

2023-2024 KERN COUNTY GRAND JURY



ROADWAY MARKING RETROREFLECTIVITY

Nighttime Visibility on Kern County Roadways

Release Date

June 13, 2024

ROADWAY MARKING RETROREFLECTIVITY

Nighttime Visibility on Kern County Roadways



Photo By: Mark Ross

SUMMARY:

Do you have difficulty seeing roadway striping at night? You are not alone. Anyone who has had a hard time seeing roadway markings while driving at night will understand the importance of retroreflectivity. For drivers, being able to clearly see roadway markings, especially in rainy or low-light conditions, is critical to avoiding collisions.

Retroreflectivity describes the ability of a surface to return light to its source and is used to enhance the visibility of roadway markings in low-light and night-time conditions.

Reducing transportation related fatalities and serious injuries are primary goals of the U. S. Department of Transportation, Federal Highway Administration (FHWA). Accordingly, the FHWA has revised its Manual on Uniform Traffic Control Devices (MUTCD) to require agencies responsible for roadway maintenance to develop and implement a method for maintaining minimum retroreflectivity for pavement markings. The purpose of including this new standard in the MUTCD is to advance safety and mobility by assisting drivers with nighttime visibility.

For roadways in Kern County, the Grand Jury asked the following questions:

- A. Are the agencies that are responsible for roadway maintenance aware of the new standard in the MUTCD that requires the implementation of a method to maintain roadway marking retroreflectivity at or above minimum levels?
- B. Are these agencies actively preparing their respective maintenance methods in accordance with the new standard, and will they be ready for implementation by September 2026, as required?
- C. What are the agencies doing now to maintain roadway markings, especially regarding markings that fall below minimum low-light and night-time visibility requirements?

PURPOSE OF INQUIRY:

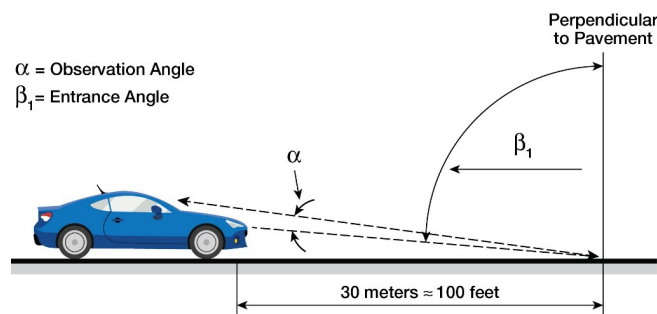
The 2023-2024 Kern County Grand Jury (Grand Jury) investigated the functions and operations of the Kern County (County) and Bakersfield City (City) Public Works Departments (PWDs) pursuant to California Penal Code §§925 and 925a, which authorize the Grand Jury to investigate and report on various county departments and incorporated cities of the county.

METHODOLOGY:

The Grand Jury interviewed staff from the City and County PWDs and researched various FHWA and California Department of Transportation (Caltrans) documents related to the standards and specifications for traffic control devices. The Grand Jury also reviewed the Caltrans Highway Design Manual, Caltrans Standard Specifications, Caltrans Public Road Data for 2022, the City of Bakersfield PWD Engineering Design Manual and the Kern County Development Standard, Division 9, Traffic Engineering.

DISCUSSION OF FACTS:

- A. The MUTCD is the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel.
- B. The FHWA published a Final Rule in the Federal Register (Vol. 87, No. 150) regarding the new standard. The Final Rule became effective September 6, 2022, and mandates a four-year compliance date. Therefore, applicable agencies have until September 6, 2026, to implement the new standard.
- C. Edition 11 of the MUTCD was published by the FHWA in December 2023. It includes the new standard in Section, 3A.05, which requires that roadway maintenance agencies develop a method to maintain a certain level of visibility for roadway striping.
- D. Retroreflectivity is the perceived brightness of an object relative to the amount of light falling on it. For roadway markings, it is specified using the international standard of 30-meter geometry. (See Below)



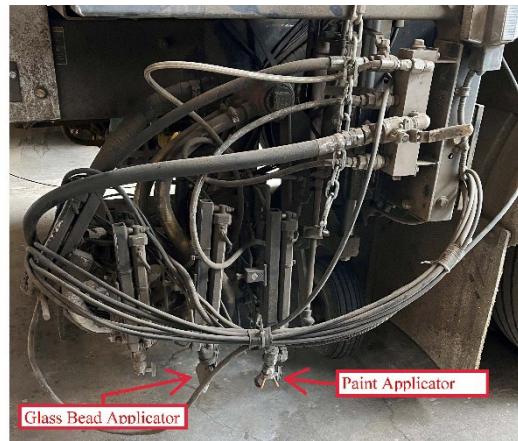
Standard-30-meter-Geometry
from: FHWA Technical Report SA-22-028

- E. The State of California has its own Manual on Uniform Traffic Control Devices (CA MUTCD). Revision 8 of the CA MUTCD includes the new standard in its Section 3A.03.

- F. Both the County and City PWDs require compliance with the CA MUTCD in their respective Development Standards and Engineering Design Manual.
- G. Both the County and City apply glass beads, at a ratio of seven pounds per gallon, to their roadway marking paints to provide retroreflective performance. The beads are partially embedded into the paint but also exposed. If the beads get damaged or knocked out of the paint, the retroreflectivity will degrade, even though the marking may still be visible. Generally, the retroreflectivity of pavement markings will fade before the paint itself.



County Large Capacity Striping Truck



Inset: Paint and Bead Applicators



Glass Beads
Photos By: Grand Jury

- H. The intent of developing the maintenance method required by the standard is to provide a **systematic means for ensuring that roadway marking retroreflectivity is continually at or above minimum requirements.**
- I. Use of the maintenance method will not only determine when pavement markings need to be refreshed but will also allow for scheduling the restriping of deficient markings in a timely manner.
- J. The FHWA provides guidance for the development of the required maintenance method in its Technical Report Number FHWA-SA-22-028. The report states that, *Agencies can use the information in this report to help determine which retroreflectivity maintenance method or combination of methods best suits their needs.*

- K. The County PWD is responsible for the maintenance of approximately 3,320 miles of roadways, approximately 2,186 of these require striping.
- L. The City PWD is responsible for maintenance of approximately 1,260 miles of roadways, approximately 567 of these miles require striping.
- M. The current method used for scheduling annual restriping programs for both the County and the City PWDs is based on historical data related to when the striping was previously replaced or refreshed.
- N. Both the County and the City PWDs review their maintenance database records from previous years and determine which areas of their respective jurisdictions have the oldest roadway markings. The road striping crews will then focus on these areas throughout the painting season (typically March through October). The crews will occasionally be sent elsewhere, however, depending on service requests from citizen complaints or if directed by the respective PWD Traffic Engineer.
- O. The County and City PWDs use water-based paint with retroreflective glass beads for their maintenance programs.
- P. The range of service life for thermoplastic marking material is more than twice that of water-based paint. However, the cost of material, equipment, and installation is significantly higher.
- Q. Citizens can submit complaints regarding pavement markings to either the County or the City through their websites.
- For the County:
<https://www.kernpublicworks.com/services/transportation/road-maintenance/report-a-problem>
or use the MyKern App
 - For the City:
<https://www.bakersfieldcity.us/559/Report-a-Service-Request>
or use the Bakersfield Mobile App
- R. For restriping of existing roadway markings, both the County and the City PWDs use water-based paint, which has a service life range of 6 months to 3 years depending on local conditions.
- S. For new or resurfaced roadways that are installed under Capital Improvement Projects, developers for both the County and the City are required to use thermoplastic paint for roadway markings. The range of service life for thermoplastic marking material is from 1 to 7 years. When the thermoplastic striping is refreshed both PWDs use water-based paint over the thermoplastic paint.

FINDINGS:

- F1. Both the County and the City PWDs are aware of the new requirement to develop a method for maintenance of retroreflectivity but neither have yet formalized, adopted, or implemented their respective methods.

- F2. Although the County and City PWDs routinely restripe roadways based on length of time since they were last painted, they do not currently have a systematic method to ensure that roadway marking retroreflectivity is continually at or above a minimum level as required by the new standard.
- F3. The County and City PWDs are not currently restriping all markings that are water-based paint with glass beads within their expected service life timeframe of between 6 months to 3 years. The glass beads wear off and the paint fades before the markings can be refreshed.
- F4. A reduction in the frequency of application of thermoplastic paint instead of water-based paint may justify the additional costs.
- F5. The County and City PWD databases used for determining their respective roadway striping schedules do not include sufficient historical data to effectively track and schedule the replacement of roadway markings in accordance with the new standard.
- F6. For citizen complaints, both the City and County websites/apps are difficult to navigate to report problems related to roadway markings.

COMMENTS:

The focus of this report has been on the Kern County and City of Bakersfield Public Works Departments. However, the FHWA MUTCD is the law governing all traffic control devices and non-compliance can ultimately result in the loss of federal-aid funds as well as in a significant increase in tort liability.

The Grand Jury urges all agencies and officials responsible for maintaining roadways to plan for the development of a systematic approach to maintaining the required minimum levels of retroreflectivity for roadway markings before September 2026. Accordingly, responses to the findings and recommendations of this report are invited from all incorporated cities in Kern County.

RECOMMENDATIONS:

The 2023-2024 Kern County Grand Jury recommends the Kern County Board of Supervisors and the Bakersfield City Council direct the Public Works Departments:

- R1. By January 1, 2025, review the guidance provided by the FHWA in their Technical Report SA-22-028, and determine the most appropriate maintenance method, or combination of methods, that will be developed to assure minimum retroreflectivity levels will be maintained for the roadway markings within their jurisdictions. (Finding 1)
- R2. By February 1, 2025, develop the formal written Method for Maintaining Pavement Marking Retroreflectivity that will be used to systematically track and schedule replacing or refreshing roadway markings that fall below the minimum retroreflectivity requirements. (Finding 2)

- R3. By April 1, 2025, perform an analysis to determine whether, and consequently where, it would be cost beneficial to restripe the roadways in their respective jurisdictions with thermoplastic paint. (Findings 3 and 4)
- R4. By June 1, 2025, develop the database required to establish a roadway marking schedule. The database should consider the agencies policies and practices regarding the use of pavement marking materials and should include information specific to the roadway, average daily traffic, and weather conditions of the local area. (Finding 5)
- R5. By November 1, 2024, the Kern County and Bakersfield City websites/apps should be modified to include a user friendly, specific service request for roadway markings. (Finding 6)

NOTES:

- The Kern County Board of Supervisors and the Bakersfield City Council should post a copy of this report where it will be available for public review.
- Persons wishing to receive an email notification of newly released reports may sign up at: <https://www.kerncounty.com/government/other-agencies/grand-jury>
- Present and past Kern County Grand Jury Final Reports and Responses can be accessed on the Kern County Grand Jury website: <https://www.kerncounty.com/government/other-agencies/grand-jury>

RESPONSE DEADLINE:

- **REQUIRED WITHIN 90 DAYS FROM:**
 - Kern County Board of Supervisors to Findings 1 through 6 and Recommendations 1 through 5
 - Bakersfield City Council to Findings 1 through 6 and Recommendations 1 through 5
- **INVITED RESPONSES FROM:**
 - Kern County Cities and Special Districts responsible for roadway maintenance

RESPONSES ARE REQUIRED PURSUANT TO CAL. PENAL CODE §§933(c) AND 933.05 TO:

- **PRESIDING JUDGE
SUPERIOR COURT OF CALIFORNIA
COUNTY OF KERN
1415 TRUXTUN AVENUE, SUITE 212
BAKERSFIELD, CA 93301**
- **FOREPERSON
KERN COUNTY GRAND JURY
1415 TRUXTUN AVENUE, SUITE 600
BAKERSFIELD, CA 93301**

Reports issued by the Grand Jury do not identify individuals interviewed. Cal. Penal Code §929 requires that reports of the Grand Jury not contain the name of any person or facts leading to the identity of any person who provides information to the Grand Jury.

BOARD OF SUPERVISORS

SUPERVISORS

Phillip Peters District 1
Zack Scrivner..... District 2
Jeff Flores District 3
David R. Couch District 4
Leticia Perez..... District 5



KATHLEEN KRAUSE
CLERK OF BOARD OF SUPERVISORS
Kern County Administrative Center
1115 Truxtun Avenue, 5th Floor
Bakersfield, California 93301
Telephone (661) 868-3585
TTY Relay 800-735-2929

July 30, 2024

The Honorable J. Eric Bradshaw, Presiding Judge
Kern County Superior Court
1415 Truxtun Avenue
Bakersfield, CA 93301

Dear Judge Bradshaw:

Transmitted herewith is the Board of Supervisors' response to the 2023-2024 Grand Jury's Final Report titled Roadway Marking Retroreflectivity - Nighttime Visibility on Kern County Roadways.

The Board of Supervisors appreciates the Grand Jury's review and input.

Sincerely,

A handwritten signature in black ink, appearing to read "David Couch", written over a horizontal line.

David Couch, Chair
Kern County Board of Supervisors

EM SH/COMPL_GJ Public Works A

Attachment

cc: Grand Jury

Kern County Board of Supervisors
Response to Grand Jury Final Report
Roadway Marking Retroreflectivity – Nighttime Visibility on Kern County Roadways

Response to Findings F1-F6:

Kern County agrees with the Grand Jury’s findings F1, F2, F4 and F5 and partially agrees with findings F3 and F6. Finding F3 states “the county and City PWDs [Public Works Departments] are not currently restriping all markings that are water-based paint with glass beads within their expected service life timeframe of between 6 months to 3 years. The glass beads wear off and the paint fades before the markings can be refreshed.” The County restripes roadways every two years with water-based paint and glass beads. Finding F6 states “for citizen complaints, both the City and county websites/apps are difficult to navigate to report problems related to roadway markings”. The County Public Works website includes multiple ways to access the “Report a Problem” feature on the main webpage: under the main navigation menu at the top of the page (under “How Do I...” > “Report a Problem”), under the main navigation sections in the body of the webpage (see “Report a Problem” icon, as well as under “Transportation” in the “Public Services” menu), and a “Report a Problem” link to at the bottom of the main page. We believe these are logical and easily accessible ways to navigate to the desired area.

Response to Recommendation:

R1: By January 1, 2025, review the guidance provided by the Federal Highway Administration (FHWA) in their Technical Report SA-22-028 and determine the most appropriate maintenance method or combination of methods, that will be developed to assure minimum retroreflectivity levels will be maintained for the roadway marking within their jurisdictions.

The recommendation will be implemented. The department will review and determine the most effective maintenance method to maintain retroreflectivity.

R2: By February 1, 2025, develop the formal written Method for Maintaining Pavement Marking Retroreflectivity that will be used to systematically track and schedule replacing or refreshing roadway markings that fall below the minimum retroreflectivity requirements.

The recommendation will be implemented. The department will develop a new policy for a testing procedure along with a modified use of existing database to track and schedule Pavement Marking maintenance.

R3: By April 1, 2025, perform an analysis to determine whether, and consequently where, it would be cost beneficial to restripe the roadways in their respective Jurisdictions with thermoplastic paint.

The recommendation will be implemented. The department will analyze Reflective Pavement Markers along with the type of striping paint.

R4: By June 1, 2025, develop the database required to establish a roadway marking schedule. The database should consider the agencies’ policies and practices regarding the use of pavement marking materials and should include information specific to the roadway, average daily traffic, and weather conditions of the local area.

The recommendation will be implemented. The department will modify the current database to include additional parameters needed.

R5: By November 1, 2024, the Kern County and Bakersfield City websites/apps should be modified to include a user friendly, specific service request for roadway markings.

The recommendation will not be implemented. The department has just recently updated its current website to include a specific service request for Pavement Markings/Stripings. The County Public Works website includes multiple ways to access the “Report a Problem” feature on the main webpage: under the main navigation menu at the top of the page (under “How Do I...” > “Report a Problem”), under the main navigation sections in the body of the webpage (see “Report a Problem” icon, as well as under “Transportation” in the “Public Services” menu), and a “Report a Problem” link to at the bottom of the main page.

In addition, the County recently launched the new MyKern smart-phone application in May. Residents can report an issue in only a few clicks—including a specific service request for Pavement Markings/Stripings—and will be guided by prompts to upload pictures or “geotag” (provide location information) to assist in resolving the issue. Users can communicate directly with County services and receive status updates through the app. MyKern is an even easier-to-use and more robust method to communicate regarding County services that is available to all residents. The MyKern app is free to download in both the Apple App Store for iPhone and Google Play for Android.

- Public Works “Report a Problem” service request form:
<https://www.kernpublicworks.com/services/transportation/road-maintenance/report-a-problem>
- Information about the MyKern app:
<https://www.kerncounty.com/Home/Components/News/News/2851/34810>

BOARD OF SUPERVISORS
COUNTY OF KERN

TRACKING PAGE

July 30, 2024

TUESDAY - 2:00 P.M.

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COUNTY ADMINISTRATIVE OFFICE

CA-22) Proposed response to Grand Jury report titled Roadway Marking Retroreflectivity - Nighttime Visibility on Kern County Roadways (Fiscal Impact: None) - APPROVED; AUTHORIZED CHAIRMAN TO SIGN CORRESPONDENCE

Flores-Perez: 3 Ayes; 2 Absent - Peters, Scrivner

RECEIVED
AUG 08 2024



BAKERSFIELD

THE SOUND OF *Something Better*

October 15, 2024

OCT 18 2024

Presiding Judge
Superior Court of California
County of Kern
1415 Truxtun Avenue, Suite 212
Bakersfield, California 93301

RE: Response to Grand Jury Findings and Recommendation regarding Traffic Painting Standards and Maintenance. 2023-2024 Kern County Grand Jury Report 5

Honorable Judge,

Kern County Grand Jury issued a report titled "Roadway Marking Retro-Reflectivity – Nighttime Visibility on Kern County Roadways". City Of Bakersfield staff has analyzed the report and have prepared the following for your consideration.

Finding #1.

Both the County and the City PWDs are aware of the new requirement to develop a method for maintenance of retroreflectivity but neither have yet formalized, adopted, or implemented their respective methods.

CITY - AGREE, WITH CLARIFICATION.

The City of Bakersfield has a process in place for several years that routinely restores pavement markings throughout the City. Given the new requirements, this process does need to be updated and additional tools (reflectivity gauges) will be required to be purchased to fully comply with the retro-reflectivity requirements. Recently, the City procured on-call contractors specifically for pavement markings so that longer lasting thermoplastic material can be used. Also, the PW Department will be updating the computerized method by which to track restoration efforts. While these changes do not need to be formally adopted by any board or committee; the PW Department will update Operating Standards for pavement marking installation, monitoring, and restoration.

Finding #2.

Although the County and City PWDs routinely restripe roadways based on length of time since they were last painted, they do not currently have a systematic method to ensure that roadway marking retroreflectivity is continually at or above a minimum level as required by the new standard.



Public Works Department
1501 Truxtun Avenue, Bakersfield, CA 93301
661-326-3724 FAX: 661-852-2120



CITY – AGREE, WITH CLARIFICATION.

Past procedure has relied on the timely restoration of pavement markings as determined by rigid and comprehensive restoration scheduling. Moving forward, the necessary tools and evaluations will be purchased and developed to ensure minimum levels of reflectivity are in place in accordance with the new requirements. Scheduling practices need to be updated to include retro-reflectivity conditions of the pavement markings.

Finding #3.

The County and City PWDs are not currently restriping all markings that are water-based paint with glass beads within their expected service life timeframe of between 6 months to 3 years. The glass beads wear off and the paint fades before the markings can be refreshed.

CITY – AGREE, WITH CLARIFICATION.

Glass beads are applied as a practice when using water-based paint. Glass beads do wear off and paint fades. The protocol for restoring water-based paint with glass beads is to reapply within 2-years. While the Department is committed to this service level, work volume, staff shortages, and priority management do occasionally delay restoration beyond the 2-years.

Finding #4.

A reduction in the frequency of application of thermoplastic paint instead of water-based paint may justify the additional costs.

CITY – AGREE.

Whenever a road is resurfaced, the City's standard for pavement markings is a thermoplastic or methacrylate material. While more expensive, its service life is 7-10 years.

Finding #5.

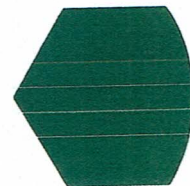
The County and City PWD databases used for determining their respective roadway striping schedules do not include sufficient historical data to effectively track and schedule the replacement of roadway markings in accordance with the new standard.

CITY – AGREE WITH CLARIFICATION.

As mentioned earlier, improvements to the City's existing computerized database is being worked on to reflect the new requirements.



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661-326-3724 FAX: 661-852-2120



Finding #6.

For citizen complaints, both the City and County websites/apps are difficult to navigate to report problems related to roadway markings.

CITY – DISAGREE, WITH CLARIFICATION.

The City offers the public a mobile app that allows individuals to submit service requests for a variety of items. The pulldown menu for service requests doesn't currently identify pavement markings as an options, which may present a problem for someone trying to report pavement markings that have been destroyed, damaged, or faded. The City will change this options to the pulldown menu for pavement marking service requests.

RECOMMENDATIONS:

Recommendation #1.

By January 1, 2025, review the guidance provided by the FHWA in their Technical Report SA-22-028, and determine the most appropriate maintenance method, or combination of methods, that will be developed to assure minimum retroreflectivity levels will be maintained for the roadway markings within their jurisdictions. (Finding 1)

CITY: Acknowledged. The City will identify the best retro-reflectivity maintenance practices by January 1, 2025.

Recommendation #2.

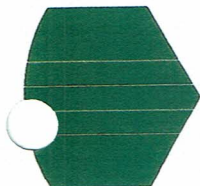
By February 1, 2025, develop the formal written Method for Maintaining Pavement Marking Retroreflectivity that will be used to systematically track and schedule replacing or refreshing roadway markings that fall below the minimum retroreflectivity requirements. (Finding 2)

City: Acknowledged. The City will update its standard operating procedures, by February 1, 2025.

Recommendation #3.

By April 1, 2025, perform an analysis to determine whether, and consequently where, it would be cost beneficial to restripe the roadways in their respective jurisdictions with thermoplastic paint. (Findings 3 and 4)

City Acknowledged the recommendation but disagree. The City currently utilizes the use of thermoplastic paint on roadways that receive new pavement. All contracted pavement restoration projects include thermoplastic paint, and the City's Streets Maintenance Division has two on-call contractors who can apply thermoplastic paint at their discretion. An analysis is not needed if this practice should be used.



Public Works Department
1501 Truxtun Avenue, Bakersfield, CA 93301
661-326-3724 FAX: 661-852-2120



Recommendation #4.

By June 1, 2025, develop the database required to establish a roadway marking schedule. The database should consider the agencies policies and practices regarding the use of pavement marking materials and should include information specific to the roadway, average daily traffic, and weather conditions of the local area. (Finding 5)

City: Acknowledged. The City currently has a database of locations, and miles of pavement markings that is used to schedule maintenance in the future. This database will be updated by June 1, 2025 to include all recommendations that are identified.

Recommendation #5.

By November 1, 2024, the Kern County and Bakersfield City websites/apps should be modified to include a user friendly, specific service request for roadway markings. (Finding 6)


City: Acknowledged. The City will update its mobile app to include a dropdown menu specific to pavement marking requests.

Sincerely,



Zac Meyer
Acting Public Works Director

Cc: Foreperson, Kern County Grand Jury



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