Recommendations

To reduce negative health impacts of the IBR Program, we recommend decision-makers design, construct, and maintain a program that prioritizes human health and safety, ecological health, and environmental justice.

Our recommendations are organized in four themes:

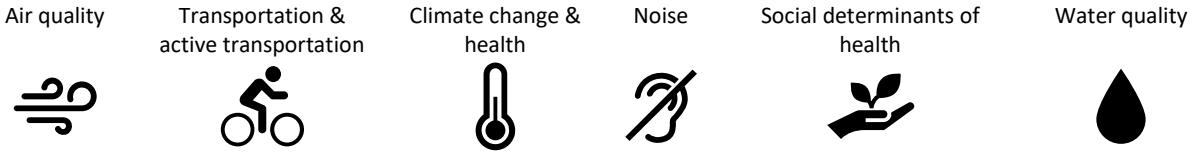
- Prioritize sustainability, transparency, communication and health for the lifetime of the project (p. 79-80)
- Provide additional information and modeling to better understand potential health impacts (p. 81)
- Design with health and equity in mind (p. 82-86)
- Construct with health and equity in mind (p. 87-89)

Our recommendations are guided by the following principles:[101]

1. Equitably reduce environmental exposures. Reducing environmental exposures in one area should not come at the expense of increased environmental exposures in another area.
2. Promote interventions to reduce environmental exposures, improve health, equitably distribute benefits, and monitor impacts on health outcomes.
3. Coordinate approaches to control environmental health risks across sectors.
4. Inform and involve communities that are affected by changes in environmental exposures.

Recommendations were developed and informed by peer-reviewed literature, best practices from previous health impact assessments on similar transportation infrastructure projects, and potential health impacts and mitigation identified during assessment of the DSEIS and other identified sources.

An icon or multiple icons accompany each recommendation. The icons indicate which topic area and associated health outcomes could be improved by implementation of the recommendation.



Prioritize sustainability, transparency, communication and health for the lifetime of the project

Transparency is central to building and maintaining trust. Community members will be affected by the IBR Program. It is critical that community members are both able to access information about how the program will affect them and able to share information, complaints, or questions with the program about how the program is affecting them.

The following recommendations support transparent communication and prioritize health during the lifetime of the program:

1. **Institute accessible systems for real-time two-way communication about project design and construction impacts to keep community members informed of project impacts, and the program informed of community impacts.**
    a. All communications materials should be written in plain language, available in multiple languages, and compatible with assistive technologies.
    b. With implementing agencies and contractors, coordinate a communication plan with multiple accessible platforms (e.g., website, social media, email and physical newsletters, text alerts, hotline) that are updated in real time so that the community can know when and where construction is happening; expected changes to transit, driving, or pedestrian routes; potential environmental impacts; and who to contact with questions, comments, or concerns.
        i. This should include notifying specific audiences with construction schedules well in advance: 1) emergency responders so they can be prepared during an emergency; 2) pedestrians and cyclists to know when it is safe to traverse portions of the road or access detours; and 3) affected residents, businesses, and commercial properties.
        ii. Communicate with community members and affected residents on types, time, duration, and potential health effects of construction well before and throughout construction activity. This should include details about noise, air quality, transportation and active transportation impacts.
        iii. Develop and maintain a centralized hotline and website for complaints, questions, or issues during and after construction. This should include coordinating with agencies responsible for controlling environmental exposures (e.g., noise, dust) during planning and construction and when responding to complaints.
        iv. Use visual technology such as 3D models and QR codes placed around the project area to help with visual understanding of design and construction plans.

2. **Prioritize health in program policies and decision-making throughout the lifetime of the program by incorporating regular engagement with community members, health department staff, and Tribal governments.**
    a. Provide funding to maintain health analysis team to continue to track and identify opportunities to include public health recommendations into the project. This can include:
        i. Incorporating health department staff into ongoing design committees or advisory councils
        ii. Proactive engagement and communication between program staff and public health to identify decision points and opportunities for health-focused decision-making well in advance
    b. Develop a monitoring, evaluation and reporting plan with clear responsibilities and accountability for the lifetime of the program. This should cover:
        i. Health, health equity, environmental justice and environmental indicators affected by the project, including health topics identified in this assessment and other topics that community and Tribal partners identify
        ii. Agencies responsible for measuring those indicators
        iii. Summaries of community complaints or comments and actions taken by the program or partner agencies to address them
        iv. Monitoring and timely reporting of any project-related issues that are context- and location-specific to support rapid response and reduce additional issues, including:
            1. Any injuries that are work related, transportation related, or non-workers injured in the project areas
            2. Any project-related noise, dust, emissions, or other environmental exposure disturbances
    c. Both before tolls go into effect, and after tolls are operational, ODOT and WSDOT should maintain a toll equity accountability committee or establish another structure where equity voices are at the table in a consistent, transparent, and resourced way to ensure long term accountability.
        i. Implement best practices from the Equity and Mobility Advisory Committee recommendations to the Oregon Transportation Commission.[215]

Provide additional information and modeling to better understand potential health impacts

Developing and sharing enhanced assessments of estimated impacts of the IBR Program on residents, people passing through and near the project area, and workers will increase the opportunity for incorporation of tailored strategies that more adequately protect health at the individual, project, and systems levels.

3. **Compile and release to the public more information about demolition plans for the current bridge infrastructure, including potential air quality, noise, and water quality impacts. This could include:**
    a. A detailed noise assessment and mitigation plan with noise heat mapping, predicted noise levels, and any overlap in noise-emitting activities with construction (e.g., if demolition and new construction are happening at the same time).
    b. Details about materials in existing infrastructure that could release contaminants into the air upon demolition, including lead and asbestos, and a detailed mitigation/abatement plan.
    c. Details about materials in existing infrastructure and the riverbed that could release sediments and contaminants into the water upon demolition, and a detailed mitigation/abatement plan.

4. **Expand information about potential air quality, safety, and connectivity impacts of design and construction.**
    a. Include air dispersion modeling of potential impacts of construction-related traffic diversion through neighborhoods adjacent to the project area.
    b. Include analysis of potential disruptions to regular transit, road, and active transportation routes that may affect community members' access to workplaces, health care services, social services, and other community services.
    c. Include analysis of severe injury and fatalities reduction for active transportation users and detail about mitigation features to prevent injury and fatalities.
    d. Collect and include pedestrian and bicycle counts from days where environmental threats (i.e., wildfire smoke) are not influencing travel behavior.

5. **Compile and release to the public additional information about potential air quality, safety, and connectivity impacts of tolling-related traffic diversion through neighborhoods.**

6. **Develop and release to the public a detailed sampling and analysis plan of riverbed sediment including potential contaminants, hazardous sediments, and toxics.**

Design with health and equity in mind

Design decisions early on are an important opportunity to make upstream, preventive health interventions that support healthier communities. Intentional planning with an environmental justice lens provides the opportunity to not only prevent disproportionate harms from design, but to address past harms and current disparities through infrastructure investments. Designing the IBR Program area with health at the forefront will be more beneficial to the community for decades to come.

The following recommendations prioritize health through program design:

7. **Design active transportation (bike lanes, sidewalks, and multi-use trails) and public transportation that is accessible to all to improve air quality and physical activity.**
    a. Design decisions should prioritize transportation system designs that reduce vehicle miles traveled, reduce single-occupancy vehicle capacity, increase physical activity, and increase access to transit.
    b. The design team should make considerations to include light rail station investment and design that encourage walkability and accessibility in surrounding areas. They should account for increased utilization, and opportunities for shade and cooling to protect users from heat.[216]
    c. Sidewalk and active transportation design should be centered around older adults, people with disabilities, and people with children, also known as inclusive design or universal design.

8. **Design safety features to reduce injury for active transportation users and vehicle users.**
    a. Design should prioritize pedestrian safety and active transportation user safety by integrating design features to reduce vehicle speeds. The design team should use a safe systems and health impact pyramid lens to evaluate ongoing transportation infrastructure decisions to reduce risk to all users.[84,85]
    b. Create active transportation spaces that feel safe and increase visibility. Use signage, lighting and lane markings on shared use paths to reduce the risk of bicycle-pedestrian, vehicle-pedestrian, and vehicle-bicycle collisions.
    c. Design and install suicide barriers that are tall and unclimbable. Install appropriate multilingual signage displaying the 988 National Suicide Prevention and Mental Health Crisis Hotline as required by Washington RCW 39.04.420.[217]

9. **Improve greenspace and tree canopy cover to improve air and water quality, provide shade, and increase natural spaces.**
    a. Use green infrastructure to improve air quality, infiltrate stormwater, increase climate resilience, improve habitat for wildlife, and increase physical activity.[218]
    b. Use landscaping materials throughout the project area, along sidewalks, roadways, trails, shared use paths, and at transit stops to soften the concrete footprint and reduce the urban heat island effect.
        i. Use native drought- and pest-resistant vegetation to support climate resilience and local biodiversity.
    c. Coordinate with the City of Portland and City of Vancouver to meet or exceed local tree canopy cover goals of 28%-33% in the project area, reduce the urban heat island effect, create shade, and reduce potential erosion into surface water.[219,220]
        i. Reduce removal of existing trees, vegetation and greenspace, and include provision of tree canopy, vegetation, and/or bridge shade structures to create shaded area for respite from heat and sun exposure.[221,222]
    d. Reduce large expanses of pavement and impervious surfaces to limit stormwater runoff and reduce urban heat island effect.

10. **Design with sustainable materials and standards to reduce greenhouse gas emissions.**
    a. Follow sustainability guidelines outlined in local government jurisdictions' sustainability and climate action plans to reduce the effects of climate change on health. The IBR Program should score highly in quantifiable sustainable practices associated with roadway design and construction.[221]
        i. For example, following the Greenroads Rating System, the IBR should score 80 points or higher.[223]
    b. Develop and implement a preferred scenario that meets or surpasses the greenhouse gas emissions reduction target set for the region to reduce the effects of climate change on health. Refer to local cities, counties and state climate action plans and requirements regarding greenhouse gas emissions, where applicable.[224–226]

11. **Prioritize resilience to extreme weather events, climate change, and seismic events to improve safety.**
    a. Develop spaces, pathways, and other facilities built to withstand extreme weather events and changes in climate (e.g., heat waves, wind and ice storms, flooding, sea level rise and storm surge, extreme rainfall) to adapt to climate change, and to prevent injury, illness, and death from extreme weather.[123,222]
        i. This includes design that makes it easier and quicker to clear ice, snow, and other extreme precipitation from pathways.

12. **Maintain and improve good air and water quality in the project area to protect physical and mental health.**
    a. Use innovative storm water management practices along the corridor to sustainably reduce vehicle pollution from entering waterways to prevent water contamination and waterborne illness.[221]
        i. Plan for more severe and frequent storms/precipitation to limit increases in stormwater runoff.
        ii. Reduce exposure of vehicle runoff infiltrating the water system.
        iii. Treat stormwater runoff from all areas impacted by the IBR Program.
    b. Maintain wetland water quality and protect/repair nearby wetlands.
    c. Follow all federal, tribal, state, territorial, and local requirements around water quality to protect aquatic life, local wildlife ecosystems and prevent water- and foodborne illness.
    d. Use innovative design features to improve air quality for active transportation users along the corridor. This could include planting vegetation between shared use paths to improve air quality and provide additional protection from vehicles.
    e. Follow all federal, tribal, state, territorial, and local requirements to protect and improve air quality.
    f. Protect and honor Native water rights by contributing to a healthy river and healthy ecosystem because “the ability to exercise these treaty rights to fish is completely dependent upon clean water and healthy ecosystems”.[227]

13. **Minimize noise in the project area to protect nearby neighbors and populations disproportionately affected by noise.**
    a. Re-examine mitigation measures for the 65 locations in the Portland project area and 135 locations in the Vancouver project area that will exceed noise standards under the Modified LPA as a way of protecting the health of residents in these areas.
        i. Re-examine mitigation measures for Discovery Middle School. Children and their learning comprehension are particularly affected by noise. If project design is unable to reduce noise exceedances for Discovery Middle School, work with Discovery Middle School to implement appropriate sound insulation as per ODOT and WSDOT noise mitigation considerations (e.g., ventilation systems, storm windows, air conditioning).
    b. Use multiple methods (e.g. freeway lids, noise walls, quieter pavement, landscaping) to reduce noise in the project area for the lifespan of the project and for all bridge users (pedestrians, cyclists, local businesses, residents).
        i. Design sound walls, and other noise reduction strategies, should prioritize the reduction in noise and be sure not to result in additional problems like disruptions of sidewalks and trails, barriers to community connectivity, or creating large concrete structures.
    c. Help residents implement noise reduction strategies before construction begins: identify and work with highly affected residents to determine mitigation during construction, such as installing double pane or sound- and dust-proof windows, installing air conditioning, sealing doors and windows, and reinsulating walls and ceilings; and providing hotel vouchers during the noisiest/overnight operations if certain noise levels are exceeded.[228]
        i. Consider lessons from the Port of Seattle Sound Insulation Repair and Replacement Pilot Program assessment (expected in 2025) as a potential model for a residential noise insulation program by a major transportation infrastructure project/port.[229]

14. **Improve connectivity and community cohesion to promote access to community and essential services.**
    a. To support reductions in racial health disparities, prioritize active transportation and transit connections to important destinations to support place-based physical activity, especially destinations identified by BIPOC communities.[230]
    b. Maintain access and, where possible, increase connectivity to key neighborhood services and assets by promoting street connectivity and walkability.[74] These include parks, schools, worksites, libraries, grocery stores, food pantries, restaurants, banks, social clubs, gas stations, laundromats, post offices, places of worship, harvesting and fishing sites, cultural and natural landmarks, hospitals and healthcare facilities, including behavioral health and substance misuse treatment facilities.
    c. Create activity-friendly routes (i.e., pedestrian, bicycle, or public transit access) that allows for multiple and convenient route options to everyday destinations by walking, biking, and rolling.[74]
    d. Use design elements (e.g. freeway lids, pedestrian bridges) to improve East/West connectivity and accessibility within the program area.
    e. Incorporate design elements that highlight local art, history, and culture, including naming the bridge, to enhance community connection.

15. **Center equity and focus on local businesses in contracting to improve economic opportunities for underrepresented groups.**
    a. Identify and commit to a plan for increasing the contracting opportunities for Disadvantaged Business Enterprises, Minority Business Enterprises, Women Business Enterprises, and Small Business Enterprises that are awarded contracts for designing, building, and operating the program.[215]
    b. Consider abiding by the Washington State Healthy Environment for All Act that establishes a "goal of directing 40 percent of grants and expenditures that create environmental benefits to vulnerable populations and overburdened communities".[231(p1)]

16. **Minimize home and business loss, and proactively support displaced residents, businesses, and employees.**
    a. Before property acquisition and displacement begins, develop and implement comprehensive strategies and funding options to address the relocation and housing needs of people displaced by the program, including housed and unhoused community members. These should build on and provide a holistic approach to Uniform Relocation Assistance and Real Property Acquisition Policies Act (URA) requirements and the objective to lessen the emotional and financial impact of displacement. This could include:
        i. Ensuring continued access to local and culturally important food, transportation, health care, and social services to displaced people and families.
        ii. Evaluating the feasibility of 'Right to Return' options for displaced residents, either in continued housing relocation assistance or in new housing options if any are developed using project funds.
        iii. Working with families and neighbors to assist with coordinated relocation for those that are interested, and to maintain community linkages because moving can be particularly difficult for children and older adults.
        iv. Working with families to relocate within their child's school district, and if possible, moving over the summer as not to disrupt school year learning.
        v. Working with organizations like the Council for the Homeless and Columbia River Mental Health to develop strategies and investments to support the movement of people experiencing homelessness within the project area into housing and avoid further stress, traumatization, and distrust of government. Partner with homeless service providers to conduct outreach and to identify accommodation and support strategies to assist people in finding permanent housing options.[232]
        vi. Assisting displaced residents to find housing options for rent or purchase within the project area that meet their accessibility needs, health and safety needs, and are sustainable. This includes that homes are LEED certified, lead abated, and remediated for mold; have heat pumps, screened windows, air filters, ventilation; and are pet-friendly for individuals and families with pets.
    b. Identify strategies to reduce business impacts like business and employee displacement. This could include assistance and support to displaced employees in the job search, and displaced businesses in searching for new properties that meet their needs.
    c. Identify strategies to provide mental health and other support services to individuals who will be displaced from their home or disconnected from their social network due to residential or business displacement, at no cost to the individual.

Construct with health and equity in mind

Construction is expected to take approximately a decade. It is important to center worker and community health in construction plans, contracts, and operations.

The following recommendations prioritize health during the multi-year construction phase of the program:

17. **Meet and exceed, where possible, state and local requirements for noise, air quality and water quality to protect the health of workers, community members, and the ecosystem.**
    a. Ensure that construction vehicles meet state and local requirements for clean diesel contracting, and retrofit diesel construction vehicles to curb air pollution prior to the start of construction.
    b. Maintain construction equipment in good working condition to reduce emissions and noise.
        i. Reduce traffic-related air pollution from combustion of fuel, tire wear and brake wear during operation of the project.
        ii. Use approved noise control devices for generators, compressors, and similar equipment. Use OHSA approved broadband back-up warning devices on all construction vehicles and equipment.
    c. Develop a workforce transportation plan with contractors (e.g., incentivize active transportation and public transit options, carpooling) to reduce expected increased single-occupancy vehicle transportation to construction sites, and to reduce noise, air pollution, and GHG emissions.
    d. Adjust the construction schedule to maximize quiet time for residents.
        i. Limit loud-noise construction activities performed within 300 meters of an occupied dwelling unit between 7:00pm and 7:00am, as reported as noise abatement time constraints in the DSEIS.
        ii. Limit the operating periods for equipment that produces loud noise, such as pile drivers and concrete cutters, particularly during nighttime periods.
    e. Measure employee noise exposures and implement a hearing loss prevention program per state and federal noise level regulations over an 8-hour shift. The recommended exposure limit is 85 dBA over an 8-hour period.
    f. Limit in-water operations to November 1 – February 28 to protect fish, wildlife, and habitat resources per Oregon Department of Fish and Wildlife and U.S. Army Corps of Engineer regulations.[233,234]

18. **Design and mark routes during construction to protect pedestrians and active transportation users from injury and environmental exposures.**
    a. Develop safe and clearly marked alternative routes and maintain temporary paths for pedestrians, bicyclists, strollers, wheelchair users, and other active transportation users during the construction period, rather than simply closing sidewalks and bike lanes.
        i. Coordinate with and incorporate adjustments for ongoing and future Safe Routes to Schools efforts and for bike bus groups used by both adults and children in the project area (for example, Bike Bus PDX[235]).
    b. Direct alternate or detour vehicle routes away from high pedestrian areas, schools, places of worship, and other community centers to decrease likelihood of vehicle-related pedestrian injury.
        i. Include speed abatement measures (ex. speed humps, temporary signals, reduced speed limit signs) to reduce potential for crashes and injury.
    c. Reduce construction hazards to motorists, pedestrians, and cyclists from hazards such as large dust and debris "kickup", concentrated air pollution, and excess noise that could lead to unsafe areas and elevated exposures.

19. **Maintain community connectivity through reliable access to transit, neighborhood services, and regular transportation routes.**
    a. Reduce obstacles to business access, local and culturally important food—including harvesting and fishing sites—transportation, health care services, schools, places of worship and other essential community services during construction.
    b. Increase transportation assistance programs during construction to reduce disruption in accessing medical care, behavioral health care, social and educational services, especially for older adults and people with disabilities. Expand those programs and financial assistance.

20. **Protect workers and community members on high-risk days for high heat and poor air quality events.**
    a. Create and implement plans for extreme heat during the construction period, including recommended or designated times for active transportation users to travel through the project area during cooler times of day to prevent heat-related illness and death.
    b. Utilizing Washington State Department of Health guidance, take steps to reduce construction-related air pollution on days when the Air Quality Index reaches 'Unhealthy for Sensitive Groups' due to wildfire smoke or high ozone to protect outdoor workers and communities at increased risk.[236] WADOH guidance available at https://doh.wa.gov/sites/default/files/2024-06/821-174.pdf.
    c. Create and implement plans to ensure worker safety and protection, accounting for overlapping exposures, health sensitivities, and disproportionate impact to outdoor workers, including easy and reliable access to personal protective equipment.[152,162]
        i. Ensure that workers understand their rights, have adequate access, and have training to take protective steps with respect to climate hazards, such as extreme heat and severe weather, wildfire smoke, and air pollution exposure. These include access to water, shade or cooling, breaks, bathroom facilities, and personal protective equipment.[237,238]

21. **Establish systems for continuous monitoring for noise and air quality during and after program construction, ensuring that pre-construction conditions are measured as a baseline.**
    a. Use the World Health Organization's most recent Air Quality Guidelines and the Oregon Air Toxics Benchmarks to track air quality indicators near the project area and in neighboring communities.
    b. Coordinate with Washington State Department of Ecology, Oregon Department of Environmental Quality, Southwest Clean Air Agency, and community members to install and regularly analyze data from air quality monitors in the project area. This may include funding installation and maintenance of air quality monitors in the project area.
    c. In line with recommendation 1 above, identify a point of contact and appropriate communication methods for community members to use if they have questions or complaints about noise or air quality.
    d. Coordinate with schools, early learning facilities, and childcare facilities to install noise and particulate matter monitors at sensitive locations in the program area. Expand collection of noise measurements to include schools and early learning facilities near the program area beyond but inclusive of Discovery Middle School.

22. **Implement workforce development and support programs to develop and retain a diverse workforce.**
    a. In accordance with the recommendations of the IBR Workforce Market Study, develop comprehensive workforce development programs, including higher education, internships, apprenticeships, and targeted training in high-paid trades, with a focus on increasing BIPOC, underrepresented, underserved community participation and preparing students in high schools and community colleges for construction and trade jobs.[239]
    b. Prioritize services and policies for working families and caregivers, including childcare, and access to breast and chest feeding and pumping space.