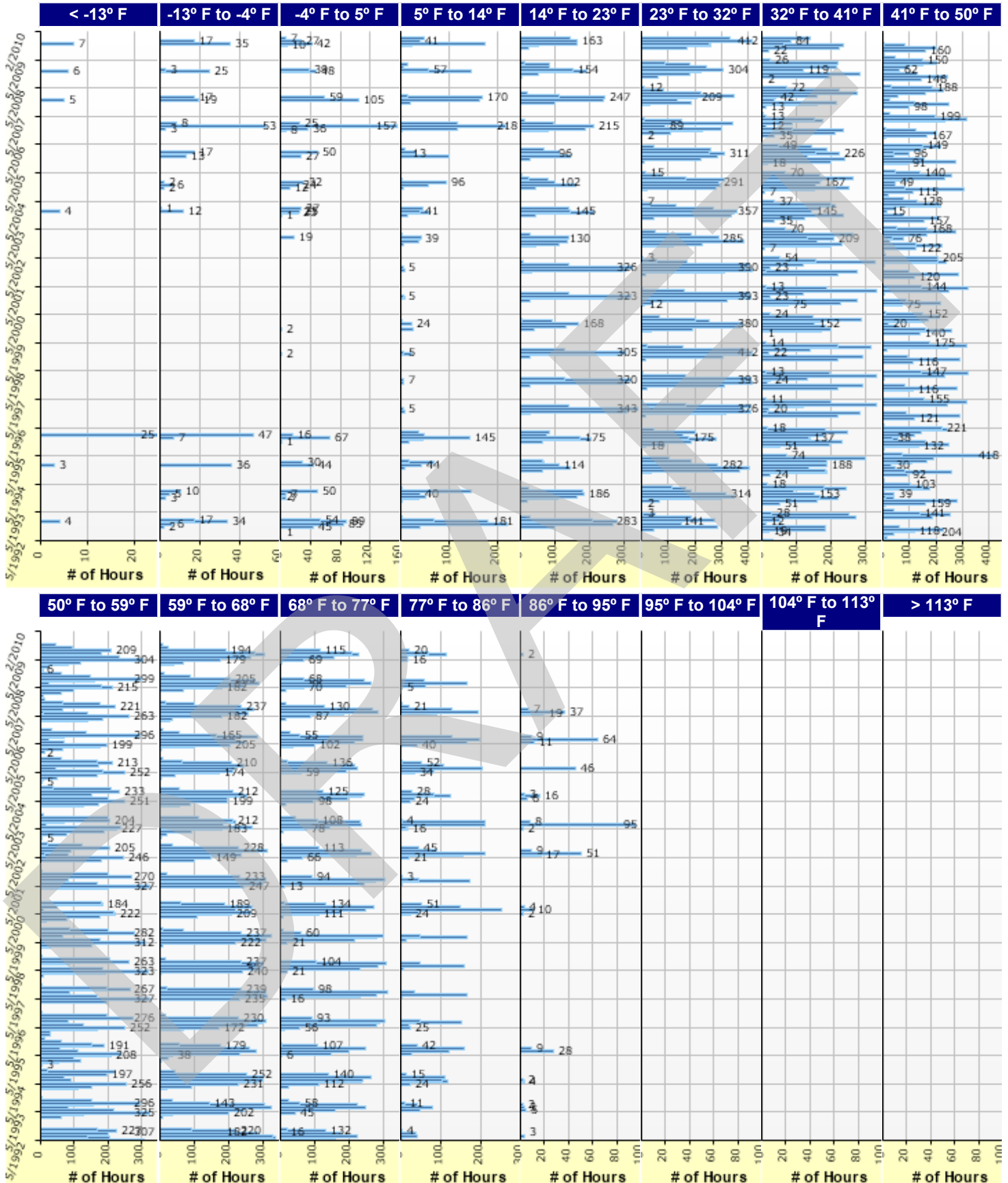


Water table depth (ft) 5.00

Monthly Climate Summary:



Hourly Air Temperature Distribution by Month:



Design Properties

JPCP Design Properties

Structure - ICM Properties

PCC surface shortwave absorptivity	0.85
------------------------------------	------

PCC joint spacing (ft)

Is joint spacing random ?	False
Joint spacing (ft)	15.00

Doweled Joints

Is joint doweled ?	True
Dowel diameter (in)	1.25
Dowel spacing (in)	12.00

Widened Slab

Is slab widened ?	False
Slab width (ft)	12.00

Sealant type

Other(Including No Sealant... Liquid... Silicone)

Tied Shoulders

Tied shoulders	True
Load transfer efficiency (%)	50.00

PCC-Base Contact Friction

PCC-Base full friction contact	True
Months until friction loss	360.00

Erodibility index

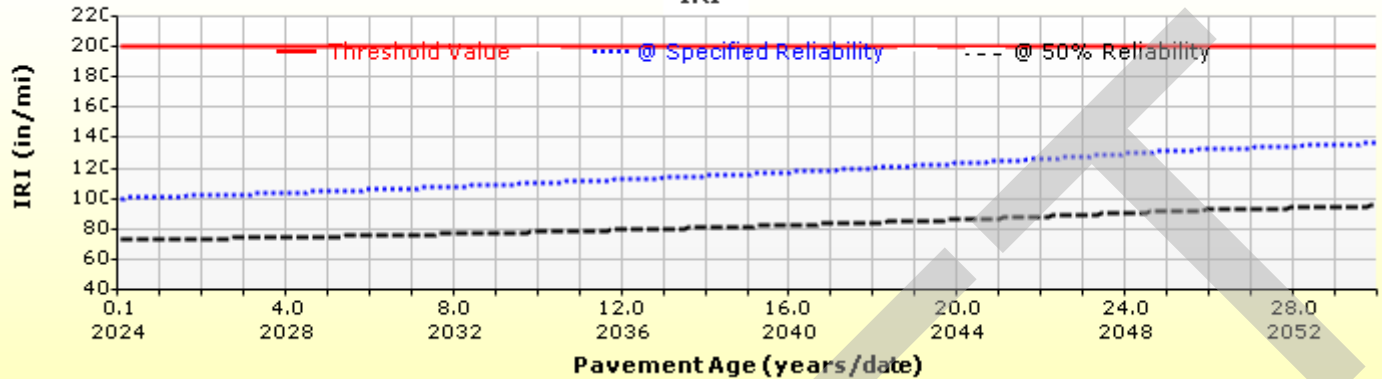
4

Permanent curl/warp effective temperature difference (°F)

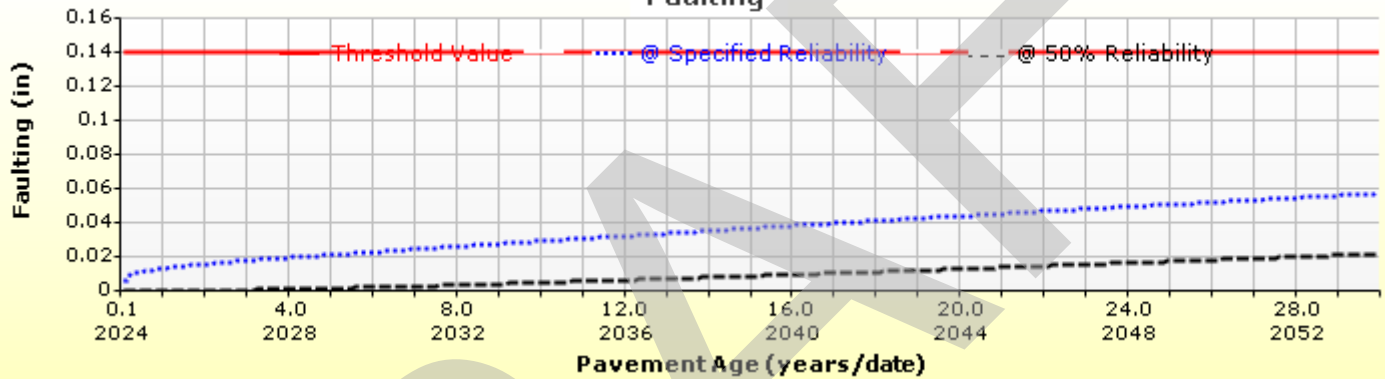
-10.00

Analysis Output Charts

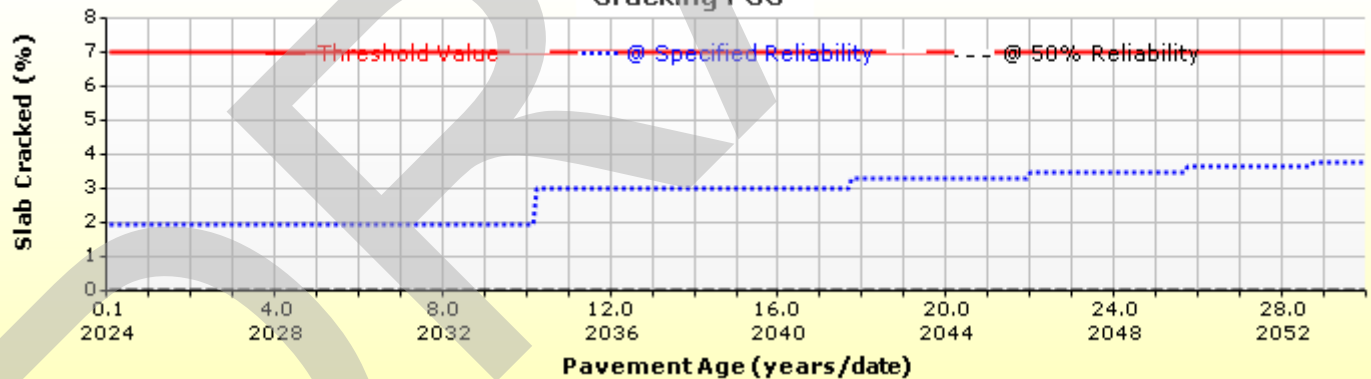
IRI



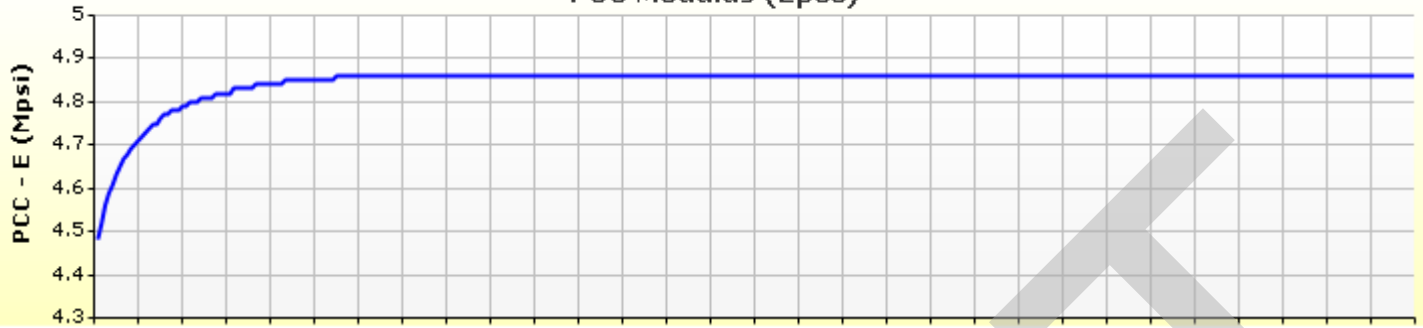
Faulting



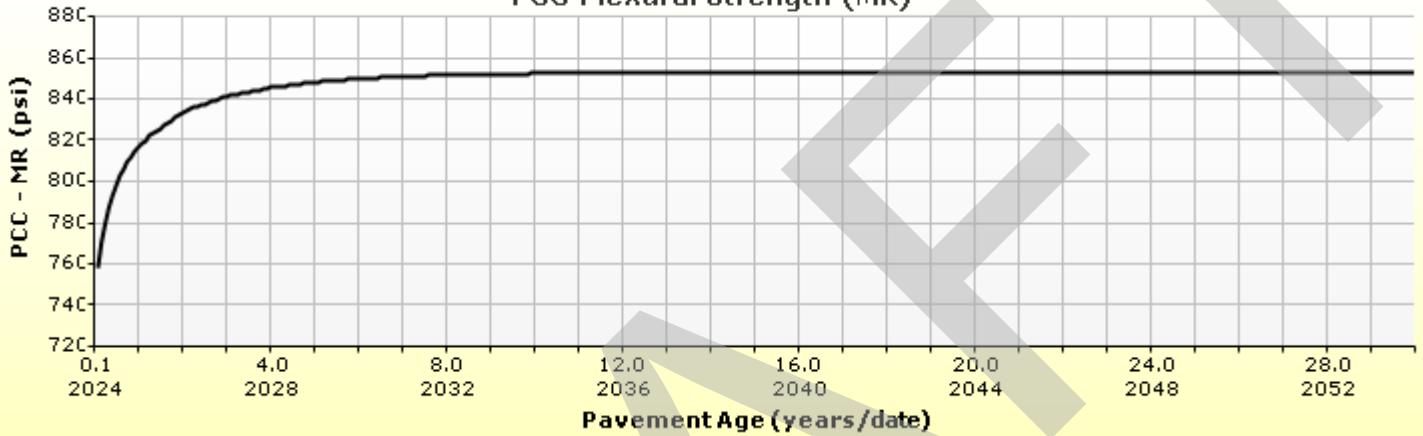
Cracking PCC



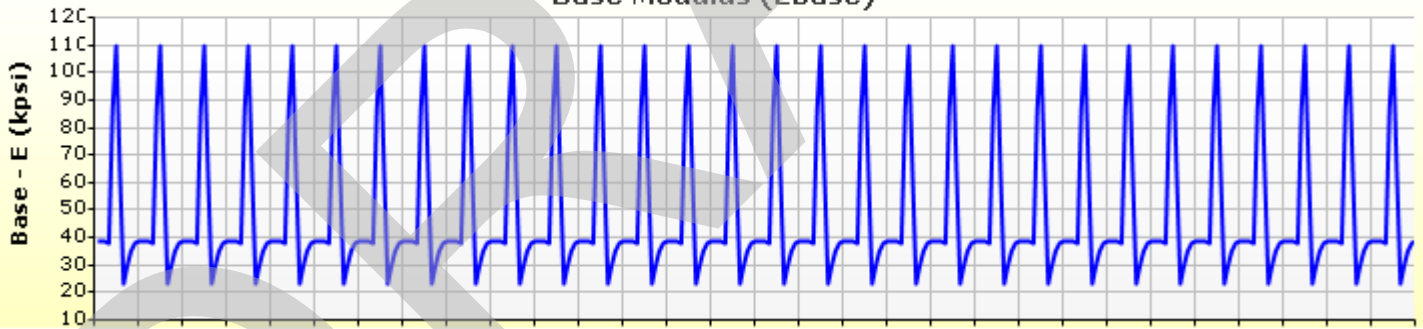
PCC Modulus (Epcc)



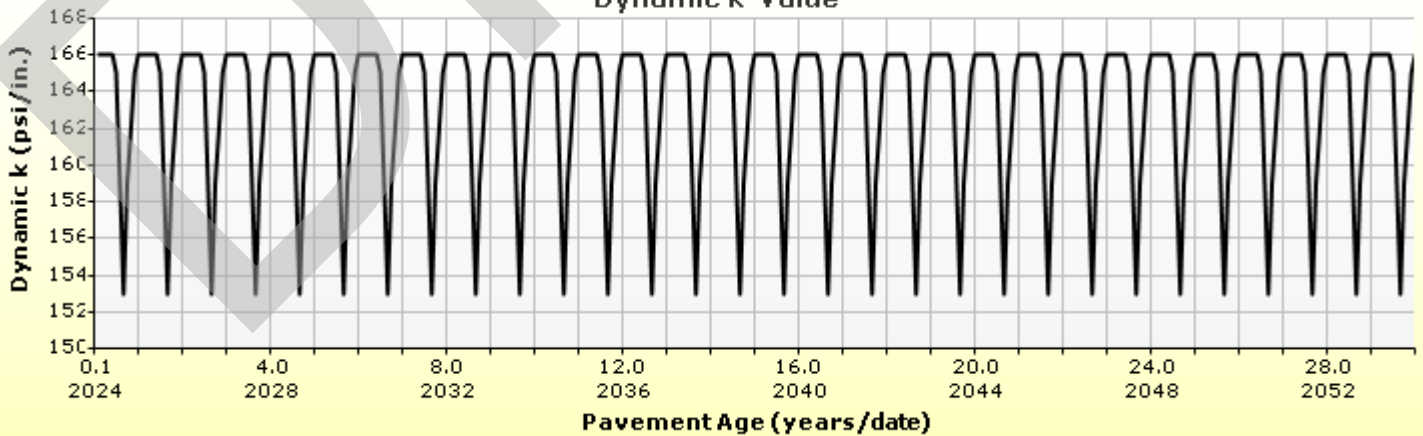
PCC Flexural Strength (MR)

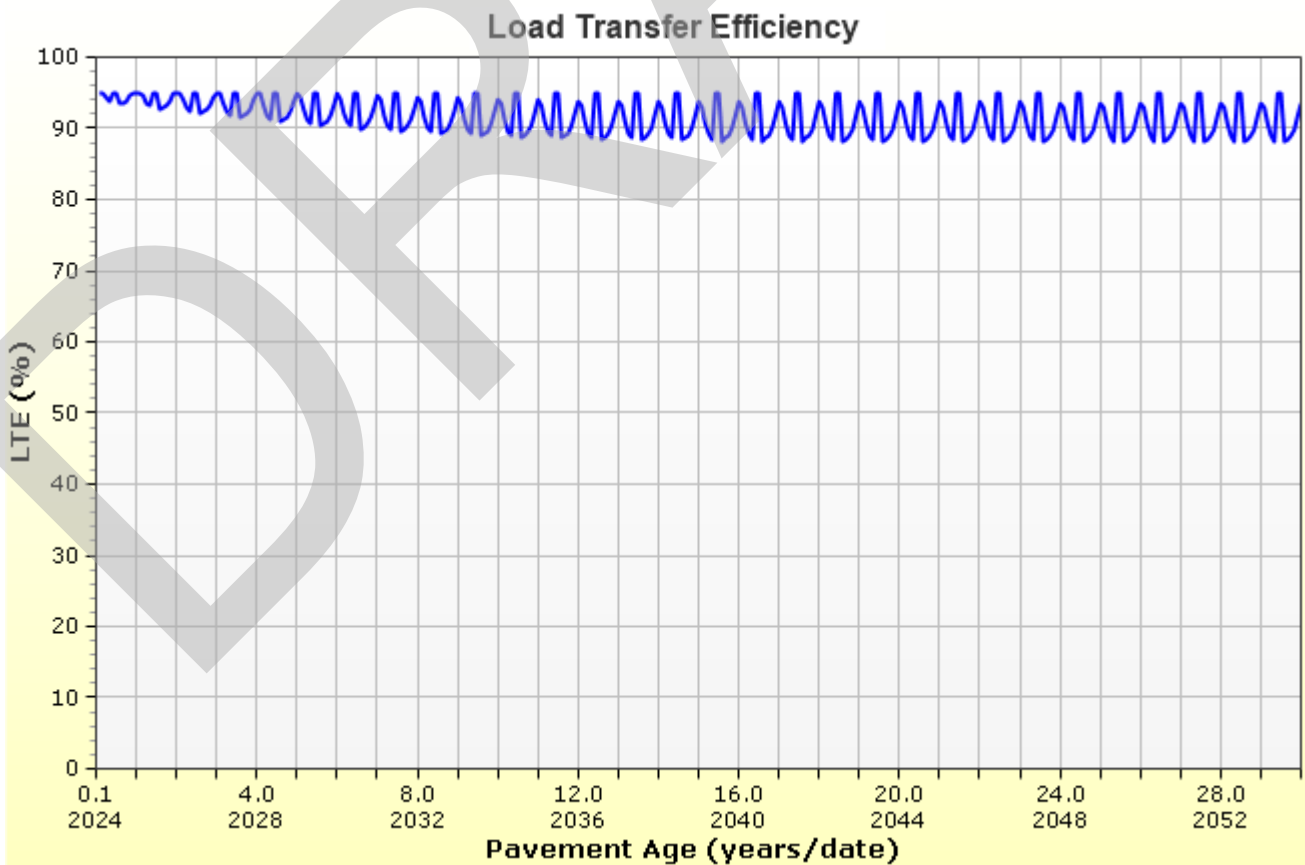
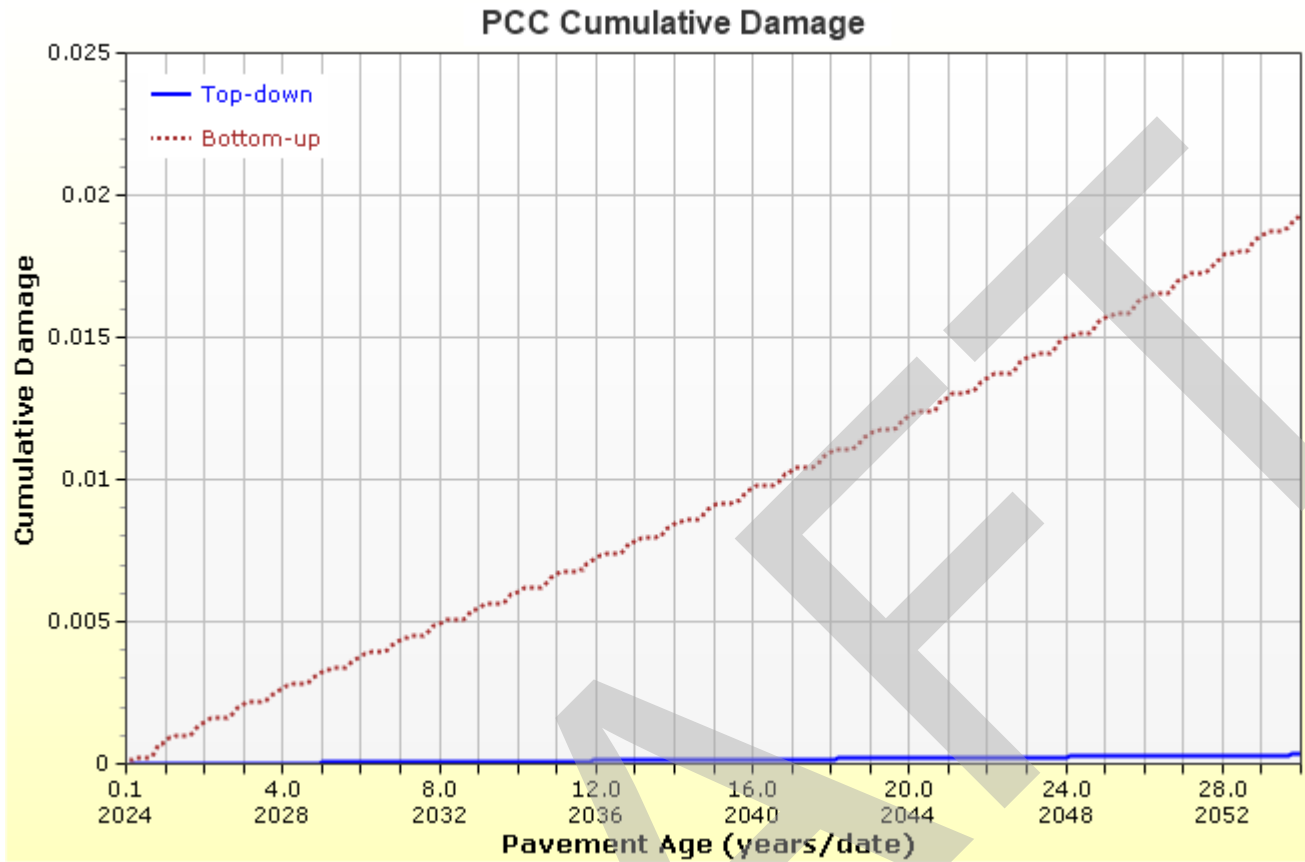


Base Modulus (Ebase)



Dynamic k-Value





Layer Information

Layer 1 PCC : R4 Level 1 Lawson

PCC

Thickness (in)	9.0
Unit weight (pcf)	140.6
Poisson's ratio	0.2

Thermal

PCC coefficient of thermal expansion (in/in/°F x 10 ⁻⁶)	4.86
PCC thermal conductivity (BTU/hr-ft-°F)	1.25
PCC heat capacity (BTU/lb-°F)	0.28

Mix

Cement type		Type I (1)
Cementitious material content (lb/yd^3)		563
Water to cement ratio		0.36
Aggregate type		Dolomite (2)
PCC zero-stress temperature (°F)	Calculated Internally?	True
	User Value	-
	Calculated Value	82.8
Ultimate shrinkage (microstrain)	Calculated Internally?	True
	User Value	-
	Calculated Value	516.0
Reversible shrinkage (%)		50
Time to develop 50% of ultimate shrinkage (days)		35
Curing method		Curing Compound

PCC strength and modulus (Input Level: 1)

Time	Modulus of rupture (psi)	Elastic modulus (psi)
7-day	560	3230000
14-day	620	3500000
28-day	710	4030000
90-day	730	4240000
20-year/28-day	1.2	1.2

Identifiers

Field	Value
Display name/identifier	R4 Level 1 Lawson
Description of object	Mix ID # 2009105
Author	CDOT
Date Created	4/3/2013 12:00:00 AM
Approver	CDOT
Date approved	4/3/2013 12:00:00 AM
State	Colorado
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	Region 4/1/6
User defined field 2	
User defined field 3	
Revision Number	0

Layer 2 Non-stabilized Base : Crushed stone

Unbound

Layer thickness (in)	6.0
Poisson's ratio	0.35
Coefficient of lateral earth pressure (k0)	0.5

Modulus (Input Level: 3)

Analysis Type:	Modify input values by temperature/moisture
Method:	Resilient Modulus (psi)

Resilient Modulus (psi)

25000.0

Use Correction factor for NDT modulus?	-
NDT Correction Factor:	-

Identifiers

Field	Value
Display name/identifier	Crushed stone
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	20

Sieve

Liquid Limit	6.0
Plasticity Index	1.0
Is layer compacted?	True

	Is User Defined?	Value
Maximum dry unit weight (pcf)	False	127.7
Saturated hydraulic conductivity (ft/hr)	False	5.054e-02
Specific gravity of solids	False	2.7
Water Content (%)	False	7.4

User-defined Soil Water Characteristic Curve (SWCC)

Is User Defined?	False
af	7.2555
bf	1.3328
cf	0.8242
hr	117.4000

Sieve Size	% Passing
0.001mm	
0.002mm	
0.020mm	
#200	8.7
#100	
#80	12.9
#60	
#50	
#40	20.0
#30	
#20	
#16	
#10	33.8
#8	
#4	44.7
3/8-in.	57.2
1/2-in.	63.1
3/4-in.	72.7
1-in.	78.8
1 1/2-in.	85.8
2-in.	91.6
2 1/2-in.	
3-in.	
3 1/2-in.	97.6

Layer 3 Subgrade : A-2-4

Unbound

Layer thickness (in)	Semi-infinite
Poisson's ratio	0.35
Coefficient of lateral earth pressure (k0)	0.5

Modulus (Input Level: 3)

Analysis Type:	Modify input values by temperature/moisture
Method:	Resilient Modulus (psi)

Resilient Modulus (psi)

9493.0

Use Correction factor for NDT modulus?	-
NDT Correction Factor:	-

Identifiers

Field	Value
Display name/identifier	A-2-4
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	0

Sieve

Liquid Limit	14.0
Plasticity Index	2.0
Is layer compacted?	True

	Is User Defined?	Value
Maximum dry unit weight (pcf)	False	124.6
Saturated hydraulic conductivity (ft/hr)	False	5.852e-04
Specific gravity of solids	False	2.7
Water Content (%)	False	9

User-defined Soil Water Characteristic Curve (SWCC)

Is User Defined?	False
af	9.5043
bf	0.6439
cf	3.0636
hr	189.6000

Sieve Size	% Passing
0.001mm	
0.002mm	
0.020mm	
#200	22.4
#100	
#80	42.3
#60	
#50	
#40	67.2
#30	
#20	
#16	
#10	82.5
#8	
#4	87.2
3/8-in.	91.6
1/2-in.	93.5
3/4-in.	95.9
1-in.	97.2
1 1/2-in.	98.5
2-in.	99.0
2 1/2-in.	
3-in.	
3 1/2-in.	99.6

Calibration Coefficients

PCC Faulting

$C_{12} = C_1 + (C_2 * FR^{0.25})$ $C_{34} = C_3 + (C_4 * FR^{0.25})$ $FaultMax_0 = C_{12} * \delta_{curling} * \left[\log(1 + C_5 * 5.0^{EROD}) * \log\left(P_{200} * \frac{WetDays}{p_s}\right) \right]^{C_6}$ $FaultMax_i = FaultMax_0 + C_7 * \sum_{j=1}^m DE_j * \log(1 + C_5 * 5.0^{EROD})^{C_6}$ $\Delta Fault_i = C_{34} * (FaultMax_{i-1} - Fault_{i-1})^2 * DE_i$ $C_8 = DowelDeterioration$			
C1: 0.5104	C2: 0.00838	C3: 0.00147	C4: 0.008345
C5: 5999	C6: 0.8404	C7: 5.9293	C8: 400
PCC Reliability Faulting Standard Deviation			
0.0831*Pow(FAULT,0.3426) + 0.00521			

IRI-jpcp

C1 - Cracking	C1: 0.8203	C2: 0.4417
C2 - Spalling	C3: 1.4929	C4: 25.24
C3 - Faulting	Reliability Standard Deviation	
C4 - Site Factor	5.4	

PCC Cracking

$\log(N) = C1 \cdot \left(\frac{MR}{\sigma}\right)^{C2}$ $CRK = \frac{100}{1 + C4 FD^{C5}}$	Fatigue Coefficients		Cracking Coefficients	
	C1: 2	C2: 1.22	C4: 0.6	C5: -2.05
	PCC Reliability Cracking Standard Deviation			
	Pow(57.08*CRACK,0.33) + 1.5			

APPENDIX I

M-E PAVEMENT DESIGN OUTPUT

37TH STREET & 65TH AVENUE INTERSECTION- FLEXIBLE DESIGN



37th and 65th Intersection-flexible

File Name: C:\Users\RSGeoTech\Desktop\PMED Projects\530.02\37th and 65th Intersection-flexible.dgpx



Design Inputs

Design Life: 20 years
Design Type: FLEXIBLE

Base construction: May, 2024
Pavement construction: June, 2024
Traffic opening: September, 2024

Climate Data 40.436, -104.618
Sources (Lat/Lon)

Design Structure

Layer type	Material Type	Thickness (in)
Flexible	R3 Level 1 SX(100) PG 64-28	2.0
Flexible	R2 Level 1 SX(75) PG 64-22	8.0
NonStabilized	Crushed stone	8.0
Subgrade	A-2-4	Semi-infinite

Volumetric at Construction:	
Effective binder content (%)	10.7
Air voids (%)	5.7

Traffic

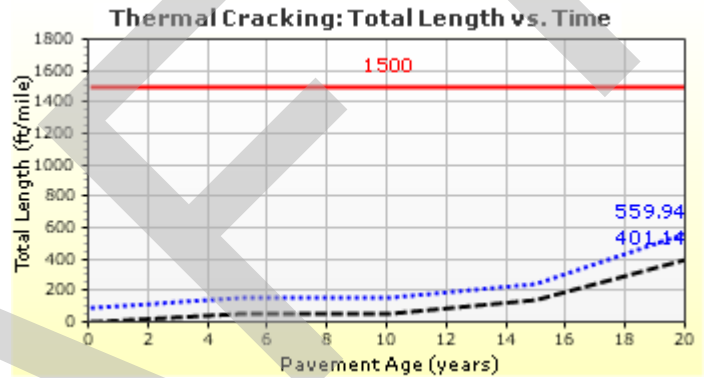
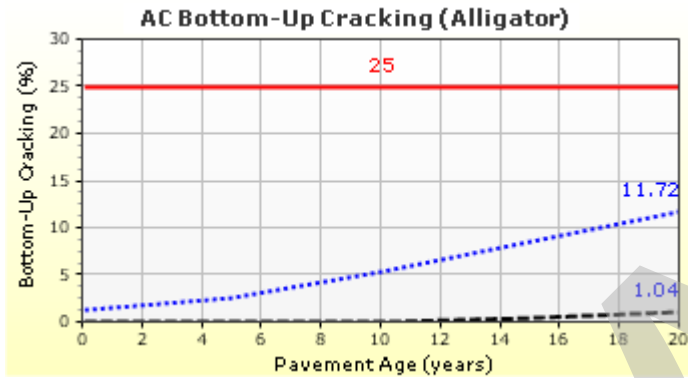
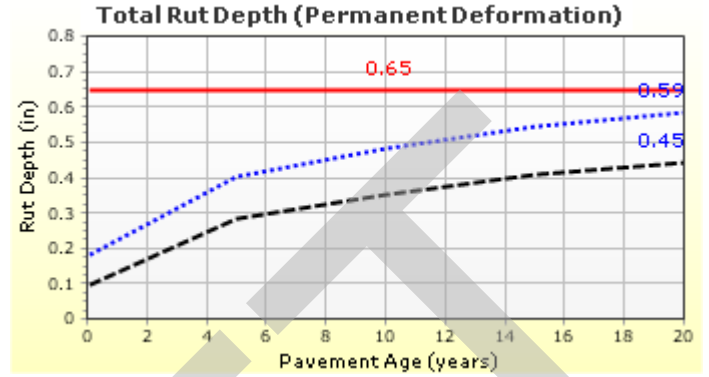
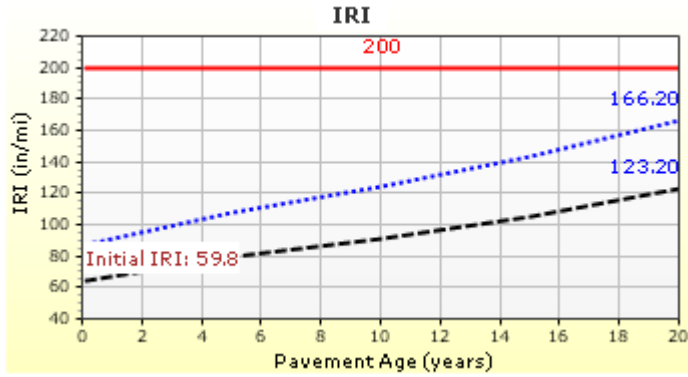
Age (year)	Heavy Trucks (cumulative)
2024 (initial)	4,600
2034 (10 years)	10,730,500
2044 (20 years)	23,037,300

Design Outputs

Distress Prediction Summary

Distress Type	Distress @ Specified Reliability		Reliability (%)		Criterion Satisfied?
	Target	Predicted	Target	Achieved	
Terminal IRI (in/mile)	200.00	166.22	90.00	98.89	Pass
Permanent deformation - total pavement (in)	0.65	0.59	90.00	96.89	Pass
AC bottom-up fatigue cracking (% lane area)	25.00	11.72	90.00	99.80	Pass
AC thermal cracking (ft/mile)	1500.00	559.94	90.00	100.00	Pass
AC top-down fatigue cracking (ft/mile)	2500.00	301.12	90.00	100.00	Pass
Permanent deformation - AC only (in)	0.50	0.45	90.00	95.76	Pass

Distress Charts



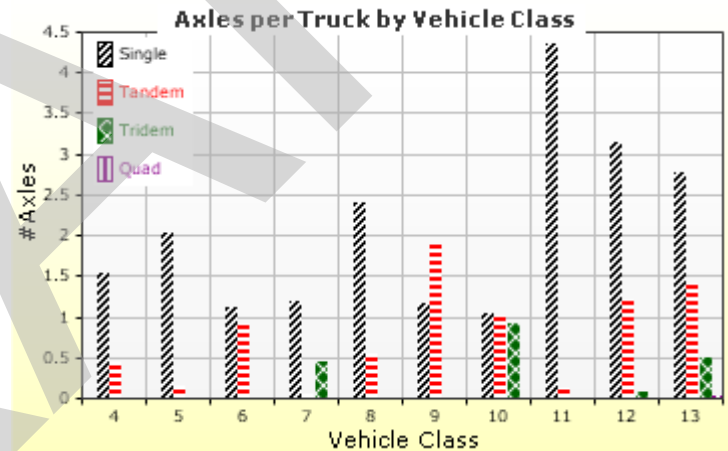
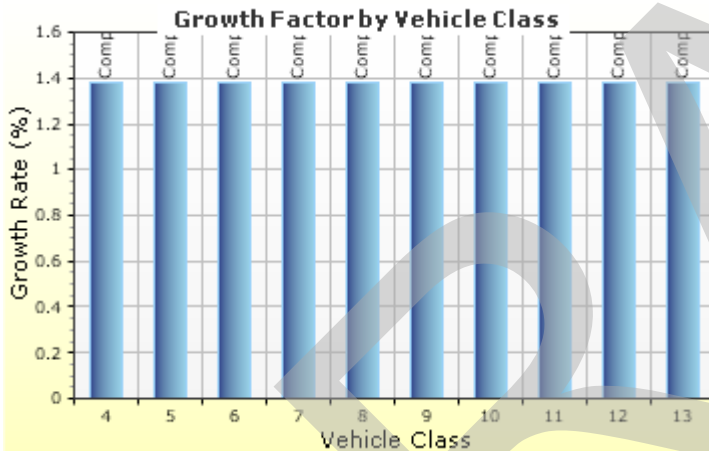
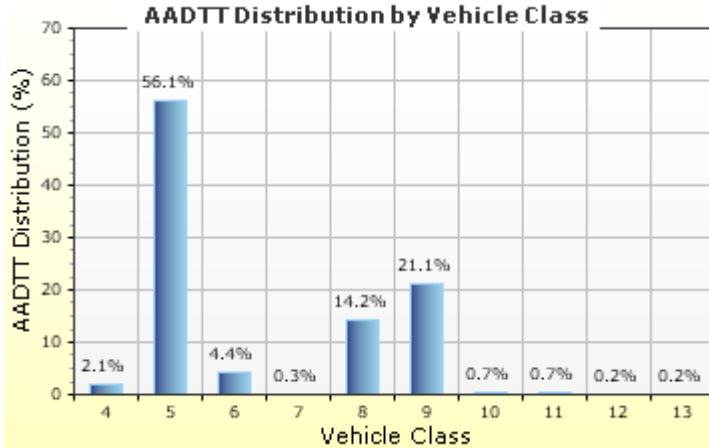
— Threshold Value @ Specified Reliability --- @ 50% Reliability

Traffic Inputs

Graphical Representation of Traffic Inputs

Initial two-way AADTT: 4,600
Number of lanes in design direction: 2

Percent of trucks in design direction (%): 60.0
Percent of trucks in design lane (%): 100.0
Operational speed (mph): 35.0



Traffic Volume Monthly Adjustment Factors



Tabular Representation of Traffic Inputs

Volume Monthly Adjustment Factors

Level 3: Default MAF

Month	Vehicle Class									
	4	5	6	7	8	9	10	11	12	13
January	0.9	0.8	0.8	0.7	0.8	0.9	0.9	0.9	0.9	0.9
February	0.9	0.8	0.8	0.8	0.9	0.9	0.9	0.9	1.0	0.8
March	1.0	0.9	0.8	1.1	1.0	1.0	1.0	1.0	0.9	0.9
April	1.0	1.0	0.9	1.0	1.0	1.0	1.1	1.0	1.0	1.1
May	1.1	1.1	1.0	1.3	1.1	1.0	1.1	1.1	1.1	1.0
June	1.1	1.1	1.2	1.1	1.1	1.0	1.1	1.0	1.1	1.0
July	1.1	1.2	1.5	1.3	1.2	1.0	1.1	1.1	1.1	1.3
August	1.1	1.2	1.3	1.0	1.1	1.0	1.1	1.1	1.1	1.0
September	1.1	1.1	1.1	1.0	1.1	1.0	1.1	1.1	1.0	1.1
October	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.1
November	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0
December	0.9	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.9	0.9

Distributions by Vehicle Class

Vehicle Class	AADTT Distribution (%) (Level 3)	Growth Factor	
		Rate (%)	Function
Class 4	2.1%	1.38%	Compound
Class 5	56.1%	1.38%	Compound
Class 6	4.4%	1.38%	Compound
Class 7	0.3%	1.38%	Compound
Class 8	14.2%	1.38%	Compound
Class 9	21.1%	1.38%	Compound
Class 10	0.7%	1.38%	Compound
Class 11	0.7%	1.38%	Compound
Class 12	0.2%	1.38%	Compound
Class 13	0.2%	1.38%	Compound

Truck Distribution by Hour does not apply

Axle Configuration

Traffic Wander	
Mean wheel location (in)	18.0
Traffic wander standard deviation (in)	10.0
Design lane width (ft)	12.0

Axle Configuration	
Average axle width (ft)	8.5
Dual tire spacing (in)	12.0
Tire pressure (psi)	120.0

Average Axle Spacing	
Tandem axle spacing (in)	51.6
Tridem axle spacing (in)	49.2
Quad axle spacing (in)	49.2

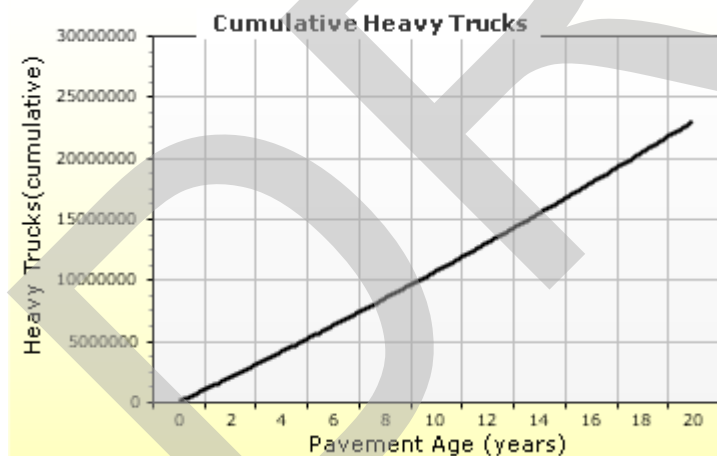
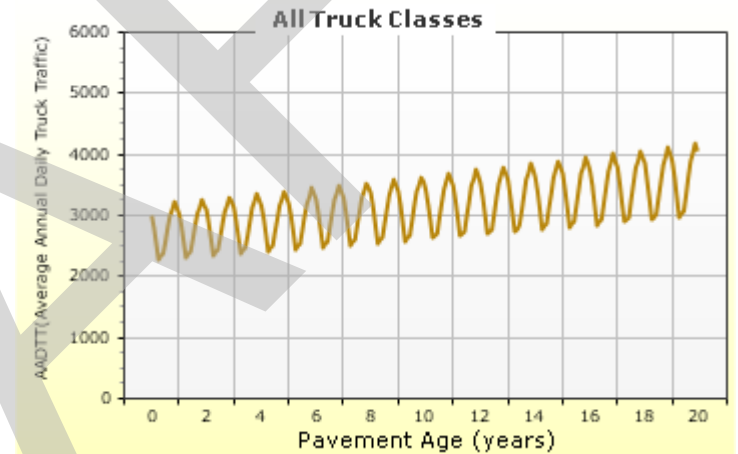
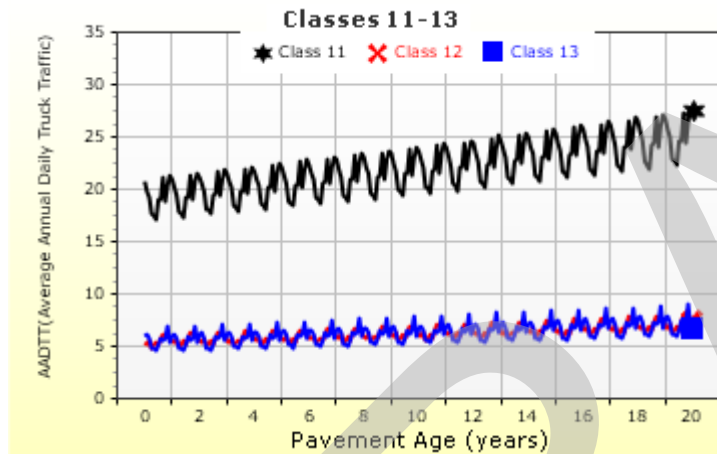
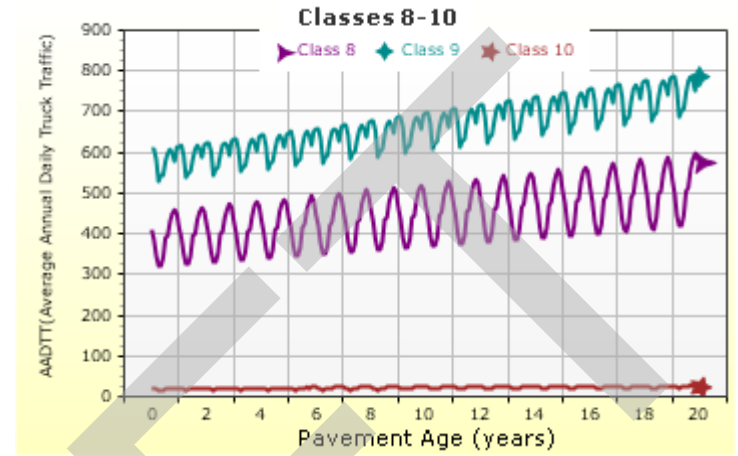
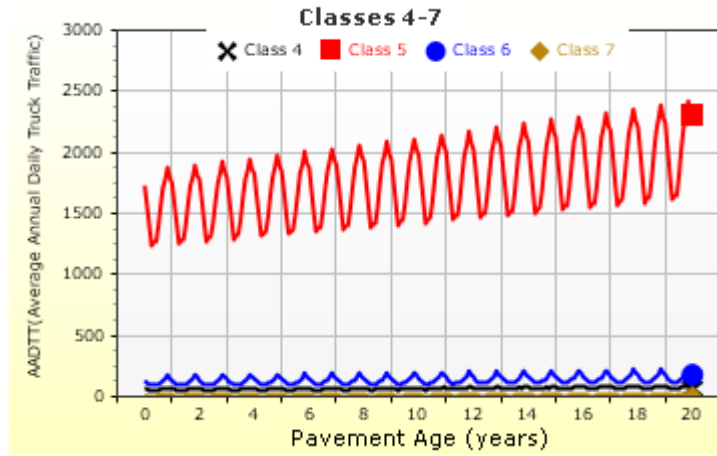
Wheelbase does not apply

Number of Axles per Truck

Vehicle Class	Single Axle	Tandem Axle	Tridem Axle	Quad Axle
Class 4	1.53	0.45	0	0
Class 5	2.02	0.16	0.02	0
Class 6	1.12	0.93	0	0
Class 7	1.19	0.07	0.45	0.02
Class 8	2.41	0.56	0.02	0
Class 9	1.16	1.88	0.01	0
Class 10	1.05	1.01	0.93	0.02
Class 11	4.35	0.13	0	0
Class 12	3.15	1.22	0.09	0
Class 13	2.77	1.4	0.51	0.04

AADTT (Average Annual Daily Truck Traffic) Growth

* Traffic cap is not enforced



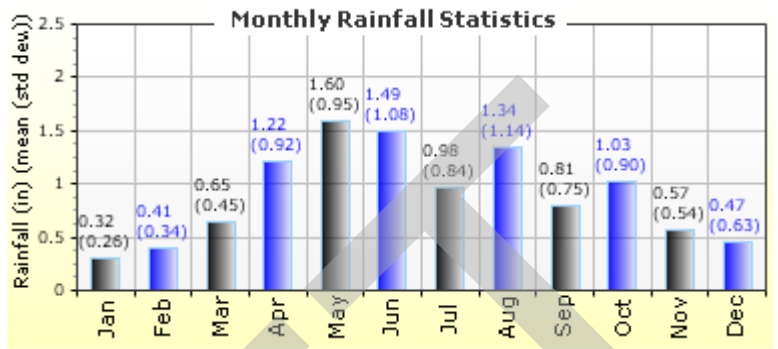
Climate Inputs

Climate Data Sources:

Climate Station Cities: Location (lat lon elevation(ft))
GREELEY, CO 40.43600 -104.61800 4649

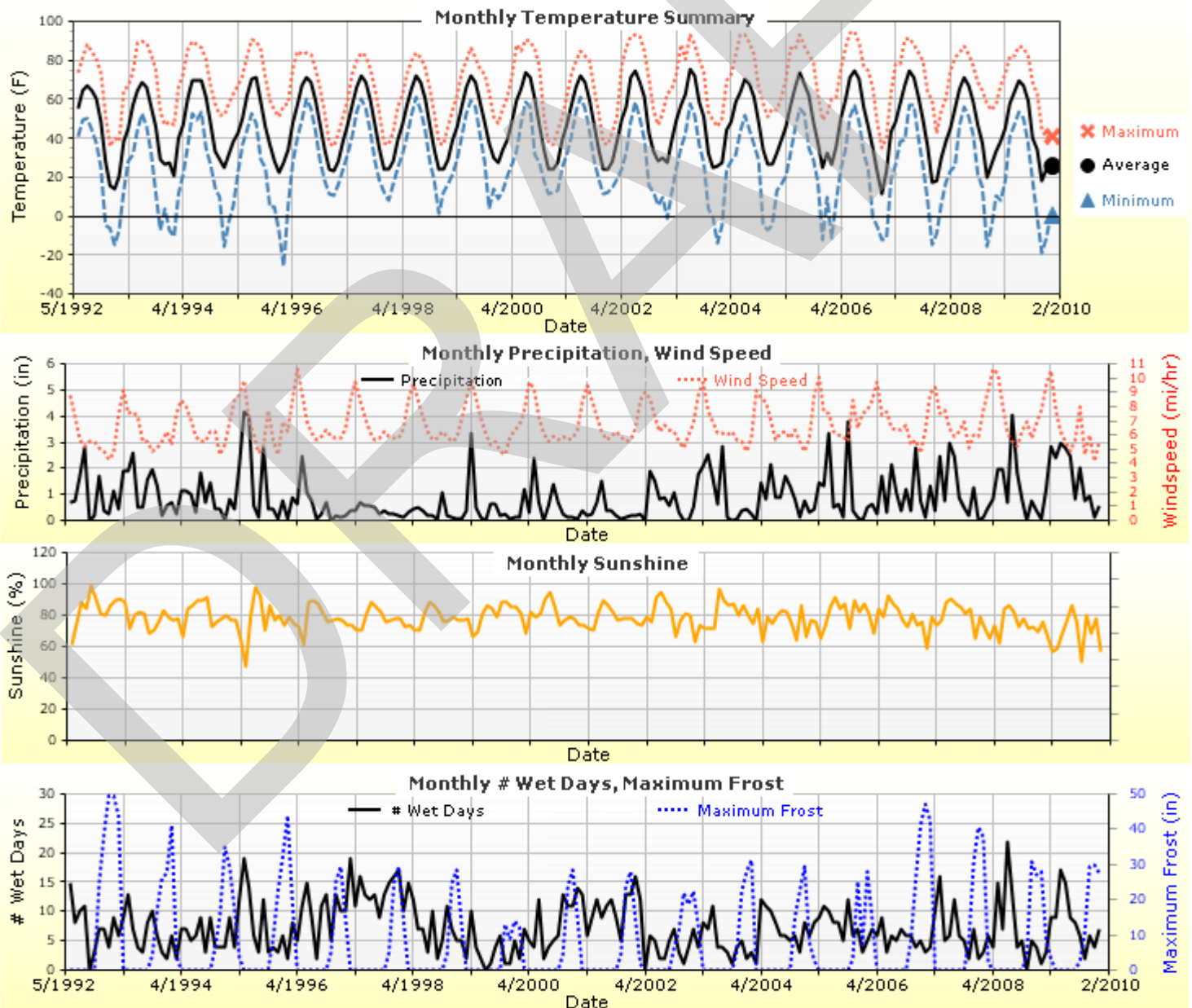
Annual Statistics:

Mean annual air temperature (°F) 47.82
 Mean annual precipitation (in) 10.98
 Freezing index (°F - days) 684.18
 Average annual number of freeze/thaw cycles: 94.81

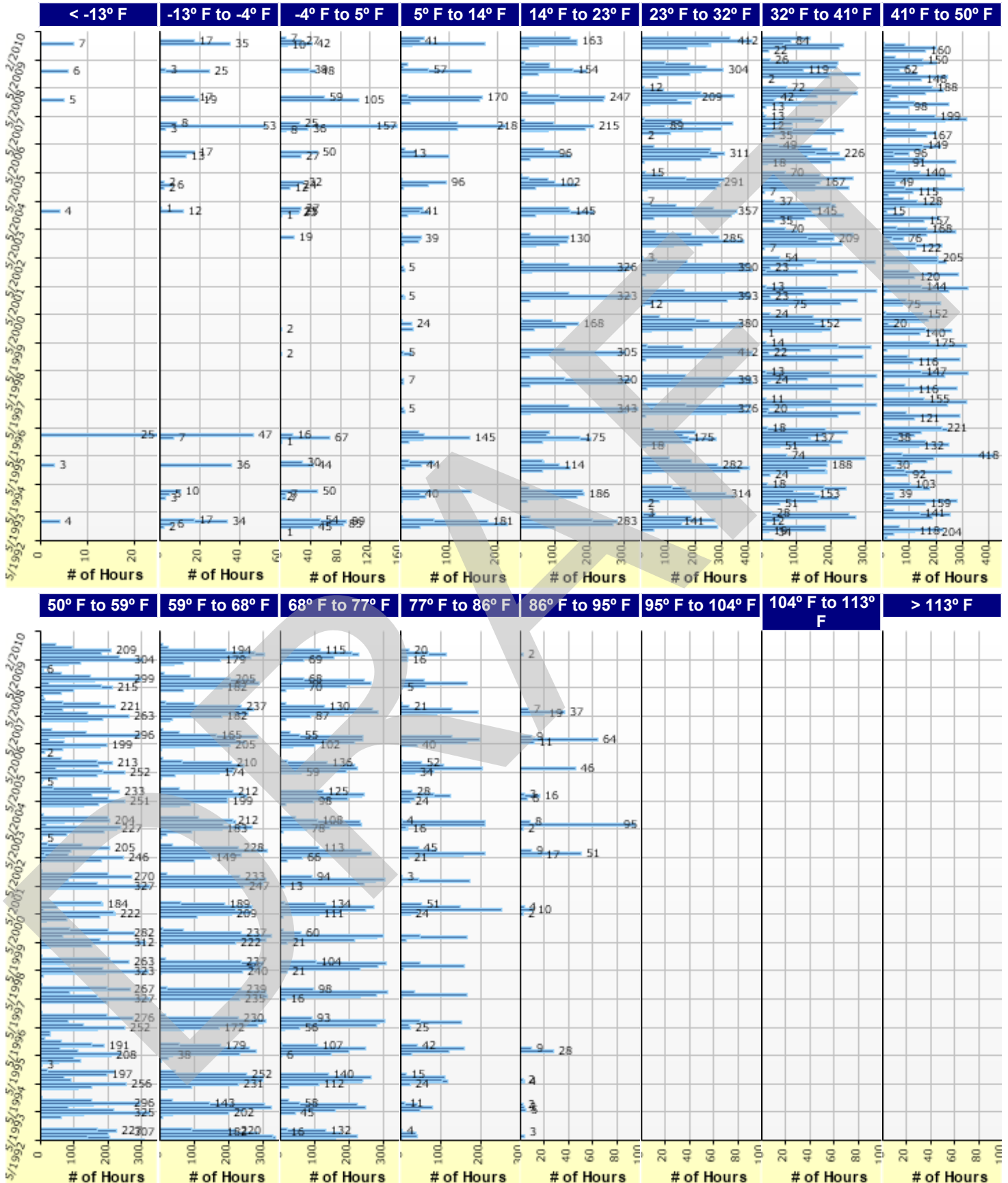


Water table depth (ft) 5.00

Monthly Climate Summary:



Hourly Air Temperature Distribution by Month:





37th and 65th Intersection-flexible

File Name: C:\Users\RSGeoTech\Desktop\PMED Projects\530.02\37th and 65th Intersection-flexible.dgpx



Design Properties

HMA Design Properties

Use Multilayer Rutting Model	False
Using G* based model (not nationally calibrated)	False
Is NCHRP 1-37A HMA Rutting Model Coefficients	True
Endurance Limit	-
Use Reflective Cracking	True

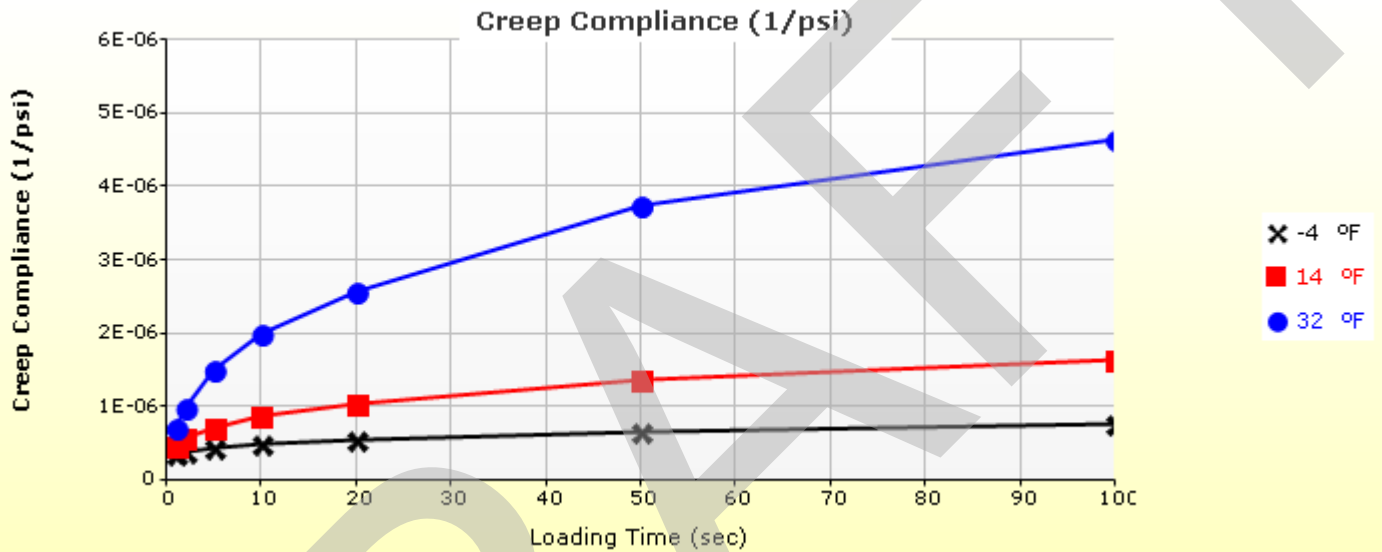
Structure - ICM Properties	
AC surface shortwave absorptivity	0.85

Layer Name	Layer Type	Interface Friction
Layer 1 Flexible : R3 Level 1 SX (100) PG 64-28	Flexible (1)	1.00
Layer 2 Flexible : R2 Level 1 SX (75) PG 64-22	Flexible (1)	1.00
Layer 3 Non-stabilized Base : Crushed stone	Non-stabilized Base (4)	1.00
Layer 4 Subgrade : A-2-4	Subgrade (5)	-

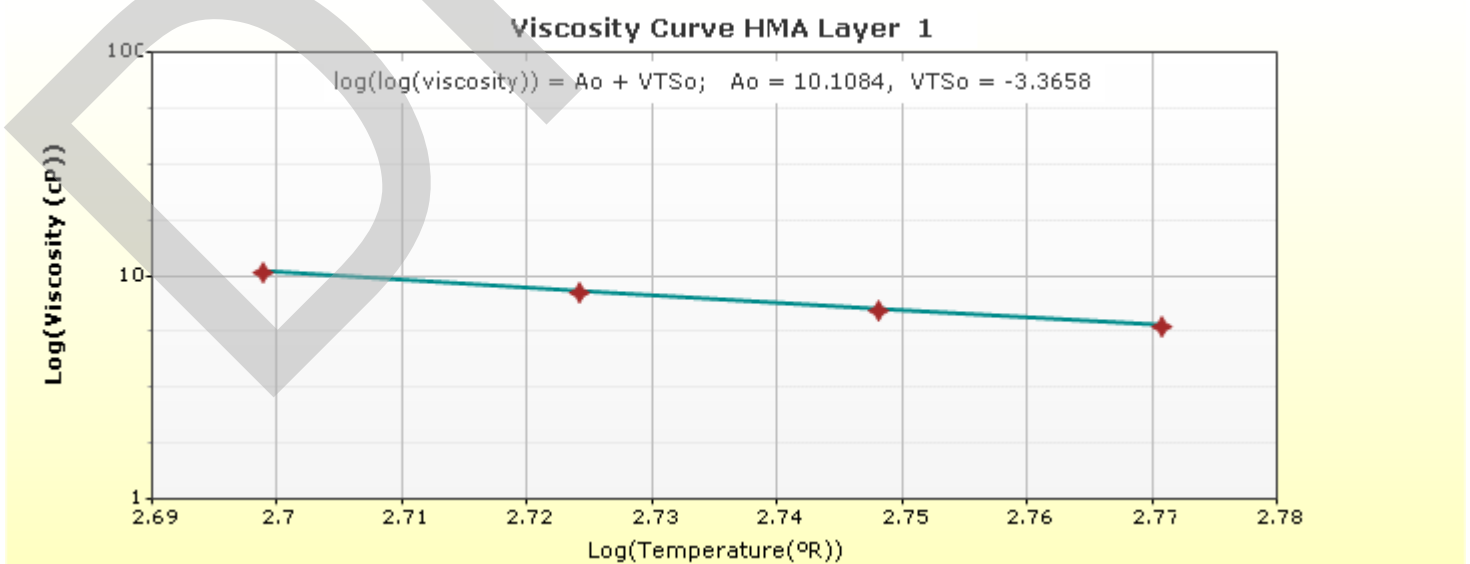
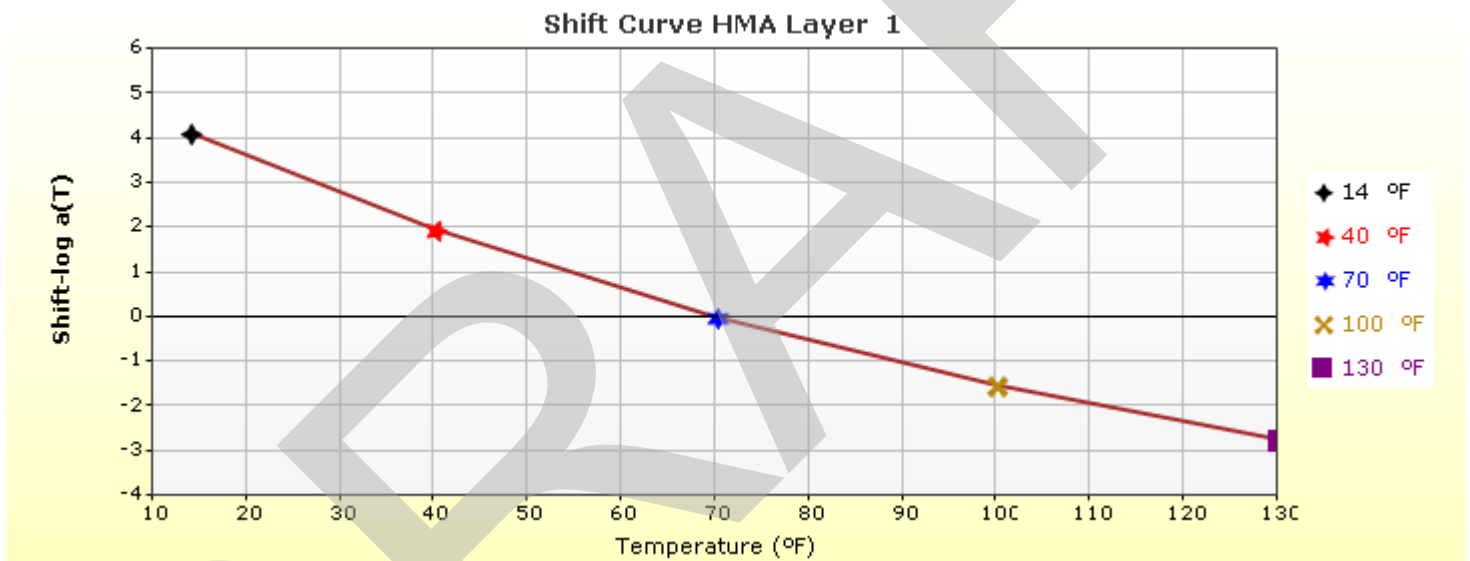
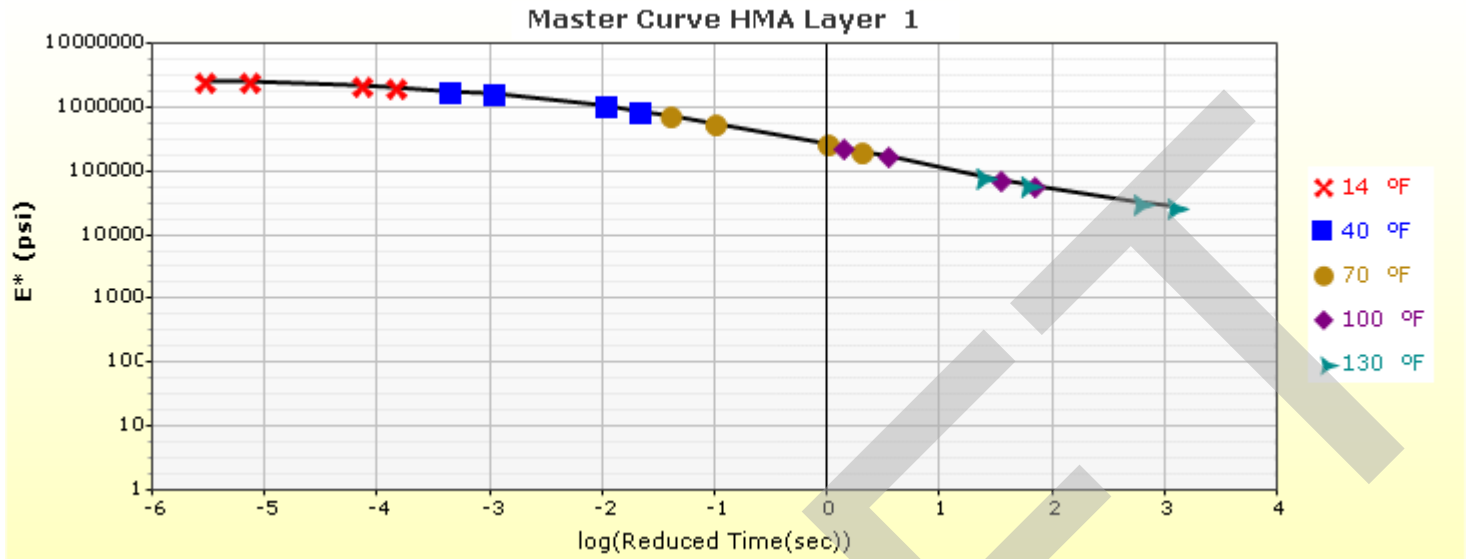
Thermal Cracking (Input Level: 1)

Indirect tensile strength at 14 °F (psi)	519.00
Thermal Contraction	
Is thermal contraction calculated?	True
Mix coefficient of thermal contraction (in/in/°F)	-
Aggregate coefficient of thermal contraction (in/in/°F)	5.0e-006
Voids in Mineral Aggregate (%)	16.4

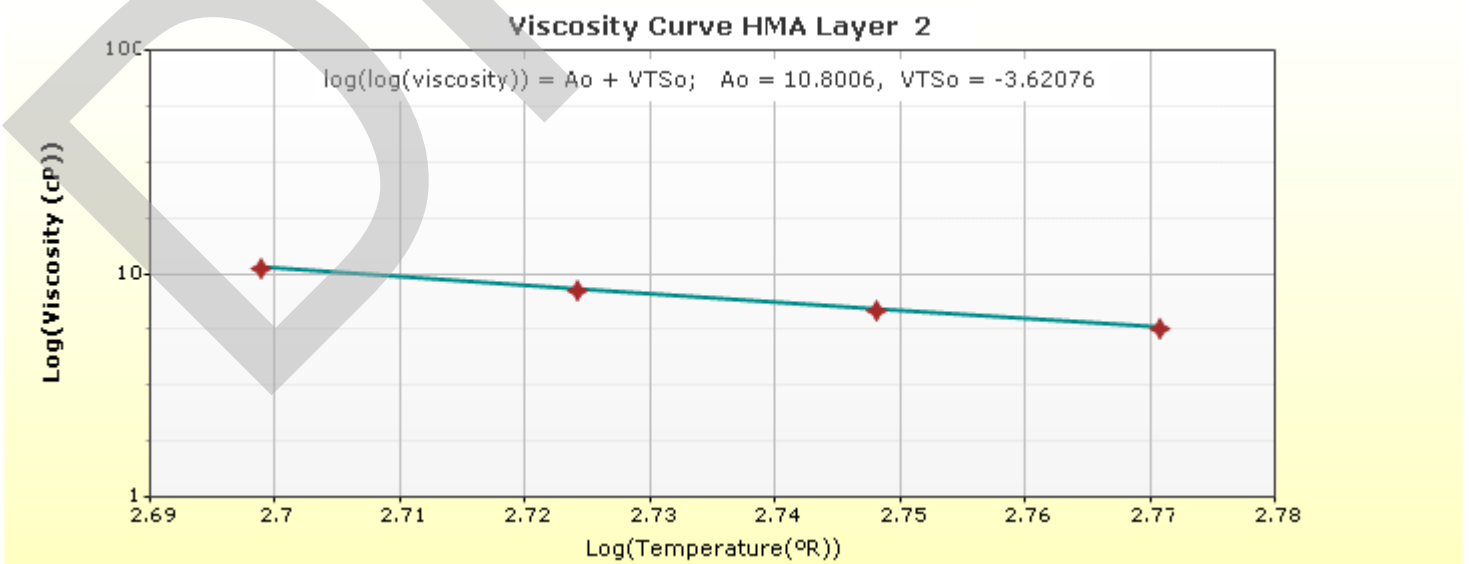
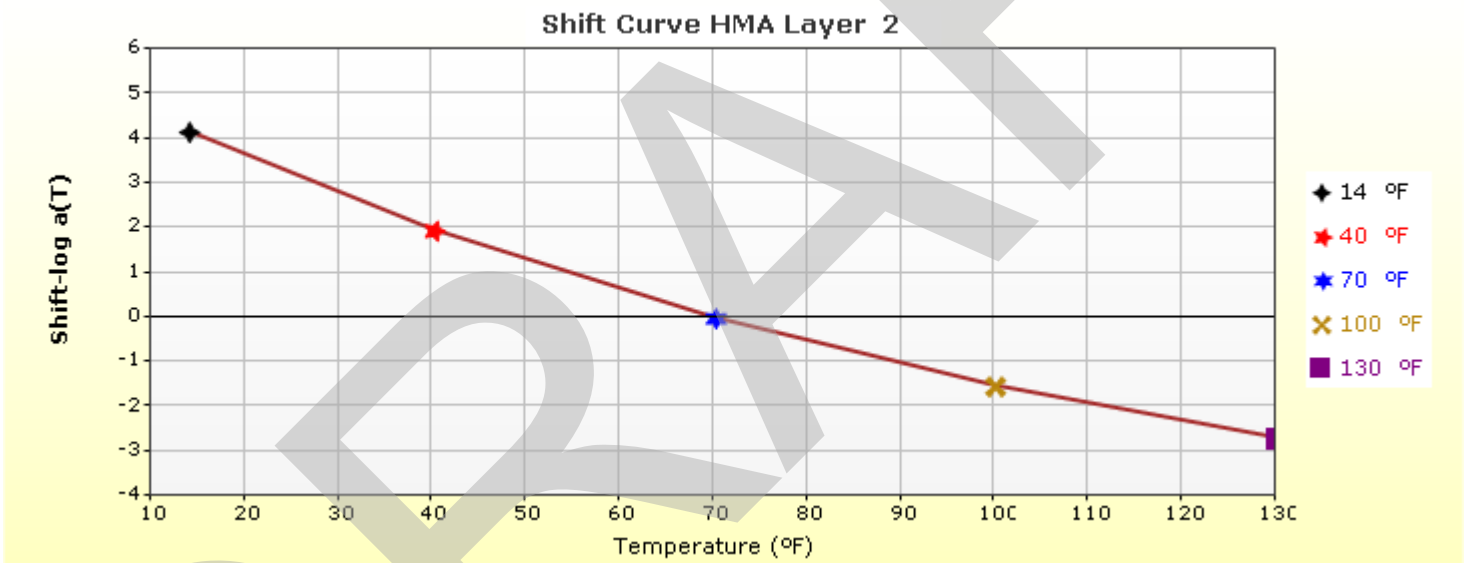
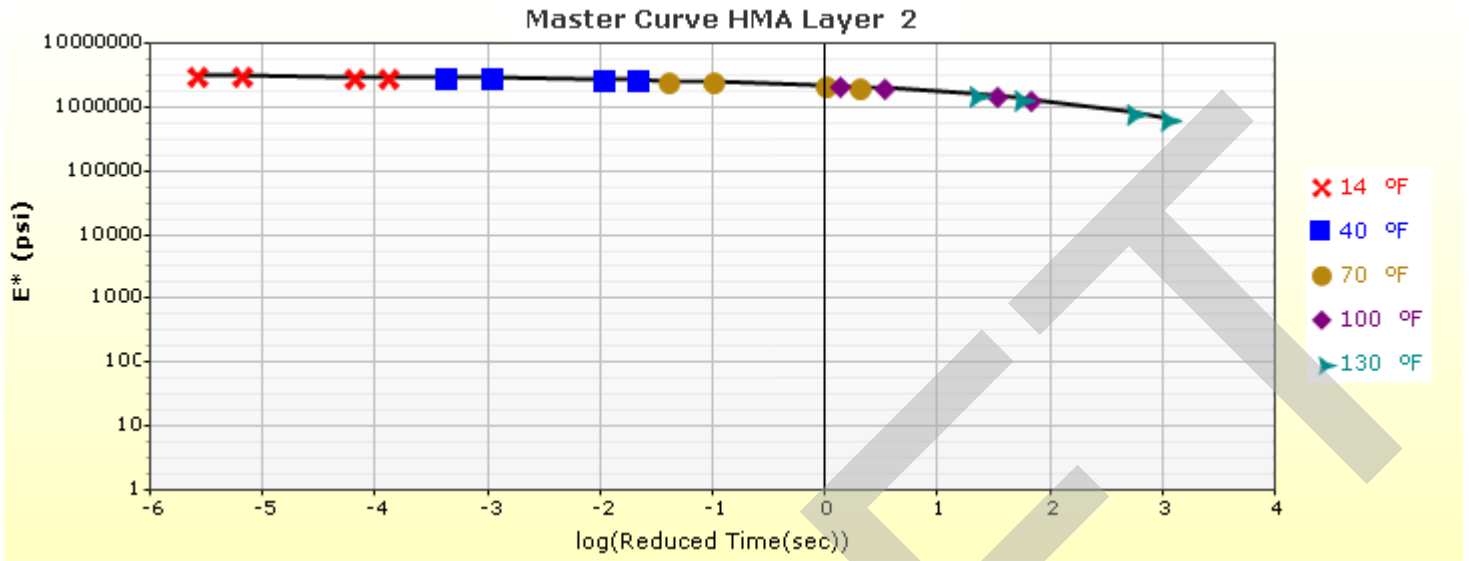
Loading time (sec)	Creep Compliance (1/psi)		
	-4 °F	14 °F	32 °F
1	3.61e-007	4.73e-007	7.12e-007
2	4.04e-007	5.74e-007	9.97e-007
5	4.51e-007	7.35e-007	1.52e-006
10	5.11e-007	8.78e-007	1.99e-006
20	5.67e-007	1.04e-006	2.59e-006
50	6.57e-007	1.37e-006	3.75e-006
100	7.68e-007	1.66e-006	4.66e-006



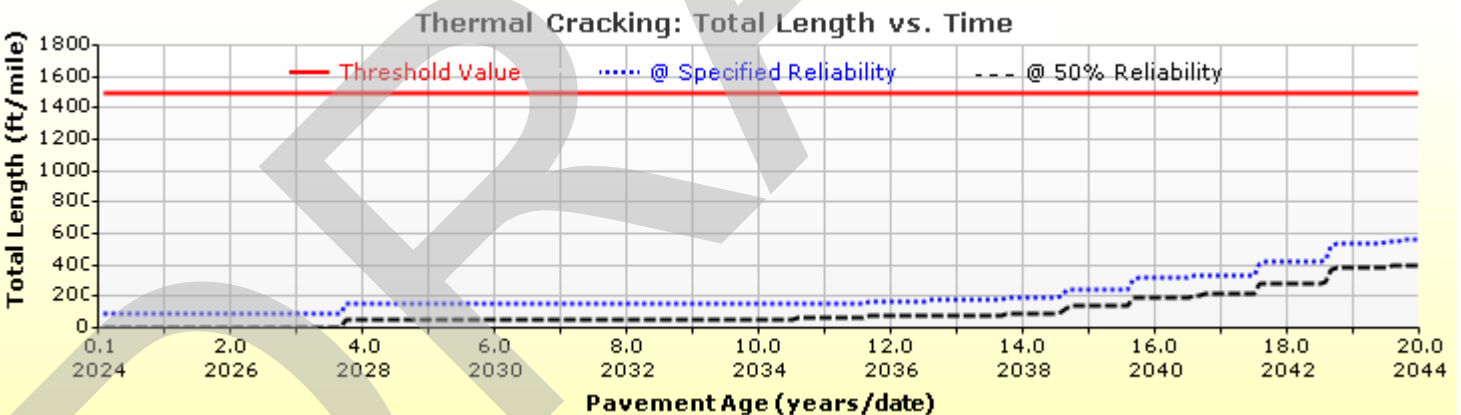
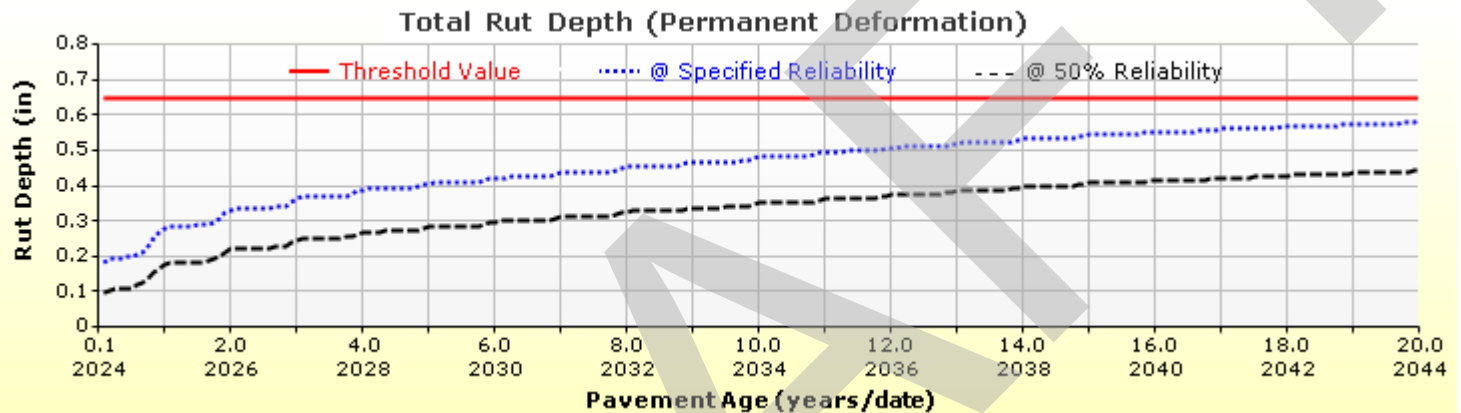
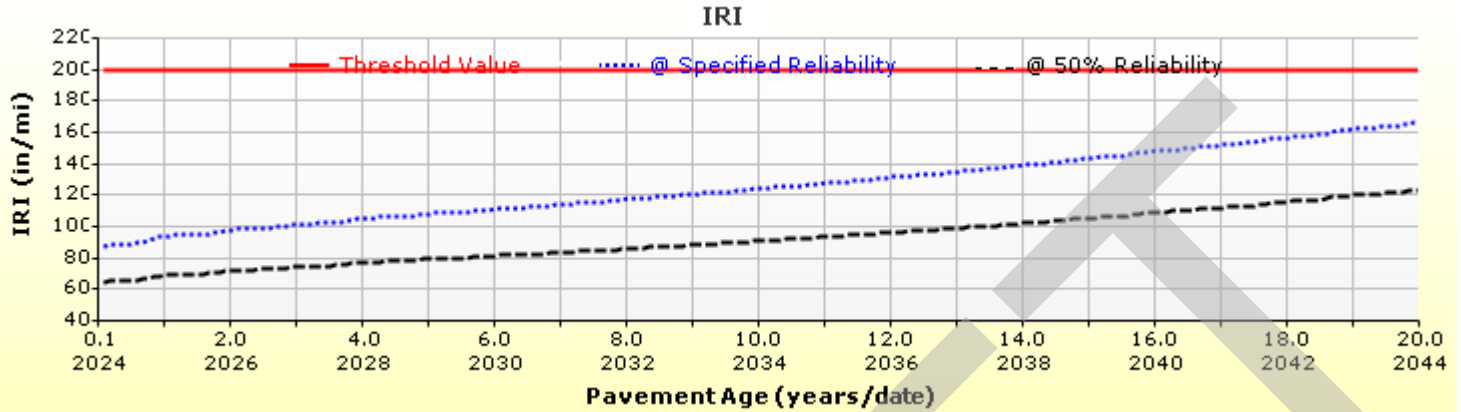
HMA Layer 1: Layer 1 Flexible : R3 Level 1 SX(100) PG 64-28

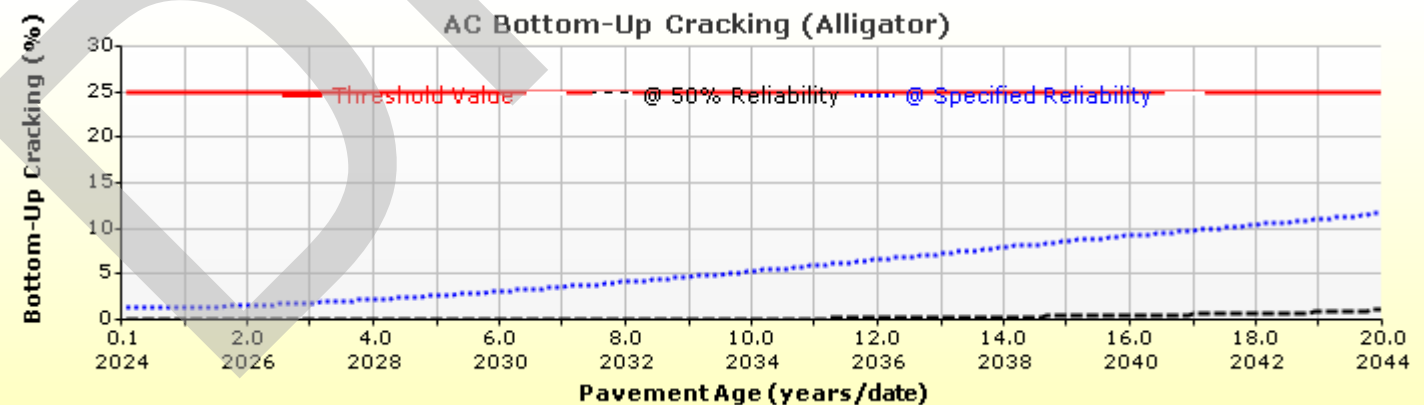
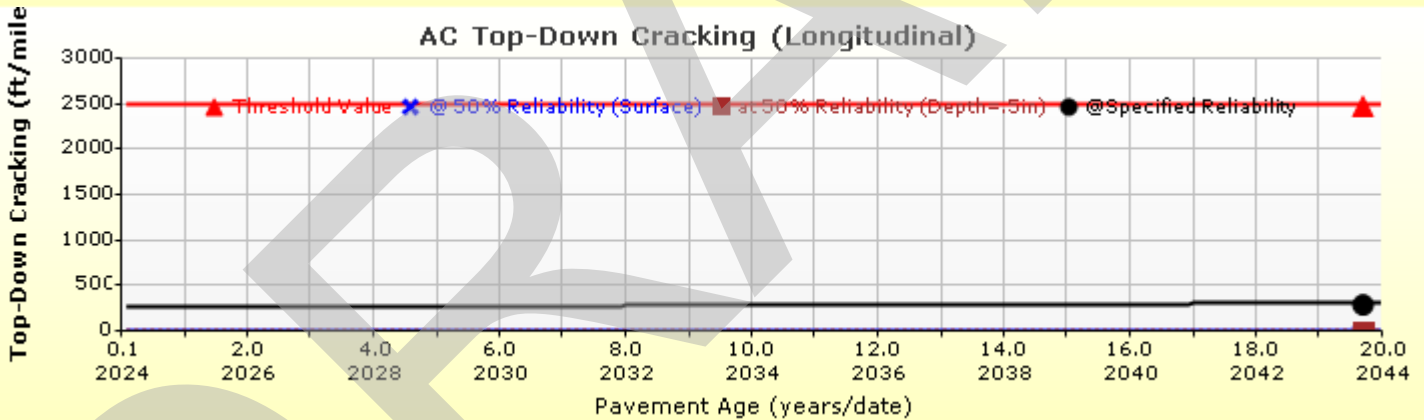
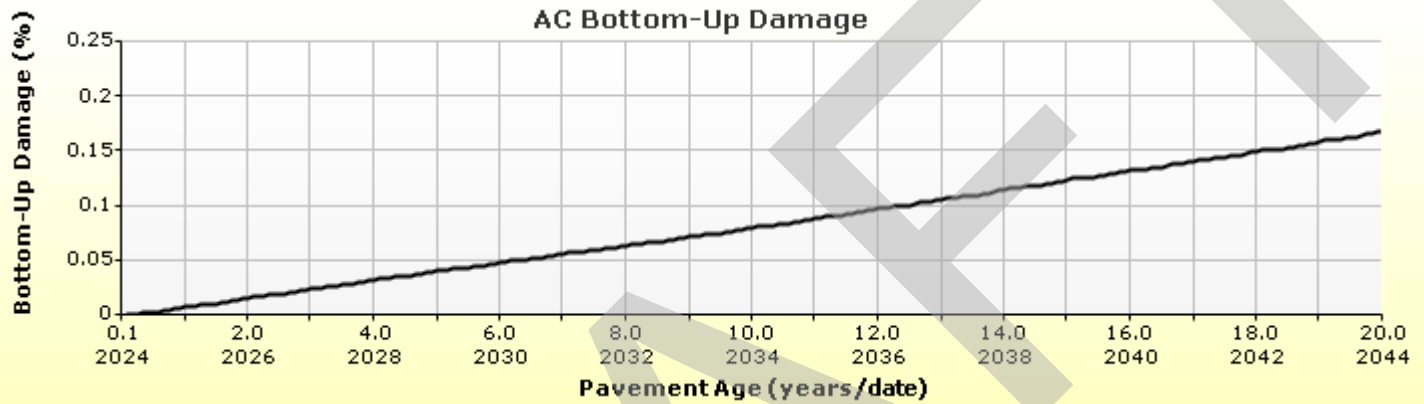
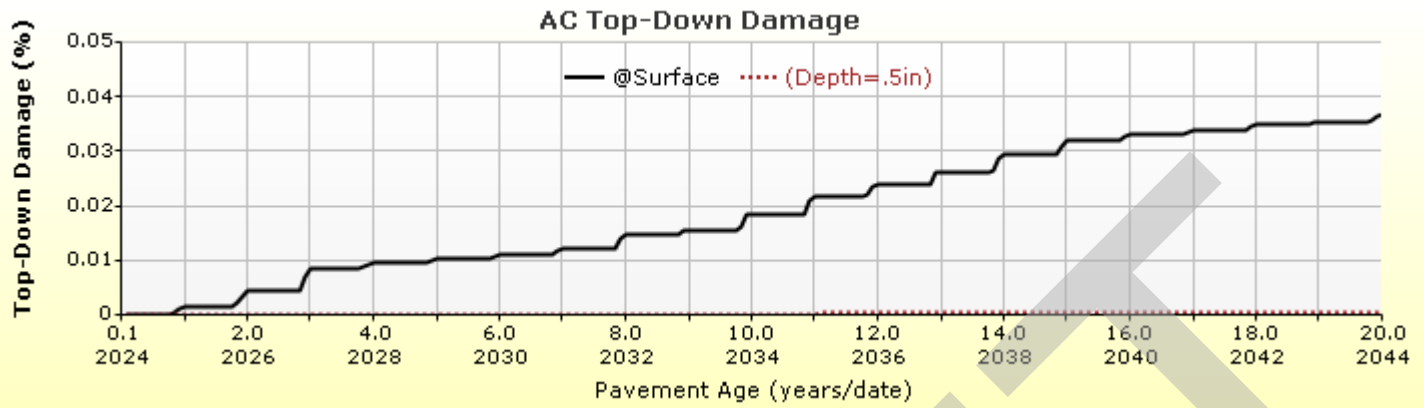


HMA Layer 2: Layer 2 Flexible : R2 Level 1 SX(75) PG 64-22

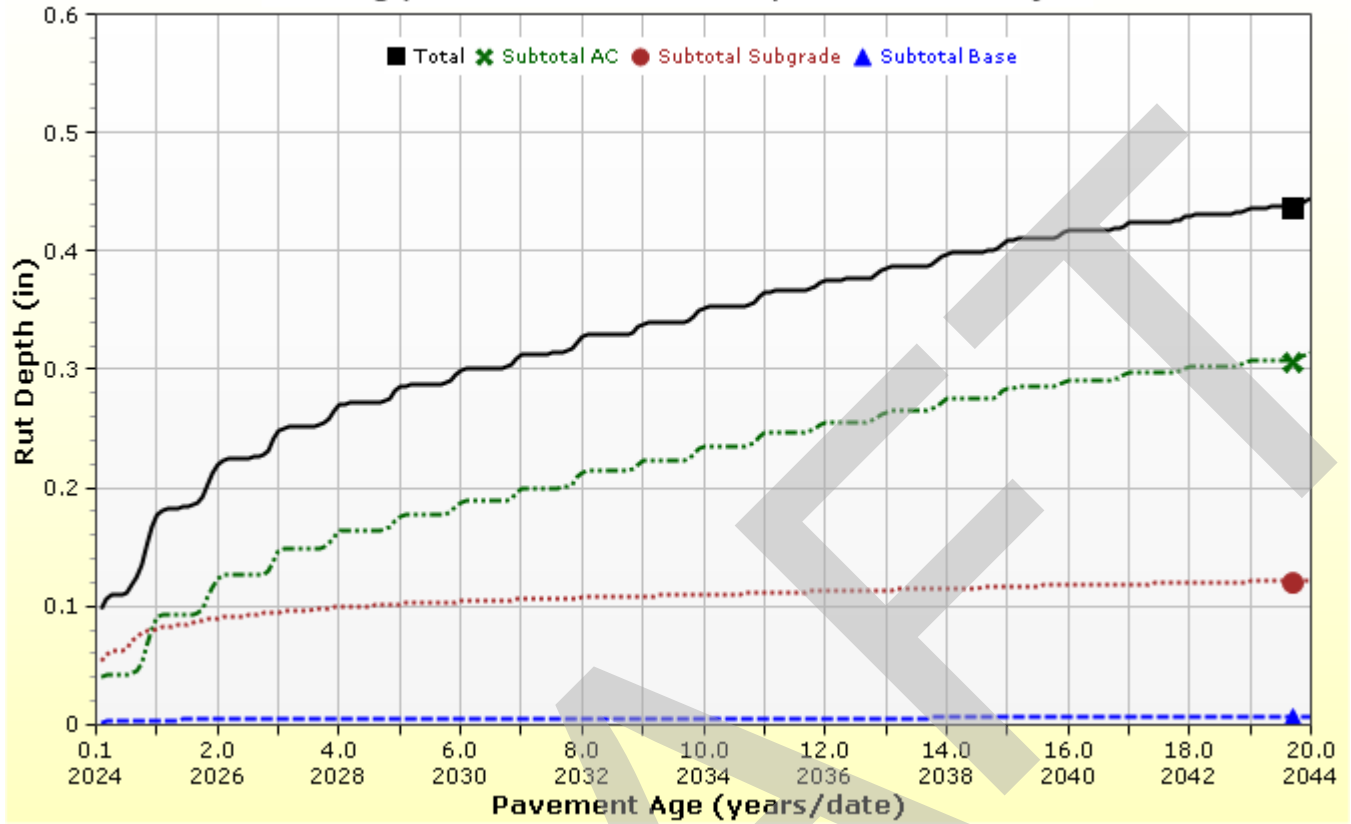


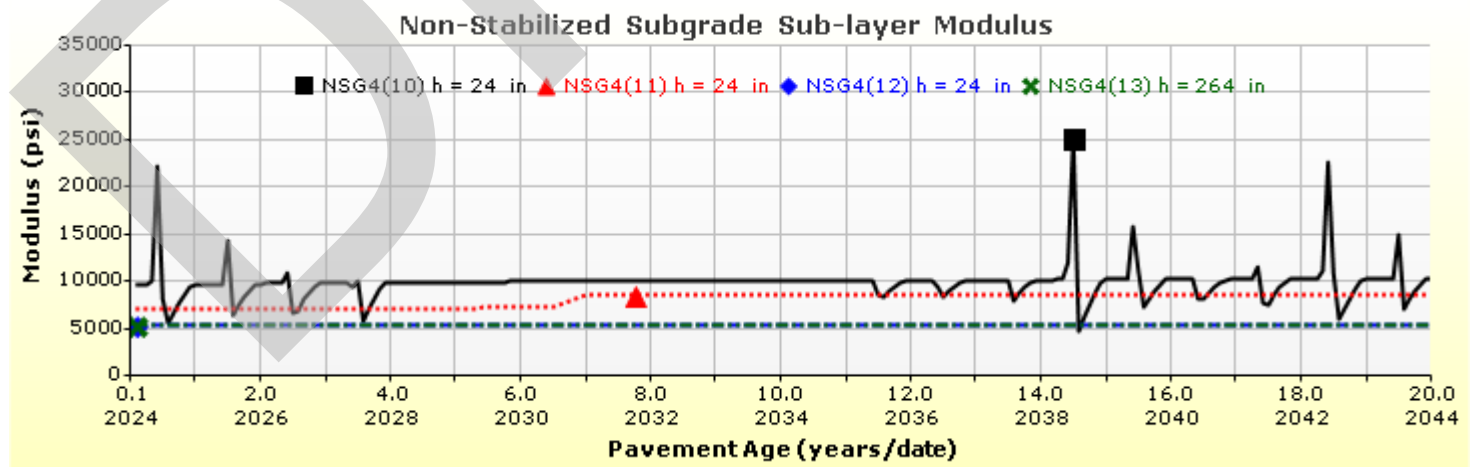
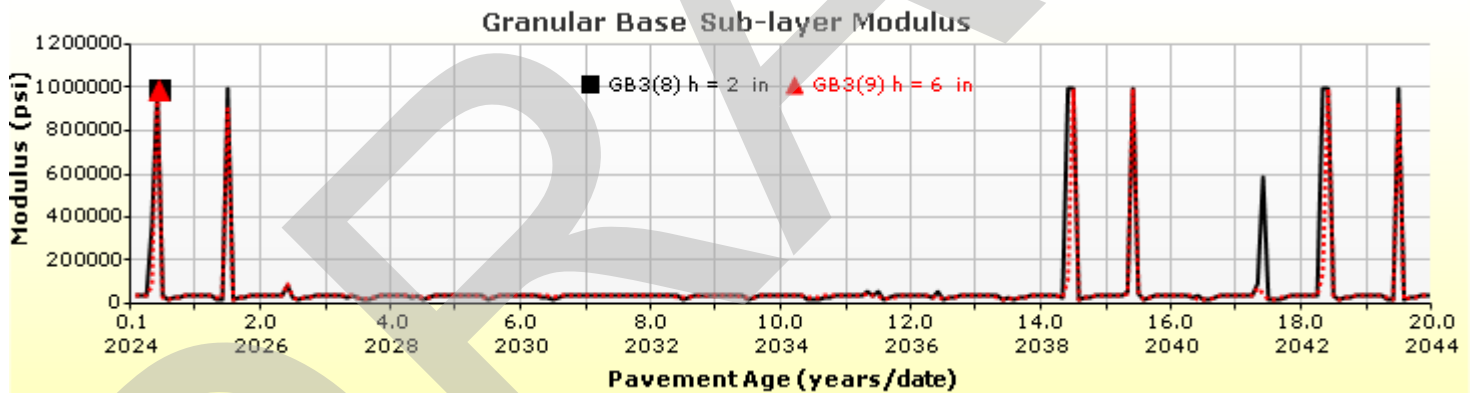
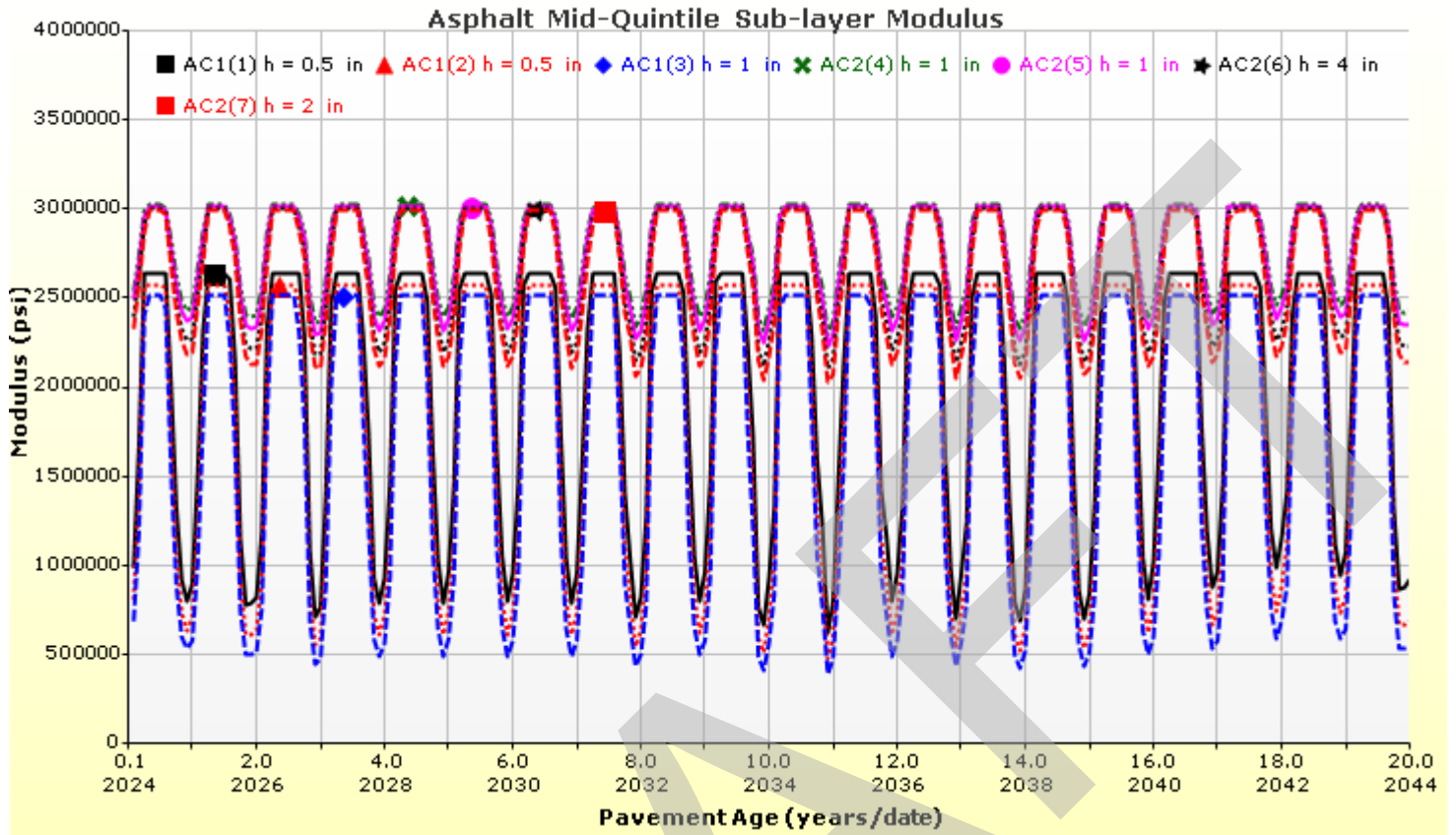
Analysis Output Charts





Rutting (Permanent Deformation) at 50% Reliability







37th and 65th Intersection-flexible

File Name: C:\Users\RSGeoTech\Desktop\PMED Projects\530.02\37th and 65th Intersection-flexible.dgpx



Layer Information

Layer 1 Flexible : R3 Level 1 SX(100) PG 64-28

Asphalt		
Thickness (in)	2.0	
Unit weight (pcf)	145.0	
Poisson's ratio	Is Calculated?	False
	Ratio	0.35
	Parameter A	-
	Parameter B	-

Asphalt Dynamic Modulus (Input Level: 1)

T (°F)	0.5 Hz	1 Hz	10 Hz	25 Hz
14	1687360	2134249	2493389	2608869
40	697463	1127680	1612900	1802220
70	173403	334774	616373	765125
100	54259	93163	175106	227742
130	27890	38645	60413	74657

Asphalt Binder

Temperature (°F)	Binder Gstar (Pa)	Phase angle (deg)
147.2	3051	81.6
158	1495	83.1
168.8	772	85

General Info

Name	Value
Reference temperature (°F)	70
Effective binder content (%)	10.7
Air voids (%)	5.7
Thermal conductivity (BTU/hr-ft-°F)	0.67
Heat capacity (BTU/lb-°F)	0.23

Identifiers

Field	Value
Display name/identifier	R3 Level 1 SX(100) PG 64-28
Description of object	Mix ID # FS1959
Author	CDOT
Date Created	4/3/2013 12:00:00 AM
Approver	CDOT
Date approved	4/3/2013 12:00:00 AM
State	Colorado
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	SX
User defined field 2	
User defined field 3	
Revision Number	0

Layer 2 Flexible : R2 Level 1 SX(75) PG 64-22

Asphalt

Thickness (in)	8.0	
Unit weight (pcf)	140.5	
Poisson's ratio	Is Calculated?	False
	Ratio	0.35
	Parameter A	-
	Parameter B	-

Asphalt Dynamic Modulus (Input Level: 1)

T (°F)	0.5 Hz	1 Hz	10 Hz	25 Hz
14	2910500	2947100	3034800	3058600
40	2620500	2695700	2882400	2934800
70	2057300	2190500	2549800	2658300
100	1334300	1500400	2017600	2195500
130	697600	836500	1365200	1584000

Asphalt Binder

Temperature (°F)	Binder Gstar (Pa)	Phase angle (deg)
168.8	451	85
147.2	1857	81.6
158	889	83.1

General Info

Name	Value
Reference temperature (°F)	70
Effective binder content (%)	11.8
Air voids (%)	6.9
Thermal conductivity (BTU/hr-ft-°F)	0.67
Heat capacity (BTU/lb-°F)	0.23

Identifiers

Field	Value
Display name/identifier	R2 Level 1 SX(75) PG 64-22
Description of object	Mix ID # 19127A
Author	CDOT
Date Created	4/3/2013 12:00:00 AM
Approver	CDOT
Date approved	4/3/2013 12:00:00 AM
State	Colorado
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	SX
User defined field 2	
User defined field 3	
Revision Number	0

Layer 3 Non-stabilized Base : Crushed stone

Unbound

Layer thickness (in)	8.0
Poisson's ratio	0.35
Coefficient of lateral earth pressure (k0)	0.5

Modulus (Input Level: 3)

Analysis Type:	Modify input values by temperature/moisture
Method:	Resilient Modulus (psi)

Resilient Modulus (psi)

25000.0

Use Correction factor for NDT modulus?	-
NDT Correction Factor:	-

Identifiers

Field	Value
Display name/identifier	Crushed stone
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	20

Sieve

Liquid Limit	6.0
Plasticity Index	1.0
Is layer compacted?	True

	Is User Defined?	Value
Maximum dry unit weight (pcf)	False	127.7
Saturated hydraulic conductivity (ft/hr)	False	5.054e-02
Specific gravity of solids	False	2.7
Water Content (%)	False	7.4

User-defined Soil Water Characteristic Curve (SWCC)

Is User Defined?	False
af	7.2555
bf	1.3328
cf	0.8242
hr	117.4000

Sieve Size	% Passing
0.001mm	
0.002mm	
0.020mm	
#200	8.7
#100	
#80	12.9
#60	
#50	
#40	20.0
#30	
#20	
#16	
#10	33.8
#8	
#4	44.7
3/8-in.	57.2
1/2-in.	63.1
3/4-in.	72.7
1-in.	78.8
1 1/2-in.	85.8
2-in.	91.6
2 1/2-in.	
3-in.	
3 1/2-in.	97.6

Layer 4 Subgrade : A-2-4

Unbound

Layer thickness (in)	Semi-infinite
Poisson's ratio	0.35
Coefficient of lateral earth pressure (k0)	0.5

Modulus (Input Level: 3)

Analysis Type:	Modify input values by temperature/moisture
Method:	Resilient Modulus (psi)

Resilient Modulus (psi)

9493.0

Use Correction factor for NDT modulus?	-
NDT Correction Factor:	-

Identifiers

Field	Value
Display name/identifier	A-2-4
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	0

Sieve

Liquid Limit	14.0
Plasticity Index	2.0
Is layer compacted?	True

	Is User Defined?	Value
Maximum dry unit weight (pcf)	False	124.6
Saturated hydraulic conductivity (ft/hr)	False	5.852e-04
Specific gravity of solids	False	2.7
Water Content (%)	False	9

User-defined Soil Water Characteristic Curve (SWCC)

Is User Defined?	False
af	9.5043
bf	0.6439
cf	3.0636
hr	189.6000

Sieve Size	% Passing
0.001mm	
0.002mm	
0.020mm	
#200	22.4
#100	
#80	42.3
#60	
#50	
#40	67.2
#30	
#20	
#16	
#10	82.5
#8	
#4	87.2
3/8-in.	91.6
1/2-in.	93.5
3/4-in.	95.9
1-in.	97.2
1 1/2-in.	98.5
2-in.	99.0
2 1/2-in.	
3-in.	
3 1/2-in.	99.6

Calibration Coefficients

AC Fatigue

$N_f = 0.00432 * C * \beta_{f1} k_1 \left(\frac{1}{\varepsilon_1}\right)^{k_2 \beta_{f2}} \left(\frac{1}{E}\right)^{k_3 \beta_{f3}}$	k1: 0.007566
$C = 10^M$	k2: 3.9492
$M = 4.84 \left(\frac{V_b}{V_a + V_b} - 0.69\right)$	k3: 1.281
	Bf1: 130.3674
	Bf2: 1
	Bf3: 1.217799

AC Rutting

$\frac{\varepsilon_p}{\varepsilon_r} = k_z \beta_{r1} 10^{k_1 T} k_2 \beta_{r2} N^{k_3 \beta_{r3}}$ $k_z = (C_1 + C_2 * depth) * 0.328196^{depth}$ $C_1 = -0.1039 * H_a^2 + 2.4868 * H_a - 17.342$ $C_2 = 0.0172 * H_a^2 - 1.7331 * H_a + 27.428$ Where: $H_{ac} = \text{total AC thickness(in)}$	$\varepsilon_p = \text{plastic strain(in/in)}$ $\varepsilon_r = \text{resilient strain(in/in)}$ $T = \text{layer temperature(}^\circ\text{F)}$ $N = \text{number of load repetitions}$
AC Rutting Standard Deviation	0.1414 * Pow(RUT,0.25) + 0.001
AC Layer	K1:-3.35412 K2:1.5606 K3:0.3791 Br1:4.3 Br2:1 Br3:1

Thermal Fracture

$C_f = 400 * N \left(\frac{\log C / h_{ac}}{\sigma} \right)$ $\Delta C = (k * \beta_t)^{n+1} * A * \Delta K^n$ $A = 10^{(4.389 - 2.52 * \log(E * \sigma_m * n))}$	$C_f = \text{observed amount of thermal cracking(ft/500ft)}$ $k = \text{refression coefficient determined through field calibration}$ $N() = \text{standard normal distribution evaluated at()}$ $\sigma = \text{standard deviation of the log of the depth of cracks in the pavments}$ $C = \text{crack depth(in)}$ $h_{ac} = \text{thickness of asphalt layer(in)}$ $\Delta C = \text{Change in the crack depth due to a cooling cycle}$ $\Delta K = \text{Change in the stress intensity factor due to a cooling cycle}$ $A, n = \text{Fracture parameters for the asphalt mixture}$ $E = \text{mixture stiffness}$ $\sigma_m = \text{Undamaged mixture tensile strength}$ $\beta_t = \text{Calibration parameter}$
Level 1 K: 6.3	Level 1 Standard Deviation: 0.1468 * THERMAL + 65.027
Level 2 K: 0.5	Level 2 Standard Deviation: 0.2841 * THERMAL + 55.462
Level 3 K: 6.3	Level 3 Standard Deviation: 0.3972 * THERMAL + 20.422

CSM Fatigue

$N_f = 10^{\left(\frac{k_1 \beta_{c1} \left(\frac{\sigma_s}{M_r} \right)}{k_2 \beta_{c2}} \right)}$	$N_f = \text{number of repetitions to fatigue cracking}$ $\sigma_s = \text{Tensile stress(psi)}$ $M_r = \text{modulus of rupture(psi)}$
k1: 1	k2: 1
Bc1: 0.75	Bc2:1.1

Subgrade Rutting			
$\delta_a(N) = \beta_{s_1} k_1 \varepsilon_v h \left(\frac{\varepsilon_0}{\varepsilon_r} \right) \left e^{-\left(\frac{\rho}{N} \right)^\beta} \right $		δ_a = permanent deformation for the layer N = number of repetitions ε_v = average vertical strain(in/in) $\varepsilon_0, \beta, \rho$ = material properties ε_r = resilient strain(in/in)	
Granular		Fine	
k1: 2.03	Bs1: 0.22	k1: 1.35	Bs1: 0.37
Standard Deviation (BASERUT) 0.0104 * Pow(BASERUT,0.67) + 0.001		Standard Deviation (BASERUT) 0.0663 * Pow(SUBRUT,0.5) + 0.001	

AC Cracking			
AC Top Down Cracking		AC Bottom Up Cracking	
$FC_{top} = \left(\frac{C_4}{1 + e^{(C_1 - C_2 \log_{10}(Damage))}} \right) * 10.56$		$FC = \left(\frac{6000}{1 + e^{(C_1 * C'_1 + C_2 * C'_2 \log_{10}(D * 100))}} \right) * \left(\frac{1}{60} \right)$ $C'_2 = -2.40874 - 39.748 * (1 + h_{ac})^{-2.856}$ $C'_1 = -2 * C'_2$	
c1: 7	c2: 3.5	c3: 0	c4: 1000
AC Cracking Top Standard Deviation 200 + 2300/(1+exp(1.072-2.1654*LOG10 (TOP+0.0001)))		AC Cracking Bottom Standard Deviation 1 + 15/(1+exp(-3.1472-4.1349*LOG10 (BOTTOM+0.0001)))	

CSM Cracking		IRI Flexible Pavements	
$FC_{ctb} = C_1 + \frac{C_2}{1 + e^{C_3 - C_4(Damage)}}$		C1 - Rutting C3 - Transverse Crack C2 - Fatigue Crack C4 - Site Factors	
C1: 0	C2: 75	C3: 5	C4: 3
CSM Standard Deviation CTB*1		C1: 50	C2: 0.55
		C3: 0.0111	C4: 0.02

APPENDIX J

M-E PAVEMENT DESIGN OUTPUT

37TH STREET & 65TH AVENUE INTERSECTION- RIGID DESIGN



37th and 65th Intersection-rigid

File Name: C:\Users\RSGeoTech\Desktop\PMED Projects\530.02\37th and 65th Intersection-rigid.dgpx



Design Inputs

Design Life: 30 years
Design Type: JPCP

Existing construction: -
Pavement construction: May, 2024
Traffic opening: August, 2024

Climate Data 40.436, -104.618
Sources (Lat/Lon)

Design Structure

Layer type	Material Type	Thickness (in)
PCC	R4 Level 1 Lawson	9.0
NonStabilized	Crushed stone	6.0
Subgrade	A-2-4	Semi-infinite

Joint Design:

Joint spacing (ft)	15.0
Dowel diameter (in)	1.25
Slab width (ft)	12.0

Traffic

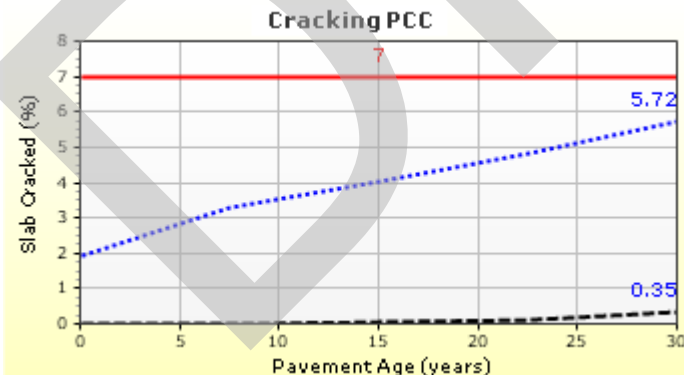
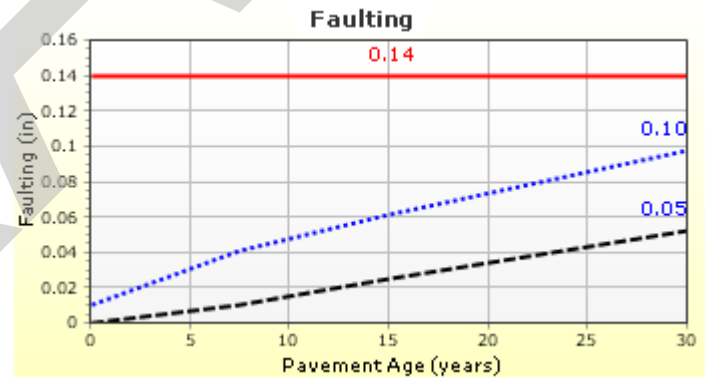
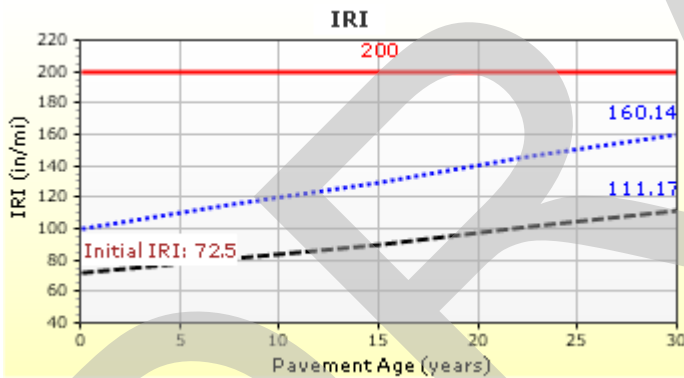
Age (year)	Heavy Trucks (cumulative)
2024 (initial)	4,600
2039 (15 years)	16,673,200
2054 (30 years)	37,151,800

Design Outputs

Distress Prediction Summary

Distress Type	Distress @ Specified Reliability		Reliability (%)		Criterion Satisfied?
	Target	Predicted	Target	Achieved	
Terminal IRI (in/mile)	200.00	160.14	90.00	99.00	Pass
Mean joint faulting (in)	0.14	0.10	90.00	99.32	Pass
JPCP transverse cracking (percent slabs)	7.00	5.72	90.00	94.39	Pass

Distress Charts



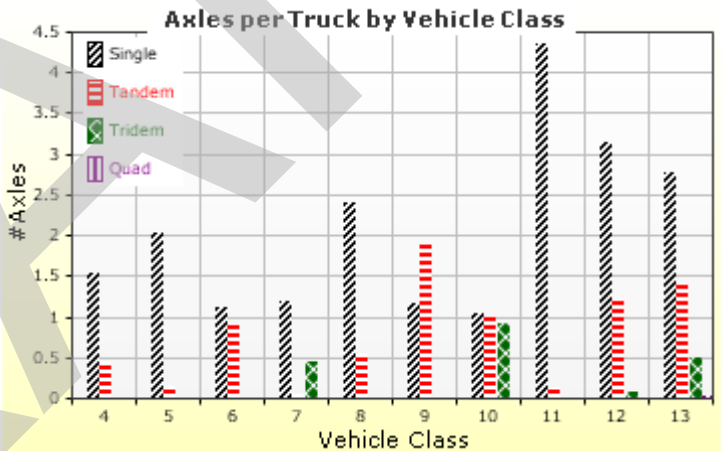
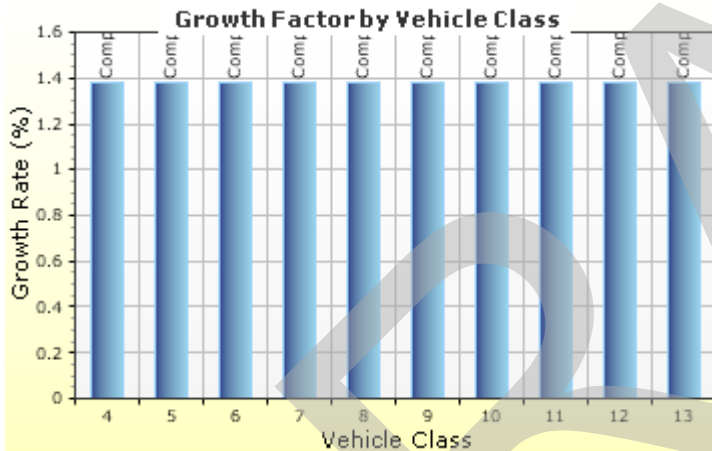
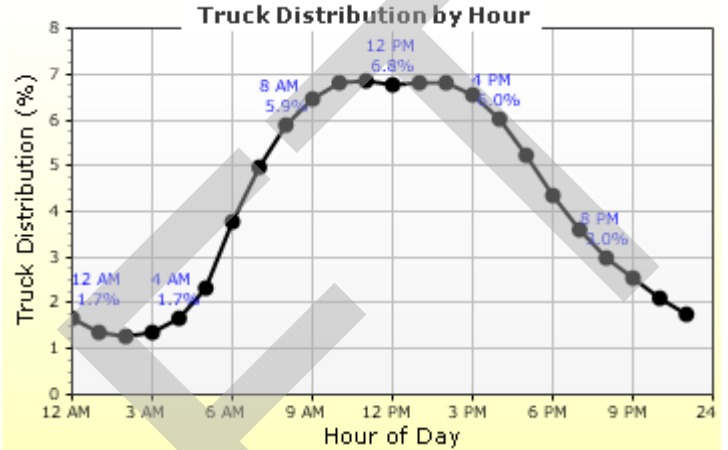
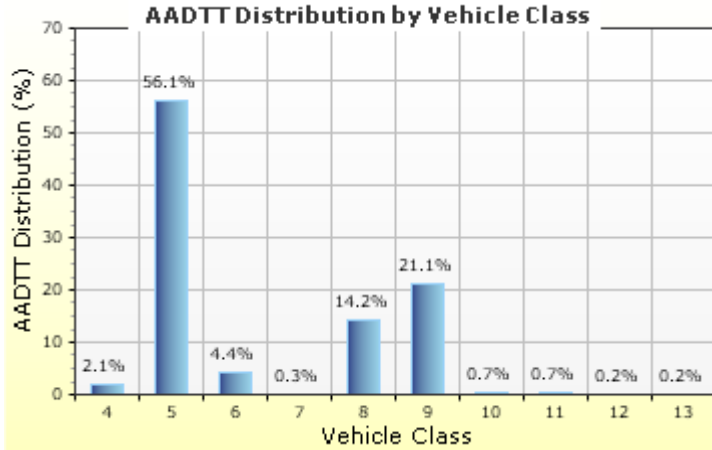
— Threshold Value @ Specified Reliability --- @ 50% Reliability

Traffic Inputs

Graphical Representation of Traffic Inputs

Initial two-way AADTT: 4,600
Number of lanes in design direction: 2

Percent of trucks in design direction (%): 60.0
Percent of trucks in design lane (%): 100.0
Operational speed (mph): 35.0



Traffic Volume Monthly Adjustment Factors



Tabular Representation of Traffic Inputs

Volume Monthly Adjustment Factors

Level 3: Default MAF

Month	Vehicle Class									
	4	5	6	7	8	9	10	11	12	13
January	0.9	0.8	0.8	0.7	0.8	0.9	0.9	0.9	0.9	0.9
February	0.9	0.8	0.8	0.8	0.9	0.9	0.9	0.9	1.0	0.8
March	1.0	0.9	0.8	1.1	1.0	1.0	1.0	1.0	0.9	0.9
April	1.0	1.0	0.9	1.0	1.0	1.0	1.1	1.0	1.0	1.1
May	1.1	1.1	1.0	1.3	1.1	1.0	1.1	1.1	1.1	1.0
June	1.1	1.1	1.2	1.1	1.1	1.0	1.1	1.0	1.1	1.0
July	1.1	1.2	1.5	1.3	1.2	1.0	1.1	1.1	1.1	1.3
August	1.1	1.2	1.3	1.0	1.1	1.0	1.1	1.1	1.1	1.0
September	1.1	1.1	1.1	1.0	1.1	1.0	1.1	1.1	1.0	1.1
October	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.1
November	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0
December	0.9	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.9	0.9

Distributions by Vehicle Class

Vehicle Class	AADTT Distribution (%) (Level 3)	Growth Factor	
		Rate (%)	Function
Class 4	2.1%	1.38%	Compound
Class 5	56.1%	1.38%	Compound
Class 6	4.4%	1.38%	Compound
Class 7	0.3%	1.38%	Compound
Class 8	14.2%	1.38%	Compound
Class 9	21.1%	1.38%	Compound
Class 10	0.7%	1.38%	Compound
Class 11	0.7%	1.38%	Compound
Class 12	0.2%	1.38%	Compound
Class 13	0.2%	1.38%	Compound

Truck Distribution by Hour

Hour	Distribution (%)	Hour	Distribution (%)
12 AM	1.65%	12 PM	6.75%
1 AM	1.37%	1 PM	6.81%
2 AM	1.28%	2 PM	6.83%
3 AM	1.36%	3 PM	6.56%
4 AM	1.66%	4 PM	6.02%
5 AM	2.32%	5 PM	5.23%
6 AM	3.8%	6 PM	4.35%
7 AM	4.95%	7 PM	3.59%
8 AM	5.9%	8 PM	2.98%
9 AM	6.48%	9 PM	2.56%
10 AM	6.83%	10 PM	2.12%
11 AM	6.85%	11 PM	1.75%
Total		100%	

Axle Configuration

Traffic Wander	
Mean wheel location (in)	18.0
Traffic wander standard deviation (in)	10.0
Design lane width (ft)	12.0

Axle Configuration	
Average axle width (ft)	8.5
Dual tire spacing (in)	12.0
Tire pressure (psi)	120.0

Average Axle Spacing	
Tandem axle spacing (in)	51.6
Tridem axle spacing (in)	49.2
Quad axle spacing (in)	49.2

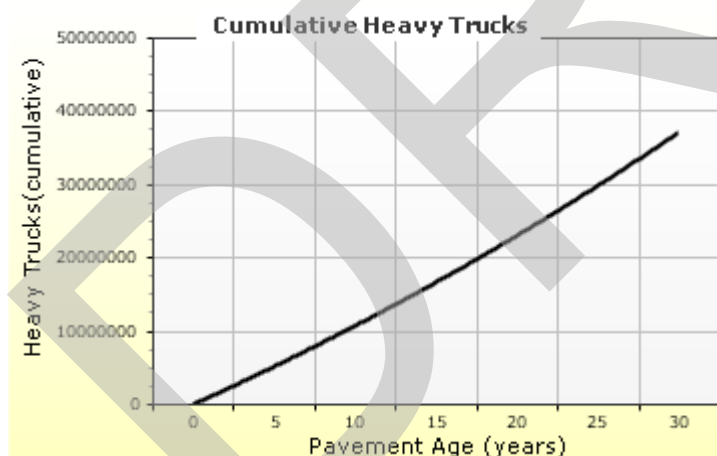
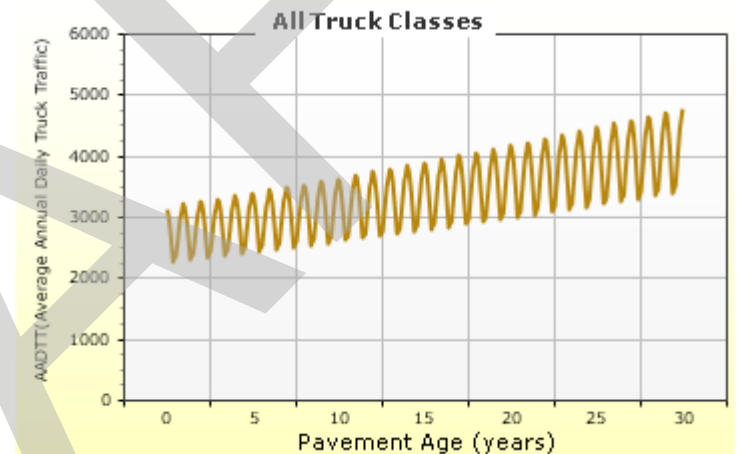
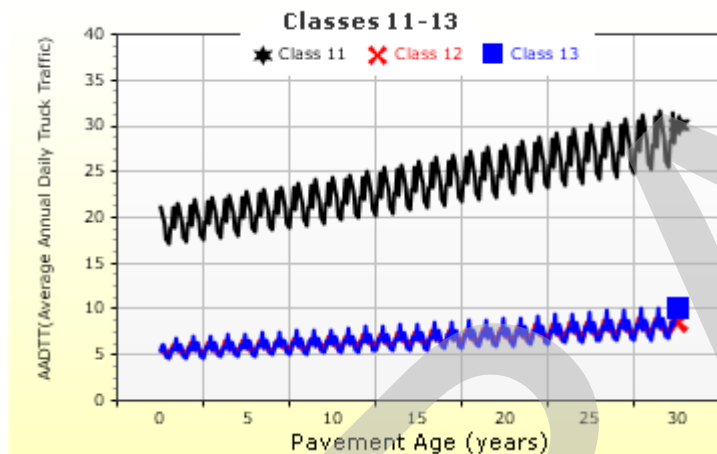
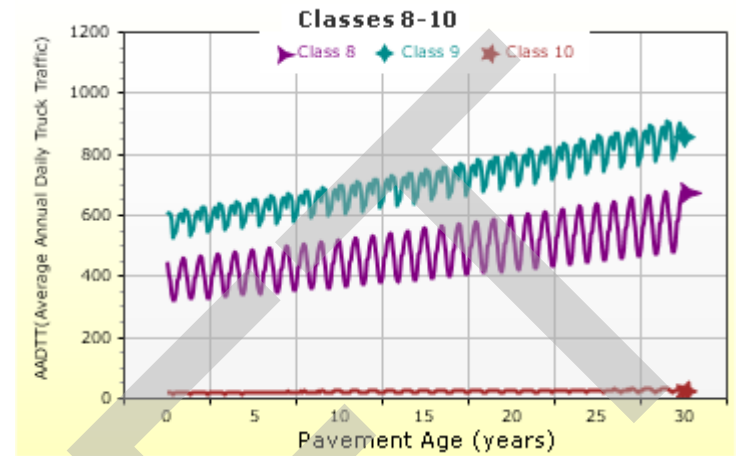
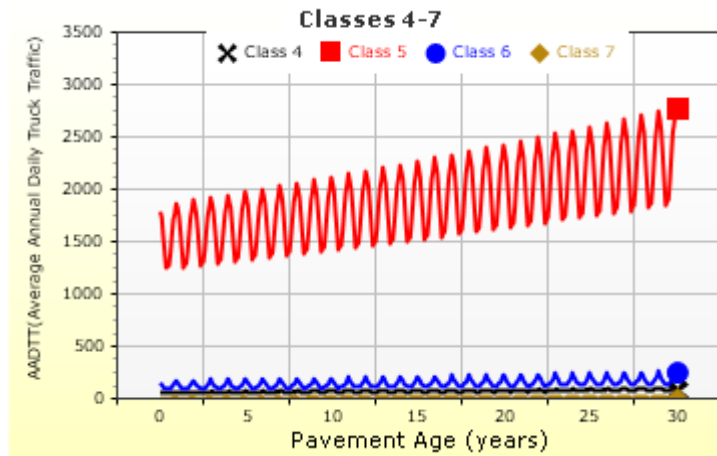
Wheelbase				
Value Type	Axle Type	Short	Medium	Long
Average spacing of axles (ft)		12.0	15.0	18.0
Percent of Trucks (%)		17.0	22.0	61.0

Number of Axles per Truck

Vehicle Class	Single Axle	Tandem Axle	Tridem Axle	Quad Axle
Class 4	1.53	0.45	0	0
Class 5	2.02	0.16	0.02	0
Class 6	1.12	0.93	0	0
Class 7	1.19	0.07	0.45	0.02
Class 8	2.41	0.56	0.02	0
Class 9	1.16	1.88	0.01	0
Class 10	1.05	1.01	0.93	0.02
Class 11	4.35	0.13	0	0
Class 12	3.15	1.22	0.09	0
Class 13	2.77	1.4	0.51	0.04

AADTT (Average Annual Daily Truck Traffic) Growth

* Traffic cap is not enforced



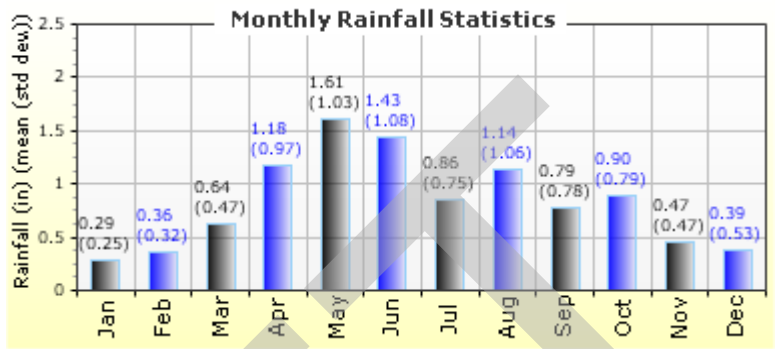
Climate Inputs

Climate Data Sources:

Climate Station Cities: Location (lat lon elevation(ft))
GREELEY, CO 40.43600 -104.61800 4649

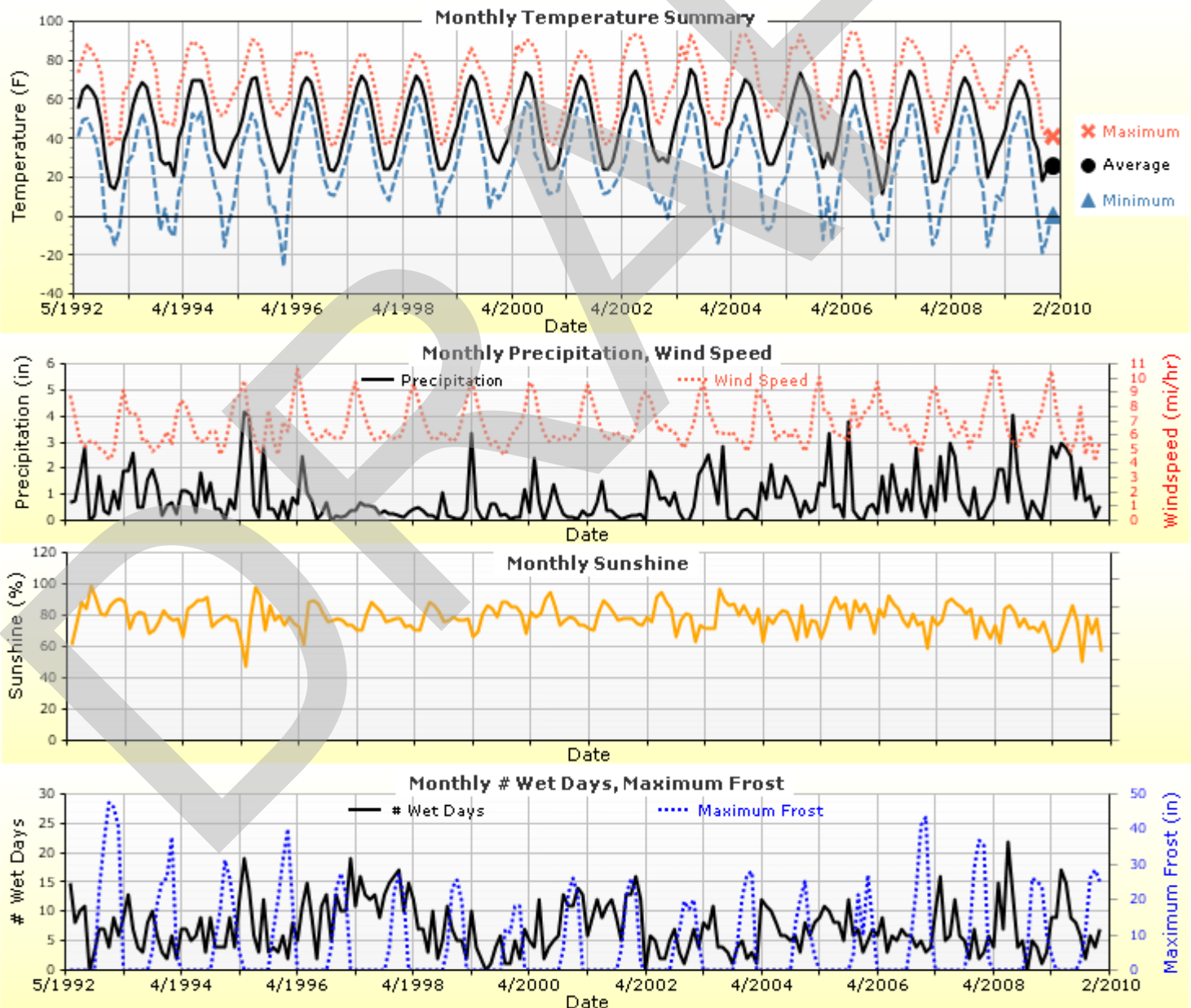
Annual Statistics:

Mean annual air temperature (°F) 47.87
 Mean annual precipitation (in) 10.12
 Freezing index (°F - days) 634.63
 Average annual number of freeze/thaw cycles: 94.81

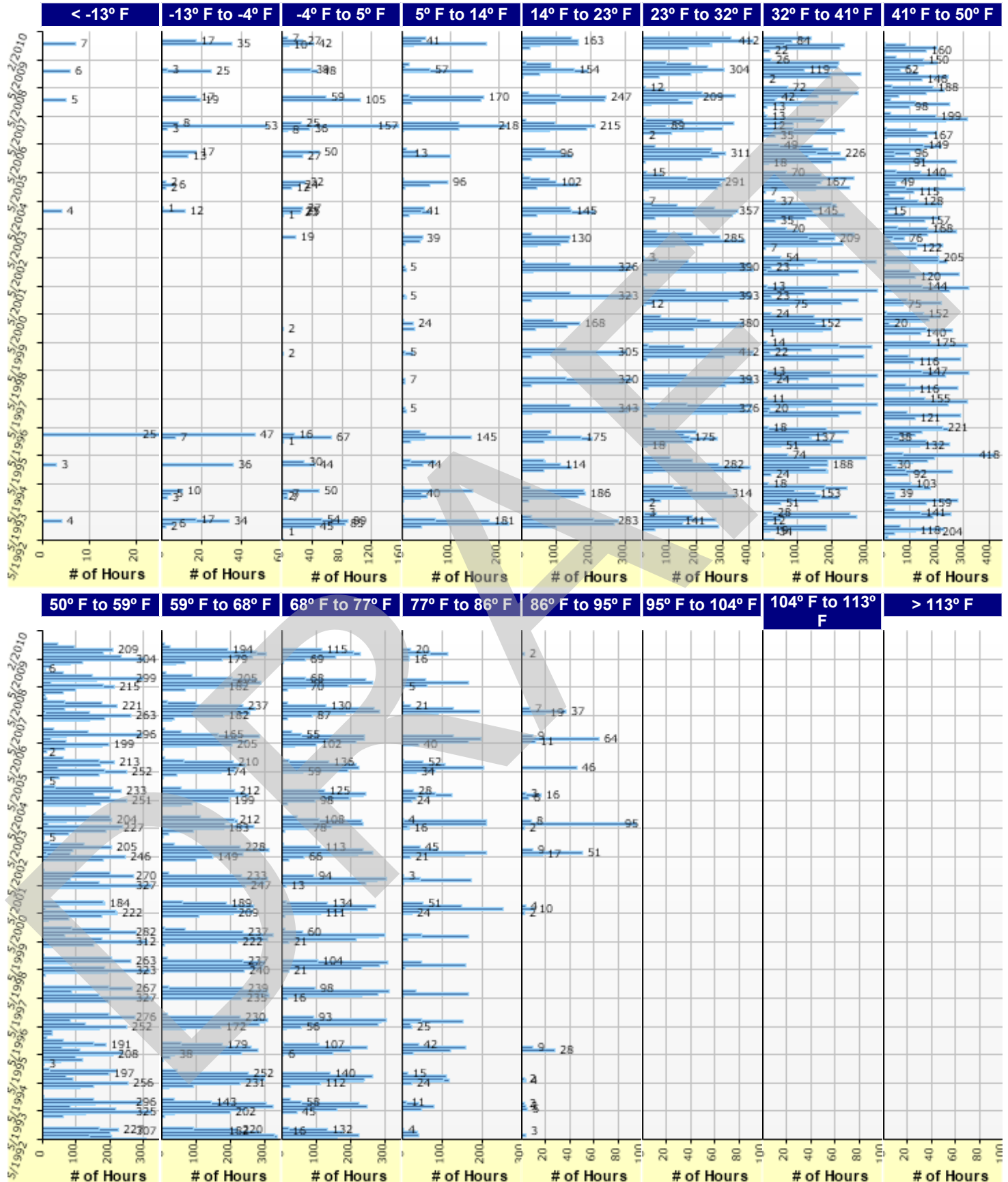


Water table depth (ft) 5.00

Monthly Climate Summary:



Hourly Air Temperature Distribution by Month:





37th and 65th Intersection-rigid

File Name: C:\Users\RSGeoTech\Desktop\PMED Projects\530.02\37th and 65th Intersection-rigid.dgpx



Design Properties

JPCP Design Properties

Structure - ICM Properties

PCC surface shortwave absorptivity	0.85
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PCC joint spacing (ft)

Is joint spacing random ?	False
Joint spacing (ft)	15.00

Doweled Joints

Is joint doweled ?	True
Dowel diameter (in)	1.25
Dowel spacing (in)	12.00

Widened Slab

Is slab widened ?	False
Slab width (ft)	12.00

Sealant type

Other(Including No Sealant... Liquid... Silicone)

Tied Shoulders

Tied shoulders	True
Load transfer efficiency (%)	50.00

PCC-Base Contact Friction

PCC-Base full friction contact	True
Months until friction loss	360.00

Erodibility index

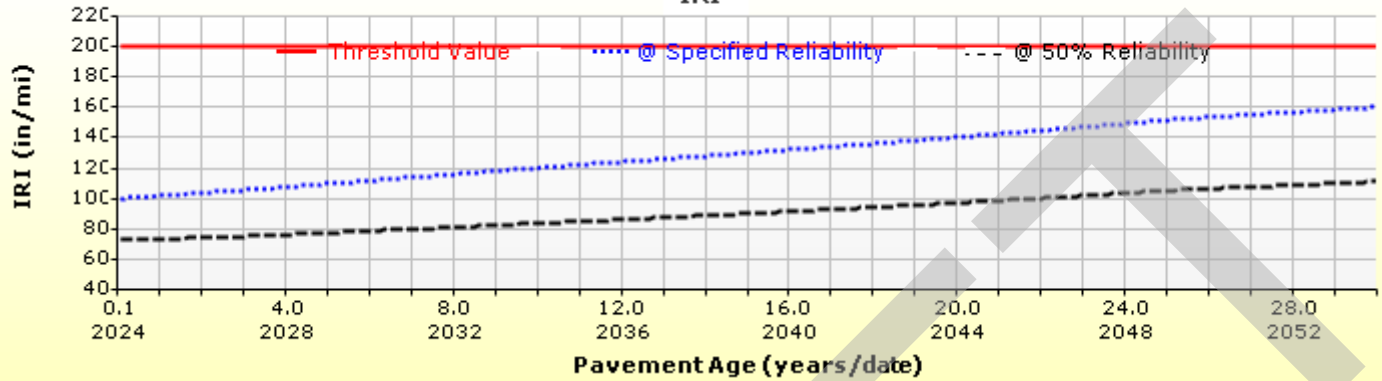
4

Permanent curl/warp effective temperature difference (°F)

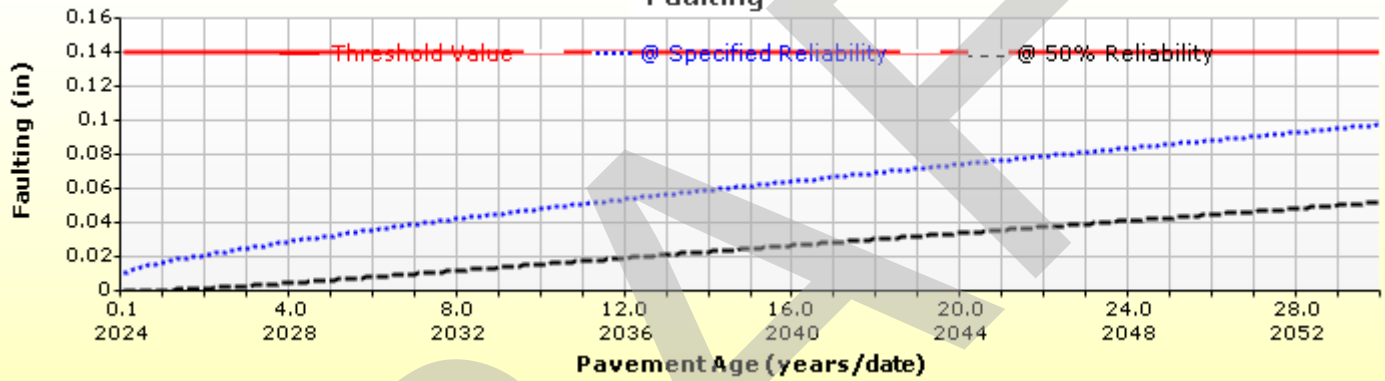
-10.00

Analysis Output Charts

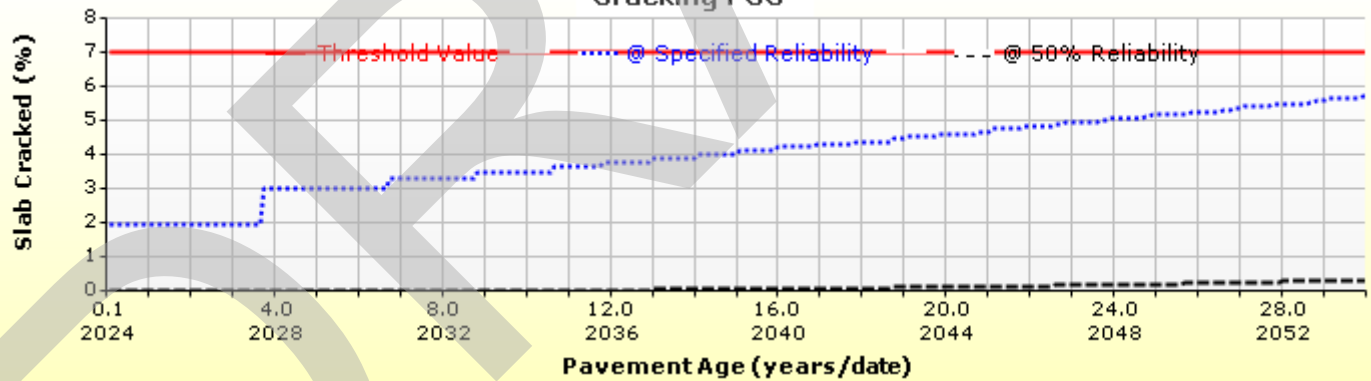
IRI



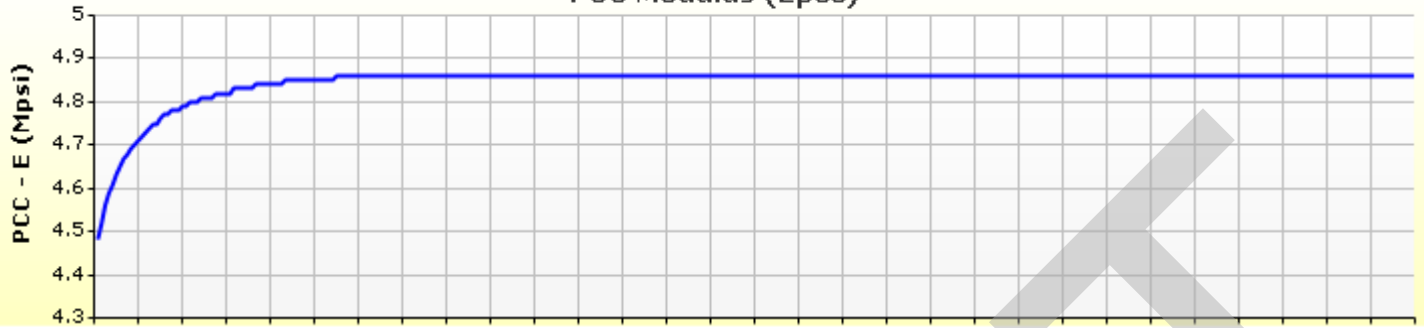
Faulting



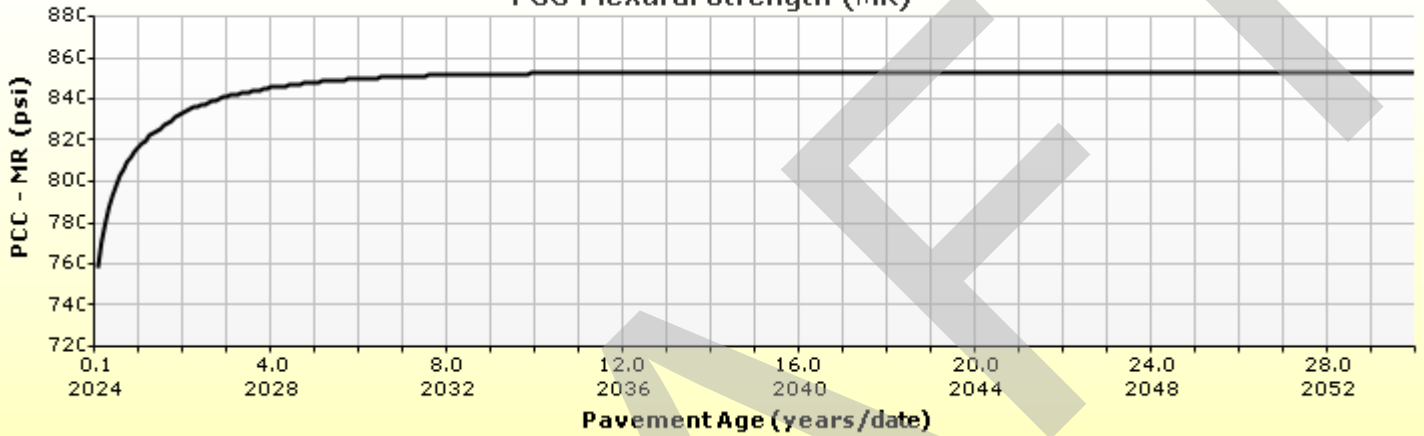
Cracking PCC



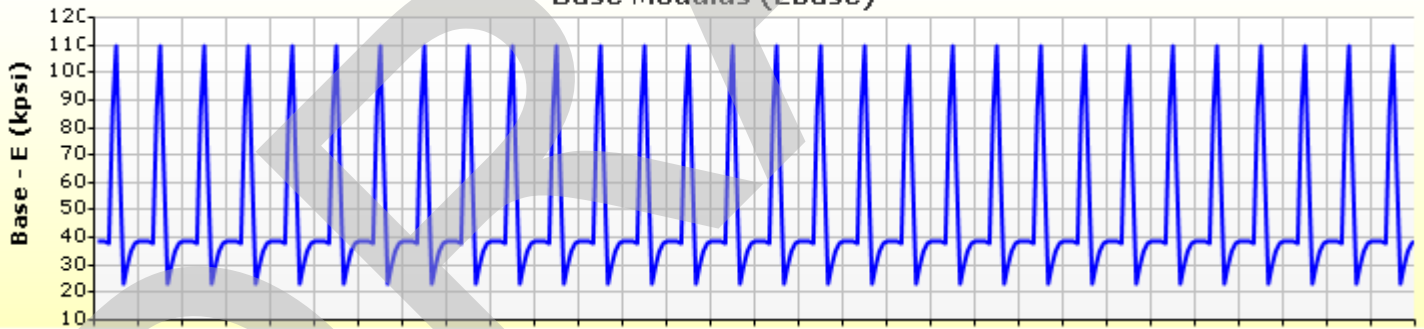
PCC Modulus (Epcc)



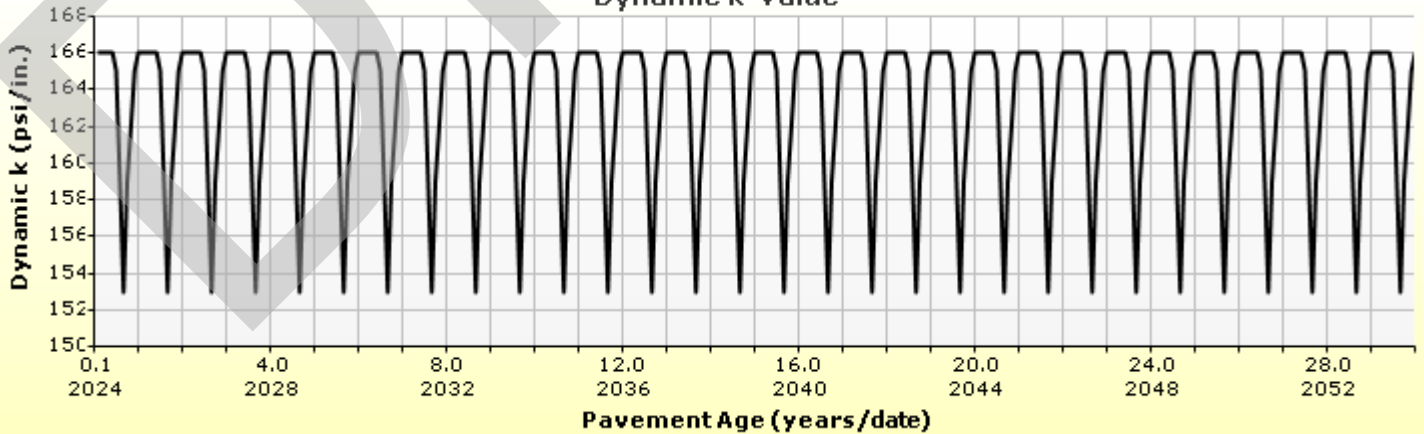
PCC Flexural Strength (MR)



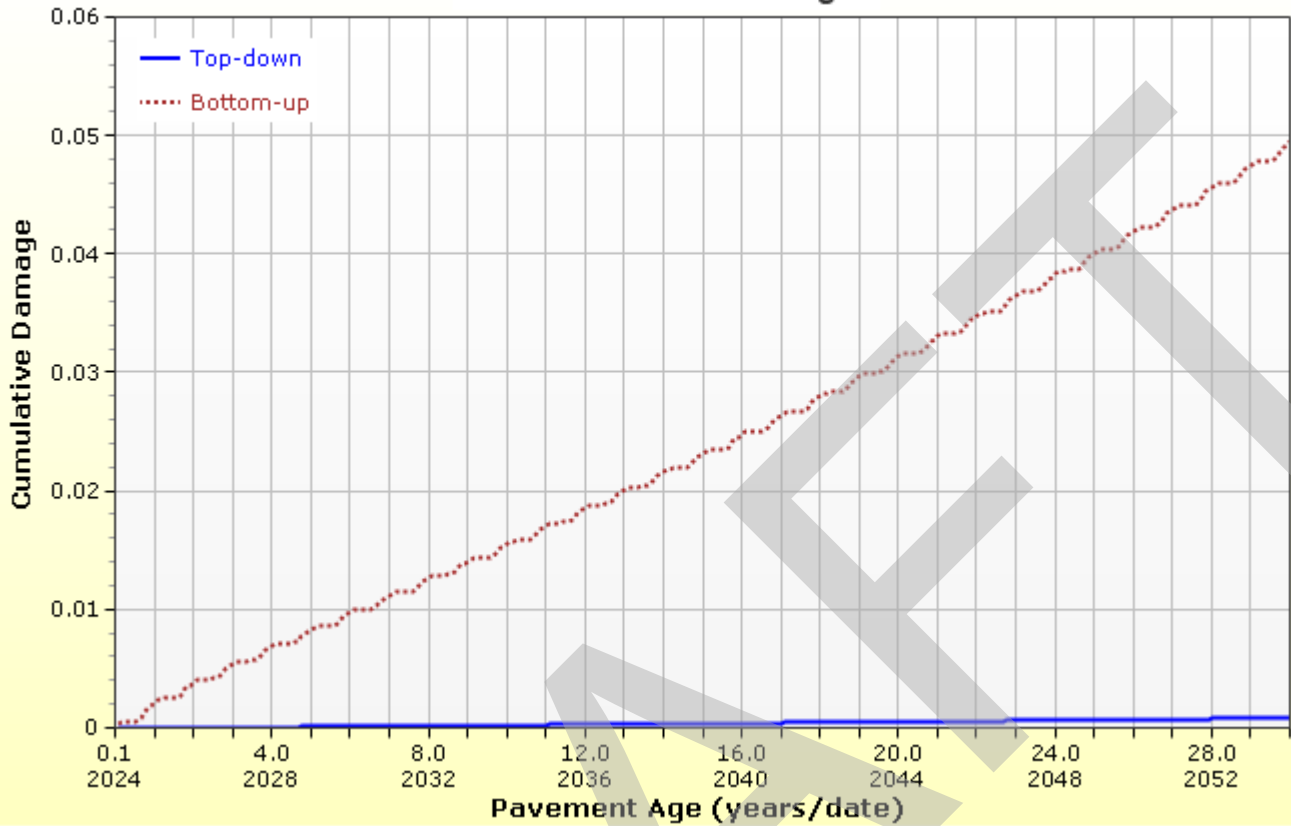
Base Modulus (Ebase)



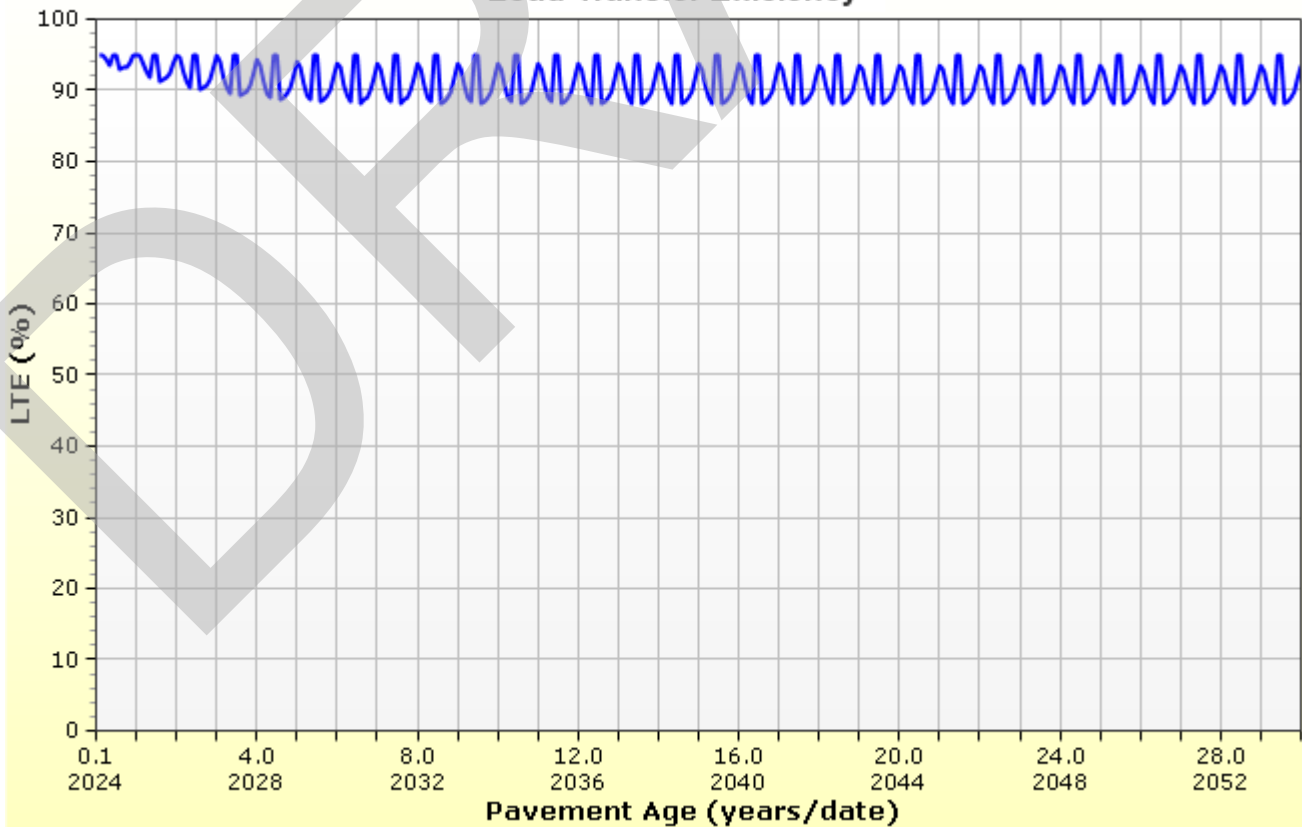
Dynamic k-Value



PCC Cumulative Damage



Load Transfer Efficiency



Layer Information

Layer 1 PCC : R4 Level 1 Lawson

PCC

Thickness (in)	9.0
Unit weight (pcf)	140.6
Poisson's ratio	0.2

Thermal

PCC coefficient of thermal expansion (in/in/°F x 10 ⁻⁶)	4.86
PCC thermal conductivity (BTU/hr-ft-°F)	1.25
PCC heat capacity (BTU/lb-°F)	0.28

Mix

Cement type		Type I (1)
Cementitious material content (lb/yd^3)		563
Water to cement ratio		0.36
Aggregate type		Dolomite (2)
PCC zero-stress temperature (°F)	Calculated Internally?	True
	User Value	-
	Calculated Value	82.8
Ultimate shrinkage (microstrain)	Calculated Internally?	True
	User Value	-
	Calculated Value	516.0
Reversible shrinkage (%)		50
Time to develop 50% of ultimate shrinkage (days)		35
Curing method		Curing Compound

Identifiers

Field	Value
Display name/identifier	R4 Level 1 Lawson
Description of object	Mix ID # 2009105
Author	CDOT
Date Created	4/3/2013 12:00:00 AM
Approver	CDOT
Date approved	4/3/2013 12:00:00 AM
State	Colorado
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	Region 4/1/6
User defined field 2	
User defined field 3	
Revision Number	0

PCC strength and modulus (Input Level: 1)

Time	Modulus of rupture (psi)	Elastic modulus (psi)
7-day	560	3230000
14-day	620	3500000
28-day	710	4030000
90-day	730	4240000
20-year/28-day	1.2	1.2

Layer 2 Non-stabilized Base : Crushed stone

Unbound

Layer thickness (in)	6.0
Poisson's ratio	0.35
Coefficient of lateral earth pressure (k0)	0.5

Modulus (Input Level: 3)

Analysis Type:	Modify input values by temperature/moisture
Method:	Resilient Modulus (psi)

Resilient Modulus (psi)

25000.0

Use Correction factor for NDT modulus?	-
NDT Correction Factor:	-

Identifiers

Field	Value
Display name/identifier	Crushed stone
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	20

Sieve

Liquid Limit	6.0
Plasticity Index	1.0
Is layer compacted?	True

	Is User Defined?	Value
Maximum dry unit weight (pcf)	False	127.7
Saturated hydraulic conductivity (ft/hr)	False	5.054e-02
Specific gravity of solids	False	2.7
Water Content (%)	False	7.4

User-defined Soil Water Characteristic Curve (SWCC)

Is User Defined?	False
af	7.2555
bf	1.3328
cf	0.8242
hr	117.4000

Sieve Size	% Passing
0.001mm	
0.002mm	
0.020mm	
#200	8.7
#100	
#80	12.9
#60	
#50	
#40	20.0
#30	
#20	
#16	
#10	33.8
#8	
#4	44.7
3/8-in.	57.2
1/2-in.	63.1
3/4-in.	72.7
1-in.	78.8
1 1/2-in.	85.8
2-in.	91.6
2 1/2-in.	
3-in.	
3 1/2-in.	97.6

Layer 3 Subgrade : A-2-4

Unbound

Layer thickness (in)	Semi-infinite
Poisson's ratio	0.35
Coefficient of lateral earth pressure (k0)	0.5

Modulus (Input Level: 3)

Analysis Type:	Modify input values by temperature/moisture
Method:	Resilient Modulus (psi)

Resilient Modulus (psi)

9493.0

Use Correction factor for NDT modulus?	-
NDT Correction Factor:	-

Identifiers

Field	Value
Display name/identifier	A-2-4
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	0

Sieve

Liquid Limit	14.0
Plasticity Index	2.0
Is layer compacted?	True

	Is User Defined?	Value
Maximum dry unit weight (pcf)	False	124.6
Saturated hydraulic conductivity (ft/hr)	False	5.852e-04
Specific gravity of solids	False	2.7
Water Content (%)	False	9

User-defined Soil Water Characteristic Curve (SWCC)

Is User Defined?	False
af	9.5043
bf	0.6439
cf	3.0636
hr	189.6000

Sieve Size	% Passing
0.001mm	
0.002mm	
0.020mm	
#200	22.4
#100	
#80	42.3
#60	
#50	
#40	67.2
#30	
#20	
#16	
#10	82.5
#8	
#4	87.2
3/8-in.	91.6
1/2-in.	93.5
3/4-in.	95.9
1-in.	97.2
1 1/2-in.	98.5
2-in.	99.0
2 1/2-in.	
3-in.	
3 1/2-in.	99.6

Calibration Coefficients

PCC Faulting

$C_{12} = C_1 + (C_2 * FR^{0.25})$ $C_{34} = C_3 + (C_4 * FR^{0.25})$ $FaultMax_0 = C_{12} * \delta_{curling} * \left[\log(1 + C_5 * 5.0^{EROD}) * \log\left(P_{200} * \frac{WetDays}{p_s}\right) \right]^{C_6}$ $FaultMax_i = FaultMax_0 + C_7 * \sum_{j=1}^m DE_j * \log(1 + C_5 * 5.0^{EROD})^{C_6}$ $\Delta Fault_i = C_{34} * (FaultMax_{i-1} - Fault_{i-1})^2 * DE_i$ $C_8 = DowelDeterioration$			
C1: 0.5104	C2: 0.00838	C3: 0.00147	C4: 0.008345
C5: 5999	C6: 0.8404	C7: 5.9293	C8: 400
PCC Reliability Faulting Standard Deviation			
0.0831*Pow(FAULT,0.3426) + 0.00521			

IRI-jpcp

C1 - Cracking	C1: 0.8203	C2: 0.4417
C2 - Spalling	C3: 1.4929	C4: 25.24
C3 - Faulting	Reliability Standard Deviation	
C4 - Site Factor	5.4	

PCC Cracking

$\log(N) = C1 \cdot \left(\frac{MR}{\sigma}\right)^{C2}$ $CRK = \frac{100}{1 + C4 \cdot FD^{C5}}$	Fatigue Coefficients		Cracking Coefficients	
	C1: 2	C2: 1.22	C4: 0.6	C5: -2.05
	PCC Reliability Cracking Standard Deviation			
	Pow(57.08*CRACK,0.33) + 1.5			