NO. 45919-1-II

COURT OF APPEALS, DIVISION II
OF THE STATE OF WASHINGTON

RONALD C. RASHOFF, and LORI J. RASHOFF, Individually and as Personal Representatives of the Estate of RYAN RASHOFF,

Appellants,

v.

THE STATE OF WASHINGTON; and BENJAMIN O. LAMOTTE,

Respondents.

BENJAMIN O. LAMOTTE,

Appellant,

v.

THE STATE OF WASHINGTON,

Respondent.

RESPONDENT'S BRIEF

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I. INTRODUCTION

> It is not possible for transportation engineers to design roads and highways that prevent drivers from making poor decisions, or from undertaking inappropriate, unsafe and even illegal risks while driving. That one or more crashes at a particular intersection have occurred does not, in and of itself, mean that intersection is unsafe. Instead, transportation engineers must rely on accepted, tested, well researched engineering standards in the design, construction and modification of roads and highways, which necessarily includes decisions the transportation officials make involving whether a traffic signal is installed at a particular intersection. These accepted engineering standards not only advance the orderly and predictable movement of traffic, they also provide a safer, more measured and reliable transportation system for drivers.

Clerk's Papers (CP) at 125.[1]

On December 8, 2009, Appellant Benjamin Lamotte made the highly dangerous, illegal decision to suddenly accelerate into an intersection, directly in front of a clearly visible, fast approaching, purple, 26,600 pound log truck. The size of the truck was further accentuated by the empty log trailer that rested "piggyback" on the log truck's bunk assembly. CP at 194 (four pictures of the log truck and trailer). Mr. Lamotte's unexpected, last second charge into the intersection left the log truck driver with no options or ability to avoid the inevitable crash. The log truck struck the passenger side of Mr. Lamotte's pickup, killing Mr. Lamotte's passenger, Ryan Rashoff.

[1] Mr. Seyfried is a Certified Professional Traffic Operations Engineer with more than forty years of experience analyzing roadway design and traffic control features. A copy of his report is attached as Appendix (App.) A.

As they did below, Mr. Lamotte and Appellants Rashoffs[2] contend the intersection, itself, is to blame for Mr. Lamotte's tragically poor decision to pull in front of the clearly visible log truck. Appellants[3] claim the intersection was unsafe, and that a traffic signal should have been installed by Respondent Washington State Department of Transportation (WSDOT) prior to Mr. Lamotte's collision. Their position is contrary to established Washington law, ignores the unchallenged evidence in the record, and, as a matter of law, was insufficient to defeat WSDOT's motion for summary judgment. The trial properly dismissed Appellants' claims against WSDOT.[4] This Court should now affirm that order.

First, WSDOT does not have a legal duty to prevent every collision caused by the poor judgment and illegal action of bad drivers. Rather, WSDOT must exercise ordinary care to keep Washington's highways "in a reasonably safe condition for ordinary travel." *Keller v. City of Spokane*, 146 Wn.2d 237, 254, 44 P.3d 845 (2002). Contrary to Appellants' contention in this appeal, an intersection that has no physical defect, meets or exceeds every accepted engineering standard, and conforms with the statutorily mandated requirements of the Manual of Uniform Traffic

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[2] For ease of reference, Appellants Ronald Rashoff and Lori Rashoff, individually and as Personal Representatives of the Estate of Ryan Rashoff, are collectively referred to as the "Rashoffs." Ryan Rashoff is referred to as "Ryan." No disrespect is intended.

[3] The Rashoffs submitted a brief setting forth their position on appeal. Mr. Lamotte "joined and adopted" every portion of the Rashoffs' brief, except the issues and argument relating to the Estate's claim for pre-death pain and suffering. No other argument was offered by Mr. Lamotte. For ease of reference, in discussing their joint claims, Mr. Lamotte and the Rashoffs are referred to as "Appellants."

[4] This order did not affect the Rashoffs' ongoing negligence claim against Mr. Lamotte.

Control Devices (MUTCD), is reasonably safe for ordinary travel as a matter of law. RCW 47.36.020; WAC 468-95-010; *Kitt v. Yakima Cnty.*, 93 Wn.2d 670, 611 P.2d 1234 (1980); *see also* Rashoffs' Opening Brief (Opening Br.) at 13 ("The MUTCD has been adopted as law in Washington . . . . [WSDOT] must comply with the provisions of the MUTCD.").

Second, the undisputed evidence establishes that the intersection had no physical defect, met or exceeded every engineering standard including the MUTCD. Further, it is undisputed that Appellants' proposed installation of a traffic signal prior to Mr. Lamotte's collision would have *increased* the risk of crashes for millions of other drivers who used the intersection. Certainly, WSDOT is under no duty to make a safe road safer. Even more compelling here, WSDOT was under no legal duty to ignore sound, fundamental engineering standards and make a safe road unsafe. Based on the undisputed admissible evidence, reasonable minds can reach only one conclusion—Mr. Lamotte, alone, caused the December 9, 2009 collision and there was no breach of any duty by WSDOT. Therefore, Appellants' negligence claims against WSDOT should be dismissed as a matter of law. *Miller v. Likins*, 109 Wn. App. 140, 144, 34 P.3d 835 (2001); *Moore v. Hagge*, 158 Wn. App. 137, 148, 241 P.3d 787 (2010).

Third, even if Appellants had evidence that demonstrated WSDOT breached its duty, Appellants failed to present any admissible evidence that Mr. Lamotte's dangerous decision to pull directly in front of the close, fast approaching log truck was proximately caused by any feature or condition of the intersection itself. *Garcia v. State, Dep't of Transp.*, 161 Wn. App. 1, 15, 270 P.3d 599 (2011); *Miller*, 109 Wn. App. at 140. Appellants' failure to establish proximate cause is also dispositive of their negligence claims against WSDOT. *Moore*, 158 Wn. App. at 148 (cause in fact may be decided as a matter of law if "the causal connection is so speculative and indirect that reasonable minds could not differ"). Legal cause, the second prong of the proximate cause element, is also lacking here. As a matter of law, the connection between Mr. Lamotte's unexplained, terribly dangerous decision to pull in front of a log truck and the intersection itself "is too remote or insubstantial" to impose liability on WSDOT. *Kim v. Budget Rent A Car Sys., Inc.*, 143 Wn.2d 190, 204, 15 P.3d 1283 (2001) (legal proximate cause presents a question of law for the court).

Finally, as a matter of law, the Estate cannot recover damages for loss of enjoyment of life (LOEL). Further, there is no admissible evidence that Ryan consciously experienced any pre-death pain or suffering. Accordingly, the Estate cannot pursue those damages in this lawsuit, and the trial court correctly dismissed that aspect of the Estate's damage

claim.[5] *Otani ex rel. Shigaki v. Broudy*, 151 Wn.2d 750, 763, 92 P.3d 192 (2004) (the estate must prove the decedent consciously experienced pre-death pain and suffering to recover); *White v. State*, 131 Wn.2d 1, 9, 929 P.2d 396 (1997) (speculation and conjecture are insufficient to create a material issue of fact or defeat summary judgment).

For each of these reasons, the Court should affirm the trial court's order that dismissed Appellants' negligence claims against WSDOT, and dismissed the Estate's claim for pre-death pain and suffering damages.

II. COUNTERSTATEMENT OF ISSUES

1. WSDOT must exercise ordinary care to keep Washington's highways reasonably safe for ordinary travel. *Keller*, 146 Wn.2d at 254. To state a claim for negligence, must Appellants produce evidence that the intersection did not conform with accepted engineering standards and the statutorily mandated MUTCD requirements?

Answer: Yes. The design of a public highway requires expertise in mathematical, physical and engineering sciences and must, by statute, be performed by a registered engineer. RCW 18.43.020(2) and (5)(a). The "ordinary care" that WSDOT must exercise in the design,

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[5] Mr. Lamotte joined in this portion of the motion for summary judgment below.

> Defendant Lamotte *joins* and incorporates by reference the facts and arguments in the State of Washington's summary judgment motion that the court dismiss the Rashoff estate's demand for pain and suffering damages, as well as its claim for damages for loss of the enjoyment of life.

CP at 376 (emphasis in original).

construction and maintenance of state highways is defined by the customary and usual practices of engineers, and any additional requirements imposed by the legislature. A highway that has no physical defect, meets or exceeds accepted engineering standards, and conforms with all statutory requirements is reasonably safe for ordinary travel as a matter of law.

2. Did the trial court properly conclude that Appellants failed to present evidence supporting the essential elements of their negligence claims?

Answer: Yes. When the facts are undisputed, questions of breach and proximate cause negligence can be decided as a matter of law. *Miller*, 109 Wn. App. at 140; *Moore*, 158 Wn. App. at 137. Here, it is undisputed that installation of a traffic signal prior to Mr. Lamotte's collision would have increased the risk of crashes at that intersection. The undisputed facts also establish the Williams Street/SR 12 intersection had no physical defects, met or exceeded every accepted engineering standard, and conformed with the statutorily mandated MUTCD signal warrants.

Furthermore, Appellants cannot show the intersection was the proximate cause of Mr. Lamotte's dangerous decision to accelerate directly in front of a fast approaching, clearly visible log truck. This too, is dispositive of their negligence claims against WSDOT. For these

reasons as well, the Court should affirm the grant of summary judgment to WSDOT. *Garcia*, 161 Wn. App. at 14-15; *Marshall v. Bally's Pacwest, Inc.*, 94 Wn. App. 372, 380, 972 P.2d 475 (1999) (the plaintiff's failure to produce evidence establishing proximate cause cannot withstand summary judgment).

3. Did the trial court correctly rule that the opinions of Edward Stevens, the Rashoffs' forensic engineer, did not conform with accepted engineering practices and were, thus, inadmissible under ER 702?

Answer: Yes. The undisputed evidence establishes the methodology Mr. Stevens used to analyze the MUTCD signal warrants failed to conform with any accepted engineering standard or practice. Accordingly, the trial court did not abuse its discretion by ruling that Mr. Stevens' opinions were inadmissible under ER 702. *Lakey v. Puget Sound Energy, Inc.*, 176 Wn.2d 909, 918-19, 296 P.3d 860, 866 (2013); *Lake Chelan Shores Homeowners Ass'n v. St. Paul Fire & Marine Ins. Co.*, 176 Wn. App. 168, 175, 313 P.3d 408, 412 (2013), *review denied*, 179 Wn.2d 1019 (2014); *Cano-Garcia v. King Cnty.*, 168 Wn. App. 223, 249, 277 P.3d 34 (2012), *review denied*, 175 Wn.2d 1010 (2012).

4. Did the trial court properly dismiss the Estate's claim for non-economic damages?

Answer: Yes. As a matter of law, the Estate cannot pursue

damages for loss of enjoyment of life. *Otani*, 151 Wn.2d at 763 ("We hold that postdeath damages for LOEL are not recoverable by a decedent's estate under Washington's survival statutes."). Further, the Estate failed to produce admissible evidence demonstrating that Ryan consciously experienced pain and suffering prior to his death. *Otani*, 151 Wn.2d at 758. Unable to support their claim for pre-death pain and suffering with any admissible evidence, the trial court correctly dismissed that portion of the Estate's damages claims. *Id.*

III. COUNTERSTATEMENT OF THE CASE

A. Mr. Lamotte's Collision

SR 12 is a major east-west highway that, in Lewis County, extends east from Interstate 5 to White Pass. Mr. Lamotte's collision took place at the intersection of Williams Street and SR 12 in Mossyrock. At this intersection, SR 12 consists of one eastbound and one westbound lane, with left turn lanes in both directions. Overhead flashing yellow lights cautioned drivers traveling on SR 12 of the intersection with Williams Street. CP at 204-05.

Williams Street is a north-south rural street. Drivers on Williams Street were required to stop at the stop sign, and yield the right of way to vehicles on SR 12. Overhead red flashing lights emphasized the need for drivers on Williams Street to stop and yield to traffic on SR 12. CP at 215; *see also* RCW 46.61.190(2) (a driver must come to a complete stop

and yield the right of way to approaching vehicles on the state highway) and RCW 46.61.065 (a driver approaching an intersection controlled by a flashing red light is required to stop at the marked stop line and yield to vehicles facing a flashing yellow light). Finally, to further emphasize the need for drivers on Williams Street to yield to traffic on SR 12, WSDOT installed "Cross Traffic Does Not Stop" signs next to existing stop signs. CP at 204-06.

On December 8, 2009 at 3:17 p.m., then 19 year old Mr. Lamotte, a resident of Mossyrock who was familiar with the subject intersection, drove north on Williams Street in his Ford F-150 pickup truck and stopped at the intersection with SR 12. Ryan Rashoff sat in the front passenger of Mr. Lamotte's truck. CP at 214-15. It is undisputed the sky was clear, the road surface was dry, and there were no adverse roadway conditions or line of sight issues that interfered with Mr. Lamotte's ability to see approaching vehicles on SR 12. CP at 214. Indeed, it is undisputed that, from the stop sign, Mr. Lamotte had an unobstructed view of more than 2,000 feet looking in the direction of westbound traffic. CP at 187. There was no one behind Mr. Lamotte, and no one pressured or forced Mr. Lamotte into the intersection.

At the time of the collision, Mr. Steen drove a 1997 purple, Peterbilt log truck westbound on SR 12. CP at 283-84. An empty logging trailer rested on the truck's bunk assembly, and rose up above the cab of

the truck. CP at 194. As Mr. Steen approached the intersection he saw Mr. Lamotte's pickup stop at the Williams Street stop sign. For reasons that remain unexplained, as the log truck approached the intersection, Mr. Lamotte suddenly pulled into the eastbound lane of SR 12 and again stopped. Seeing this, Mr. Steen concluded that Mr. Lamotte saw his log truck and planned to remain stopped in the eastbound lane until the log truck cleared the westbound lane of the intersection. CP at 280-81. Tragically, Mr. Lamotte did not wait.

Without any warning, Mr. Lamotte suddenly accelerated from the eastbound lane directly in front of the log truck, which was less than 300 feet from the intersection.[6] CP at 199-200. Mr. Steen had no time to stop

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[6] Mr. Steen did not describe this "double-stop" maneuver by Mr. Lamotte when interviewed shortly after the accident. Initially, Mr. Steen reported Mr. Lamotte suddenly accelerated from the stop sign directly into his westbound lane. CP at 184. Nathan Rose, an accredited Traffic Accident Reconstruction expert, separately analyzed both descriptions of the accident. CP at 174-80, 201-02. Both scenarios led Mr. Rose to the same inescapable conclusions:

> Based on my investigation and analysis of this collision, I concluded that Benjamin Lamotte caused this collision on a more probable than not basis .... Specifically, Mr. Lamotte either entered the intersection when it was unsafe to do so, or failed to fully utilize the acceleration capabilities of his pickup as he traveled through the intersection despite the quickly approaching Peterbilt log truck which would have been plainly visible to him if he looked. In both cases, Mr. Lamotte, alone, controlled the sequence of events that caused this collision. In addition, had Mr. Lamotte waited just 6 seconds, he could have accelerated at a mild acceleration rate and still cleared the intersection about five seconds before Richard Ary's vehicle entered the intersection and about 16 seconds before Michael Olson's vehicle entered the intersection.

CP at 171-72. Significantly, Appellants' accident reconstruction expert did not dispute any of Mr. Rose's conclusions. A copy of Mr. Rose's report is attached to this brief as App. B.

or take evasive maneuvers. "[It] just all happened so quick, there was no time to do anything." CP at 286-87.

At the time of the collision Richard Ary was in a truck heading eastbound towards the intersection (i.e., facing Mr. Steen). CP at 221. He saw the pickup accelerate directly in front of Mr. Steen's log truck. Referring to Mr. Lamotte, Mr. Ary testified:

> It's like what were they thinking? I couldn't – you know, I couldn't comprehend what they were thinking. Because basically they pulled out – they pulled right out in front of [the log truck].

CP at 238-39.

As pointed out by Richard Gill, the Rashoffs' human factors expert, had Mr. Lamotte bothered to look, the following visual factors would have alerted him to the incredible danger posed by the quickly approaching log truck:

- From his stopped position, Mr. Lamotte had more than 2,000 feet of unobstructed view of the westbound approaching log truck.
- Had he looked, Mr. Lamotte would have viewed a large object (the Steen truck).
- The sun was "behind" Mr. Lamotte, and would have "illuminated" Mr. Steen's truck.
- Williams Road in the northbound direction (the direction of travel of the Lamotte vehicle) angled slightly toward Mr. Steen.

CP at 440.

Mr. Lamotte does not dispute these facts or Mr. Steen's testimony. Mr. Lamotte has no memory of the collision. He does not know whether he ever looked in the direction of Mr. Steen's truck prior to charging into

the intersection, nor can he offer any explanation for why he chose to pull directly in front of the log truck. *See* CP at 267.

The log truck struck Mr. Lamotte's pickup on the passenger side where Ryan was sitting. It is undisputed that Ryan never regained consciousness after the impact, and died within minutes of the collision.

Mr. Ary stopped at the collision site "less than a minute" after it occurred. CP at 224. Mr. Ary testified Ryan was unconscious when he arrived, and never regained consciousness. CP at 240. Mike Olson drove the one vehicle behind Mr. Steen's log truck (although he was so far behind Mr. Steen that he did not see the events leading up to the collision). CP at 246-47. Mr. Olson testified Ryan was unconscious and had no pulse when he arrived. CP at 253. Rebecca Sutherland, a reserve police officer with the Mossyrock Police Department, also testified Ryan had no pulse and was not breathing when she arrived. She concluded Ryan had already passed. CP at 121.

Again, Mr. Lamotte cannot describe what Ryan was doing in the seconds leading up to the collision. *See* CP at 267. In fact, *no one* was able to testify whether Ryan was texting, listening to music, or even awake immediately prior to the collision.

B. Procedural History

Mr. Lamotte and the Rashoffs filed separate lawsuits against WSDOT,[7] which were subsequently consolidated for trial. CP at 21. On October 24, 2013, WSDOT filed a motion for summary judgment. Mr. Lamotte and Appellants filed opposing briefs that alleged WSDOT violated the MUTCD signal warrants by failing to install a traffic signal at the intersection prior to Mr. Lamotte's collision.

On November 27, 2013, the Honorable Chris Wickham issued a letter opinion that dismissed the non-economic damages claim of the Estate. CP at 643-44. In addition, Judge Wickham ruled the opinions rendered by the Rashoffs' engineering expert, Edward Stevens, did not satisfy the requirements of ER 702, and were, therefore, inadmissible.[8] However, recognizing the reliance Appellants placed on the MUTCD, and specifically Mr. Stevens' opinions, the trial court took the unusual step of allowing Appellants to submit supplemental declarations and briefs, which the Rashoffs did. CP at 643. Despite the additional opportunity afforded by the trial court, Mr. Stevens could not correct the critical flaws that rendered his analysis inadmissible under ER 702. *Infra*, at 30 to 39.

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[7] The Rashoffs did not initially name Mr. Lamotte as a defendant in their lawsuit. They amended their lawsuit to add Mr. Lamotte as a defendant only after WSDOT identified him as a party at fault. *See* CP at 75-78.

[8] The trial court mistakenly cited ER 701 in its letter opinion. However, the actual quote cited and relied upon by Judge Wickham was taken directly from ER 702. Both the quote and the context make it clear the reference to ER 701 was a scrivener's error.

On January 7, 2014, the trial court issued a letter opinion that dismissed Mr. Lamotte's lawsuit and dismissed WSDOT from the Rashoff lawsuit. The trial court order allowed the Rashoffs' negligence action against Mr. Lamotte to continue. CP at 722. An order setting forth this decision was entered on February 7, 2014. CP at 723. That same day the trial court entered an order directing entry of final judgment as to WSDOT in the Rashoff matter, and stayed the Rashoffs ongoing lawsuit against Mr. Lamotte. Mr. Lamotte and the Rashoffs filed timely appeals to this court.

IV. STANDARD OF REVIEW

Generally, when reviewing a motion for summary judgment, the appellate court conducts the same inquiry as the trial court. *Howland v. Grout*, 123 Wn. App. 6, 9, 94 P.3d 332 (2004). Summary judgment is properly granted where the admissible evidence, viewed in the light most favorable to the nonmoving party, demonstrates there are no genuine issues of material fact and the moving party is entitled to judgment as a matter of law. CR 56; *Weyerhaeuser Co. v. Aetna Cas. & Sur. Co.*, 123 Wn.2d 891, 897, 874 P.2d 142 (1994). A material fact is one that "affects the outcome of the litigation." *Ruff v. King Cnty.*, 125 Wn.2d 697, 703, 887 P.2d 886 (1995).

A reviewing court "may not consider inadmissible evidence when ruling on a motion for summary judgment." *Cano-Garcia*, 168 Wn. App.

at 223. Argumentative assertions and speculation are insufficient to create a genuine issue of material fact or defeat summary judgment. *Young v. Key Pharm., Inc.*, 112 Wn.2d 216, 225, 770 P.2d 182, 187 (1989); *Seven Gables Corp. v. MGM/UA Entm't Co.*, 106 Wn.2d 1, 13, 721 P.2d 1 (1986).

A trial court's ruling that expert testimony is inadmissible under ER 702 is reviewed for abuse of discretion. *Lakey*, 176 Wn.2d at 919; *State v. Yates,* 161 Wn.2d 714, 762, 168 P.3d 359 (2007).

> A trial court abuses its discretion by issuing manifestly unreasonable rulings or rulings based on untenable grounds, such as a ruling contrary to law.

Lakey, 176 Wn.2d at 919 (citing *Wash. State Physicians Ins. Exch. & Ass'n v. Fisons Corp.,* 122 Wn.2d 299, 339, 858 P.2d 1054 (1993)).

If the party with the burden of proof at trial fails to establish the existence of an element essential to that party's case, summary judgment should be granted. *Young*, 112 Wn.2d at 225.

> In such a situation, there can be 'no genuine issue as to any material fact,' since a complete failure of proof concerning an essential element of the nonmoving party's case necessarily renders all other facts immaterial.

Young, 112 Wn.2d at 225.

V. ARGUMENT

A. WSDOT Satisfied Its Legal Duty To Exercise Ordinary Care By Complying With Accepted Engineering Standards And The Statutorily Mandated MUTCD Signal Warrants

To defeat a motion for summary judgment, a plaintiff must produce admissible evidence establishing all four elements of their negligence claim: a legal duty owed to plaintiff, breach, proximate cause, and damages. *White*, 131 Wn.2d at 9; *see also Degel v. Majestic Mobile Manor, Inc.*, 129 Wn.2d 43, 48, 914 P.2d 728 (1996). The extent and scope of the legal duty owed is a question of law for the court to decide. *Keller*, 146 Wn.2d at 243 ("Whether a municipality owes a duty in a particular situation is a question of law . . . ."); *see also Xiao Ping Chen v. City of Seattle*, 153 Wn. App. 890, 899-900, 223 P.3d 1230, 1235 (2009), *review denied*, 169 Wn.2d 1003 (2010).

All parties agree WSDOT has a duty to exercise ordinary care in the design, construction and maintenance of Washington's highways "to keep them in a reasonably safe condition for ordinary travel." *Keller*, 146 Wn.2d at 254. Similarly, all parties agree this duty extends to all persons using the highway, whether negligent or fault free. *Owen v. Burlington Northern & Santa Fe R.R. Co.*, 153 Wn.2d 780, 786, 108 P.3d 1220 (2005). It is the third question, the scope of WSDOT's duty and the standard of care it must follow, that Appellants seek to significantly expand in this appeal. As demonstrated below, the scope of WSDOT's

duty and the standard of care it must adhere to in making Washington's highways reasonably safe for ordinary travel are defined by, (1) accepted engineering standards and the engineering judgment those standards require, and (2) the statutory requirements imposed by the legislature.

1. The Duty To Exercise "Ordinary Care" To Keep Roads "Reasonably Safe" Is Defined By Accepted Engineering Standards And The Requirements Imposed By Statute

Initially, WSDOT is not required, nor is it possible, to design a highway that prevents collisions. CP at 125.

> It is an unfortunate reality that traffic collisions have and will continue to occur at intersections that have no defect or design flaw. Nothing can prevent drivers from exercising poor judgment or from taking unreasonable, even fatal risks. But the reasonableness of the actions of WSDOT (or any other transportation agency for that matter) and a determination of whether an intersection is reasonably safe for ordinary travel cannot be measured by the poor driving decisions of a single driver.

CP at 691 (Mr. Seyfried Decl.).

Recognizing this limitation, the Washington State Supreme Court has repeatedly held that municipalities "are not the insurers against accidents nor the guarantors of public safety and are not required to 'anticipate and protect against all imaginable acts of negligent drivers.' " *Keller*, 146 Wn.2d at 252 (citing with approval *Stewart v. State of Washington*, 92 Wn.2d 285, 299, 597 P.2d 101 (1979)). Instead, WSDOT is required to exercise "ordinary care" to keep Washington's highways in

a "reasonably safe" condition for ordinary travel. *Keller*, 146 Wn.2d at 254.

By law, the design of a public highway, including the traffic control features placed on the highway, constitutes the "practice of engineering." It requires "the application of special knowledge of mathematical, physical, and engineering sciences" that are beyond the knowledge of a lay person, and, must be performed by a registered engineer.[9] RCW 18.43.020(2) and (5)(a). Thus, in the context of the common law duty clarified in *Keller*, "ordinary care" is defined by the customary and usual practices of engineers. *See Douglas v. Freeman*, 117 Wn.2d 242, 248-49, 814 P.2d 1160 (1991) (where professional expertise is required, the standard of care "is based on proof of the customary and usual practices within the profession"); 65 C.J.S. Negligence § 163 (persons performing professional services have a duty "to exercise a reasonable degree of knowledge, skill, and care, as determined by the degree of skill and care ordinarily employed by their respective professions under similar conditions or under similar circumstances."). Similarly, where the determination of whether a highway is "reasonably safe for ordinary travel" concerns highway

[9] Notably, as well, responsibility for the safe design of a public highway is a uniquely governmental function performed exclusively by public transportation agencies like WSDOT. *See, for example,* RCW 47.01.011.

engineering and design issues, then that determination must be controlled by accepted engineering standards.

Accepted engineering standards, and the engineering judgment those standards require, is the benchmark used not only by WSDOT, but by every transportation agency.[10] CP at 125, 205, 532-33, 593, 691-92. The reason for this is immediately obvious:

> By relying and adhering to such standards, WSDOT is able to utilize and benefit from not only its own extensive experience, but also from the research, testing and experience of federal and state transportation agencies across the nation. This enables WSDOT to design, construct and maintain highways that are safe for ordinary travel.

CP at 205.

Moreover, as the undisputed facts of this case establish, modifying an intersection in a way that conflicts with accepted engineering standards may actually make the intersection less safe and increase the risk of crashes. CP at 125, 533, 593.

In addition to accepted engineering standards, WSDOT's standard of care and the scope of its duty are further defined by the requirements mandated by the legislature. *Owen*, 153 Wn.2d at 787 ("a statute, regulation, or other positive enactment may help define the scope of a duty or the standard of care."). Here, all parties agree, the legislature requires WSDOT to comply with the MUTCD "signal warrants" in evaluating

[10] Mr. Stevens, the forensic engineer hired by the Rashoffs, does not dispute that accepted engineering standards provide the benchmark for ensuring a state highway is safe, nor does he offer any alternative engineering standard or approach WSDOT could or should have followed here. *See* CP at 691.

whether an intersection is safe, and, if not, whether a traffic signal should be installed. RCW 47.36.020 (WSDOT shall adopt a uniform system of traffic control signals that "shall correlate with and so far as possible conform to" the MUTCD);[11] RCW 47.36.050 and 110 (stop sign must conform with the MUTCD); RCW 47.36.053 (the placement and maintenance of traffic devices on highways must conform with the adopted provisions of the MUTCD); *see* also Opening Br. at 13 ("The MUTCD has been adopted as law in Washington . . . . *Defendant State must comply with the provisions of the MUTCD.*") (emphasis added).

The justification for the Legislature's reliance on, and WSDOT's adherence to, the MUTCD signal warrants is immediately apparent. The MUTCD signal warrants are the product of more than five decades of research by traffic engineers, and incorporate the practical experience of traffic engineers and transportation agencies from across the nation.[12] CP at 532, 593. It is undisputed that every transportation agency in the United States, including WSDOT, uses the signal warrants to determine whether it is safe and appropriate to install a traffic signal at an intersection. CP at 532, 593. The reason for this is compelling—installation of a traffic signal at an intersection that does not

[11] Pursuant to this statute, WSDOT adopted the provisions of the MUTCD signal warrants. WAC 468-95-010.

[12] Compliance with the MUTCD is also a condition of federal grant funding. *See Garcia*, 161 Wn. App. at 8 n.2.

satisfy the signal warrants *increases* the risk of crashes. CP at 125, 533, 593.

There are eight separate MUTCD signal warrants that evaluate the operation and geometrics of the intersection from every relevant perspective. Specifically, those eight signal warrants require a comprehensive evaluation of: traffic speed; average traffic volume and the corresponding gaps available for the disfavored traffic (e.g., those vehicles that are required to yield the right of way to cross traffic); the number and type of lanes on the respective roads; the crash experience at the intersection; and the intersection's relationship to other intersections, the highway network, school crossings, and pedestrian volume. CP at 464 (Mr. Stevens' Decl.), 593. At least one of the eight signal warrants must be met before a transportation agency can consider installing a traffic signal at the intersection. CP at 126, 205, 464. Strict adherence to the warrants is required. As Mr. Seyfried explained:

> The question of whether to install a traffic signal is not taken lightly. *Installing a traffic signal at an intersection that does not meet any of the MUTCD signal warrants is not only unsound and improper from an engineering perspective, it also increases the likelihood that crashes will take place at that intersection.* For that reason, the specific section of the MUTCD that contains the signal warrants, Section 4C.01 "Studies and Factors for Justifying Traffic Control Signals," specifically warns that a traffic control signal "should not be installed unless one or more of the factors described in this Chapter are met." Similarly, even when an intersection is analyzed under Signal Warrant 7 (which, per the MUTCD, is the Warrant used when "the severity and frequency of crashes are the principal reasons to consider installing a traffic control

> signal"), the MUTCD warns that a traffic signal should only be considered if an "adequate trial of alternatives" has "failed to reduce the crash frequency." *The reason, again, is that a traffic control signal does not prevent the occurrence of crashes. Quite to the contrary, a traffic signal installed at a location that does not conform with the MUTCD signal warrants may increase the frequency of crashes at that intersection.*

CP at 593-94 (emphasis added); *see also* CP at 533 ("Installing a traffic signal in an intersection that does not meet warrants leads to increased collisions and unnecessary delay.").

The crux of Appellants' claim is that WSDOT breached a duty because of the absence of a traffic signal. In this context, the scope of WSDOT's duty, and the standard of care it must adhere to, are defined and controlled by, (1) accepted engineering standards and the engineering judgment those standards require, and (2) the statutory requirements imposed by the legislature. Appellants failed to present admissible evidence demonstrating a breach of this duty; therefore, their negligence claim fails, and the grant of summary judgment to WSDOT should be affirmed. *Young*, 112 Wn.2d at 225.

2. The Expansive "Totality Of The Circumstances" Test Advanced By Appellants Is Both Legally Wrong And Contrary To Sound Public Policy

Citing *Chen*, 153 Wn. App. 890, Appellants contend WSDOT's standard of care is established by reference to a nebulous, undefined "totality of circumstances" standard, that may neither reflect nor be

consistent with accepted engineering standards.[13] Opening Br. at 4-5. By untethering their new, expanded test from accepted engineering standards, Appellants seek to transform "totality of circumstances" into a standard that is met when "*any* circumstances are alleged," even if the plaintiff can prove no violation of any engineering standards. Indeed, once sound engineering standards are removed from the standard of care equation, there remains no logical or meaningful way to qualify, quantify or otherwise evaluate whether a highway is reasonably safe. According to Appellants, *any* evidence becomes sufficient to defeat summary judgment, even when, like here, that evidence advocates a course of action that increases the risk of crashes, made the highway more dangerous for millions of other drivers, and is contrary to the MUTCD engineering standards that have been developed to make roads safer. Opening Br. at 34-36. Respectfully, that is not the law in Washington, and for good reason. As Mr. Seyfried explained:

> It is improper to expect or demand transportation agencies to risk the safety and lives of millions of drivers and abandon accepted traffic engineering principals to try and prevent a single driver from taking an unreasonable, dangerous risk that causes a terrible accident.

CP at 691-92.

[13] As demonstrated below, Appellants misconstrue the nature and scope of the *Chen* holding, which, in any event, should be construed in light of the peculiar facts of that case.

Furthermore, Appellants' proposed radical expansion of WSDOT's duty is inconsistent with the holding in *Chen*. In *Chen*, the City of Seattle took affirmative action that made an intersection unsafe. Specifically, the City removed the very safety structure, a pedestrian island, that it previously installed to prevent vehicle-pedestrian accidents. *Chen*, 153 Wn. App. at 910. While the island was in place, the vehicle-pedestrian accidents completely stopped. Despite this success, the City removed the pedestrian island, apparently to appease a business that wanted to increase vehicle access to its establishment. *Id.*

Importantly, the City removed the pedestrian island without taking any other steps to protect pedestrians from the known dangers that caused it to install the island in the first place. Predictably, the City's action led to a sharp increase in pedestrian-vehicle accidents at the intersection, including one fatality. Subsequently, the plaintiff, too, was struck and killed by a vehicle while trying to cross that same intersection. *Id.* at 894-95. The plaintiff's estate sued alleging, in part, the City created an unsafe condition when it removed the pedestrian island. *Id.* at 896-97.

Based on the unique facts presented in *Chen*, Division I of the Court of Appeals held:

> Whether roadway conditions are reasonably safe for ordinary travel depends on the circumstances surrounding a particular roadway. Although relevant to the determination of whether a municipality has breached its duty, evidence that a particular physical defect in a roadway rendered the roadway dangerous or misleading or evidence that a municipality was in violation

> of a law concerning roadway safety measures are not essential to a claim that a municipality breached the duty of care owed to travelers on its roadways. A trier of fact may conclude that a municipality breached its duty of care based on the totality of the circumstances established by the evidence.

Chen, 153 Wn. App. at 894.

However, contrary to the position advanced by Appellants here, *Chen* did not uncouple "totality of circumstances" from accepted engineering practices. Rather, it found summary judgment was not appropriate because the plaintiff produced admissible expert testimony that the "city created an unsafe condition when it removed the pedestrian island," and the number of "crossing gaps" at the intersection did not conform with "sound engineering principles." *Chen*, 153 Wn. App. at 896-97, 910.

Unlike *Chen*, there is no evidence WSDOT ever altered or modified the Williams Street/SR 12 intersection in a way that created a defect or unsafe condition. Quite to the contrary, it is undisputed WSDOT installed additional signs on Williams Street in 2007 that completely eliminated "enter at angle crashes"[14] at the intersection for more than two years. CP at 536. Moreover, unlike *Chen*, and as demonstrated below, the undisputed admissible evidence establishes that the intersection had no physical defect, satisfied all accepted engineering standards, and complied

[14] An "enter at angle" crash is one where the vehicle entering the intersection is required to grant right of way to traffic coming from the right or left but fails to do so. CP at 463.

with every MUTCD standard at the time of Mr. Lamotte's collision. *Infra*, at 26 to 29.

The Court should reject Appellants' attempt to expand WSDOT's duty. It should hold that WSDOT's duty, and the standard of care it must adhere to, requires evidence that, if believed, would demonstrate a breach of (1) accepted engineering standards and the engineering judgment those standards require, or (2) the statutory requirements imposed by the legislature.

B. As A Matter Of Law, The Williams Street/SR 12 Intersection Was Reasonably Safe For Ordinary Travel

Whether a defendant breached the applicable standard of care typically presents a question of fact and, thus, is not ordinarily susceptible to summary judgment. However, as the trial court did here, this issue can be decided as a matter of law when the facts are undisputed and "reasonable minds can reach only one conclusion." *Ruff*, 125 Wn.2d at 703; *Hartley v. State*, 103 Wn.2d 768, 775, 698 P.2d 77, 81 (1985); *Miller*, 109 Wn. App. at 140. Here, Appellants' negligence claim fails as a matter of law because they did not produce any admissible evidence of WSDOT's negligence under the legal standard described above.

Initially, it is not unusual nor is it inherently dangerous for a cross street to intersect with a rural state highway that has a posted speed limit of 55 m.p.h. Such intersections exist on rural highways across the nation. *See* CP at 138. Rather, each intersection must separately be evaluated to

determine whether it conformed with accepted engineering standards. The undisputed evidence establishes that the Williams Street/SR 12 intersection met or exceeded every accepted engineering standard at the time of Mr. Lamotte's collision. CP at 205, 691-92.

It is undisputed this intersection conformed with all geometric design standards regarding lane width and striping. CP at 205. It is also undisputed that drivers who stopped on Williams Street had a clear, unobstructed view of SR 12 extending more than 2,000 feet. CP at 533.

Similarly, Appellants do not dispute that the time gaps available to drivers on Williams Street who wanted to cross SR 12 met or exceeded every national and state highway engineering design standard. CP at 162-63. Again, the unchallenged facts establish that, had Mr. Lamotte waited just six seconds, he could have easily and safely crossed the intersection using only a mild rate of acceleration. CP at 200, 202. In addition, it is undisputed that the posted speed limit on SR 12 conformed with the requirements of the MUTCD, and was appropriate for conditions along SR 12 in the vicinity of Mr. Lamotte's collision.[15] CP at 161-62.

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[15] The Rashoffs suggest WSDOT could have established a different speed limit in the vicinity of the intersection. Opening Br. at 13. However, none of their experts supported that suggestion. On the contrary, it is undisputed the traffic studies conducted by WSDOT did not reveal any speeding problems on SR 12. CP at 162. Further, Mr. Seyfried opined the posted speed limit satisfied the MUTCD requirements. In addition, research demonstrates that lowering the posted speed limit on this highway was "unlikely to change the actual speed of traffic." CP at 162. None of these opinions are disputed. Finally, on a more practical front, there is no evidence Mr. Lamotte ever looked for oncoming traffic before pulling in front of Mr. Steen's log truck. Thus, there is no evidence a reduced speed limit would have had any effect on the unfortunate decision he made.

Nevertheless, Appellants contend the intersection was not safe because it did not have a traffic signal prior to Mr. Lamotte's collision. Again, that claim is not supported by any admissible evidence and was properly rejected by the trial court. As it does with every intersection across the state, WSDOT repeatedly reviewed the safety of the Williams Street/SR 12 intersection. In fact, it is undisputed WSDOT studied this intersection in 2003, 2004, 2006, 2007, May 18, 2009, and again after Mr. Lamotte's collision in December, 2009. *See* CP at 138-39, 143-46.

In conducting these studies, WSDOT evaluated the intersection using all eight of the MUTCD signal warrants. CP at 139-61. The undisputed admissible evidence establishes the intersection never satisfied the criteria of any of the eight signal warrants prior to Mr. Lamotte's collision. Furthermore, it is undisputed that installing a traffic signal before Mr. Lamotte's collision would have increased the risk of crashes for millions of other drivers who passed through the intersection. CP at 126, 206, 533, 592-93.

In short, Mr. Lamotte's December 8, 2009 collision did not result from any defect or engineering deficiency with the road itself. It resulted solely from Mr. Lamotte's poor, still unexplained, decision to pull directly into the path of a close, fast approaching log truck. As Mr. Rose concluded following his unchallenged reconstruction of this collision, "Mr. Lamotte, alone, controlled the sequence of events that

caused this collision." CP at 172. That Mr. Lamotte made an incredibly poor, illegal driving decision does not mean there was anything wrong or unsafe about the intersection. CP at 691.

WSDOT complied with every engineering standard and the statutorily required MUTCD. Given this undisputed evidence, reasonable minds can reach only one conclusion—this collision was caused solely by Mr. Lamotte and not by any defect, deficiency or condition of the intersection. The trial court correctly dismissed Appellants' negligence claims against WSDOT, and this Court should affirm that order. *Young*, 112 Wn.2d at 225.

1. The Trial Court Properly Ruled Mr. Stevens' Opinions And Conclusions Were Inadmissible Under ER 702

Mr. Stevens cited and exclusively relied on the MUTCD signal warrants to analyze the traffic volume, crash history, and, indeed, the overall safety of the subject intersection. From his analysis of the signal warrants, Mr. Stevens concluded WSDOT should have installed a traffic signal at the intersection prior to Mr. Lamotte's collision.[16] However, while the MUTCD signal warrants are the product of more than

[16] Mr. Stevens also suggests WSDOT should have installed a 4-way stop on this highway as an "interim" measure until a traffic signal was installed. CP at 468. Again, his suggestion is directly contrary to the requirements of the MUTCD. Under the MUTCD, consideration of a 4-way stop at an intersection is only appropriate when the volume of traffic on the intersecting roads is approximately equal, and, again, states that consideration should only be given to this option when less intrusive measures are first attempted. It is undisputed neither of these factors were met. CP at 535, 600-01. Thus, installation of a 4-way stop on this highway would have violated both the statutory MUTCD requirements and accepted engineering standards.

five-decades of research, it is undisputed that the methodology Mr. Stevens used to analyze those warrants is unique to him and this lawsuit. CP at 534, 596, 684-86, 789-90. Appellants nevertheless contend that, because Mr. Stevens' is a registered engineer, his opinions concerning the safety of the highway are admissible, regardless of whether they conform to accepted engineering practices. Opening Br. at 33. They are mistaken.

The trial court "must exclude expert testimony involving scientific evidence unless the testimony satisfies both *Frye* and ER 702." *Lakey*, 176 Wn.2d at 918-19.

> To admit evidence under *Frye*, the trial court must find that the underlying scientific theory and the " 'techniques, experiments, or studies utilizing that theory' " are generally accepted in the relevant scientific community and capable of producing reliable results. To admit expert testimony under ER 702, the trial court must determine that the witness qualifies as an expert and the testimony will assist the trier of fact. Unreliable testimony does not assist the trier of fact. *Frye* and ER 702 work together to regulate expert testimony: *Frye* excludes testimony based on novel scientific methodology until a scientific consensus decides the methodology is reliable; ER 702 excludes testimony where the expert fails to adhere to that reliable methodology.

Id. at 918-19 (citations omitted).

The trial court has "wide discretion" in ruling on the admissibility of expert testimony. *Miller*, 109 Wn. App. at 140. The exclusion of expert testimony is reviewed for abuse of discretion. *Lakey*, 176 Wn.2d at 919 ("A trial court abuses its discretion by issuing manifestly unreasonable rulings or rulings based on untenable grounds, such as a

ruling contrary to law.").

Contrary to Appellants' assertion, the exclusion of Mr. Stevens' opinions was not based on the "personal opinion" of the trial judge, nor did the trial court improperly weigh the testimony of opposing experts. Opening Br. at 33-35. Rather, the trial court excluded Mr. Stevens' opinions because the methodology he used to analyze signal warrants No. 1 and No. 7 was inconsistent with the express requirements of the MUTCD and not generally accepted in the community of traffic engineers. CP at 643. As a matter of law, no court can consider Mr. Stevens' inadmissible opinions and conclusions in ruling on WSDOT's motion for summary judgment. ER 702; *Lakey*, 176 Wn. 2d at 920; *Lake Chelan*, 176 Wn. App. at 175; *Cano-Garcia*, 168 Wn. App. at 249.

a. Mr. Stevens' Analysis Of Warrant No. 1 Did Not Conform With The Requirements Of The MUTCD Or Accepted Engineering Practices

Based on the "traffic counts made by WSDOT in 2006," Mr. Stevens concluded the intersection satisfied signal warrant No. 1.[17] CP at 464 (Stevens' Decl.). He was forced to concede, however, that he failed to apply the mathematical "multi-axle factor" to the raw data he used. CP at 646. As demonstrated below, this, in turn, resulted in

[17] Signal warrant No. 1 focuses on traffic volume and "is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic signal." CP at 141, 487.

artificially inflated traffic counts that rendered his analysis meaningless and inadmissible. CP at 595, 646.

The 2006 traffic counts were collected by mechanical devices that, to passing drivers, looked like rubber tubes stretched across the highway. Those devices recorded each time the wheels of a vehicle axle drove over it. CP at 594-95. However, the collection of this data is only the beginning step in the traffic volume calculation. CP at 594-95.

> Thus, every two axles are counted as a single vehicle . . . . However, neither WSDOT, nor any other transportation agency, relies or uses this raw, unrefined data as the final traffic volume count when applying the MUTCD signal warrants. The reason is immediately obvious: it does not account for the multi-axle vehicles that travel on the roads. Thus, for example, a five axle tractor trailer truck would be recorded as 2 ½ vehicles when, in reality, only one vehicle had passed through the intersection.

CP at 595.

Accordingly, like every transportation agency in the nation, WSDOT applies the multi-axle formula to the raw traffic counts to address the over-reporting caused by multi-axle vehicles. CP at 594-95. Mr. Stevens never explained why he ignored the multi-axle adjustment factor in his analysis.[18] When this formula is applied to the data used by Mr. Stevens, the traffic volume requirements of signal warrant No. 1 are not met. CP at 534, 596-97. Mr. Stevens' decision not to apply the multi-

[18] Mr. Seyfried pointed out Mr. Stevens' mathematical error in his initial report. CP at 141. Still, Mr. Stevens chose to offer opinions under oath he knew were incorrect. CP at 685.

axle formula was a violation of accepted engineering standards. CP at 686 ("[T]he use of the unadjusted raw traffic volume data is not a methodology used or relied upon by the professional community of traffic engineers when analyzing the MUTCD Signal Warrants.").

> To be clear, no reasonable traffic engineer would ever use the raw, unadjusted traffic data from 2006 to analyze the MUTCD Signal Warrants. The reason is simple: the MUTCD requires transportation agencies to use traffic volumes for "an average day" when analyzing the Signal Warrants. By definition, the artificially inflated traffic volume numbers from 2006 used by Mr. Stevens did not and do not represent an "average day" at the intersection of SR 12 and Williams Road.

CP at 685 (Mr. Seyfried Decl.).

Even after his methods were directly challenged, Mr. Stevens could cite no engineering principal, guideline, study or accepted engineering practice that explained, permitted or justified the methodology he used, nor his use of raw traffic volume data. CP at 686.

In addition, to determine the traffic volume for "an average day," as the MUTCD specifically requires, traffic engineers must apply a "seasonal adjustment" factor to the raw traffic counts. CP at 596. As Mr. Seyfried explained:

> By definition, traffic studies are performed over a relatively few number of days during a single week of the year. It is well established that traffic volumes vary significantly depending on the time of year for a variety of reasons (weather, greater influx of vacationers, etc.). Again, Warrant 1 of the MUTCD requires the traffic engineer to consider traffic volumes on "an average day." To account for the different traffic volumes and patterns that occur on a specific highway over the course of a year and use data that best captures "an average day," a second

> "seasonal" adjustment is applied to the raw data. Depending on the time of year that the raw data is collected, the mathematical factor used will result in either an upward or downward adjustment of the raw data.

CP at 595-96.

This seasonal adjustment factor is an integral part of the formula used by engineers to evaluate signal warrant No. 1. CP at 141, 534, 595-96. Mr. Stevens concedes he never applied this required formula to the traffic counts he used. CP at 646-47. Once again, it is undisputed that, had Mr. Stevens applied the seasonal adjustment here, the traffic volumes would never satisfy signal warrant No. 1. CP at 596. Mr. Stevens failed to cite any engineering principal, guideline, study or accepted engineering practice that explained, permitted or justified his decision to cut out this required step from his signal warrant analysis.[19] CP at 686.

For these reasons, it is undisputed that Mr. Stevens' analysis of signal warrant No. 1 fails to conform with any known or accepted engineering practice. The trial court correctly ruled Mr. Stevens' opinions would not be helpful to a trier-of-fact and were inadmissible under ER 702. Appellants cannot establish that the trial court abused its discretion in

[19] Mr. Stevens desperately tried to salvage his fatally flawed analysis of signal warrant No. 1 in his supplemental declaration by speculating that higher traffic counts may have existed in 2003, six years *before* the Lamotte collision. *See* CP at 596. He is mistaken. First, as a matter of law, Mr. Stevens' speculation is not sufficient to create a material issue of fact. *Young*, 112 Wn.2d at 225. Even more importantly, however, the actual traffic counts covering the period of his speculation were known and, in fact, shared with Mr. Stevens before he drafted his first declaration. CP at 143. Mr. Stevens simply chose to ignore the actual traffic count numbers in favor of the traffic count numbers that he literally made up. Not surprisingly, he was unable to explain this significant deviation from accepted engineering standards.

reaching this conclusion, and, thus, the trial court's ruling should be affirmed.

b. Mr. Stevens' Analysis Of Signal Warrant No. 7 Did Not Follow The MUTCD Requirements Or Conform With Accepted Engineering Practices

The methodology Mr. Stevens used in his analysis of signal warrant No. 7 was similarly flawed. Signal warrant No. 7 provides the methodology for analyzing the crash history at an intersection and "is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal." CP at 160, 490. Here, there were 13 "enter at angle" collisions at the Williams Street/SR 12 intersection between 2003 and Mr. Lamotte's collision. By way of perspective, it is undisputed that more than 11.7 million vehicles drove through this intersection over that same period without incident. CP at 206.

The experts agree all three criteria must be met for signal warrant No. 7 to apply: (1) the engineer must attempt an "adequate trial of alternatives with satisfactory observance and enforcement" in an attempt to reduce the crash frequency; (2) there must be five or more reported crashes, of types susceptible to correction by a traffic control signal, occurred within a 12-month period; *and* (3) the traffic volume at the intersection must meet certain minimum levels. CP at 466, 490 (text of signal warrant No. 7).

Realizing he could not satisfy the first element of signal warrant No. 7, Mr. Stevens simply chose, without explanation, to exclude this element from his analysis. CP at 599.

> By listing that an "adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency" as the first criteria to be considered in evaluating this warrant, MUTCD Warrant 7 emphasizes the importance of considering alternatives to signal installation before evaluating the potential desirability of signal installation. Again, this is consistent with the industry wide recognition that installing traffic signals at intersections like the one at issue here frequently causes an increase in the occurrence of accidents.

CP at 688-89.

The undisputed admissible evidence demonstrated that this element of signal warrant No. 7 was not met. In 2007 WSDOT erected "CROSS TRAFFIC DOES NOT STOP" signs on Williams Street.[20] Appellants concede, as they must, the installation of these signs did not just reduce the "enter at angle" collisions at this intersection, ***they completely stopped***. CP at 206, 481. More than 4 million vehicles traveled through the intersection between October, 2007 and Mr. Lamotte's collision without

[20] WSDOT implemented this alternative following an "enter at angle" collision at this intersection caused by a driver on Williams Street who mistakenly concluded all four directions had red flashing lights and were required to stop. CP at 206. Believing he had the right of way, the driver pulled in front of a vehicle traveling on SR 12.

any "enter at angle" crashes.[21]

Mr. Stevens dismisses the complete cessation of all relevant crashes at the intersection as "a normal variation in accident occurrence." CP at 467. Notably, he did not express this opinion on a more probable than not engineering certainty, nor could he. Appellants concede, since 2003, there has never been any other two-year period without a crash. CP at 481. Moreover, Mr. Seyfried conducted a critical rate calculation that demonstrates the irrelevance of Mr. Stevens' unsupported speculation.

> That calculation establishes that there is less than a 0.5% chance that the change in crash frequency (from before the installation of warning signs indicating that cross traffic does not stop compared with after the installation of the signs) could be due to randomness, which falls short of the reasonable engineering probability standard. Stated differently, there is a 99.5% certainty that the change in crash frequency was not random and likely due to the installation of warning signs on each side of Williams Street.

CP at 599-600.[22]

[21] Appellants misleadingly suggest a collision in January, 2009 is somehow relevant to this appeal. Opening Br. at 9. According to Mr. Stevens, that collision involved a vehicle that drove too fast in foggy, icy conditions, lost control and hit a fixed object. Even Mr. Stevens conceded that collision was caused solely by driver error. *See* CP at 463; 481. Similarly, Mr. Stevens conceded a number of the other collisions at the intersection cited by Appellants had absolutely no relationship to the intersection itself. *See, for example,* CP at 481(8/29/03 – rear end collision caused by vehicle following too closely; 4/13/07 – a driver improperly backed up in the rain and hit a light pole).

By choosing to completely disregard one of the required elements of signal warrant No. 7, Mr. Stevens adopted a methodology that was both inconsistent with the MUTCD and failed to conform with any accepted engineering standard or practice. CP at 599-600. For this reason alone, the trial court correctly rejected Mr. Stevens' analysis of signal warrant No. 7 under ER 702. *Lakey*, 176 Wn.2d at 918-19.

Second, as demonstrated above, it is undisputed there were no crashes susceptible to correction by a traffic signal in the 12 months prior to Mr. Lamotte's collision.[23] Thus, the second element of signal warrant No. 7 cannot be satisfied. Third, Mr. Stevens concedes he used the same flawed traffic volume data from his analysis of signal warrant No. 1 to

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[22] Appellants mistakenly suggest the effectiveness of the corrective action taken by WSDOT presents a question of fact. Opening Br. at 31. They are mistaken. Again, the signs installed by WSDOT did not just reduce crashes at the intersection, *they completely eliminated them*. Thus, reasonable minds can only conclude the measure taken by WSDOT was both appropriate and successful. *Hartley*, 103 Wn.2d at 775. Moreover, Appellants' contention demonstrates a fundamental misunderstanding of signal warrant No. 7. Warrant No. 7 required WSDOT to implement an alternative measure to try and reduce crash frequency, and, through further study, determine its effectiveness. WSDOT did both here. And, of course, it is undisputed the action taken by WSDOT was **100 percent successful** in reducing crashes for more than two years. Indeed, the effectiveness of WSDOT's action was only called into question *because of* Mr. Lamotte's collision. Thus, signal warrant No. 7 "could not have been and was never satisfied before Mr. Lamotte's collision." CP at 689-90, 792-93. It is undisputed WSDOT installed a traffic signal immediately after it determined that all requirements of signal warrant No. 7 were met. Specifically, the December, 2009 traffic study showed that the traffic volume had increased since the traffic study completed just seven months earlier, and, with Mr. Lamotte's collision, WSDOT determined that the alternative measures it had employed were no longer sufficient to prevent "enter at angle" crashes. CP 689-91, 791-92.

[23] The purpose of this element is to evaluate crash frequency relative to exposure to potential crashes (as measured by traffic volume). Thus, the traffic volume and crash history from the same time period must be used. Using a traffic volume that is literally years after the time period when crash frequency was a concern, as Mr. Stevens does, is contrary to the MUTCD, and does not conform with engineering practices. CP at 690-91.

justify the traffic volume requirements of Warrant No. 7. Thus, his analysis of this element is meaningless. CP at 467 ¶ 25, 597-98.

Mr. Stevens attempted to correct this error in his second declaration by retroactively applying traffic volume data obtained *after* Mr. Lamotte's collision. CP at 650-51. However, even if such a retroactive application conformed with accepted engineering practices, which it does not, Mr. Stevens still cannot establish the first requirement of signal warrant No. 7 (an adequate trial of alternatives), and, thus, his analysis of signal warrant No. 7 still necessarily fails. CP at 689-91.

The trial court did not abuse its discretion when it rejected Mr. Stevens' opinion. His analysis of signal warrant No. 7 did not address each required element, misinterpreted the elements he did address, and was premised on admittedly unreliable raw traffic counts. His methodology fell far below accepted engineering standards, and was correctly excluded by the trial court under ER 702.

2. Unrealized Future Traffic Volume Projections Are Insufficient To Establish Any MUTCD Signal Warrant

In one last attempt to create a material issue of fact, Appellants invite this Court to ignore the *actual* traffic studies that conclusively disprove their claims, and rely instead on admittedly unrealized, *projected* traffic volume increases to satisfy the requirements of signal warrant No. 1. The trial court had no difficulty seeing through this inartful ploy. This Court should do the same.

Initially, and most importantly, WSDOT studied the subject intersection four times between 2003 and Lamotte's accident—2003, 2006, 2007, and May, 2009. CP at 139. As demonstrated above, it is undisputed that none of those traffic counts from any of those studies satisfied the signal warrant requirements. It is also undisputed that no other traffic counts were taken of this intersection by WSDOT during this period of time, nor have Appellants identified any traffic counts taken by any other entity or person during this time. CP at 594. More importantly, Appellants could not identify any engineering principal, standard or guideline that permits or justifies the use of unverified traffic volume *projections*, especially where, like here, it is undisputed those projected traffic volumes were never realized.

WSDOT oversees more than 20,000 lane miles of state highway. This responsibility requires WSDOT to not only manage existing improvement projects, but also take steps to anticipate future improvement projects that may be required. CP at 793. One of the ways it does this is by applying an annual growth factor to existing traffic count data. WSDOT uses that projected traffic volume growth to anticipate the possible future modifications and improvements. With respect to intersections on state highways, WSDOT uses projected traffic volume figures to anticipate which intersections might meet the MUTCD signal warrants in the future. CP at 793.

It is undisputed that traffic signals are never installed based on *projected* traffic volume estimates made years earlier. As Mr. Hancock explained, the reasons for this are immediately obvious. First, traffic volumes on rural highways like SR 12 frequently fluctuate up and down because of various economic and other factors. Thus, WSDOT always conducts subsequent periodic traffic studies to determine whether the projected traffic volume rates have actually been realized. CP at 793-94.

Second, installing a traffic signal at an intersection that does not meet the MUTCD signal warrants *increases* the risk of crashes at that site. Thus, it is critical to make sure the projected traffic volume rates have actually been realized and the signal warrants have actually been met before installing a traffic signal. CP at 793. It is undisputed that WSDOT has never, ever installed a traffic signal based on *projected* increases in traffic volume made years earlier. CP at 793-94.

Appellants' attempt to satisfy the MUTCD signal warrants by relying on projected, admittedly unrealized traffic volume figures does not conform with any accepted engineering standard or practice, does not create a material issue of fact, and, as the trial court properly ruled, is insufficient to defeat summary judgment.

C. Appellants Failed To Establish The Critical Element Of Proximate Cause

To defeat summary judgment, Appellants must demonstrate the alleged deficiencies with the intersection proximately caused

Mr. Lamotte's collision. There are two elements of proximate cause, cause in fact and legal causation. Cause in fact refers to the "but for" consequences of an act—the physical connection between an act and an injury. *Hartley*, 103 Wn.2d at 778. Cause in fact is usually a question for the trier of fact, but becomes a question of law for the Court "if the facts, and inferences from them, are plain and not subject to reasonable doubt or a difference of opinion." *Little v. Countrywood Homes, Inc.*, 132 Wn. App. 777, 780, 133 P.3d 944, 946 (2006).

Legal causation, on the other hand, is grounded in the determination of how far the consequences of a defendant's act should extend, and focuses on whether the connection between the defendant's act and the result is too remote or inconsequential to impose liability. Legal causation presents a question of law. *Lowman v. Wilbur*, 178 Wn.2d 165, 169, 309 P.3d 387 (2013); *Hartley*, 103 Wn.2d at 777-79. Appellants failed to establish either prong of the proximate cause element of their negligence claims. Accordingly, summary judgment was properly granted to WSDOT.

1. Appellants Cannot Demonstrate Cause In Fact

Even if they could demonstrate breach by WSDOT, which they cannot do, Appellants failed to produce any evidence demonstrating that Mr. Lamotte's collision was proximately caused by the deficiencies they attribute to the intersection. Unable to establish this essential element,

Appellants negligence claims against WSDOT were properly dismissed. *Garcia,* 161 Wn. App. at 15 (to hold a municipality liable for failure to provide a safe roadway, the plaintiff must establish "more than that the government's breach of duty *might* have caused the injury") (emphasis in original); *see also Miller*, 109 Wn. App. at 145.

In *Garcia*, Frank Garcia was struck and killed by a car driven by Diane Cushing while crossing at an intersection in Shoreline. Importantly, Cushing admitted she "wasn't really looking" and was talking with her son who was sitting in the passenger seat, and she did not see Garcia until "about two second[s]" before she hit him with her car. *Garcia,* 161 Wn. App. at 3. In their suit, Garcia's wife and estate claimed WSDOT breached its duty to maintain the intersection in a reasonably safe condition. *Id.* at 14. Plaintiffs presented expert testimony from a traffic engineer that WSDOT failed to install devices that would have provided visual cues to alert Cushing of Garcia's presence in the crosswalk. *Garcia,* 161 Wn. App. at 9-10. The trial court dismissed the suit on summary judgment, ruling plaintiffs failed to establish the element of proximate cause. Affirming the trial court, this Court rejected plaintiffs' contention that some additional visual cue might have impacted Cushing's actions.

> There is also no dispute that Cushing was not looking ahead and was talking to her son who was sitting in the passenger seat. By her own admission, Cushing did not notice the three cars stopped in the outside lane to her right. The Estate's claim

> that WSDOT should have activated the roving eyes device sooner or installed different technology, and the argument that the roving eyes device would have prevented the collision, is based on speculation and as a matter of law is too attenuated to impose liability in this case.

Id. at 16.

Like *Garcia*, Appellants' suggestion that Mr. Lamotte pulled directly in front of the log truck because of some deficiency with the intersection is pure speculation, and is insufficient as a matter of law to establish the "cause-in-fact" element of proximate cause. *Id.* There is no direct or circumstantial evidence demonstrating why Mr. Lamotte chose to charge out in front of Mr. Steen's truck. Mr. Lamotte, himself, claims he has no memory of the accident, and no other admissible evidence exists as to why he undertook the dangerous, illegal act that led to his collision. Contrary to Appellants' argument, it is not sufficient to allege that some aspect of the intersection "might" have been the reason for Mr. Lamotte's dangerous action. *Garcia,* 161 Wn. App. at 15.

Relying on the declaration of Dr. Gill, the Rashoffs' human factors expert, Appellants attribute a number of *possible* actions and behaviors to Mr. Lamotte that *might* be why he chose to pull in front of the log truck. *See* CP at 443 ("The following scenario, *whether it is precisely what happened or not*, explains both this collision and the various factors discussed in points (a) and (b) above . . . .") (emphasis added)). This is insufficient to create a material issue of fact.

> [I]f there is nothing more substantial to proceed upon than two or more conjectural theories, under one or more of which a defendant would be liable, and under one or more of which there would be no liability upon him, a jury will not be permitted to conjecture how the accident occurred.

Grange v. Finlay, 58 Wn.2d 528, 531, 364 P.2d 234, 236 (1961); *see also Little*, 132 Wn. App. at 783.

As a matter of law, Dr. Gill's speculation is insufficient to defeat summary judgment. *Garcia,* 161 Wn. App. at 15; *see also Johanson v. King Cnty.*, 7 Wn.2d 111, 123, 109 P.2d 307, 312 (1941).

Appellants next assert, oddly, that the sight distance available to Mr. Lamotte was *too great.* Relying on Dr. Gill, Appellants contend Mr. Lamotte would not have been able to perceive the speed of Mr. Steen's truck when it was greater than 390 feet from the intersection, and, thus, could not have determined whether it was safe for him to cross. CP at 443. Again, there is no evidence that Mr. Lamotte ever looked in the direction of Mr. Steen's truck before he charged into the intersection. Thus, the sight distance question is simply not material to this appeal. However, even if one overlooked this critical flaw in Appellants' analysis, the undisputed facts establish Mr. Steen was *less than 300 feet away* when Mr. Lamotte accelerated into the intersection. CP at 199-200. Thus, even if one uses Dr. Gill's hypothesis, had Mr. Lamotte looked he would not only have been able to see the large purple log truck approaching, he would have also been able to accurately estimate the log

truck's speed and determined it was unsafe to pull into the intersection. CP at 201, 601-02.

There is no question Mr. Lamotte made a tragically poor decision on December 8, 2009, that had catastrophic consequences. However, Appellants cannot demonstrate that any condition of the highway, itself, proximately caused Mr. Lamotte's actions or his collision. Accordingly, the order granting summary judgment to WSDOT should be affirmed. *Garcia,* 161 Wn. App. at 15; *see also Young*, 112 Wn.2d at 225.

2. Appellants Failed To Establish Legal Proximate Cause

In deciding whether a defendant's breach of duty is too remote or insubstantial to trigger liability, this Court must evaluate "mixed considerations of logic, common sense, justice, policy, and precedent." *Lowman*, 178 Wn.2d at 169 (citing *Hartley*, 103 Wn.2d at 779).

> Legal causation is, among other things, a concept that permits a court for sound policy reasons to limit liability where duty and foreseeability concepts alone indicate liability can arise.

Lowman, 178 Wn.2d at 169 (citing *Schooley v. Pinch's Deli Market, Inc.*, 134 Wn.2d 468, 479, 951 P.2d 749 (1998)).

Here, as in *Garcia*, the relationship between the alleged deficiencies in this highway and Mr. Lamotte's collision are too attenuated and removed to impose liability on WSDOT. The undisputed evidence establishes that the intersection conformed with every engineering standard and the statutorily mandated MUTCD

requirements. Furthermore, as demonstrated above, there is no evidence that explains why Mr. Lamotte pulled in front of the log truck, much less evidence that shows his decision was caused by any deficiency with or characteristic of the highway itself. In this instance, and on this record, Appellants failed to establish legal causation. For this reason as well, this Court should dismiss Appellants' negligence claims against WSDOT. *Garcia*, 161 Wn. App. at 15-16.

D. The Estate Cannot Recover Damages For Pre-Death Pain And Suffering

The trial court dismissed the Estate's claim for non-economic damages because it failed to produce any admissible evidence that Ryan was aware of the impending collision before it occurred, or consciously experienced any pre-death pain and suffering prior to his death. CP at 643-44. Because the undisputed admissible evidence supports that ruling, this Court should affirm the dismissal of this portion of the Estate's damage claim.[24]

A claim for pain and suffering "personal to and suffered by" a decedent is recoverable by an estate. RCW 4.20.046 (survival of actions); RCW 4.20.020 (wrongful death). However, to establish such a claim there must be evidence the decedent consciously experienced pain and suffering prior to his death. *Otani*, 151 Wn.2d at 758 (the "statute still requires that

[24] The Estate conceded below that it cannot recover for Ryan's shortened life expectancy or loss of enjoyment of life, and it does not challenge the trial court's exclusion of those damages in this appeal. CP at 526 (fn. 53).

a plaintiff consciously experience suffering in order to permit recovery"). Evidence of such damages cannot be based on speculation or conjecture. *Id.*; *White*, 131 Wn.2d at 9.

Here, there is no admissible evidence that Ryan perceived or knew the crash was imminent. What is clear from the undisputed facts, though, is Ryan was never conscious after impact. Mr. Ary, Mr. Olson and Officer Sutherland all testified Ryan was unconscious when they arrived, never regained consciousness, and passed minutes after the accident. CP at 121, 224, 240, 253.

Citing Dr. Gill, Appellants contend there were auditory and visual cues that may have alerted Ryan to the pending collision. CP at 440-41. However, again, Appellants can only speculate whether any of those cues actually registered with Ryan. Indeed, there is no evidence Ryan was even awake at the time of the collision, much less whether he was listening to music, talking on the phone, or performing any one of a myriad of possible different distracting actions. There is simply no admissible evidence Ryan heard, saw or perceived Mr. Steen's log truck prior to impact. As a matter of law, Dr. Gill's speculation and conjecture concerning what Ryan "might" have heard or seen is not sufficient to establish this aspect of the Estate's damage claim or to defeat summary judgment. *Otani*, 151 Wn.2d at 758; *White*, 131 Wn.2d at 9; *Gardner v. Seymour*, 27 Wn.2d 802, 808, 180 P.2d 564 (1947); *Marshall*, 94 Wn.

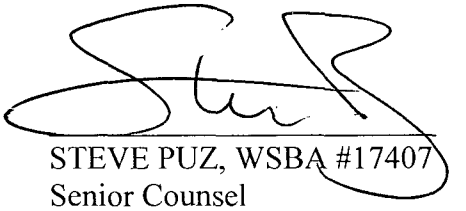
App. at 381. This Court should, therefore, affirm the trial court order that dismissed the Estate's claim for pre-death pain and suffering damages.

VI. CONCLUSION

For each of the reasons stated herein, WSDOT respectfully asks this Court to dismiss Appellants' claims against WSDOT; and dismiss the Estate's claim for pre-death pain and suffering damages.

RESPECTFULLY SUBMITTED this 8th day of September, 2014.

ROBERT W. FERGUSON
Attorney General



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CERTIFICATE OF FILING AND SERVICE

I, Cynthia A. Meyer, certify that on September 8, 2014, I filed Respondent's Brief with:

Washington State Court of Appeals, Division II.

I also served a full, true, and correct copy of the document to the attorneys for Appellants, by US mail and electronic mail to the addresses below:

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DATED this 8th day of September, 2014, at Tumwater, Washington.

CYNTHIA A. MEYER, Legal Assistant

APPENDIX
A

ROBERT K. SEYFRIED, PE, PTOE
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October 9, 2013

Mr. Steve Puz
Office of the Attorney General of Washington
Torts Division
7141 Cleanwater Dr. SW
Olympia, WA 98504-0126

Re: Rashoff, et.al. v. State of Washington
Thurston County Cause No. 12-2-01285-4

Dear Mr. Puz:

The following report documents my traffic engineering analysis and opinions with regard to the above referenced case.

AVAILABLE DATA

The following information was available and considered in this analysis:

1. Two CDs containing extensive data related to the subject accident and accident site. The contents of these CDs are summarized in Appendix A.

2. Report prepared by Edward Stevens and case file materials produced by Edward Stevens including 43 CDs of file materials

3. Letter dated September 9, 2013 disclosing anticipated testimony of Richard Gill and case file materials produced by Richard Gill

4. All available traffic counts for the intersection of US Route 12 and Williams/New Harmony Road (SR 122) in Mossyrock, Washington and AADT history for these roads

5. *Priority Programming for Traffic Signal Installations* authored by Stanley Ching

ACCIDENT OCCURRENCE

According to the Police Traffic Collision Report, the subject accident occurred at 3:17 p.m. on December 8, 2009 at the intersection of US Route 12 and Williams/New Harmony Road (SR 122) in

Mossyrock, Washington. A 2001 Ford F150 pickup truck driven by Benjamin Lamotte was northbound on Williams Street and entered the intersection after stopping at a STOP sign. A 1997 Peterbuilt truck driven by Vance Steen was westbound on US Route 12. The Steen Peterbuilt collided with the passenger side of the Lamotte Ford resulting in fatal injuries to Ryan Rashoff, a passenger in the Lamotte Ford. Statements by Vance Steen and witnesses "indicated that Lamotte pulled across US 12 in front of the log truck driven by Steen."

The intersection was controlled by STOP signs on the northbound Williams Street and southbound New Harmony Road approaches. There also were flashing red beacons suspended over the intersection facing the north and southbound approaches and flashing yellow beacons facing the east and westbound approaches. "CROSS TRAFFIC DOES NOT STOP" warning signs were posted under the STOP signs. A stop line was marked on the pavement on the northbound approach; the police report indicated that this stop line was "damaged by weather and traffic; however it was still clearly discernible." The posted speed limit on US Route 12 was 55 mph, and a witness stated that the Steen Peterbuilt had been traveling at approximately 55 to 60 mph prior to the accident.

At the subject intersection, US Route 12 has one lane for each direction of travel plus left turn lanes. Williams Street and New Harmony Road have one lane for each direction of travel. The police report indicates that the "intersection provides adequate visibility and there were no adverse weather conditions of visibility obstructions present at the time of the collision."

ANALYSIS

Traffic Volumes. The Washington State Department of Transportation has conducted several multi-day traffic counts at the intersection of US Route 12 and Williams/New Harmony Road. Table 1 summarizes the Annual Average Daily Traffic (AADT) volumes based on traffic count data. These data indicate that traffic volumes at the intersection have remained relatively stable during the seven year period of 2003 through 2009, with actual decreases in AADTs on US 12 and New Harmony Road, and a 7.6% increase on Williams Street (slightly more than 1% per year growth).

Accident History. According to records provided by the Washington State Department of Transportation, a total of 24 accidents occurred at or near the intersection of US Route 12 and Williams/New Harmony Road during the period of 2002 to December 2009. These accidents are summarized in Table 2. Based on the total number of accidents in and near the intersection, and the traffic volumes previously discussed, the overall accident rate for the intersection of US Route 12 and Williams/New Harmony Road during the period of 2002 to 2009 was 134 accidents per million entering vehicles. This accident rate is essentially equal to the average accident rate for 4-way intersections in rural municipalities (1.35 accidents per million entering vehicles) reported in the U.S. Department of Transportation publication *Safety Effectiveness of Highway Design Features, Volume V, Intersections*. In other words, it would be expected that half of similar intersections throughout the United States would have accident rates greater than those experienced at the intersection of US Route 12 and Williams/New Harmony Road.

TABLE 1. Annual Average Daily Traffic Volumes (Two-Way Traffic)

COUNT DATE	US 12 WEST OF INTERSECTION	US 12 EAST OF INTERSECTION	NEW HARMONY RD NORTH OF INTERSECTION	WILLIAMS ST SOUTH OF INTERSECTION
6/2/2003	5446	4952	1226	2906
7/12/2004			1077	
8/14/2006	5168	4725	1015	
5/21/2007	5336			
5/18/2009	5208	4232		
12/14/2009	5367	4461	1165	3128

Table 2 also indicates whether each of the accidents that occurred at the intersection of US Route 12 and Williams/New Harmony Road was susceptible to correction by the installation of traffic signals. Normally, accidents involving substantially right-angle collisions between a vehicle entering from the side road and a through vehicle on the main road are considered to be "correctible" by signalization. Similarly, accidents involving a left turning vehicle and an opposing through vehicle are considered to be "correctible" if, and only if, the signal operation were to include protected left-turn phases. For the intersection of US Route 12 and Williams/New Harmony Road, traffic signals installed after the subject accident include protected left-turn phases for US Route 12 approaches, but not for the Williams/New Harmony Road approaches. Therefore, the accident that occurred on May 11, 2007 (see Table 2) would not be considered "correctible" by signalization. In Table 2, accidents that would be considered "correctible" by signalization are highlighted in yellow.

Traffic Signal Warrants. The 2003 edition of the *Manual on Uniform Traffic Control Devices* (MUTCD) contains a series of eight "warrants" for traffic signal installation. As stated in the MUTCD, these warrants "define the minimum conditions under which installing traffic control signals might be justified." Further, the MUTCD states that "since vehicular delay and the frequency of some types of crashes are sometimes greater under traffic signal control than under STOP sign control, consideration should be given to providing alternatives to traffic control signals even if one or more of the signal warrants has been satisfied." Finally, the MUTCD states that "satisfaction of a traffic signal control warrant or warrants shall not in itself require the installation of a traffic control signal."

Following is a discussion of each of the eight traffic signal warrants as they may apply to the subject intersection:

TABLE 2. Accident History at Intersection of US Route 12 and Williams/New Harmony Road

DATE	CRASH TYPE	VEHICLE 1 ACTION	VEHICLE 2 ACTION	SUSCEPTABLE TO CORRECTION BY SIGNALS?
4/20/2002	ANGLE	STRAIGHT FROM SIDE ROAD	STRAIGHT ON US 12	YES
3/3/2003	ANGLE	LEFT TURN FROM SIDE ROAD	STRAIGHT ON US 12	YES
8/29/2003	REAR END	STRAIGHT ON US 12	STRAIGHT ON US 12	NO
12/3/2004	LEFT TURN	LEFT TURN FROM US 12	STRAIGHT ON US 12	YES IF LEFT TURN PHASE
5/29/2005	REAR END	STOPPED IN TRAFFIC	STRAIGHT ON US 12	NO
6/28/2005	ANGLE	STRAIGHT FROM SIDE ROAD	STRAIGHT ON US 12	YES
7/4/2005	ANGLE	RIGHT TURN FROM SIDE ROAD	STRAIGHT ON US 12	YES
10/4/2005	ANGLE	STRAIGHT FROM SIDE ROAD	STRAIGHT ON US 12	YES
3/13/2006	ANGLE	STRAIGHT FROM SIDE ROAD	STRAIGHT ON US 12	YES
6/12/2006	ANGLE	STRAIGHT FROM SIDE ROAD	STRAIGHT ON US 12	YES
7/28/2006	LEFT TURN	LEFT TURN FROM US 12	STRAIGHT ON US 12	YES IF LEFT TURN PHASE
11/19/2006	ANGLE	LEFT TURN FROM SIDE ROAD	STRAIGHT ON US 12	YES
2/6/2007	ANGLE	STRAIGHT FROM SIDE ROAD	STRAIGHT ON US 12	YES
4/13/2007	ANGLE	LEFT TURN FROM SIDE ROAD	STRAIGHT ON US 12	YES
4/13/2007	FIXED OBJECT	BACKED INTO LIGHT POLE	N/A	NO
4/21/2007	ANGLE	LEFT TURN FROM SIDE ROAD	STRAIGHT ON US 12	YES
5/7/2007	RUN OFF ROAD	STRAIGHT ON US 12	N/A	NO
5/11/2007	LEFT TURN	LEFT TURN FROM SIDE ROAD	STRAIGHT ON SIDE ROAD	YES IF LEFT TURN PHASE
5/17/2007	ANGLE	LEFT TURN FROM SIDE ROAD	STRAIGHT ON US 12	YES
5/24/2007	ANGLE	STRAIGHT FROM SIDE ROAD	STRAIGHT ON US 12	YES
9/12/2007	ANGLE	STRAIGHT FROM SIDE ROAD	STRAIGHT ON US 12	YES
2/20/2008	REAR END	MAKING U TURN AT DRIVEWAY	STRAIGHT ON US 12	NO
7/13/2008	FIXED OBJECT	STRAIGHT ON US 12	N/A	NO
1/16/2009	FIXED OBJECT	STRUCK LIGHT POLE	N/A	NO

1. *Warrant 1, Condition A.* This warrant is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic signal. The traffic volumes required to meet the conditions of Warrant 1, Condition A are contained in Table 3, identified as Table 4C-1 in the MUTCD.

TABLE 3. Traffic Volume Requirements for Warrant 1, Condition A

Condition A—Minimum Vehicular Volume									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[c]	100%[a]	80%[b]	70%[c]	56%[d]
1.....	1.....	500	400	350	280	150	120	105	84
2 or more...	1.....	600	480	420	336	150	120	105	84
2 or more...	2 or more...	600	480	420	336	200	160	140	112
1.....	2 or more....	500	400	350	280	200	160	140	112

Because the posted speed limit on US Route 12 is 55 mph, the traffic volumes in the columns labeled "70%" are used for evaluating this warrant. Although both of the US Route 12 intersection approaches have a through lane and a left turn lane, the left turn volumes are relatively low, and the warrant analysis is properly based on 1-lane approaches for the "Major Street" (US Route 12) and 1-lane approaches for the "Minor Street" (Williams/New Harmony Road). Therefore Warrant 1, Condition A is satisfied if, for each of any eight hours on an average day, the total of both directions of traffic on US Route 12 equals or exceeds 350 vehicles, and for the same eight hours the single highest volume approach on Williams/New Harmony Road equals or exceeds 105 vehicles.

As previously discussed, multiple traffic counts have been conducted at the subject intersection by the Washington State Department of Transportation, including June 2003, August 2006, May 2009, and December 2009 (following the subject accident). These traffic counts were analyzed to determine the hourly traffic volumes entering the intersection from each approach on an "average" day. This required averaging the counts made on 3 to 5 different days, and applying seasonal adjustment factors and axle correction factors to the hourly counts. The seasonal adjustment factors account for the variability of traffic during different seasons of the year. The axle correction factors account for the fact that some traffic counting equipment counts axles (assuming that each vehicle has two axles) rather than vehicles. Since some vehicles like trucks have multiple axles, the correction factor is needed to obtain a more accurate measurement of the actual number of vehicles on the road during an average day of the year. It is noted that Mr. Stevens, in his warrant analysis, incorrectly used the raw hourly traffic counts from a single day and did not apply the seasonal adjustment factor nor the axle correction factor.

Table 4 summarizes the warrant analysis for Warrant 1, Condition A based on the June 2003 traffic counts. Table 5 summarizes the warrant analysis for Warrant 1, Condition A based on the August 2006 traffic counts. Table 6 summarizes the warrant analysis for Warrant 1, Condition A based on the May 2009 traffic counts. Table 7 summarizes the warrant analysis for Warrant 1, Condition A

based on the December 2009 traffic counts. In each case, the most recent available traffic count data were used. Because no traffic counts were conducted on the northbound Williams Street approach after 2003 until December 2009, the 2003 counts were used for this approach in Tables 5 and 6. However, even if a traffic growth rate of slightly more than 1% per year (as actually occurred) had been assumed for the Williams Street approach in Tables 5 and 6, the warrant would still not have been satisfied.

The hours in which the warrant conditions are met in Tables 4 through 7 are highlighted in yellow. As can be seen from Tables 4 through 7, the intersection of US Route 12 and Williams/New Harmony Road does not satisfy the requirements of Warrant 1, Condition A for eight hours of an average day for any time period from 2003 through 2009.

It should also be noted that the minor street traffic volumes (Williams and New Harmony) used in Tables 4 through 7, as well as in subsequent volume warrant analyses, have not been reduced to account for the lesser potential benefits of signalization for right turning traffic from the minor approaches. Such reductions are acknowledged as acceptable practice by the MUTCD, and are typically applied by the Washington State Department of Transportation. If such reductions in minor street traffic volumes had been made in this analysis, even fewer hours of an average day would have meet the volume warrant criteria.

TABLE 4. Warrant 1, Condition A Based on the June 2003 Traffic Counts (Satisfaction Requires Eight Hours with ≥350 vehicles on US 12 and ≥105 vehicles on Williams or New Harmony)

HOUR STARTING	EASTBD + WESTBD US 12	NORTHBD WILLIAMS	SOUTHBD NEW HARMONY	WARRANT 1A
6	210	44	16	NO
7	279	65	51	NO
8	352	109	76	YES
9	321	75	43	NO
10	321	72	43	NO
11	339	81	34	NO
12	336	94	46	NO
13	347	89	34	NO
14	377	79	33	NO
15	389	155	33	YES
16	360	114	34	YES
17	350	97	38	NO
18	229	73	32	NO
19	155	84	27	NO
20	160	67	23	NO
21	103	48	14	NO

TABLE 5. Warrant 1, Condition A Based on the August 2006 Traffic Counts (Satisfaction Requires Eight Hours with ≥350 vehicles on US 12 and ≥105 vehicles on Williams or New Harmony)

HOUR STARTING	EASTBD + WESTBD US 12	NORTHBD WILLIAMS (2003)	SOUTHBD NEW HARMONY	WARRANT 1A
6	172	44	16	NO
7	212	65	51	NO
8	275	109	76	NO
9	283	75	43	NO
10	314	72	43	NO
11	348	81	34	NO
12	354	94	46	NO
13	351	89	34	NO
14	394	79	33	NO
15	364	155	33	YES
16	355	114	34	YES
17	317	97	38	NO
18	257	73	32	NO
19	194	84	27	NO
20	141	67	23	NO
21	98	48	14	NO

TABLE 6. Warrant 1, Condition A Based on the May 2009 Traffic Counts (Satisfaction Requires Eight Hours with ≥350 vehicles on US 12 and ≥105 vehicles on Williams or New Harmony)

HOUR STARTING	EASTBD + WESTBD US 12	NORTHBD WILLIAMS (2003)	SOUTHBD NEW HARMONY	WARRANT 1A
6	153	44	16	NO
7	234	65	51	NO
8	289	109	76	NO
9	267	75	43	NO
10	288	72	43	NO
11	291	81	34	NO
12	303	94	46	NO
13	323	89	34	NO
14	336	79	33	NO
15	362	155	33	YES
16	344	114	34	NO
17	366	97	38	NO
18	239	73	32	NO
19	173	84	27	NO
20	136	67	23	NO
21	98	48	14	NO

TABLE 7. Warrant 1, Condition A Based on the December 2009 Traffic Counts (Satisfaction Requires Eight Hours with ≥350 vehicles on US 12 and ≥105 vehicles on Williams or New Harmony)

HOUR STARTING	EASTBD + WESTBD US 12	NORTHBD WILLIAMS	SOUTHBD NEW HARMONY	WARRANT 1A
6	156	48	11	NO
7	297	57	37	NO
8	343	94	57	NO
9	287	75	30	NO
10	322	98	35	NO
11	323	107	47	NO
12	296	106	33	NO
13	342	113	53	NO
14	363	97	46	NO
15	435	152	50	YES
16	369	118	26	YES
17	337	122	34	NO
18	189	59	34	NO
19	124	49	14	NO
20	91	41	16	NO
21	85	29	7	NO

2. *Warrant 1, Condition B.* This warrant is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street. The traffic volumes required to meet the conditions of Warrant 1, Condition B are contained in Table 8, identified as Table 4C-1 in the MUTCD.

As with Warrant 1, Condition A, the traffic volumes in the columns labeled "70%" are used for evaluating this warrant, and the warrant analysis is properly based on 1-lane approaches for the "Major Street" (US Route 12) and 1-lane approaches for the "Minor Street" (Williams/New Harmony Road). Therefore Warrant 1, Condition B is satisfied if, for each of any eight hours on an average day, the total of both directions of traffic on US Route 12 equal or exceed 525 vehicles, and for the same eight hours the single highest volume approach on Williams/New Harmony Road equals or exceeds 53 vehicles.

TABLE 8. Traffic Volume Requirements for Warrant 1, Condition B

Condition B—Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

Table 9 summarizes the warrant analysis for Warrant 1, Condition B based on the June 2003 traffic counts. Table 10 summarizes the warrant analysis for Warrant 1, Condition B based on the August 2006 traffic counts. Table 11 summarizes the warrant analysis for Warrant 1, Condition B based on the May 2009 traffic counts. Table 12 summarizes the warrant analysis for Warrant 1, Condition B based on the December 2009 traffic counts. As before, in each case, the most recent available traffic count data were used.

The hours in which the warrant conditions are met in Tables 9 through 12 are highlighted in yellow. As can be seen from Tables 9 through 12, the intersection of US Route 12 and Williams/New Harmony Road does not satisfy the requirements of Warrant 1, Condition B for eight hours of an average day for any time period from 2003 through 2009. As before, because no traffic counts were conducted on the northbound Williams Street approach after 2003 until December 2009, the 2003 counts were used for this approach in Tables 10 and 11. However, even if a traffic growth rate of slightly more than 1% per year (as actually occurred) had been assumed for the Williams Street approach in Tables 10 and 11, the warrant would still not have been satisfied.

TABLE 9. Warrant 1, Condition B Based on the June 2003 Traffic Counts (Satisfaction Requires Eight Hours with ≥525 vehicles on US 12 and ≥53 vehicles on Williams or New Harmony)

HOUR STARTING	EASTBD + WESTBD US 12	NORTHBD WILLIAMS	SOUTHBD NEW HARMONY	WARRANT 1B
6	210	44	16	NO
7	279	65	51	NO
8	352	109	76	NO
9	321	75	43	NO
10	321	72	43	NO
11	339	81	34	NO
12	336	94	46	NO
13	347	89	34	NO
14	377	79	33	NO
15	389	155	33	NO
16	360	114	34	NO
17	350	97	38	NO
18	229	73	32	NO
19	155	84	27	NO
20	160	67	23	NO
21	103	48	14	NO

TABLE 10. Warrant 1, Condition B Based on the August 2006 Traffic Counts (Satisfaction Requires Eight Hours with ≥525 vehicles on US 12 and ≥53 vehicles on Williams or New Harmony)

HOUR STARTING	EASTBD + WESTBD US 12	NORTHBD WILLIAMS (2003)	SOUTHBD NEW HARMONY	WARRANT 1B
6	172	44	16	NO
7	212	65	51	NO
8	275	109	76	NO
9	283	75	43	NO
10	314	72	43	NO
11	348	81	34	NO
12	354	94	46	NO
13	351	89	34	NO
14	394	79	33	NO
15	364	155	33	NO
16	355	114	34	NO
17	317	97	38	NO
18	257	73	32	NO
19	194	84	27	NO
20	141	67	23	NO
21	98	48	14	NO

TABLE 11. Warrant 1, Condition B Based on the May 2009 Traffic Counts (Satisfaction Requires Eight Hours with ≥525 vehicles on US 12 and ≥53 vehicles on Williams or New Harmony)

HOUR STARTING	EASTBD + WESTBD US 12	NORTHBD WILLIAMS (2003)	SOUTHBD SR 122	WARRANT 1B
6	153	44	16	NO
7	234	65	51	NO
8	289	109	76	NO
9	267	75	43	NO
10	288	72	43	NO
11	291	81	34	NO
12	303	94	46	NO
13	323	89	34	NO
14	336	79	33	NO
15	362	155	33	NO
16	344	114	34	NO
17	366	97	38	NO
18	239	73	32	NO
19	173	84	27	NO
20	136	67	23	NO
21	98	48	14	NO

TABLE 12. Warrant 1, Condition B Based on the December 2009 Traffic Counts (Satisfaction Requires Eight Hours with ≥525 vehicles on US 12 and ≥53 vehicles on Williams or New Harmony)

HOUR STARTING	EASTBD + WESTBD US 12	NORTHBD WILLIAMS	SOUTHBD NEW HARMONY	WARRANT 1B
6	156	48	11	NO
7	297	57	37	NO
8	343	94	57	NO
9	287	75	30	NO
10	322	98	35	NO
11	323	107	47	NO
12	296	106	33	NO
13	342	113	53	NO
14	363	97	46	NO
15	435	152	50	NO
16	369	118	26	NO
17	337	122	34	NO
18	189	59	34	NO
19	124	49	14	NO
20	91	41	16	NO
21	85	29	7	NO

3. *Warrant 1, Combination of Conditions A and B.* This warrant is intended for application at locations where neither Condition A nor Condition B is satisfied. The MUTCD specifically states that this warrant "should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems." The traffic volumes required to meet the conditions of Warrant 1, Combination of Conditions A and B are contained in Tables 3 and 8, identified as Table 4C-1 in the MUTCD.

In this case, the traffic volumes in the columns labeled "56%" (80% of 70%) are used for evaluating this warrant, and the warrant analysis is properly based on 1-lane approaches for the "Major Street" (US Route 12) and 1-lane approaches for the "Minor Street" (Williams/New Harmony Road). Therefore Warrant 1, Combination of Conditions A and B is satisfied if for each of any eight hours on an average day, the total of both directions of traffic on US Route 12 equal or exceed 280 vehicles, and for the same eight hours the single highest volume approach on Williams/New Harmony Road equals or exceeds 84 vehicles (56% of Condition A) **and** for each of any eight hours on an average day, the total of both directions of traffic on US Route 12 equal or exceed 420 vehicles, and for the same eight hours the single highest volume approach on Williams/New Harmony Road equals or exceeds 42 vehicles (56% of Condition B).

Table 13 summarizes the warrant analysis for Warrant 1, Combination of Conditions A and B based on the June 2003 traffic counts. Table 14 summarizes the warrant analysis for Warrant 1, Combination of Conditions A and B based on the August 2006 traffic counts. Table 15 summarizes the warrant analysis for Warrant 1, Combination of Conditions A and B based on the May 2009 traffic counts. Table 16 summarizes the warrant analysis for Warrant 1, Combination of Conditions A and B based on the December 2009 traffic counts. As before, in each case, the most recent available traffic count data was used.

The hours in which the warrant conditions are met in Tables 13 through 16 are highlighted in yellow. As can be seen from Tables 13 through 16, the intersection of US Route 12 and Williams/New Harmony Road does not satisfy the requirements of Warrant 1, Combination of Conditions A and B for eight hours of an average day for any time period from 2003 through 2009. As before, because no traffic counts were conducted on the northbound Williams Street approach after 2003 until December 2009, the 2003 counts were used for this approach in Tables 14 and 15. However, even if a traffic growth rate of slightly more than 1% per year (as actually occurred) had been assumed for the Williams Street approach in Tables 14 and 15, the warrant would still not have been satisfied.

TABLE 13. Warrant 1, Combination of Conditions A and B
Based on the June 2003 Traffic Counts
(Satisfaction Requires Eight Hours with ≥280 vehicles on US 12
and ≥84 vehicles on Williams or New Harmony
and Eight Hours with ≥420 vehicles on US 12 and ≥42 vehicles on Williams or New Harmony)

HOUR STARTING	EASTBD + WESTBD US 12	NORTHBD WILLIAMS	SOUTHBD NEW HARMONY	WARRANT 1 A+B	
				80% 1A	80% 1B
6	210	44	16	NO	NO
7	279	65	51	NO	NO
8	352	109	76	YES	NO
9	321	75	43	NO	NO
10	321	72	43	NO	NO
11	339	81	34	NO	NO
12	336	94	46	YES	NO
13	347	89	34	YES	NO
14	377	79	33	NO	NO
15	389	155	33	YES	NO
16	360	114	34	YES	NO
17	350	97	38	YES	NO
18	229	73	32	NO	NO
19	155	84	27	NO	NO
20	160	67	23	NO	NO
21	103	48	14	NO	NO

TABLE 14. Warrant 1, Combination of Conditions A and B
Based on the August 2006 Traffic Counts
(Satisfaction Requires Eight Hours with ≥280 vehicles on US 12
and ≥84 vehicles on Williams or New Harmony
and Eight Hours with ≥420 vehicles on US 12 and ≥42 vehicles on Williams or New Harmony)

HOUR STARTING	EASTBD + WESTBD US 12	NORTHBD WILLIAMS (2003)	SOUTHBD NEW HARMONY	WARRANT 1 A+B	
				80% 1A	80% 1B
6	172	44	16	NO	NO
7	212	65	51	NO	NO
8	275	109	76	NO	NO
9	283	75	43	NO	NO
10	314	72	43	NO	NO
11	348	81	34	NO	NO
12	354	94	46	YES	NO
13	351	89	34	YES	NO
14	394	79	33	NO	NO
15	364	155	33	YES	NO
16	355	114	34	YES	NO
17	317	97	38	YES	NO
18	257	73	32	NO	NO
19	194	84	27	NO	NO
20	141	67	23	NO	NO
21	98	48	14	NO	NO

TABLE 15. Warrant 1, Combination of Conditions A and B
Based on the May 2009 Traffic Counts
(Satisfaction Requires Eight Hours with ≥280 vehicles on US 12
and ≥84 vehicles on Williams or New Harmony
and Eight Hours with ≥420 vehicles on US 12 and ≥42 vehicles on Williams or New Harmony)

HOUR STARTING	EASTBD + WESTBD US 12	NORTHBD WILLIAMS (2003)	SOUTHBD NEW HARMONY	WARRANT 1 A+B	
				80% 1A	80% 1B
6	153	44	16	NO	NO
7	234	65	51	NO	NO
8	289	109	76	YES	NO
9	267	75	43	NO	NO
10	288	72	43	NO	NO
11	291	81	34	NO	NO
12	303	94	46	YES	NO
13	323	89	34	YES	NO
14	336	79	33	NO	NO
15	362	155	33	YES	NO
16	344	114	34	YES	NO
17	366	97	38	YES	NO
18	239	73	32	NO	NO
19	173	84	27	NO	NO
20	136	67	23	NO	NO
21	98	48	14	NO	NO

TABLE 16. Warrant 1, Combination of Conditions A and B
Based on the December 2009 Traffic Counts
(Satisfaction Requires Eight Hours with ≥280 vehicles on US 12
and ≥84 vehicles on Williams or New Harmony
and Eight Hours with ≥420 vehicles on US 12 and ≥42 vehicles on Williams or New Harmony)

HOUR STARTING	EASTBD + WESTBD US 12	NORTHBD WILLIAMS	SOUTHBD NEW HARMONY	WARRANT 1 A+B	
				80% 1A	80% 1B
6	156	48	11	NO	NO
7	297	57	37	NO	NO
8	343	94	57	YES	NO
9	287	75	30	NO	NO
10	322	98	35	YES	NO
11	323	107	47	YES	NO
12	296	106	33	YES	NO
13	342	113	53	YES	NO
14	363	97	46	YES	NO
15	435	152	50	YES	YES
16	369	118	26	YES	NO
17	337	122	34	YES	NO
18	189	59	34	NO	NO
19	124	49	14	NO	NO
20	91	41	16	NO	NO
21	85	29	7	NO	NO

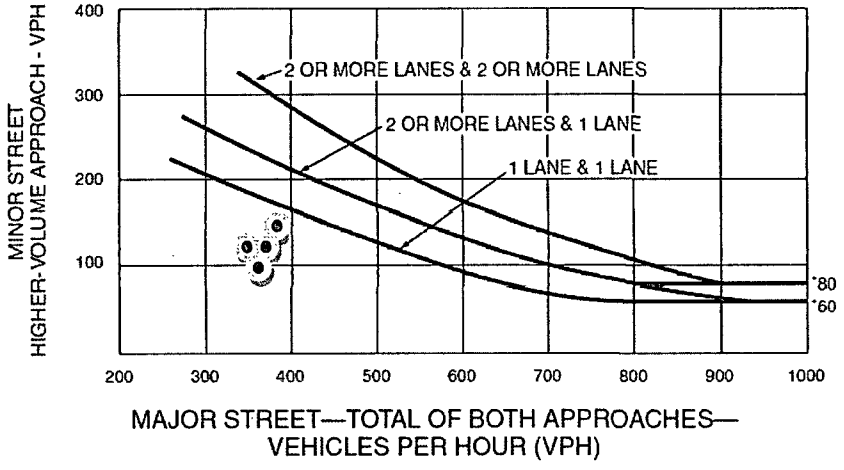
4. *Warrant 2, Four-Hour Vehicular Volume.* This warrant is "intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic signal." It is similar to Warrant 1, Condition A, but requires that a minimum amount of traffic be present for each of any four hours of an average day, rather than eight hours. Rather than a table of minimum volumes, this warrant is based on plotting the combination of hourly entering traffic in both directions on the major roadway (US Route 12) and the highest volume direction on the minor roadway (Williams Street) on a chart. Because the posted speed limit on US Route 12 is 55 mph, the chart shown in Figures 1 through 4 (MUTCD Figure 4C-2) are used.

Figure 1 shows the graphical warrant analysis for Warrant 2 based on the June 2003 traffic counts. Figure 2 shows the graphical warrant analysis for Warrant 2 based on the August 2006 traffic counts. Figure 3 shows the graphical warrant analysis for Warrant 2 based on the May 2009 traffic counts. Figure 4 shows the graphical warrant analysis for Warrant 2 based on the December 2009 traffic counts. As before, in each case, the most recent available traffic count data were used.

FIGURE 1. Warrant 2, Four-Hour Vehicular Volume Warrant
Based on the June 2003 Traffic Counts
(Satisfaction Requires Four Hours with plotted points above line labeled "1 LANE & 1 LANE";
4 highest volume hours plotted)

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)

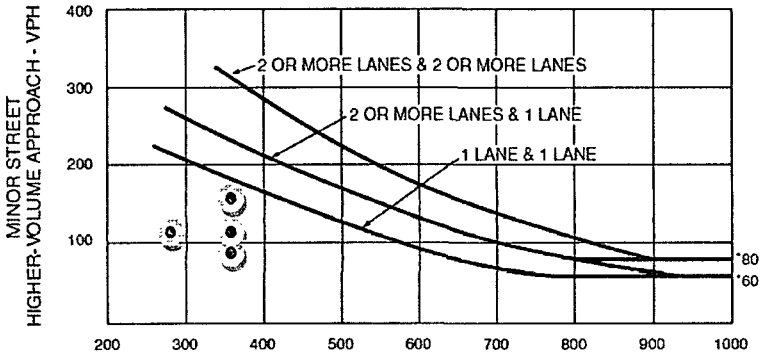


*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

FIGURE 2. Warrant 2, Four-Hour Vehicular Volume Warrant
Based on the August 2006 Traffic Counts
(Satisfaction Requires Four Hours with plotted points above line labeled "1 LANE & 1 LANE";
4 highest volume hours plotted)

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)

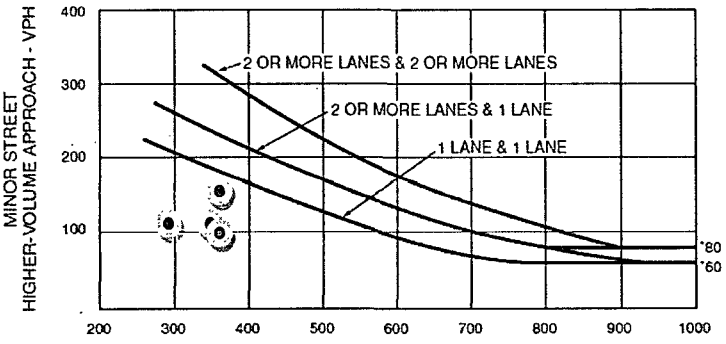


*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

FIGURE 3. Warrant 2, Four-Hour Vehicular Volume Warrant
Based on the May 2009 Traffic Counts
(Satisfaction Requires Four Hours with plotted points above line labeled "1 LANE & 1 LANE";
4 highest volume hours plotted)

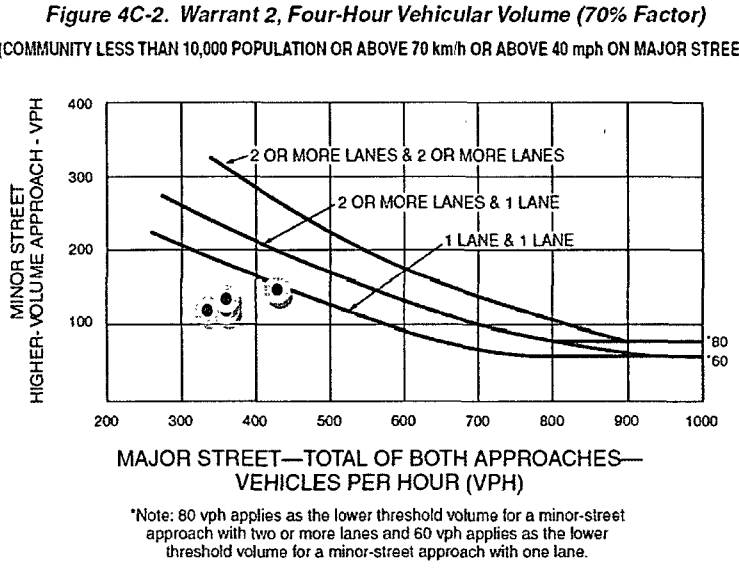
Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h OR ABOVE 40 mph ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

FIGURE 4. Warrant 2, Four-Hour Vehicular Volume Warrant
Based on the December 2009 Traffic Counts
(Satisfaction Requires Four Hours with plotted points above line labeled "1 LANE & 1 LANE";
4 highest volume hours plotted)



As can be seen from Figures 1 through 4, the intersection of US Route 12 and Williams/New Harmony Road does not satisfy the requirements of Warrant 2 for four hours of an average day for any time period from 2003 through 2009. As before, because no traffic counts were conducted on the northbound Williams Street approach after 2003 until December 2009, the 2003 counts were used for this approach in Figures 2 and 3. However, even if a traffic growth rate of slightly more than 1% per year (as actually occurred) had been assumed for the Williams Street approach in Figures 2 and 3, the warrant would still not have been satisfied.

5. *Warrant 3, Peak Hour.* This warrant "is intended for use at a location where traffic conditions are such that for a minimum of 1 hour on an average day, the minor-street traffic suffers undue delay when entering or crossing the major street." The MUTCD goes on to state that "this signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time." The intersection of US Route 12 and Williams/New Harmony Road does not fit the characteristics appropriate for application of Warrant 3, and the traffic volume counts do not suggest any severe peak hour traffic delay problem. Therefore this warrant is not applicable.

6. *Warrant 4, Pedestrian Volume.* This warrant "is intended for application where the traffic volume on the major street is so heavy that pedestrians experience excessive delay in crossing the major street." Warrant 4 is satisfied only if the volume of pedestrians crossing the major street (US Route 12) exceeds 100 per hour for each of any 4 hours, or 190 during 1 hour, of an average day. Videos of this intersection made after the subject accident indicate very low volumes of pedestrians crossing US Route 12; therefore this warrant is not satisfied.

7. *Warrant 5, School Crossing.* This warrant "is intended for application where the fact that school children cross the major street is the principal reason to consider installing a traffic control signal." The MUTCD further states that this warrant is to be applied at an "established school crossing across the major street." Although there is a school relatively close to the subject intersection, there is no indication that this intersection was designated as a school crossing. This is confirmed by the fact that photographs made at the time of the subject accident (and shortly after) reveal that there were no marked crosswalks at the intersection, as would be present if this was an "established school crossing"; therefore this warrant is not applicable.

8. *Warrant 6, Coordinated Signal Systems.* This warrant is intended for applications where an intersection falls within a potential coordinated signal system. Such signal systems are typically only provided where signalized intersections are located within about ½ mile of one another along a street in an urban area. The intersection of US Route 12 and Williams/New Harmony Road is not a candidate for consideration of operating a coordinated signal system by virtue of its isolated location; therefore this warrant is not applicable.

9. *Warrant 7, Crash Experience.* This warrant is "intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal." The MUTCD goes on to state that the need for a traffic signal shall be considered if **all of the following conditions are met** (emphasis added):

A. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and
B. Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and
C. For each of any eight hours of an average day, the vehicles per hour given in both of the 56 percent columns of Warrant 1, Condition A in Table 4C-1, or the vehicles per hour in both of the 56 percent columns of Warrant 1, Condition B in Table 4C-1 exists on the major street and the higher volume minor street approach, respectively, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant.

As previously discussed, the number of accidents at the subject intersection of types susceptible to correction by a traffic signal exceeded five in a 12-month period during the period of June 2005 to September 2007. However, during this time period, the traffic volumes at the intersection did not meet the volume criteria of Warrant 1, Condition A or Warrant 1, Condition B for eight hours of an average day. Therefore, the Crash Experience warrant was not satisfied.

Further, in an apparent response to the accidents that had occurred at the subject intersection during the 2005-2007 time period, the Washington State Department of Transportation installed "CROSS TRAFFIC DOES NOT STOP" warning signs beneath the north and southbound STOP signs in June 2007. This action was an appropriate remedial treatment in response to the accident pattern, and was apparently successful in reducing the frequency of correctible accidents at the intersection; subsequent to the installation of these warning signs, only one "correctible" accident occurred at the intersection between July 2007 and November 2009.

Because an adequate trial of this alternative treatment did in fact successfully reduce accident frequency, and because the intersection did not meet the traffic volume criteria specified in the Crash Experience warrant during the period of time when the number of correctible accidents exceeded five in a 12-month period, this warrant was not satisfied.

10. *Warrant 8, Roadway Network.* This warrant is intended to be applied at the intersection of "two or more major routes." In this context, New Harmony Road and Williams Street would not be considered "major routes." Therefore this warrant is not applicable.

The preceding discussion indicates that the intersection of US Route 12 and Williams/New Harmony Road did not satisfy the criteria of any of the established warrants for traffic signal installation at any time during the period of 2003 through 2009. Therefore, it would have been inappropriate to further consider the installation of a traffic signal at this intersection prior to the subject accident. Further, the installation of "CROSS TRAFFIC DOES NOT STOP" warning signs in conjunction with the north and southbound STOP signs was a successful remedial treatment in response to the accidents that occurred during the 2005-2007 time period.

All-Way STOP Control. The *Manual on Uniform Traffic Control Devices* indicates that all-way STOP control is used where the "volume of traffic on the intersection roads is approximately equal." This is not the case at the intersection of US Route 12 and Williams/New Harmony Road. As can be seen from the Annual Average Daily Traffic Volumes in Table 1, the amount of traffic on US Route 12 is approximately double the amount of traffic on Williams/New Harmony Road. Therefore, the use of all-way STOP control at this intersection would be undesirable. Because US Route 12 is a through route, and due to the speed of traffic on US Route 12, all-way STOP control would likely result in an increase in high-speed rear-end collisions on US Route 12 at the intersection.

Speed. The posted speed limit on US Route 12 in the vicinity of the subject intersection was 55 mph. In his deposition, Mr. Hancock testified that citizens voiced concerns about speeding traffic on US 12. However, speed studies conducted by the Washington State Department of Transportation in December 2009 east and west of Williams/New Harmony Road found 85th percentile speeds in the range of 55 to 58 mph. Other speed studies conducted in 1988 and 2010 found 85th percentile speeds in the range of 55 to 60 mph. The 85th percentile speed of free-flowing traffic has traditionally been used by traffic engineers as the best indicator of the appropriate speed limit. In fact, the *Manual on Uniform Traffic Control Devices* indicated that "when a speed limit is to be posted, it should be within 10 km/h or 5 mph of the 85th-percentile speed of free-flowing traffic." Therefore the 55 mph

speed limit was appropriate for conditions along US Route 12 in the vicinity of the subject intersection. Finally, it must also be noted that research has indicated that simply lowering the speed limit would be unlikely to change the actual speed of traffic. Further, the speed studies did not indicate any speeding problems on US Route 12 such as large numbers of vehicles traveling at speeds significantly over the posted speed limit.

Sight Distance. Photographs and videos made at the subject intersection, as well as aerial and "street view" photography available on the Google Earth web site, indicate that sight distance for drivers stopped on the Williams/New Harmony Road approaches to the intersection is more than adequate for safe operations. From these sources, sight distance available to drivers on the STOP-controlled approaches to the intersection of US Route 12 and Williams/New Harmony Road appears to equal or exceed 1000 feet. The American Association of State Highway and Transportation Officials (AASHTO) publishes a manual entitled *A Policy on Geometric Design for Highways and Streets*. This manual is used throughout the United States as a basis for street and highway design criteria. The 2004 edition of this manual indicates that for a STOP-controlled intersection approach, the driver of a 4-wheeled vehicle (passenger car or pickup truck) should be able to see oncoming traffic on a non-stopping, 55 mph main road at a distance of 647 feet. This is based on a time gap in the non-stopping traffic on 8.0 seconds. Because actual available sight distance exceeds desired intersection sight distance, drivers on Williams Street and New Harmony Road would be expected to be able to adequately see approaching traffic on US Route 12 at a distance that allows them to safely decide whether or not to enter the intersection.

Gaps. As noted in the preceding section, the AASHTO intersection sight distance criteria are based on the size of time gaps in moving traffic that drivers on STOP-controlled approaches are comfortable in accepting and entering the intersection of a non-stopping main road. The time gap size criteria were established based on an extensive research project published as National Cooperative Highway Research Program Report 383 *Intersection Sight Distance*. This study actually observed the behavior of drivers entering intersections from STOP-controlled approaches on two-lane main roads with speed limits ranging between 35 and 55 mph. More than 5,000 time gaps were evaluated by these drivers, and the study recorded the size of time gaps in non-stopping traffic that drivers either accepted (and entered the intersection) or rejected (and waited for a larger gap). No difference was noted by the study in the size of time gaps accepted or rejected based on the speed of traffic on the non-stopping main road. In other words, drivers were just as likely to accept an 8.0 second time gap at an intersection with a 35-mph main road as at an intersection with a 55-mph main road. This indicates that drivers are fully capable of adequately assessing the size of time gaps, even when the approaching vehicle on the non-stopping road is 647 feet away from the intersection (8.0 second time gap at 55 mph speed).

The actual availability of gaps in non-stopping traffic on US Route 12 can be estimated using the following equation from the *Highway Capacity Manual* published by the Transportation Research Board:

$$C = V \times \frac{e^{-Vt_g / 3600}}{1 - e^{Vt_f / 3600}}$$

Where C = Number of available gaps per hour greater than or equal to t_g
V = Hourly volume of traffic on US Route 12
t_g = Time gap in non-stopping traffic acceptable to entering driver (8.0 seconds)
t_f = Followup headway for second driver to enter after first vehicle (conservatively taken as 8.0 seconds)

For the highest hourly traffic volume on US Route 12 from any of the traffic counts (435 vehicles per hour; see Tables 4 through 7 and 9 through 16), the number of calculated time gaps adequate for drivers to enter the intersection from the Williams Street approach equals 267. The actual volume of traffic entering the intersection from the Williams Street approach during this same hour was 152 vehicles (see Tables 4 through 7 and 9 through 16). Thus there were an adequate number of time gaps in US Route 12 traffic to allow drivers on Williams Street to select an adequate time gap in order to enter the intersection safely.

SUMMARY OF OPINIONS

1. Traffic volumes entering the intersection of US Route 12 and Williams/New Harmony Road have remained relatively stable over the period of 2003 through 2009.

2. The overall accident rate at the intersection of US Route 12 and Williams/New Harmony Road is approximately equal to the average accident rate for similar intersections throughout the United States.

3. The intersection of US Route 12 and Williams/New Harmony Road did not meet any of the MUTCD warrants for traffic signal installation at any time during the period of 2003 through 2009. As a result, installation of a traffic signal would not have been appropriate prior to the subject accident.

4. The installation of "CROSS TRAFFIC DOES NOT STOP" warning signs in conjunction with the north and southbound STOP signs was an appropriate and successful remedial treatment in response to the accidents that occurred during the 2005-2007 time period.

5. All-way STOP control would not have been appropriate for the intersection of US Route 12 and Williams/New Harmony Road, and would likely have resulted in high-speed rear-end collisions on US Route 12.

6. The posted speed limit of 55 mph on US Route 12 was appropriate and there is no indication of any speeding problems on US Route 12.

7. Available sight distance exceeds desired intersection sight distance permitting drivers on

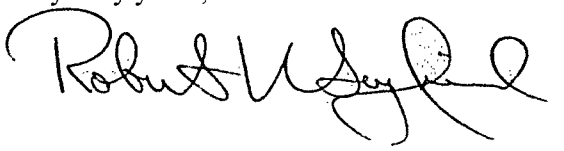
Williams Street and New Harmony Road to be able to adequately see approaching traffic on US Route 12 at a distance that allows them to safely decide whether or not to enter the intersection.

8. There is no evidence that drivers are incapable of adequately assessing the size of available time gaps in non-stopping traffic and making safe decisions about whether or not to enter an intersection such as US Route 12 and Williams/New Harmony Road.

9. There were an adequate number of time gaps in US Route 12 traffic to allow drivers on Williams Street to select an adequate time gap in order to enter the intersection safely.

The preceding opinions are stated within a reasonable degree of traffic engineering certainty. Attached as Appendix B is a copy of my current resume containing my qualifications as an expert in traffic engineering.

Very truly yours,



Robert K. Seyfried, PE, PTOE

APPENDIX A

SUMMARY OF CONTENTS OF DATA CDs

RASHOFF V STATE OF WASHINGTON
INVENTORY OF CD-ROM #1

1. Accident_Collison Data File:
   - Accident data, US 12 MP 69.13-69.19
   - E-mail correspondence re. US 12, MP 69-74
   - Accident data, US 12 MP 71-74
   - Accident data, US 12 MP 85.72
   - E-mail correspondence re. US 12 and SR 122 fatal crashes and traffic signal at Mary's corner
   - Traffic study recommending installation of signal at US 12 MP 86.88 (printed)
   - E-mail correspondence re. Randle intersection
   - Accident data, US 12 MP 86.88
   - Accident data, US 12 MP 66.54-151.15
   - E-mail correspondence re. Senator Swecker inquiry US 12 about accidents, MP 69-74
   - Accident data, US 12 MP 86.84-86.91
   - Accident data, US 12 multiple locations
   - Accident data, SR 122 MP 7.63-7.88 (no accidents)
   - Accident data, US 12 MP 86.63-87.13
   - Statewide collisions at intersections, but intersection type and location
   - Accident data, US 12 MP 86.68-87.07
   - E-mail correspondence re. US 12 accidents in Lewis Co.; summary of accidents at US 12/SR 122 for various time periods; US 12/SR 122 collision diagram; US 12/SR 122 peak hour volumes and speed study summary; US 12 MP 86.00-87.50 accident summary 1991-1996 and 1993-1996; summary of accident spots US 12 MP 66-151; and miscellaneous duplicative materials

2. Investigation file
   - Police accident report (printed) and supplemental reports
   - Witness statements

3. Claim

4. Discovery
   - State response to interrogatories and request for production of documents dated July 26, 2012 and December 4, 2012, and first supplemental response
     - Historical aerial photographs, 1999-2009
   - State response to interrogatories and request for production of documents dated October 12, 2012
     - Sign maintenance action log US 12/SR122
     - CROSS TRAFFIC DOES NOT STOP sign installation work order
     - 2007 correspondence regarding safety concerns at US 12/SR122 and decision to install CROSS TRAFFIC DOES NOT STOP sign
     - US 12 centerline rumble stripe plans and contract
     - Average daily traffic volumes 2007-2010

- 4 police traffic accident reports, 2007-2009
- Accident data, US 12 MP 86.88-87.08, 2007-2009
- Hourly traffic volume data, US 12/SR122, 2007 and 2009

5. Counts
   - Hourly traffic volume data, US 12/SR122, December 2009

6. As-Builts
   - US 12 as-built plans for original construction and subsequent resurfacing and improvement projects

RASHOFF V STATE OF WASHINGTON
INVENTORY OF CD-ROM #2

1. Photos File:
   - Accident site and vehicles
   - Accident scene photos
   - Accident site photos dated 12/16/09; 3/17/10, temporary signal installation dated 8/10, photos showing AM sun at 4:00 position, and PM sun at 8:00 position
   - Two aerial photos

2. Pleadings file

3. Public Concern file
   - Post-accident e-mail, newspaper articles, and letters to the editor
   - Post-accident letter and newspaper articles

4. Signal Warrants file
   - 2008 e-mail chain re. Mossyrock request for signal
   - 2007 e-mail chain re. citizen request for signal
   - Signal priority ranking dated 2000 (ranked 39; printed), 2002 (ranked 27-31; printed), 2003 (ranked 32), 2004 (ranked 18), 2006 (ranked 13)
   - Signal warrant analysis summary sheets, 2002-2003 and 2009
   - Benefit/cost analysis worksheet
   - WSDOT Memo dated May 11, 2010 re. temporary signal
   - Traffic signal permit dated May 11, 2010
   - Historical summary of intersection conditions

5. Speed Studies file
   - US 12 speed studies, December 2009-2010
   - 2007 e-mail chain re. citizen request to lower speed limit
   - 1997 correspondence re. citizen request to lower speed limit
   - 2010 work order for advance warning signs installation
   - December 10, 2009 request for volume count and speed study
   - December 2009 e-mail chain re. overall accident rate on US 12
   - Traffic volume count data 1998, 2003, 2007, and December 2009
   - Turning movement traffic volume count data, December 2009
   - Traffic volume count data, Jackson Highway, 2008
   - Signal warrant analysis summary sheet, 1998 and 2008
   - Signal warrant analysis, 2007 and undated
   - 1997 estimated hourly volumes
   - Accident data, US 12 MP 69.16
   - Accident data 1999-2008, US 12 MP 66.54-151.15
   - Accident data 1999-2008, US 12 MP 86.83-86.93
   - Accident data 1992-1999, US 12 MP 68.99-69.33
   - Raw speed study data, 1988 and December 2009

- History of speed studies, 1987-2009
- December 2009 e-mail chain re. benefit/cost analysis of alternative treatments

6. Traffic Volume file:
   - Peak hours turning movement traffic volume count data, December 2009

7. SR View file:
   - Video, WB vehicle, December 2009
   - Video, EB vehicle, June 2009
   - Video, EB vehicle, June 2010

APPENDIX B

RESUME OF ROBERT K. SEYFRIED, PE, PTOE

RESUME
ROBERT K. SEYFRIED, PE, PTOE
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PROFESSIONAL EXPERIENCE

R.K. Seyfried and Associates, Inc.
President
2009-Present

Consultation and preparation of expert testimony related to highway traffic accidents. Analysis of roadway design and traffic control features, including geometric design of highways and intersections, traffic signal design and operation, traffic signs and pavement markings, traffic control in construction and maintenance work zones, and bicycle and pedestrian facility design and operation. Traffic accident reconstruction to resolve issues related to vehicle speeds, visibility, reaction time, evasive actions, occupant movement and interaction with vehicle components, and other such issues. Preparation of traffic engineering studies related to roadway improvements and site development.

Adjunct Instructor for Transportation Engineering and Traffic Accident Reconstruction Training Programs presented for Northwestern University Center for Public Safety, Institute of Transportation Engineers, and National Highway Institute. Responsible for the development and presentation of professional development programs in traffic engineering, transportation planning, geometric design, traffic control devices, bicycle and pedestrian facility planning and design, and accident analysis. These continuing education programs are designed for professional engineering personnel of city, county, and state transportation and engineering organizations and agencies.

In addition to training programs conducted on-campus in Evanston Illinois, programs have also been presented in the states of Alabama, Alaska, Arizona, Colorado, Connecticut, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Virginia, Washington, Wisconsin, and Wyoming, the District of Columbia, the Commonwealth of Puerto Rico, and the Province of British Columbia.

Northwestern University Center for Public Safety (Traffic Institute)
Director, Transportation Engineering Programs
1986-2009

Division director with responsibility for administration, planning, development, and presentation of professional development programs consulting services, research, and development projects.

Northwestern University Traffic Institute
Associate Director, Transportation Engineering Division, 1982-1986

Assistant to division director with responsibility for planning, development, and presentation of professional development programs and consulting services.

Northwestern University Traffic Institute
Senior Transportation Engineer, Transportation Engineering Division, 1976-1982

Responsible for planning, development, and presentation of professional development programs and consulting services.

Westenhoff and Novick, Inc., Chicago, Illinois
Chief Traffic and Transportation Engineer
1975-1976

Head of department responsible for traffic engineering, transportation planning, and environmental analysis projects. Included feasibility studies and planning and design of public transportation systems, freeway and arterial street systems, parking facilities, and traffic control devices. Responsible for preparation of environmental impact studies and contract plans and specifications for intersection improvements, traffic signals, and freeway projects. Responsible for engineering studies related to site development planning. Lecturer at Illinois Institute of Technology.

Westenhoff and Novick, Inc., Chicago, Illinois
Assistant Chief Traffic and Transportation Engineer
1969-1975

Assistant to department head, responsible for supervision and conduct of traffic engineering and transportation planning projects.

EDUCATION

M.S., Northwestern University, Civil Engineering, 1970
B.S., Northwestern University, Civil Engineering, 1968
Ovid W. Eshbach Award, 1968, Outstanding Engineering Graduate
Tau Beta Pi, honorary engineering society
Chi Epsilon, honorary civil engineering society

PROFESSIONAL TRAINING

Certificate, Traffic Accident Reconstruction,
Northwestern University Traffic Institute, 1981

Certificate, Theory of Traffic Flow
George Washington University, 1970

PROFESSIONAL ACTIVITIES

Registered Professional Engineer, State of Illinois, 62-31085

Certified Professional Traffic Operations Engineer, Transportation Professional Certification Board, 1999

National Committee on Uniform Traffic Control Devices, Technical Member, Signs Technical Committee (1988 to present)
Member, Regulatory and Warning Signs Technical Committee
Co-Chair, Sites Open to Public Travel Task Force (2012 to present)
Vice Chair, Guide/Motorist Information Signs Technical Committee
Task Force on Private Property open to Public Travel
Task Force on Pedestrians
Task Force on Curve Advisory Speeds
Task Force on Stop Sign Location (member)
Task Force on Urban Street Width Transition Signing (chair)
Task Force on Secondary Signs (chair)
Task Force on Re-Write of Section 2A (chair)
Task Force on Interchange Guide Signing on Conventional Roads (chair)
Research Committee (member)

Board of Directors, Transportation Professional Certification Board, member, 2007 to 2011

Institute of Transportation Engineers, Life Member
International Board of Directors (representing Midwestern District ITE), Institute of Transportation Engineers, member, 2010 to 2012
Illinois Section Past Presidents' Award for Exceptional Service, 2002
President, Illinois Section, 1984
Director, Professional Traffic Operations Engineers Certification Examination Refresher Course, 1999
Director, Traffic Operations Practitioners Certification Examination Refresher Course, 2006
Director, Traffic Signal Operations Practitioners Specialty Certification Examination Refresher Course, 2006
Director, Traffic Engineering Academy, 1990-1991

Co-Chair, District IV Annual Meeting, 1988
Manual on Uniform Traffic Control Devices Review Team (1998 to present)
Technical Council Committee TENC-102-02, Committee Jurisdiction and Warrants for Highway-Railroad Crossing Treatments (co-chair, 2001-present)
Technical Council Committee 5B-29, Committee on Intersection and Driveway Sight Distance (member)
Technical Council Committee 2-43, Committee for a Systematic Approach to Professional Development (member)
Professional Traffic Operations Engineers Certification Examination Test Development Committee (member)
Traffic Operations Practitioners Certification Examination Test Development Committee (member)
Traffic Engineering Council (member)
Expert Witness Council (member)
Traffic Engineering Academy Task Force (member)

Signalized Intersection Safety Scanning Tour (member), sponsored by Federal Highway Administration and American Association of State Highway and Transportation Officials (2002)

Federal Highway Administration Task Force on Traffic Signal Timing (2004)

Federal Highway Administration Task Force on Urban Traffic Congestion

Federal Highway Administration Task Force on Traffic Operations Manpower

American Society of Civil Engineers, Life Member

Transportation Research Board
Committee on Traffic Control Devices (AHB50), 2011 to present (member)
Steering Committee to Review Research Methods Used to Study the Effects of Raising and Lowering Speed Limits (member)
Review Panel, NCHRP Project 20-7, Signing for Two-Lane Exit Ramps, 2003-2004
Review Panel, NCHRP Project 20-5, Pavement Markings Design and Layout Details, 2005

PUBLICATIONS

Traffic Control Devices Handbook, Institute of Transportation Engineers, (Editor and Chapter Author), March 2013

"Methodologies for Determination of Advisory Speeds," (co-author) *ITE Journal*, Institute of Transportation Engineers, November 2010

Methodologies for Determination of Advisory Speeds, Informational Report, (co-author), Institute of Transportation Engineers, 2010

Fundamentals of Traffic Engineering Web Seminar Instructional Materials, Project coordinator and module developer, Institute of Transportation Engineers, 2009

"Signs and Pavement Markings," Chapter 13, *Traffic Control Devices Handbook*, Institute of Transportation Engineers, 2009

"Crash Analysis," Highway Safety 101 Module 7, Web Seminar Instructional Materials, Institute of Transportation Engineers, 2008

Traffic Operations Practitioner Specialty Certification Program Refresher Course, Institute of Transportation Engineers, 2007

Traffic Signal Operations Specialty Certification Program Refresher Course, Institute of Transportation Engineers, 2007

"Low-Cost Safety Improvements in Europe," *Compendium of Technical Papers, 2004 Annual Meeting*, Institute of Transportation Engineers, August 2004

"Highway-Rail Grade Crossing Guidance Document," (co-author), *ITE Journal,* June 2004

"Traffic Signal Operations," Chapter 6, *Toolbox on Intersection Safety and Design,* Institute of Transportation Engineers, 2004

Engineering Intersections to Reduce Red-Light Running, ITE Professional Development Program Participant Manual and Instructional Material, Institute of Transportation Engineers, 2004.

Signalized Intersection Safety in Europe, (co-author), Federal Highway Administration Report No. FHWA-PL-04-004, December 2003.

"Installation and Maintenance Practices," Chapter 3, *Traffic Control Devices Handbook*, Institute of Transportation Engineers, 2001.

"Timing of Traffic Signal Preemption at Intersections Near Highway-Railroad Grade Crossings", *Compendium of Technical Papers, 2001 Annual Meeting*, Institute of Transportation Engineers, August 2001.

"Measuring the Road for After-Accident Situation Maps," (co-author), Topic 832 of the *Traffic Accident Investigation Manual*, Northwestern University Traffic Institute, 1985.

"Drawing After-Accident Situation Maps," (co-author), Topic 834 of the *Traffic Accident Investigation Manual*, Northwestern University Traffic Institute, 1985.

"Urban Street Geometrics," (co-author), *ITE Journal*, November 1985. "Bicycle Facility Design and Legal Liability," *Bicycle Forum Magazine*, 1982.

Peak Hour Traffic Signal Warrant, (co-author), National Highway Research Program Report 249, Transportation Research Board, 1982.

"Planning for Safe and Efficient Pedestrian Facilities," (co-author), *Proceedings*, Metropolitan Association of Urban Planners and Environmental Designers Annual Meeting, 1978.

"A Challenge to U.S. Traffic Engineers: An Illinois Section Experience," *Traffic Engineering Magazine*, May, 1976.

An Economic Evaluation of the Proposed Illinois Complex Source Regulation, (co-author), Argonne National Laboratory, August, 1974.

PRESENTATIONS

"Methodologies for Determination of Advisory Speeds," Institute of Transportation Engineers Technical Conference, April, 2011

"Engineering Intersections to Reduce Red-Light Running," Illinois Society of Professional Engineers Annual Meeting, July 2006.

"Traffic Accident Reconstruction," "Revisions to the *Manual on Uniform Traffic Control Devices*," and "Identification of High-Hazard Locations," Illinois Society of Professional Engineers PDH Bootcamp, October 2005.

"Revisions to the *Manual on Uniform Traffic Control Devices*," Illinois Section Institute of Transportation Engineers, April 2004.

"Intersection Safety Toolbox: Traffic Signal Operations," Institute of Transportation Engineers Technical Conference, March, 2004

"Engineering Intersections to Reduce Red-Light Running," Institute of Transportation Engineers Technical Conference, March, 2004 and District IV Institute of Transportation Engineers Annual Meeting, July 2004

"Training Today's Professionals," Institute of Transportation Engineers Annual Meeting, Seattle, Washington, August, 2003

"Traffic Accident Reconstruction," New York State Bar Association Trial Lawyers Section Summer Meeting, Niagara-on-the-Lake, Ontario, August, 2003

"Accident Reconstruction for Traffic Engineers," American Public Works Association Illinois Chapter Annual Conference, Peoria, Illinois, May, 2003.

"Signalized Intersection Safety Scanning Tour," Illinois Section Institute of Transportation Engineers, Chicago, Illinois, September, 2002.

"Revisions to the *Manual on Uniform Traffic Control Devices*," Illinois Association of Highway Engineers, Itasca, Illinois, April 2001.

"Traffic Engineering in the Peoples' Republic of China," Illinois Section Institute of Transportation Engineers, Chicago, Illinois, September 2000.

"Evaluation of a Proposed Movable Median Barrier on the Golden Gate Bridge," Intermountain Section I.T.E. Annual Meeting, Jackson, Wyoming, May 1998.

"Legal Liability in Small Communities," Workshop on Traffic Engineering in Small Communities, Brookfield, Wisconsin, April 1998.

"Accident Analysis," Workshop on Traffic Engineering in Small Communities, Waukasha, Wisconsin, April 1996.

"Accident Site Investigation," University of Wisconsin Department of Engineering Professional Development, Madison, Wisconsin, April 1996.

"Update on the *Manual on Uniform Traffic Control Devices*," Workshop on Traffic Engineering in Small Communities, Waukasha, Wisconsin, April 1995.

"Low-Cost Improvements," Workshop on Traffic Engineering in Small Communities, West Bend, Wisconsin, April 1992.

"Revisions to the *Manual on Uniform Traffic Control Devices*," 3rd Annual Midwest Traffic Engineering and Parking Seminar, Peoria, Illinois, April 1992.

"Mock Trial," (moderator), Institute of Transportation Engineers Annual Meeting, Milwaukee Wisconsin, September 1991.

"Update on the *Manual on Uniform Traffic Control Devices*," Illinois Section Institute of Transportation Engineers, Chicago, Illinois, June 1991.

"Work Zone Traffic Control and Signing," Workshop on Traffic Engineering in Small Communities, West Bend, Wisconsin, April 1991.

"An Evaluation of Montana Speed Zoning Policies and Practices," Montana State Highway Commission, Helena, Montana, December 1993, March 1991, July 1989, and January 1985.

"Site Traffic Impact Analysis," Nevada Chapter Institute of Transportation Engineers, Carson City, Nevada, May 1990.

"Traffic Safety in the U.S.--A Look to the Future," Institute of Transportation Engineers Annual Meeting, San Diego, California, September 1989.

"Evaluation of a Proposed Movable Median Barrier on the Golden Gate Bridge," Intermountain Section ITE Meeting, Jackson Wyoming, May

APPENDIX B

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Kineticorp™

Forensic Engineering | and Visualization

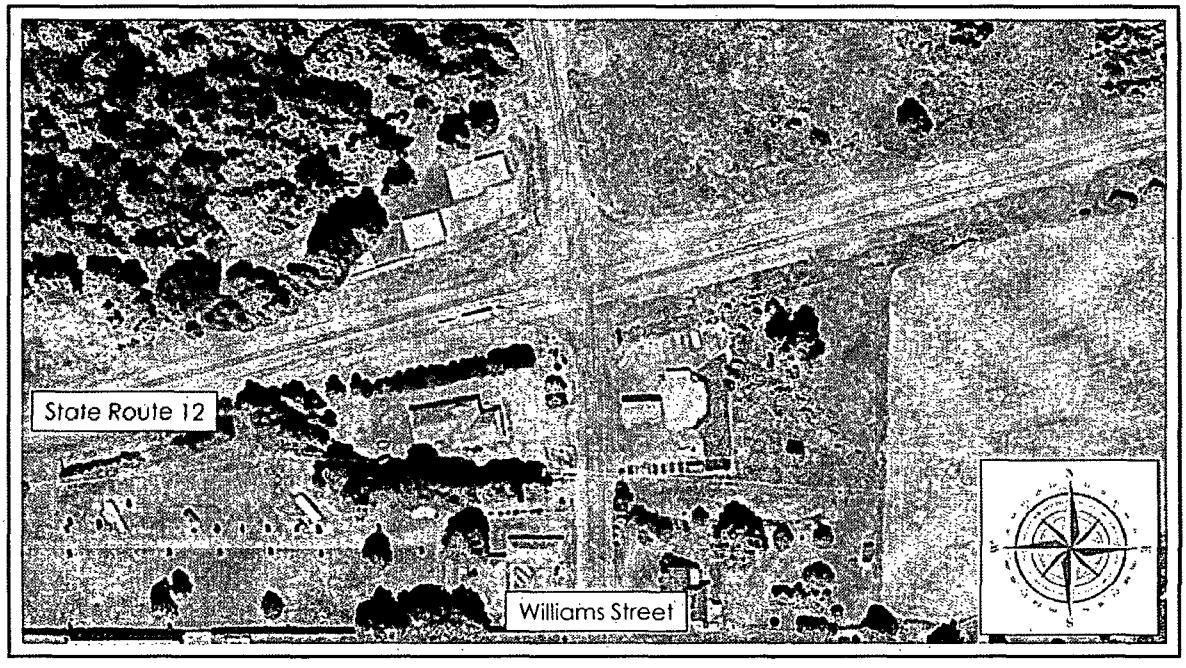
October 4, 2013

Steve Puz
Washington State Office of the Attorney General
7141 Cleanwater Dr. SW
Olympia, WA 98504-0121
stevep@atg.wa.gov

Re: **Lamotte & Rashoff v. State of Washington**
Accident Reconstruction Report

Dear Mr. Puz:

As requested, Kineticorp investigated and reconstructed an accident that occurred at approximately 3:17 p.m. on December 8, 2009 at the intersection of State Route 12 with Williams Street in Mossyrock, Washington. According to the State of Washington Police Traffic Collision Report, this accident occurred when Benjamin Lamotte, who was driving a 2001 Ford F150 northbound on Williams Street, attempted to travel across the intersection and was impacted in the passenger's side by a westbound 1997 Peterbilt semi tractor that was being driven by Vance Steen and was piggybacking an empty log trailer. The aerial photograph below shows this intersection and the surrounding roadways. Ryan Rashoff, the right front passenger in the Ford pickup, was fatally injured during this accident.



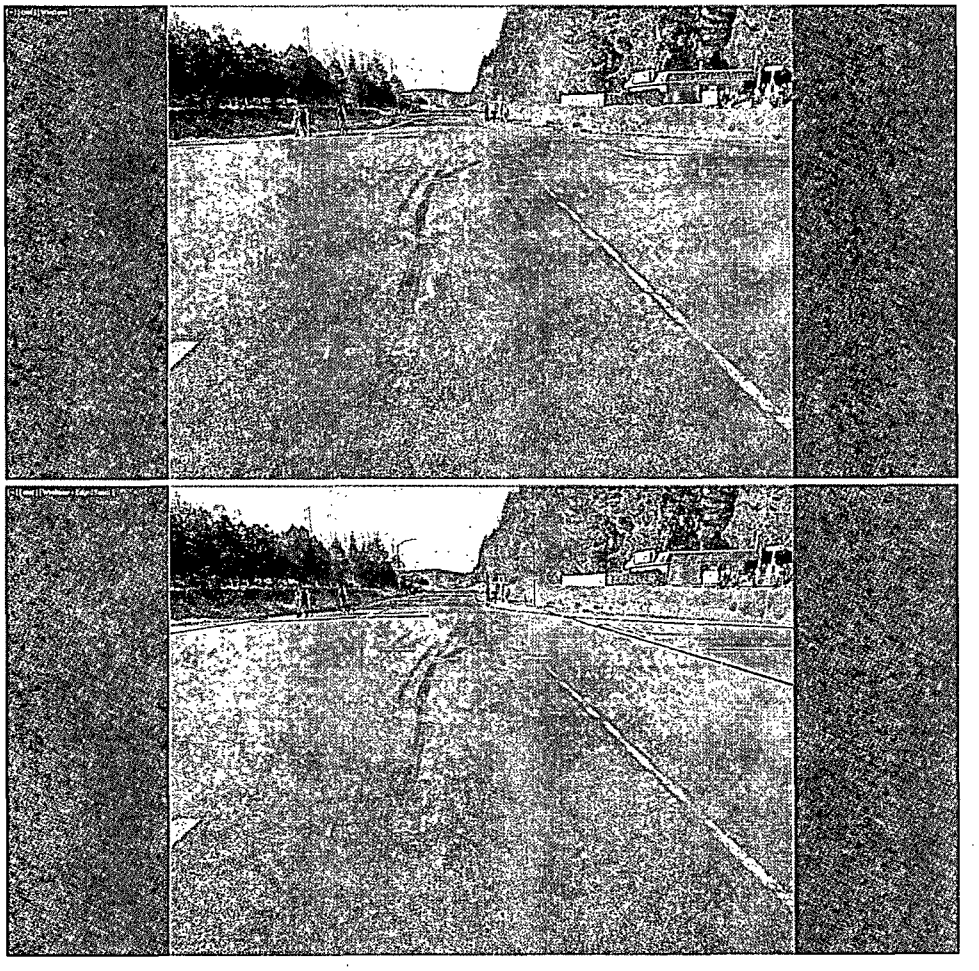
(2) The computer-generated environment is imported into a modeling software package and a computer-modeled camera is set up to view the environment model from a perspective that is visually similar to that shown in the photograph that is to be analyzed.

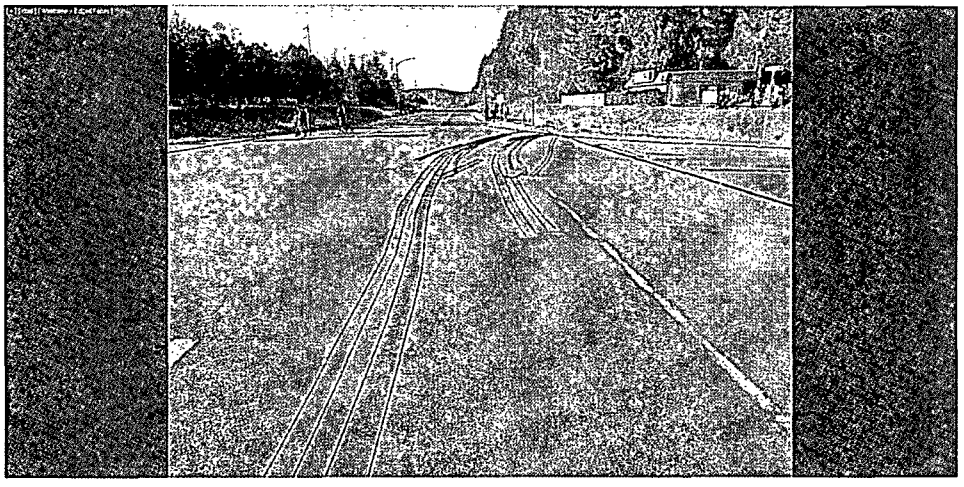
(3) The accident scene photograph that is to be analyzed is imported into the modeling software and is designated as a background image for the computer-modeled camera.

(4) The analyst makes adjustments to the location, focal length, and viewing plane of the computer-modeled camera until an overlay is achieved between the computer-generated environment model and the environment shown in the photograph. When this process is complete, the analyst has reconstructed the location and characteristics of the camera used to take the original photograph.

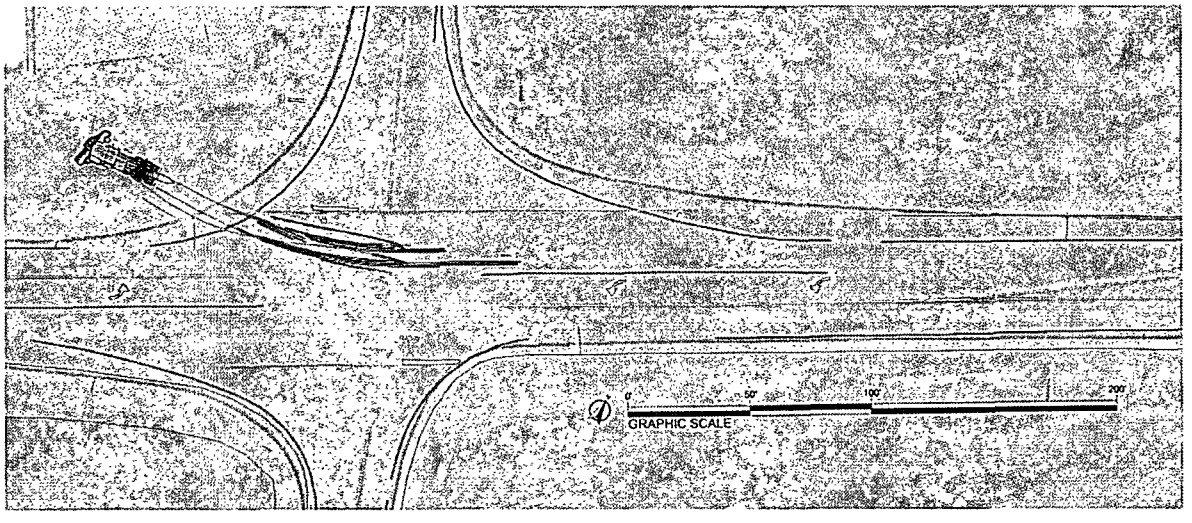
(5) Once the camera location and characteristics are known, the analyst can use the overlay between the environment model and the photograph to either trace non-permanent features, such as physical evidence on the roadway, from the photograph onto the environment model or to position computer models of non-permanent features, such as vehicle rest positions, into the environment model. Once these non-permanent features are transferred to the environment model, they can be measured relative to the known dimensions of the environment model.

The three images below show an example of how this process progresses. The first image is an accident scene photograph taken by the WSP. The second image shows this same photograph aligned with our scene model created from our mapping of the accident site. The third image then shows our trace of the evidence from this photograph.



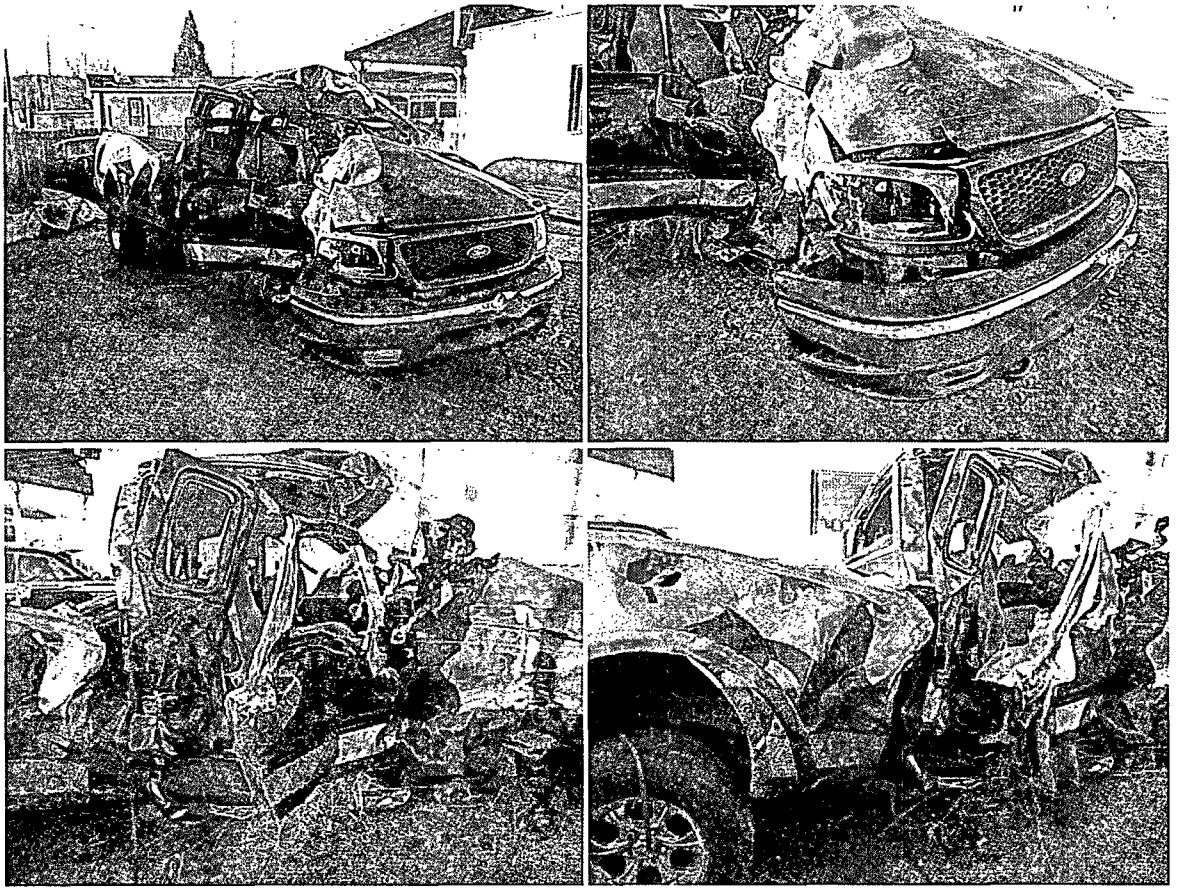


Having completed our photogrammetric analysis, we then produced an evidence diagram, which is included below, depicting the location of the physical evidence that was deposited on and off the roadway as a result of this accident. This diagram was produced using aerial photography, provided photographs, police documentation and measurements, our own documentation of the accident site, and our photogrammetric analysis.

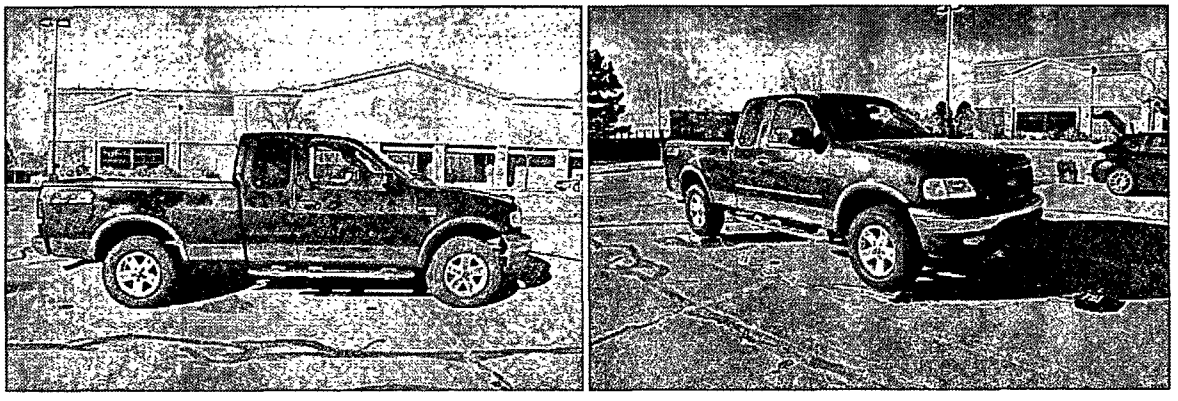


Vehicle Specifications, Characteristics and Damage

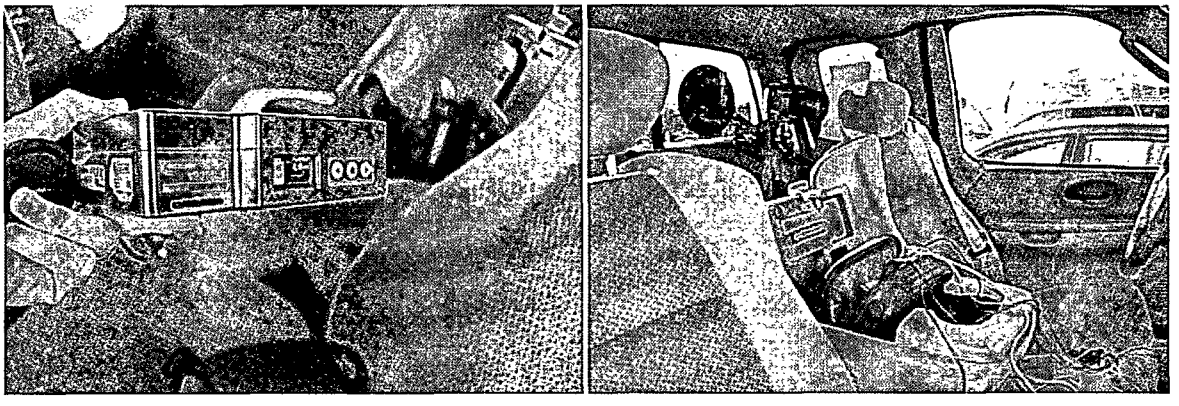
Ford F150 – The 2001 Ford F150 that Mr. Lamotte was driving when this accident occurred was equipped with the XLT trim package, a SuperCab, part-time four-wheel drive, an automatic transmission, a 5.4 liter, V-8 gasoline engine, 6½ foot bed, and anti-lock brakes. At the time of this accident, Ryan Rashoff was seated in the front passenger seat. Including Mr. Lamotte and Mr. Rashoff, we calculated that the Ford weighed approximately 5,200 pounds. The photographs below show the passenger's side impact damage that occurred to the Ford F150 as a result of being impacted by the front of the Peterbilt. As these photographs show, the area in which the Peterbilt directly contacted the Ford begins at the right front wheel and extends back to an area just in front of the right rear wheel.

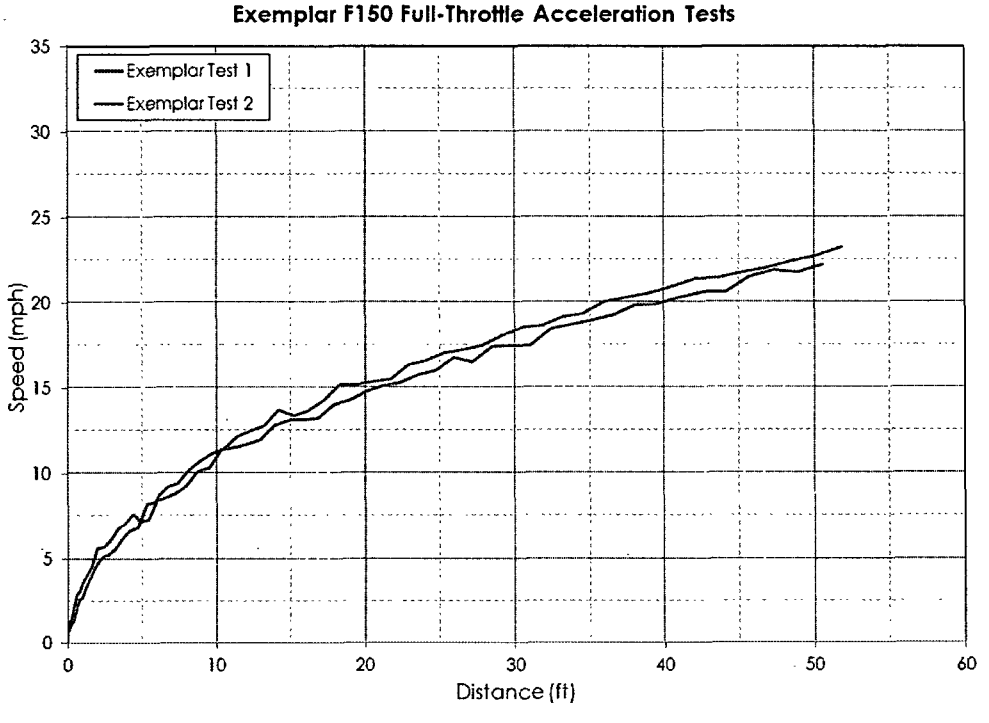


On November 12, 2012, we inspected and physically tested an exemplar 2003 Ford F150. This exemplar, which is depicted in the photographs below, had similar weight, dimensions, and engine and drivetrain characteristics to the 2001 Ford F150 that was involved in the subject accident. This exemplar vehicle had part-time four-wheel drive (it was tested in two-wheel drive mode), an automatic transmission, and a 5.4 liter, V-8 gasoline engine. It was equipped with Hankook DynaPro AT RF08 tires of size P265/70 R17. During our inspection of this exemplar vehicle, we weighed it and found that it had a weight of 5,002 pounds.



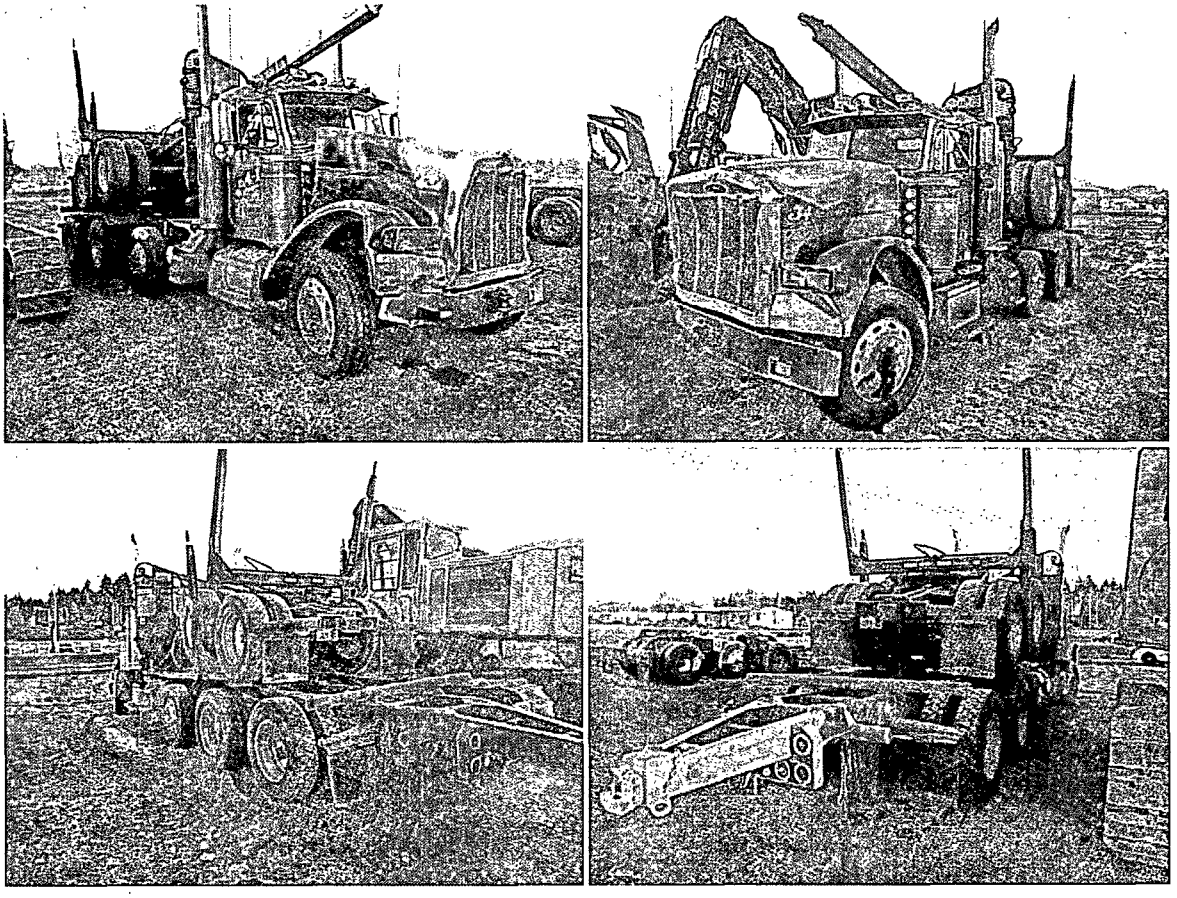
We conducted a road test of this exemplar vehicle on a flat, straight asphalt surface in Greenwood Village, Colorado. This testing consisted of two full-throttle acceleration runs from 0 mph up to a speed of around 23 mph. For these runs, the vehicle was instrumented with a RaceLogic VBOX 20-Hz GPS data acquisition system (VBOX)[21] and a camera was setup to record the instrument panel. This setup is depicted in the photographs below. At the time of these tests, the temperature was approximately 48° F, the pressure was 24.38 inches of mercury (in-Hg), and the humidity was 30%. The results of our tests are shown in the graph below. In this graph, distance traveled by the vehicle is plotted on the horizontal axis in feet and the speed of the exemplar Ford is plotted on the vertical axis in miles per hour.





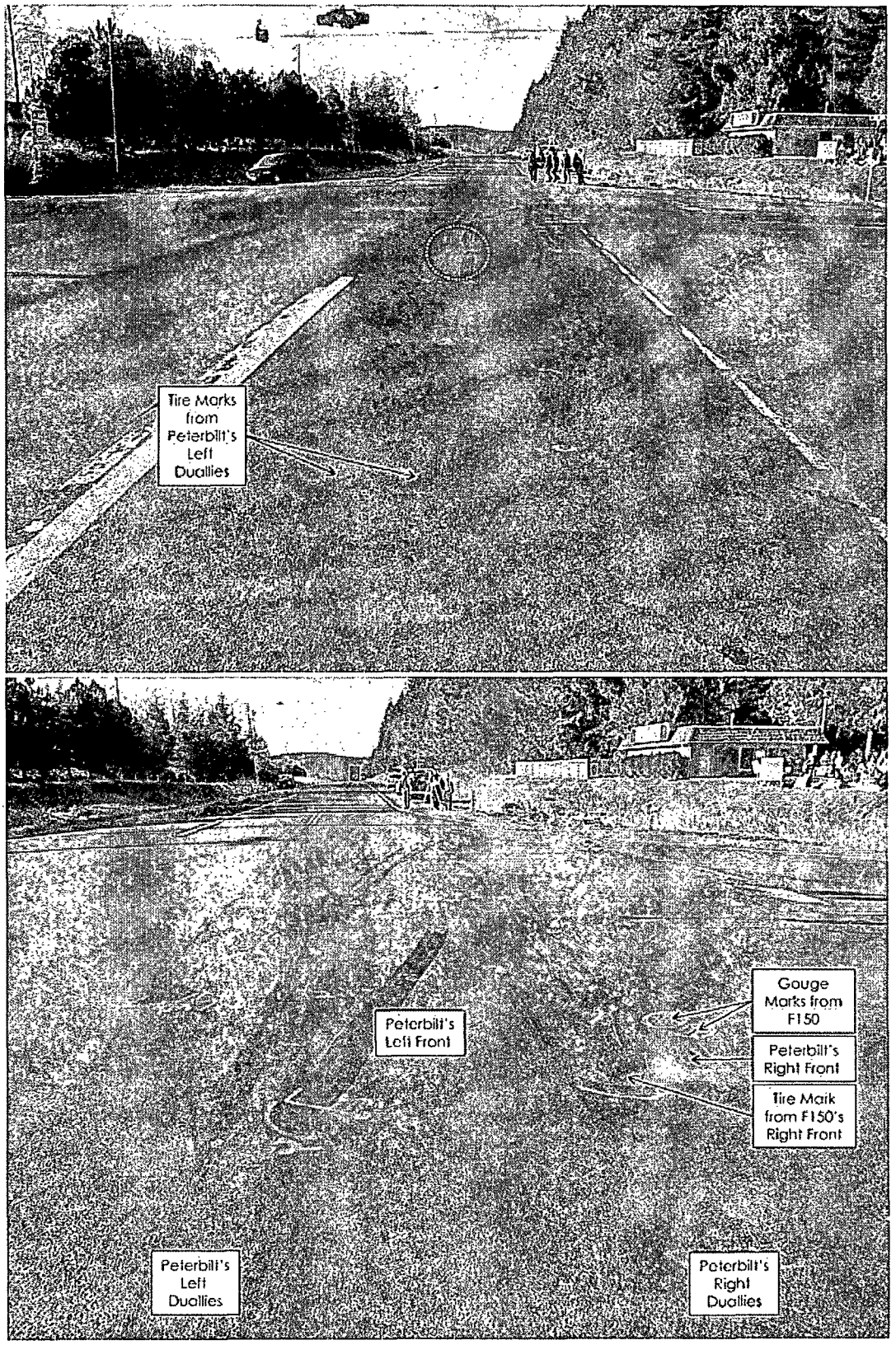
[21] The following technical paper validates the use of a VBOX system for this type of testing: White, Kirsten, "Rollout Deceleration of Modern Passenger Vehicles," Society of Automotive Engineers, Paper Number 2012-01-0616.

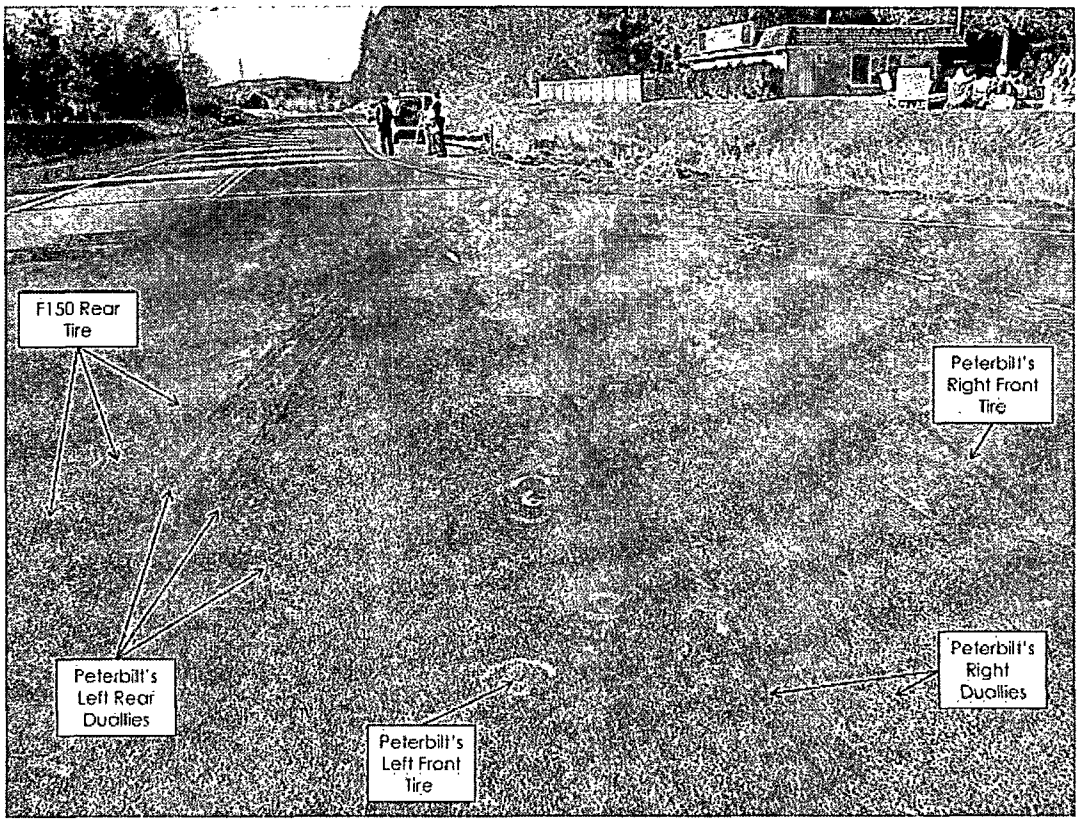
Peterbilt Logging Tractor – The 1997 Peterbilt 379 that Mr. Steen was driving when this accident occurred was a 6x4 day-cab tractor equipped with a logging package, a lift axle, a Caterpillar engine, and anti-lock brakes. At the time of the accident, Mr. Steen was traveling alone and he had an empty logging trailer secured to his bunk assembly/fifth wheel. We estimated that, at the time of this accident, the Peterbilt weighed approximately 26,600 pounds. The first and second photographs below show the moderate front end damage exhibited by the Peterbilt as a result of impacting the passenger's side of the Ford F150. The third and fourth photographs below show the logging trailer that the Peterbilt was piggybacking when this accident occurred.

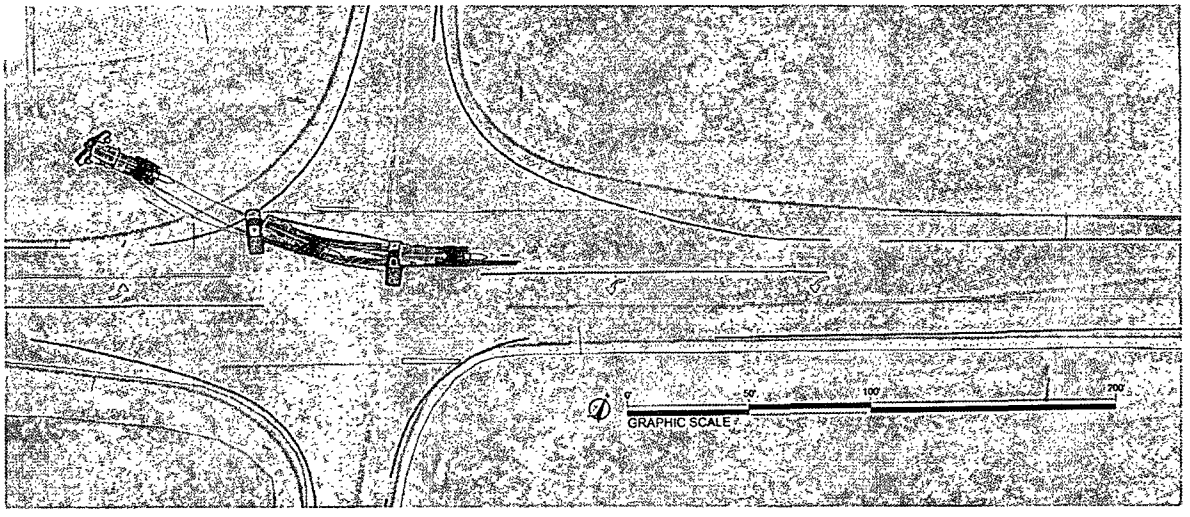


Accident Sequence

In analyzing the motion experienced by the Peterbilt and the Ford during this accident, we used our evidence diagram and the WSP photographs of the road evidence and vehicle damage to analyze how each piece of roadway evidence was deposited. On the WSP photographs included below, we added labels to the depicted evidence identifying what deposited each mark. In the first photograph, the white dotted circle identifies a quick change in direction of the Peterbilt's left duallies due to the impact and subsequent clockwise rotation of the Peterbilt. Based on our analysis, we concluded that when the front end of the Peterbilt impacted the passenger's side of the Ford, both vehicles were redirected towards the northwest corner of the intersection where they exited the roadway and came to rest in the dirt and vegetation in this corner of the intersection. This sequence is depicted in the diagram on Page 15.


Tire Marks from Peterbilt's Left Duallies
Peterbilt's Left Front
Gouge Marks from F150
Peterbilt's Right Front
Tire Mark from F150's Right Front
Peterbilt's Left Duallies
Peterbilt's Right Duallies





Speed and Time Space Analysis

We used principles of physics to analyze the speeds of the Peterbilt and the Ford before, during and after they made contact. To carry out our analysis of the post-impact speeds of these vehicles, we utilized the principle of conservation of energy. Once we had calculated the post-impact speeds of the vehicles, these speeds then became inputs into our analysis of the impact speeds. To carry out our impact speed analysis, we utilized the principle of conservation of momentum in a form that allowed us

to consider both translation and rotation of the vehicles. The following technical literature describes and validates the use of the principle of conservation of momentum for accident reconstruction:

- Brach, Raymond M., R. Matthew Brach, Vehicle Accident Analysis and Reconstruction Methods, Society of Automotive Engineers, 2005.

- Brach, Raymond M., Mechanical Impact Dynamics: Rigid Body Collisions, Revised Edition, 2007.

Our analysis with the principles of conservation of energy and conservation of momentum led us to conclude that, at impact, the Peterbilt was traveling approximately 58 mph and the Ford was traveling approximately 21 mph.

Once we calculated the impact speeds of the Peterbilt and the Ford, these speeds then became inputs into our analysis of the pre-impact speeds of the vehicles. To carry out our analysis of the motion of the vehicles leading up to impact, we used a simulation software package called PC-Crash, which utilizes physics-based equations to calculate the movement of the vehicles caused by driver steering, braking, and acceleration inputs or by impact forces. The software allows the analyst to specify vehicle and scene geometry, roadway surface conditions, impact parameters and driver steering and braking inputs to analyze the consistency of various scenarios with specific physical evidence. In conducting analysis with PC-Crash, we used inputs into the software that were physically realistic, reasonable and justified by the available technical literature of accident reconstruction and by our physical testing of an exemplar Ford F150. The following technical literature describes and validates the use of PC-Crash for accident reconstruction:

- Bailey, Mark N., "Data from Five Staged Car to Car Collisions and Comparison with Simulations," Society of Automotive Engineers Technical Paper Number 2000-01-0849.

- Cliff, William E., "Validation of PC-Crash – A Momentum-Based Accident Reconstruction Program," Society of Automotive Engineers Technical Paper Number 960885.

- Cliff, William E., "The Measured Rolling Resistance of Vehicles for Accident Reconstruction," Society of Automotive Engineers Technical Paper Number 980368.

- Cliff, William E., "Yaw Testing of an Instrumented Vehicle with and without Braking," Society of Automotive Engineers Technical Paper Number 2004-01-1187.

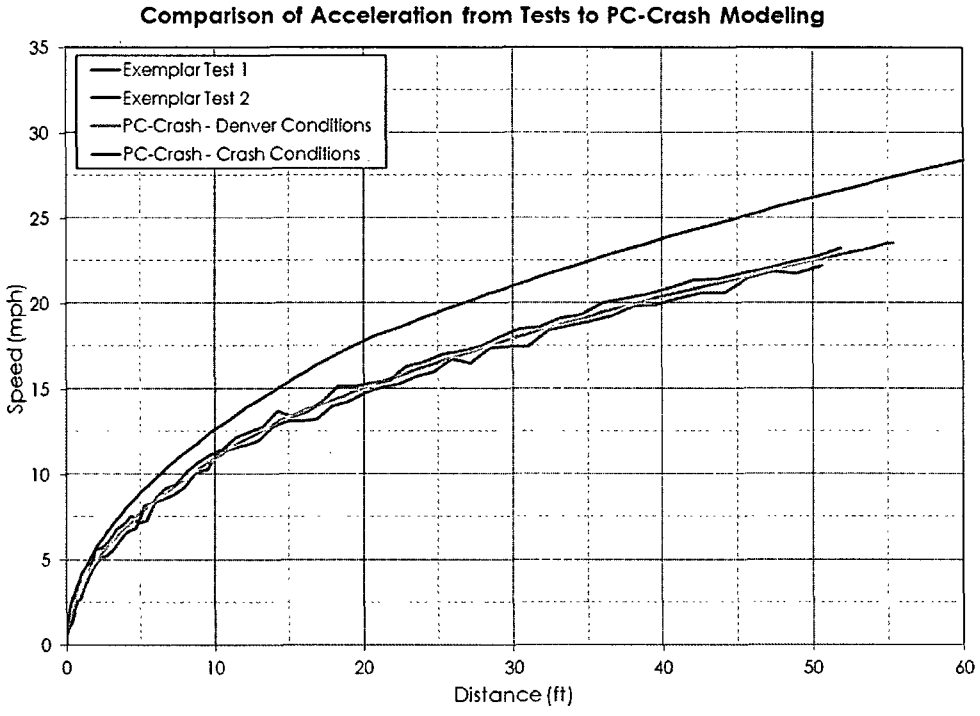
- Cliff, William E., Moser, Andreas, "Reconstruction of Twenty Staged Collisions with PC-Crash's Optimizer," Society of Automotive Engineers Technical Paper Number 2001-01-0507.

- MacInnis, Duane D., Cliff, William E., "A Comparison of Moment of Inertia Estimation Techniques for Vehicle Dynamics Simulation," Society of Automotive Engineers Technical Paper Number 970951.

- Steffan, Hermann, "The Collision and Trajectory Models of PC-Crash," Society of Automotive Engineers Technical Paper Number 960886.

The Peterbilt skidded for approximately 18 feet prior to impacting the Ford, indicating that Mr. Steen applied the brakes just before impact. Using typical deceleration rates for heavy trucks, we used PC-Crash to model this braking by Mr. Steen and concluded that the Peterbilt was traveling approximately 61 mph when it began skidding. To evaluate the actions of Mr. Lamotte in the moments leading up to impact, we modeled the acceleration capabilities of the Ford in PC-Crash and examined the degree to which Mr. Lamotte would have had to have been accelerating from the area of the stop sign to the area of impact. The graph below shows the match between our PC-

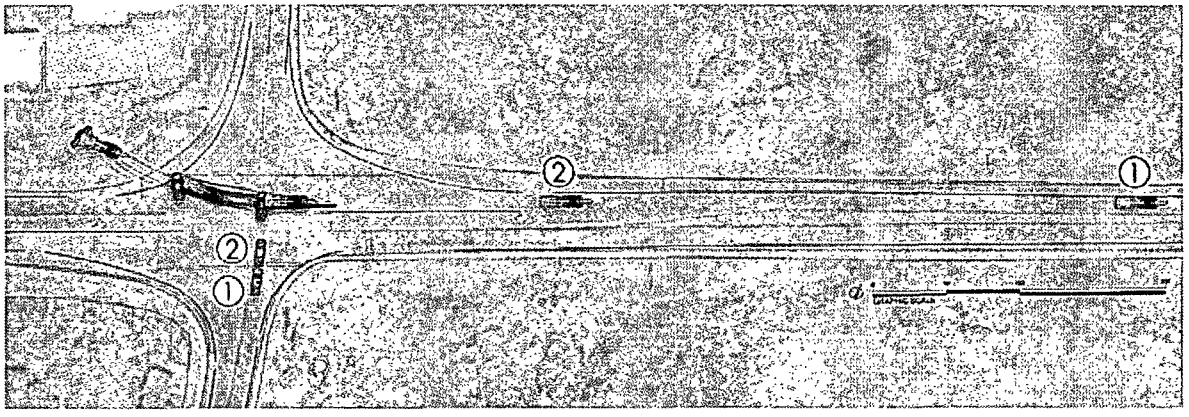
Crash acceleration modeling and the maximum acceleration capabilities of the Ford F150 from our testing. This graph is identical to the one included previously for the Ford with the exception that we have added two additional curves. The green curve represents our modeling of the Ford's acceleration capabilities under the atmospheric conditions present during the time of our testing in the Denver area (Greenwood Village, Colorado). This curve demonstrates that our modeling in PC-Crash achieved good agreement with our test data. Once we obtained this agreement, we then made an adjustment to the acceleration rate of the Ford in PC-Crash to account for differences in the atmospheric conditions present during our testing and those present at the time of the subject accident.[22,23] The purple curve represents the acceleration capabilities of the Ford given the atmospheric conditions that existed at the time of the subject accident.



In evaluating Mr. Lamotte's actions before impact, we considered five scenarios. The first scenario was that described by Mr. Steen during his deposition (Scenario 1). Mr. Steen testified that he had observed the Ford F150 stopped at the stop sign and then it "started rolling out. And then they stopped [just real faintly, real quick...for a quick few seconds]...in the eastbound lane...and then...they took off."[24] We modeled this scenario in PC-Crash, having Mr. Lamotte accelerate at a normal rate into the eastbound lane, stop for a brief period of time, and then accelerate rapidly up to the point of impact. As a part of this scenario, we considered the possibility that Mr. Lamotte stopped for only a brief instant in the eastbound lane and also the possibility that he stopped for a longer period of time in the eastbound lane (around 1½ seconds). Results from this first scenario are

[22] Rose, Nathan A., Neal Carter, David Pentecost, "Engine and Drivetrain Modeling in PC-Crash," currently under peer review for publication by the Society of Automotive Engineers in April 2014.
[23] "Engine Power Test Code – Spark Ignition and Compression Ignition – As Installed Net Power Rating," SAE International Surface Vehicle Standard J134 SEP 2011.
[24] Transcript of the Deposition of Vance Steen, August 16, 2013, 13:17-14:10; 14:21-25; 17:21-23; 32:15-16.

depicted in the graphic below. In this graphic, we have labeled the initial starting position of the Ford with the number 1, and then, the second starting position after his stop in the eastbound lane with the number 2. Corresponding positions for the Peterbilt are also depicted. These positions for the Peterbilt assume that Mr. Lamotte was stopped for around 1½ seconds in eastbound lane.



This scenario produced the following results:

- When the Ford began pulling away from the stop bar, the Peterbilt was approximately 580 feet from impact.

- Given that the Ford was traveling approximately 21 mph at the time of impact and assuming that Mr. Lamotte utilized the full acceleration capabilities of his vehicle, we found that Mr. Lamotte would have begun accelerating from a stop, with his front end protruding into the eastbound through lane of SR 12 by approximately 8 feet.

- When the Ford began accelerating again after stopping in the eastbound lane, the Peterbilt was approximately 185 feet from impact.

- It would take the Ford about 5½ seconds to travel from the stop bar to the point of impact.

- If he had accelerated continuously through the intersection without stopping in the eastbound lane, Mr. Lamotte could have driven completely through the intersection in 3 seconds without being impacted.

In our analysis of this scenario, we evaluated Mr. Steen's actions in terms of when he began braking in response to the Ford. Based on the timing of this scenario and the physical evidence, we determined Mr. Steen's likely perception-response time. We then compared this perception-response time with data in the technical literature and concluded that Mr. Steen's perception-response time to the Ford in this accident was typical for this situation.[25,26,27] Therefore, Mr. Steen could not have been expected to react any faster than he did and he could not have avoided impacting the Ford.

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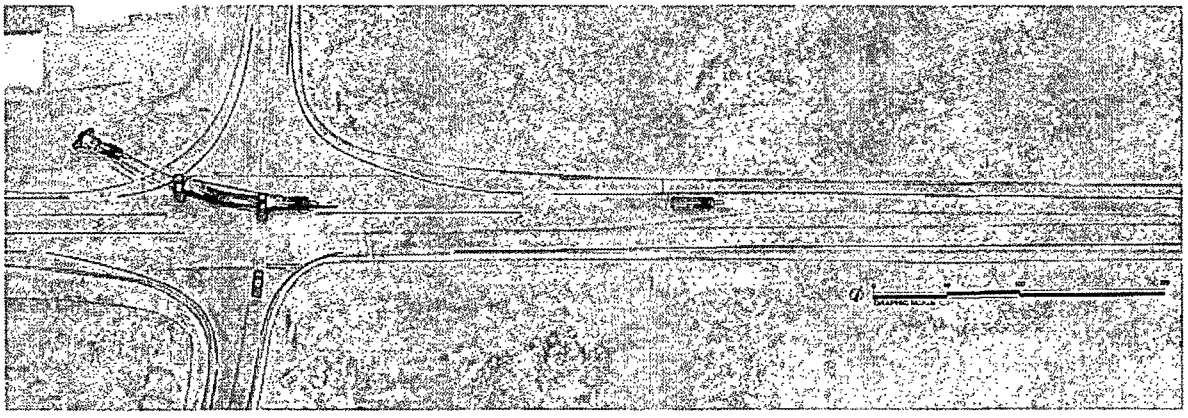
[25] Muttart, Jeffrey W., "Quantifying Driver Response Times Based Upon Research and Real Life Data," *Proceedings of the Third International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design*, 2005.

The second scenario that we analyzed in PC-Crash considered the possibility that Mr. Lamotte did accelerate continuously from the stop bar up to a speed of approximately 21 mph in the area of impact (Scenario 2). We found that, if this were the case, then Mr. Lamotte accelerated at only about 70 percent of his pickup's acceleration capabilities. Under this scenario, we found that Mr. Lamotte could have cleared the intersection without being impacted had he simply utilized his pickup's full acceleration capabilities. Scenario 2 is depicted in the graphic below. The pre-impact position for the Peterbilt shown in this graphic corresponds to the time that Mr. Lamotte would begin pulling away from the stop sign under this scenario. This position is approximately 275 feet from impact.



The third scenario we analyzed in PC-Crash considered the possibility that Mr. Lamotte accelerated continuously from the stop bar at full-throttle all the way to the area of impact (Scenario 3). Under this scenario, the Ford pickup would be traveling approximately 26 mph at impact. This impact speed is inconsistent with the physical evidence, and so, we concluded that Mr. Lamotte did not accelerate at full throttle from the stop bar. Under this scenario, the Peterbilt would be approximately 230 feet away from impact when the F150 left the stop bar.

When he entered the intersection, there were no obstructions that would have prevented Mr. Lamotte from seeing the approaching Peterbilt. So, the fourth scenario we analyzed was an avoidance scenario where Mr. Lamotte waited to enter the intersection until the Peterbilt had passed through the intersection (Scenario 4). To perform this analysis, we supplemented Scenario 1 in PC-Crash with the witness vehicles, placing them in accordance with the testimony, and found that Mr. Lamotte would likely have only needed to wait an additional 6 seconds for the Peterbilt to pass before proceeding into the intersection. Once he proceeded, he could have accelerated at a mild acceleration rate and still cleared the intersection about 5 seconds before Richard Ary's vehicle entered the intersection and about 16 seconds before Michael Olson's vehicle entered the intersection.

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[26] Muttart, Jeffrey W., "Estimating Driver Response Times," Chapter 14 in Handbook of Human Factors in Litigation, CRC Press, 2004.

[27] Muttart, Jeffrey W., "Development and Evaluation of Driver Response Time Predictors Based on Meta Analysis," Society of Automotive Engineers, Paper Number 2003-01-0885, 2003.

Review of the Analysis of Dr. Abdelouahab Abrous

In the course of our analysis, we reviewed the file materials of Dr. Abdelouahab Abrous. Based on his document titled "Summary of Calculations," Dr. Abrous concluded that the Peterbilt was initially traveling approximately 62 mph and that at impact it was traveling approximately 59 mph. These speeds are in agreement with our calculated speeds. However, Dr. Abrous goes on to state, "It is assumed that the Ford was stopped at the stop bar...followed by an attempt to cross the intersection at normal acceleration of 0.15 g." From this assumption, Dr. Abrous calculated that the Ford would be traveling 15.2 mph at impact and that it would take it 4.61 seconds to travel from the stop bar to impact. Dr. Abrous's scenario is the fifth scenario we analyzed. We concluded first, that his scenario is unreasonable because it assumes an acceleration rate (and therefore, impact speed) for the Ford rather than using the physical evidence to calculate the impact speed and acceleration rate of the Ford. The physical evidence from this case is sufficient to calculate the impact speed of the Ford using the principle of conservation of momentum. Second, the acceleration rate that Dr. Abrous used is only about a third the rate that Mr. Lamotte's Ford was capable of accelerating at. It is unlikely that a driver would accelerate at such a low rate while passing through an intersection with a log truck approaching. Such a low acceleration rate would seem to indicate the Mr. Lamotte was unaware of the presence of the Peterbilt prior to impact. Under Dr. Abrous's assumption, Mr. Lamotte could have easily avoided being impacted by simply accelerating at a slightly higher rate.

Summary of Conclusions

Our investigation and analysis of this accident to date has led us to the following conclusions:

1. At impact, the Peterbilt was traveling approximately 58 mph and the Ford 21 mph.

2. The Peterbilt began depositing skid marks when it was 18 feet from impact. These skid marks were deposited because Mr. Steen fully applied the brakes of the Peterbilt.

3. The Peterbilt was traveling approximately 61 mph when it began depositing skid marks on the road.

4. When he entered the intersection, there were no obstructions that would have prevented Mr. Lamotte from seeing the approaching Peterbilt.

5. Scenario 1 – Assuming he utilized the full acceleration capabilities of his Ford, Mr. Lamotte began accelerating from a stop, with his front end protruding into the eastbound through lane of SR 12 by approximately 8 feet. This is consistent with Mr. Steen's testimony that the Ford began accelerating at a normal rate from the area of the stop sign, then stopped within the eastbound lane, and then began accelerating again at a rapid rate up to impact. Under this scenario, it would take the Ford around 5½ seconds to travel from the stop bar to the point of impact. Under this scenario, Mr. Lamotte would have cleared the intersection without being impacted had he not stopped in the eastbound lane of SR 12, but had instead continued through the intersection with a moderate level of acceleration. Under this scenario, Mr. Steen could not have avoided impacting the Ford.

6. Scenario 2 – If Mr. Lamotte accelerated continuously from the stop bar, then he did not utilize the full acceleration capabilities of his pickup. Under this scenario, Mr. Lamotte would have cleared the intersection without being impacted had he utilized his pickup's full acceleration capabilities.

7. Scenario 3 – Mr. Lamotte did not accelerate at full throttle from the stop bar.

8. Scenario 4 – Mr. Lamotte could also have avoided this accident by waiting to enter the intersection until the Peterbilt had passed through the intersection. Given the testimony of the witnesses, Mr. Lamotte would likely have only needed to wait an additional 6 seconds.

9. Scenario 5 – According to Dr. Abrous, Mr. Lamotte accelerated continuously from the stop bar utilizing only about a third of his vehicle's acceleration capabilities. Under this scenario, Mr. Lamotte would have avoided this accident had he accelerated at a greater rate.

10. Mr. Lamotte caused this accident either by entering the intersection when it was unsafe to do so, or by failing to fully utilize the acceleration capabilities of his pickup as he traveled through the intersection.

Closing: The conclusions expressed in this report were reached to a reasonable degree of certainty based on our investigation and analysis to date. Further information, data, investigation or analysis may lead us to revise or supplement these conclusions. Kineticorp is in the process of producing animations of this accident that I intend to use should I be asked to testify in this case.

Sincerely,

Nathan A. Rose, M.S.
Director and Principal
Kineticorp, LLC