

# Technical Report

**To:** Lauren Frick, Flathead Beacon

**From:** Grigory Namyasenko

**Date:** May 9, 2026

**Re:** Whitefish Fire Coverage Map - Methodology and Assumptions

## Abstract

This map shows residences within the Whitefish Fire Service Area, including coverage from the main Whitefish station, the Hodgson Road station, and the Star Meadows station planned to come online in May 2026. It also highlights the 5-road-mile service areas around each station and the residences that fall within them.

## Methodology

The analysis was performed in QGIS using publicly available GIS data from the Montana State Library and Flathead County GIS portals. The workflow is summarized below.

### Data Sources

- Address points and structure data - Montana State Library Cadastral Database (Orion CAMA).
- Road centerline layer - Montana State Library.
- Whitefish Fire Service Area (WFSA) boundary, Whitefish city limits, Star Meadows Fire District boundary, and fire station locations - Flathead County GIS.

#### *Coordinate Reference System*

All layers were projected to NAD83(2011) Montana State Plane, Meters (EPSG:6514)

### Workflow

1. Defined the study area by performing a Union of the Whitefish Fire Service Area boundary, the Whitefish city limits, and the Star Meadows Fire District boundary. The Star Meadows district was extracted as a separate feature from the Fire Service Area layer and added independently to reflect its status as a newly established district.
2. Filtered the address points layer by the residency attribute to retain only residential structures.
3. Delineated the 5-road-mile service area for each fire station (the existing Whitefish station, the Hodgson Road station, and the planned Star Meadows station) using the QGIS

"Service Area (from layer)" network analysis tool, with a travel cost of 8,046.72 meters (5 miles) along the road centerline network.

4. Identified residences within the service areas using the QGIS "Extract within distance" tool with a 200-meter (656.2 feet) distance parameter, applied between the residential address points and the service area road network.
5. Performed manual cleanup along the outer boundaries of the 5-road-mile service area to correct edge cases and ensure accurate representation of served residences.

## **Manual Cleanup**

As part of the manual cleanup step, edge-case properties were reviewed individually. The most common case involved residential address points that fell outside the 200-meter buffer from the road centerline because the structure itself is set back from the public road, but whose driveway or private access road connects to a public road within the 5-road-mile service area. These properties were added to the "within coverage" count manually to better represent the service relationship as understood by the Whitefish Fire Department and as typically applied by insurance carriers.(See Exhibit 1)

## **Assumptions/ Limitation**

1. Each individual residential address point was counted as a single unit, including individual apartments or dwelling units within a single multi-unit structure. (see Exhibit 1 for an example)
2. Where multiple physical structures were associated with a single residential address point (e.g., a primary residence with detached outbuildings on the same parcel), only the address point was counted. The number of physical structures was not the focus of this analysis; the focus was on residences served. (See Exhibit 2 for an example)
3. The Star Meadows Fire District was included in the analysis even though the station was not yet operational at the time of this exhibit. Coverage shown for Star Meadows reflects its planned service area, with the station expected to come online in May 2026.
4. The 5-road-mile service area was calculated using the public road network only. Private roads, driveways, and unimproved access routes were not included in the network analysis but were considered during manual cleanup where applicable. (See Exhibit 3 for an example)
5. The 200-meter parameter used in the "Extract within distance" step represents a reasonable proxy for the typical distance between a residential address point and the nearest road centerline. This value was selected to capture residences whose properties are reasonably accessible from the public road network without over-counting properties on long private drives.

This map is a journalistic exhibit and is not intended to be used as a legal, regulatory, or actuarial document. Insurance carriers vary in how they determine the 5-road-mile threshold for premium calculations. The methodology used here approximates a common interpretation but does not represent any specific carrier's underwriting practice. Address point data reflects the Montana State Library Cadastral Database at the time of download and may not capture all recent construction. The Star Meadows station location is based on the planned site as of the date of this memo. Actual coverage may differ once the station is operational.

## Exhibits

Exhibit 1 - Multi-Unit Residences with Individual Address Points *Each apartment or dwelling unit within a multi-unit structure carries its own residential address point and is counted separately in the analysis. Building footprints shown in purple; address points shown in green.*



Exhibit 2 - Setback Residences with Driveway Access *Two residential properties located approximately 900 feet from the public road, accessed by private driveways. Although the address points fall outside the 200-meter automated buffer, the driveways connect to a public road within the 5-road-mile service area. These properties were added to the "within coverage" count during manual cleanup.*

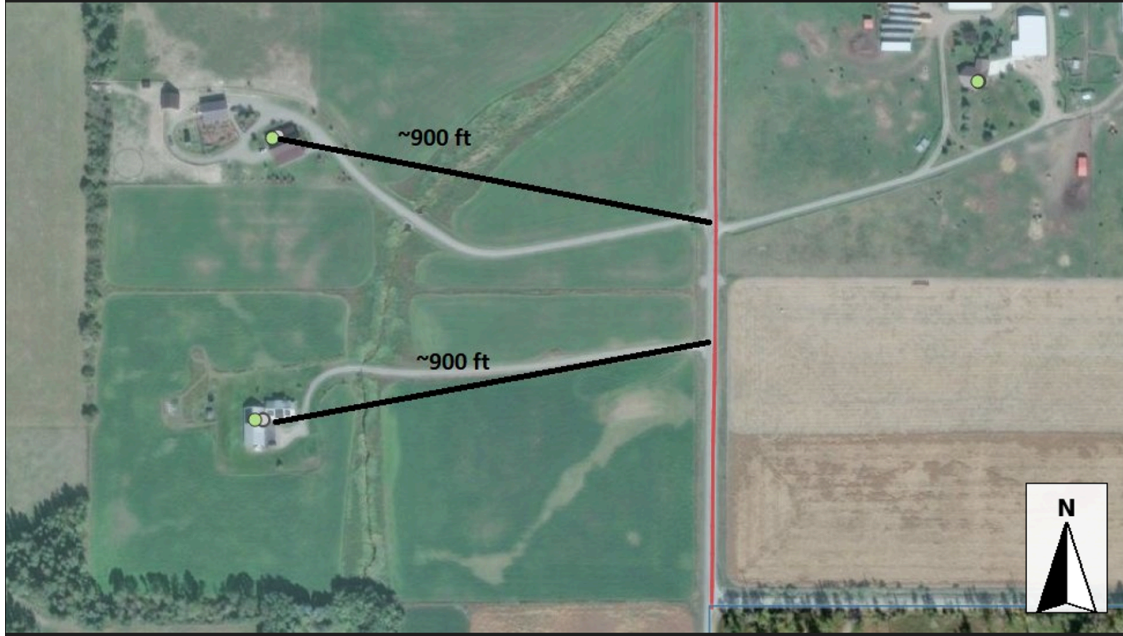


Exhibit 3 Multiple Structures on a Single Parcel A rural property containing several physical structures (primary residence, outbuildings) served by a single residential address point. Only the address point is counted; the number of physical structures is not the unit of analysis.



## Sources

### Geospatial data

- Montana State Library, Montana Spatial Data Infrastructure — Cadastral Database (Orion CAMA): structure and address points, building footprints (Lidar-derived), road centerlines. <http://geoinfo.msl.mt.gov/msdi/cadastral>
- Flathead County GIS - Whitefish city limits, Whitefish Fire Service Area boundary, Star Meadows Fire District boundary, fire station locations.
- Esri World Imagery - aerial imagery basemap.
- OpenStreetMap contributors - reference basemap.