

# Transportation Projects Aimed at Easing Traffic Congestion, Increasing Mobility

by John Wolcott and Lucy Bodilly



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Transportation related projects are adding over \$5 billion to the Northwest economy over the next five years. Voter approved tax levies and bond issues are a major portion of the funding.

Transportation projects will be a driving force in Oregon and Washington for the next few years, thanks to a major funding initiative from voters and help from the federal government.

Congress passed a new version of the SAFETEA-LU legislation, which will provide \$3.1 billion in funding in Washington state and \$2.2 billion in funding for Oregon between 2005 and 2009.

State voters in Washington also passed a 9.5-cent gas tax increase to fund highway projects. In Oregon, contractors are using bond money approved by voters there to repair bridges and improve freight mobility throughout the state.

By the time the projects funded by the Oregon Transportation Investment Act are completed in 2012, every bridge

in the state will have been rebuilt or improved. The repairs will allow the bridges to carry heavier loads.

The boost in funding and a critical need for improved traffic flow are spurring innovative techniques and contracting methods. Design-build delivery is one way to perform the work quickly.

"With a design-build-bid project, you would take two or three years to design it, and another year to put out bids and award it," said Moe Dichari with the Oregon Bridge Partners Associates, a consortium of engineering firms overseeing the OTIA projects. "With design-build, once we pick a team, it can start construction and design the project at the same time."

In Oregon the delivery method >>

The retaining wall is part of construction along I-405.



The Everett Project will greatly improve traffic flow in one of I-5's major bottlenecks.

will account for 140 projects worth more than \$610 million over the next four years. Washington is using design-build on three current projects.

"You can expect to see a lot more of it in the future," said Colleen Gantz, a public information officer with the Washington DOT.

It can be a difficult concept for many in the DOT management to get used to, Don Williams, a Washington DOT project manager, said at a recent meeting of the Design Build Institute of America, Northwest Chapter. "The department of transportation is so used to close oversight, it's hard for us to get used to the fact that the contractor is now taking responsibility of certain functions."

Here is an overview of some local transportation projects now under construction:

### Oregon DOT Mount Hood to Chemault

Description: Replacement of 12 bridges along a 214-mi. section of Highway 97 and SR 26 to improve freight mobility. Construction of a 1.8-mi. passing lane.

Wildish Construction is 98 percent complete on the project, with plans to finish final paving and punch-list items as weather permits.

#### Key Players

**General Contractor** Wildish Construction, Eugene

**Engineer** David Evans and Associates

Oregon DOT chose a design-build contract for the job.

"The next phase of the Oregon Transportation Investment Act calls for replacing bridges along Interstate 5, and the milestone was to have another north-south route accessible before the I-5 phase of the project," said Dichari. Another OTIA goal is to stimulate Oregon's economy by hiring local companies and construction workers.

"We hired three different asphalt paving companies, but it wasn't to meet that goal," said Red Killiland, a project manager with Wildish Construction, Eugene, Ore. "We were so spread out, we didn't have any choice."

Though many of the bridge replacements were routine, the team on two occasions broke its own record for installing the longest prestressed girder in the state.

The beams allowed for a single span to be used over Alder Creek, which broke the record first, and another one over Chemault Creek. A double span would have necessitated a maintenance agreement with the Burlington Northern Railroad because of railroad tracks below the bridges.

"We chose Morse Brothers out of Harrisburg (Ore.) to make the girders because they had trucks heavy enough to transport them, but coordinating traffic through the Portland area was difficult," Killand said.

Throughout the project, the team worked to recycle or reuse as much of the concrete and asphalt as possible.

### Sauvie Island Bridge

The new bridge will feature many improvements over the current bridge, including:

- Two wider (12 ft.) traffic lanes, with a second westbound turn lane at the intersection with Highway 30 to assist traffic exiting the island.
- Two 6-ft. sidewalks.
- Two 6-ft. shoulders.
- Gentler, safer curves on the island approach to the bridge.
- Wider horizontal clearance for river traffic and identical vertical clearance for river traffic.

Several architectural features were designed with the help of a Citizen Advisory Committee of 10 volunteers from Sauvie Island and nearby neighborhoods. Committee members worked with the project team, including engineers from Multnomah County and David Evans and Associates, an engineering firm in Portland, and the bridge architecture firm H2L2

The committee helped to select a >>



On the other side of Puget Sound, the Hood Canal Bridge project will greatly improve safety and add another traffic lane to the bridge.

wheat color for concrete portions of the bridge, an open railing style, cross braces in the main arch that have openings and a sunburst pattern for the cables between the main arch and deck.

### I-5 through Everett

One of Western Washington's worst traffic bottlenecks – on 6 mi. of Interstate 5 through Everett – is being cleared by a creative realignment of roadways, overpasses and HOV-lane exits and entrances.

The project stretches from East Marine View Drive to SR 526 at the Everett Mall and Boeing plant exits.

Working under a \$260 million state Department of Transportation design-build contract, designer CH2M-Hill of Seattle and contractor Guy F. Atkinson Co. LLC of Renton, Wash., expect to finish a six-lane 41st Street overpass by May 2007. A new right-exit ramp will lead to an I-5 flyover bridge to Broadway, replacing the old left-lane exit for northbound traffic.

By summer 2008, new north and south HOV lanes should be in use

through Everett, well ahead of the influx of traffic and visitors expected in the region for the 2010 Winter Olympic Games in Vancouver, B.C.

As notable as the project itself is, the transportation department's design-build approach to highway construction is just as significant. The DOT chose this method of construction to save time in the construction process and minimize traffic impacts.

State transportation officials recognized that they could greatly improve the effectiveness of the HOV project by combining it with a 41st Street Bridge widening project that wasn't scheduled for construction for two more years. The bridge will be torn down and rebuilt with a six-lane configuration in six months.

Started in September 2005, all of the Everett work is expected to be completed three years earlier than originally planned under the traditional design-build process.

The 6 mi. of widened freeway from SR 526 to the exit for SR 2, the HOV lane additions and the flyover exit to Broadway

are funded by \$220 million from the 5-cent-a-gallon gas tax approved by the 2003 Legislature.

Perhaps the most dramatic change for motorists will be the Broadway flyover being built with a right-exit ramp that comes off I-5 and heads up a curved bridge of concrete and steel that passes over I-5 and merges on the other side with Broadway. The flyover will replace the left-exit ramp.

The new I-5 to Broadway ramp and bridge is supported by 15 steel girders, each 106 ft. long and weighing 43 tons, stretched over several T-shaped concrete support towers that have been built in the Lowell neighborhood east of I-5.

The two-lane, left-exit ramp will become a northbound HOV lane exit for carpools, vanpools and buses when the flyover opens this summer. There will also be 4.6 mi. of new southbound HOV lanes on I-5 from Marine View Drive to SR 526.

The Department of Transportation also will be installing several miles of noise barrier walls throughout the project area.

One of the significant aspects of the project is the construction of water-treatment facilities for the freeway rainwater runoff from 280 acres of pavement, medians and sloping land. No previous I-5 project has provided anything but simple drains for stormwater that flows into salmon spawning streams, wetlands and the Snohomish River.

"We're building six detention ponds and wetland areas to improve the water in the river, create new space for wildlife and provide recreation opportunity," said Connie Lewis, public outreach manager for the design-build team.

More information is available at [www.wsdot.wa.gov/Projects/I5/HOVS/R526toUS2](http://www.wsdot.wa.gov/Projects/I5/HOVS/R526toUS2), by sending email to [EverettHOV@wsdot.wa.gov](mailto:EverettHOV@wsdot.wa.gov) or calling 877-241-0770.

## Design-Build Innovation In Oregon

By ODOT Staff

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**Design-build contracts are becoming** increasingly common because they can help save projects time and money. For the Oregon Department of Transportation, these design-build projects are also creating more innovative solutions to design and mobility challenges.

On the OTIA III State Bridge Delivery Program, a \$1.3 billion program to repair and replace hundreds of aging bridges in Oregon, the agency has capitalized on the advantages of this delivery method with a highly focused team, the Design-Build Unit. DBU is responsible for managing the factors that make the design-build method of procurement so effective.

“Design-builder innovation is a very exciting part of reviewing design-build contracts,” said Jim Cox, the interim manager of the DBU. “When the same team designs the bridges they will construct, they can work to the strengths and skills of their team members.”

Time is critical in construction. Contractors bidding on design-build projects need to devise solutions that avoid mobility challenges and shorten the construction schedule. As ODOT staff prepared the request for proposals to replace two aging bridges along Highway 38 at Elk Creek, they realized the project’s unique challenges were well-suited to the design-build delivery method.

Highway 38 is part of a coastal road network built in the 1930s. The highway connects large population centers in Portland, Salem and Eugene with the Oregon coast. When the highway was built, bridges such as the two at Elk Creek served to open the state’s scenic coastal regions to commerce and tourism.



Oregon and Washington are both using design build contracts to help speed up construction.

The purpose of the bridges hasn’t changed much in the ensuing 70 years, but their usage has. Oregon’s population has increased, and the highway is now crowded with tourists and weekend visitors, putting extra stress on the aging bridges.

Replacing the Elk Creek bridges demands innovative solutions. There is virtually no possibility of using a detour structure, because the bridge decks border both the northern and southern ends of a tunnel. The road is a vital link between Interstate 5, the coast and the communities in between. It cannot be shut down for long periods of time, yet the topography dictates full closure since there is little room for temporary

lane closures or detours.

To solve this problem, ODOT is developing a contract that focuses on communication among all stakeholders, including ODOT, the contractor and the public. The agency has developed an innovative public involvement program that will be used before the request for proposal is issued. Two different options for road closures have been prepared: closing the roadway completely for approximately one month using rapid replacement techniques, or creating a one-lane bridge detour—which would push the construction schedule to approximately six months.

After presenting these possibilities >>

to the public for consideration, the agency will include the final decision in the RFP, thereby attracting the most suitable and qualified contractor for the project.

The high level of public involvement prior to the RFP is a system the agency tries to incorporate into many of its projects. ODOT views the public as partners in the program and incorporates their ideas into the work as a way to create efficiency. The result is a program that meets the requirements of many different stakeholders.

In addition to the extensive public involvement on this particular project, ODOT is also helping potential contractors by incorporating design exceptions into the RFP. Design exceptions are made when it is impossible to complete a project to full design standards. The RFP for the Elk Creek bridges will be slightly different in that all the design exceptions will be approved beforehand and incorporated in the RFP before it is sent out. This gives potential firms early knowledge of the exceptions approved for the project, making it easier for them to evaluate whether they can meet the particular requirements. ODOT believes this innovation will result in stronger bids and more qualified contractors.

Through a detailed design-build contract that incorporates public feedback and features a reasonable set of goals for the finished project, these bridges will be rebuilt to serve tourists and commerce heading to Oregon's coastal region far into the future. <<

## Alternate Delivery Keeps Oregon Highway Projects Moving

By Matt Garrett, ODOT Director

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**Matt Garrett** The Oregon Department of Transportation is delivering on historic levels of construction, maintenance and preservation — and it's been a particular pleasure getting here with the involvement of high quality contractors and partners in the transportation industry.

In 2005, ODOT awarded the highest volume of contract dollars in its history — over \$520 million. And the growth is just beginning. Over the next five years, ODOT will continue to implement the Oregon Transportation Investment Act (OTIA I-III), a \$3 billion program to repair or replace 365 bridges, pave and maintain city and county roads, improve and expand interchanges, add new capacity to Oregon's highway system, and remove freight bottlenecks statewide. We've got lofty goals — and high expectations for ourselves and our partners — but the rewards for success are invaluable: stimulating Oregon's economy, sustaining family wage jobs, and contributing to Oregon's livability.

We won't get there by doing business as usual. Times have changed. In every industry, projects are being designed, built and delivered faster, better and stronger. With a focus on being outstanding stewards of the public's investment, ODOT, too, can do things more cost-effectively — and with increased safety — by using technology and inno-

vation. We know what we have to do. We know what kind of partners we need to get the job done.



Sound Transit and its partners, King County Metro Transit and the City of Mercer Island, broke ground in mid-April for a new two level park-and-ride garage. Sound Transit has completed or started construction on almost 5,000 parking spaces along the I-90 corridor. The new low-profile garage will have 450 parking stalls with landscaping and architecture designed to fit well into the surrounding neighborhood. When completed, the new transit center will feature extended bus bays, new and vastly improved bus shelters for passengers and increased bicycle storage. Public art, as part of Sound Transit's Start Program, will be an important part of the passenger experience at the new transit center.

It's important for us to be able to share good news with Oregonians, like the fact that in each of the last two calendar years, on projects we've completed, we are running about 1 percent under budget. That's a savings to taxpayers of a little over \$3 million per year. We want to do better.

There are myriad opportunities coming up in Oregon, for both Oregon-based and other contractors. In 2005, \$28.8 million was spent on goods and services related to the OTIA III bridge-work; of that total, more than 95 percent went to Oregon firms. In the next 12 months, 57 OTIA III projects are expected to be let, totaling \$243 million. Twenty of those projects (\$167.5 million) are design-build; 37 projects >>

(\$75.5 million) are design-bid-build.

We're also continuing to make investments in the state with the new ConnectOregon initiative, a \$100 million lottery backed-bond initiative for Oregon's air, rail, marine, and transit infrastructure. The project applications, from throughout the state and totaling \$238 million, are being reviewed by stakeholders now and will be considered for approval by the Oregon Transportation Commission in July. With this fast-tracked initiative — and construction readiness as a key consideration for project inclusion — construction will commence soon thereafter.

In addition, ODOT continues to deliver the traditional workload of approximately \$350 million per year in transportation infrastructure projects — repaving Oregon's highways, building new interchanges and turn lanes, repairing and replacing bridges, and adding new lanes to the state's highway system.

Here in Oregon we're also looking to move forward on several large projects in the coming years, including the Columbia River Crossing project on the I-5 corridor. In conjunction with our Washington state colleagues, we are engaged in an Environmental Impact study to determine the best alternative to enhance this transportation lifeline from State Route 500 in Vancouver, Wash. to approximately Columbia Blvd. in Portland. The project is aimed at improving the mobility, reliability and accessibility for automobile, freight, transit, bicycle, and pedestrian users of that busy stretch of I-5.

Efforts are also underway to begin construction by 2008 on the I-5 Delta Park project, which will widen the southbound portion of I-5 in north Portland between Victory Blvd. and N. Lombard Ave. — another outstanding opportunity to facilitate the movement of goods, services and people in our area.

In southern Oregon, construction is expected to begin this year for the new South Medford Interchange at exit 27 on I-5. Estimated project cost is \$70 million, making it the single most expensive transportation project ever in that part of the state. In eastern Oregon, a third lane (truck passing) for eastbound I-84 traffic headed up Three-Mile Hill west of Ontario is planned for 2009. The OTIA-funded project will reduce wintertime road closures due to

crashes that can block the freeway on this steep grade. And those are just a few of the projects in our future, and in the futures of our partners. It's an exciting time for all of us as we invest in our communities, our economy and our environment. We look forward to working with you!

## Oregon Investigates Public-Private Partnerships

In a new approach to delivering significant transportation projects, ODOT has also embarked on a new era in public-private partnerships. The department's Office of Innovative Partnerships and Alternative Funding, created by the Oregon Legislature in 2001, encourages the private sector to work with the public sector in bringing innovative solutions to transportation projects in Oregon. In 2005, the office issued and awarded its first request for proposal, for services related to three large, unfunded transportation projects: the Newberg Dundee Bypass, the Sunrise Project and the South I-205 Corridor.

The Oregon Transportation Improvement Group (OTIG), a private consortium made up of Macquarie Infrastructure Group as the major partner and investor, Macquarie Securities USA as the financial advisor, Hatch Mott MacDonald as the technical advisor, and others, is working with ODOT to determine the feasibility of devel-

oping the three projects. Development of the three projects will take place in two distinct phases: pre-development and implementation. We are currently in the pre-development phase, which will take approximately 12 - 18 months to complete and involves analyzing the feasibility of various technical, commercial and financial options for the projects. If the pre-development phase reveals that the projects can move forward, the Oregon Transportation Commission will be asked to approve allowing OTIG to move into the implementation phase. As part of the original RFP, if implementation is approved, ODOT requires OTIG to conduct a competition for the design and construction of the projects. This would be an unprecedented opportunity for Oregon and northwest regional contractors. It is important to note, however, that at this time, no decisions to move forward with construction have been made.

## I-405 Projects

By Lucy Bodilly

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The flyover will improve traffic mobility near Everett.

**Two projects under way near I-405** in Kirkland, Wash. will provide congestion relief and improve freeway access. Funded by the Nickel gas tax in 2003, they are part of a \$1.4 billion program that will improve traffic flow through the area, which runs on the east side of Lake Washington between Renton and Lynnwood.

Stage one of the Kirkland I-405 project calls for adding a general purpose lane in each direction of the freeway between NE 85th and 124th Streets, which will include noise wall construction. The contract, being fulfilled by Max J. Kuney Construction, Spokane, Wash. includes surface street improvements as well. That stretch of freeway runs over wetlands requiring mitigation work.

Work also calls for improving traffic access near the freeway. The most unusual aspect of the project for Kuney

will be the use of a styrofoam road bed.

“The road runs over a goopy peat bog, and styrofoam is the one material light enough for us to use without impacting the bog,” said David E. Becher, P.E., Engineering manager for the Washington State Department of Transportation.

Kuney will tear up the road, and then rebuild the foundation with large styrofoam blocks as the base. The rest of the road will be built in the usual manner, with a gravel base course and paving.

The freeway configuration will allow access directly from the transit station to I405 for buses and carpool drivers. Because it involves so many different groups: the city of Kirkland, Sound Transit and WSDOT and the public said Lee Somerstein, public information officer with Sound Transit. This phase of I405 improvements will receive \$54 million from Sound Transit, of the \$85

million in total cost.

The next phase of the project is under the direction of a design build team of Kiewit Construction and DMJM/Harris.

“We chose design build for this phase of the project because of the time savings,” Becher said. “It also helps us take advantage of innovative ideas.”

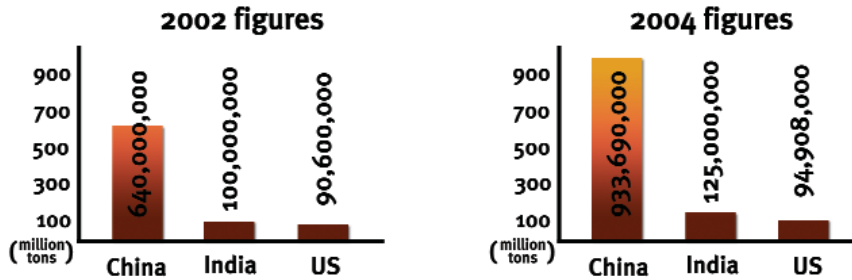
The main concerns teams competing for the contract had to consider were their ability to meet the basic contract requirements, use innovative ideas to complete the project and minimize the traffic impacts, by keeping at least four lanes open at all times. Being able to maintain communication between all affected jurisdictions was also key.

AMEC, Kirkland, Wash., is team that is providing environmental support for the project. The wetland mitigation and stream enhancement measures have helped the project gain public acceptance and expedited the environmental/permitting process, said Susan Sander, a principal with the firm.

As part of the effort, the team will restore wetlands in the corridor and create a new wetland off-site. In addition, a new streambed feature has been designed to create more than 250 feet of new habitat and allow fish to migrate from Lake Washington to Forbes Lake for the first time in decades by creating a passage under the freeway.

WSDOT will use both design-bid-build and alternative delivery methods for the rest of the I-405 projects. For more information see [www.wsdot.wa.gov/projects/405](http://www.wsdot.wa.gov/projects/405).

## Top World Producers of Cement in Metric Tons (One Metric Ton is 1,000 KG or 2,204 lbs.)



Oregon customers.

Cement Replacement with Fly Ash in the Northwest:

The primary fly ash supply source in the Northwest has been the power plant in Centralia, Wash. Currently the industry is experiencing spot shortages of fly ash. "GreenBuild" specifications have specifiers increasing the percentage of fly ash in commercial mixes. In order to

meet demand for these higher ash contents specified into commercial jobs, a few producers have had to remove ash from residential mixes. In some cases, the net effect of the "Green" movement has been to simply move the ash consumption from the residential to the commercial market. In other areas that are outside the Northwest, such as Wyoming and Alberta, Canada, there is quite a bit of

ash available, but transportation costs and logistical problems with rail transportation make it uneconomical.

### Solutions:

Performance mixes offer some relief from the cement and flyash shortages. When a producer has the option to supply performance mixes, it is possible to reduce cementitious contents and achieve equal or better performance through the addition or optimization of the admixtures in the concrete mix design. Minimum cement content specifications contents often require a Ready Mix producer to supply concrete mixes with more cementitious materials in them than they actually need.

More than ever, the Northwest construction industry is competing in an increasingly global economy. This is illustrated by the impacts other countries are having on our supplies of materials.

## Pavement Choice May Reduce the Need for Noise Walls

Noise reduction has become one of the most serious challenges of the Federal Highway Administration (FHWA) and all state departments of transportation. Unfortunately, traditional mitigation measures are limited, often deemed infeasible from the cost-benefit perspective, or considered aesthetically unacceptable to residents of the affected communities.

Currently, noise abatement for most U.S. state transportation departments constructs noise walls. But at \$1.2- to \$5-million per mile, they also are one of the most expensive solutions.

One of the northwest's busiest highways, I-5, generates noise of up to 75 decibels (dB) during certain times of the day. For those vehicles traveling on that corridor faster than 35 mph, the dominant source of traffic noise is the tires on the roadway surface. The current form of noise abatement for Washington State Department of Transportation (WSDOT) and most DOT's in the U.S. is the use of noise walls. Depending upon the design and material, noise walls can provide a reduction in noise levels by approximately 15 dB. However, they are one of the most expensive mitigation

measures and they range from 1.2 to 5.0 million dollars per mile.

As a result of this growing, system-wide problem, FHWA has introduced the Quiet Pavement Pilot Program, a solution that significantly controls car and truck noise at the source.

Quiet Pavement is a safe, durable, economical pavement design that can be used for asphalt and concrete pavement and costs the same to construct as traditional pavement. It has been shown to reduce tire traffic noise as much as, or more than, a noise wall—the difference between, say, loud singing and a normal conversation between two adults. Quiet Pavement, combined with well-designed and constructed noise walls, produces even more significant noise reduction, as well as creating flexibility for design and placement of noise walls that might otherwise not be practical.

For product information contact AMEC, Kirkland Wash.

## Light Rail Project on Track

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With a total construction cost approaching \$750 million, the Seattle Link Light Rail Line is one of the most expensive transportation projects in the area. Work is being completed under five main contracts. The rail line winds its way through downtown Seattle, under Beacon Hill, down the Rainier Valley and to Seattle Tacoma International Airport. Construction requires a retrofit of the existing bus tunnel, construction of a new tunnel under Beacon Hill and installation of elevated and ground level tracks.



### Tukwila to Sea-Tac

Contract amount: \$231.7 million

Expected completion: Spring 2008

PCL Construction of Bellevue is using a gantry to lift 12 sections of track between each pier along the final section of the rail line that runs between Tukwila and Sea-Tac International Airport. The segments are hoisted into place, and then post tensioned, fastened with cables and grouted into place. Then the gantry is launched forward until its weight can be transferred to the next pier. PCL is also building three bridges so the train can cross Interstate 5.

### Downtown Seattle Transit Tunnel Retrofit

Contract amount: \$74.6 million

Expected completion: Fall 2007

Balfour Beatty of Seattle is working to expedite the schedule on the Pine Street stub tunnel, which will provide a turn-around for Sound Transit trains. The goal is to complete that portion of the project by Thanksgiving, before the holiday shopping season begins and the city of Seattle starts its annual construction moratorium.

"So now instead of working 19 hours per day, they are working 21," said Geoff Patrick, public information officer with Sound Transit.



### Rainier Valley

Contract amount: \$114.2 million

Completion: 43 percent

Expected completion: Spring 2007

RCI/Herzog of Sumner, Wash. is almost done moving the utilities and will start repaving Rainier Avenue and MLK Way from curb to curb in May. When the repaving is completed, crews will lay the light rail track down the center of the median.



### Beacon Hill

Contract amount: \$280.0 million

Obayashi Corp. of San Francisco is about 60 percent complete with the tunnel through Beacon Hill, that connects the downtown Seattle rail line to the Rainier Valley. The contractor is about 40 percent done with the tunnel portion of the project and has temporarily stopped boring to build a conveyor system to move the spoils from inside the tunnel. It will stop again in June for maintenance and repair of the boring machine. At the same time, the contractor is building the shaft that will bring commuters to the main platform 160 ft. below the surface to the boarding platform.

### SODO

Contract amount: \$40.7 million

Expected completion: Spring 2006

Kiewit Pacific of Vancouver, Wash. is 90 percent done with this portion of the light rail line, which starts near the sports stadiums and runs through the SODO district to the beginning of the Beacon Hill tunnel. Work still being completed includes street crossings, railing, station and train platform installation. Also under Kiewit's contract is the operations and maintenance facility located on Lander Street. The contract amount for that portion of the work is \$50.4 million, and the anticipated completion date is in Fall 2006.

