THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Transportation and Public Facilities

SOUTHCOAST REGION
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Preconstruction

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April 4, 2019

Juneau: Riverside Drive and Stephen Richards Congestion Mitigation
State Program No.: **SFHWY00081**
Federal Project No.: 0003207

Air Quality Conformity Determination for State Program No.: SFHWY00081, Riverside Drive and Stephen Richards Congestion Mitigation in Juneau, Alaska

Attachment A: Location and Intersection Overview
Attachment B: Scoping Letters
Attachment C: Juneau Air Quality Monitoring Data
Attachment D: Vehicle Emissions Estimates
Attachment E: Existing Four-way Stop Control Performance
Attachment F: Proposed Traffic Signal Performance

The Alaska Department of Transportation and Public Facilities (DOT&PF) has assumed the responsibilities of the Federal Highway Administration (FHWA) under 23 U.S.C. 327, and proposes a project to reduce traffic congestion at the intersection of Riverside Drive and Stephen Richards Drive in the Mendenhall Valley of Juneau. The proposed project is located in Section 19 of Township 40S, Range 66E, USGS Quadrangle Juneau B-2, Copper River Meridian (Attachment A).

According to the Memorandum of Understanding between FHWA and DOT&PF, the latter assumes all of the US DOT Secretary's responsibilities under NEPA for environmental review, reevaluation, consultation or other actions pertaining to the review or approval of highway projects including the Clean Air Act, **with the exception of project level conformity determinations.**

Based on the supporting information provided below, the proposed project is not anticipated to contribute to any new localized PM_{10} violations or delay other milestones in the PM_{10} maintenance area of the Mendenhall Valley in

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by DOT&PF pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated November 3, 2017 and executed by FHWA and DOT&PF.

Juneau, Alaska. Pursuant to 40 CFR 93.116(b)(3), DOT&PF consulted with the Environmental Protection Agency (EPA), FHWA, Federal Transit Administration, and the Alaska Department of Environmental Conservation Air Quality Division (DEC AQ) to determine that the provisions in 40 CFR 93.116(a) have been met and do not require further hot-spot analysis for the proposed project.

Purpose & Need

Traffic congestion at the existing four-way stop controlled intersection creates excessive delays and idling vehicles that produce emissions in the Mendenhall Valley, an air quality maintenance area for PM_{10}. The purpose of the project is to improve traffic flow through intersection and reduce congestion which occurs during morning and evening commuting periods.

Project Description

The intersection currently operates under a four-way stop control. Riverside Drive is classified as a minor arterial and is one of two north-south routes into the Mendenhall Valley. Riverside Drive provides access into a predominantly residential area via local roads and major / minor collectors including Stephen Richards Drive. Directional traffic flow occurs during AM and PM peak commuting hours. As a result, Southbound (AM) and northbound (PM) traffic on Riverside Drive experience directional delays and failing level of service (LOS) in conjunction with AM and PM peak directional traffic flows.

DOT&PF developed and evaluated multiple traffic control options to reduce congestion at the intersection and limit resultant traffic delays and emissions. Control options ranged from restoring the two-way stop control, roundabout variations, and a traffic signal. Intersection concepts were evaluated, and the preferred alternative was selected based on data pertaining to traffic flow, safety, right-of-way impacts, maintenance costs, and public comment. The four-way traffic signal was determined to best fulfill the project purpose and need. Construction work to install the traffic control option would include:

- Installing traffic and pedestrian signal poles and bases, which may include:
  - Trenching for new ridged metal conduit
  - Installing junction boxes, new load center, and traffic control cabinet
  - Reconfiguring intersection lamination
- Relocating utilities within the intersection
- Reconstructing curbs to comply with the Americans with Disabilities Act (ADA)
- Milling and repaving the surface of the intersection
- Repainting centerlines and crosswalks
- Installing and/or replacing signage

Scoping and Public Involvement

Agency scoping and public involvement was conducted simultaneously in two phases – the first introducing the project and presenting the wide range of potential traffic control options and the second announcing the selected alternative and detailing the selection process (Attachment B). Agencies were notified via email on June 26, 2018 to request comments pertaining to potentially impacted resources within their jurisdiction including Fish Streams, Waters of the US, Wildlife, Cultural Resources, Air Quality, and Construction Impacts. Similarly, the second

request for comments specific to the proposed traffic signal was sent to agencies via email on January 18, 2019. Concurrent with agency scoping, public open houses were hosted on July 11, 2018 and February 7, 2019 to garner public feedback first, on range of alternatives, and second, on the traffic signal.

Consultation

The proposed project would install a traffic signal in a maintenance area. For this reason, it is not exempt from air quality conformity pursuant to 40 CFR 93.126 (Table of Exempt Projects). On March 11, 2019, Southcoast Region DOT&PF contacted DEC AQ to confirm that the project was not exempt from air quality analysis and request guidance for project-level analysis. **DEC AQ responded as follows on March 20, 2019:**

> "The proposed traffic signal installation at the intersection of Riverside Drive and Stephen Richards might not be exempt from project-level conformity because it is a traffic control concept with signalization. And since the proposed project is within the boundaries of Mendenhall Maintenance area for PM_{10}, under 40 CFR 93.116(a), the proposed project must demonstrate it does not contribute to any new localized PM_{10} violations, or delay other milestones in the PM_{10} maintenance area. To satisfy these requirements, the provisions in 40 CFR 93.123(b)(2) require a qualitative hot-spot analysis if the quantitative analysis methods are not available. However, in accordance with 40 CFR 93.123(b)(3), DOT&PF in consultation with EPA may choose to make a categorical hot-spot finding that the provisions in 40 CFR 93.116(a) have been met without further hot-spot analysis based on appropriate modeling or supporting information. (emphasis added)
>
> Therefore, in accordance with the provisions in 18 AAC 50.715(a)(2) and 40 CFR 93.105(c), the Air Quality Division (AQ) of Alaska Department of Environmental Conservation (ADEC) recommends an interagency consultation to discuss the project. It may be possible that after discussions the PM_{10} hot-spot analysis is not required for the proposed project. The interagency consultation should include the air quality staff of ADEC, Environmental Protection Agency (EPA), and State and federal DOTs (ADOT/PF and the Federal Highway Administration (FHWA)/Federal Transit Administration (FTA) within the Department of Transportation (DOT))."

Accordingly, DOT&PF prepared a preliminary conformity determination and requested interagency consultation with EPA, FHWA, FTA, and DEC AQ. An interagency teleconference was held on April 4, 2019 during which time EPA, FHWA,and FTA concurred a hot-spot analysis was not necessary for the proposed traffic signal project at Riverside Drive and Stephen Richards Drive in the Mendenhall Valley maintenance area.

Mendenhall Valley Maintenance Area

The DEC AQ website for Affected Communities[1] states that,

> "EPA designated the Mendenhall Valley area of Juneau, Alaska as a moderate nonattainment area for the National Ambient Air Quality Standard (NAAQS) for particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM_{10}) in 1991 based on violations of the 24-hour PM_{10} standard that occurred throughout the 1980s. The EPA fully approved Alaska's moderate PM_{10} nonattainment area plan as a State Implementation Plan (SIP) revision for the Mendenhall Valley PM_{10} nonattainment area in 1994

[1] https://dec.alaska.gov/air/anpms/communities/pm10-juneau/

(Federal Register: March 24, 1994). There have been no measured violations of the PM_{10} standard since 1994. EPA has approved a Limited Maintenance Plan (LMP) for the Mendenhall Valley area of Juneau that provides contingency plans if Juneau experiences a PM_{10} problem in the future. Juneau is designated as in attainment for PM_{10}." *(*Emphasis added)

"Juneau's Mendenhall Valley Proposed PM_{10} Limited Maintenance Plan" (Adopted February 20, 2009) defines the Requirements of the Limited Maintenance Plan (LMP) as follows:

"This PM_{10} LMP for the Mendenhall Valley nonattainment area demonstrates how the LMP requirements have been met. These requirements are set out in the August 9, 2001 EPA issued guidance on streamlined maintenance plan provisions for certain PM_{10} nonattainment areas seeking redesignation to attainment [entitled "Limited Maintenance Plan Option for Moderate PM_{10} Nonattainment Areas" (Wegman 2001)]. The guidance provides a statistical demonstration that areas meeting certain criteria will have a high degree of probability of maintaining the standard 10 years into the future, thus demonstrating maintenance of the standard as required for redesignation. To qualify for the LMP option:

- The area should have attained the PM_{10} National Ambient Air Quality Standards (NAAQS);
- The average 24-hour PM_{10} design value for the area, based on the most recent 5 years of air quality data at all monitors in the area, should be at or below 98 ug/m^3 with no violations at any monitor in the nonattainment area; and
- The area should expect only limited growth in on-road motor vehicle PM_{10} emissions (including fugitive dust) and should have passed a motor vehicle regional emissions analysis test;"

Conformity Determination

1. **PM_{10} NAAQS:** As noted above, there have been no measured violations of the PM_{10} standard in Juneau since 1994. Air Quality Monitoring Data for PM_{10} in Juneau[2] indicates that PM_{10} levels in the Mendenhall Valley have remained well below the 24-Hr Maximum for PM_{10} concentrations from 2000 to 2017 (Attachment C).

2. **Reduced Vehicle Emissions:** Based on the data for most recent 5 years (2012 to 2017), the average 24-hour PM_{10} design value for the Mendenhall Valley has remained below 40 ug/m^3 – significantly below the standard outlined in the LMP. The Traffic Analysis Report (October 2018) completed for the Riverside Drive and Stephen Richards Congestion Mitigation Project concluded that the proposed traffic signal would reduce vehicle emissions in comparison to the existing four-way stop (Attachment D).

3. **LOS:** The majority of traffic flow through the intersection is north-south direction on Riverside Drive. Under the existing four-way stop control, the Lane LOS for southbound (AM peak) and northbound (PM peak) movements operates at a LOS F during peak commuting hours. Under the proposed traffic signal alternative, the intersection would operate at an overall LOS B with Lane LOS between A and B for southbound and northbound movements during peak commuting hours (Attachment E: Pages 23-24, 29; Attachment F: Page 64).

[2] https://dec.alaska.gov/air/air-monitoring/community-data/juneau-pm10-data/

4. **Increased Average Annual Daily Traffic:** The traffic analysis set the design year for 2040 (20 years following estimated construction completion) and a forecasted intersection performance based on an annual growth rate of 0.25 percent. Population statistics and development patterns do not predict exceptional growth. The proposed project would not create additional lanes or increased capacity for extraordinarily increased traffic volumes (Attachment E).

5. **Diesel / Heavy Vehicle:** As previously noted, Riverside Drive is a minor arterial providing connection into a predominantly residential area with limited heavy truck / diesel truck traffic. Heavy vehicle percentages included in the traffic analysis were observed to be approximately 4 percent or less during peak periods. As the intersection is not being expanded and traffic volumes are to increase at 0.25 percent, heavy vehicle / diesel truck traffic is not anticipated to increase as a result of the project (Attachment E: Page 23, 28).

Based on this data, the proposed traffic signal at the intersection of Riverside Drive and Stephen Richards Drive in the Mendenhall Valley is not anticipated to contribute to any new localized PM_{10} violations. For this reason and because the Mendenhall Valley has remained in attainment for PM_{10} NAAQS since 1994, the project would not delay milestones in the PM_{10} maintenance area. Pursuant to 40 CFR 93.116(b)(3), DOT&PF has consulted with EPA to determine a categorical hot-spot finding that the provisions in 40 CFR 93.116(a) has been met and the project does not require further hot-spot analysis.

Megan Daniels, Environmental Impact Analyst
DOT&PF Southcoast Region

Distribution via email:

Leigh Oesterling, FHWA Resource Center
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Adeyemi Alimi, DEC Air Quality Division
John Barnett, DOT&PF, Southcoast Region

Attachment A:

Location and Intersection Overview

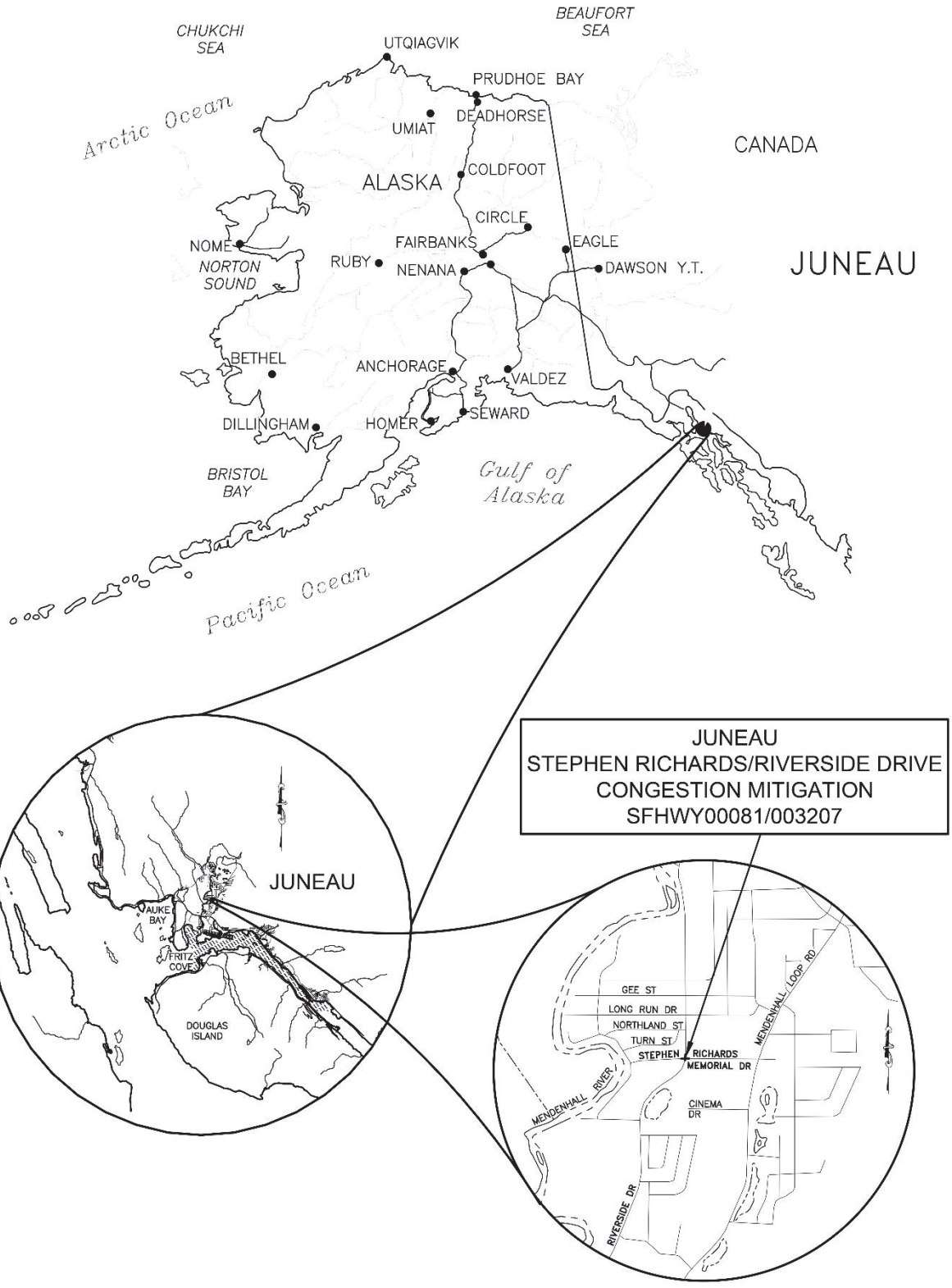

Figure 1: Project Vicinity Map

2 Existing Infrastructure

2.1 Intersection Characteristics

The study intersection is four-leg unsignalized with all-way stop control, as shown in Figure 2 and Figure 3. In 2008, the intersection was modified from two-way stop control to the current all-way stop control configuration.

All legs of the intersection have two 12-foot lanes, one in each direction. The speed limit on Riverside Drive is 35 mph. West of Riverside Drive, Stephen Richards Memorial Drive has a speed limit of 20 mph. East of Riverside Drive, Stephen Richards Memorial Drive has a speed limit of 30 mph.

Section Highlights

- The study intersection is under all-way stop control.
- Non-motorized traffic is accommodated by 6-foot bike lanes, attached sidewalks, and marked crosswalks.
- Transit buses travel to and make northbound right turns at the intersection hourly on weekdays. One bus a day travels south through the intersection and one bus a day travels north through the intersection.

Figure 2: Looking North at the Study Intersection

Figure 3. Existing Configuration

Attachment B:

Scoping Letters

JNU Riverside and Stephen Richards Drive Congestion Mitigation, SFHWY00081, Agency Scoping

Daniels, Megan E (DOT)

Tue 6/26/2018 9:39 AM

Sent Items

To: Lacroix.matthew@Epamail.epa.gov <Lacroix.matthew@Epamail.epa.gov>; linda.speerstra@usace.army.mil <linda.speerstra@usace.army.mil>; douglass_cooper@fws.gov <douglass_cooper@fws.gov>; steve_brockmann@fws.gov <steve_brockmann@fws.gov>; steve_b_lewis@fws.gov <steve_b_lewis@fws.gov>; Timothy, Jackie L (DFG) <jackie.timothy@alaska.gov>; Ashton, William S (DEC) <william.ashton@alaska.gov>; Bittner, Judith E (DNR) <judy.bittner@alaska.gov>; Rorie.Watt@juneau.org <Rorie.Watt@juneau.org>; Jill.Maclean@juneau.org <Jill.Maclean@juneau.org>; Roger.Healy@juneau.org <Roger.Healy@juneau.org>; mark.miller@juneauschools.org <mark.miller@juneauschools.org>; doug.mecum@noaa.gov <doug.mecum@noaa.gov>;

Cc: Brown, James L (DOT) <james.brown@alaska.gov>; Goins, Christopher B (DOT) <christopher.goins@alaska.gov>; Barnett, John C (DOT) <john.barnett@alaska.gov>; Landau, Aurah (DOT) <aurah.landau@alaska.gov>; Dirks, Kristin L (DOT) <kristin.dirks@alaska.gov>;

1 attachments (2 MB)

SFHWY00081_ScopingLetter_JNU Riverside Richards.pdf;

Dear Agency Representative:

The Alaska Department of Transportation and Public Facilities (DOT&PF) has assumed the responsibilities of Federal Highway Administration under 23 U.S.C. 327, and is proposing a project to reduce traffic congestion at the intersection of Riverside Drive and Stephen Richards in the Mendenhall Valley. The project proposes to replace the existing four-way stop with an improved traffic control option.

The proposed project is located in Juneau, Alaska, Section 19 of Township 40S, Range 66E, USGS Quadrangle Juneau B-2, Copper River Meridian. Please review the attached scoping letter, maps, and proposed traffic control alternatives for the proposed project.

DOT&PF is hosting an **open house public meeting on Wednesday, July 11, 2017 at the Mendenhall Valley Public Library from 5:00PM – 7:00PM**. We request your comments about the proposed action, particularly in regard to resources under your jurisdiction. Your comments are important and would be included in the project's environmental document. We would appreciate your response by **July 27, 2018.**

Thank you for your consideration of this request for comment,

Megan Daniels
Environmental Impact Analyst
Alaska Department of Transportation and Public Facilities
Southcoast Region
megan.daniels@alaska.gov
907-465-2156

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by DOT&PF pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated November 3, 2017 and executed by FHWA and DOT&PF.

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Transportation and Public Facilities

SOUTHCOAST REGION
PRECONSTRUCTION
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June 26, 2018

Juneau: Riverside Drive and Stephen Richards Congestion Mitigation
State Program No.: **SFHWY00081**
Federal Project No.: 0003207

Re: Request for Comments

Dear Agency Representative:

The Alaska Department of Transportation and Public Facilities (DOT&PF) has assumed the responsibilities of the Federal Highway Administration (FHWA) under 23 U.S.C. 327, and proposes a project to reduce traffic congestion at the intersection of Riverside Drive and Stephen Richards Drive in the Mendenhall Valley.

The proposed project is located in Section 19 of Township 40S, Range 66E, USGS Quadrangle Juneau B-2, Copper River Meridian. Enclosed are vicinity, location and project area maps (Figure 1) and project overview map (Figure 2).

Purpose & Need

The purpose of the project is to reduce traffic congestion which occurs during morning and evening commuting periods at the intersection of Riverside Drive and Stephen Richards Memorial Drive. Traffic congestion at the four-way stop intersection creates excessive delays and idling vehicles produce emissions in an air quality maintenance area – the Mendenhall Valley. This proposed project would develop and evaluate intersection concepts to reduce congestion and limit resultant traffic delays and emissions.

Project Description

The project proposes to replace the existing four-way stop with an improved traffic control option. Design alternatives for the proposed project may include a roundabout or enhanced traffic signals;

although, other intersection layouts may develop through agency comments, stakeholder feedback, and public input. Project activities may also include:

- relocation of existing utilities,
- new signage and lighting,
- adjustments to ditches, culverts, or stormwater structures,
- pedestrian improvements,
- pavement reconstruction, and
- pavement markings.

Identified Resources

Fish Streams and Waters of the US. The project does not cross streams or involve an intertidal zone. However, adjustments to ditches, culverts, or stormwater structures may necessitate fill and would require authorization from the U.S. Army Corps of Engineers (USACE).

Wildlife. Eagle nests have not been documented within 660 feet of the project area. DOT&PF would consult with US Fish and Wildlife Service (USFWS) to determine if the project would warrant conducting an eagle nest survey and permitting.

Cultural Resources. An initial review of the Alaska Heritage Resource Survey (AHRS) database did not reveal previously surveyed or known archaeological, historic, or cultural resources in the vicinity of the project area. However, DOT&PF would consult with the State Historic Preservation Office pursuant to Section 106 of the National Historic Preservation Act.

Air Quality. The project area is located within a PM-10 air quality maintenance area. Although temporary impacts to air quality are anticipated due to construction, the overall project intends to reduce resultant emissions from idling vehicles delayed at the intersection.

Construction. Temporary traffic delays, noise, and reduction in air quality are anticipated during construction. DOT&PF would require the contractor to use Best Management Practices during construction as well as an approved Traffic Control Plan.

Public Meeting and Request for Comments

DOT&PF is hosting an **open house public meeting on Wednesday, July 11, 2017 at the Mendenhall Valley Public Library from 5:00PM – 7:00PM**. Project team members will be on hand to explain design concepts, answer questions, and listen to comments. We request your comments about the proposed action, particularly in regard to resources under your jurisdiction. Your comments are important and would be included in the project's environmental document.

We would appreciate your response by **July 27, 2018.**

Thank you for your consideration of this request for comments. If you need any further information, you may contact Megan Daniels, DOT&PF Environmental Impact Analyst at megan.daniels@alaska.gov or (907) 465-2156.

Sincerely,

Megan Daniels
Project Environmental Coordinator

Enclosures:

Figure 1: Project Vicinity, Location, and Area Maps
Figure 2: Project Overview
Figure 3: Traffic Control Design Alternatives

Distribution List via email:

Matt LaCroix, Alaska Region 10, EPA
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Cc:

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Agency Scoping, SFHWY00081, JNU Riverside and Stephen Richards Congestion Mitigation

Daniels, Megan E (DOT)

Fri 1/18/2019 2:55 PM

To: Matt Lacroix <lacroix.matthew@epamail.epa.gov>; Randal.P.Vigil@usace.army.mil <Randal.P.Vigil@usace.army.mil>; doug.mecum@noaa.gov <doug.mecum@noaa.gov>; douglass_cooper@fws.gov <douglass_cooper@fws.gov>; neil_stichert@fws.gov <neil_stichert@fws.gov>; Raptor Specialist Steve Lewis <steve_b_lewis@fws.gov>; Kanouse, Kate M (DFG) <kate.kanouse@alaska.gov>; Ashton, William S (DEC) <william.ashton@alaska.gov>; Edwards, Alice L S (DEC) <alice.edwards@alaska.gov>; Bittner, Judith E (DNR) <judy.bittner@alaska.gov>; Rorie.Watt@juneau.org <Rorie.Watt@juneau.org>; Jill.Maclean@juneau.org <Jill.Maclean@juneau.org>; Mike.Vigue@juneau.org <Mike.Vigue@juneau.org>; John.Bohan@juneau.org <John.Bohan@juneau.org>; Ed.Foster@juneau.org <Ed.Foster@juneau.org>; bridget.weiss@juneauschools.org <bridget.weiss@juneauschools.org>;

Cc: Brown, James L (DOT) <james.brown@alaska.gov>; Goins, Christopher B (DOT) <christopher.goins@alaska.gov>; Barnett, John C (DOT) <john.barnett@alaska.gov>; Landau, Aurah (DOT) <aurah.landau@alaska.gov>; Dirks, Kristin L (DOT) <kristin.dirks@alaska.gov>;

3 attachments (3 MB)

SFHWY00081_Scoping_signal concept_20190118.pdf; SFHWY00081_Scoping_Figure 1-2.pdf; SFHWY00081_Scoping_Figure 3 Pre-Env Planset.pdf;

Dear Agency Representative:

The Alaska Department of Transportation and Public Facilities (DOT&PF) has assumed the responsibilities of Federal Highway Administration under 23 U.S.C. 327, and is proposing a project to reduce traffic congestion at the intersection of Riverside Drive and Stephen Richards in the Mendenhall Valley. The project proposes to replace the existing four-way stop with a traffic signal in order to improve traffic flow and reduce emissions from idling vehicles. Construction work to install the traffic control option would include:

- Installing traffic and pedestrian signal poles and bases, which may include:
  - Trenching for new ridged metal conduit
  - Installing junction boxes, new load center, and traffic control cabinet
  - Reconfiguring intersection lamination
- Relocating utilities within the intersection
- Reconstructing curbs to comply with the Americans with Disabilities Act (ADA)
- Milling and repaving the surface of the intersection
- Repainting centerlines and crosswalks
- Installing and/or replacing signage

The proposed project is located in Juneau, Alaska, Section 19 of Township 40S, Range 66E, USGS Quadrangle Juneau B-2, Copper River Meridian.

Please review the attached scoping letter, maps, and preliminary plan set for the proposed project. DOT&PF is also hosting an **open house public meeting on Thursday, February 7, 2019 at the Mendenhall Valley Public Library from 4:30PM – 6:30PM**.

We request your comments about the proposed action, particularly in regard to resources under your jurisdiction. Your comments are important and would be included in the project's environmental document. We would appreciate your response by **February 19, 2019.**

Thank you for your consideration of this request for comment,

Megan Daniels
Environmental Impact Analyst
Alaska Department of Transportation and Public Facilities
Southcoast Region
megan.daniels@alaska.gov
907-465-2156

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by DOT&PF pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated November 3, 2017 and executed by FHWA and DOT&PF.

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

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January 18, 2019

Juneau: Riverside Drive and Stephen Richards Congestion Mitigation
State Program No.: **SFHWY00081**
Federal Project No.: 0003207

Re: Request for Comments

Dear Agency Representative:

The Alaska Department of Transportation and Public Facilities (DOT&PF) has assumed the responsibilities of the Federal Highway Administration (FHWA) under 23 U.S.C. 327, and proposes a project to reduce traffic congestion at the intersection of Riverside Drive and Stephen Richards Drive in the Mendenhall Valley.

The proposed project is located in Section 19 of Township 40S, Range 66E, USGS Quadrangle Juneau B-2, Copper River Meridian. Enclosed are vicinity, location (Figure 1) and project area maps (Figure 2).

Purpose & Need

The purpose of the project is to reduce traffic congestion which occurs during morning and evening commuting periods at the intersection of Riverside Drive and Stephen Richards Memorial Drive. Traffic congestion at the four-way stop intersection creates excessive delays and idling vehicles produce emissions in an air quality maintenance area – the Mendenhall Valley.

Project Description

DOT&PF has developed and evaluated intersection concepts to reduce congestion and limit resultant traffic delays and emissions. An initial request for comments on any of the potential traffic control options was sent in June 26, 2018. A public meeting was held to garner public feedback on the intersection and all of the potential traffic control options in July 2018.

Intersection concepts, ranging from stop signs to traffic signals to roundabouts, were evaluated, and a proposed traffic control concept has been identified. The selection process took into consideration input provided by agencies, stakeholders, and the public and was informed by data pertaining to traffic flow, safety, right-of-way impacts, and maintenance costs. In the consideration of these factors, DOT&PF proposes to install a four-way traffic signal at the intersection of Riverside Drive and Stephen Richards Drive as it was determined to best fulfill the project purpose and need. The traffic signal option provides the most comprehensive solution to address public feedback, safety, cost efficiency, and traffic flow.

Construction work to install the traffic control option would include:

- Installing traffic and pedestrian signal poles and bases, which may include:
  - Trenching for new ridged metal conduit
  - Installing junction boxes, new load center, and traffic control cabinet
  - Reconfiguring intersection lamination
- Relocating utilities within the intersection
- Reconstructing curbs to comply with the Americans with Disabilities Act (ADA)
- Milling and repaving the surface of the intersection
- Repainting centerlines and crosswalks
- Installing and/or replacing signage

Enclosed are preliminary plan sets for the work proposed at the intersection (Figure 3).

Identified Resources

Wildlife**:** The nearest surveyed eagle nest is located approximately one-half mile west of the project area.

Cultural Resources: Review of the Alaska Heritage Resource Survey (AHRS) database did not reveal previously surveyed or known archaeological, historic, or cultural resources in the vicinity of the project area. Preliminary research of the built environment did not reveal properties over 45 years of age in or adjacent to the Area of Potential Effect. Ground disturbance for the project is expected to be limited to previously disturbed areas of the highly developed intersection. Based on the nature of the work within this location, we do not anticipate encountering any historic resources in the project area. Consultation for this project would be conducted in accordance with the *First Amended Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, the Alaska State Historic Preservation Officer, and the Alaska Department of Transportation and Public Facilities regarding implementation of Section 106 of the National Historic Preservation Act for the Federal-Aid Highway Program in Alaska.* A Project Consultation Options Form is provided to Federally-Recognized Tribes.

Air Quality: The project area is located within a PM-10 air quality maintenance area. Although temporary impacts to air quality are anticipated due to construction, the overall project intends to reduce resultant emissions from idling vehicles delayed at the intersection.

Construction: Temporary traffic delays, noise, and reduction in air quality are anticipated during construction. DOT&PF would require the contractor to use Best Management Practices during construction as well as an approved Traffic Control Plan.

Public Meeting

DOT&PF is hosting an open house public meeting on Thursday, February 7, 2019 at the Mendenhall Valley Public Library from 4:30PM – 6:30PM to present data behind the proposal to install a traffic signal. Project team members will be on hand to explain the design concept and the evaluation process, answer questions, and listen to comments.

Request for Comments

We request your comments about the proposed action, particularly in regard to resources under your jurisdiction. DOT&PF must also determine to what extent this project would impact cultural or historic resources. If you have information that would assist in these determinations, please contact us. Your comments are important and would be considered in the environmental review and included in the final environmental document. Information on the design development and public involvement to date is available on the project website at http://alaska.gov/go/45E4

We would appreciate your response by February 19, 2019.

Thank you for your consideration. For questions or if you would like additional information, please contact Megan Daniels at megan.daniels@alaska.gov or (907) 465-2156.

Sincerely,

Megan Daniels
Project Environmental Coordinator

Enclosures:
- Figure 1: Project Vicinity and Location
- Figure 2: Project Area
- Figure 3: Preliminary Plan Set

Distribution List via mail:
- Clarence Laiti, Douglas Indian Association, President
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Steve Lewis, Raptor Specialist, USFWS
Kate Kanouse, Habitat Biologist, ADF&G
William Ashton, Division of Water, ADEC
Alice Edwards, Division of Air Quality, ADEC
Judith Bittner, State Historic Preservation Officer, ADNR
Rorie Watt, Manager, City and Borough of Juneau
Jill Maclean, Director, Community Development, City and Borough of Juneau
Mike Vigue, Director, Engineering and Public Works, City and Borough of Juneau
John Bohan, CIP Engineering Division, City and Borough of Juneau
Ed Foster, Streets and Fleet Maintenance, City and Borough of Juneau
Bridget Weiss, Superintendent, Juneau School District

Cc:

Jim Brown, P.E., DOT&PF, Southcoast Region Project Manager
Chris Goins, P.E., DOT&PF, Southcoast Design Group Chief
John Barnett, DOT&PF, Southcoast Region Environmental Manager
Aurah Landau, DOT&PF, Southcoast Region Public Information Officer
Kristin Dirks, DOT&PF, Southcoast Region Publication Specialist

Attachment C:

Juneau Air Quality Monitoring Data

Division of Air Quality
MONITORING AND QUALITY ASSURANCE

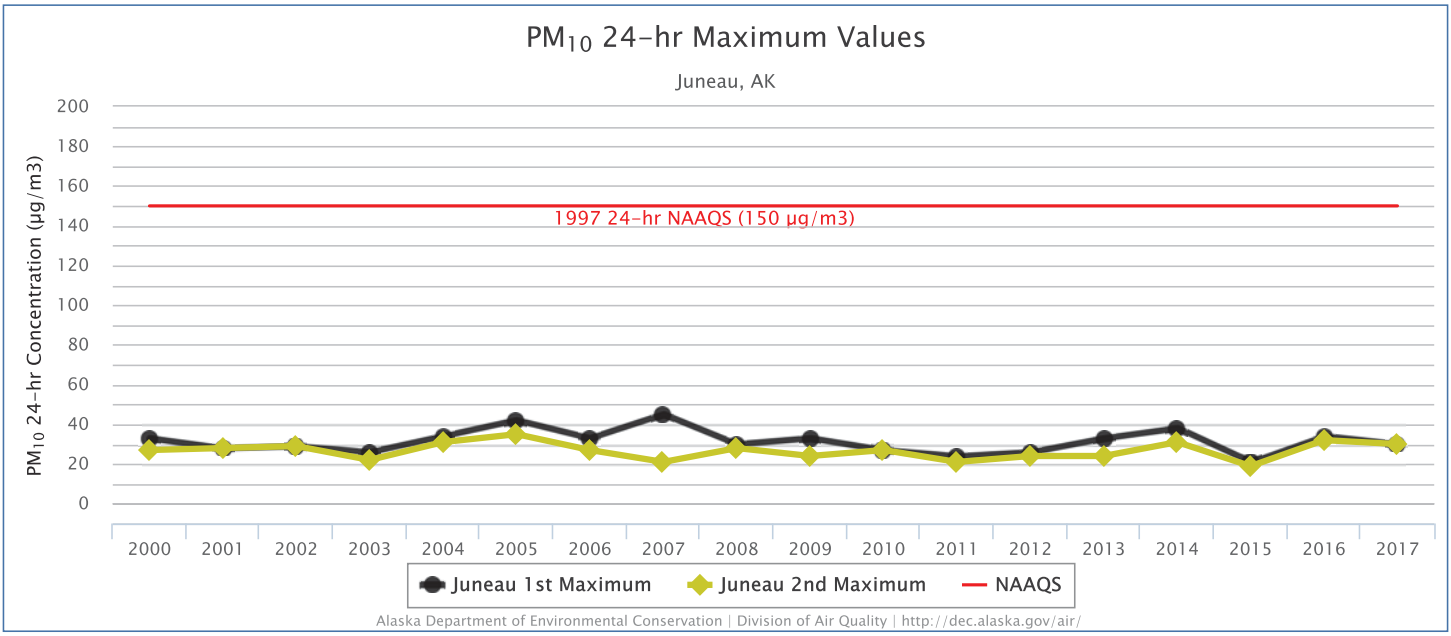
JUNEAU PM10 DATA

Juneau Air Quality Monitoring Data - PM_{10}

The Juneau Floyd Dryden site is located in the Juneau Mendenhall Valley PM10 maintenace area. The charts below show historical data from this monitor. The Alaska Air Monitoring Plan contains more information about this monitor.

- Realtime Air Quality Data

Note: The vertical axis of these charts extends to **200 µg/m^3**.



The following graphs show the 24-hour averaged PM_{10} concentrations measured at the Juneau Floyd Dryden site from 2017 through 2000.

Attachment D:

Vehicle Emissions Estimates

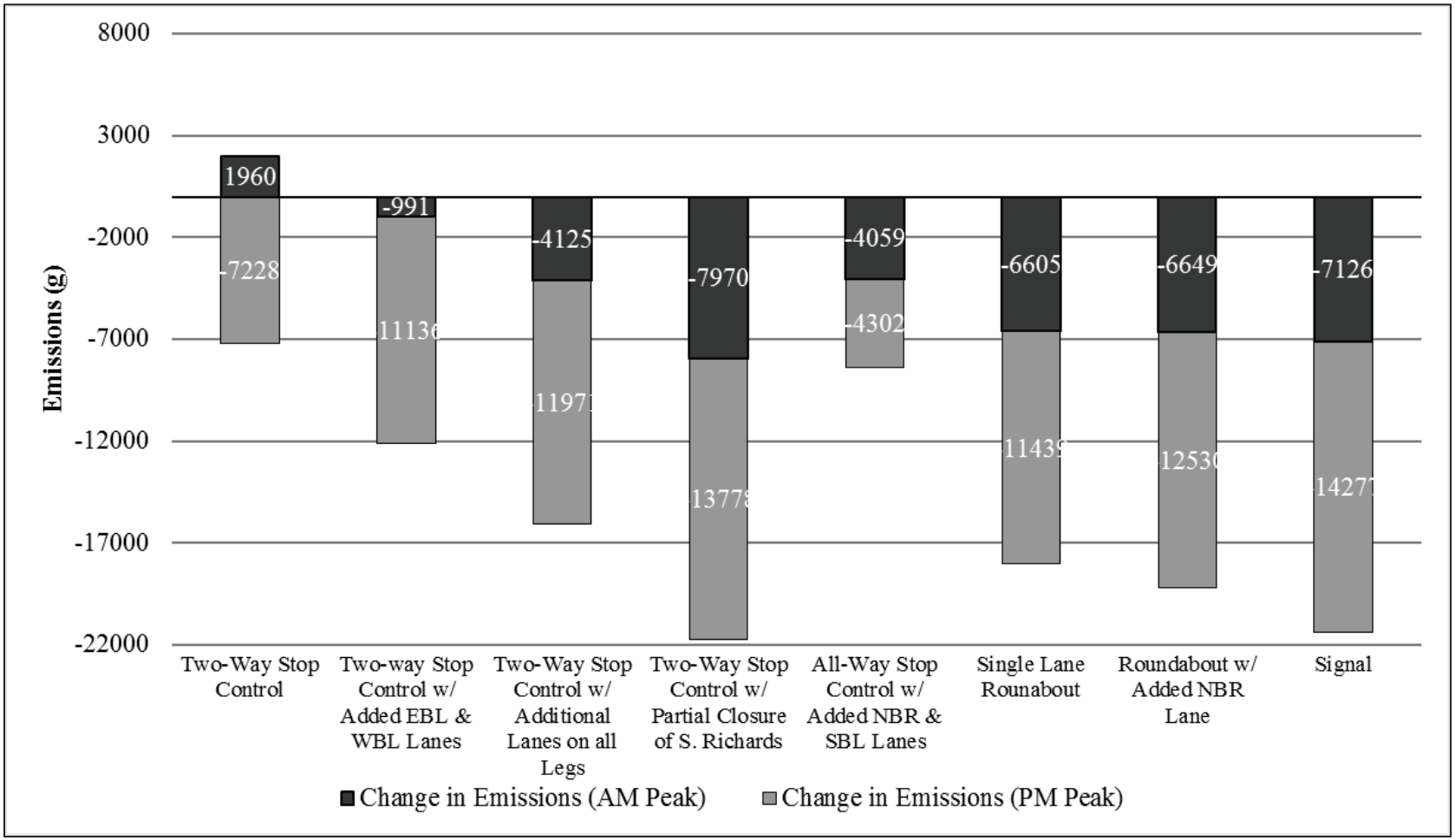


Figure 26: Emissions for each Alternative Compared Against No Build (All-Way Stop Control) in 2040

Attachment E:

Existing Four-way Stop Control Performance

5 Existing Operations

5.1 Vehicular Operations

5.1.1 Historical AADT

AADT volumes for segments in the study area were collected from the DOT&PF's *Southcoast Region 2013 Traffic and Safety Report* and online *Annual Average Daily Traffic (AADT) GIS Map*. Table 4 summarizes historical AADT for road segments leading to the study intersection.

Since 2016 volumes are the most recent available at the time of the analysis (2017 has since been added to the GIS Map) and are the highest observed volumes, these have been used for the "existing year" volumes. Historical AADT for the west leg of the intersection was not available, so AADT for this segment was estimated from AM peak traffic counts.

Figure 9 presents the existing volumes used to analyze existing operations.

Section Highlights

- 8,000 to 9,000 vehicles travel along Riverside Drive each day.
- Southbound movements during the AM Peak, and northbound movements during the PM Peak experience level of service F, with queues almost 800 feet in length.
- All other movements experience little delay.
- Counts from September 2014 show peak pedestrian volumes of 10 to 20 pedestrians crossing Riverside Drive in an hour.

Table 4: Historical AADTs.

Segment Name	Extents	2010	2011	2012	2013	2014	2015	2016
Riverside Drive	Dimond Park to Stephen Richards Drive	9,012	8,811	8,700	8,020	-	8,020	9,514
Riverside Drive	Stephen Richards Drive to Julep Street	7,960	7,783	7,690	7,040	-	7,040	8,404
Stephen Richards Drive	King Crab Lane to Riverside Drive	3,329	3,269	2,769	2,805	3,062	2,757	3,221

NOTE: AADTs are unavailable for Riverside Drive in 2014.

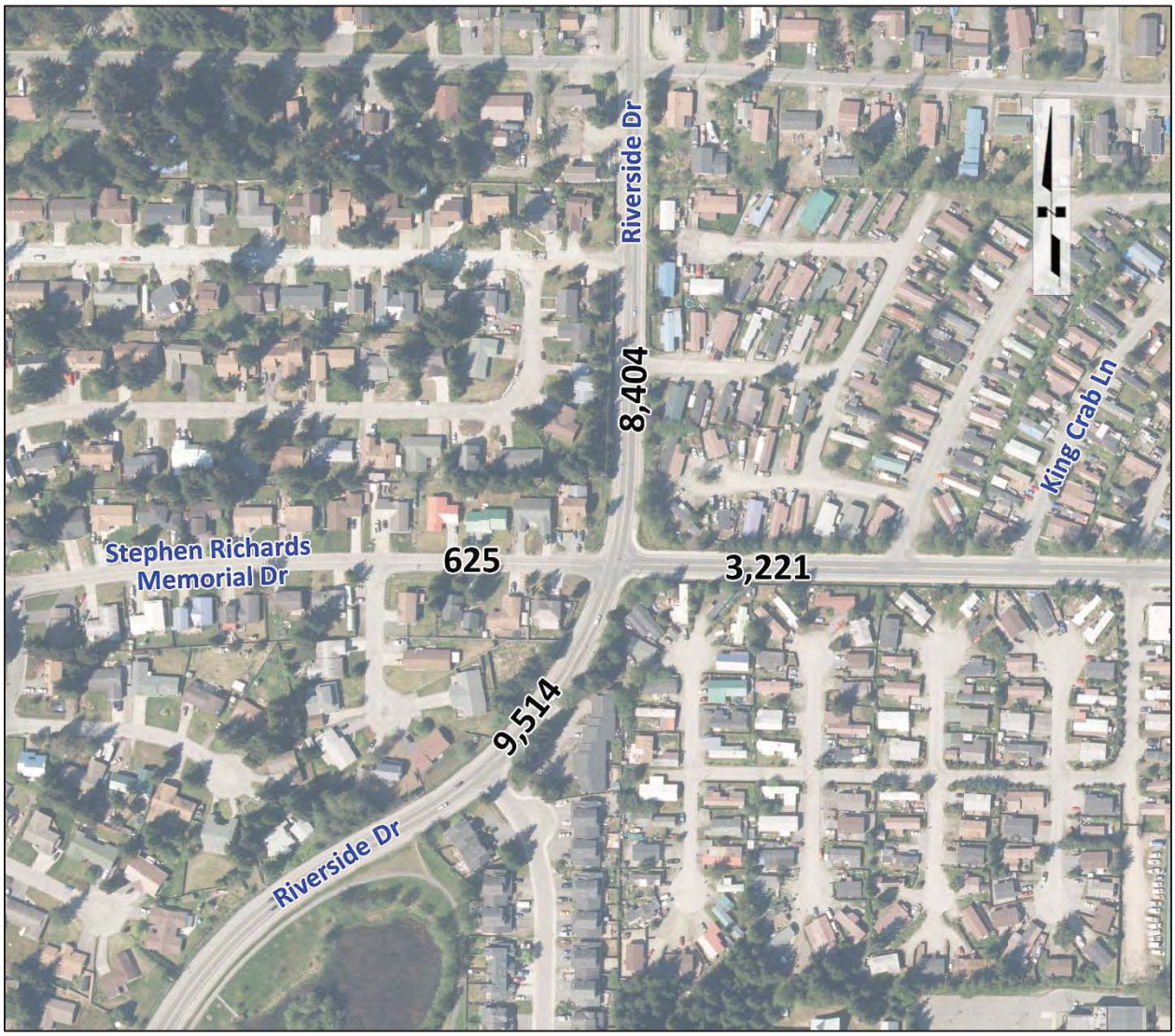


Figure 9: Existing AADT Volumes

5.1.2 Existing Turning Movement Volumes

Turning movement volumes (TMVs) for the study intersection were provided by the DOT&PF. Analysis of the TMVs identified 7:15 to 8:15 AM as the morning peak hour and 5:00 to 6:00 PM as the PM peak hour. Field observations indicate that long queues form at the study intersection in the southbound direction during the AM peak and in the northbound direction during the PM peak. When TMVs were modeled in Synchro and analyzed using *Highway Capacity Manual* (HCM) deterministic analysis, estimated queue lengths were shorter than observed queue lengths. The discrepancy between calculated and observed queue lengths indicate that the TMVs reflect the number of cars moving through the intersection during 15-minute periods rather than the number of cars accumulating at the end of the queue and waiting for a turn to enter the intersection (i.e., the TMVs reflect the throughput capacity of the intersection, not necessarily the demand to use the intersection).

To better simulate the flow of traffic through the study intersection, the Synchro model was adjusted to include the signalized intersections of Riverside Drive at Riverwood Drive and Riverside Drive at Vintage Boulevard/Mendenhall Mall Road. The northbound demand volume in the PM peak was estimated by comparing the northbound volume leaving the Riverwood Drive intersection with the northbound volume entering the Stephen Richards Memorial Drive intersection. The excess traffic leaving the Riverwood Drive intersection was added to the Stephen Richards Memorial Drive intersection.

In addition, the PM peak hour factor (PHF) at the Stephen Richards Memorial Drive intersection was adjusted. The PHF represents the uniformity of traffic volumes over an hourly period. The measured PHF at the Stephen Richards intersection was 0.95, higher than the PHF of 0.92 at the Riverwood intersection, indicating that traffic departs the Stephen Richards intersection at a more uniform rate than it does at Riverwood Drive. By using the Riverwood Drive PHF at the Stephen Richards intersection, demand values at the study intersection are better represented.

Upstream TMVs and PHFs were not available for the southbound approach during the AM peak period. Therefore, the AM peak period demand volume was estimated by increasing the southbound AM volume by the same percentage that the northbound PM volume was increased.

Figure 10 and Figure 11 depict the adjusted TMVs used for existing condition analysis of the study intersection for the AM and PM peak hours.

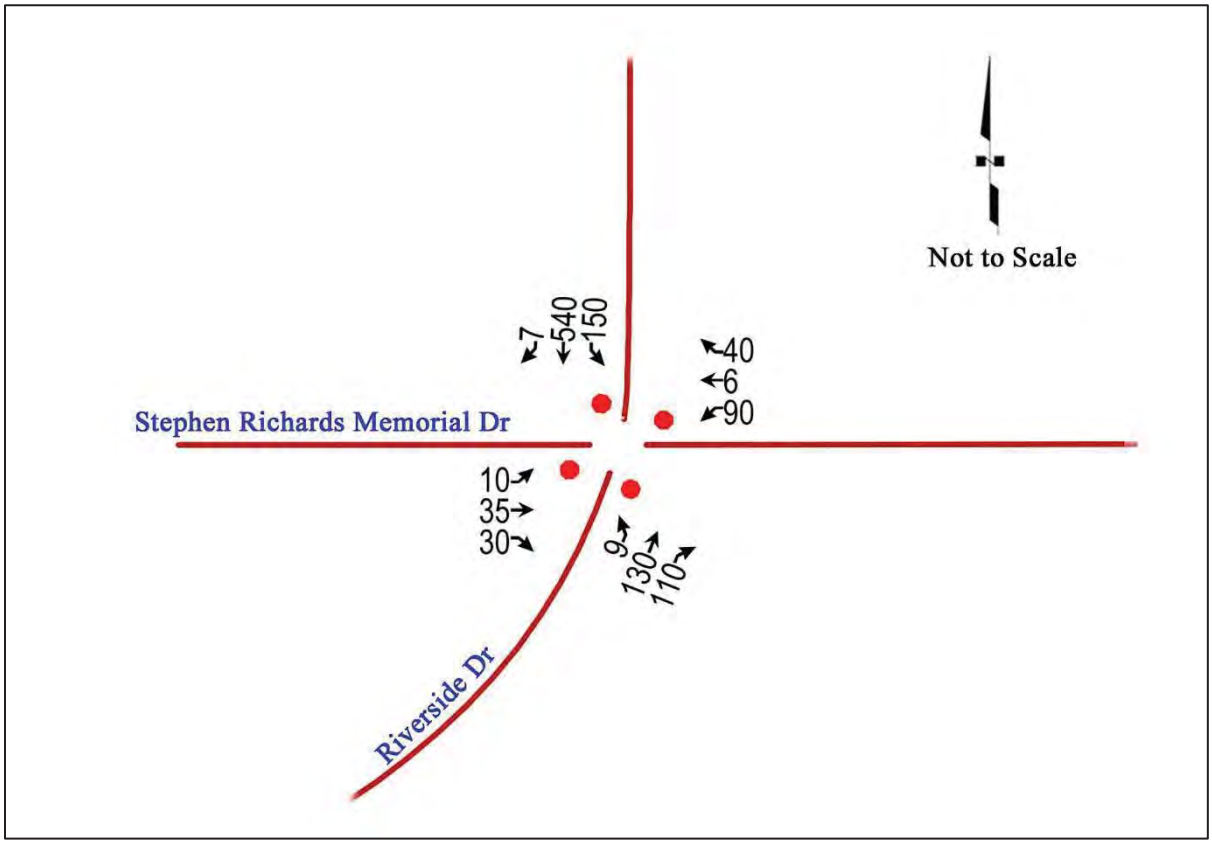


Figure 10: Existing TMVs, AM Peak

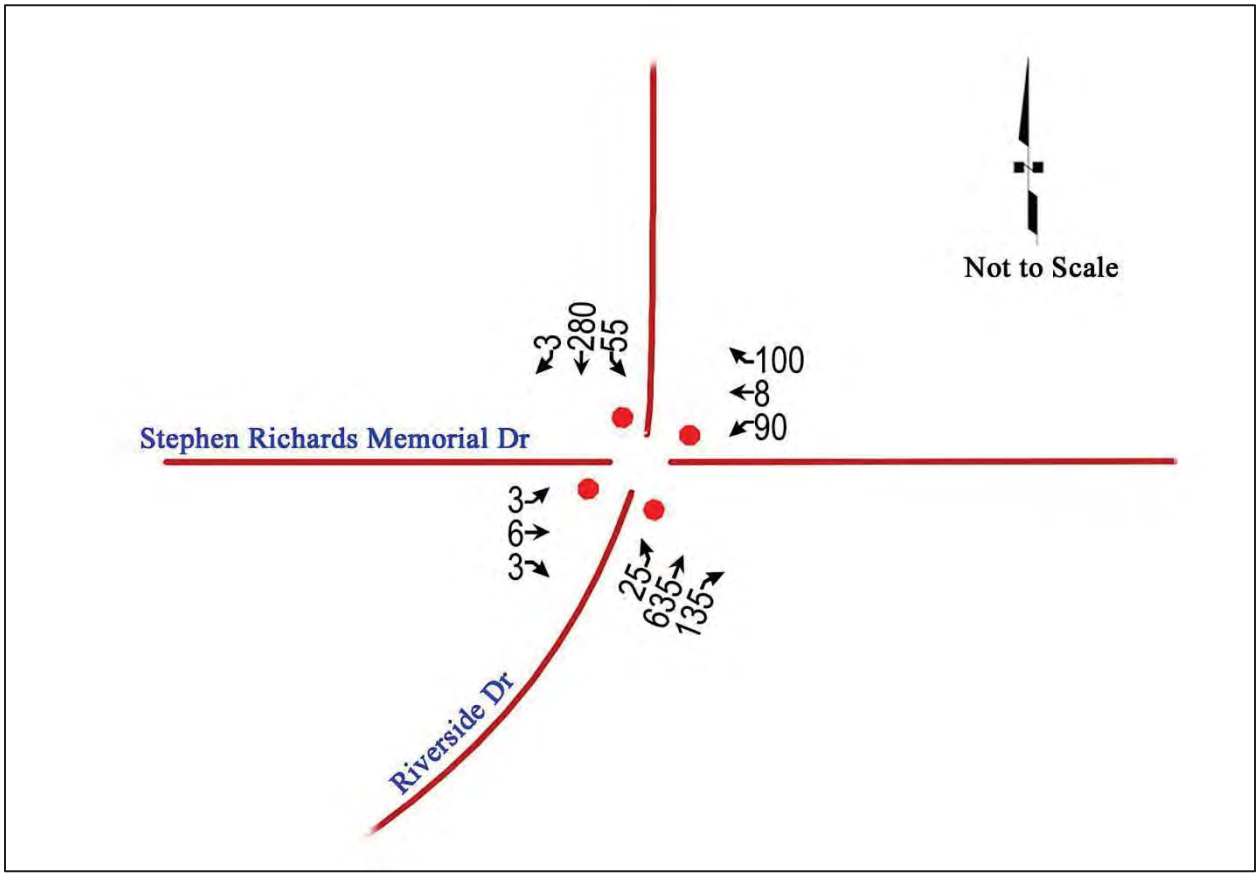


Figure 11: Existing TMVs, PM Peak

5.1.3 Peak Hour Factors

Peak hour factors (PHFs) convert hourly volumes to 15-minute design flow rates for capacity analyses. They represent the uniformity of traffic volumes over an hourly period and range from 0.25 (all traffic arrives in one 15-minute period and no additional traffic arrives for the rest of the hour) to 1.0 (equal number of vehicles arrive during each 15-minute period).

Table 5 shows the adjusted PHFs used for analysis of the AM and PM peaks at the study intersection.

Table 5: Existing Peak Hour Factors

Peak Period	Peak Hour Factor
AM Peak	0.83
PM Peak	0.92

5.1.4 Heavy Vehicle Percentages

Heavy vehicle percentages (HV%) are taken into account during analysis of intersection capacity. The turning movement data provided by the DOT&PF included information about the HV% on each leg of the study intersection during the AM and PM peak hours. The HV% used for analysis are shown in Table 6.

Table 6: Heavy Vehicle Percentages

Peak Period	Heavy Vehicle Percentages by Movement			
	Eastbound	Westbound	Northbound	Southbound
AM Peak	1%	4%	4%	1%
PM Peak	1%	1%	1%	1%

Note that the DOT&PF counts included 3 buses and 2 single unit trucks traveling eastbound in the morning peak and 1 articulated truck traveling eastbound in the evening peak. Because of the low eastbound volumes throughout the day, this small volume of heavy vehicle traffic is equivalent to a high heavy vehicle percentage (8%). After review of school bus routes for 2018, it was concluded that daily heavy vehicle percentages are likely much lower than what was counted in 2014. Thus, the eastbound heavy vehicle percentages are estimated at 1%.

5.1.5 Existing Intersection Capacity

Capacity analyses for the AM and PM peak hours were conducted using Synchro Trafficware, which relies on HCM methodologies. Table 7 and Table 8 summarize the existing intersection operations in the study area during the AM and PM peaks. The analysis indicates that the southbound movements during the AM peak and northbound movements during the PM peak experience significant delay and a failing level of service (LOS). Other movements exhibit an acceptable LOS.

Table 7: Existing Intersection Capacity at the AM Peak Hour

AM Peak	Approach				
	EB	WB	NB	SB	Intersection
V/C Ratio	0.2	0.3	0.5	1.2	-
Control Delay (sec)	11.8	13.3	14.0	139.6	**89.4**
Lane LOS	B	B	B	F	**F**
95th % Queue (feet)	25	50	75	775	-

Table 8: Existing Intersection Capacity at the PM Peak Hour

PM Peak	Approach				
	EB	WB	NB	SB	Intersection
V/C Ratio	0.0	0.4	1.2	0.6	-
Control Delay (sec)	10.9	13.8	139.2	16.6	**88.7**
Lane LOS	B	B	F	C	**F**
95th % Queue (feet)	25	50	800	100	-

5.2 Non-Motorized Operations

5.2.1 Pedestrian and Cyclist Counts

The turning movement counts provided by DOT&PF included pedestrian and cyclist counts. Figure 12 and Figure 13 depict peak pedestrian and cyclist movements at the study intersection.

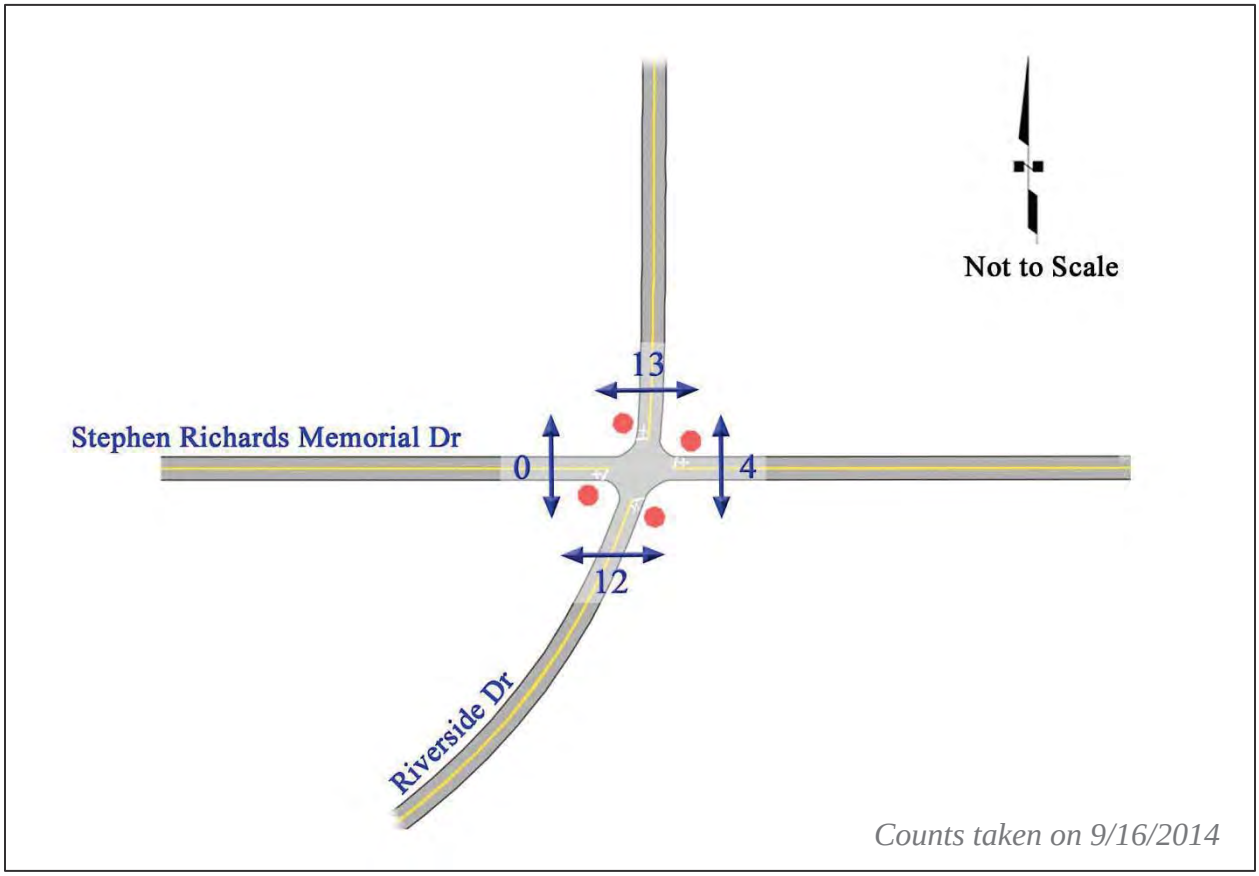


Figure 12: Peak AM Pedestrian and Cyclist Movements, (8:15 AM – 9:15 AM)

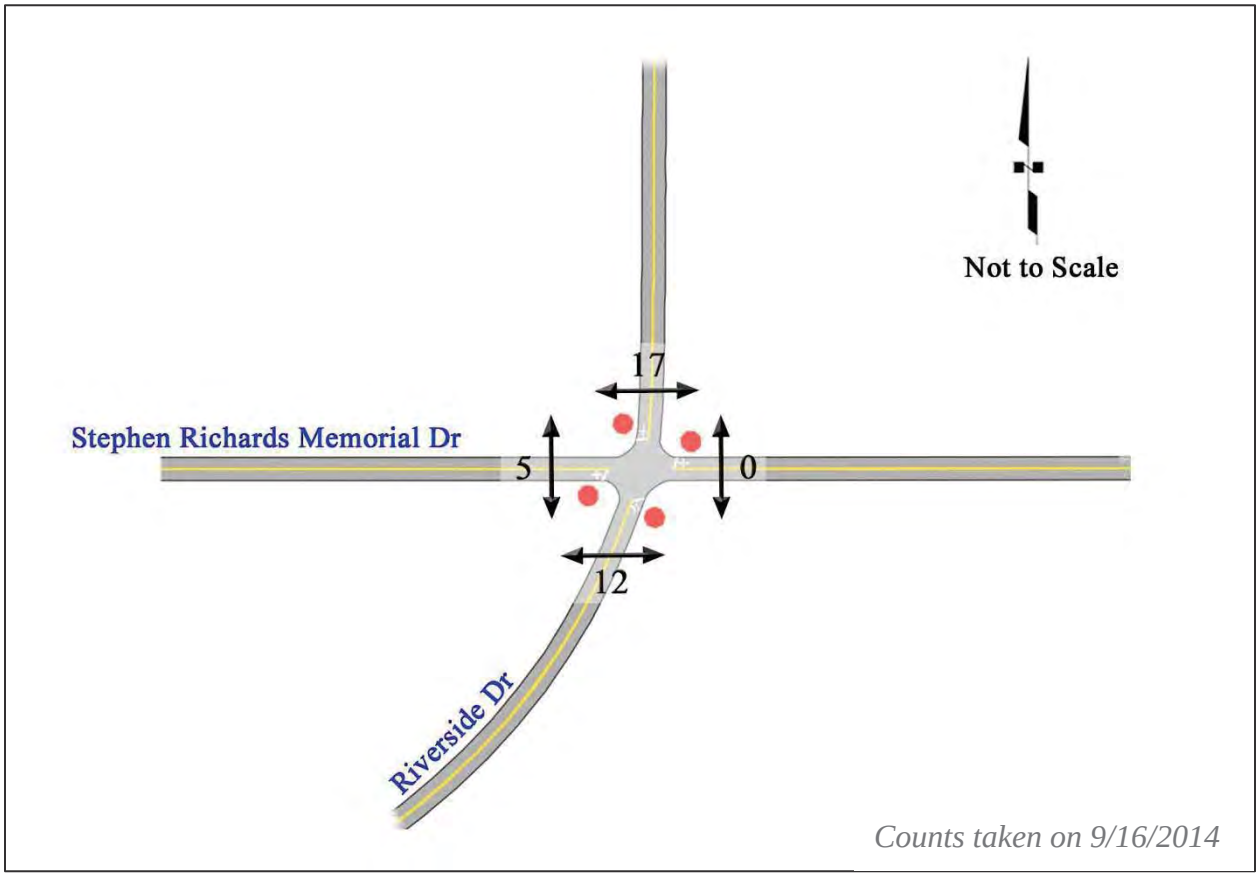


Figure 13: Peak PM Pedestrian and Cyclist Movements, (4:00 PM – 5:00 PM)

5.2.2 Pedestrian and Cyclist Crossing Analyses

Since the study intersection is all-way stop control, there is no pedestrian delay. Pedestrians wishing to cross will have the right-of-way.

6 Future Operations

Section Highlights

- TMVs for the year 2040 were forecasted using a 0.25% annual growth rate.
- Southbound delay and queues in the AM peak and northbound delay and queues in the PM peak are forecast to worsen by the year 2040 under the no build alternative.

6.1 Vehicular Operations

6.1.1 2040 AADT

Based on an estimated construction year close to 2020 and a design life of 20 years, 2040 was chosen as the design year for this project. To forecast 2040 design year AADTs, historical AADTs were first analyzed. Since 2016 volumes are the most recent available volumes and also represent the highest observed volumes over the most recent 5-year period, they were used for the "existing year" volumes. As recommended by the DOT&PF, an annual growth rate of 0.25% was applied to the existing year volumes to project design year volumes. Projected AADT values are shown in Table 9.

Table 9. Projected AADT

Segment Name	Extents	2016	2040
Riverside Drive	Dimond Park to Stephen Richards Drive	9,514	10,000
Riverside Drive	Stephen Richards Drive to Julep Street	8,404	8,900
Stephen Richards Drive	King Crab Lane to Riverside Drive	3,221	3,400

6.1.2 2040 Turning Movement Volumes

A continuous count station (CCS) that records traffic volumes is located on Riverside Drive, north of the study intersection. The most recent available data from the CCS is summarized in the *Southcoast Region 2013 Traffic and Safety Report.* To forecast design year TMVs, peak hour volume percentages developed from the CCS data were identified. In accordance with guidance from the Green Book, the PM peak hour design volume was based on the 30th highest hourly AADT volume percentage of 12.7%. The 30th highest hourly volume percentage was rounded down to 12% to remain in the range of values suggested in the Green Book (9% to 12% of AADT). According to the CSS, the average AM peak hourly percentage was 4.5% to 5.8% of AADT, while the average PM peak hourly percentage was 9.3% of AADT. The design AM peak hour percentage was chosen as 8% (the ratio of the average AM peak percentage to the average PM peak percentage multiplied by the 30th highest hourly volume percentage).

For the eastbound approach, it was noted that AM peak hour traffic is significantly heavier than the PM peak hour traffic. Design hour percentages for this approach were chosen to mimic the

relative daily volumes compared to those on Riverside Drive. Table 10 shows the design hour percentages for each approach.

Table 10. Chosen Design Hour Percentage by Approach

	AM Design Hour Percentage	PM Design Hour Percentage
Northbound Approach	8%	12%
Southbound Approach	8%	12%
Eastbound Approach	14%	8%
Westbound Approach	8%	12%

The estimated peak hour percentages were applied to projected AADTs to estimate future PM TMVs. Figure 14 and Figure 15 depict the adjusted TMVs used for analysis of the study intersection under projected traffic volumes for the AM and PM peak hours.

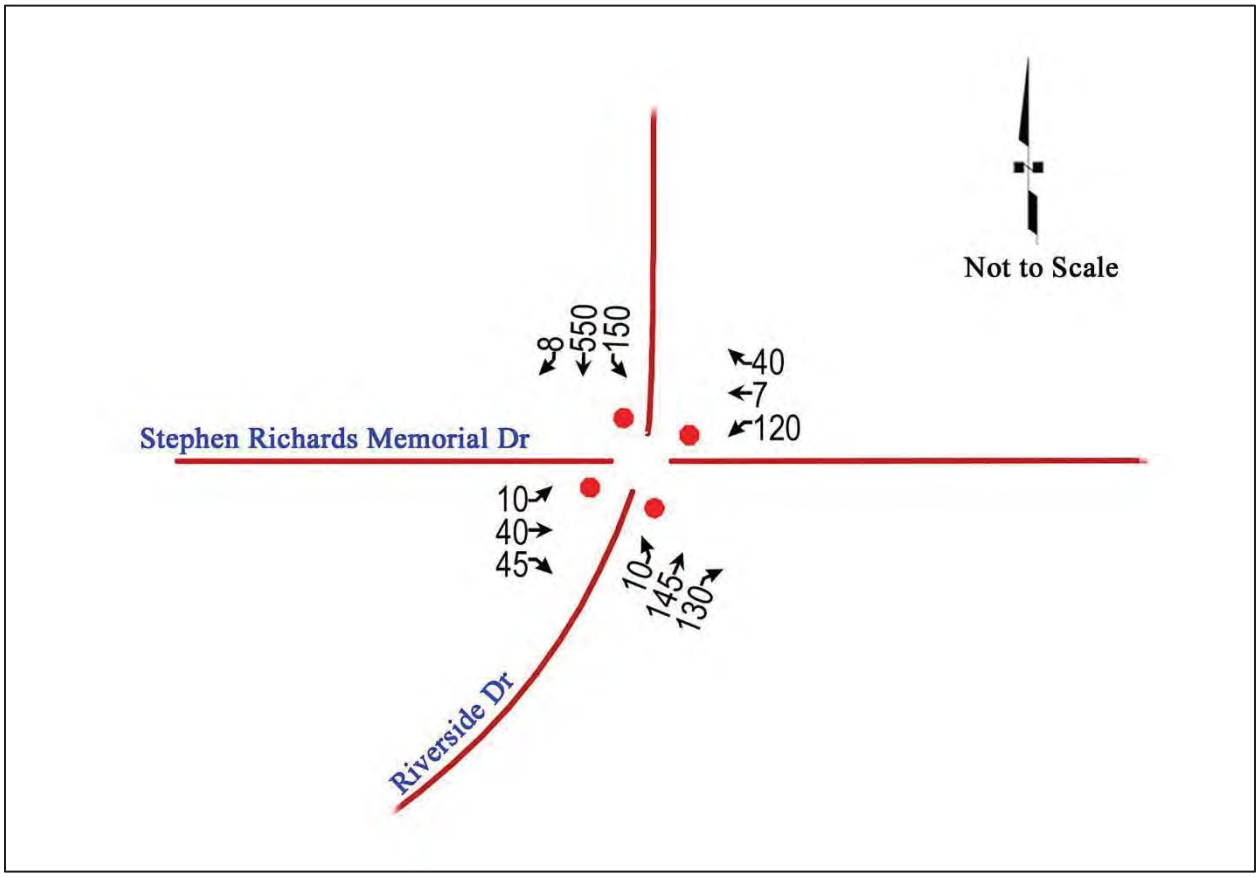


Figure 14: 2040 TMVs, AM Peak Hour

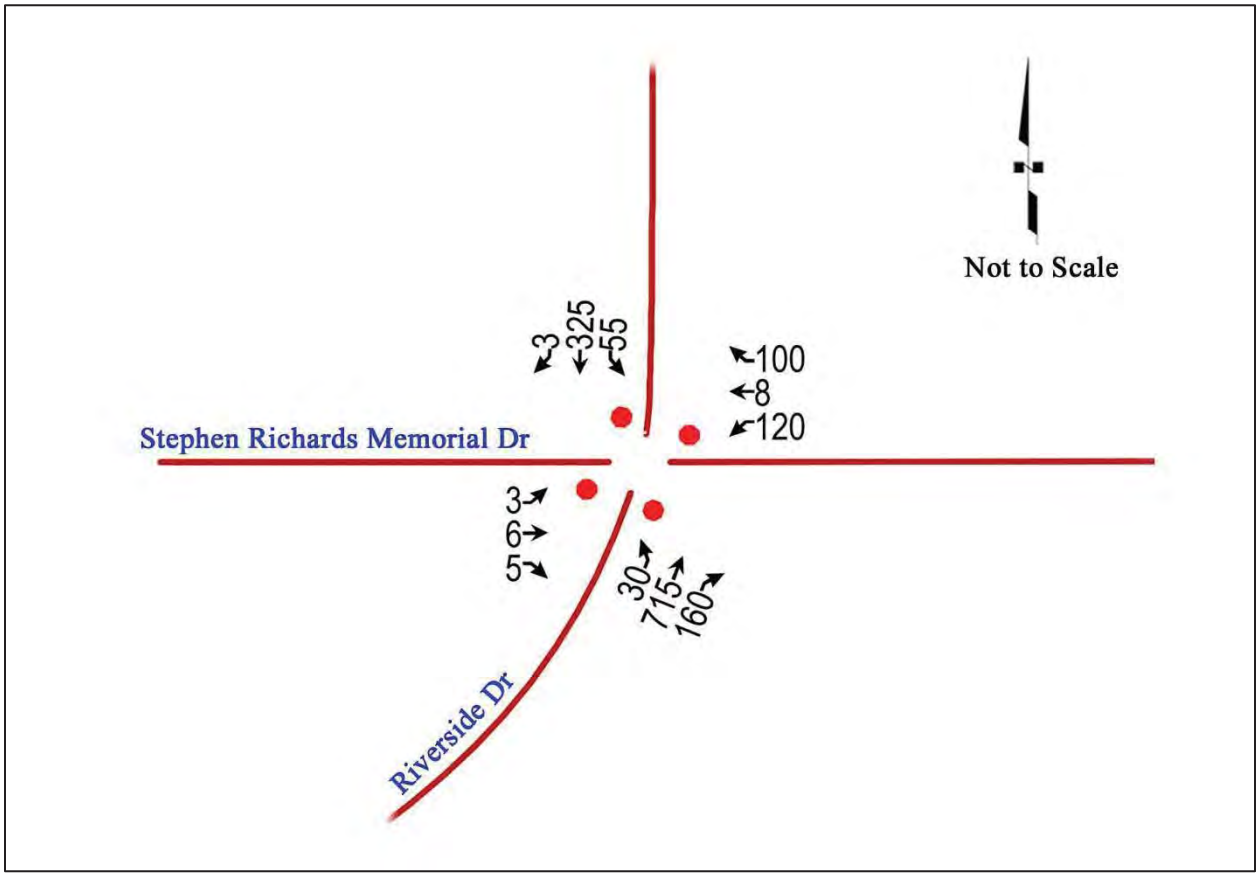


Figure 15. 2040 TMVs, PM Peak Hour

6.1.3 Peak Hour Factors and Heavy Vehicle Percentages

For analysis of operations under the no-build condition, the same peak hour factors and heavy vehicle percentages used for analysis of existing conditions were utilized.

6.1.4 2040 Intersection Capacity

Since 2008, the study intersection has operated under all-way stop control, which improved safety over two-way stop control. The no build-alternative would leave the existing lane configuration and existing all-way stop control. The no-build alternative under projected traffic volumes was analyzed using Synchro Trafficware and the overall intersection was determined to continue to operate at LOS F, with increased delay and queue lengths. Table 11 and Table 12 summarize the future intersection operations for each movement during the AM and PM peaks. The primary concern is still the directional queues for southbound and northbound Riverside Drive in the morning and evening, respectively.

Table 11: 2040 Intersection Capacity under All-Way Stop Control – AM Peak

AM Peak	EB	WB	NB	SB	Intersection
V/C Ratio	0.3	0.4	0.6	1.3	-
Control Delay (sec)	13.0	15.5	17.4	186.4	**112.2**
Lane LOS	B	C	C	F	**F**
95th % Queue (feet)	25	50	100	925	-

Table 12: 2040 Intersection Capacity under All-Way Stop Control – PM Peak

PM Peak	EB	WB	NB	SB	Intersection
V/C Ratio	0.0	0.5	1.4	0.7	-
Control Delay (sec)	11.7	16.1	242.0	21.3	**151.1**
Lane LOS	B	C	F	C	**F**
95th % Queue (feet)	25	75	1200	125	-

Attachment F:

Proposed Traffic Signal Performance

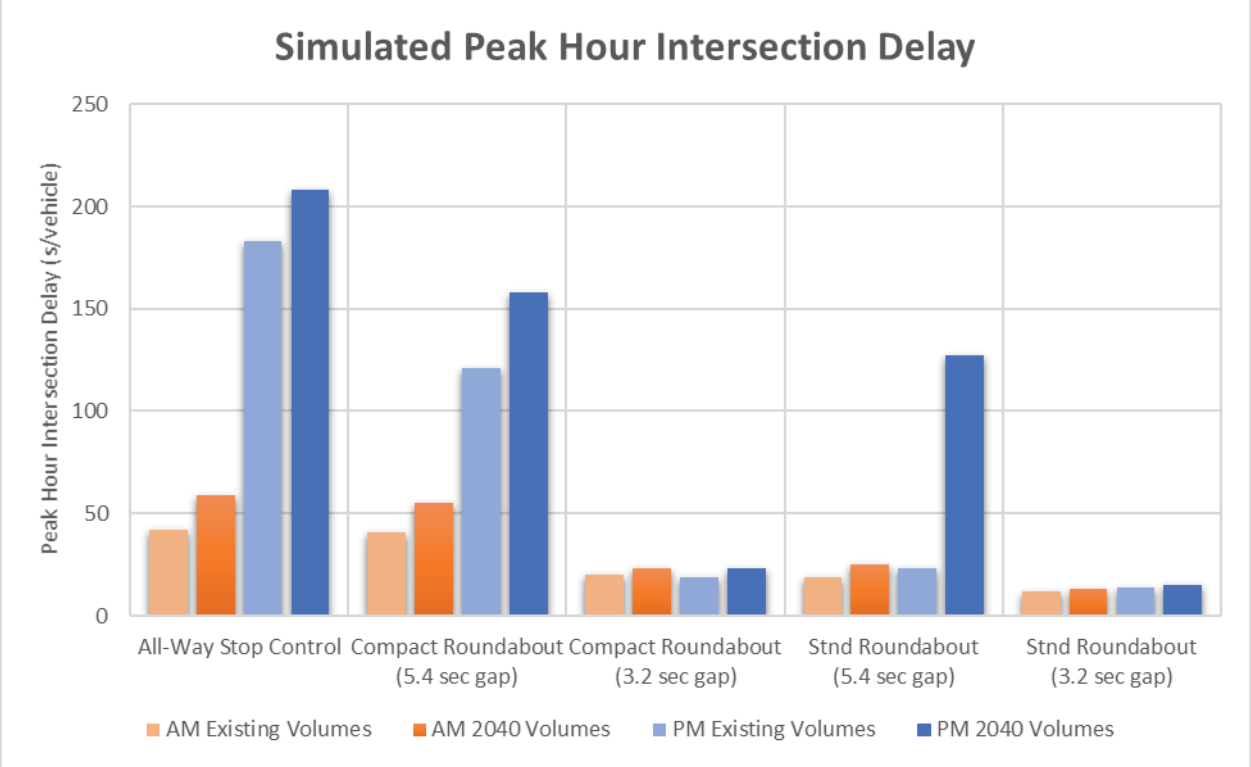


Figure 25: Simulated Intersection Delay (Weighted Average of All Vehicle Delay)

7.4.4 Summary

Either a compact-roundabout or a standard roundabout (110-ft diameter) would decrease delay for traffic traveling in the peak direction in both the AM and PM periods; however, the improvement for the compact-roundabout is minimal under the condition in which drivers are more timid (desire larger gaps before entering the roundabout). The standard roundabout would work well under a wider range of driver types.

7.5 Signal Control

Signalization was also considered at the study intersection using guidance from "Chapter 4C. Traffic Control Signal Needs Studies" from the 2009 *Manual of Uniform Traffic Control Devices* (MUTCD). Signalization should generally only be considered if one or more of the 9 warrants described in the MUTCD are satisfied; however, satisfaction of a traffic signal warrant or warrants does not necessarily mandate installation of a signal. The signal warrant analysis uses existing and future traffic conditions at the intersection and compares them with historical performance for similar intersections to determine whether the location is a favorable candidate for a traffic signal. If one or more warrants is met, other factors, such as pedestrian and geometric characteristics as well as the traffic control at nearby intersections, should be

considered to determine if a signal would improve the overall safety and/or operation of the intersection and neighborhood.

Applicable warrants for signalization at the study intersection were analyzed, as summarized in Table 54. No signal warrants were met.

Table 54: 2009 Signal Warrants

2009 MUTCD Warrant	2009 MUTCD Warrant Description	Criterion Required	Condition Met	Warrant Met?
Warrant 1	8-Hour Volume *Condition A: Minimum Vehicular Volume*	8 hours	1 hour	No
Warrant 1	8-Hour Volume *Condition B: Interruption of Continuous Traffic Flow*	8 hours	3 hours	No
Warrant 1	8-Hour Volume *Combination of Condition A & Condition B*	8 hours	1 hour	No
Warrant 2	4-Hour Volume	4 hours	1 hours	No
Warrant 3	Peak Hour	1 hour	0 hours	No
Warrant 7	Crash Experience	8 hours	5 hours	No
		5 crashes	2 crashes	

Warrant 4, Pedestrian Volume, is applicable in locations where there is a high number of pedestrians (>100 pedestrians/hour) who experience excessive delay when trying to cross the major street due to high traffic volumes. Existing peak hour pedestrian counts at the study intersection were under 30 pedestrians/hour.

Warrant 5, School Crossing, is generally applicable when there are at least 20 schoolchildren/hour crossing the major street during the peak hour at an established school crossing location. While schoolchildren do navigate through the study intersection, it is not an established school crossing location.

Warrant 6, Coordinated Signal System, is to be used when the intersection falls within a system of coordinated signals when the spacing is such that an additional signal would benefit progression along the corridor. This warrant is not met because neither Riverside Drive nor Stephen Richards Memorial Drive have systems of coordinated signals.

Warrant 8, Roadway Network, is to be used at the intersection of two or more major routes. Riverside Drive and Stephen Richards Memorial Drive do not appear to meet these criteria.

Warrant 9, Intersection Near a Grade Crossing, is to be used at intersections that are close to at-grade railroad crossings. This warrant is not met, as there is not a railroad crossing within 140 feet of this intersection.

7.5.1 Intersection Operations

Although signal warrants were not met, the study intersection was analyzed under signal control using Synchro Trafficware to give an indication of the effect of a signal at this location. As shown in Table 55 and Table 56, a signalized intersection with a single lane approach in each direction would operate at a LOS B for both AM and PM peaks.

Table 55: Projected Intersection Operations under Signalization – AM Peak

AM Peak	EB	WB	NB	SB	Intersection
V/C Ratio	0.2	0.7	0.3	0.9	-
Control Delay (sec)	18.4	25.2	4.7	16.4	**15.1**
Lane LOS	B	C	A	B	**B**
95th % Queue (feet)	45	101	57	436	-

Table 56: Projected Intersection Operations under Signalization – PM Peak

PM Peak	EB	WB	NB	SB	Intersection
V/C Ratio	0.0	0.7	0.9	0.4	-
Control Delay (sec)	17.9	26.6	15.3	5.3	**14.5**
Lane LOS	B	C	B	A	**B**
95th % Queue (feet)	15	123	560	129	-

7.5.2 Effect on Safety

The 2018 HSIP Handbook indicates that installation of a new traffic signal at a two-way stop control intersection would reduce right-angle crashes by 60% but increase rear end crashes by 25%. The likely occurrence and severity of right-angle and rear end crashes under signal control was determined by applying HSIP crash reduction factors to crash counts under two-way stop control. Table 57 compares the occurrence and severity of crashes during the five-year crash analysis period (2010-2014) under existing all-way stop control with the likely occurrence and severity of crashes over a five-year period under signal control. Compared to all-way stop control, signal control would likely increase the number of right-angle crashes but decrease the number of rear end crashes.

Table 57: Comparison of Crashes: All-Way Stop versus Signal Control

Intersection Control	Crash Type	Major Injury	Minor Injury	PDO	Total
Existing All-Way Stop Control (2010-2014)	Right-Angle Crashes	-	-	2	2
	Rear End Crashes	-	-	3	3
	All Other Crashes	-	-	-	-
	Total Crashes	-	-	*5*	*5*
Signal Control	Right-Angle Crashes	<1	2	2	4
	Rear End Crashes	-	-	>1	>1
	All Other Crashes	-	1	1	2
	Total Crashes	*<1*	*3*	*>4*	*>7*

7.5.3 Pedestrian Delay

Chapter 18 of the HCM provides a step-by-step methodology to determine pedestrian delay for pedestrian crossings at signalized intersections. The methodology considers hourly vehicular and pedestrian volumes, crossing width, signal timing and cycle length, and whether or not a pedestrian signal head is present with rest-in-walk enabled. For this analysis, rest-in-walk was assumed for the east and west approaches (for pedestrians traveling along Riverside Drive) while it was assumed the walk symbol would only be activated by a pedestrian push button for crossing Riverside Drive (the north and south approaches).

The HCM states that computed pedestrian delay can be used to generalize how pedestrians will behave. “In general, pedestrians become impatient when they experience delays in excess of 30 s/p [seconds per pedestrian], and there is a high likelihood of their not complying with the signal indication. In contrast, pedestrians are very likely to comply with the signal indication if their expected delay is less than 10 s/p” (Page 18-69).

Table 58 shows the calculated pedestrian delay under signalization. All computed delays are below 30 sec/pedestrian.

Table 58: Pedestrian Delay under Signalization

Peak Hour	Signalized Crossing Location	Average Pedestrian Delay (sec/pedestrian)
AM	North and South Approaches	19.9
	East and West Approaches	6.6
PM	North and South Approaches	20.4
	East and West Approaches	6.5

7.5.4 Emissions Impacts

Table 59 describes the estimated 2040 reduction in fuel use, fuel cost and emissions if the intersection control were changed from all-way stop control (no build) to signalized. A signal shows a marked decrease in fuel use and hence fuel costs and emissions in comparison to the no build configuration.

Table 59: 2040 Signal - Change in Fuel Use, Fuel Cost and Emissions per Peak Hour

Peak Hour	Fuel Use (gallons)	Change in Fuel Costs	CO Emissions (g)	No_x Emissions (g)	VOC Emissions (g)
AM Peak	- 71	- $253.74	- 4996.2	- 972.1	- 1157.9
PM Peak	- 139	- $493.52	- 9856.6	- 2029.7	- 2391.2

7.5.5 Costs and Impacts

The estimated costs for a traffic signal are shown in Table 60.

Table 60: Estimated Costs for Traffic Signal

Element	**Cost**
Design	$169,000
Utilities	$100,000
Right-of-Way	$43,100
Construction	$988,550
Total Cost of Project	**$1,300,650**

The right-of-way costs listed cover temporary construction easements – no permanent right-of-way acquisition is anticipated for this alternative.

7.5.6 Summary

No warrants for signalization at the study intersection were met. However, if signal control was implemented, all intersection movements would operate at a LOS C or better. The occurrence and severity of crashes would likely increase slightly over the existing all-way stop control, but likely decrease in comparison with two-way stop control. Pedestrian delay for all crossings are computed to be below 30 seconds/pedestrian, indicating that pedestrians would be likely to comply with crossing signal indications.