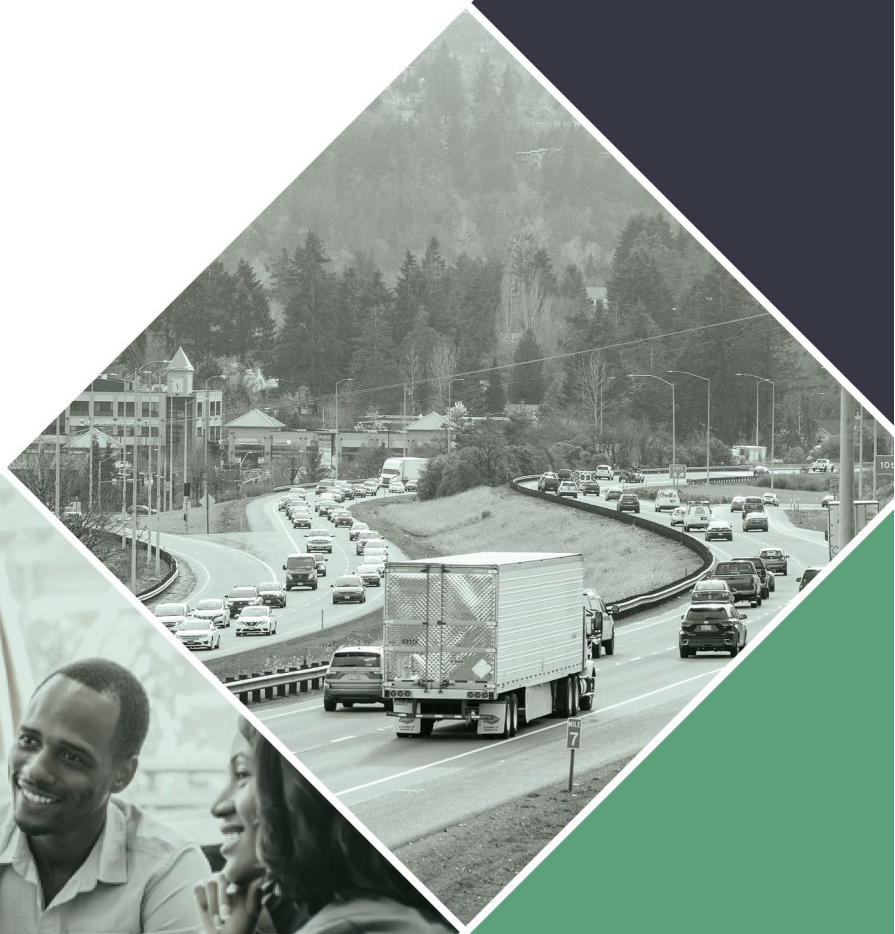
Appendix F I-205 Toll Project Economics Technical Report

I-205 Toll Project

Economics Technical Report

February 2023



Urban Mobility STRATEGY

Oregon Department of Transportation

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Economics Technical Report

February 2023

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
2018 CE	2018 Categorical Exclusion for the I-205 Improvements Project
API	area of potential impact
BEA	U.S. Bureau of Economic Analysis
CE	Categorical Exclusion
C.F.R.	Code of Federal Regulations
FHWA	Federal Highway Administration
FY	Fiscal Year
I-205	Interstate 205
LATCH	Local Area Transportation Characteristics for Households Survey
MP	mile post
I-205 Improvements Project	I-205 Improvements: Stafford Road to OR 213 Project
MSA	Metropolitan Statistical Area
NEPA	National Environmental Policy Act
ODOT	Oregon Department of Transportation
O&M	operations and maintenance
OR	Oregon Route
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
Phase 1A	I-205: Phase 1A Project
Project	Variable rate tolls on the Abernethy and Tualatin River Bridges and the toll-funded I-205 improvements between Stafford Road and OR 213
RIMS	Regional Input-Output Modeling System
USDOT	U.S. Department of Transportation

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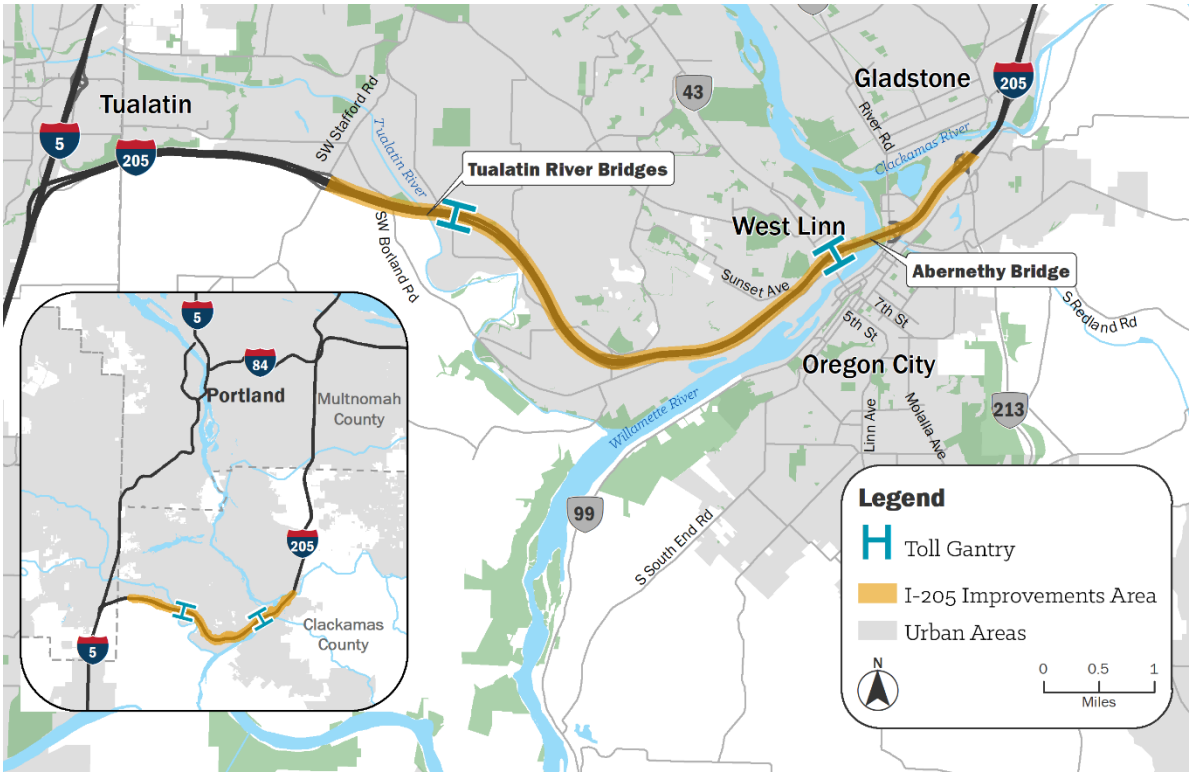
1 Introduction

This technical report supports the I-205 Toll Project Environmental Assessment developed by the Oregon Department of Transportation (ODOT) in partnership with the Federal Highway Administration (FHWA). ODOT proposes to use variable-rate tolls[1] on the Interstate 205 (I-205) Abernethy Bridge and Tualatin River Bridges to raise revenue for construction of planned improvements to I-205 from Stafford Road to Oregon Route (OR) 213, including seismic upgrades and widening, and to manage congestion. The Environmental Assessment evaluates the effects of variable rate tolls and the toll-funded I-205 improvements (together, the "Project") on the human and natural environment in accordance with the National Environmental Policy Act (NEPA). Figure 1-1 illustrates Project Area.

Figure 1-1. Project Area



This technical report describes the existing economic conditions, discusses the potential impacts and benefits the Project would have on those conditions, and identifies measures to avoid, minimize, and/or mitigate adverse effects.

[1] Variable-rate tolls are fees charged to use a road or bridge that vary based on time of day and that can be used as a strategy to shift demand to less congested times of day.

2 Project Alternatives

ODOT evaluated two alternatives in the I-205 Toll Project Environmental Assessment and this technical report:

- No Build Alternative
- Build Alternative

Section 2.1 describes the previous environmental review that led up to the Environmental Assessment and associated technical analyses, and Sections 2.2 and 2.3 describe the alternatives in more detail.

2.1 Project Background and Environmental Review

Oregon House Bill 2017 identified improvements on I-205 as a priority project, known as the I-205: Stafford Road to OR 213 Improvements Project (I-205 Improvements Project). The purpose of the improvements was reducing congestion; improving mobility, travel time reliability, and safety; and providing seismic resiliency for I-205 to function effectively as a statewide north-south lifeline route after a major earthquake by widening I-205 and seismically upgrading or replacing 13 bridges. In 2018, ODOT and FHWA determined that, with respect to FHWA regulations implementing NEPA, the I-205 Improvements Project qualified as a categorical exclusion (CE) (Code of Federal Regulations [CFR] 23 771.117[d][13]). In December 2018, FHWA signed a CE Closeout Document (2018 CE) for the I-205 Improvements Project, which demonstrated that it would not involve significant environmental impacts. At that time, the potential locations for tolling on I-205 had not been determined, and tolling of I-205 was not included in any adopted long-term transportation plan;[2] therefore, tolling was not considered part of the I-205 Improvements Project nor analyzed in the 2018 CE.

After FHWA approved the 2018 CE, ODOT advanced elements of the I-205 Improvements Project as multiple phased construction packages; however, efforts to secure construction funding for the entirety of the project were unsuccessful. In 2021, Oregon House Bill 3055 provided financing options that allowed the first phase of the I-205 Improvements Project to be constructed without toll revenue[3]. This first phase, referred to as the I-205: Phase 1A Project (Phase 1A), includes reconstruction of the Abernethy Bridge with added auxiliary lanes and improvements to the adjacent interchanges at OR 43 and OR 99E. ODOT determined that toll revenue would be needed to complete the remaining construction phases of the I-205 Improvements Project as described in the 2018 CE (i.e. those not included in Phase 1A).

In May 2022, FHWA and ODOT reduced the scope of the project to include only Phase 1A and completed a NEPA re-evaluation that reduced the scope of the 2018 CE decision for the scaled back project (ODOT 2022a). Construction of Phase 1A began in summer 2022 and is estimated to be complete in 2025. The toll-funded improvements were removed from the I-205 Improvements Project and accompanying 2018 CE decision and are now included in the I-205 Toll Project. The environmental effects of the toll-funded improvements are analyzed in the Environmental Assessment and associated technical analyses.

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[2] Federal regulations require that transportation projects be formally included in state and/or regional long-term transportation plans before they receive NEPA approvals.

[3] If tolling is approved upon completion of environmental review of the I-205 Toll Project, tolls could be used to pay back loans for Phase 1A.

2.2 No Build Alternative

NEPA regulations require an evaluation of a No Build Alternative to provide a baseline to compare with the potential effects of a Build Alternative. The No Build Alternative consists of existing transportation infrastructure and any planned improvements that would occur regardless of the Project. The No Build Alternative includes the I-205: Phase 1A Project (reconstruction of the Abernethy Bridge with added auxiliary lanes and improvements to the adjacent interchanges at OR 43 and OR 99E) as a previously approved project that would be constructed by 2025. Under the No Build Alternative, tolling would not be implemented and the toll-funded widening and seismic improvements on I-205 between Stafford Road and OR 213 would not be constructed

2.3 Build Alternative

Under the Build Alternative, drivers of vehicles on I-205 would be assessed a toll for crossing the Abernethy Bridge (between OR 43 and OR 99E) and for crossing the Tualatin River Bridges (between Stafford Road and 10th Street). The Build Alternative includes construction of a third through lane in each direction of I-205 between the Stafford Road interchange and the OR 43 interchange, a northbound auxiliary lane between OR 99E and OR 213, toll gantries and supporting infrastructure, as well as replacement of or seismic upgrades to multiple bridges along I-205 (shown schematically in Figure 2-1).

The following sections provide a more detailed description of the Build Alternative.

2.3.1 Bridge Tolls – Abernethy and Tualatin River Bridges

Two toll gantry areas have been identified for placement of the toll gantries and supporting infrastructure, as shown in Figure 2-2. The gantries and supporting infrastructure would be located entirely within the existing I-205 right-of-way.

Figure 2-1. Schematic Diagrams of No Build and Build Alternatives

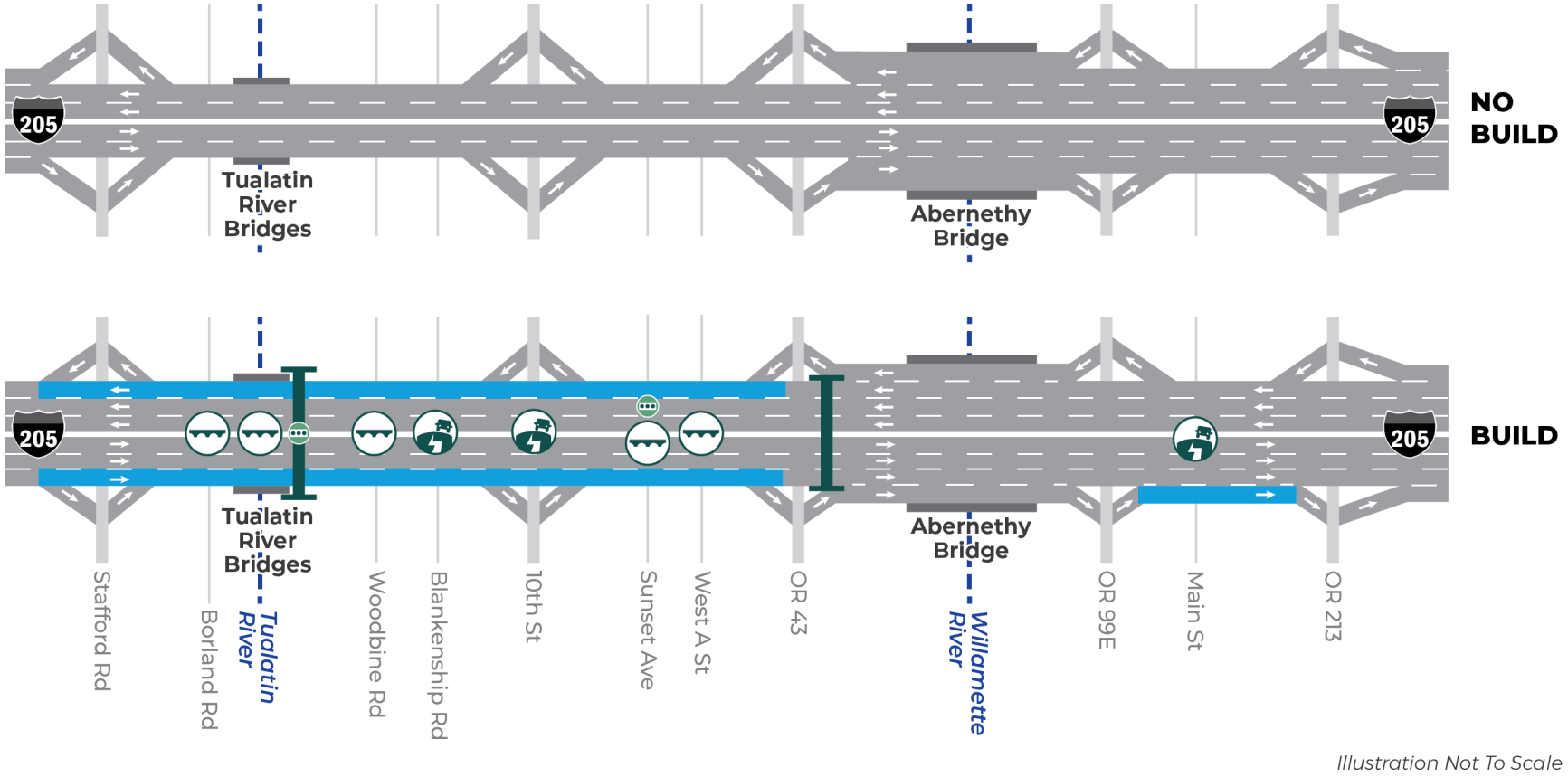
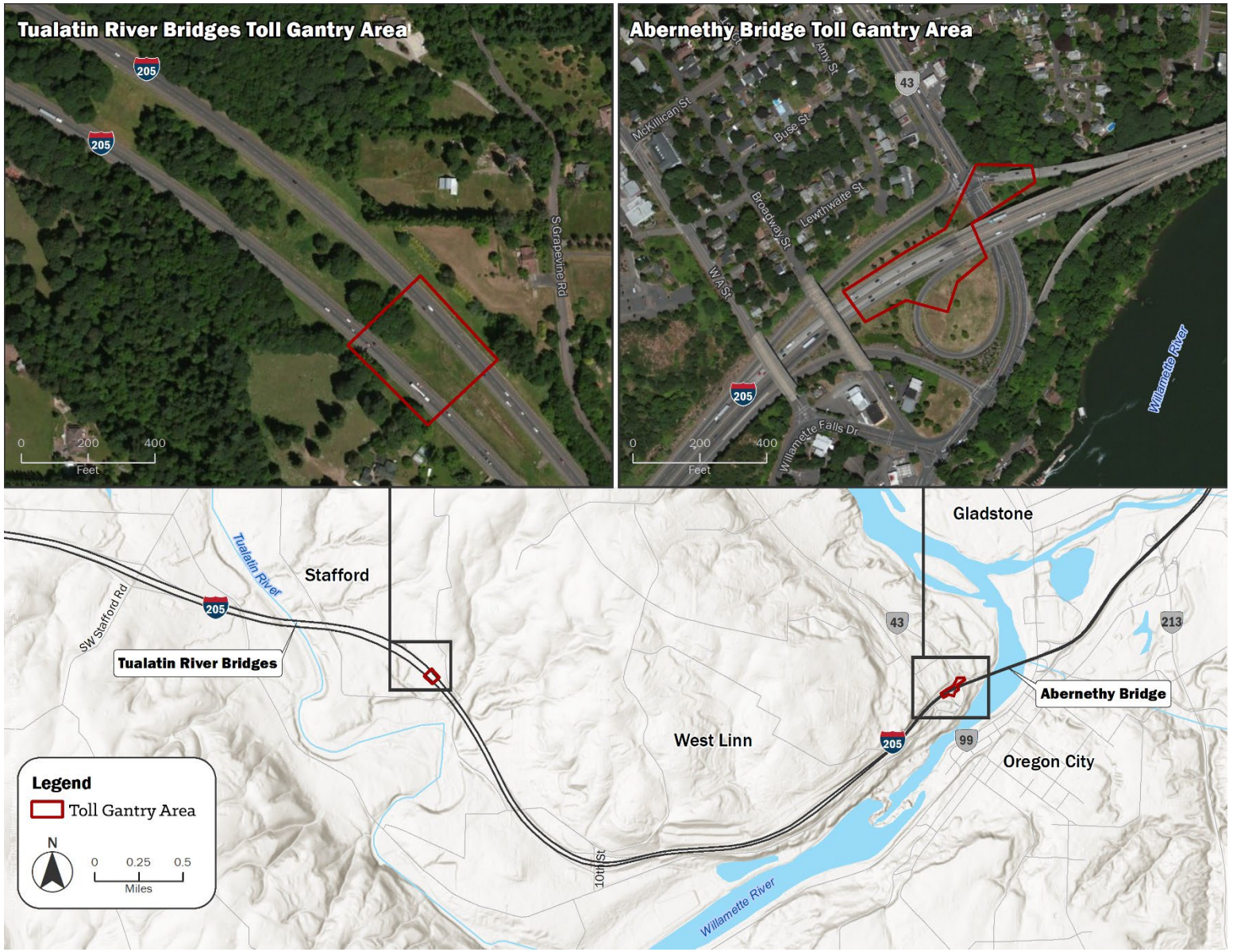


Figure 2-2. Build Alternative: Bridge Tolls – Abernethy Bridge and Tualatin River Bridges



Tolling Technology

Under the Build Alternative, tolling would consist of an all-electronic system that would automatically collect tolls from vehicles traveling on the highway, as shown in Figure 2-3. There would be no toll booths requiring drivers to stop. Rather, antennae, cameras, lights, and other sensors would be mounted on the toll gantries spanning the roadway and would either (1) read a driver's toll account transponder (a small sticker placed on the windshield), or (2) capture a picture of a vehicle's license plate and send an invoice to the registered owner of the vehicle.

Figure 2-3. Electronic Toll System

How electronic tolling works. An all-electronic system would automatically collect tolls from vehicles traveling on the highway. A transponder (a small sticker placed on the windshield) is read and connected to a prepaid account. If a vehicle doesn't have a transponder, a camera captures the car's license plate, and the registered owner is billed. This keeps traffic flowing without stopping to pay tolls.

Tolling Infrastructure

Toll gantries would consist of vertical columns on the outside of the travel lanes and a horizontal structure that would span the travel lanes to which the electronic tolling equipment would be attached. Toll gantries would be constructed of a metal framework with metal or concrete support structures. Gantries and supporting infrastructure would be designed to ensure consistency with other improvements to I-205 included in the Project. The final structure type and design would be determined during the preliminary design of the gantries and would be based on cost, aesthetics, and ease of construction. The toll gantry areas would include paved parking for service vehicles, which would typically be protected by a safety barrier or guard rail.

In addition to the toll technology mounted overhead on the gantries themselves, the gantries would require some additional toll system equipment for data processing, storage, and network operations. This equipment is generally enclosed within a small, access-controlled concrete structure, from which connections to existing ODOT data fiber and commercial power would be routed. ODOT currently operates a fiber data network with a 48-strand fiber-optic cable along the north side of I-205, to which the toll system equipment would be connected. A backup generator (typically fueled by diesel or natural gas) would be provided so the toll equipment would function during power outages. No relocation of existing utilities to accommodate construction of the gantries or any supporting infrastructure is expected.

The Abernethy Bridge toll gantry area would include three toll gantries: a mainline gantry structure that spans all highway lanes, and gantries over the northbound on-ramp and the southbound off-ramp. Each toll gantry would include a single gantry structure. The on-ramp and off-ramp gantries would likely be cantilevered structures. The Tualatin River Bridges toll gantry area would include two toll gantries: one over the mainline northbound travel lanes and one over the mainline southbound travel lanes. Each toll gantry would include a single gantry structure.

Toll Implementation

As Oregon's toll authority, the Oregon Transportation Commission will set toll rates, policies (including discounts and exemptions), and price escalation. If tolling is approved, the Oregon Transportation Commission would ultimately set toll rates at levels sufficient to meet all financial commitments, fund

Project construction and maintenance, and manage congestion. The Oregon Transportation Commission is expected to finalize toll rates in 2024. ODOT could begin tolling as early as December 2024, before the completion of construction of Project improvements to I-205 under the Build Alternative.

Toll Rate Assumptions

Toll rates have not been determined and will be set by the Oregon Transportation Commission if tolling is approved. For environmental analysis and financial planning purposes, a baseline weekday variable-rate toll schedule was identified that balances the objectives of revenue generation sufficient to meet the funding target for capital construction of the I-205 improvements, and alleviating congestion on I-205 during peak travel times. The identified toll rates would provide a sustainable source of revenue for ongoing corridor operations and maintenance and for periodic repair and replacement costs. For environmental analysis and financial planning purposes, the identified baseline toll rate schedule for the year of opening varies as follows:

- During off-peak hours, toll rates are assumed to be lowest, ranging from $0.55 overnight (from 11 p.m. to 5 a.m.) to $0.65 in the midday and evening (from 10 a.m. to 1 p.m. and 8 p.m. to 11 p.m.) to cross a single bridge.
- During peak hours (6 a.m. to 9 a.m. and 3 p.m. to 7 p.m.), toll rates are assumed to be highest during peak hours, varying from $1.65 to $2.20 to cross a single bridge depending on which weekday peak hour.
- During the shoulder period hours just before and after the peak periods (5 a.m. to 6 a.m., 9 a.m. to 10 a.m., 1 p.m. to 3 p.m., 7 p.m. to 8 p.m.), toll rates are assumed to be $1.00 to cross a single bridge.

These assumed rates would apply to each bridge crossing. The rates for a through trip (i.e., crossing both the Abernethy and Tualatin River bridges) would be double the assumed toll rate for only crossing one bridge. The assumed toll rates are provided in state fiscal year (FY) 2025 dollars, indicative of the year of opening, and are assumed to escalate annually with general price inflation, conservatively assumed to be 2.15% per year.

A recent financial analysis confirmed that under the assumed baseline toll rates, there would be sufficient net toll revenues to leverage bonds that would meet the toll funding contribution target for construction of the planned I-205 improvements (ODOT 2022b).

2.3.2 Improvements to I-205

Under the Build Alternative, a 7-mile portion of I-205 would be widened between Stafford Road and OR 213, with added through lanes between Stafford Road and OR 43, and a northbound auxiliary lane from OR 99E to OR 213. Eight bridges between Stafford Road and OR 213 would be replaced or reconstructed to withstand a major seismic event. New drainage facilities would be installed in both directions of I-205.

Bridge Reconstructions and Replacements

The following bridges would be reconstructed with foundation improvements and substructure upgrades for seismic resiliency but would not be replaced:

- Northbound I-205 bridge over Blankenship Road – Mile Post (MP) 5.84
- Southbound I-205 bridge over Blankenship Road – MP 5.90
- Northbound I-205 bridge over 10th Street (West Linn) – MP 6.40
- Southbound I-205 bridge over 10th Street (West Linn) – MP 6.42
- I-205 bridge over Main Street (Oregon City) – MP 9.51

The following bridges would be replaced to meet seismic design standards and to facilitate the widening of I-205:

- Northbound I-205 bridge over SW Borland Road – MP 3.82
- Southbound I-205 bridge over SW Borland Road – MP 3.81
- Northbound I-205 bridge over the Tualatin River – MP 4.1
- Southbound I-205 bridge over the Tualatin River – MP 4.08
- Northbound I-205 bridge over Woodbine Road – MP 5.14
- Southbound I-205 bridge over Woodbine Road – MP 5.19
- Sunset Avenue (West Linn) bridge over I-205 – MP 8.28
- West A Street (West Linn) bridge over I-205 – MP 8.64

The I-205 bridges over 10th Street and Blankenship Road would be widened and raised to meet the proposed new highway grade. The I-205 bridges over the Tualatin River and SW Borland Road would be replaced on a new alignment between the existing northbound and southbound directions to accommodate construction. The I-205 bridges over Woodbine Road would be replaced on the existing alignment and raised to meet the proposed new highway grade. The Broadway Street Bridge over I-205 would be removed to enhance the function of the OR 43 interchange.

2.3.3 Construction

Construction of the Build Alternative is expected to last approximately 4 years, beginning in late 2023 with construction of toll gantries and toll-related infrastructure and continuing from 2024 through 2027 with construction of I-205 widening and seismic improvements. Most toll-related construction would be conducted alongside I-205 within the existing right-of-way. For highway widening, it is anticipated that construction would be sequenced to widen one direction of I-205 at a time, enabling traffic to be moved to a temporary alignment while the remaining widening work is completed. Construction activities would include adding temporary crossover lanes to enable access to the temporary traffic configurations during roadway widening. Staging areas for construction equipment and supplies for the Build Alternative would be located primarily in the median of I-205 in ODOT right-of-way.

3 Regulatory Framework

3.1 Laws, Plans, Policies, Regulations, and Guidance

The following federal laws, regulations, plans, policies, and guidance documents informed the assessment of economics for the Project:

- National Environmental Policy Act of 1969
- U.S. Department of Transportation (USDOT) Federal Highway Administration, *Community Impact Assessment: A Quick Reference for Transportation*, 2018 Update
- USDOT, *Benefit-Cost Analysis Guidance for Discretionary Grant Programs*, February 2021 (USDOT 2021)

4 Methodology

4.1 Area of Potential Impact

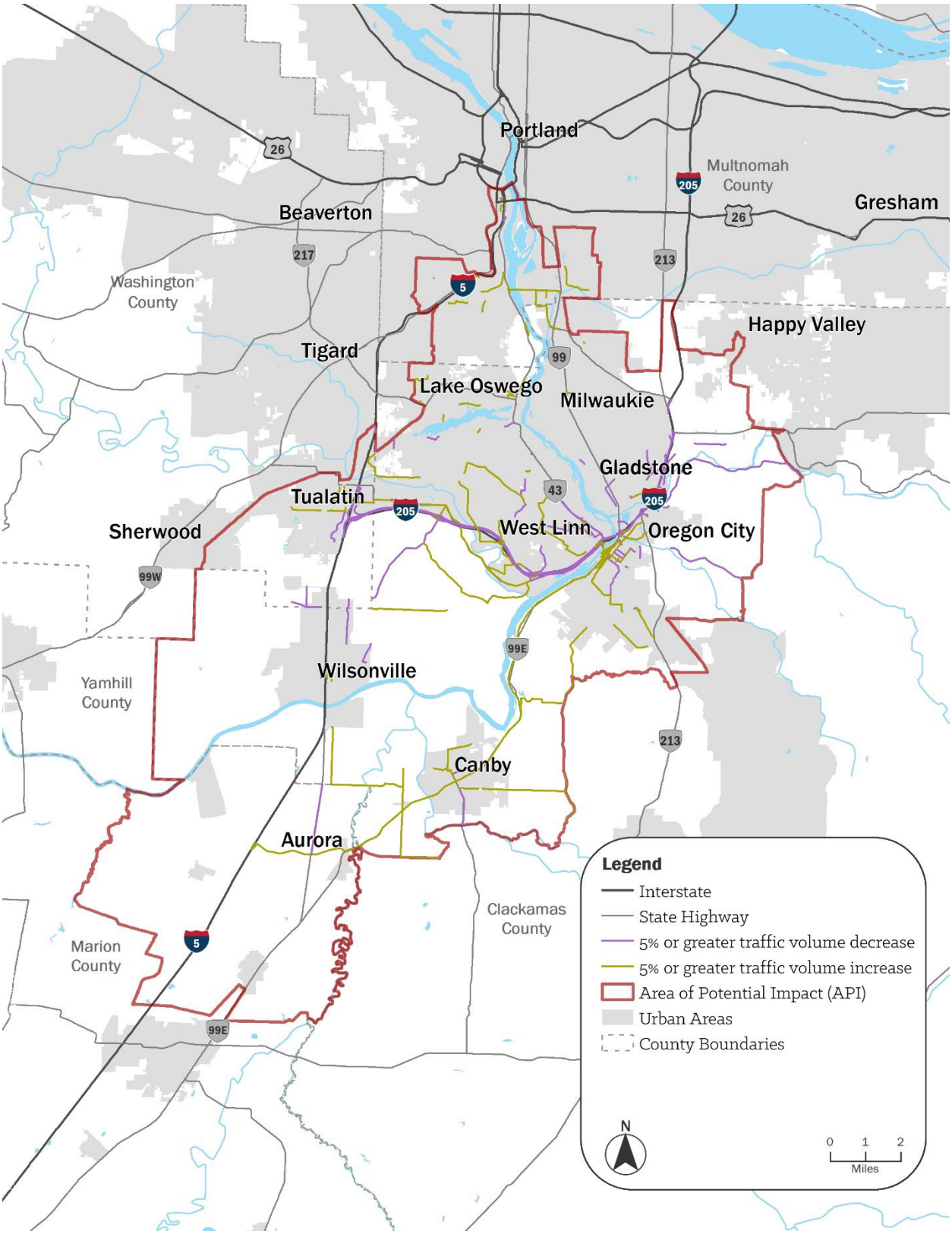
The Area of Potential Impact (API) used to evaluate economic effects is shown in Figure 4-1. The appropriate API for economics can vary depending on the direct and indirect effects being analyzed. A primary focus of this economic analysis is the potential direct and indirect effects on businesses related to traffic volume changes on local streets resulting from the Project, as well as the potential effects on populations that would use the Project with the highest frequency. The Project team determined the API using the initial screening results from the Metro regional travel demand model; the observed changes in traffic volume resulting from the Project were in the range of plus or minus 5%. The economics API encompasses those roadways forecast to experience changes in traffic volumes of plus or minus 5%. The outer boundaries of the economics API are determined by census tract boundaries.

The Project team analyzed the potentially affected roadways with additional geospatial information to identify commercial corridors, business districts, and employment concentrations in the API that the Project may affect. The analysis focused on businesses that may be the most sensitive to changes in traffic patterns, such as convenience retail and other industry categories that rely on vehicular traffic volume.

Additional direct effects (such as those from truck freight effects) and indirect effects (from the collection and expenditure of tolling revenue) would extend to a much larger geographic area given that the origin and destination of end-users of the Project area are likely to be at a more regional scale. As such, certain economic effects were evaluated at larger regional levels[4] as well as at the state level, while estimates of other various benefits of the Project (such as those used in a benefit-cost analysis) were calculated based on all users of the Project, regardless of geography.

[4] Such as the Portland-Vancouver-Hillsboro Metropolitan Statistical Area (Portland MSA) or the greater Portland urban growth boundary as defined by Metro.

Figure 4-1. Economics Area of Potential Impact



4.2 Describing the Affected Environment

As summarized in Section 5, the description of the affected environment discusses the existing conditions in the API and the surrounding region related to the residential population, the business economy, and regional travel patterns. The purpose of evaluating existing conditions is to provide a baseline for understanding how the Project would affect the regional population and economy in the future. As a critical transportation corridor in the region, any changes to I-205 are presumed to affect households and businesses within the API and the surrounding areas. Data reviewed for the development of the existing conditions includes current and forecast socioeconomic data, business and employment information, input-output final demand multipliers, property value data, and freight system data. Sections 4.2.1 and 4.2.2 detail the sources used to evaluate the affected environment of the Project.

4.2.1 Published Sources and Databases

Data used in the 2018 Documented Categorical Exclusion prepared for the I-205 Improvements Project was reviewed to confirm its relevancy and applicability to this Project. The following data was used to determine and describe economic resources available and to develop existing conditions:

- Current and forecast socioeconomic data, such as households, household income, population, and employment from several sources:
  - Oregon State Revenue Forecast, produced by the Office of Economic Analysis, Oregon Department of Administrative Services
  - Oregon Employment Department
  - U.S. Census Bureau American Community Survey
  - Portland State University Population Research Center
  - Metro's Regional Travel Demand Model
- Business community profile (businesses by industrial categories) based on Google maps, local business directories, municipal planning documents, purchased business data, and other relevant documents.
- Inventory of retail businesses and employment by industry based on the database of geocoded employment data provided by the Oregon Employment Department in selected corridors in the API with the largest forecast changes in traffic volume and concentrations of businesses.
- Economic structure (such as industry-sector multipliers) based on Impact Analysis for Planning data files and U.S. Bureau of Economic Analysis (BEA) Regional Input-Output Modeling System (RIMS II) multipliers to estimate economic effects of the Build Alternative expenditures and tolling operations.
- In coordination with the land use effects analysis for the Project, property value information from Metro's Regional Land Information System.
- Various available freight data sources to identify freight functional classification designations, freight trip generators, traffic volumes, and travel times:
  - INRIX-fused National Performance Management Research Data Set
  - HERE Mapping System
  - American Transportation Research Institute
  - U.S. Census Bureau Commodity Flow Survey

  - Federal, state (i.e., ODOT), or third-party data/sources to measure freight effects (with the goal of supplementing/updating findings from prior freight studies)

- Consumer expenditures and vehicle travel characteristics data to evaluate the distribution of toll costs across households in the API:
  - Bureau of Transportation Statistics Local Area Transportation Characteristics for Households (LATCH) Survey
  - U.S. Census Bureau American Community Survey
  - Bureau of Labor Statistics Consumer Expenditure Survey
  - I-205 Toll Project preliminary toll revenue forecasting

4.2.2 Contacts and Coordination

Local governments and business organizations were contacted to gather information on the following:

- Availability of data on businesses in the Project vicinity (number of businesses by category, average revenue, employment, etc.)
- Experience with past construction projects and their effects on local businesses
- Anticipated effects of the Build Alternative

4.3 Effect Assessment Methods

The effects analysis addresses the short-term, long-term, and indirect economic effects of the Build Alternative on local businesses, residents, and freight transport. The Build Alternative was evaluated for the analysis period from 2027, the year of the Project opening and the start of tolling operations, to the future year of 2045. The effects are defined in the following ways and described in more detail in Sections 4.3.1 through 4.3.3:

- Short-term effects comprise the regional economic effects, including benefits and impacts, of construction and other capital activities related to the implementation of the Project.
- Long-term effects comprise the changes in the user and social effects between the No Build Alternative and Build Alternative for regional commuters and truck freight traffic related to the facility improvements and tolling operations, as well as the change in consumer spending at businesses within the region resulting from changes in travel patterns related to the Project.[5] Long-term effects also include an estimate of the additional cost of toll payments to be paid by households.
- Indirect economic effects comprise the economic effects of changes in household spending on transportation costs under the Build Alternative and public investment related to the Project. The analysis of indirect economic effects likely to result from the Build Alternative considers the potential regional economic effects from toll collections and toll revenue investments.

[5] User effects refer to transportation system changes that directly affect I-205 users (e.g., improved travel times, vehicle fuel and maintenance costs), while social effects refer to those that affect not only roadway users, but others in society (e.g., lower vehicle emissions or roadway noise).

The following effects are analyzed:

- Short-term economic effects from construction spending
- Retail business effects resulting from changes in traffic patterns
- Household and user effects resulting from changes in travel times, travel costs, and job accessibility
- Effects on truck freight economics resulting from changes in travel costs, congestion and reliability
- Broader effects resulting from toll collection and expenditure of net toll collections

Existing conditions are also described, including economic trends (such as at-place employment and employment by industry sector) and socioeconomic data (such as households by income.).

4.3.1 Short-Term Effect Assessment Methods

Short-term economic effects resulting from construction spending were estimated using regional employment, income and economic output impacts RIMS II multipliers developed by the BEA for the Portland-Vancouver-Hillsboro metropolitan statistical area (Portland MSA).

4.3.2 Long-Term Effect Assessment Methods

The analysis of direct long-term economic effects resulting from the Build Alternative considers the following:

- The effects on consumer spending at businesses affected by changes in traffic patterns, changes in access, and changes in business clustering, including any net economic effects from business and/or household relocation
- The overall change in household vehicle operating costs in the region[6]
- The resulting change in travel costs as a percentage of household income
- The monetary value of travel time savings to users
- The effects on truck freight transportation resulting from changes in reliability, travel times, and vehicle operating costs
- Monetary valuation of all other positive and negative effects, including changes in vehicle crashes, emissions (in coordination with the *I-205 Toll Project Energy and Greenhouse Gas Emissions Technical Report*), pavement maintenance costs, modal effects, and other identified effects

In addition to the analysis described above, the resulting overall share of regional jobs accessible within a 30-minute drive at peak hour is analyzed in the *I-205 Toll Project Environmental Justice Technical Report* and the *I-205 Toll Project Social Resources and Communities Technical Report*.

Transportation modeling combined with an examination of geocoded employment data (data that corresponds to a location using geographical coordinates) was used to develop an inventory of businesses and business concentrations with the most potential to be affected by changes in traffic volume. The business employment was classified by industry category to evaluate overall sensitivity to

[6] The extent to which the increased household vehicle operating costs and travel costs are a burden on specific types of households (e.g., low-income households) and households in general is addressed in the *I-205 Toll Project Environmental Justice Technical Report* and *Social Resources and Communities Technical Report*.

changes in traffic volumes, based on analyses conducted on other U.S. projects, previously gathered data from business and customer intercept surveys conducted within business corridors, and literature reviews.

Net effects on users of the No Build and Build Alternatives, including the truck freight industry, were analyzed using a benefit-cost analysis framework.[7] The analysis was based on industry-accepted practices and USDOT guidance regarding benefit-cost analysis, including the valuation of effects such as travel-time savings and reliability.

4.3.3 Indirect Effects Assessment Methods

Indirect effects are those that would take place later in time or are further removed from the Build Alternative's initial effects but are reasonably likely to occur. The analysis of indirect economic effects likely to result from the Build Alternative considers the potential regional economic effects from toll collections and toll revenue investments. Total toll revenue estimates from a net revenue financial analysis conducted by the Project team were used to inform this analysis. Data on household travel characteristics and household budget spending patterns was used to define the average household in the API, as well as calculate the mean distribution of toll payments across households in the API, to provide a simple overview of the distributed impact in the region. As households in the API vary in their vehicle ownership rates, travel patterns, household budget spending patterns, willingness to pay for toll costs, and household composition, the mean distribution of toll costs across households in the API is not meant to indicate the actual costs on any specific household.

Regional economic effects include an economic input-output approach using the BEA RIMS II multipliers, a widely recognized economic impact modeling tool used for evaluating the effect of a specific change in the industry's activity within the regional economy. The multipliers translate spending in specific industries into projected employment, labor income, and economic output based on the region's market dynamics. These economic effects are classified into direct effects (industry spending on labor and materials), indirect effects (household spending on consumer goods), and induced effects (the increased personal income in the regional economy resulting from the direct and indirect effects). The multipliers used for the analysis are specifically representative of the Portland MSA.

4.3.4 Cumulative Effects Assessment Methods

The I-205 Toll Project *Cumulative Impacts Technical Report* includes an analysis of the Project's potential to contribute to cumulative effects on economics.

4.4 Mitigation Approach

As summarized in Section 6, the Build Alternative is expected to result in no direct short-term construction or long-term economic impacts; therefore, no mitigation is proposed beyond the measures detailed in the *I-205 Toll Project Transportation Technical Report, I-205 Toll Project Social Resources and Communities Technical Report,* and *I-205 Toll Project Environmental Justice Technical Report*.

[7] A benefit-cost analysis framework identifies and quantifies the marginal change in regional travel behavior and applies monetization variables to determine the economic value of those changes in behavior.

5 Affected Environment

This section describes existing economic conditions and trends in the economics API that may be affected or benefited by the Build Alternative. Topics analyzed inform the following:

- If, and to what extent, businesses would be affected by traffic rerouting
- Effects on the truck freight transportation industry resulting from changes in reliability, travel times, and travel costs
- The overall effects on household budgets from changes in travel costs

5.1 Employment

This section describes the employment characteristics of the API with comparisons to the Portland MSA and the state. Table 5-1 shows the change in annual employment within these three geographical areas from 2012 to 2018.[8] The annualized growth rate illustrates the average year-over-year change in total employment between 2012 and 2018.

Table 5-1. Annual Employment (thousands, 2012 to 2018)

Geography	2012	2015	2018	Annualized Growth Rate
Oregon	1,644.1	1,788.9	1,922.8	2.64%
Portland MSA	1,022.6	1,116.7	1,204.6	2.77%
Area of Potential Impact	137.5	153.7	165.2	3.10%

Sources: U.S. Bureau of Labor Statistics, Current Employment Statistics 2021; U.S. Census Bureau, Longitudinal Employer-Household Dynamics 2021
MSA = Metropolitan Statistical Area

From 2012 to 2018, employment growth in the API was faster than that of the Portland MSA, which outpaced average growth at the state level. Table 5-2 shows the share of total employment by North American Industry Classification System industry sector in 2018. The employment by industry sector is ordered highest to lowest by the share of total employment in the API.

Table 5-3 shows the change in total employment by North American Industry Classification System industry sector within the API, the Portland MSA, and the state of Oregon between 2012 and 2018.

[8] Employment data for the state of Oregon and the Portland MSA is from the U.S. Bureau of Labor Statistics. Data for the customized API boundary was generated from the U.S. Census Bureau's Longitudinal Employer-Household Dynamics data, which is available through 2018.

Table 5-2. Annual Employment by Industry Sector (2018)

Industry Sector	Oregon	Portland MSA	Area of Potential Impact	Area of Potential Impact as Percentage of Portland MSA (Oregon)
Manufacturing	195,200	127,500	20,400	16% (10%)
Health Care and Social Assistance	268,900	156,200	17,500	11% (7%)
Retail Trade	211,400	119,500	16,800	14% (8%)
Construction	105,400	72,700	14,800	20% (14%)
Wholesale Trade	75,600	56,700	12,900	23% (17%)
Educational Services	36,500	28,400	12,200	43% (33%)
Accommodation and Food Services	183,800	107,000	11,900	11% (6%)
Administration & Support, Waste Management and Remediation	103,400	66,700	11,500	17% (11%)
Professional, Scientific, and Technical Services	97,700	77,300	10,300	13% (11%)
Other Services (excluding Public Administration)	64,400	42,200	7,000	17% (11%)
Public Administration	294,800	150,500	5,600	4% (2%)
Transportation and Warehousing	60,900	39,400	5,600	14% (9%)
Finance and Insurance	57,500	43,300	3,900	9% (7%)
Management of Companies and Enterprises	48,600	40,800	3,400	8% (7%)
Arts, Entertainment, and Recreation	27,600	18,100	3,000	17% (11%)
Information	34,300	25,500	2,900	11% (8%)
Real Estate and Rental and Leasing	44,800	29,100	2,700	9% (6%)
Agriculture, Forestry, Fishing and Hunting	102,000	28,400	1,900	7% (2%)
Utilities	4,800	2,500	700	28% (15%)
Mining, Quarrying, and Oil and Gas Extraction	7,200	1,400	200	14% (3%)
Total Annual Employment	**2,024,800**	**1,233,200**	**165,200**	**-**

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics 2021; U.S. Census Bureau, Longitudinal Employer-Household Dynamics 2021
MSA = Metropolitan Statistical Area

Table 5-3. Change in Annual Employment by Geography and Industry Sector (2012 to 2018)

Industry Sector	Oregon	Portland MSA	Area of Potential Impact
Manufacturing	+23,200 (13%)	+13,200 (12%)	+1,700 (9%)
Health Care and Social Assistance	+61,700 (30%)	+32,300 (26%)	+2,400 (16%)
Retail Trade	+23,000 (12%)	+14,300 (14%)	+2,600 (18%)
Construction	+35,600 (51%)	+23,700 (48%)	+5,000 (51%)
Wholesale Trade	+7,800 (12%)	+5,000 (10%)	+100 (1%)
Educational Services	+2,900 (9%)	+1,800 (7%)	-500 (-4%)
Accommodation and Food Services	+35,300 (24%)	+20,900 (24%)	+2,100 (22%)
Administration & Support, Waste Management and Remediation	+15,500 (18%)	+8,300 (14%)	+3,600 (46%)
Professional, Scientific, and Technical Services	+20,100 (26%)	+17,100 (28%)	+2,600 (34%)
Other Services (excluding Public Administration)	+7,100 (12%)	+5,600 (15%)	+1,600 (29%)
Public Administration	+3,800 (1%)	+5,700 (4%)	-200 (-4%)
Transportation and Warehousing	+11,000 (22%)	+7,800 (25%)	+700 (14%)
Finance and Insurance	+1,600 (3%)	+2,700 (7%)	+300 (7%)
Management of Companies and Enterprises	+11,500 (31%)	+10,400 (34%)	+400 (12%)
Arts, Entertainment, and Recreation	+6,000 (28%)	+3,900 (27%)	+700 (29%)
Information	+2,100 (7%)	+1,500 (6%)	-100 (-5%)
Real Estate and Rental and Leasing	+10,000 (29%)	+7,200 (33%)	+300 (10%)
Agriculture, Forestry, Fishing and Hunting	+200 (1%)	+500 (16%)	-100 (-6%)
Utilities	+200 (4%)	+300 (14%)	+100 (21%)
Mining, Quarrying, and Oil and Gas Extraction	+400 (6%)	+400 (40%)	- (0%)

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics 2021
MSA = Metropolitan Statistical Area

The construction industry sector has had the highest percentage growth rate across all three geographies, which is due in part to the endpoints of the time period analyzed: 2010 to 2018. Construction activity is highly sensitive to periods of economic expansion and contraction, and the period from 2012 to 2018 was one of slow, steady expansion and recovery from the Great Recession. Furthermore, the construction industry sector contracted more during the Great Recession from 2007 to 2009 than under typical recession conditions due to an abrupt decline in housing production.

Since early 2020, employment growth in specific industries in the region and state has been affected by economic shutdowns related to the COVID-19 pandemic public health mandates. As of 2021, employment levels in the manufacturing, leisure and hospitality, educational services, government services, and retail trade industry sectors remain below pre-pandemic levels. Conversely, the transportation and warehousing, professional services, and construction industry sectors have recovered to equal or surpass pre-pandemic employment levels. Preliminary data for the Portland MSA through June 2021 shows that after several years of steady year-over-year employment growth (ranging from 21,000 to 36,000 jobs per year), total employment in June 2020 was 131,000 jobs lower than June 2019. Over the following year (June 2020 to June 2021), total employment grew by 70,000 jobs, indicating that the regional economy is recovering from the COVID-19 pandemic-induced contraction, as shown in Table 5-4.

Table 5-4. Year-over-Year Change in Total Employment, Portland MSA (thousands, June 2012 to 2021)

Geography	June 2012	June 2013	June 2014	June 2015	June 2016	June 2017	June 2018	June 2019	June 2020	June 2021
Portland MSA	24	24	31	35	36	35	21	22	-131	70
Oregon	20	33	48	65	52	51	30	31	-198	105

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics 2021
MSA = Metropolitan Statistical Area

5.2 Households

The following section describes the number of households and median household income within the API with comparisons to the Portland MSA and the state. Table 5-5 shows the change in the number of total households within these three areas from 2012 to 2018. The annualized growth rate illustrates the average year-over-year percentage change in total households between 2012 and 2018.

Table 5-5. Annual Households by Geography (thousands, 2012 to 2018)

Geography	2012	2015	2018	Annualized Growth Rate
Oregon	1,522	1,533	1,592	0.75%
Portland MSA	869	887	926	1.06%
API	117	121	125	1.12%

Source: U.S. Census Bureau, American Community Survey 2021
API = Area of Potential Impact; MSA = Metropolitan Statistical Area

From 2012 to 2018, annual household growth in the API slightly outpaced that of the Portland MSA. Both the API and Portland MSA showed a higher rate of household growth compared to the state as a whole over the same period. This growth is consistent with data described in Section 5.3, which shows that residential uses are the predominant type of developed land in the API. Table 5-6 shows the change in the median household income within these three areas from 2012 to 2018. The annualized growth rate illustrates the average year-over-year percentage change in median household income between 2012 and 2018.

Table 5-6. Median Annual Household Income by Geography (nominal dollars, 2012 to 2018)

Geography	2012	2015	2018	Annualized Growth Rate
Oregon	$51,618	$51,243	$59,393	2.37%
Portland MSA	$59,584	$60,286	$70,724	2.90%
API	$68,958	$70,039	$81,875	2.90%

Source: U.S. Census Bureau, American Community Survey 2021; State of Oregon Employment Department 2021
API = Area of Potential Impact; MSA = Metropolitan Statistical Area

While median household income within the API is higher than the greater Portland MSA and the state average, annual growth stayed aligned with the growth in the Portland MSA. Median household income in the API and Portland MSA showed a higher rate of growth compared to the state over the same period. Because detailed household spending data is not available at the state, regional, and API level, household income is assumed to be equivalent to household spending for the purposes of this analysis.

For the median household in the API, transportation costs make up 7.9% of the total household budget (approximately $7,000 per year) in 2021; transportation costs include vehicle ownership costs (68%) and vehicle operating costs (32%).

5.3 Property Values/Tax Base

Based on data obtained from Metro's Regional Land Information System, the built environment in the API is driven by single-family residential uses, representing about 60% of total assessed land value. Commercial, industrial, and multifamily residential uses represented about 30% of assessed land value (Metro Data Resource Center 2021). The assessed 2020 value for all taxable land within the API was approximately $74.5 billion; of that, single-family residential properties represented approximately $44 billion.

A large portion of the API is made up of area outside of an urban growth boundary, which delineates where new development may take place to support growth. On a land area basis, the API comprises large amounts of agricultural and undeveloped land, with 68% of total acres classified as agriculture, public, rural, or vacant. Table 5-7 provides a summary of API land area and assessed property value by general land use types.

Table 5-7. Land Area and Property Value by Land Use Category within the API (2020)

Land Use Category	Area (acres)	2020 Assessed Value (billions)	Percentage of Total Assessed Value	Percentage of Total Acreage within API
Single-Family Residential	25,300	$44.4	59.6%	22.3%
Commercial	6,200	$10.4	13.9%	5.5%
Multifamily Residential	1,900	$8.0	10.8%	1.7%
Industrial	3,100	$3.9	5.2%	2.7%
Other (Agriculture, Public, Forest Rural, Vacant)	76,900	$7.9	10.6%	67.8%

Source: Portland Metro Regional Land Information System 2021
API = Area of Potential Impact

5.4 Truck Freight Industry

The Portland MSA is the fourth-largest international freight hub on the West Coast after Los Angeles/Long Beach, Seattle/Tacoma, and San Francisco/Oakland (Portland Bureau of Transportation 2021). Given the nature of truck freight flows in the region relative to the Project, effects on the truck freight industry caused by the Build Alternative are likely to take place beyond the API and more at the regional scale. As such, the affected environment for truck freight was analyzed at the Portland MSA scale for this evaluation. Truck freight movement depends on a well-functioning roadway network with consistent reliability throughout the day, and good connectivity between producers and markets. As delays in the transportation of goods accumulate in the supply chain, a cascade of additional costs affects the abilities of producers, suppliers, and retailers to operate cost-effectively and on schedule. These effects can occur from the national goods supply chain down to local markets.

The Portland MSA has experienced steady growth in the general freight trucking sector and very strong growth in the warehousing sector between 2012 and 2020, as shown in Table 5-8.

Table 5-8. Annual Employment, General Freight Trucking and Warehousing Industry Sectors, Portland MSA (thousands, 2012–2020)

Industry Sector	2012	2013	2014	2015	2016	2017	2018	2019	2020
General Freight Trucking	9.8	10.2	10.4	10.6	10.6	10.7	10.7	11.1	10.7
Warehousing	3.3	3.2	3.5	3.6	3.9	4.7	5.8	9.0	13.1

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics 2021
MSA = Metropolitan Statistical Area

Growth in the warehousing sector has been fueled by the steady increase in e-commerce activity over the last decade and an additional increase resulting from the COVID-19 pandemic. Statewide, the Oregon Employment Department forecasts 27% growth in warehousing and storage between 2019 and 2029, compared to total employment growth of 9% over the same period (Oregon Employment Department 2021).

Although detailed data immediately prior to the COVID-19 pandemic is not yet available, growth in truck-based freight flows was relatively strong before this period. Between 2012 and 2017, truck freight increased as a share of freight flows across all modes over the period, as shown in Table 5-9.

Table 5-9. Commodity Flow Survey of Volume (thousand tons) and Value, All Freight Modes and Truck Mode, Portland-Vancouver-Salem OR-WA Commodity Flow Survey Area (Oregon Portion) (2012 and 2017)

Mode	2012 (thousand tons)	2017 (thousand tons)	Growth (thousand tons)	2012 Value (million$)	2017 (million$)	Growth in Value (million$)
Truck Mode	46,204	61,568	33%	$ 76,103	$78,543	3%
Total (All Freight Modes)	**58,537**	**75,331**	**29%**	**$116,169**	**$115,119**	**-1%**
Total (Truck Percentage)	**79%**	**82%**		**66%**	**68%**	

Source: U.S. Census Bureau, Commodity Flow Survey 2017

5.5 Local Traffic-Dependent Businesses

The affected environment includes the identified roadways in the API forecast to experience changes in traffic volumes of plus or minus 5% as a result of the Build Alternative. These roadways were then further evaluated to identify business concentrations that may be sensitive to changes in traffic volume.

A fundamental concept in this approach is the extent to which individual businesses are destination oriented or traffic-exposure oriented. Destination businesses are those to which consumers plan to travel in advance. Travelers plan a destination stop because a particular business provides a special product or attraction, or because they plan to have a particular appointment or receive a particular service. Traffic-exposure oriented establishments are those to which consumers do not plan to travel in advance; these trips are classified as "opportunity" trips. The stop might be made to purchase a convenience good (like gasoline or a soda) or to browse comparison goods, but in all cases the stop would not have been made if the business were not easy to access. The traffic shopper would likely have purchased the same or a similar product at another business if the chosen establishment were not so visible and/or easy to access. The approximate proportion of destination or opportunity trips depends on the characteristics of individual business types. Certain categories of businesses depend more on opportunity shoppers (relying on visibility and access from pass-by traffic), whereas others depend more on destination shoppers.

Based on the results of previous analyses on U.S. projects, Table 5-10 shows an approximation of shares of destination versus opportunity trips by business category in the API.

Table 5-10. Proportion of Destination-Oriented and Opportunity Trips By Business Types in API

Type of Business	Percentage Destination-Oriented Trips	Percentage Opportunity Trips	Description of Typical Business Type
Community/Regional Business	95%	5%	Large grocery, big box, shopping center
Small Business/Other Durable Goods	95%	5%	Homewares, construction materials, clothing, other durable goods
Professional Services	95%	5%	Lawyers, doctors, human services, banks, contractors, insurance, engineers, consultants, etc.
Small Business – Services	85%	15%	Haircutters, nails, realty, non-retail/non-wholesale/non-food small businesses
Restaurant/Bar	75%	25%	Sit-down restaurants and bars
Hotel/Motel	70%	30%	Hotels and motels
Small Business – Specialty Goods	60%	40%	Liquor, tobacco, hardware, sporting goods, etc.
Gas Station/ Convenience Grocery Store	55%	45%	Gas stations and/or small grocery stores, convenience foods
Auto Sales/Service	50%	50%	Auto dealerships / service
Small Business Goods/ Fast Food	50%	50%	Dollar stores, gifts, greeting cards, videos, fast food restaurants

Sources: Based on estimates in New York State Thruway Authority 2006 and Maryland State Highway Administration 2000
API = Area of Potential Impact

With the Build Alternative, most rerouting is anticipated to occur from I-205 and to local roadways due in part to localized toll avoidance. There is currently no direct business access on I-205. The analysis of changes in traffic volumes and concentrations of businesses with the Build Alternative identified three

potentially affected retail areas within the API chosen for the analysis: OR 99 in Canby, Main Street in Oregon City, and Willamette Falls Drive in West Linn.

Based on the analysis of spending by households in the API, the existing spending by cost category can be estimated. From the household budget information, traffic analysis data, and the breakdown of destination and opportunity spending, the opportunity spending per trip by business category can be estimated for households within the API. Table 5-11 summarizes the details about the household spending characteristics and spending per trip in the API.

Table 5-11. Average Household Spending per Consumer Vehicle Trip Classified by Business Type

Business Type	Average Annual Household Spending (2021$)	Average Annual Household "Opportunity" Spending (2021$)	Average Annual "Opportunity" Spending per Trip (2021$)
Convenience Retail	$1,870	$840	$0.46
Business Retail	$6,410	$2,560	$1.40
Grocery Retail	$4,820	$1,690	$0.92
Recreation	$280	$40	$0.02
Food Services and Drinking Places	$3,810	$950	$0.52
Personal Care Services	$810	$320	$0.18
Auto Repair	$3,050	$920	$0.50

Sources: Bureau of Transportation Statistics, LATCH Survey, 2017; U.S. Department of Labor Bureau of Labor Statistics Consumer Expenditure Survey 2019-2020

6 Environmental Consequences

This section describes the anticipated benefits and impacts of the Project with regard to economics under the No Build Alternative and the Build Alternative.

6.1 No Build Alternative

6.1.1 Short-Term Effects

Under the No Build Alternative, no construction activity would occur; therefore, there would be no short-term benefits to the regional economy, including no additional capital costs, labor income, and economic output related to the construction industry.

6.1.2 Long-Term Effects

Under the No Build Alternative, I-205 would continue facilitating commuter vehicle-trips into and from the Portland MSA and connecting truck freight traffic to the interstate highway system. Passenger and commercial vehicles on this segment of I-205 would experience increasingly longer travel times and increased congestion as compared with the Build Alternative (see *I-205 Toll Project Transportation Technical Report)*. The performance of I-205 would continue to influence on-time truck reliability, affecting costs for businesses in the supply chain in the region and throughout the Western states. With increased congestion and intermittent travel speeds under the No Build Alternative, fuel consumption and related emissions per vehicle are expected to rise as vehicles and their engines would operate below their optimal efficiency compared to the conditions under the Build Alternative.

The traffic-related economic effects of the No Build Alternative were analyzed by comparing the change in regional traffic patterns from 2027 to 2045 and monetizing their value according to the USDOT Benefit-Cost Analysis Guidance and standard industry practices. Table 6-1 summarizes the annualized user and social effects of the No Build Alternative relative to existing conditions in 2021. The costs described in Table 6-1 represent the annualized value of the costs incurred by users traveling along I-205 between 2027 and 2045, as the sum total of user and social costs. Relative to the current conditions in 2021, the performance of I-205 is expected to become increasingly poor due to increased traffic congestion and intermittent travel speeds throughout the day.

The evaluation of the long-term traffic-related economic effects under the No Build Alternative compares the traffic environment on I-205 under existing conditions to a future condition without the implementation of the tolling system and the additional improvements to I-205. The analysis evaluates the monetized value of the projected deterioration of the traffic performance on I-205 using values provided by the USDOT guidance and standard industry practices. The analysis evaluates the criteria related to changes in travel time, vehicle volumes, and truck freight reliability; these evaluation criteria and their values are shown in Table 6-1. To maintain consistency of the output values with the input values and standardized factors and to account for the time value of money, future values are discounted at an annual rate of 7% and reported in constant 2021 dollars. Discounting future values allows for comparison to today's valuation of a dollar and accounts for future unknown risks, including variability in the value of money and the forecasted operational conditions. Effectively, the discount rate illustrates a conservative evaluation of future effects.

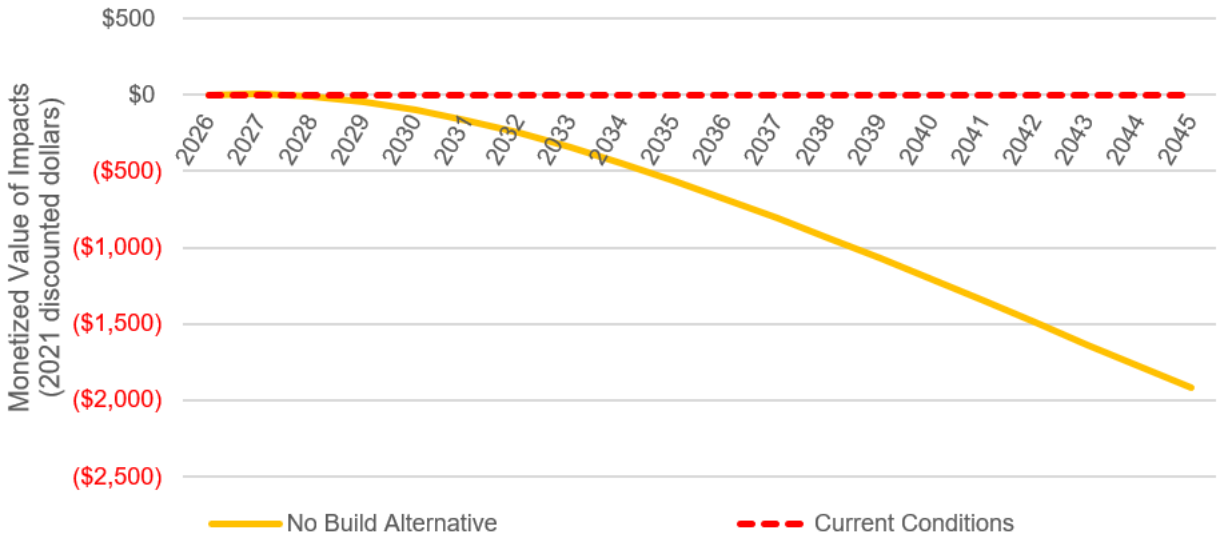
Table 6-1. Annualized Monetized Value of the Effects of Traffic Under the No Build Alternative on I-205 (2027 to 2045)

Social Effects and User Costs	Average Annualized Value 2027-2045 (2021$, undiscounted)	Average Annualized Value 2027-2045 (2021$, discounted at 7%)
Value of Travel Time (Auto)	$245,391,000	$73,676,000
Value of Travel Time (Truck)	$26,458,000	$7,853,000
Truck On-Time Reliability Costs	$9,429,000	$3,743,000
Vehicle O&M Costs	$115,827,000	$34,742,000
Pavement Damage Costs	$2,761,000	$821,000
Traffic Noise Costs	$604,000	$180,000
Cost of Emissions – Nitrogen Oxides	$221,000	$71,000
Cost of Emissions – Sulfur Oxides	$17,000	$5,000
Cost of Emissions –$PM_{2.5}$	$297,000	$99,000
Cost of Emissions – Carbon Dioxide	$8,339,000	$4,916,000
Cost of Vehicle Crash Injuries	$55,651,000	$16,700,000
Cost of Vehicle Crash Fatalities	$3,073,000	$922,000
Annual Net No Build Costs	**$468,068,000**	**$143,728,000**

Source: WSP Benefit-Cost Analysis Model 2021
O&M = operations and maintenance; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter

The monetized value of the effects of traffic over time related to the No Build Alternative from 2027 to 2045 are illustrated in Figure 6-1 below. The graph shows the current conditions in the API as the baseline for comparison to the No Build Alternative. Over time, projected increases in vehicle-trips, traffic congestion, and deteriorating system performance will accrue as additional costs, including longer trip times, additional vehicle operating and maintenance costs and vehicle emissions, lower truck travel-time reliability, and increases in crashes between roadway vehicles.

Figure 6-1. Monetized Value of the Effects of Increasing Traffic Volumes over Time, Comparing the No Build Alternative to Current Conditions (in discounted $2021 millions)



Under the No Build Alternative, I-205 would be maintained by the dedicated Highway Fund. The existing infrastructure funding scheme is not anticipated to change the value of direct transportation costs of households within the API or wholesale retail businesses in the region.

Without tolls, transportation costs as a percentage of household income (7.9%), as discussed in Section 5.2, would remain the same under the No Build Alternative as under existing conditions.

6.1.3 Indirect Effects

For businesses in the supply chain affected by the reliability of truck service along I-205, the existing traffic conditions exert a cost on the transportation of intermediate and finished goods related to traffic delays and other trip disruptions. Please refer to the *I-205 Toll Project Transportation Technical Report* for a detailed analysis of the existing and future conditions of truck freight performance on I-205. With the value of time for truck freight transportation estimated at $160 per hour (Guerrero et al, 2019), the costs from existing traffic conditions along I-205 would be expected to grow because of the projected increase in traffic congestion. Under the projected No Build Alternative traffic conditions on I-205 and I-5, traffic delays would result in an average additional direct cost of $9.4 million per year for the retailers, vendors and suppliers in the supply chain, as illustrated in Table 6-1 under "Truck On-Time Reliability Costs." At a 7% discount rate,[9] these additional costs would be $3.7 million per year. Given that transportation costs are generally passed onto the end consumer, those changes in traffic conditions could manifest as higher per-unit costs and lower total retail revenues on the goods transported on I-205, if the increased cost results in reduced demand.

The economic impact analysis measured the benefits from additional spending under the Build Alternative relative to the No Build Alternative. As the No Build Alternative does not include additional spending resulting from the collection of toll revenues, the economic impact in the API is assumed to be zero. Any spending related to I-205 under the No Build Alternative, including planned maintenance or capital spending, not related to tolling is assumed to be included in the Build Alternative. The No Build Alternative may affect the commuting behavior and housing choices of residents within the API as compared to the current baseline conditions. The availability and cost of housing within the API are assumed to be indirectly affected by any changes in the regional transportation system based on the relationship between changes in commuting patterns and transportation and housing costs. The *I-205 Toll Project Environmental Justice Technical Report* provides a detailed breakdown of the relationship between the cost of housing and transportation on household budgets and the projected effects of the No Build Alternative. The *I-205 Toll Project Social Resources and Communities Technical Report* provides a detailed analysis on accessibility challenges related to housing and transportation costs and the projected effects of the No Build Alternative.

[9] The 7% discount rate is the standard value for the real discount rate defined in the latest USDOT Benefit-Cost Analysis guidance documentation (USDOT 2021). The real discount rate is compounded annually on future monetized impacts to evaluate the present value of those impacts in current year dollars.

6.2 Build Alternative

6.2.1 Short-Term Effects

Project construction would generate positive short term economic benefits to the region because supplies and materials would be purchased and workers would be hired to conduct construction activities. An economic impact analysis of the design and construction activities related to the tolling system and improvements on I-205 evaluates the effect of ODOT's investment on the regional economy. The analysis uses the BEA RIMS II multipliers as described in Section 4.3.

As the multipliers evaluate the economic effects resulting from spending in specific industries, the construction spending was allocated to industry sectors related to the construction of the project improvements and the implementation of the tolling system, based on similar projects in the region. Table 6-2 shows the breakdown of the capital costs by sector based on preliminary high-level cost estimates developed by WSP for use in the analysis and should not be considered as demonstrative of the final capital costs.

Table 6-2. Capital Costs for Build Alternative by Industry Sector (in 2021 Dollars)

Industry Sectors	Capital Costs	Percentage of Total Capital Costs
Construction Services	$375,000,000	50%
Engineering Services	$112,500,000	15%
Management Consulting Services	$75,000,000	10%
Computer Design System Services	$187,500,000	25%
Total	**$750,000,000**	**100%**

Source: Oregon Department of Transportation Preliminary Estimates, 2021

The capital costs are allocated across their end use activities in construction, professional services, and system implementation; BEA RIMS II multipliers are applied to these expenditures to measure their effect on employment, labor income, and economic output. Table 6-3 shows the final demand multipliers by industry sector used to calculate the economic effects of the construction activities.

Table 6-3. Final Demand BEA RIMS II Multipliers by Industry Sector

Multipliers	Construction Services	Engineering Services	Management Consulting Services	Computer Design System Services
Employment (Type 1)	6.1	8.2	10.7	7.1
Labor Income (Type 1)	0.4	0.6	0.6	0.6
Economic Output (Type 1)	1.5	1.4	1.4	1.3
Employment (Type 2)	9.3	12.9	15.6	11.9
Labor Income (Type 2)	0.5	0.8	0.8	0.8
Economic Output (Type 2)	2.0	2.1	2.1	2.0

Source: Bureau of Economic Analysis, RIMS II Input-Output Model, 2021
BEA = U.S. Bureau of Economic Analysis; RIMS = Regional Input-Output Modeling System

Using the capital costs and the RIMS II multipliers for each industry, the economic effects of the construction activities for the Build Alternative are calculated. The multipliers translate spending in specific industries into projected employment, labor income, and economic output based on the region's market dynamics. These economic effects are classified into direct effects (industry spending on labor and materials), indirect effects (household spending on consumer goods), and induced effects (the increased personal income in the regional economy resulting from the direct and indirect effects). The

multipliers used for the analysis are specifically representative of the Portland MSA. Table 6-4 summarizes the economic impact of those activities.

Table 6-4. Total Economic Effects Related to Toll System Implementation

Effect Categories	Employment (Job-Years)[1]	Labor Income (2021$)	Economic Output (2021$)
Direct Effects	1,044	$285,281,000	$750,000,000
Indirect Effects	4,050	$93,427,000	$307,151,000
Induced Effects	2,890	$129,990,000	$433,613,000
Total Effects	**7,985**	**$508,699,000**	**$1,490,764,000**

Source: Bureau of Economic Analysis, RIMS II Input-Output Model, 2021

BEA = U.S. Bureau of Economic Analysis; RIMS = Regional Input-Output Modeling System

[1] Job-years refers to the equivalent of an employee working full time for 2,080 hours in a year. For example, a full-time employee working for three years would be equal to three job-years, while three part-time employees working a total of 2,080 hours in a year would be equivalent to one job-year.

6.2.2 Long-Term Effects

The implementation of tolling on I-205 is likely to discourage discretionary vehicle-trips on I-205 during the peak hours, and therefore would reduce facility vehicle-miles traveled while ensuring the performance of the facility during hours of high-traffic volumes. Table 6-5 compares the average weekday traffic volumes from the *I-205 Toll Project Transportation Technical Report* for the AM and PM peak hours on I-205 for the No Build Alternative and Build Alternative for the Project's long-term design year (2045). In the AM and PM peak hours, the traffic volumes are projected to be lower in the Build Alternative throughout the analysis period, indicating higher throughput speeds and fewer overall vehicle-trips.

Table 6-5. Peak-Hour Volumes on I-205 Segments – No Build and Build Alternatives

I-205 Segment	2045 No Build		2045 Build		% Change	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Northbound						
Between I-5 and Stafford Rd	3,415	3,275	3,355	4,735	-1.8%	44.6%
Between Stafford Rd and 10th St	3,720	2,660	3,465	3,920	-6.9%	47.4%
Between 10th St and OR 43	3,900	3,180	3,710	4,425	-4.9%	39.2%
Between OR 43 and OR 99E	4,370	4,095	3,870	5,080	-11.4%	24.1%
Between OR 99E and OR 213	4,980	5,005	4,705	6,020	-5.5%	20.3%
Southbound						
Between OR 213 and OR 99E	3,250	5,355	3,210	5,355	-1.2%	0.0%
Between OR 99E and OR 43	3,845	4,600	3,740	4,135	-2.7%	-10.1%
Between OR 43 and 10th St	3,245	4,125	3,120	3,575	-3.9%	-13.3%
Between 10th St and Stafford Rd	3,340	3,890	2,345	2,845	-29.8%	-26.9%
Between Stafford Rd and I-5	3,230	3,535	2,890	3,090	-10.5%	-12.6%

Source: *I-205 Toll Project Transportation Technical Report*

These changes in regional travel behavior are expected to result in user and social benefits, including reduced emissions, shorter travel times, improved truck on-time reliability, vehicle operating cost savings, fewer vehicle crashes, and prevention of pavement damage, as described in Table 6-6. The traffic effects were analyzed by comparing the change in regional traffic patterns between the No Build and Build Alternatives from 2027 to 2045 and monetizing their value according to the USDOT Benefit-Cost Guidance and standard industry practices. The values in Table 6-6 represent the additional savings and costs that would occur with the Build Alternative as compared to the No Build Alternative. The positive values indicate savings, whereas the negative values indicate additional costs.

The evaluation of the long-term traffic effects under the Build Alternative compares the traffic environment on I-205 in a future scenario, which includes the implementation of the tolling system and improvements to I-205, and the No Build Alternative, a future scenario that would not implement tolling and would include only the improvements in Phase 1A. The analysis evaluates the value of the marginal change in traffic performance on I-205 using values provided by the USDOT guidance and standard industry practices. Compared to the values in Table 6-1 illustrating the total user and social costs under the No Build Alternative, the values shown in Table 6-6 quantify the monetized value of the marginal benefits under the Build Alternative. To maintain consistency of the output values with the input values and standardized factors, the values are discounted at an annual rate of 7% and reported in constant 2021 dollars.

Table 6-6. Annualized Monetized Value of Traffic Benefits of the Build Alternative Relative to the No Build Alternative on I-205 (2027 to 2045)

Social Effects and User Costs	Average Annualized Value 2027-2045 (2021$, undiscounted)	Average Annualized Value 2027-2045 (2021$, discounted at 7%)
Travel Time Savings (Auto)	$44,862,000	$14,694,000
Travel Time Savings (Truck)	$19,036,000	$8,782,000
Improved Truck On-Time Reliability	$9,859,000	$3,913,000
Vehicle O&M Cost Savings	$27,972,000	$11,964,000
Avoided Pavement Damage	$984,000	$541,000
Traffic Noise Reduction	$198,000	$104,000
Emissions – Nitrogen Oxides	$201,000	$79,000
Emissions – Sulfur Oxides	$18,000	$8,000
Emissions –$PM_{2.5}$	($297,000)	($114,000)
Emissions – Carbon Dioxide	$1,340,000	$890,000
Vehicle Crash Injuries	$725,000	$328,000
Vehicle Crash Fatalities	$40,000	$18,000
Annual Net Benefits	$104,938,000	$41,207,000

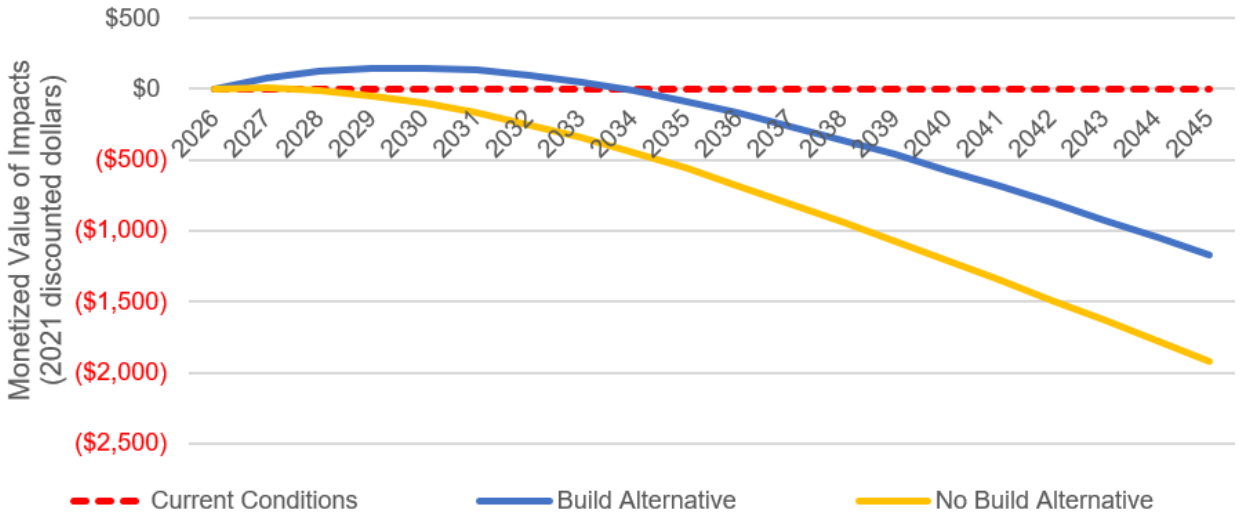
Source: WSP Benefit-Cost Analysis Model 2021
O&M = operations and maintenance; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter

The monetized value of the effects of traffic over time related to the Build Alternative from 2027 to 2045 are illustrated in Figure 6-2. The graph compares the effects related to the Build Alternative and the No Build Alternative with the current conditions in the API serving as the baseline. The Build Alternative is projected to mitigate the projected increases in vehicle-trips, traffic congestion, and the overall deteriorating system performance as the region continues to grow and develop. In the analysis, the results shown in Table 6-6 illustrate the monetized value of the net effects of the Build Alternative relative to the effects of the No Build Alternative.

The projected changes in traffic patterns are expected to affect opportunistic consumer spending in the region. The rerouting of traffic away from I-205 would bring a percentage of traffic through commercial districts along alternative routes. As part of the traffic analysis, three commercial districts projected to experience increases in traffic volumes were identified to study these effects:

- Pacific Highway E in Canby
- Main Street in Oregon City
- Willamette Falls Drive in West Linn

Figure 6-2. Monetized Value of the Effects of Increasing Traffic Volumes over Time, Comparing the Build Alternative to the No Build Alternative and Current Conditions (in discounted $2021 millions)



The additional spending in these commercial districts resulting from the change in traffic patterns translates into additional business revenues and employment in these areas.

By attributing the opportunity spending per trip (Table 5-11) and evaluating the change in traffic volumes within these commercial districts, the economic effects of this additional spending can be evaluated. The effects include changes in employment, labor income and total economic output. Table 6-7 summarizes the economic effects analysis for the changes in opportunity spending on an annual basis.

Table 6-7. Annualized Economic Effects Related to Change in Consumer Spending

Effect Categories	Employment (Job-Years)[1]	Labor Income (2021$)	Economic Output (2021$)
Direct Effects	2.0	$57,000	$157,000
Indirect Effects	0.4	$23,000	$73,000
Induced Effects	0.6	$28,000	$84,000
Total Effects	**3.0**	**$108,000**	**$313,000**

Source: Bureau of Economic Analysis, RIMS II Input-Output Model, 2021

BEA = U.S. Bureau of Economic Analysis; RIMS = Regional Input-Output Modeling System

[1] Job-years refers to the equivalent of an employee working for 2,080 hours in a year. For example, a full-time employee working for three years would be equal to three job-years, while three part-time employees working a total of 2,080 hours in a year would be equivalent to one job-year.

Using data on the travel characteristics and spending budgets of households in the API from the LATCH survey, the average number of vehicle-trips per household and the average household spending on transportation costs were evaluated for the API. The travel characteristics indicate the percentage of vehicle-trips likely to be taken on the I-205 tolled bridges as the percentage of total daily vehicle-trips. Based on these characteristics and the forecasted toll rates for personal vehicles in 2027, the average distribution of the toll payments across all households in the API was estimated. Because differences in household composition, travel patterns, household budget, and proximity to I-205 affect the decisions of users to complete their trips throughout the region, the estimate of annual toll payments per household is only meant to be illustrative as a hypothetical “average” household. The household effects of the toll payments can be estimated from the number of households in the API, the average number of annual weekday vehicle-trips per household on I-205, and average annual cost of toll payments, as shown in Table 6-8.

Table 6-8. Household Effects Related to Toll Revenue Operations

Metric	Values
Households in API with One or More Vehicles[1]	113,140
Average Total Annual Weekday Vehicle-Trips per Household in API[2]	1,285
Average Annual Weekday Vehicle-Trips on I-205 per Household in API[2, 3]	206
Estimated Average Annual Weekday Toll Fees per Household in Opening Year (in 2021 dollars)[4]*	$575

[1] Source U.S. Census Bureau American Community Survey, 2019

[2] Source: Bureau of Transportation Statistics LATCH Survey, 2017

[3] Source: Metro regional travel demand model

[4] Source: Bureau of Labor Statistics Consumer Expenditure Survey, 2019-2020

* The projected toll revenues include assumptions about population growth and other factors related to the forecasted traffic conditions, developed as part of the Project's toll revenue forecast. The values are in constant 2021 dollars based on the forecasted toll rate for the project opening in 2027.

API = Area of Potential Impact; LATCH = Local Area Transportation Characteristics for Households

Table 6-9 shows the estimated change in annual transportation costs for the average household in the API under the No Build Alternative as compared to the Build Alternative relative to the estimated average household budget in 2021 dollars, according to the LATCH Survey and the U.S. Census data. Transportation costs as a percentage of the total budget for households at the median income level would be 7.9% under the No Build Alternative compared to 8.6% under the Build Alternative. This 0.7 percentage point difference represents approximately 9% higher transportation costs for a median household in the API compared to the No Build Alternative.

Table 6-9. Comparison of Average Household Budget and Transportation Costs in the API under the No Build Alternative and Build Alternative (in 2021 Dollars)

Alternative	Average Annual Household Budget in API	Average Annual Household Transportation Costs	Average Annual Toll Payments	Total Average Annual Household Transportation Costs	Transportation Costs as Percentage of Total Household Budget
No Build Alternative	$88,400	$7,000	—	$7,000	7.9%
Build Alternative	$88,400	$7,000	$600	$7,600	8.6%

Source: Bureau of Transportation Statistics, LATCH Survey 2017; U.S. Census Bureau, American Community Survey 2018

Note: Total annual household transportation costs and average annual toll payments may be affected by rounding

API = Area of Potential Impact

The calculated average annual toll payment is based on numerous variables, including the average weekday vehicle-trips per household, distribution of trips on I-205 and alternative routes, forecasted traffic on I-205 by vehicle class, projected gross toll revenues by vehicle class and projected regional cost inflation. As a result, it should not be considered demonstrative of the actual toll payments in any particular year, but rather an average converted to current-year dollars to allow for comparison to current household spending.

6.2.3 Indirect Effects

The Build Alternative would result in vehicle traffic paying for the use of the roadway. Toll revenues paid by passenger vehicles and commercial trucks from 2027 to 2045 would be collected as revenue to fund construction of the remaining elements of the I-205 Improvements Project (i.e., all phases except Phase 1A), finance other roadway and bridge improvements along I-205, and pay for the toll system's operational and maintenance costs.

For this analysis, the tolls paid by passenger vehicles are characterized as additional transportation expenditures paid by households, which would result in an equivalent change in transportation spending by households throughout the region. The tolls paid by commercial vehicles are characterized as additional transportation costs passed through the supply chain to wholesale traders, resulting in an equivalent change in revenues for the wholesale retail business. The net difference in the economic effects of the additional government investment in roadway and bridge infrastructure from tolling and the change in wholesale trade revenues and household spending provide an estimate of the economic effects specifically related to the toll operations, as described in Table 6-10.

Under the Build Alternative, households within the API would spend an average estimated $93 million in toll payments per year and truck freight operators employed by the wholesale trade sector would spend an average estimated $39 million in toll payments per year. ODOT would collect these toll payments, totaling about $132 million annually, as operational revenues to pay for the costs of administering government programs and paying for professional services and construction services to deliver their capital improvement projects.

Table 6-10. Change in Estimated Annualized Spending by Industry (2027 to 2045)

Source of Spending	Gross Toll Revenues (millions, 2021$)	Toll Payments[1] (millions, 2021$)
Total ODOT Spending	**$131.7**	—
ODOT Government Enterprises[2]	*$26.3*	—
ODOT Road and Bridge Construction	*$92.2*	—
ODOT Professional Services	*$13.2*	—
Total Household Spending	**—**	**($93.2)**
Household Retail Purchases	—	*($32.6)*
Household Entertainment and Recreation	—	*($18.6)*
Household Restaurant and Food Services	—	*($41.9)*
Total Wholesale Trade Spending	**—**	**($38.5)**
Annual Net Change in Spending	**$131.7**	**($131.7)**

Source: Bureau of Transportation Statistics, LATCH Survey 2017; U.S. Census Bureau, American Community Survey 2018; Bureau of Labor Statistics Consumer Expenditure Survey, 2019-2020; Metro Regional Travel Demand Model

[1] The estimated toll payments by households and the wholesale trade sector are based on the forecasted toll rates for the multiple vehicle classes and forecasted traffic volumes. They are an annualized estimate used for the purposes of the analysis to evaluate the transfer of payments from the toll payees to ODOT and are not indicative of future revenues or toll rates in any particular year.

[2] "Government Enterprises" are defined by the Bureau of Economic Analysis as the government agencies responsible for administering, overseeing, and managing public programs within a given area; the RIMS II multipliers evaluate the regional spending patterns related the performance of these activities. The classification is equivalent to Sector 92 Public Administration under the 2017 North American Industry Classification System Classification System.

ODOT = Oregon Department of Transportation

ODOT's collection of toll revenue from households and truck freight operators and subsequent investment of this revenue into the transportation network represents a shift in economic activity. Table 6-11 summarizes the net economic effects resulting from this change in private and public spending, including the change in employment, labor income, and total economic output in the Portland MSA. Total net change in economic output and labor income would be minimal, although there would be a negative effect on job-years supported. This is largely a function of reducing household expenditures in primarily retail, entertainment, and food services sectors and increasing expenditures in transportation and professional

services sectors. The analysis assumes the change in private and public spending to be perfectly symmetrical, without any leakage to households or businesses outside of the Portland MSA.

Table 6-11. Summary of Annualized Economic Effects related to Toll Revenue Operations (2027 to 2045)

Effect Categories	Employment (Job-Years)[1]	Labor Income (millions 2021$)	Economic Output (millions 2021$)
ODOT Investment of Revenue	1,249	$75.5	$262.9
Household Expenditure	-1,699	-$59.1	-$190.1
Wholesale Trade Spending	-313	-$29.6	-$70.3
Annual Net Change	**-763**	**-$3.2**	**$2.4**

Source: Bureau of Economic Analysis, RIMS II Input-Output Model, 2021
Note: The change in employment assumes a linear change in employment in the industries supported by household spending (Retail, Entertainment and Food Services). These effects would be spread across the API and therefore represent the aggregated total job-years, not individual full-time equivalent employees, and their related labor income.
[1] Job-years refers to the equivalent of an employee working for 2,080 hours in a year. For example, a full-time employee working for three years would be equal to three job-years, while three part-time employees working a total of 2,080 hours in a year would be equivalent to one job-year.
BEA = U.S. Bureau of Economic Analysis; RIMS = Regional Input-Output Modeling System

The effects shown in Table 6-11 illustrate only the effect of the increased costs in transportation for businesses and households; the table does not include the added value of improved travel conditions, reduced delay costs, and change in other vehicle operating costs. The improvements in I-205 performance of are expected to increase the value for users and the region. Additionally, while the employment effects on the wholesale retail sector are expected to be distributed beyond the region, decreased congestion and improved on-time reliability are expected to increase demand in the warehousing and wholesale trade sectors, benefiting businesses throughout the supply chain. As such, the employment effects are not meant to indicate the net change in regional employment, but a variable within the greater calculus of evaluating travel benefits, changes in market demand, changes in spending behaviors, and the evolution of industry patterns within the region and throughout the supply chain.

6.3 Summary of Effects by Alternative

Table 6-12 provides a comparison of anticipated benefits and impacts by alternative. Under the No Build Alternative, the values represent the economic conditions in the future without the implementation of tolling and improvements to I-205 beyond Phase 1A. Under the Build Alternative, the values represent the differences resulting from implementation of tolling and subsequent I-205 improvements relative to the No Build Alternative.

Table 6-12. Summary of Economics Effects by Alternative

Effects	No Build Alternative	Build Alternative[1]
Short-term	• None	**Toll System Implementation Economic Benefits** • Total employment: 7,985 job-years • Total labor income: $508.7 million • Total economic output: $1,490.8 million
Long-term	**Traffic Impacts on Users and Society** • Annual undiscounted net costs: $468.1 million • Annual discounted net costs: $143.7 million **Truck Freight Impacts** • Annual undiscounted additional costs for less reliable truck freight service: $9.4 million • Annual discounted additional costs for less reliable truck freight service: $3.7 million **Household Impacts** • No change in transportation costs as a percentage of median household income under the No Build Alternative compared to existing conditions	**Toll Operations Economic Benefits for Users and Society** • Annual undiscounted net benefits: $104.9 million • Annual discounted net benefits: $41.2 million **Consumer Spending Economic Benefits** • Annual employment change: 3 job-years • Annual labor income: $0.1 million • Annual economic output: $0.3 million **Truck Freight Benefits from Toll Operations** • Annual undiscounted additional cost savings for more reliable truck freight service: $9.9 million • Annual discounted additional cost savings for more reliable truck freight service: $3.9 million **Household Impacts from Toll Operations** • Additional average (rounded) annual spending: $600 • Difference in transportation costs as percentage of median household income (as of 2018): Less than 1 (0.7) percentage point higher, which represents about 9% higher transportation costs under the Build Alternative compared to the No Build Alternative
Indirect	• None	**Toll Revenue Operations Economic Benefits** • Annual employment: (763 job-years) • Annual labor income: ($3.2 million) • Annual economic output: $2.4 million

[1] All dollar values are in 2021 dollars and discounted where noted.

7 Avoidance, Minimization, and/or Mitigation Commitments

The following sections identify measures to avoid, minimize, and/or mitigate impacts of the Build Alternative, as discussed in Section 6.2. Due to the nature of the improvements related to the Build Alternative and how they would affect travel and consumer behavior, the impacts are expected to be related to the equitable access to social and economic opportunities for the residents within the API. Additional mitigation measures to address impacts on social resources and communities and on environmental justice populations are included in the *I-205 Toll Project Social Resources and Communities Technical Report* and the *I-205 Toll Project Environmental Justice Technical Report*.

7.1 Short-Term Impacts

The Build Alternative would not result in any negative economic effects during construction; therefore, no mitigation is proposed.

7.2 Long-Term and Indirect Impacts

With the mitigation measures detailed in the *I-205 Toll Project Transportation Technical Report, I-205 Toll Project Social Resources and Communities Technical Report,* and *I-205 Toll Project Environmental Justice Technical Report*, no additional mitigation measures for long-term and indirect economics impacts are warranted.

8 Preparers

Table 8-1 identifies the individuals involved in preparing the Economics Technical Report.

Table 8-1. List of Preparers

Name	Role	Education	Years of Experience
Chris Wilhelm	Lead Analyst, Economic Analysis	B.S. Environmental Economics B.S. Business Management	5
Timothy Thornton	Manager, Economic Analysis	M.B.A. Business Administration B.A. Economics and Business	22

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