

CHAPTER 5: SOCIAL AND ECONOMIC IMPACTS

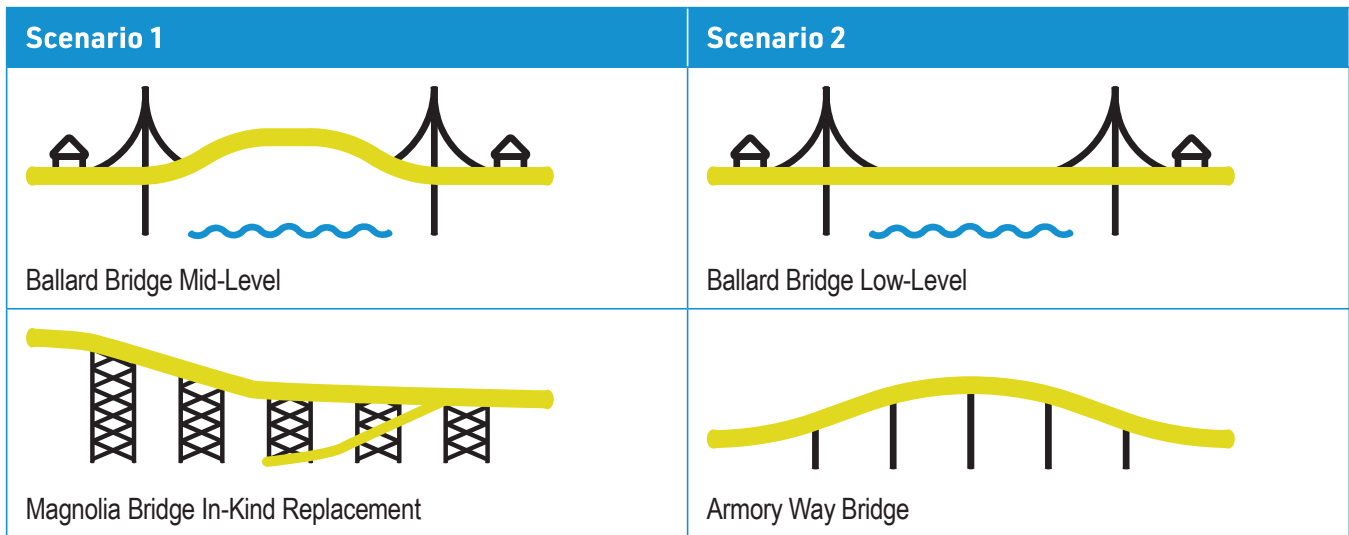
The Ballard-Interbay Regional Transportation System (BIRT) study area encompasses one of the city’s most important industrial and manufacturing centers and is surrounded by growing residential neighborhoods. Like much of Seattle, the area is changing as the city grows.

As part of the BIRT study, the project team developed a data-rich overview of the economic, social, and community significance of the Ballard-Interbay study area. The detailed report included in Appendix E provides an assessment of the current economic and employment landscape, commute patterns, demographic and housing trends, development patterns, and typical uses of the transportation network. Appendix H reviews the replacement and rehabilitation alternatives for the Ballard and Magnolia bridges, including an analysis of the impacts and benefits associated with the alternatives from social and economic dimensions. This chapter summarizes the findings in Appendices E and H, and presents the trade-offs associated with the bridge alternatives evaluated in Scenarios 1 and 2.

ALTERNATIVES EVALUATED

The social and economic assessment focuses on differentiating between Ballard Bridge and Magnolia Bridge alternatives using Scenarios 1 and 2 described in Chapter 4 as the primary comparison.

FIGURE 5-1: BRIDGE SCENARIOS



Chapter 4 presents detailed information about each bridge alternative and scenario

SOCIAL AND ECONOMIC IMPACTS ASSESSMENT

The social and economic impacts of future bridge replacement scenarios frame how alternatives will affect residents, workers, and businesses in daily life. Potential impacts considered for each bridge alternative include travel time, safety, vehicle operating costs, housing accessibility, market desirability, and bridge costs.

FIGURE 5-2: IMPACTS ANALYSIS CRITERIA



The study did **not** conduct a detailed evaluation of construction impacts of bridge alternatives. All impacts are for the operational period of the bridges, and the study year used for analysis is 2042. Detailed assumptions and a more thorough discussion of the analysis are available in Appendix H.

The findings presented in this chapter draw on multiple data and information sources, including previous bridge plans and studies, traffic analysis conducted as part of this study, and state and federal sources (e.g., Washington State Employment Security Department, Office of Financial Management, U.S. Bureau of Labor Statistics). All estimated costs are in 2018 dollars, except in the case of Ballard Bridge costs (page 78) which are forecasted in 2019 dollars.

Summary







Key takeaways from the social and economic impacts analysis include:

- The study area encompasses commuter and distribution networks that are critical to the region by connecting Seattle’s southern industrial areas, downtown Seattle, and areas north. It complements north-south corridors, SR 99 and I-5. Bridge alternatives do not suggest any significant differences in terms of vehicle operating costs or market desirability.
- Both Ballard Bridge and Magnolia Bridge alternatives are expected to provide safety benefits for commuters and people that travel either facility. The proposed bicycle and pedestrian facilities on the Ballard Bridge provide safer active travel.
- Seattle neighborhoods and study area workers rely heavily on the corridor to access jobs and services. The surrounding Ballard, Queen Anne, and Magnolia neighborhoods depend on the Ballard-Interbay corridor for daily work and personal trips. These

important neighborhoods are in high demand for housing of all types, yet affordability and limited multifamily housing options require many workers to live outside the study area. The growing diversity of housing in proximity to downtown and industrial employment centers attracts talent to Seattle, and supports the economy and vibrant commercial areas.

- While there is little difference in terms of travel time between the Ballard Bridge replacement alternatives being considered, the impacts associated with the Magnolia Bridge replacement alternatives differ substantially. Transportation access to a new Armory Way Bridge could result in higher vehicular delay and vehicle miles traveled than the In-Kind Alternative. If this alternative is chosen, SDOT would need to work in close partnership with agencies like King County Metro and Sound Transit to minimize impacts to access, mobility, and travel time.

TABLE 5-1. SUMMARY OF IMPACTS ASSESSMENT FINDINGS

Criteria	 Travel Time	 Safety	 Operating Cost	 Housing Accessibility	 Market Desirability	 Bridge Costs
Ballard Bridge Mid-Level	Improves by 0.6 minutes	Reduces risk of collisions	No significant change	No impact	No change	\$680M to \$1,460M
Ballard Bridge Low-Level	Improves by 0.2 minutes	Reduces risk of collisions	No significant change	No impact	No change	\$330M to \$710M
Magnolia Bridge In-Kind Replacement	Increases by 0.7 minutes	Minimal safety benefits	No significant change	No impact	No change	\$340M to \$420M
Armory Way Bridge	Increases by 12.7 minutes	Minimal safety benefits	No significant change	Could increase commute time	No change	\$200M to \$350M

Travel Time



How will each bridge alternative impact travel time for commuters and freight that use the bridges?

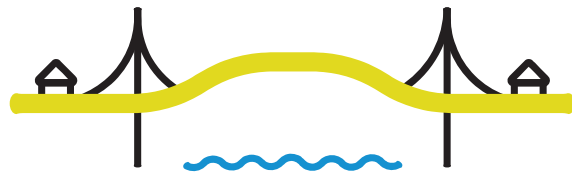
People's time has value. Increased time spent traveling reflects loss of productivity for individuals and is costly to businesses that move goods and freight on the public street system. A reduction in travel time can increase people's personal time for other activities and have a net economic benefit for businesses and goods haulers. Travel time impacts are estimated using data on projected traffic volumes and travel time changes taken from transportation modeling conducted by the BIRT study team. The change in travel time represented is the average of the change for representative trips crossing each bridge for the AM and PM peak periods.

Ballard Bridge

From the perspective of travel time alone, the 2 Ballard Bridge alternatives considered are forecasted to have a small benefit for people using vehicles, including those operating trucks and goods delivery vehicles.¹ The forecasted travel time impacts of the bridge replacement alternatives are compared to the No Build option in 2042, which assumes no change in the existing transportation network. A mid-level alternative reduces the need for bridge span openings compared with the low-level alternative. The Ballard Bridge opens approximately 7 times each weekday with an average delay of 5 minutes per opening. The low-level alternative would not change the number of openings or amount of delay. According to the BBPS, the mid-level alternative would significantly reduce the number of bridge opening daily. It also provides better connectivity between the bridge and local streets north of the Ship Canal.

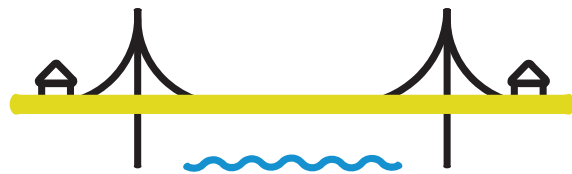
The Ballard-Interbay corridor will continue to experience high demand for housing and commercial development, which will result in a steady increase in trip volumes throughout the corridor. The potential investments identified in Chapter 6 provide much needed maintenance and improvements to mitigate continued growth and demand on the transportation system.

BALLARD BRIDGE MID-LEVEL



Improves travel time by **0.6 minutes** per vehicle, resulting in total annual travel time savings of **\$3.9 million** in 2042 (in 2018 dollars).

BALLARD BRIDGE LOW-LEVEL



Improves travel time by **0.2 minutes** per vehicle, resulting in total travel time savings of **\$1.4 million** in 2042 (in 2018 dollars).

¹ Travel times used for the estimation of travel time savings are average daily general-purpose traffic travel times per vehicle, for all travel purposes including commuting, freight, and other (HOV, SOV).

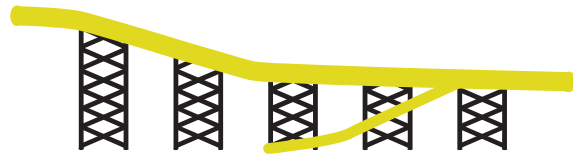
Magnolia Bridge

The analysis found that the Armory Way Bridge would likely result in higher vehicular delay and vehicle miles traveled compared to a No Build option or the In-Kind Replacement alternative (which have the same forecasted travel time due to their similar designs). The Armory Way Bridge alternative is forecasted to increase travel time by approximately 13 minutes for trips that connect from west of the current Magnolia Bridge terminus at Thorndyke Ave W/W Galer St to the east at Elliott Ave W/W Galer St Flyover.

This translates to an estimated economic impact of \$23.1 million in 2042. It should be noted that this is an extremely conservative estimate, as it assumes that all 20,000 daily bridge users would travel between the existing Magnolia Bridge terminus at Thorndyke Ave W/W Galer St to the east terminus at Elliott Ave W/W Galer St Flyover, via the new Armory Way Bridge. This is a very circuitous route that many travelers will not take, as they would more likely access the new bridge from points further to the north. If this bridge replacement alternative is selected, it is recommended that additional surface route modeling be performed to better understand travel time impacts, and that the City collaborate with entities like King County Metro and Sound Transit to minimize travel time impacts.

In addition to travel time impacts from the Armory Way alternative, there are impacts to Port of Seattle access at Terminal 91. Port lands are required to build new access roads and a series of 90 degree turn-movements are required, impacting larger vehicles accessing the north end of Terminal 91.

IN-KIND REPLACEMENT



- Increases travel times by **0.7 minutes** per commuting and general-purpose vehicle and by **1.3 minutes** per freight vehicle.
- Negative impacts to the economy from travel time delays are estimated at **\$1.5 million** in 2042 (in 2018 dollars).

ARMORY WAY BRIDGE



- Increases travel times by **12.7 minutes** per vehicle. Travel time impacts depend on the origin and destination and apply to a subset of trips that currently use the Magnolia Bridge.
- Negative impacts to the economy from travel time delays are estimated at **\$23.1 million** in 2042.

Magnolia Village, the commercial core of Magnolia, provides neighborhood services and retail; it is not, however, a major employment center. Workers may commute into the Magnolia neighborhood from elsewhere, and those that rely on the Magnolia Bridge would be affected by increased travel to Armory Way.

Other Corridors

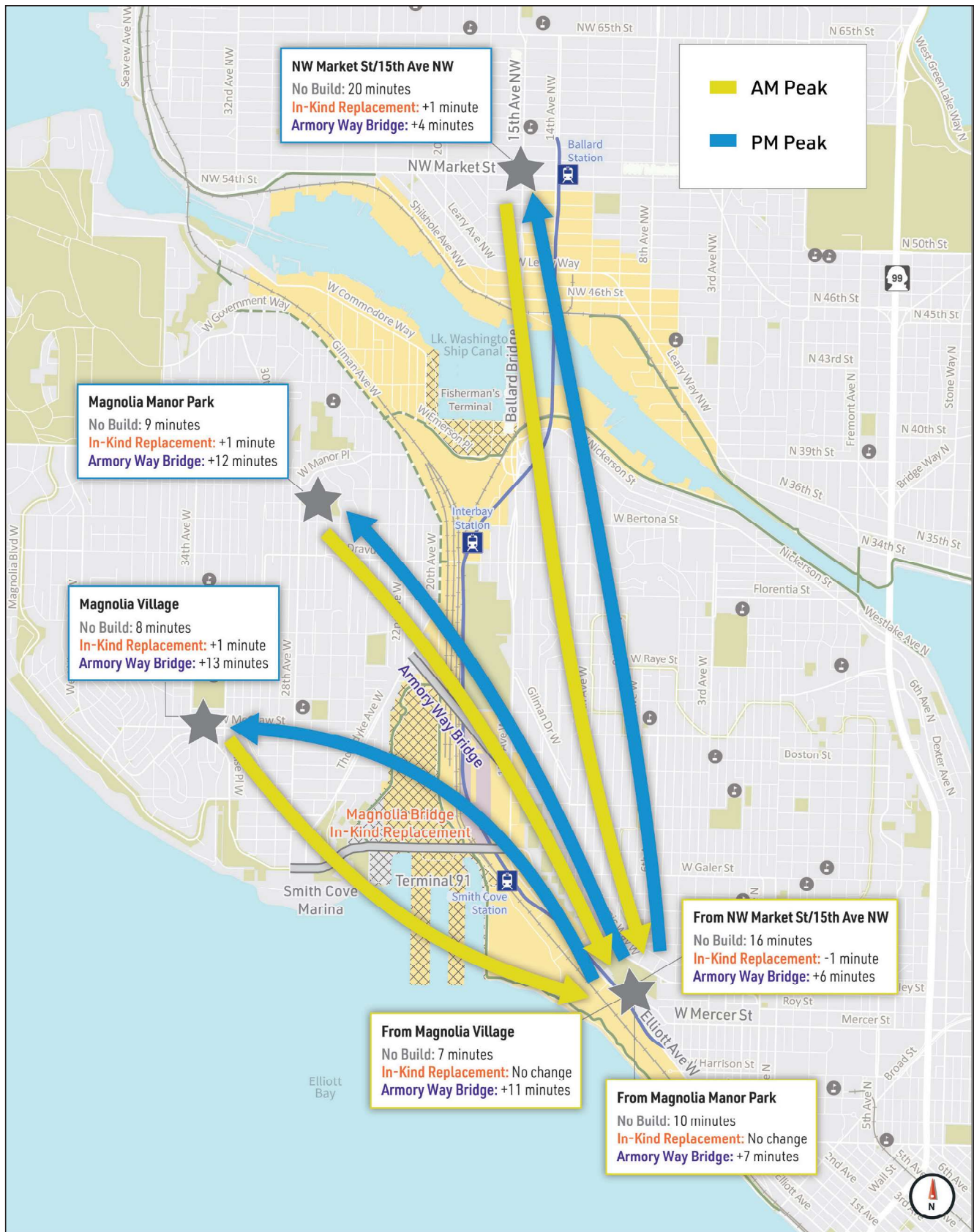
The analysis of travel time impacts also considered potential impacts to other corridors in the BIRT study area from changes to the network produced by the proposed Ballard Bridge and Magnolia Bridge alternatives. According to travel time analysis results, travel time impacts for general-purpose and freight traffic are projected to be minimal on NW Leary Way between 17th Ave NW and 14th Ave NW, W Emerson St/W Nickerson St between Gilman Ave W and 13th Ave W, and W Dravus St.



Travel time impacts are projected to be minimal on W Dravus St (pictured) and other corridors in the BIRT study area

Figure 5-3 (next page) shows the forecasted 2042 travel times for common vehicle trips within the study area during the AM and PM peak periods, when there is the most delay. The values are from traffic modeling conducted during the BIRT study. The modeling assumes major projects such as West Seattle and Ballard Light Rail Extensions are in place (and all projects assumed in our baseline scenario described in Chapter 4), but does not include the benefits of recommended BIRT investments. Of note is that the Armory Way bridge option increases travel delay on the 15th Ave W corridor as well as increasing travel time between points south and Magnolia neighborhoods.

FIGURE 5-3: PROJECTED AM AND PM PEAK VEHICLE TRAVEL TIMES, COMPARISON OF MAGNOLIA BRIDGE IN-KIND BRIDGE REPLACEMENT AND AMORY WAY BRIDGE ALTERNATIVE TO 2042 NO BUILD



Safety



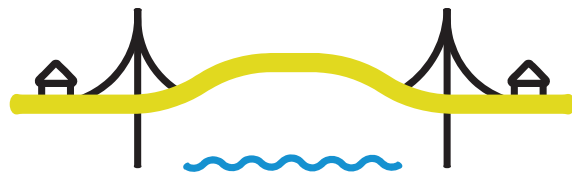
How will each bridge alternative impact safety for various modes of transportation?

The safety analysis considers whether the proposed Ballard Bridge and Magnolia Bridge alternatives reduce the likelihood of fatalities, injuries, and property damage and improve safety outcomes for residents and workers in the BIRT study area. Traffic collisions can impose various types of non-market costs such as pain, grief, and reduced quality of life, as well as medical and rehabilitation care costs, emergency services, lost productivity and disability compensation, and property damage. Transportation projects that improve road safety can enhance economic performance by improving labor productivity and reducing economic losses that result from injuries and disabilities. This study does not project future crashes and therefore a full quantification of safety benefits was not possible.

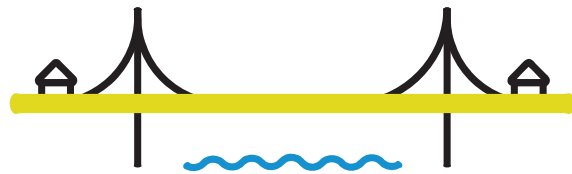
Ballard Bridge

Both Ballard Bridge alternatives provide improved bicycle and pedestrian facilities that will increase travel safety for people walking, rolling, and biking. The Ballard Bridge Planning Study (2020) evaluated collision data for the Ballard Bridge and the ramp junctions north and south of the bridge. Five years of collision data show no collisions involving people walking or biking on the main segment of the Ballard Bridge between the ramp junctions, and only 1 collision involving a person walking or biking at each interchange on 15th Ave W and south of the bridge. None of these collisions resulted in serious injuries or fatalities. The probability of collisions could increase with growth in all modes of travel.

BALLARD BRIDGE MID-LEVEL



BALLARD BRIDGE LOW-LEVEL

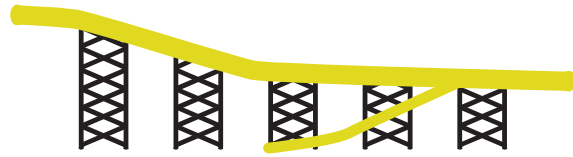


The shared use path included in both alternatives for the Ballard Bridge has the potential to save **\$2.65 million per fatal crash and \$62,650 per injury crash** by reducing the risk of collisions involving people walking and biking. According to data from the Federal Highway Administration, a shared use path can reduce fatal and non-fatal crashes by 25%.

Magnolia Bridge

Previous studies suggest people walking and biking will continue using existing travel routes regardless of bridge alternative due to natural grades in the area. A relatively small increase in bicycle and pedestrian traffic is expected with both alternatives. Low collision rates in this part of the study area—no collisions involving people walking or biking on the Magnolia Bridge between 2014 and 2019—suggest safety benefits for non-motorized access would be minimal; however, both alternatives will improve facilities for walking, rolling, and bicycling. The In-Kind Replacement and the Armory Way Bridge alternative will feature a non-motorized, shared-use path on the south side. Prior studies on the Magnolia Bridge assume a connection to the Elliott Bay Trail from the Armory Way bridge via 20th Ave W. While they do not explicitly assume a connection to the Elliott Bay Trail from an in-kind replacement bridge, the shared-use path on the bridge could connect to the Elliott Bay Trail using the off-ramp to Smith Cove, and this report recommends including this in the design.

IN-KIND REPLACEMENT



ARMORY WAY BRIDGE



For the Magnolia Bridge alternatives, **minimal safety benefits** are expected for non-motorized access due to low levels of historic collisions involving people walking or biking on the Magnolia Bridge and a relatively small projected increase in pedestrian and bicyclist volumes with both alternatives.

The Cost of a Crash

Federal guidelines estimate the cost savings of a prevented crash based upon productivity losses, property damage, medical costs, rehabilitation costs, congestion costs, legal and court costs, emergency services (such as medical, police, and fire services), insurance administration costs, and the costs to employers. Values for more intangible consequences such as physical pain or lost quality-of-life are also examined in estimates of comprehensive costs, which include both economic cost components and quality-of-life valuations.

Seattle is committed to achieving the Vision Zero goal to eliminate transportation-related serious injuries and deaths. The cost savings estimated for each bridge alternative above are based upon federal guidelines and do not project or assume future crashes.

Based on the National Highway Traffic Safety Administration (NHTSA) *The Economic and Societal Impact of Motor Vehicle Crashes*

Operating Costs



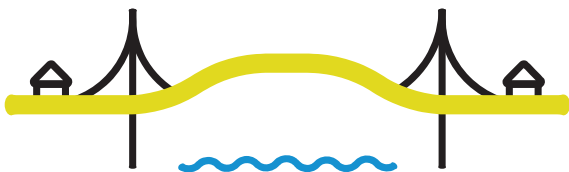
How will each bridge alternative impact vehicle operating costs for transit, freight, and autos?

Vehicle operating cost savings are realized when transportation improvements lead to a decrease in vehicle miles traveled (VMT). Data from the travel demand model does not provide sufficient evidence to suggest any changes in VMT occurring from the implementation of the proposed bridge alternatives. Changes are attributed largely to future increases in density and changes to land uses in the study area rather than improvements specific to bridge alternatives.

The travel demand model used for the study is a version of the Puget Sound Regional Council (PSRC) model that is currently being used for the West Seattle and Ballard Light Rail Extensions project. The model incorporates future land development projects such as Terminal 91 development, later phases of the Expedia Headquarters Campus, and Armory site development. VMT changes are annual and show the difference between the existing VMT and the future 2042 scenarios.

Ballard Bridge

BALLARD BRIDGE MID-LEVEL



No significant change

- Commuting + 607 VMT
- Freight - 1,943 VMT

BALLARD BRIDGE LOW-LEVEL

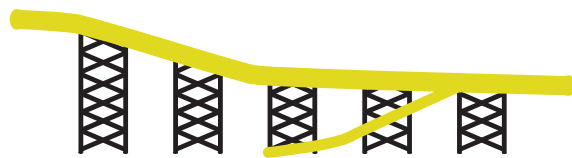


No significant change

- Commuting + 893 VMT
- Freight - 1,721 VMT

Magnolia Bridge

IN-KIND REPLACEMENT



No significant change

- Commuting + 809 VMT
- Freight - 272 VMT

ARMORY WAY BRIDGE



No significant change

- Commuting + 709 VMT
- Freight - 463 VMT

Housing Accessibility

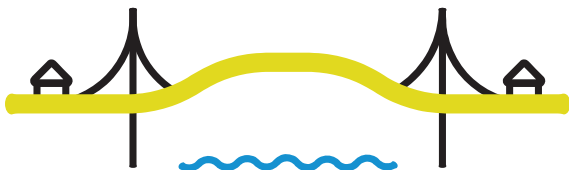


How will each bridge alternative impact access to housing for workers in the study area?

The accessibility analysis assessed how the proposed bridge alternatives would impact access to housing for workers in the BIRT study area. The bridge alternatives and access to the bridges do not rank high among the challenges to workforce housing in the area. Among employers interviewed for this study and other Seattle industrial lands work, the greatest concern for workforce housing in the area is the supply of housing, and the zoned capacity of the land to accommodate demand and development of more affordable housing. Surface traffic circulation affects the experience and time cost of living in the area, but ranks low as a determinant of affordability.

Ballard Bridge

BALLARD BRIDGE MID-LEVEL



No impact to access to housing due to modest improvement in travel time.

BALLARD BRIDGE LOW-LEVEL

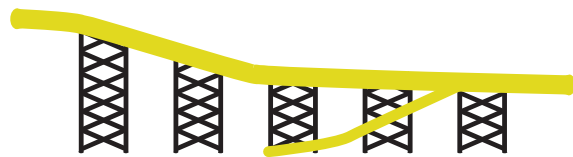


No impact to access to housing due to modest improvement in travel time.

There will likely be no impact to access to housing that is affordable to workers in the study area from the Ballard Bridge replacement alternatives. Both ends of the Ballard Bridge are near a large quantity of relatively affordable housing, by Seattle market standards, and access to the bridge will not suffer based on current traffic analysis.

Magnolia Bridge

IN-KIND REPLACEMENT



No impact to access to housing due to minimal change in travel time.

ARMORY WAY BRIDGE



Could increase commute time for some workers in the Magnolia area traveling from the western terminus of the existing bridge.

The Armory Way Bridge would increase the average commute time per vehicle per day for housing located near the western terminus of the Magnolia Bridge. Lower-priced housing is located well north of the Magnolia Bridge western terminus. Those households would experience less travel time impact due to a more direct and shorter route to the Armory Way Bridge. Access to jobs in the area is not likely to be affected by changes in travel time. For jobs located close to the current eastern terminus of the bridge, commutes from most housing north of the bridge will fall within acceptable commute times (i.e., 20 to 25 minutes during AM and PM peaks).

Market Desirability



How will each bridge alternative affect home and real estate values in the study area?

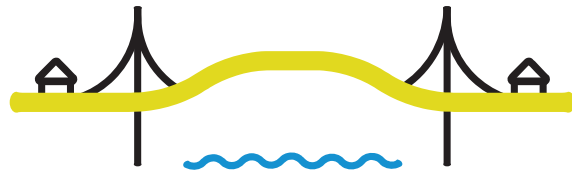
Many residents in the study area have concerns about the impact of the bridge alternatives on home real estate values and the real estate market in general. These concerns were raised during the public outreach process for this project and other planning studies in the area.

Businesses and industry in the area have monitored the alternatives closely but have not expressed a perception of negative impacts on their operations. Based on employer interviews, a top-ranking concern of businesses in the corridor, however, is access to workforce housing. The bridge alternatives do not impair access to businesses in the area from residential areas (and thus this concern is not analyzed in detail). A Magnolia Bridge Planning Study intercept survey found that just 11 percent of respondents in Magnolia Village were visitors who neither lived or worked in Magnolia.

Ballard Bridge

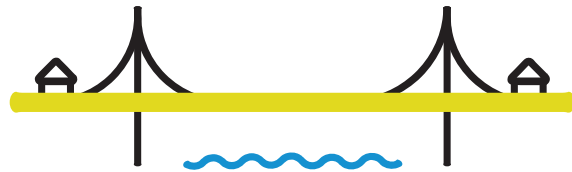
The Ballard Bridge alternatives are expected to have minimal impact on travel time, with an overall net reduction in traveler delay. The 2 Ballard Bridge alternatives improve multimodal connectivity in general and offer relatively minimal difference in how non-motorized and motorized bridge users connect to the surface transportation systems. The areas most affected by the Ballard Bridge alternatives are areas that rely on the new access points. The alternatives are not expected to significantly increase the time to access the bridge, therefore no change in market interest is expected.

BALLARD BRIDGE MID-LEVEL



No change

BALLARD BRIDGE LOW-LEVEL



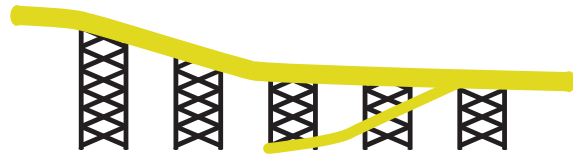
No change

Magnolia Bridge

The long-term growth of the region combined with the comparative advantages of the Magnolia neighborhood are expected to sustain demand for housing. Even with increased travel times to Downtown Seattle, the Magnolia neighborhood's views, limited single-family housing supply, and proximity to Magnolia Village are likely to keep market desirability stable over time. The long-term demand will include market segments for whom the travel time to Downtown ranks relatively lower for their interests.

The Armory Way Bridge is forecasted to add 13 minutes on average per vehicle for trips connecting points south of the study area with southern and central Magnolia. Travel time impacts for travelers connecting north are much less. However, only a portion of the 20,000 vehicles that are forecasted to cross the bridge traveling from the southern portion of the Magnolia neighborhood will experience this level of change in travel time; southern Magnolia may experience some negative travel time impacts and northern Magnolia may experience neutral or positive impacts. The increase in travel time most affects residents of households who must travel through Thorndyke Ave W and W Galer St. Other households, particularly the multifamily housing north of the current terminus along Thorndyke Ave W, will experience a lesser travel time impact.

IN-KIND REPLACEMENT



No change in market desirability foreseen due to continued market demand for the study area.

ARMORY WAY BRIDGE



Insufficient evidence to suggest that the change in travel time would correlate with an impact on market desirability for the Magnolia neighborhood.

Bridge Costs

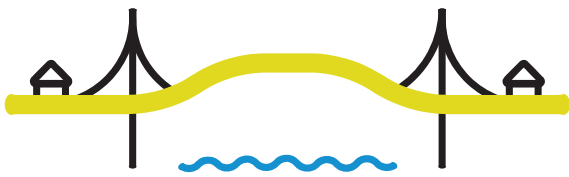


How much will each bridge alternative cost?

Cost estimates were sourced from existing bridge planning studies. Planning level estimates for the Ballard Bridge include construction, maintenance and operations, and right-of-way acquisition. The planning level cost estimates for the Magnolia Bridge also include contingency costs and soft costs.

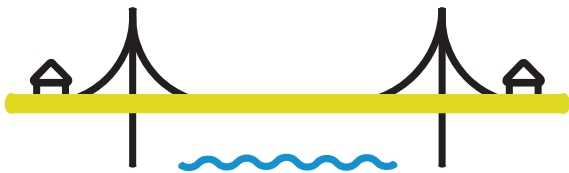
Ballard Bridge

BALLARD BRIDGE MID-LEVEL



Planning level cost estimates are **\$680 to \$1,460 million**² (in 2019 dollars)

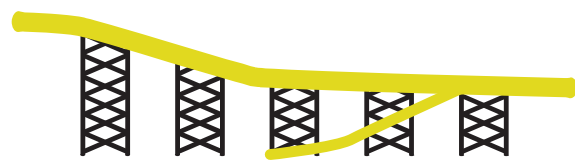
BALLARD BRIDGE LOW-LEVEL



Planning level cost estimates are **\$330 to \$710 million** (in 2019 dollars)

Magnolia Bridge

IN-KIND REPLACEMENT



Planning level cost estimates are **\$340 to \$420 million** (in 2018 dollars)³

ARMORY WAY BRIDGE



Planning level cost estimates are **\$200 to \$350 million** (in 2018 dollars)

² Seattle Department of Transportation (2020). Ballard Bridge Planning Study.

³ The Magnolia Bridge Planning Study (2019) used the cost-estimate basis from an earlier planning study, factoring costs up for inflation. It is important to recognize that all cost estimates used in this report are developed at a rough-order of magnitude level. The significant cost range is reflective of a high level of contingency for unknown cost factors. Those factors could represent costs increases or savings.

CONSTRUCTION IMPACTS

There is insufficient data and information on detour routes, traffic volumes diverted, or the impact on travel times to quantify the effects from construction of bridge alternatives. Construction impacts from current bridge studies are summarized in this section.

Ballard Bridge

The Ballard Bridge Planning Study (2020) did not evaluate traffic conditions during construction.

- The Ballard Bridge Low-Level alternative would require single lane shutdowns as needed across the bridge during construction, with no need for a detour. This alternative has the shortest construction duration of the 3 alternatives considered in the Ballard Bridge Planning Study. More study is needed to determine how the Modified Single-Point Urban Interchange to replace the existing interchange at the W Nickerson St/W Emerson St/15th Ave W intersection could be constructed while maintaining through traffic on 15th Ave W as well as all connections to W Nickerson St and W Emerson St.
- The Ballard Bridge Mid-Level alternative would require complete closure of the existing Ballard Bridge during construction, and a temporary bridge and detour route. The Fremont and Aurora Bridges do not have enough capacity to accommodate diverted traffic. Further traffic and design analysis is required to determine configuration and location of a temporary crossing. Industrial areas along the north shore of the Ship Canal would find this disruption costly and burdensome, and by necessity would use the alternative routes for freight and distribution.

Magnolia Bridge

Existing planning studies for the Magnolia Bridge provide some information on the change in traffic patterns for the No Build scenario.

- The Magnolia Bridge Traffic Maintenance During Bridge Closure (2017) study evaluated the impact to traffic during a potential closure of the existing bridge, either because of a catastrophic event or because of the need to detour traffic during construction of a permanent facility. The study assumes traffic would divert to either W Dravus St or W Emerson St based on existing travel patterns. These alternate routes are expected to become congested, especially at W Dravus St /15th Ave W ramp intersections, W Dravus St /20th Ave W, W Emerson Pl /Gilman Ave W, and W Emerson St /W Nickerson St. Transit would need to be rerouted using the currently designated snow route or other alternative route.
- The Magnolia Bridge Planning Study (2019) estimates that the Magnolia Bridge alternatives will have a similar construction duration, yet the construction impacts of the In-Kind Replacement alternative are expected to last almost twice as long. The Armory Way Bridge will take 29 months to complete, compared to 31 months for the In-Kind Replacement. Within that time-frame, however, the construction impacts for the In-Kind Replacement are expected to last 27 months compared to 14 months for the Armory Way alternative. The difference in duration relates to the required deconstruction of the existing Magnolia Bridge.



RAILROAD
CROSSING

REMOTE
2279

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REMOTE CONTROL EQUIPMENT

GP38-2

BA
REMOTE CONTROL

SPILL PREVENTION
KIT

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