

5 | Construction Effects



Chapter 5 examines construction activities and the temporary effects to the community and environment expected to occur during the construction period.

What activities would take place during construction?

Construction of the Build Alternative would involve a range of activities, most of which would occur on and adjacent to the current roadway alignment. Construction activities would affect traffic using SR 502, and also would have temporary effects on the community and environment.

The Build Alternative would widen SR 502, add median treatment, construct intersection improvements, build facilities to capture and treat stormwater, and create wetland mitigation sites. Construction would initially involve clearing and grading of land where roadway widening would occur. Construction of stormwater facilities would likely occur early on so that they could be available to retain and treat stormwater runoff during much of the construction period.

Due to the relative flatness of the corridor’s topography, no major earthwork cuts or fills would be necessary. Several structures would be constructed, including box culverts and possibly small retaining walls to reduce the project’s encroachment into sensitive environmental areas such as wetlands.

Road widening would consist of cutting and removing existing pavement, laying and grading aggregate base courses to provide a foundation for the roadway surface, and overlaying this foundation with new pavement (Exhibit 5-1). Construction would occur in multiple locations at the same time.

? **DEFINITION**

WHAT ARE TEMPORARY EFFECTS?

Temporary effects are short-term beneficial and adverse effects that occur during the construction of a project, but which are not permanent effects of the project.

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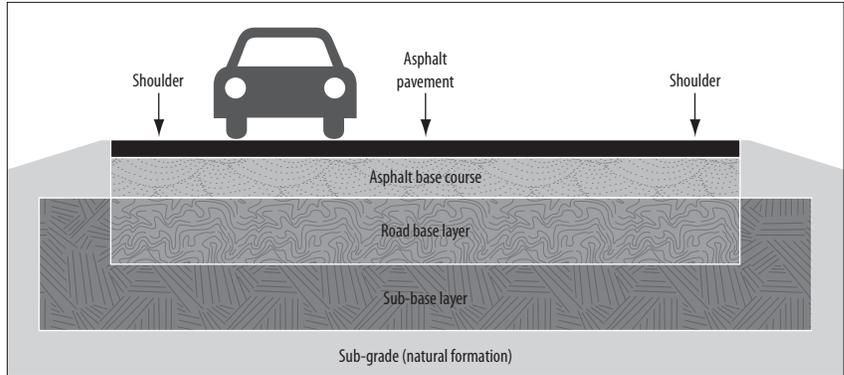


Exhibit 5-1: Construction layers of a typical road bed



DEFINITION

WHAT ARE CONSTRUCTION STAGING AREAS?

Construction staging areas are locations where contractors store equipment and materials during the construction process. For the SR 502 project, these locations would be selected by the contractor based on the overall acreage of the area, accessibility of the area, and avoidance of disruption to the community. These areas would likely be located on land acquired for right of way, and additional land acquisitions specifically for staging are not expected.

Construction staging would most likely occur on parcels acquired for right of way along the corridor. The contractor would select staging areas for equipment and materials storage during the construction of the project. Staging areas would be located beyond ordinary high water mark as permitted by Washington State Department of Ecology and outside of environmentally sensitive areas or areas with significant historic or archaeological resources. Washington State Department of Transportation would identify areas without these resources that could be used for staging areas. Staging areas would also be located on existing roadways whenever possible and as close to work sites as possible to minimize energy needs. Staging areas must also be included in the spill prevention control and countermeasures plan required for the project.

The project would also involve the creation of new wetlands at selected wetland mitigation sites. The exact nature of construction activities at wetland mitigation sites would be determined by the site characteristics and the extent of restoration or rehabilitation conducted.

At the Sunset Oaks wetland mitigation site, the Curtin Creek channel would be reconstructed to provide gradual winding across the site based on topography, groundwater levels and stream flow. The new channel and side channels would be constructed adjacent to the existing Curtin Creek channel. Prior to rerouting Curtin Creek into the new channel, block nets would be installed upstream and downstream to isolate the entire stream reach and prevent fish and other aquatic life from moving into the in-water work area. The existing channel would then be filled in and planted or re-graded as an overflow channel.

The Mill Creek North mitigation site would be constructed as a main channel of deep water with one bank designed for shallow flow. As a result of channel reconstruction and wetland rehabilitation work, in-stream work on Mill Creek North would occur. Coho, Chinook, chum, and steelhead may be present in Mill Creek North. Bull trout are not

expected in Mill Creek North. However, avoidance and minimization measures would be implemented to minimize potential adverse effects to these species and any in-stream work would occur within the designated in-water work window (July 15 to September 30).

More detail on the construction approach and schedule for wetland mitigation elements would develop as the design process progresses.

How long would it take to build the project?

Construction of the SR 502 project is expected to begin in spring of 2012 and last for about three years. Activities to develop wetland mitigation sites are expected to be completed during this timeframe as well. Changes in funding availability or other unexpected conditions could alter this schedule.

How would construction activities affect the community and environment?

Community and environmental effects related to the construction of the SR 502 project would occur under the Build Alternative. These effects would be temporary in nature, occurring only during the construction period. Potential construction disturbances include traffic congestion, delays, modifications to access, equipment noise, vehicle and work light illumination, air and dust emissions, and vibration effects. These temporary effects would primarily occur during weekday daytime hours and would likely vary along the corridor as construction proceeded. Mitigation measures to reduce and manage these effects are described further in Chapter 7, *Environmental Commitments*.

How would construction affect transportation?

Construction activities would result in temporary periods of traffic delay along SR 502 and on intersecting roadways. Washington State Department of Transportation and the contractor would develop traffic control plans to allow necessary construction activities to take place in an efficient manner while effectively meeting the travel needs of SR 502 users. The full closure of SR 502 is not expected. One possible approach to managing traffic during construction would be to utilize existing and newly paved areas to maintain traffic through the construction zone while work is ongoing. For example, new roadway could be constructed on one side of an existing lane. Traffic would then be shifted to this newly paved area and work could continue outside of the travel lane with little interruption to the flow.

Detailed traffic control signage and flagging would be utilized as needed to maintain safe traffic flow through the corridor during construction.



KEY POINT

Under the No Build Alternative, construction would not occur and there would be no construction related effects.



DEFINITION

WHAT ARE AIR AND DUST EMISSIONS?

Air and dust emissions are airborne pollutants released during the construction processes.

**DEFINITION****WHAT IS EROSION?**

Erosion is the wearing away of soil and rock. During construction, erosion may result from the action of streams, wind, and rain water on exposed soils.

Long detours to other routes during construction are not expected. The public would be notified of any roadway detours through local media sources. Media sources may include local television stations and newspapers such as *The Columbian*, *The Oregonian*, and *The Battle Ground Reflector*.

How would construction affect surface water?

Erosion from exposed soils during construction could increase the amount of sediment and total suspended solids entering Mill Creek, Mill Creek North, unnamed tributaries to Gee Creek and the East Fork Lewis River, and adjacent wetlands. Stormwater runoff may also carry other contaminants, such as fuel or oil from construction operations, particularly at staging areas. Potential concrete spills from pouring concrete near open water could raise the local pH due to the alkaline nature of the cement component of concrete. In addition, cement modified soils, which are used to firm-up wet, mucky soils to prepare a site for a building, structure or roadway, are expected to be used and could potentially raise the local pH level.

A temporary erosion and sediment control plan and a spill prevention control and countermeasures plan would be developed and implemented to minimize these construction effects. Construction effects would be contained to the minimum area necessary. Construction of the SR 502 project would abide by all resource agency permit conditions and conservation measures.

How would construction affect biological resources?

Construction of the Build Alternative may result in minor, temporary effects to upland and riparian habitats including grassland, scrub-shrub, and forests. However, staging areas would be located beyond the ordinary high water mark as permitted by the Washington State Department of Ecology, in already developed areas outside of environmentally sensitive areas. Staging and temporary access areas would be located on existing roadways whenever possible. Therefore, construction effects to biological resources are expected to be insignificant.

Noise from construction activities could temporarily displace wildlife from nearby areas. The internal combustion engine would be the most prevalent noise source. Pile-driving may occur in the location of Mill Creek North. No threatened or endangered wildlife species are expected to be affected by the noise, but common terrestrial and avian species could be temporarily displaced. Additionally, construction could displace and/or inadvertently kill burrowing species living within construction zones, such as gophers, rats, snakes or mice. No threatened or endangered species are expected to be encountered.

Vegetation removal, erosion, increased surface runoff, noise, and artificial light during construction could temporarily affect aquatic organisms and stream habitat. Temporary effects due to clearing and site access are expected to be minimal. Culvert replacement would be conducted during the established in-water work window and in full compliance with all appropriate environmental permits. Accidental spills could enter the creeks but measures would be taken to minimize spills and ensure all harmful materials are properly stored, contained, and disposed. Temporary effects to fish-accessible streams would be associated with potential dewatering of work areas below the ordinary high water mark, and also from channel realignment/restoration activities and wetland mitigation construction. There is the potential for fish handling from in water work which could result in mortality of fish.

In addition Washington State Department of Transportation will comply with and implement the terms and conditions for protection of biological resources as specified in the Biological Opinion issued by the National Oceanic and Atmospheric Administration – National Marine Fisheries Service (see Appendix D, *Agency Correspondence*).

How would construction affect wetlands?

Under the Build Alternative, construction activities may require the temporary removal of vegetation in some areas. Runoff from soils exposed during construction could result in an increase in the amount of suspended solids and sediments entering adjacent wetlands, potentially reducing water quality and impairing fish and wildlife habitat. Wetlands that should not be disturbed would be properly marked per Washington State Department of Transportation policy. Spills of materials used during construction could also potentially effect wetlands, but measures would be taken to minimize spills and ensure all harmful materials are properly stored. Construction activities will comply with Washington State Department of Ecology requirements to ensure that wetlands and other sensitive areas are properly protected during the construction process.

How would construction affect floodplains?

During construction, the minor grading associated with the Build Alternative could potentially redirect and/or obstruct the flow of runoff or floodwaters. Once the grading is completed and the stormwater facilities are operating, the potential temporary floodplain effects would be eliminated.

How would construction affect groundwater?

Construction activities that require vegetation clearing, soil compaction, and other practices can decrease the permeability of

the ground surface and impede infiltration of rainfall. These effects would be temporary, and restoration of some disturbed areas after construction would re-establish ground surface permeability along the SR 502 corridor.

Spills from construction equipment, if not properly contained and cleaned-up, could enter and affect the shallow aquifer. Prior to any construction activities contractors would be required to prepare and follow a spill prevention and control countermeasures plan for construction in accordance with standard specifications published by Washington State Department of Transportation.

How would construction affect geology and soils?

During construction, ground clearing activities would take place which could allow exposed soils to erode. Soil loss from erosion could negatively affect surface water resources and associated habitat. Soils exposed to windblown erosion could create nuisance dust, which may reduce visibility, create respiratory hazards, cover adjacent fragile agriculture, and may harm visual quality by getting in the way of views and creating dusty conditions. A temporary erosion and sedimentation control plan would be developed and implemented to minimize the construction effects.

How would construction affect farmlands and other land uses?

Residents, livestock, and crops in the study area would be temporarily affected by the disturbances associated with construction of the Build Alternative. Construction related effects would decrease in intensity as the distance between a particular land use and construction increases.

Construction is not expected to preclude the existing land uses around the SR 502 corridor for agricultural, residential, commercial, church, or public use; however these land uses may be temporarily disturbed by access restrictions, traffic delays and equipment noise, for example. Similarly, construction would not prohibit new land uses as prescribed under County and City zoning designations.

What effect would construction have on the local and regional economy?

With the Build Alternative, the region's construction workers may be able to obtain new jobs, and businesses may be able to sell supplies or materials for the construction activities. Some local businesses may benefit from construction workers purchasing food and gas. Others may experience a decline in sales, increased operation costs or decreased operation efficiency during construction.



Some local businesses may benefit from construction workers purchasing food and gas

Businesses along SR 502 would experience construction disturbances. For the duration of construction, one lane of travel would be maintained in each direction and access to all properties would be guaranteed. However, for short periods of time there may be a need to stop or detour traffic. These effects would be primarily during weekday daylight hours, and would avoid peak travel periods if possible. The higher level of congestion during construction would increase travel time along the project corridor and may make it more difficult to make left-turns to and from SR 502. This may deter business customers from patronizing local businesses. Parking in adjacent parking lots for local businesses would not be affected by construction. Local government revenues could benefit from the sales taxes paid on construction supplies.

Would construction affect historic and archaeological resources?

As discussed in Chapter 4, *Comparison of the Alternatives – Environmental Effects*, there are six historic resources in the study area that are considered eligible for listing in the National Register of Historic Places. The J.B. Williams house would be demolished, and the house on the Thomas farmstead would be relocated or demolished, but the remaining resources would likely experience construction disturbances from the Build Alternative. The level of these construction-related effects would depend on the proximity of the resource to the areas of construction. In addition, construction equipment, exposed cut areas, stockpiled soil, and vegetation removal along the roadway during construction could diminish the quality of the visual features which comprise the resources' setting and contributes to their historical significance; however, these effects would be temporary and Washington State Department of Transportation would remove equipment and restore the areas as soon as construction is complete.

Other than the six historical resources, no other historic or archaeological resources are believed to have the potential of being affected by the project. An inadvertent discovery plan for archaeological resources would be prepared for the Build Alternative prior to construction. If any inadvertent discoveries were encountered during construction, work would immediately cease in the vicinity of the discovery to avoid further damages to the resources. Washington State Department of Transportation, Washington State Department of Archaeology and Historic Preservation, and affected Native American tribes would be notified for evaluation of the significance of the discovery and the appropriate course of action would be implemented.

How would construction affect parks, recreation, and open space?

No publicly owned parklands would be affected during construction of the project. Bicyclists traveling on SR 502 would be subject to the same traffic control restrictions as drivers. Further, travel lanes would likely be narrowed through the project corridor during construction and some sections of the roadway may be unpaved at times, which could affect safe travel conditions for bicyclists.

How would construction affect neighborhoods?

The Build Alternative would cause residents living close to SR 502 to potentially be exposed to construction disturbances. The increased level of congestion during construction would increase travel time along the project corridor and may make it more difficult to make left-turns to and from SR 502. For the duration of construction, one lane of travel would be maintained in each direction and access to all properties would be preserved. However, for short periods of time there may be a need to stop or detour traffic. These effects would be primarily during weekday daylight hours, and would avoid peak travel periods if possible. Media releases or other notifications would be made to local residents to alert them of planned construction activities to minimize disruptions to their daily travel and activities.

How would minority, low-income, elderly, and disabled populations be affected by construction?

Under the Build Alternative, construction disturbances and the associated effects on minority and low-income populations, minority businesses and businesses serving minorities, elderly, and disabled populations would be the same as those experienced by other residents living within close proximity to construction activities.

How would construction affect the character of views?

During construction of the Build Alternative, all four landscape units would experience temporary visual effects that introduce construction equipment and workers, light and glare, material stockpiles, debris, staging areas and demolition activities into the view. Signage would also be introduced, however, brightly colored signs or lights have an intended beneficial effect on safety. Grading and the removal of vegetation for staging areas would also create a temporary visual effect, provided that staging areas are rehabilitated after construction. All of these effects would temporarily disrupt the connectivity and unity of existing views.

How would construction affect sound levels?

Construction of the project would involve different combinations of activities, each of which would have its own mix of equipment and,



Brightly colored signage has an intended safety effect

consequently, varying noise characteristics. The most prevalent noise source at construction sites would be the internal combustion engine. Engine-powered equipment includes earth-moving equipment, material-handling equipment, and stationary equipment. Mobile equipment operates in an episodic fashion with periods of high and low noise, while stationary equipment, such as generators and compressors, operates at sound levels fairly constant over time. Because trucks would be present during most phases and would not be confined to the project site, noise from trucks could affect more area residents. Other construction noise sources would include impact equipment and tools such as pile drivers. Impact tools could be pneumatically powered, hydraulic, or electric.

Construction noise levels would depend on the type, amount, and location of construction activities. The location of construction equipment relative to adjacent properties would determine any effects of distance in reducing construction noise levels. The noise levels for the types of construction equipment that could be used on the project would be 90 decibels or less at a distance of 50 feet, except for pile drivers which could reach 101 decibels.

Construction noise from projects within the State of Washington is exempt from Washington State Department of Ecology property line regulations during daytime hours, but must meet the regulations during nighttime hours (10 p.m. to 7 a.m. on weekdays and 10 p.m. to 8 a.m. on weekends). Performance of construction activities during nighttime hours would require a noise variance from the City of Battle Ground or coordination with Clark County, depending on the location of the activity. To the extent feasible, noisier construction activities would be conducted during daytime hours to reduce noise levels during sensitive nighttime hours. Additional measures would be applied to reduce noise levels, including equipping engines with adequate mufflers, turning off equipment during prolonged periods of nonuse, and locating compressors and generators away from residences.

The Sunset Oaks and Mill Creek North mitigation sites may also be temporarily affected by noise from construction equipment.

How would construction affect hazardous materials?

Project construction in areas of hazardous materials contamination could have an adverse effect on human health and the environment. Construction activities, such as grading and excavation, could cause worker exposure to hazardous materials and the release of contaminants to the soil, groundwater, and surface waters. The sampling, special handling and disposal of media contaminated with hazardous materials could pose potential construction delays that result

in increased project construction costs. Contamination from asbestos-containing materials and lead-based paint may also be encountered within structures to be demolished as part of the project. There are also several electrical transformers located along SR 502 that may contain hazardous substances. These transformers may need to be removed and relocated for construction of the project, which could potentially result in adverse effects to human health and the environment.

Property acquisitions for the proposed corridor widening are planned at five of the 10 hazardous materials sites. The potential exists for Washington State Department of Transportation to incur liability issues associated with acquisition and/or construction at these sites. A series of evaluations would be conducted prior to construction to further identify and remediate, if necessary, the hazards associated with these contaminants. However, current property owners could be responsible for removal of any existing hazardous materials on their properties before being acquired.

How would construction affect public utilities?

Under the Build Alternative, utility providers may construct some new utilities and would relocate or modify others to maintain access and improve safety near the edge of the travel lane. Utility disruptions to residential and commercial customers may inadvertently occur during construction. However, most new utility construction and utility relocation would likely be completed prior to switching customers from the old utility system to the new system, which minimizes service disruptions.

How would construction affect air quality?

Construction activities would result in production of airborne dust as well as emissions from construction equipment. Fine dust particles, classified as fugitive particulate matter emissions less than 10 microns in size (PM_{10}), are associated with construction activities such as demolition, land clearing, ground excavation, grading, cut-and-fill operations, and structure erection. These emissions would vary from day to day, depending on the level of activity, specific operations, soil conditions, and weather conditions. Larger dust particles would settle near the source, and fine particles would be dispersed over greater distances from the construction site.

Heavy trucks and construction equipment powered by gasoline and diesel engines would generate other pollutants in their exhaust emissions, primarily particulate matter less than 2.5 microns in size ($PM_{2.5}$), carbon monoxide, and nitrogen oxide. Additionally, construction traffic and lane closures may increase congestion and



DEFINITION

WHAT IS FUGITIVE PARTICULATE MATTER?

Particulate matter includes very small naturally occurring and man made particles. Fugitive particulate matter is suspended in the air by the wind and human activities.

reduce the speed of other vehicles in the area, temporarily increasing emissions from traffic in the immediate area. Some construction phases (particularly during paving operations using asphalt) would result in short-term odors. These odors might be detectable to some people near the site and would be diluted as distance from the site increases.

During construction, contractors would take reasonable precautions to prevent fugitive dust from becoming airborne and would maintain and operate the source to minimize emissions. Air pollutants, including fugitive dust, would be controlled by incorporating guidance from the Associated General Contractors of Washington, *Guide to Handling Fugitive Dust from Construction Projects* (Associated General Contractors 1997).

What are the energy needs to construct the project?

Energy is consumed during construction to manufacture materials, transport materials, and operate construction machinery. During construction, the Build Alternative would result in the consumption of energy to manufacture and transport materials, as well as operate construction equipment. Staging areas would be located near work areas to minimize haul distances and conserve energy.

The total energy that would be consumed to construct the Build Alternative is estimated to be 581–743 million BTU. This equates to such a small percentage of Washington State’s overall energy consumption (605 trillion BTU in 2005) that it would not place substantial additional demand on energy sources or fuel availability in the state during the construction period.



DEFINITION

WHAT IS A BTU?

A BTU, or British Thermal Unit, is a standard unit of measurement for energy use. A BTU was originally established as the amount of energy needed to raise the temperature of one pound of water in liquid form by one degree Fahrenheit.

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