Optimal Station Location Analysis for Belgrade-Bozeman-Yellowstone Airport

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Executive Summary

Alberta-Montana Passenger Rail Project wants to reconnect Alberta and Montana with a new retail corridor to alleviate road congestion, enhance mobility and contribute to economic development while improving regional connectivity, tourism and sustainability. Bozeman's new train station boosts transportation, freeing up traffic, strengthening local businesses, supporting tourism, creating improved airport access, encouraging sustainability, connecting communities and providing the much-needed impetus for greener travel choices. The Albert-Montana passenger Rail will enhance connectivity in the region, spur economic growth, enhance tourism and promote sustainability. Major conclusions suggest placing priority on planning strategic station location, developing air-rail integration, enhancing public support and environmental standards and financial feasibility for success in the implementation.

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Montana rail transport is essential in maintaining the American State's economy, environment and mobility (Montanan Rail Link, 2024). It provides an effective journey experience, minimizes distance and decreases carbon emissions, which leads to sustainable development. Alongside this, not only the railway would support the local industries but also link communities by increasing economic and social integration. The Alberta-Montana Passenger Rail Project is designed to re-link Alberta and Montana via a new passenger rail corridor that would have a great impact on Bozeman and the surrounding area (MTFP, 2023). The project seeks to decrease traffic congestion on roads, improve mobility and promote economic development through offering an environmentally friendly alternative mode of transportation. The rail connection would enhance access to Bozeman and the surrounding regions. The rail connection would enhance access to the Bozeman Yellowstone International Airport and other main destinations, enhancing regional connectivity and tourism.

The main goal of this report is to analyse possible station locations, identify economic and environmental effects and provide a recommendation for the best site for the new rail station. This report provides in-depth analysis and stakeholder outreach, by which the project aims to enhance sustainable transit and respond to increasing transit demand in the Gallatin Valley area.

Site Selection Criteria

Geographical Considerations

The possible three sites differ greatly in terms of availability and topography of the land. Downtown Bozeman has existing infrastructure that could be renovated to save construction time and money albeit at limited expansion. There are plenty of undeveloped lands around the Bozeman Yellowstone International Airport to plan a fully customised

design for the stations and future expansion with flat grounds ideal for future rail development. Between these two extremes Belgrade has certain existing structures that could be utilised further but still has capacity to expand. All three sites are well connected, with downtown Bozeman and Belgrade having developed street networks and transit routes. The airport area benefits from proximity to major highways and an existing transportation infrastructure that serves air passengers.

Connectivity & Accessibility

The perfect train station needs to interface seamlessly with what is already there in transportation infrastructure. Locations must give visibility and access on major highways like I-90 and US-191 for vehicular travel and along Streamline Bus routes for last-mile public transport. Proximity to Bozeman Yellowstone International Airport can open up multimodal travel chains for local residents and tourists alike. Pedestrian and bicycle access can provide connection from the station to surrounding neighbourhoods to encourage active travel. Consideration may be given to emergency vehicle access for rapid response. A strategic location next to primary arterial roads decreased emission congestion and improved regional accessibility.

Population & Ridership Demand

Bozeman is quite strong with respect to its population growth, boasting over the years 53,293 residents in 2020, contrasted to 27,509 in 2000 and densifying approximately to about 2,587.2 people per square mile. There is a fair amount of commuter travel between Bozeman, Belgrade and other nearby areas mainly for work and school purposes. The state has registered over 12.5 million non-residents into Montana in 2023 only to record visitor expenditure amounting to $5.45 billion (City-Data, 2023). Belgrade steadily increased its population and is adjacent to Bozeman Yellowstone International Airport-the busiest airport in Montana. The resident commuting public and tourists indicate good ridership potential on

a day-to-day basis with much higher expectations as populations grow with established train service.

Economic Factors

The site chosen for a train station must have economic potential to be fully harnessed and translate into business development, enhance tourism and create jobs. Strategic locations are near commercial districts which can stimulate local business growth, increase foot traffic to retail establishments and attract new investment. Quite simply a destination site near treasures such as Yellowstone National Park or the Museum of the Rockies can change visitor numbers and their spending habits. Such development creates construction jobs upfront and further it triggers longer-term employment generation in transportation, retail and services. Through creating jobs, the economic effects of a station go beyond its immediate perimeters; they result in rising property values, an expanded tax base and contributions to regional development more broadly.

Environmental & Sustainability Factors

There were major environmental and sustainability considerations when evaluating new train station locations as to where they would be sited. The effects of land use were variable across locations, downtown sites might require redevelopment of existing properties while an airport or suburban area can likely involve undeveloped land. Furthermore, each location can contribute to reducing emissions through increased rail travel while hence, being a better alternative to personal vehicles. A downtown station may probably have the greatest impact on this front because more people walk to and from the station and existing transit connections. Noise pollution effects vary depending on location such as downtowns affect more residents but already have ambient noise while airport areas are already affected by aviation noise but impact fewer people. Instead, Belgrade presents a middling option with average residential density. The best site will reduce negative environmental impacts while

maximising the advantages of sustainability from land use efficiency and emissions reductions.

Regulatory & Zoning Compliance

It is important to assess potential sites for train stations in compliance with regulatory and zoning requirements. Different local governments follow different policies that relate to the requirements they might impose for their respective jurisdictions on transportation infrastructure. Since the station can directly be located close to Canada, cross-border regulations can also come into the picture as they can require some coordination that can dictate the types of activities allowed on the site, the height of the building, setback conditions and parking requirements that apply to each site. The project can be subject to the requirements of the National Environmental Policy Act (NEPA), Americans with Disabilities Act (ADA) and the Montana Environmental Policy Act (MEPA) as well (Environmental Protection Agency, 2024 and Americans with Disabilities Act, 2024). Early engagement with regulatory bodies can identify what compliance can require and where challenges might arise, easing the approval process.

Infrastructure Feasibility

Every prospective site for a train station needs to be evaluated for infrastructure feasibility. Normally examined parameters include existing rail lines suitable for conversion to passenger service, corridors for freight rail that may be converted and basically the availability of requisite station facilities. On the critical side there may also be the state of the old rail infrastructure and its capacity, space available for platforms and passenger activities, compatibility with existing rail operations and site engineering challenges in the exercise. Another aspect that could greatly influence development costs and time for the station are the site utilities topography and ease of access for construction.

Potential Locations for the Train Station

Location 1: Old Bozeman Railway Station

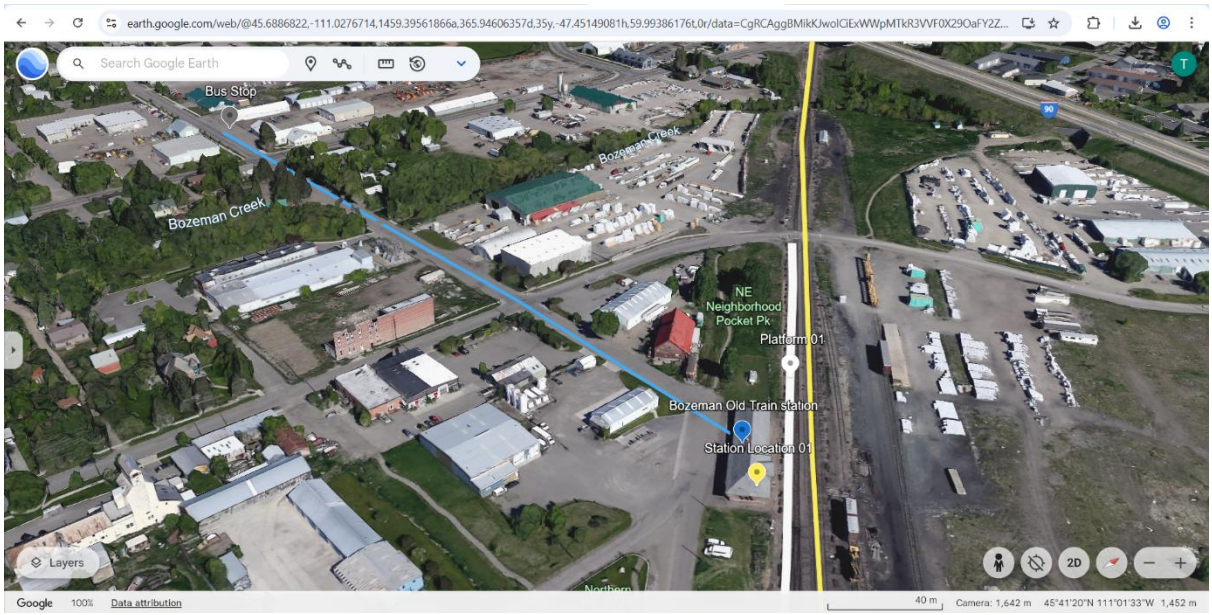


Figure 01: Bozeman Station Location

Source: (Google Earth, 2025)

The proposed location is the former Bozeman train station itself. It has access to city public transport and the Streamline bus services. The nearest bus station is just 400+ meters away from it, and it is connected with all the major routes of Bozeman. Apart from that, there is enough room for future expansion.

In the United States, railway platforms for intercity and commuter rail systems typically range from 400 to 1000 feet in length (Station Platforms, 2012). The map shows a white line that the platform can be built 980 feet long at the location.

Pros & Cons

The Old Bozeman Railway Station is a good location because it is historically valued and close to downtown (Smith, 2023). More importantly, it can link tourists and locals,

increasing traffic to local businesses. Furthermore, restoring the station would keep its history and serve as a cultural centre for the locals. However, the available infrastructure is outdated and might have to undergo huge overhauling to achieve the standards of the modern era. In this way, it can push up the prices and prolong the project of this railway track. Expansion space is also limited, something that could restrain future growth.

Existing transportation infrastructure

The station is well positioned close to the city centre, with easy access to the surrounding local bus routes like the Streamline Bus Service. The facilitation of connectivity with available public transit means that residents and visitors can easily shift between the train and bus services (Pazzini et al., 2022). Moreover, the position of the station close to major commercial and recreational areas maximizes its usage potential.

Economic impact

Renovating the Old Station of Bozeman would benefit the local economy through increased tourist visits and business activities. In addition, the station would serve as a centre of cultural and social activities, which would help promote community engagement and economic development.

Other locations in Bozeman

Two more locations, Location 01A & 01B, were also proposed, which are green field sights and serve similar benefits as Location 01. However, they do not have direct and continuous public transportation facilities available as location 01. And they also have enough space to build a platform, which is shown in the map.

Location 2: Belgrade

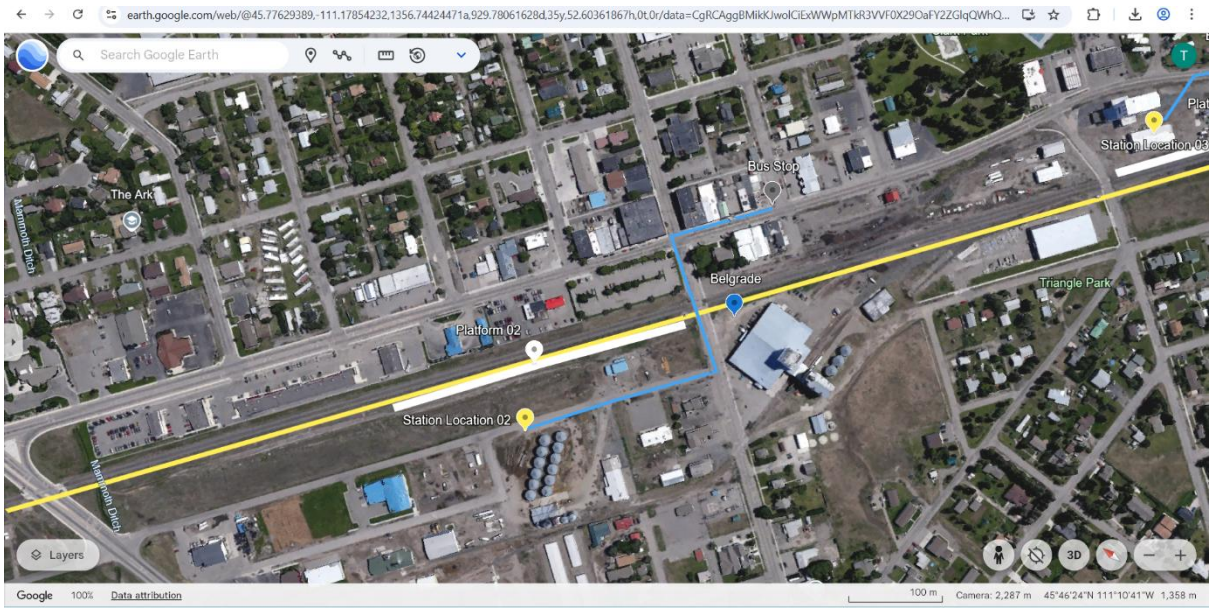


Figure 02: Belgrade

Source: (Google Earth, 2025)

The second proposed location is an industrial site located at the very heart of Belgrade beside the railway track, also available for purchase (https://www.realtor.com/), which is around 2 acres of area and accessible to all the main roads of Belgrade city. And this location platform can be built more than 1000 feet also, so that makes it a feasible location.

Pros & Cons

Belgrade's position provides a potential option for a train station since it is convenient for commuters as well as freight requirements (City-Data. Com, 2022). The increased residential population of the city and its closeness to the airport add value to its high ridership potential. Moreover, proximity to major highways favours good regional connectivity.

Impact on Suburban Expansion

Having a station in Belgrade could foster Suburban expansion by drawing in new residents l, businesses and residential construction (Medić et al., 2024). Enhanced transportation will make communicators centralising towards residing in the place, increasing housing prices and the growth of cities. The accessibility of the station could also induce transit-oriented living communities, as Belgrade will become a place of interest and a place of residence for work professionals in Bozeman.

Connectivity to other Montana cities

As Belgrade is strategically located close to US 191 and I-90, it facilitates easy access to other Montana towns and cities (Gallatin Country, MT, 2021). The train station would connect urban and rural areas and ensure regional economic integration and mobility.

Location 3: Bozeman-Yellowstone International Airport

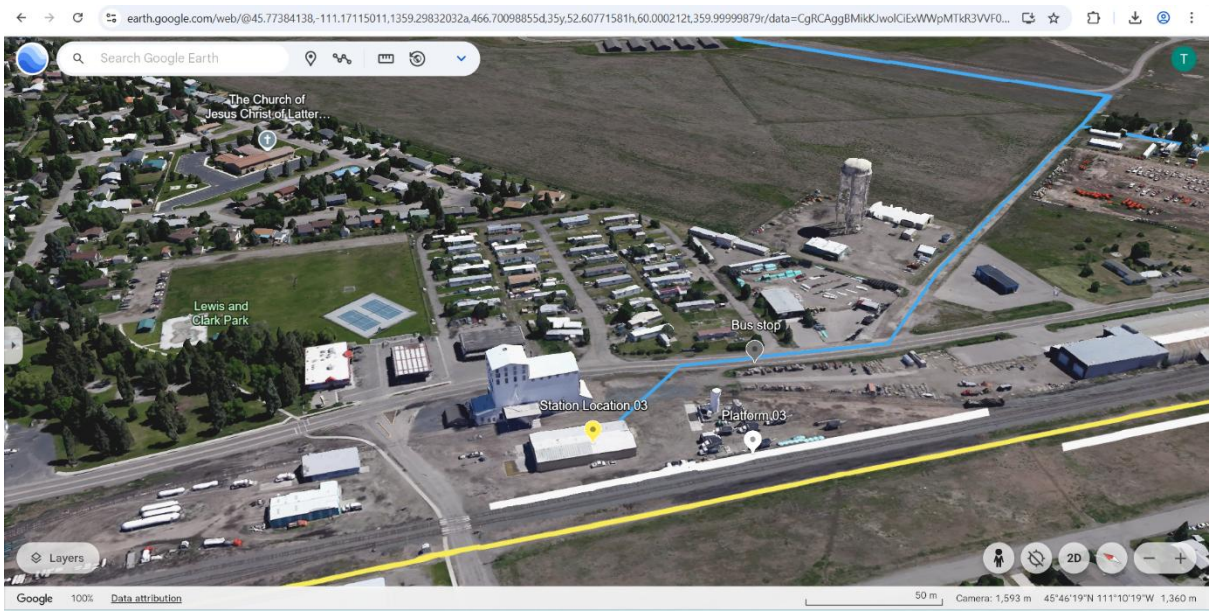


Figure 03: Bozeman Yellowstone International Airport

Source: (Google Earth, 2025)

The proposed location is a warehouse building, which is just 0.8 miles away from the Bozeman-Yellowstone Airport, and the nearest public bus stop is also adjacent to the building. It has the lowest space available to make a platform; it can be around 700 feet, not more than that, due to being surrounded by an industrial area.

Pros & Cons

Locating the station close to the Bozeman Yellowstone International Airport has many advantages (Wikipedia, 2025). It would provide smoother air to rail transportation, which would bring tourists and business travellers more. The residentially low-density neighbourhood could pose some restrictions on using it for daily commuters, while public transport interface integration would entail a high price tag.

Integration with air travel and transit connection

Positioning the station close to that airport enhances convenience for passengers, providing direct access to flights and less dependency on cars. The location has easy access to main highways, such as Interstate 90 and US 191, making it convenient for travellers from surrounding cities. To promote mobility, incorporating a shuttle service from the station to major tourist destinations such as Yellowstone National Park and Big Sky Resort would be crucial (Cregger et al., 2022).

Land use and development potential

The undeveloped land in the airport area offers the potential for building a world-class station with up-to-date facilities. The station may have commercial facilities like rental agencies, shops, and car parking, making it a transportation centre that benefits the local community economically.

Other locations near Airport

Locations 03A and 03B are proposed as green field sights, which are similar to location 03. These are also located near the airport; one positive is that they have enough space available to make longer platforms and scope for future expansion.

Location Findings

All seven locations have space to build platforms of the needed length for the usual station, but If an unstaffed station were built, then it would be easier and financially feasible, too. In small space stations can be ready with low cost and low carbon footprint due to minimal construction as Essex MT station, whose platform length is just 200 ft long.

However, one of the challenges with all the locations is that no train can be stopped without blocking a grade crossing because the average train length is around 5000 ft in the USA, according to The Association of American Railroads, and not a single location available nearby is where the train can be stopped with open grade crossing.

Google Earth link:

https://earth.google.com/optimal_stations_locations

Every detail needed is available in the provided Google Earth link for the locations and location-related details mentioned in it.

Economic and Community Impact Analysis

Job creation and business opportunities

The Alberta-Montana Passenger Rail Project would help to generate many job opportunities both in the construction and operational stages. Indirect jobs will also be created through the growing demand for local businesses based on the rail operations and

public services. The project will foster entrepreneurship by driving the establishment of rail-related ventures such as station-oriented food stores and retail vendors.

Tourism and hospitality sector growth

The increased connectivity of passengers and the local community will highly enhance growth in the tourism and hospitality sector. Connecting major attractions such as Yellowstone National Park and Banff, the railroad will bring more tourists to the area, which will encourage the demand for hotels and huge jobs (Parks Canada, 2022). Travelers will find it easy to get to view sites and places of culture, which will enhance their vacation experience and lead to extended stays.

Housing market and urban development impact

The enhanced access of the location would foster the desirable destinations for housing investment and residential redevelopment, driving demands for housing and real estate investments. Transit-oriented development would foster liveable urban development with less development dependency.

Public perception and stakeholder engagement

Support from the local community is crucial in this project, they can assist in public meetings regarding building construction and beneficial input in the area. Their support in this project not only helped the railway authority but also developed the economic, social and environmental value and positive change of the land.

Funding and Financial Feasibility

Government funding and grants

Government funding is traditionally complemented on passenger rail infrastructure. The other option is directly from a bank such as the Canada Infrastructure Bank (CIB) which has up to CAD$1.28 billion in the REM system of Montreal and has also committed CAD$55 million to High Frequency Rail between Ontario and Quebec (Canada Infrastructure Bank, 2025). Some American grants such as the Corridor Identification Programme of the Federal Railroad Administration (US$500,000 per corridor) and CRISI Programme (US$1.4 billion total) could definitely benefit cross-border initiatives (Federal Railroad Administration, 2025).

Public-Private Partnerships (P3s)

P3 offers an alternative model where projects comprise financing, skills and resources from the private sector along with government funding. The P3 route accelerates project delivery, allocates financial risks, promotes innovation and enhances cost efficiency. However, its success relies on careful planning to ensure public benefits outweigh private profits.

Potential private investors and economic impact studies

Private investors that could be included in this are CDPQ (CAD 434.2 billion in assets) of Quebec and its subsidiary infrastructure developing institutions such as CDPQ infra and Plenary Americas (CDPQ, 2025). On the foregoing note Plenary has been receptive to the Alberta passenger rail through an Enhanced Unsolicited Proposal for the Calgary-Banff Railway project and has gathered proven expertise in developing sustainable transport systems.

Cost-benefit analysis for each location

Every site needs a thorough cost-benefit analysis of construction costs, operational costs, revenue estimates, economic activity multiplier benefits, tourism benefits, employment generation and environmental impacts to ascertain the financial feasibility and appropriate financing structure across the jurisdictions.

Environmental and Regulatory Compliance

Environmental impact assessment

Maintenance of air quality noise disturbance, habitat fragmentation and contamination hazards are among the assessment parameters of an environmental study (Thyret & Macklem, 2024). Mitigation measures can consider wildlife corridors, noise dampening measures and alternative fuels such as hydrogen-electric hybrids. On top of this Project implementation should consider other legal matters such as the Canadian Environmental Protection Act, the Montana Environmental Policy Act and several others relating to the protection of water and species on both sides of the border (Act, 1993 & Owen, 2024).

Compliance with Montana and federal transportation laws

Both state and federal transportation regulations within Montana necessitate that the US Federal Railroad Safety Act is followed as well as the standards from the Department of Transportation regarding track maintenance, equipment standards and operational practices. Regarding Transport Canada the Railway Safety Act obliges railway companies to obtain Railway Operating Certificates to implement Safety Management Systems and to comply with standards for locomotive safety and grade crossings (Transport Canada, 2019).

Cross-border regulatory considerations

There are cross-border concerns one should coordinate with CBSA and US Customs and Border Protection for customs clearance as well as immigration procedures and security

protocols. These may additionally involve international agreements negotiations for streamlined border crossing, including pre-clearance arrangements, shared security standards and coordinated inspection systems application to provide efficiency in passengers processing and maintenance of security.

Recommendations & Conclusion

Summary of research findings

The overall study is focused on the Alberta-Montana Passenger Rail Project, which will connect the lifeline between Alberta and Montana and develop the quality of life, along with economic, environmental and social standards of the area. The in-depth analysis describing a range of sides of this project would help the rail organisation to boost their knowledge and complete it seamlessly.

Final recommendation

The Alberta-Montana Passenger Rail Project must first consider strategic planning about optimizing connectivity and economic gain. Interconnecting the air, rail travel and local transport systems must increase mobility and tourism. Public support and long-term success depend on community involvement and open communication.

References

Act, C. E. P. (1993). Priority substances list assessment report. Environment Canada and Health Canada, Ottawa, Ontario, 1-56. Retrieved on 24 March 2025 from: https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/contaminants/psl1-lsp1/1_2_dichlorobenzene/1_2_dichlorobenzene-eng.pdf

Americans with Disabilities Act (ADA), (2024). Accessibility requirements for public transit and rail stations. Retrieved on 24 March 2025 from: https://www.ada.gov/

CDPQ, (2025). Infrastructure. Retrieved on 24 March 2025 from: https://www.cdpq.com/en/investments/infrastructure

City-Data, (2023). Belgrade, Montana: Population growth and economic trends. Retrieved on 24 March 2025 from: https://www.city-data.com/city/Belgrade-Montana.html#google_vignette

City-Data. Com, (2022). Belgrade, Montana. Retrieved on 24 March 2025 from: https://www.city-data.com/city/Belgrade-Montana.html

Cregger, J., Mahavier, K., Holub, A., Machek, E., Crayton, T., Patel, R., ... & John, A. (2022). *Brothers National Memorial* (No. DOT-VNTSC-NPS-22-03). John A. Volpe National Transportation Systems Center (US). Retrieved on 24 March 2025 from: https://rosap.ntl.bts.gov/view/dot/63612

Federal Railroad Administration. (2025). Corridor Identification and Development Program. Retrieved on 24 March 2025 from: https://railroads.dot.gov/corridor-ID-program

Gallatin Country, MT, (2021). Triangle Trails Plan. Retrieved on 24 March 2025 from: https://gallatincomt.virtualtownhall.net/sites/g/files/vyhlif606/f/pages/triangle_trails_plan_adopted_112321.pdf

Medić, S., Atanacković Jeličić, J., & Rapaić, M. (2024). Advancing social and economic sustainability in urban areas: a methodology for determining architectural programs of shopping centers. *Sustainability*, *16*(8), 3264. Retrieved on 24 March 2025 from: https://www.mdpi.com/2071-1050/16/8/3264

Montanan Rail Link, 2024). MRL to BNSF Transition. Retrieved on 24 March 2025 from: https://www.montanarail.com/

MTFP, (2023). Are passenger trains entering a golden age or reaching the end of the line?

Optimal station locations. (n.d.). [Dataset]. https://earth.google.com/web/@45.68931618,-111.02638499,1451.34923404a,593.80972476d,34.99994217y,32.2540548h,0t,0r/data=CgRCAggBMikKJwolCiExWWpMTkR3VVF0X29OaFY2ZGlqQWhQQ3dnaHVmWmZKbTAgAToDCgEwQgIIAEoHCPGE2zMQAQ

Owen, D. (2024). The Water District and the State. Yale LJ, 134, 1. Retrieved on 24 March 2025 from: https://www.yalelawjournal.org/article/the-water-district-and-the-state

Parks Canada, (2022). Banff National Park of Canada Management Plan 2022. Retrieved on 24 March 2025 from: https://parks.canada.ca/pn-np/ab/banff/info/gestion-management/involved/plan/plan-2022

Canada Infrastructure Bank, (2025). High-Frequency Rail. Retrieved on 24 March 2025 from: https://cib-bic.ca/en/projects/trade-and-transport/high-frequency-rail/

Pazzini, M., Lantieri, C., Vignali, V., Simone, A., Dondi, G., Luppino, G., & Grasso, D. (2022). Comparison between different territorial policies to support intermodality of public transport. *Transportation Research Procedia*, *60*, 68-75. Retrieved on 24 March 2025 from: https://www.sciencedirect.com/science/article/pii/S2352146521009108

Realtor.com. (n.d.). https://www.realtor.com/realestateandhomes-detail/110-Northern-Pacific-Ave_Belgrade_MT_59714_M90797-59727

Retrieved on 24 March 2025 from: https://montanafreepress.org/2025/02/05/are-passenger-trains-entering-a-golden-age-or-reaching-the-end-of-the-line/

Smith, P. T. (2023). *Bozeman and the Gallatin Valley: a history*. Rowman & Littlefield. Retrieved on 24 March 2025 from: https://books.google.com/books?hl=en&lr=&id=ZKEeEQAAQBAJ&oi=fnd&pg=PP1&dq=The+Old+Bozeman+Railway+Station+is+a+good+location+because+it%27s+historically+valued+and+close+to+downtown&ots=iIxK95eHai&sig=0A2NKz4n1QivvKOR0tJUgYI9N3I

Station platforms. (2012). In *Station Design Guidelines*. https://media.tri-rail.com/Files/About/SFRTA/Planning/Reports/Station%20Design%20Guidelines/CHAPTER-04-Station-Platforms.pdf

The Association of American Railroads (AAR). (2025, March 21). *Freight rail & Train length | AAR*. Association of American Railroads. https://www.aar.org/issue/freight-train-length/

Thyret. S, and Macklem. T. (2024). Alberta-Montana Passenger Rail Feasibility Report. Retrieved on 24 March 2025 from: https://www.researchgate.net/publication/379889905_Alberta-Montana_Passenger_Rail_Feasibility_Report

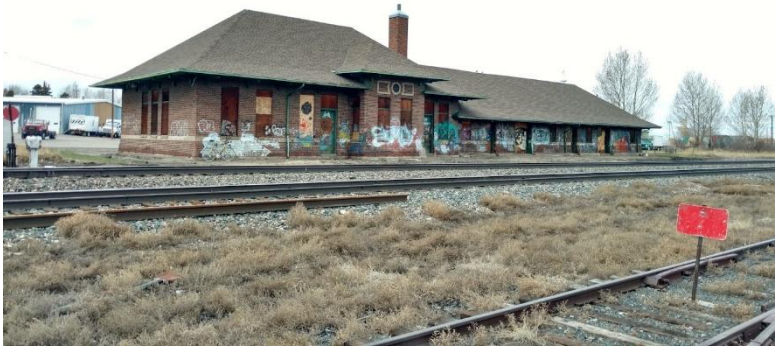
Transport Canada, (2019). The Railway Safety Act. Retrieved on 24 March 2025 from: https://tc.canada.ca/en/rail-transportation/rail-safety-canada/railway-safety-act

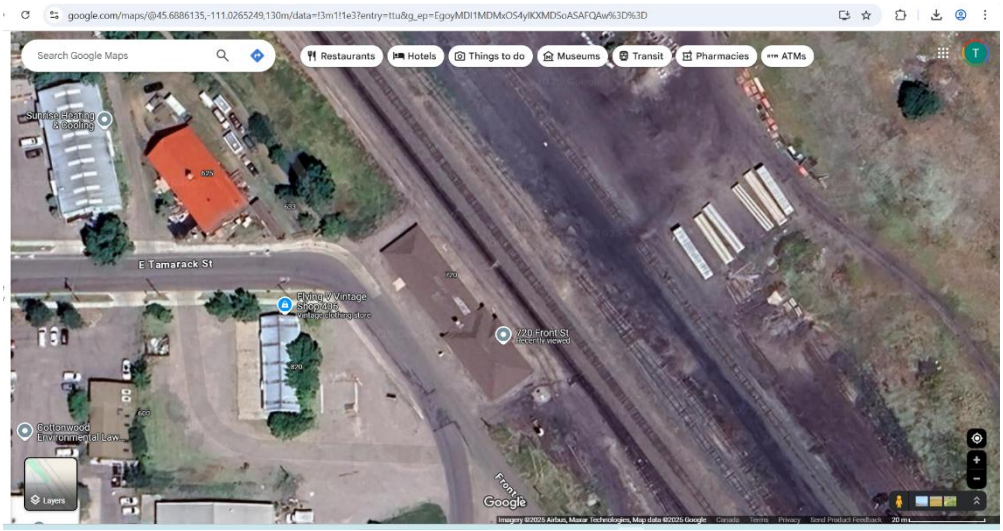
U.S. Environmental Protection Agency, (2024). National Environmental Policy Act. Retrieved on 24 March 2025 from: https://www.epa.gov/nepa

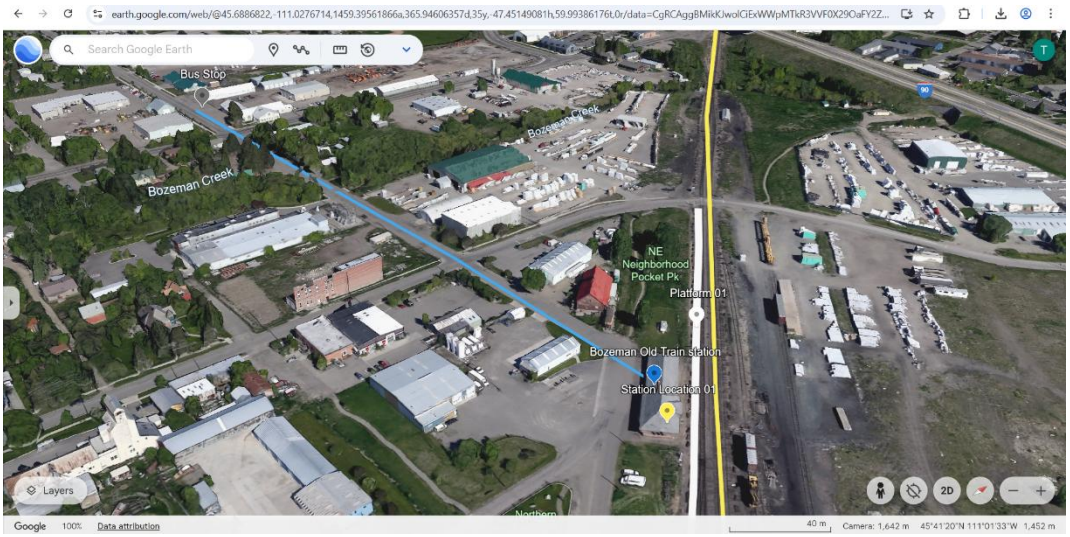
Wikipedia, (2025). Bozeman Yellowstone International Airport. Retrieved on 24 March 2025 from: https://en.wikipedia.org/wiki/Bozeman_Yellowstone_International_Airport

Appendix

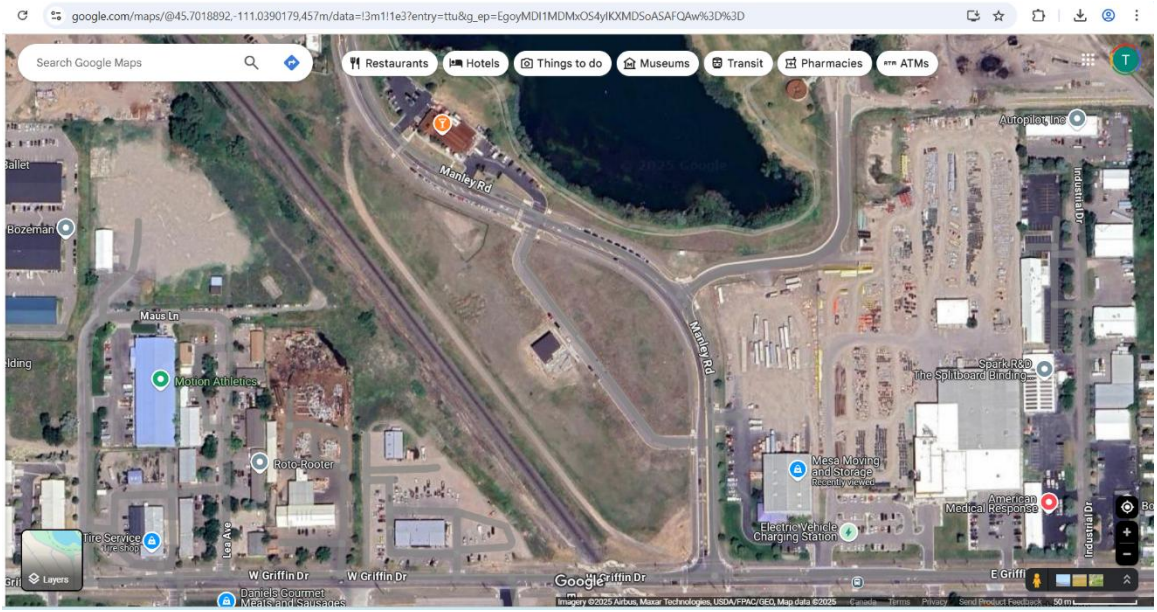
Location 01: Bozeman Station

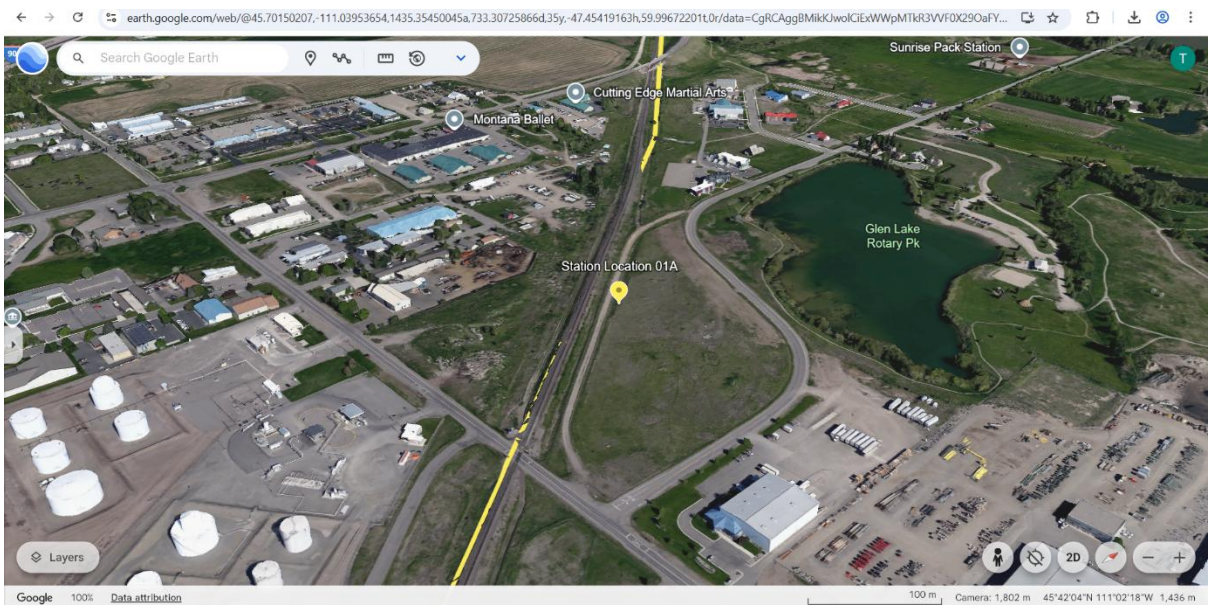






Location 01A: Bozeman Station





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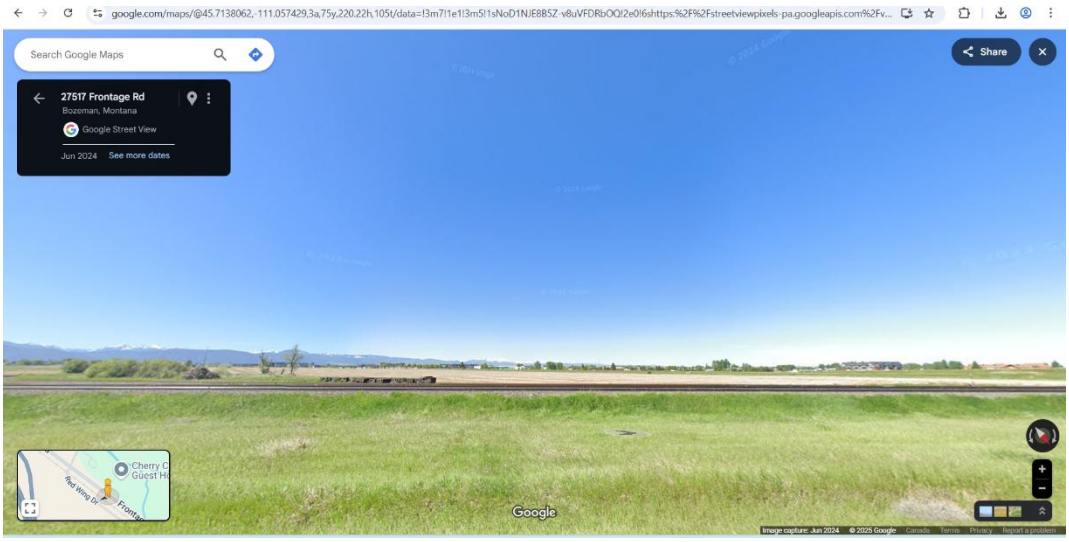

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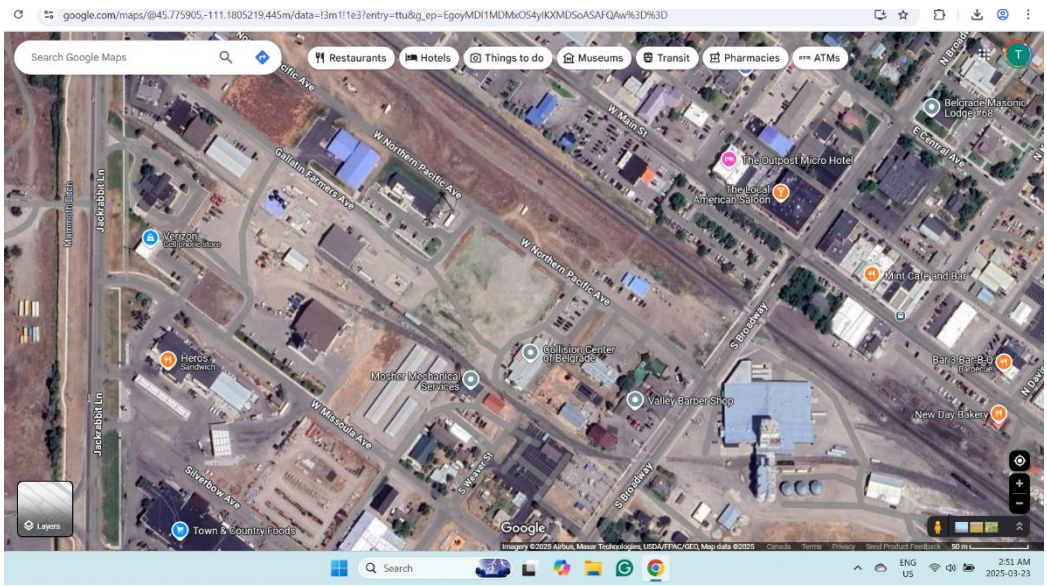
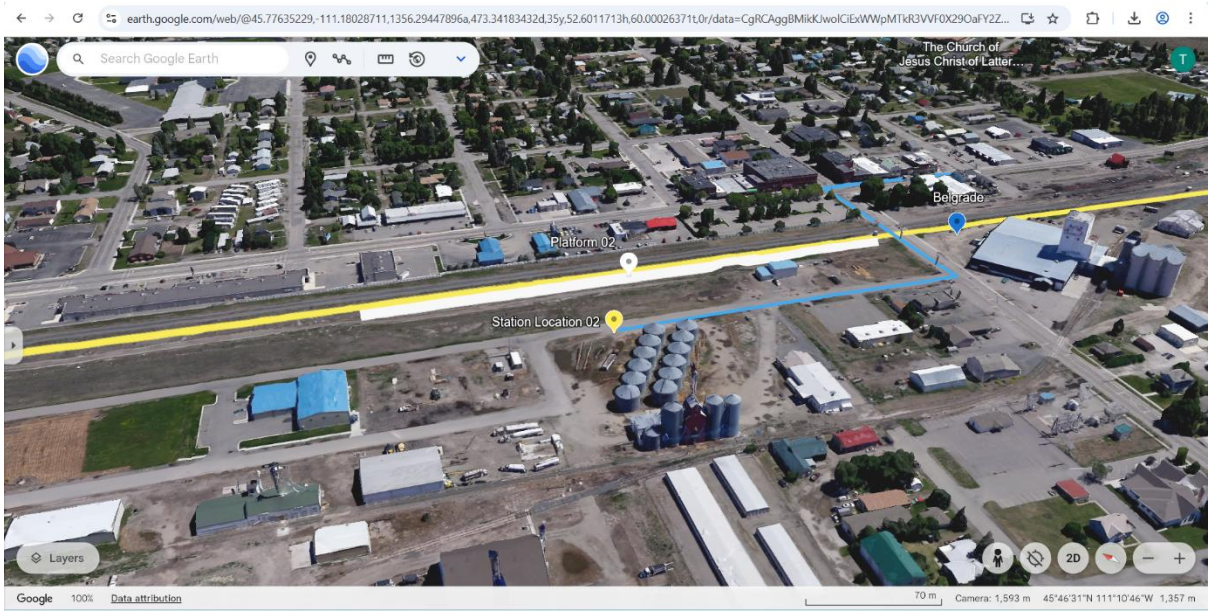
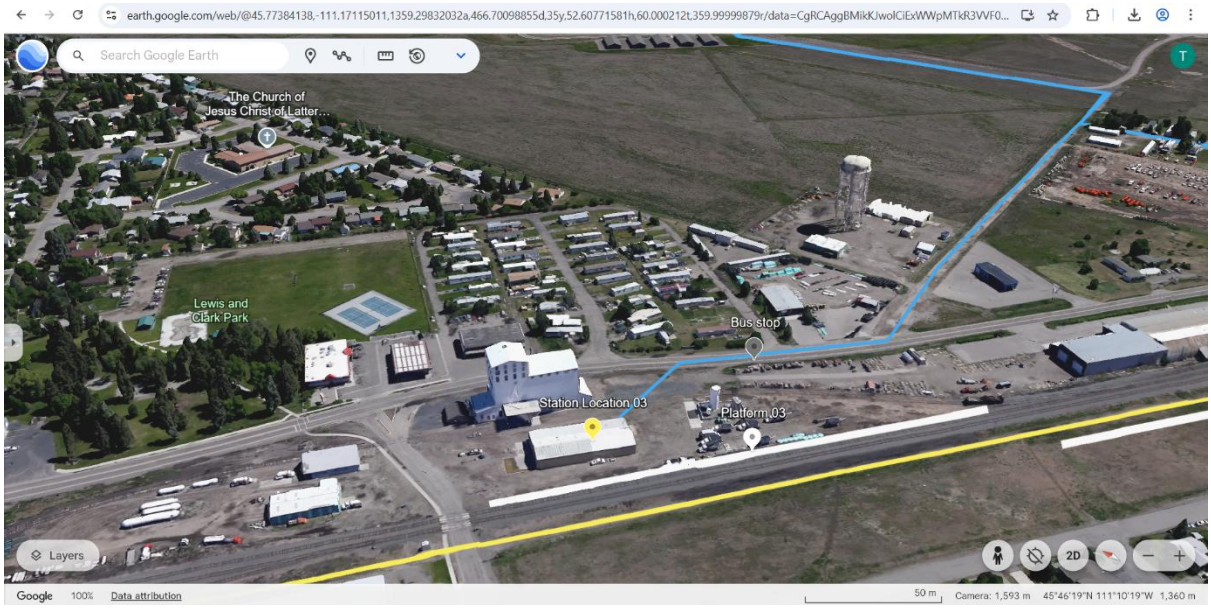
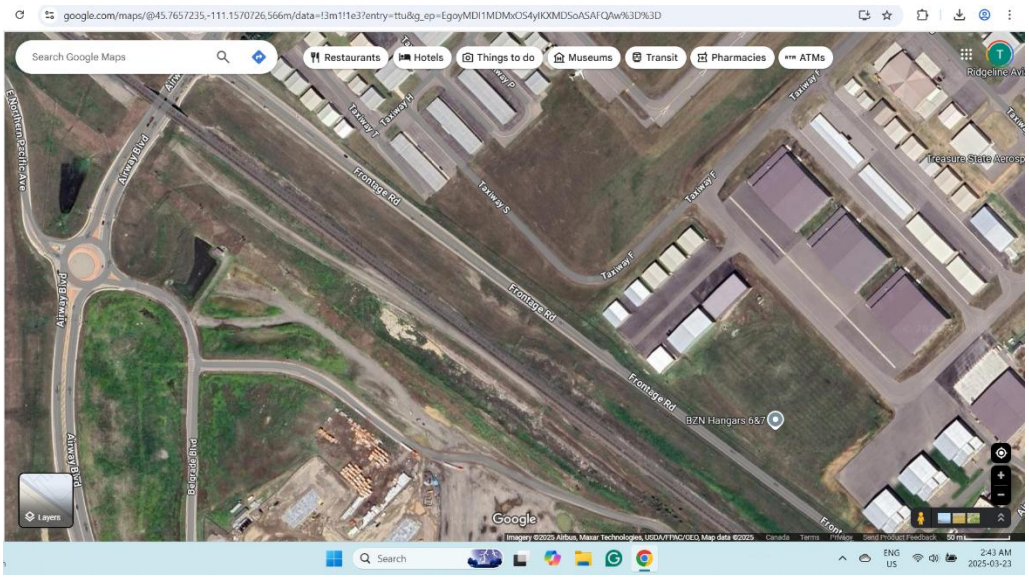


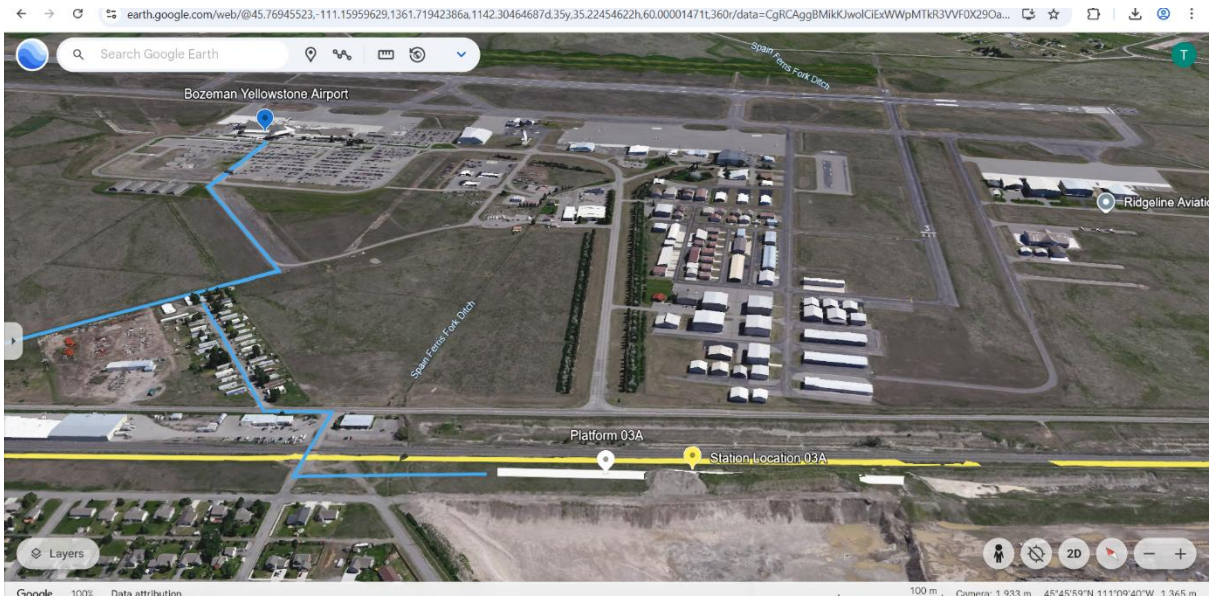


Location 03: Bozeman-Yellowstone Airport

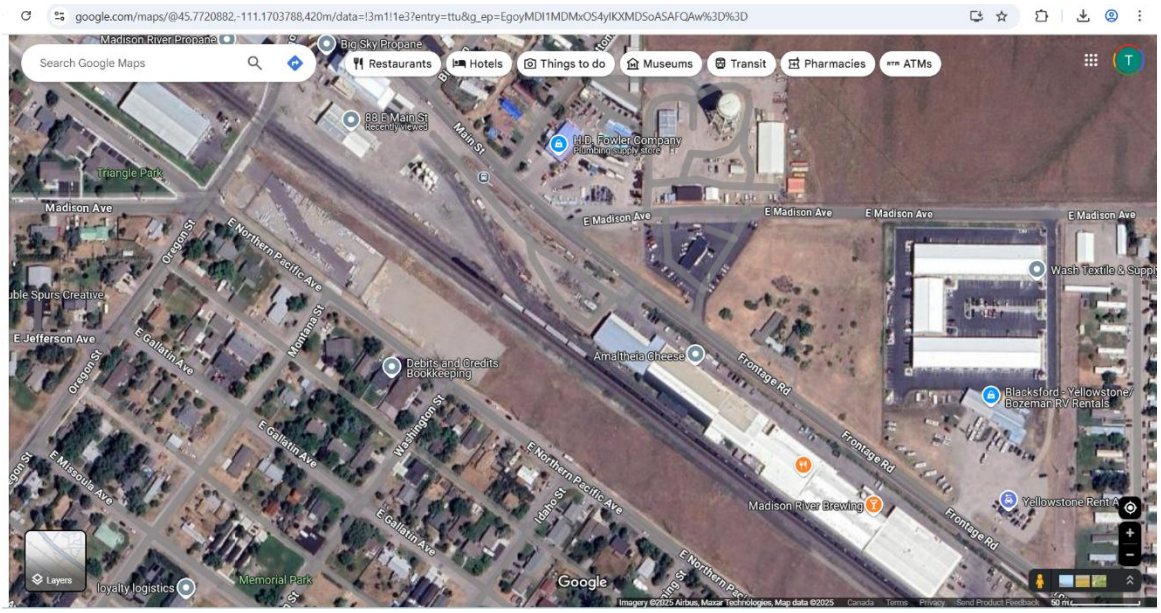


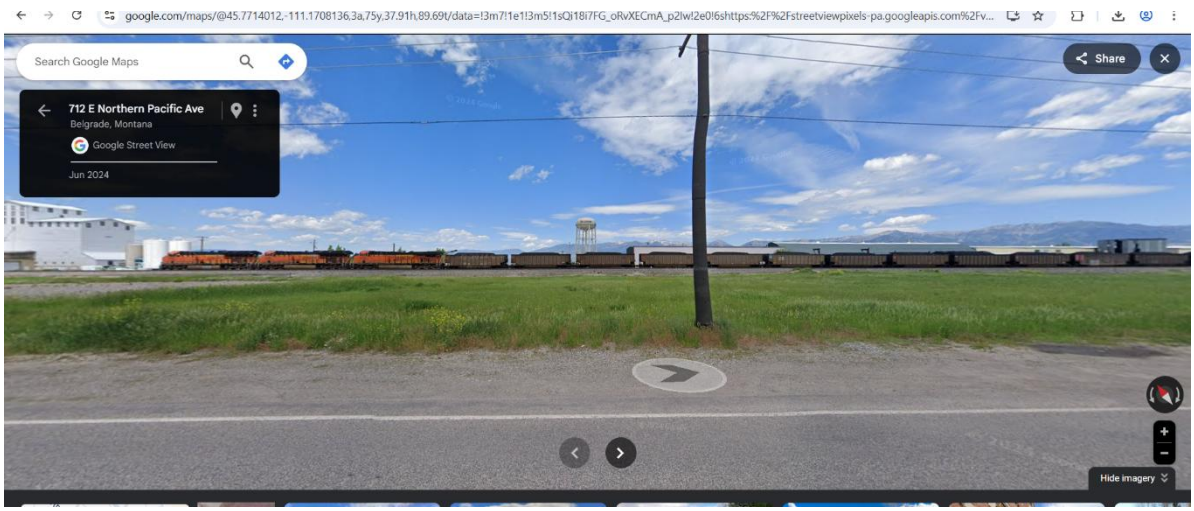
Location 03A: Bozeman-Yellowstone Airport

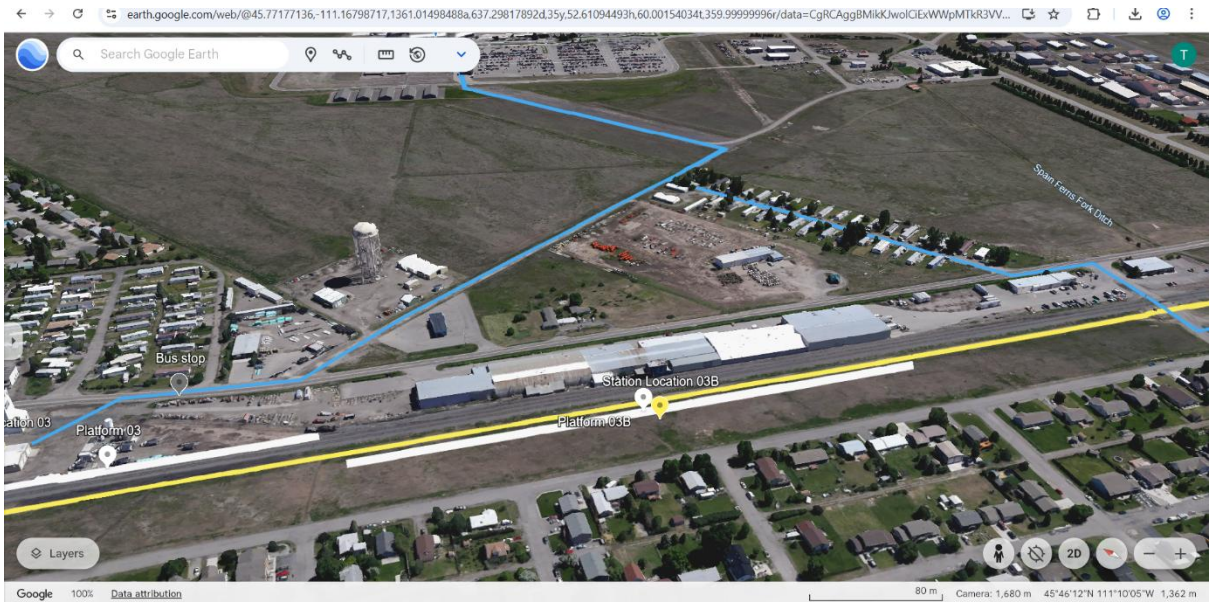




Location 03B: Bozeman-Yellowstone Airport



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Search Google Earth
Spain Ferris Fork Ditch
Bus stop
Station Location 03B
Platform 03B
Platform 03
Layers
2D
Google
100%
Data attribution
80 m
Camera: 1,680 m
45°46'12"N 111°10'05"W 1,362 m