POLICY brief

Washington Research Council

PB 04-10 December 22, 2004

BRIEFLY

This is the first policy brief in a four-part Research Council series on Washington State's infrastructure needs.

Washington's Infrastructure Needs: Plans, Funding and Gaps

There is little doubt that Washington State will continue to grow at a faster rate than the nation as a whole, fueled by a forward-looking economy and a wide variety of attractive lifestyle options. Whether the state and the communities within it grow with grace depends, in large part, on the ability of state and local governments to keep up with basic infrastructure needs. This policy brief provides an overview of the state's identified infrastructure needs and funding gaps, focusing on roads and highways and water and sewer utilities.

MEASURING NEEDS: THREE COMPLICATING FACTORS

Maintenance vs. new capacity

For most of the history of Washington State, infrastructure development meant adding systems and capacity to a young, and often frontier, built environment. Paved streets, municipal water and sewer systems, the interstate highway system, major bridges and tunnels all delivered new services and opened opportunities that would allow the state to grow, foster economic development and improve the quality of life.

Within the past generation, the pattern of infrastructure needs has changed dramatically. An increasing part of the effort and spending now goes to maintenance and replacement of worn out and outmoded systems, with capacity additions often receiving lower priority. As roads, bridges, pipes and treatment plants reach the end of their useful life, or fail to meet more stringent performance standards, replacement becomes a priority, often at a much higher cost than starting from scratch.

Therefore, any assessment of infrastructure needs must be broken out into two basic categories: maintenance and replacement of existing capacity, and construction of new capacity. These often overlap, as a practical matter, but many funding programs treat them separately and they usually involve different political dynamics.

Levels of service: a moving target

The adequacy of infrastructure is quite a subjective matter. Some outcomes, such as drinking water quality and effluent discharge, are subject to federal regulation, but others, such as household water pressure

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and the acceptable level of traffic congestion, do not follow any rigid standards.

The lack of standards presents problems when determining future capacity needs. Patterns of usage change over time in response to lifestyle changes and pricing. For example, per capita vehicle miles traveled, a basic measure of the use of the road system, had been steadily climbing through the 1980s, as suburbs spread out and more women went to work. Then that measure began to flatten out, and has remained stable for the past decade. So whereas demand on roads was increasing faster than population growth for decades, it now seems to be increasing at about the same rate. We may see similar changes in demand on water systems as residential lot sizes (and their landscaped areas) shrink and waterwise gardening becomes more popular.

In addition to shifting of individual preferences, levels of service can be set through public policy. Users of public infrastructure are certainly entitled to safety, but they are not entitled to any particular level of performance. Decisionmakers continually calculate the costs (financial and political) and benefits of expanding infrastructure capacity, and adjust their ideas of acceptable performance accordingly.

Quality, design and impact mitigation

As communities become more compact, infrastructure and public facilities become more visible and play a more complex role in the surrounding environment. They cannot be off by themselves, with purely functional designs that emphasize getting the most capacity for the money. In another era, a strip of asphalt would have been a perfectly acceptable road in a low-density residential area, whereas contemporary street designs require curbs, gutters, sidewalks and planting strips. Odor control at wastewater plants and noise mitigation of freeways add costs but do not add capacity.

Much of the discussion of "adequacy" of infrastructure goes well beyond the question of whether the facility performs its basic function, and veers off into more aesthetic territory. So while more elaborate projects certainly can enhance the quality of the community, extensive design and mitigation features drive up costs and limit the number of projects that can be completed within constrained resources.

STATE HIGHWAYS

The shift in emphasis from capacity to maintenance/replacement is clearly illustrated in current strategies for state highways. Funding for preservation and maintenance nearly always comes first in agency budgets, with capacity enhancements coming after. But even some major projects do not really add capacity. Two of the most expensive road projects in the state – replacement of the Alaskan Way Viaduct and the SR-520 bridge – will cost billions of dollars and likely add no new general purpose lane capacity.

Maintenance

In response to recommendations by the Governor's Blue Ribbon Committee on Transportation, the state Department of Transportation (WSDOT) adopted a series of benchmarks to measure their efforts to

improve the state's transportation system (Washington State Department of Transportation 2003 (1)). The benchmarks set goals of zero lanes-miles of pavement in poor condition and zero structurally deficient bridges.

Since 1999, the state has whittled its backlog of repaving from about 3,800 lane miles to around 3,000. Currently about nine percent of the state's highways are considered to be in poor condition. (Washington State Department of Transportation, 2002 (1)) The number of state bridges rated in "poor" condition, such that they trigger weight restrictions, has fallen from five percent to three percent in the last four years. (Washington State Department of Transportation, 2003 (2))

Compared to other states, Washington does not look too bad in the maintenance category. According to the Federal Highway Administration, Washington ranked 17th in the country in 2002 for the roughness of the pavement on state highways. In the same year, Washington ranked sixth for the fewest number of structurally deficient bridges. (Washington State Department of Transportation, 2002 (1))

Table 1: Twenty-One Highway Projects Costing More Than $200 Million

Highway/Location and Improvement	WSDOT Region(s)
I-405 Corridor – Tukwila to Lynnwood Multimodal Improvements	Northwest
SR 520 Trans-Lake Solution – Multimodal Improvements	Northwest
I-5 Core HOV	Northwest, Olympic
U.S. 395 – North Spokane Corridor	Eastern
New SR 509	Northwest
SR 167 Extension	Olympic
SR 16 – Tacoma Narrows Bridge	Olympic
SR 99 – Alaskan Way Viaduct, Replacement	Northwest
Spokane I-90 / Central Business District	Eastern
SR 28 – Wenatchee to I-90	North Central
I-90 – Snoqualmie Pass East	South Central
U.S. 101 / I-5 – HOV	Olympic
I-5 – Columbia River Interstate Crossing	Southwest
I-5 – Oregon State Line to I-205 Junction	Southwest
I-5 – SR 501 to Toutle River Rest Area Vicinity	Southwest
I-5 – Toutle River rest area Vicinity to Rush Road – Increase Capacity	Southwest
U.S. 395 / I-82 to I-182 – Widen to Six Lanes	South Central
SR 104 Kingston – Widen from Two to Four lanes	Olympic
I-5 – 72nd to Pacific Avenue – Add Core HOV Lanes	Olympic
I-5 – Pacific Avenue to Port of Tacoma – Add Core HOV Lanes	Olympic
I-5 – Rush Road to Thurston County Line – Increase Capacity	Southwest

Source: Washington State Department of Transportation, 2002 (2)

Capacity

Capacity of the road and highway systems is much more difficult to benchmark than pavement conditions. Inadequate capacity and the impact of capacity improvements are usually measured by various indicators of congestion and travel time.

In national congestion rankings, the metropolitan areas of the state seem to have improved in recent years. The Texas Transportation Institute's annual congestion index used to show the Seattle area among the very worst in the country. Now, however, through some real improvements, as well as changes in measurement methodology, the Seattle area ranks sixteenth worst among the 85 areas studied. Interestingly, the Portland area, which includes parts of Clark County, is now tied with the Seattle area in the overall congestion index. Spokane is way down at number 74. (Schrank and Lomax, 2004)

While congestion measures can usefully point to transportation system deficiencies, capacity questions usually boil down to specific projects that will improve the performance of a corridor. The WSDOT 20 Year Plan lists well over 1100 separate projects under its program for mobility improvement across the state. These range from relatively inexpen-

Table 2: The WSDOT 20 Year Plan Covers the Whole Range of Operations and Construction Activities
In millions of 2001 dollars

Preservation		
Pavement	$4,530	
Bridges	$1,704	
Retaining walls & other structures	$2,518	
Preservation Total		**$8,752**
Improvements		
Mobility	$38,168	
Safety	$2,260	
Economic initiatives	$2,563	
Environmental	$1,357	
Improvements Total		**$44,348**
Maintenance Total		**$3,337**
Operations Total		**$596**
Total 20 Year Highway Plan		**57,033**

Source: Washington State Department of Transportation, 2002 (2)

sive ramp improvements or signalizations, to multi-billion dollar projects. Table 1 shows the 21 projects estimated to cost in excess of $200 million. (Washington State Department of Transportation, 2002 (2)

The current WSDOT Highway Plan calls for spending $57 billion over the next 20 years, or an average of $5.7 billion per biennium. (See Table 2.) Available revenues, however, fall well short of this target. In the 2003-2005 biennium, WSDOT will spend a total of about $2.6 billion on highways, or less than half of the amount called for by the plan, with the shortfall coming disproportionately from the capital side. The 20 Year Plan calls for about 93 percent of highway expenditures to go towards construction, whereas the 2003-2005 WSDOT highways budget shows about 83 percent going to construction, and the balance going to maintenance and operations. (Washington State Department of Transportation, 2002 (2); Washington State Department of Transportation, 2002 (3))

The most expensive projects in the 20 year plan are mostly found in the Puget Sound region, and the plan relies on local funding through the Regional Transportation Improvement District (RTID) authorized by the Legislature and created by King, Snohomish and Pierce Counties. The current RTID plan, which has yet to go before the voters, would add as much as $11.7 billion to WSDOT's highway construction budget during the period of 2005 to 2019 (Regional Transportation Improvement District, 2004). But even if the RTID is adopted, it will not fund all projects in the Puget Sound area in the 20 year plan, and it does nothing for unfunded projects in the rest of the state.

LOCAL ROADS

Assessing the needs of city and county road systems is extremely difficult. Each jurisdiction has its own capital facilities program (CFP), usually assembled on a rolling six year cycle, as required by the Growth Management Act (GMA). The measurement tools are not always consistent among jurisdictions, so adding together projected needs often means combining apples and oranges. Furthermore, the GMA requires those CFP's to be "resource constrained" – that is, they should only list projects for which the jurisdiction can identify funding.

In 1998, the State Public Works Board undertook the Local Government Infrastructure Study, which attempted to combine the capital needs of all cities, counties and utility districts in the state. (Washington State Public Works Board, 1999) To do this the study

team requested the CFPs of all jurisdictions, and then made adjustments for inconsistent data and extrapolations for missing data. Table 3 shows the total needs, available funding and funding gap for roads and bridges maintained by cities and counties.

The total gap of $1.69 billion represents projects that jurisdictions fully intend to build but for which funding sources are identified but not firmly nailed down. Each jurisdiction has a longer list of projects they would like to build, but for which they cannot even guess at a funding source and therefore have excluded from their "resource constrained" CFP. Hence, the real gap would be much larger than that shown in the study.

Table 3: City and County Roads and Bridges Funding Gap

In millions of 1998 dollars

	Roads	Bridges	Total
Funding Needs	$3,700	$390	$4,090
Available Funding	$2,150	$250	$2,400
Funding Gap	$1,550	$140	$1,690

Source: State of Washington Local Government Infrastructure Study

Another way to uncover capacity deficiencies at the local level is through the concurrency requirements of the GMA. The GMA requires that jurisdictions provide infrastructure concurrent with new housing and commercial development. If infrastructure becomes overburdened and cannot be expanded in a timely way, jurisdictions must halt development that might make the situation worse. Nearly all jurisdictions planning under the GMA have concurrency programs in place, but they vary widely in their measurements and standards.

Even with its unevenness, concurrency has had an impact on development. In a survey by the Puget Sound Regional Council of jurisdictions in King, Pierce, Snohomish and Kitsap Counties, eight jurisdictions reported they had denied projects because of inadequate local roads, eleven jurisdictions reported delaying developments until road projects were completed, and twelve jurisdictions compelled developers to change the scope of their projects. (Puget Sound Regional Council, 2003)

In King County, despite a recent loosening of standards, a large part of the Soos Creek area near Kent remains off limits to development due to congestion on local streets. In all of unincorporated King County about 1800 potential housing units cannot be built until concurrency requirements are met. (King County Department of Transportation)

WATER SYSTEMS

Nearly 90 percent of Washington residents get their drinking water from one of about 16,000 water systems. These range from private systems serving just two homes, to the Seattle system, which directly serves over a half million people and provides water to cities and water districts serving hundreds of thousands more. Another 600,000 state residents get their water from a household well. (Washington State Department of Health, 2002) Table 4 shows water systems in the state in 2002:

Like road systems, the adequacy of water systems has two parts: capacity and quality. But the analogy ends there, since, while a rough road is still useable, unsafe drinking water can pose major health hazards. Moreover, the vast majority of roads are maintained by relatively large

governments that have the necessary financial and technical capacity to maintain them, while tens of thousands of homes are served by very small private water systems managed by owners or volunteers.

The quality and safety of drinking water systems is governed by the Federal Safe Drinking Water Act (SDWA). (Group A systems must comply with SDWA; Group B systems are exempt.) The 1996 amendments to the SDWA placed a high emphasis on improving the technical, managerial and financial capacity of water systems, so they will be better able to comply with more stringent standards.

Despite the enhanced capacity of small water systems – 98 percent of Group A systems now have certified operators – the regulatory compliance bar keeps being raised. Prior to 1996, water systems needed to track 23 possible contaminants. They now need to track over 100 possible contaminants, and by 2010 they may need to track as many as 130. These and other requirements add up to a substantial burden of sampling, testing, inspection and paperwork that can easily overwhelm small systems. (Washington Water Supply Advisory Committee, 2003) While the State Department of Health has programs to provide technical assistance, the large number of systems – over 4200 Group A systems must comply with SDWA – spreads this assistance very thin. (Washington State Department of Health, 2002)

The capacity of water systems has been a growing concern, especially in the rapidly-growing areas served by groundwater. The large municipal surface water systems were built with substantial capacity and have been able to keep up with growth. And because growth happens in these systems at the margins, they can use conservation throughout the system to free up capacity for new hook-ups. Their size also gives them the rate base and bonding capacity to finance improvements with little difficulty.

Table 4: Water Systems in Washington State

	Number of Systems	Population Served
Group A Community Systems		
Serving over 1000 homes	191	4,442,237
Serving 100 to 999 homes	516	455,898
Serving 15 to 99 homes	1,626	146,283
Total Group A	**2,333**	**5,044,418**
Group A Non-community Systems		
Serving businesses and non-residential institutions	1,903	n/a
Group B Systems		
Serving 2 to 15 homes	12,566	107,301
Private wells		
Serving one home only	n/a	600,000

Source: Washington State Department of Health

Many areas around the state that were once rural and are now suburban still rely on groundwater systems that have limited capacity. As this capacity becomes strained, many areas have imposed building moratoria by denying applicants the "certificate of water availability" called for in the GMA. The certificate is issued by the local water utility which may be a private system or water district, so even if a city or county can accommodate growth, the water supplier may deny it.

Recent legislation promises improvements in the situation. In 2001 the Depart-

ment of Ecology (DOE) was authorized to institute a "two line" process of approving water rights. Under the old system, water right applications were addressed strictly in the order received, so complex applications would hold up the line and create a major backlog. Under the new system simple applications for changes in water rights are processed separately from complex applications. As a result, DOE went from processing about 250 applications in 2001 to over 700 in 2003. (Washington State Department of Ecology)

A second important change in water law allows water rights to be transferred more easily and allows water to be used outside of the geographic area of the original right. So, a water district can now acquire a water right from a business, mine, farm or other holder and use that water throughout its service territory. This allows water districts to expand their reach and makes it easier to merge small systems into larger, more technically and financially secure ones. (Washington State Legislature, 2003)

Among the six-year CFPs of cities and water districts in 1998, the Local Government Infrastructure Study identified a total of $1.68 billion in capital needs and $1.1 billion in available funding, resulting in a funding gap of $580 million. (Washington State Public Works Board, 1999) This figure understates the needs of the state's water systems, since it includes only cities and water districts and does not include the many private water systems that have the greatest need for upgrading to current standards and the least financial ability to do so.

WASTEWATER

More than perhaps any other infrastructure, the provision of wastewater treatment services determines patterns of growth. With their large pipes and reliance on gravity and pumping stations, conveyance systems are very expensive and require a large number of hook-ups for financial feasibility. Treatment plants are also very expensive and difficult to site and get permitted. Because of the cost of providing it, many urbanized areas of the state still do not have sewer service, making it difficult for them to accommodate infill and redevelopment.

Like larger water utilities, larger wastewater systems can finance expansion and renovation with revenue bonds that are repaid through rates. The problem they face is allocating costs for expansion of the system. Because they are so difficult to build, wastewater plants are designed with substantial excess capacity that can accommodate decades of growth. But once that capacity is used up, who pays for expansion? Growth should pay for itself, but construction bonds will need repayment long before the growth arrives.

The large wastewater utilities in the state are spending huge amounts of money to expand capacity and bring their systems up to date. King County estimates it will spend $1.7 billion over the next 30 years on new treatment and conveyance facilities and to stop overflows from combined sewers. (King County Department of Natural Resources and Parks, 2004) Pierce County plans to spend $304 million, most of which goes to its Chambers Creek treatment plant. (Pierce County Department of Public Works and Utilities, 2002) In Clark County, expansion of the Salmon Creek system will cost up to $80 million. (Clean

Water Community Partnership) Even with no major new facilities, the City of Spokane budgets $25 million this year for capital improvements. (City of Spokane Wastewater Management, 2004)

At the local level, cities and sewer districts rely on hook-up charges to extend their systems, but they often struggle to expand into already-developed areas that have septic systems. In these areas, many of which are aging, low density neighborhoods with redevelopment potential, utilities must use local improvement districts (LIDs) to spread the cost of new sewer service. But current residents have little incentive to approve such financing if their septic systems still function. As a result, developable properties remain vacant unless the land owners or developers can afford to extend the sewer line themselves.

In cases where developers cannot successfully form an LID, they may be able to take advantage of a latecomer process, where subsequent development that hooks into the new sewer line repays the developer who initially paid for the line. Not all jurisdictions, however, have latecomer processes.

The Local Government Infrastructure Study identified a total of $1.82 billion in wastewater capital needs and $1.34 billion in available funding, resulting in a funding gap of $480 million. (Washington State Public Works Board, 1999) This probably understates the need substantially, since a resource-constrained six-year CFP would not likely include sewer extensions for which LIDs or private funding had not been proposed. Completing sewer service to all the urban growth areas of the state, as envisioned by the GMA, will be an enormous and expensive undertaking.

CONCLUSION

The challenge of accurately assessing infrastructure needs in the state reflects the fragmented governance and unclear standards and objectives under which infrastructure planning takes place. Local decision-making tends to favor the needs of current residents, and the visible deterioration or technical inadequacy of existing facilities tends to favor replacement and renovation. But the state keeps growing, and every new job and resident comes with a new increment of infrastructure need. The following papers in this series will examine the tug and pull of infrastructure planning and financing, and identify ways around these conundrums.

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