

TECHNICAL MEMORANDUM

Project: Snohomish Regional Fire & Rescue – Station 32
19959 Oaks Street, Monroe, WA

Subject: Transportation Assessment

Date: August 7, 2025

Author: Marni C. Heffron, PE, PTOE, Principal

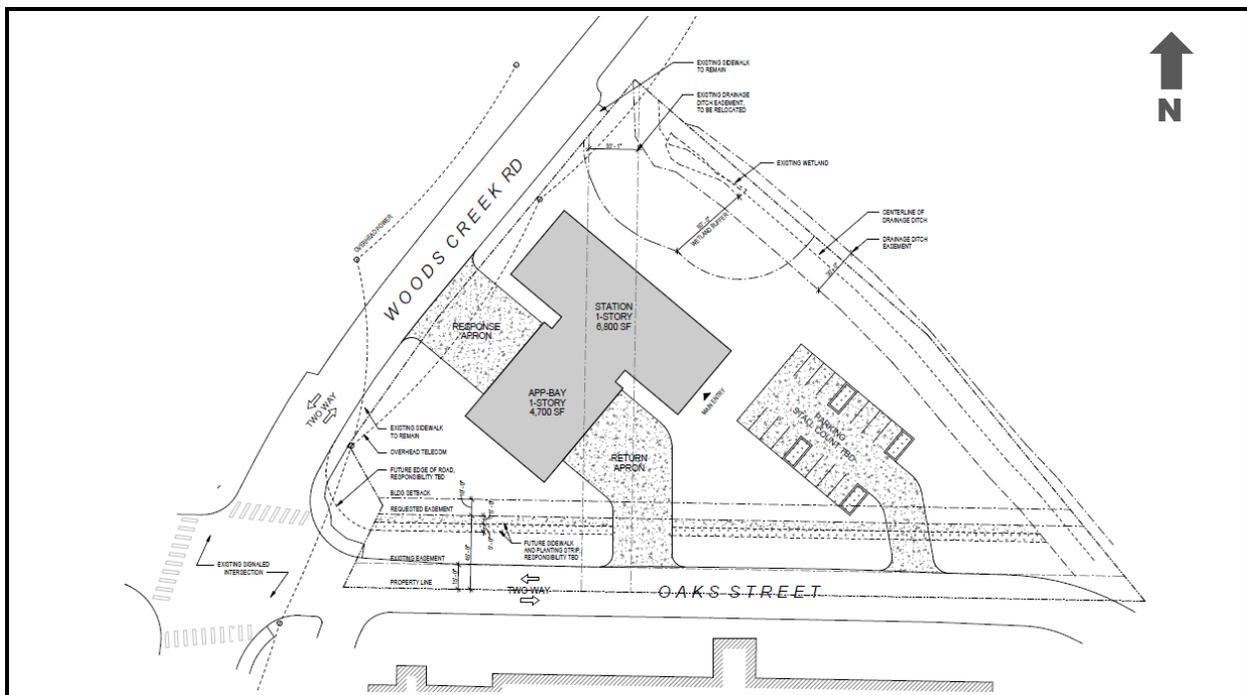
Please update and include in report to reflect the new methodology of how the City prescribes TIF to include PM Peak Hour Person Trips, not just PM peak hour vehicle trips.

Snohomish Regional Fire and Rescue (SRFR) is proposing to relocate Fire Station (FS) 32 in Monroe, WA from its existing location, at 22122 132nd Street SE, to a new site at 19959 Oaks Street, which is closer to US Highway 2 and the Monroe town center. This memorandum assesses the transportation effects of the proposed projects, and evaluates various emergency traffic control needs at and near the site.

1. Project Description

FS 32 is proposed to be located on a triangular-shaped site with frontage on two streets: Oaks Street along the south side of the site and Woods Creek Road along the northwest side of the site. The new station would have a drive-thru equipment bay with access from Oaks Street and the egress to Woods Creek Road. The driveways on each side of the bay are referred to as the “Return Apron” (entrance) and “Response Apron” (exit). The station is being designed to accommodate seven (7) staff at a time who work in 24-hour shifts; the shift change occurs each day between 7:00 and 8:00 A.M. This would be an increase in staff compared to the existing FS 32, which has three people on each shift. A staff parking lot, with 14 to 16 stalls is proposed southeast of the station building, with a separate access driveway on Oaks Street. Figure 1 shows a conceptual plan of the proposed FS 32 site.

Figure 1. FS 32 Conceptual Site Plan



Source: Miller/Hull, 30% Design, July 2025.

2. Trip Generation

FS 32 would have seven staff on site at a time, with a shift change every 24 hours between 7:00 and 8:00 A.M. During that time period, and assuming all staff drive themselves to and from the site, the station would generate 14 vehicle trips (7 in and 7 out). Emergency calls can occur at any time, but the vehicle trips associated with those are not included in the trip generation estimate since those vehicles create their own traffic control (with lights and sirens) to enter and exit the site if needed. Occasional service trips such as supply delivery and waste pick-up would also be generated, but are also expected to be sporadic and not occur during the shift change time.

3. Street Operations

Woods Creek Road connects to US Highway 2 less than 800 feet south of the site. However, southbound movements at that unsignalized intersection are physically restricted to right turns only by curbing in the center of Highway 2. Vehicles are allowed to turn left and right from Highway 2 onto Woods Creek Road, but crossing movements to and from the south side of the highway are prohibited. Therefore, any emergency calls or staff trips destined to the east on Highway 2 or to areas south of Highway 2 would need to travel east on Oaks Street from the station and then southwest on Old Owen Road to reach the signalized intersection with Highway 2. A relatively small number of trips would have to use this alternative route. It is unlikely that trips destined to and from the west on Highway 2 would use this route since it is about 0.25 miles longer than the direct connection via Woods Creek Road.

The adjacent intersection at Woods Creed Road / Oaks Street / Tjerne Place SE is signalized. It is recommended that the signal be updated to allow for emergency pre-emption when equipment is leaving FS 32 to clear any southbound queue approaching that intersection and prevent northbound traffic from passing the station driveway. Emergency-traffic control at the site driveway is evaluated in the next section.

4. Emergency Vehicle Control at Site Driveway

Traffic control at the site driveway must comply with the *Manual on Uniform Traffic Control Devices (MUTCD)*.¹ Chapters 4M and 4N of the 11th Edition MUTCD describe various options for emergency vehicle access. Chapter 2C describes advance warning sign options. Three options, listed below, were evaluated for FS 32.

1. **Emergency traffic-control signal (Emergency Vehicle Signal, or EVS)** – This is a special traffic control signal that directs all conflicting traffic to stop in order to permit the driver of an authorized emergency vehicle to proceed into the roadway. It may be installed at locations that do not meet other traffic signal warrants.
2. **Hybrid beacon for emergency-vehicle access (Hybrid Beacon)** – This beacon would have two red lights over one yellow light. It will be “dark” until activated for emergency egress, when it will first flash yellow, then alternate-flash the two red beacons. It must be paired with warning signs.
3. **Emergency vehicle sign with supplemental Warning Beacon (Warning Sign with Beacon)** – This device pairs standard Emergency Vehicle warning signage with flashing Warning Beacons that are activated from a fire station.

The guidance for the signal control measures states that they should meet warrants, which are based on the traffic and geometric conditions of the roadway where the driveway is located. The applicable warrants are described and evaluated in the following section.

¹ Federal Highway Administration, 11th Edition, December 2023.

4.1. Emergency Vehicle Signal Warrants

MUTCD Guidance

An EVS gives right-of-way to authorized emergency vehicles at driveways or streets accessing emergency responder stations such as fire, ambulance, or police stations. The MUTCD Section 4M.01 provides the following guidance:

If a traffic control signal is not justified under the signal warrants of Chapter 4C and if gaps in traffic are not adequate to permit the timely entrance of emergency vehicles, or the stopping sight distance for vehicles approaching on the major street is insufficient for emergency vehicles, installing an emergency-vehicle traffic control signal should be considered.

The sight distance determination should be based on the location of the visibility obstruction for the critical approach lane for each street or drive and the posted or statutory speed limit or 85th-percentile speed on the major street, whichever is higher.

With only four station fleet vehicles, FS 32 would not generate enough traffic to meet any of the MUTCD's traffic volume-based signalization warrants (Warrants 1-4). Therefore, the application of an EVS relies on inadequate gaps in traffic or inadequacy of stopping sight distance (SSD) for vehicles approaching the station. However, MUTCD does not provide guidance in the interpretation of "gap adequacy," which may reduce this choice to opinion or judgment. Guidance from other sources were researched to determine if there are traffic volume thresholds that would substitute for gap analysis, which is described in the next section.

Emergency Vehicle Signal Warrant Guidelines Other than MUTCD

As noted above, warrants for a traditional traffic signal would not be met for the project, therefore other sources were researched. The *Oregon Department of Transportation Traffic Signal Policy and Guidelines Section 6.1 Emergency Traffic Signals*² provides the following minimum Average Daily Traffic (ADT) and sight distance thresholds that would motivate an EVS installation.

- An EVS would be warranted at two-lane highways with an ADT equal to or more than 8,850 vehicles, and four-lane highways with ADT equal to or more than 10,600 vehicles. These thresholds of ADT are applicable if the posted speed limit is equal to or less than 40 mph and the location is not in an isolated community with a population of less than 10,000. Monroe's population in 2023 was about 19,700.³
- In terms of sight distance, different thresholds for various speeds are provided. ODOT recommends a minimum sight distance of 260 feet on a 35-mph road.

² Oregon Department of Transportation Traffic Signal Policy and Guidelines (2024), https://www.oregon.gov/odot/Engineering/Documents_TrafficStandards/Traffic-Signal-Policy-Guidelines.pdf

³ US Census Bureau, accessed July 2025.

4.2. Minimum Sight Distance for Woods Creek Road

Woods Creek Road is relatively flat along the site’s frontage between Oaks Street and the Response Apron, and then has about a 5% uphill slope north of the apron that crests near the north property line.

Based on equations published in a *Policy on Geometric Design of Highways and Streets*⁴ for a 35-mph roadway at a 5% downgrade, minimum stop sight distance for southbound vehicles is approximately 265 feet. For northbound vehicles approaching on a flat grade, the minimum stopping sight distance is 245 feet. These values are in line with ODO T guidelines, which recommend a minimum sight distance of 260 feet for speeds of 35 mph. Typically, stopping sight distance is measured to a 6-inch object in the path of an approaching motorist. However, for this condition, the object would be an emergency vehicle at least 7-feet high entering the roadway. An approaching motorist with an eye height of 3.5 feet would be able to see over the crest of the hill to see the vehicle. The road section is nearly straight and is not affected by horizontal curves.

4.3. Emergency Signal Warrant Analysis for FS 32

FS 32 would have its Response Apron (exit) on Woods Creek Road approximately 165-feet from the Oaks Street/Tjerne Place SE intersection (from the edge of crosswalk to the center of the apron). At that location, Woods Creed Road has one lane in each direction and a posted speed limit of 35 mph.

The EVS warrant analysis utilizes a 24-hour traffic count performed on Woods Creek Road north of County Crescent Boulevard in June 2022.⁵ It provided Average Weekday Daily Traffic (AWDT) as well as AM and PM peak hour volumes. The Washington State Department of Transportation’s (WSDOT) *Short Count Factoring Guide*⁶ has a list of adjustment factors to convert an AWDT taken in any month into an Average Annual Daily Traffic (AADT) value. The factor for a “Rural, Non-Interstate, Non-Recreational” road in the West part of the state is 0.89.

Table 1 summarizes the 2022 traffic volumes by direction. The AADT on Woods Creek Road is estimated to be 7,425 vehicles per day.

Table 1. Traffic Volumes on Woods Creek Road (June 7, 2022)

	Average Weekday Daily Traffic (AWDT)	Annual Average Daily Traffic (AADT)	Weekday AM Peak Hour	Weekday PM Peak Hour
Northbound	4,108	3,656	373	302
Southbound	4,235	3,769	202	450
Total	8,342	7,425	575	752

a. Traffic Count performed by IDAX Data Solutions, June 7, 2022 on Woods Creek Road east of Country Crescent Boulevard. Northbound past the FS 32 site would be eastbound at the count location.

b. Applies WSDOT Adjustment Factor of 0.89 which reflects category “SFG-05: Rural, Non-Interstate, Non-Recreational West.” Conversion factors based on WSDOT state-wide data from 2022, 2023 and 2024.

Based on ODOT guidelines, an EVS would not be warranted at the FS 32 Response Apron location since the AADT is below the recommended threshold of 8,850. Even with growth in background traffic, the volume would not exceed the threshold when the station is expected to open in 2026.

⁴ American Association of State Highways and Transportation Officials’ (AASHTO), 7th Edition, 2018.

⁵ Traffic count performed by IDAX Data Solutions, June 7, 2022.

⁶ Washington State Department of Transportation, March 2025. <https://wsdot.wa.gov/sites/default/files/2024-02/Short-Count-Factoring-Guide-2024.pdf>

4.4. Hybrid Beacon for Emergency-Vehicle Access

MUTCD Chapter 4N presents guidance for Hybrid Beacons for Emergency-Vehicle Access. The guidance is listed below.

Emergency-vehicle hybrid beacons should only be used when all of the following criteria are satisfied:

- A. *The conditions justifying an emergency-vehicle traffic control signal (see Section 4M.01) are met;*
- B. *An engineering study, considering the road width, approach speeds, and other pertinent factors, determines that emergency-vehicle hybrid beacons can be designed and located in compliance with the requirements contained in this Chapter and in Section 4S.01, such that they effectively warn and control traffic at the location; and*
- C. *The location is not at or within 100 feet from an intersection or driveway where the side road or driveway is controlled by a STOP or YIELD sign.*

A hybrid beacon would be an option for FS 32 in the future if traffic volumes were to increase above the 8,500 AADT level; however, the current volumes and two-lane roadway configuration do not warrant it. As noted in the following section, an advance warning beacon for southbound traffic on Woods Creek Road is recommended.

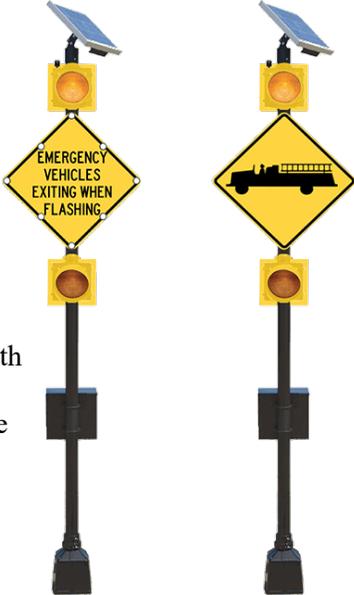
4.5. Emergency Vehicle Sign with Supplemental Warning Beacon

MUTCD Section 2C.54 states that,

The Emergency Vehicle (W11-8) sign, or a word message sign indicating the type of emergency vehicle (such as rescue squad), may be used in advance of the emergency-vehicle station when no emergency-vehicle traffic control signal is present. A Warning Beacon (see Section 4S.03) may be used with any Vehicular Traffic Warning sign to indicate specific periods when the condition or activity is present or is likely to be present, or to provide enhanced sign conspicuity. A supplemental WHEN FLASHING (W16-13P) plaque (see Figure 2C-16) may be used with any Vehicular Traffic Warning sign that is supplemented with a Warning Beacon to indicate specific periods when the condition or activity is present or is likely to be present.

Two example W11-8 signs with beacons are shown at right. While not required by the MUTCD for locations with no emergency-vehicle traffic control signal, implementation of Emergency Vehicle signs would call driver attention to the possibility of the need to yield to emergency vehicles. More recent advancements in technology would allow for these beacons to be activated by SRRF employees or by the emergency vehicles themselves.

Even though adequate minimum sight distance to the FS 32 Response Apron would exist, a supplemental warning beacon is recommended for southbound Woods Creek Road approaching the station since motorists arriving from the north on Woods Creek Road or Wagner Road may have traveled several miles without encountering any other traffic control that would require the motorist to stop. The warning beacon is described in the following section. The sign should be located about 300 feet north of the Response Apron. If the adjacent intersection’s traffic signal can be pre-empted to prevent northbound traffic at the Response Apron, then no supplemental warning sign would be needed for northbound traffic.



5. Transportation Impact Fee

The City of Monroe assesses a Transportation Impact Fee to new development projects per Monroe Municipal Code (MCC) §3.54.130. The rate sheet does not include a Fire Station use. Therefore, MCC §3.54.130.C. would apply, which states, “*For uses that are not identified in the fees established by subsection (B) of this section, the city engineer shall calculate the impact fee amount using the methodology employed in the Transportation Impact Fee Rate Study Update Methodology.*”

The City updated its fees in April 2025 based on the *Transportation Impact Fee Update Methodology*.⁷ That memorandum derived the impact fee of \$3,749.39 per PM peak hour person trip. As described above, FS 32 is expected to generate up to 14 AM peak hour trips associated with the once-daily shift change, but would generate zero (0) PM peak hour trips. Therefore, the project should not be assessed any transportation impact fee.

6. Parking

Peak parking demand would occur during the shift change each morning. The worst case would occur if all seven of the incoming staff arrived at the start of the shift while the seven staff from the prior shift were all still at the site. A total of 14 stalls would be needed to accommodate the shift change. Fewer stalls would be needed if the shift change is staggered. During all but the morning shift-change period, seven of the spaces would be available for non-staff or visitor use. The on-site parking lot should be sized to accommodate the shift change.

7. Summary

FS 32 is expected to have very little impact on the near-site transportation system. It would generate few non-emergency trips associated with staff and services. The peak trip generation would occur during once-per-day shift change in the morning, with up to 14 trips (7 in, 7 out) between 7:00 and 8:00 A.M.; it would generate no staff trips during the PM peak hour. The few AM peak hour trips are not expected to adversely affect area traffic operations. Since the City’s Transportation Impact Fee is based on PM peak hour trips, the project’s fee would be \$0.

The Response Apron would not warrant an Emergency Vehicle Signal. However, an Emergency Vehicle Sign with Supplemental Warning Beacon is recommended for southbound Woods Creek Road, and should be placed about 300 feet north of the Response Apron. The sign can be activated by SRFR staff or with vehicle detection on the apron. In addition, the adjacent traffic signal at Woods Creek Road/Oaks Street should be upgraded with emergency pre-emption that would flush southbound traffic before emergency vehicles leave the site and hold all northbound traffic on Woods Creek Road. The pre-emption could utilize the same manual or vehicle detection as the emergency beacon.

Peak parking would also occur during the daily shift change when up to 14 vehicles could be parked on site simultaneously. The on-site parking lot should be sized to accommodate the shift change.

MCH/tsm

SRFR FS 32 (Monroe) - Transportation Assessment - FINAL - 08-07-2025.docx

⁷ Transpo Group, March 2025.