S A C O G

Item #05-10-5

SACOG Board of Directors — Workshop

October 13, 2005

Metropolitan Transportation Plan Issue Papers

Issue: Presentation of issue papers.

Recommendation: None, this item is for information purposes only

Committee Action/Discussion: Staff is continuing work on topical issue papers for the MTP 2030. A key goal of the effort is to improve the information base of the current Board and help frame issues for discussion in advance of the major public outreach activities during the spring of 2006. Each paper is being incorporated into public education materials under development.

Papers on road maintenance and system retrofits issues are attached. Comments from the Transportation & Air Quality Committee, the Regional Planning Partnership, and the Public Works Advisory Committee have been addressed in these final versions of the papers for the Board.

The road maintenance paper examines how cities, counties, and Caltrans keep the street, road, and highway system in a state of road repair. Relevant data and analysis is provided through the paper's five sections: cost of road maintenance; funding for road maintenance; factors affecting road maintenance and rehabilitation; road system condition and performance; and comparison with other areas. In the MTP 2030 the Board must face difficult questions, such as: To what extent can the region accept the consequences of continuing to defer maintenance? What priority should local road rehabilitation have in the investment of regional funds? How can the region address chronic road maintenance funding shortfalls, especially in the more rural areas?

The second paper is on system retrofits, which are those upgrades to the transportation system that improve function, safety, or livability. Some of the topics covered are high tech road and transit improvements, soundwalls, compliance with the Americans with Disabilities Act for sidewalks and intersections, bike lane and sidewalk connectivity, street improvements, upgrades to local bridges and rail, and storm drainage on roadways. Some of the questions raised are: Is retrofit a priority compared with maintenance and operations? Which are the highest priority types of retrofits? Can retrofits be phased over time? What are the risks and tradeoffs of delay? Can retrofits enhance a Blueprint-based transportation plan?

Two to three papers each month will be presented to the Board through January 2006. Papers on road expansions, transit expansions, and freight/goods movement are being prepared for November.

Approved by:

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MM:NK:MC:gg
Attachments

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Road Maintenance Costs, Funding & Performance

(Data mostly from 2003 sources)

	Caltrans	Counties						Example Cities									
	(all 6 Cos.)	Sacramento	Placer	El Dorado	Yolo	Sutter	Yuba	Sacramento	Roseville	Citrus Hts.	West Sac.	Davis	Yuba City	Lincoln	Marysville	Galt	Placerville
System:																	
State Highway Mileage	826	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
County Arterial Mileage		352	129	127	88	90	65	--	--	--	--	--	--	--	--	--	--
Local Co. Rd. Mileage		2002	862	937	716	735	524	--	--	--	--	--	--	--	--	--	--
City Arterial Mileage		--	--	--	--	--	--	180	45	27	19	24	20	6	7	9	5
Local Street Mileage		--	--	--	--	--	--	1104	274	160	117	128	132	48	51	69	45
Costs:																	
Road Maintenance	$50,000,000	$34,000,000	$8,200,000	$8,200,000	$2,000,000	$2,800,000	$1,400,000	$23,600,000	$3,200,000	$2,400,000	$1,600,000	$4,200,000	$2,500,000	$1,100,000	$500,000	$1,200,000	$400,000
Road Reconstruction	$50,000,000	$4,000,000	$9,100,000	$7,300,000	$4,300,000	$2,800,000	$2,900,000	$22,100,000	$2,200,000	$2,600,000	$2,300,000	$800,000	$300,000	$0	$0	$700,000	$300,000
Equipment		$0	$1,200,000	$1,100,000	$200,000	$200,000	$100,000	$0	$800,000	$100,000	$100,000	$0	$100,000	$0	$0	$100,000	$0
Snow Removal	$10,000,000	$0	$1,900,000	$1,400,000	$0	$0	$100,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Engineering & Admin.	$15,000,000	$11,700,000	$2,900,000	$2,700,000	$2,500,000	$600,000	$300,000	$5,300,000	$5,000,000	$2,300,000	$400,000	$1,100,000	$500,000	$100,000	$100,000	$400,000	$100,000
Signals & Safety		$200,000	$2,500,000	$2,800,000	$0	$0	$100,000	$6,500,000	$5,300,000	$0	$100,000	$100,000	$700,000	$0	$100,000	$100,000	$100,000
Sidewalk & Bike Lane		$1,300,000	$1,200,000	$0	$200,000	$0	$0	$1,100,000	$1,400,000	$0	$100,000	$1,800,000	$100,000	$100,000	$0	$0	$0
Right of Way		$500,000	$0	$500,000	$100,000	$0	$0	$0	$0	$100,000	$0	$0	$300,000	$0	$0	$0	$0
New Road Construction		$0	$600,000	$2,900,000	$0	$0	$0	$11,500,000	$600,000	$2,700,000	$0	$0	$700,000	$0	$0	$0	$0
Total Costs	$125,000,000	$51,700,000	$27,600,000	$26,900,000	$9,300,000	$6,400,000	$4,900,000	$70,100,000	$18,500,000	$10,200,000	$4,600,000	$8,000,000	$5,200,000	$1,300,000	$700,000	$2,500,000	$900,000
Funding:																	
Gas Tax Local Share		$25,200,000	$8,000,000	$6,100,000	$3,600,000	$2,300,000	$1,700,000	$9,600,000	$1,900,000	$2,800,000	$800,000	$1,200,000	$900,000	$400,000	$300,000	$400,000	$200,000
Prop 42 Funding		$3,000,000	$900,000	$700,000	$500,000	$400,000	$300,000	$1,200,000	$200,000	$400,000	$100,000	$200,000	$100,000	$100,000	$100,000	$100,000	$100,000
TDA (Transp. Dev. Act)		$400,000	$2,100,000	$700,000	$700,000	$0	$600,000	$700,000	$0	$100,000	$0	$400,000	$100,000	$100,000	$100,000	$700,000	$100,000
County Sales Tax		$8,200,000		$0	$0	$0	$0	$21,400,000	$0	$3,200,000	$0	$0	$0	$0	$0	$0	$0
Local General Funds		$0	$7,600,000	$2,600,000	$0	$0	$0	$800,000	$7,300,000	$0	$300,000	$1,200,000	$2,600,000	$400,000	$200,000	$0	$400,000
Other Local Funds		$24,700,000	$8,600,000	$19,000,000	$700,000	$400,000	$300,000	$24,100,000	$15,000,000	$900,000	$2,500,000	$4,200,000	$1,600,000	$0	$0	$200,000	$800,000
State Funds	$70,000,000	$600,000	$3,900,000	$3,200,000	$1,000,000	$800,000	$2,200,000	$10,600,000	$0	$600,000	$1,100,000	$1,400,000	$0	$0	$300,000	$100,000	$0
Federal Funds	$55,000,000	$7,200,000	$1,500,000	$3,900,000	$4,000,000	$800,000	$300,000	$9,100,000	$100,000	$0	$100,000	$1,600,000	$0	$0	$100,000	$0	$0
Add to or Use Reserves		$17,600,000	$5,000,000	$9,300,000	$1,200,000	-$1,700,000	$500,000	$7,400,000	$6,000,000	-$2,200,000	$300,000	$2,200,000	$100,000	-$300,000	$400,000	-$1,000,000	$700,000
Total Funding	$125,000,000	$69,300,000	$32,600,000	$36,200,000	$10,500,000	$4,700,000	$5,400,000	$77,500,000	$24,500,000	$8,000,000	$4,900,000	$10,200,000	$5,300,000	$1,000,000	$1,100,000	$1,500,000	$1,600,000
Performance:																	
100% Mntce + Recons		$80,322,000	$28,099,600	$26,294,907	$21,087,467	$21,150,800	$14,358,533	$43,336,800	$10,222,667	$6,342,600	$4,587,600	$5,509,013	$5,272,000	$1,560,800	$1,697,600	$2,118,480	$1,265,600
Actual Mntce+Recons		$52,430,380	$29,770,833	$20,120,283	$9,116,923	$8,300,000	$5,086,364	$45,911,574	$8,453,543	$8,346,753	$6,187,805	$5,289,855	$3,616,279	$1,558,333	$583,333	$2,095,000	$1,050,000
% Deferred Annually		35%	0%	23%	57%	61%	65%	0%	17%	0%	0%	4%	31%	0%	66%	1%	17%
Est'd Deferred Backlog		$240,000,000	$100,000,000	$90,000,000	$110,000,000	$60,000,000	$90,000,000	$160,000,000	$30,000,000	$30,000,000	$20,000,000	$20,000,000	$25,000,000	$8,000,000	$14,000,000	$24,000,000	$8,000,000
Backlog Growth Rate		15%	5%	5%	20%	10%	10%	12%	8%	10%	12%	12%	14%	6%	8%	10%	8%
Avg width Main Rd		60	60	54	60	54	54	60	60	60	60	64	60	60	60	54	54
Avg width Local Rd		36	36	28	32	32	28	36	40	36	36	40	40	40	40	36	32
Main Rd area/mi.(SY)		35200	35200	31680	35200	31680	31680	35200	35200	35200	35200	37547	35200	35200	35200	31680	31680
Local Rd area/mi.(SY)		21120	21120	16427	18773	18773	16427	21120	23467	21120	21120	23467	23467	23467	23467	21120	18773

SACOG ISSUE PAPER FOR 2007 MTP
ROAD MAINTENANCE ISSUES

This paper begins discussion, toward developing the MTP 2030, about critical issues facing road maintenance over the next 25 years. Key questions to consider include: How can the region address chronic road maintenance funding shortfalls, especially in more rural areas? What are the consequences of continuing to defer maintenance? What priority should local road rehabilitation have in the investment of regional funds?

Cities, counties, and Caltrans keep the street, road, and highway system in a state of good repair via regular maintenance – activities such as sealing cracks, repairing pavement, cleaning and repairing drains, fixing signals, and sweeping streets – and major repair, rehabilitation, and reconstruction – activities such as sealing pavement, repaving, reconstructing subgrade and drainage, replacing bridges, and reconfiguring intersections. This paper examines both routine preventive road maintenance and costlier road rehabilitation which comes due on a recurring cycle.

Cost of Road Maintenance

- The 6 counties and 22 cities in the region spend about $250 million per year to maintain, repair, rehabilitate, and reconstruct the region's 10,000 miles of local roads, streets, bridges, and sidewalks.
- About $150 million (60%) of these expenditures go for routine preventive maintenance, done primarily by public works forces, costing about $15,000 per mile of road per year on average.
- About $100 million (40%) go for major repair, rehabilitation, and reconstruction, usually done as discrete projects using contractors.
- The 6 counties and 22 cities in the region should spend an estimated $350 million annually for road maintenance and rehabilitation to keep all streets and roads in good state of repair, which means that today the cities and counties are deferring about $100 million, or 30%, of work that should be done.
- Maintenance and rehabilitation consumes about 80% of the typical local road budget today, leaving only 20% - about $50 million regionwide - for local improvements and new construction.
- Caltrans is spending $2.4 billion statewide for state highway maintenance and rehabilitation this year, twice what it spent ten years ago, and is working off deferred maintenance left over from the mid-1990s; perhaps $125 million of that total falls in the Sacramento region, about 70% higher than was envisioned in SACOG's MTP 2025 just three years ago.

Paying for Road Maintenance

- Road maintenance faces a funding squeeze, and there are no easy choices for more money.
  - Preventive maintenance is key to controlling long-term costs, but the only funds available for maintenance are the local share of the gas tax, sales tax funds, and local general funds. For rehabilitation, some state and federal funds can also be brought to bear.
  - The typical local road maintenance and rehabilitation budget comes about 25% from gas taxes, 45% from sales tax-based revenues, 10% from other local sources including general funds, and 20% from state and federal funds for road rehabilitation, but it varies among jurisdictions.

- Road maintenance consumes close to 90% of local funds currently usable for that purpose; since the need is greater, deferred maintenance follows unless new local revenues can be found.

- The inadequacy of the state gasoline tax is widely misunderstood; it now covers only 25% of actual local road maintenance and rehabilitation costs, with nothing left over for road improvements.
  - About 6 cents (1/3) of the 18-cent-per-gallon gas tax goes to cities and counties for streets and roads (the rest stays with the State). The $80 million that comes to cities and counties in this region could cover less than 20% of what various cities and counties should spend for road maintenance and rehabilitation; thirty years ago in 1975 the gas tax covered 70% of these costs.
  - The local share of the gas tax covered actual road maintenance costs in 2003 for only Yolo and Yuba Counties out of 16 sampled agencies, and when rehabilitation is included, it covered no more than 50% of these costs for any city or county.
  - In 2005, the State for the first time consumed all of its 12 cent share of the gas tax plus all of its federal funds for maintenance, rehabilitation, and operations of state highways and administration of Caltrans, with none left over for state highway improvements or expansion.
  - Gas tax revenues have increased very slowly, about 1% per year, for the past 25 years, with large growth in vehicles and miles of travel almost cancelled out by improving fleet efficiency. The gas tax rate has not kept up with inflation either; to have equivalent purchasing power to the 7-cents-per-gallon rate of 1965, the gas tax today would have to be 42 cents per gallon - instead of the actual 18 cents per gallon.

- Sales tax revenues – from Proposition 42, Measure A in Sacramento County, and Transportation Development Act (TDA) in rural areas - have taken up the slack for the gas tax, and now provide about half of local road maintenance and rehabilitation funding in most cities and counties.
  - Proposition 42 directs the sales tax on gasoline to transportation purposes, with 20% to cities and 20% to counties for local road maintenance after Traffic Congestion Relief Program (TCRP) funds are taken off the top. Proposition 42 funds in 2005 add about 25% on top of the local gas tax share, but once TCRP funding ends (presumably in 2009) that will increase to about 65%, maybe as much as 100% if gas prices stay high.
  - Within Sacramento County, the Measure A ½% sales tax funds about half of local road maintenance and rehabilitation costs.
  - In rural counties, TDA funds (¼% sales tax) can be used for road purposes once transit needs are met; for rural counties, none of which have enacted transportation sales tax measures, TDA funds cover 10-30% of road maintenance costs, and public works departments assiduously defend their share of TDA funds.
  - TDA and Measure A revenues expand with the economy, as do road maintenance and rehabilitation costs; thus, at least this part of the funding base keeps up with inflation.
  - General sales taxes bear little relation to road use, so users (drivers) lose touch with the real cost of the system they drive on, and can – and do – over-use the system and ignore the public cost.

- No state or federal transportation funds that come to local agencies can be used for road maintenance; state and federal funds must be used for capital improvements or major rehabilitation.
  - Congress and the Legislature generally prohibit use of federal and state funds for road maintenance, on the principle that local road maintenance should be a local responsibility.
  - Deferred maintenance, leading to road deterioration and need for rehabilitation, has led SACOG to divert 15% of state and federal funds to rehabilitation instead of improvements since 1998.

- Some local agencies still use general funds for road maintenance, but other local funds dedicated to transportation are typically restricted only to capital improvements.
  - In 1976 local general funds used to cover 40% of city street maintenance costs and 20% of county road maintenance costs – property access is one of the basic purposes for property taxation – but that source has shrunk dramatically since Proposition 13 in 1978, averaging less than 10% today, and zero in some cities and counties.
  - Other local revenues used for transportation, including developer fees, assessments, and bonds, generally are dedicated to capital improvements, not maintenance or rehabilitation.
- Caltrans has been able to double its expenditures for maintenance and rehabilitation since the mid-1990s by shifting state and federal funds from the State Transportation Improvement Program (STIP), an elastic funding option not available to local agencies.

Factors Affecting Road Maintenance and Rehabilitation

- Texas Transportation Institute studies conclude that it costs less in the long run to have good roads than bad roads – if you keep up with preventive maintenance continuously.
- Deferred maintenance drives up long term cost; it shortens the cycle for rehabilitation, which is four times as costly. Deferred rehabilitation compounds the problem, often leading to pavement failure and the need to reconstruct the whole roadbed, at ten times the cost.
  - Routine preventive maintenance, particularly to seal cracks, patch potholes, and keep drains open, on a continuing basis takes on average about $20,000 per mile of road per year to do right.
  - Regular heavy maintenance, meaning a slurry or chip seal coat, adds costs in the range of $50,000-$80,000 per mile for residential streets, on about a seven year cycle.
  - For well-maintained roads, the pavement rehabilitation cycle, meaning an asphalt overlay, comes due in 15 years for arterials and 30 years for local streets, costing $300,000-$400,000 per mile; rubberized asphalt can last longer and cuts road noise but costs about 25% more up front.
  - Reconstruction of poorly-maintained roads, which entails removing the pavement and repairing the gravel base underneath, costs as much as $2 million per mile.
- Heavy truck traffic and wet weather comprise the two most critical factors in pavement deterioration.
  - Heavy trucks (particularly those hauling gravel, logs, construction materials, overseas containers, agricultural products, garbage) and transit buses flex the pavement and create spaces underneath.
  - Wet weather, with cracked pavement or poor drainage, can lead to water undermining pavement.
  - One fully-loaded 80,000-pound truck causes as much pavement wear as 10,000 autos, and trucks' numbers are growing: heavy truck travel grew at a 50% greater rate than auto travel since 1990.
  - The original concrete pavement from the 1950s still serves Highway 160 just north of downtown Sacramento, largely because it has carried very little heavy truck traffic for the past 40 years.
- Local agencies point to damage from heavier trucks as a rising factor in poor pavement condition.
  - Caltrans designs state highway pavements for today's heavy trucks, but heavy trucks do major damage to older rural county roads and urban arterials not built for 80,000-pound loads.

- Congress in 1997 via TEA-21 authorized a 10% increase in maximum truck weight (from 72,000 pounds to 80,000 pounds), which increased road wear from those trucks by 25%, with no increase in road maintenance funding.
- The Sacramento area, with few cross-suburban state highways, but manufacturing and distribution increasingly moving to suburban locations, faces a particularly vexing challenge regarding heavy truck wear on urban and suburban arterials.

- The road maintenance challenge is real and serious for everyone but affects jurisdictions unevenly on both the cost and revenue sides.
  - Older built-out cities such as Sacramento, Citrus Heights, and Marysville with older roads built to past standards and years of deferred road maintenance face continuing major rehabilitation costs.
  - Newer developing cities such as Elk Grove, Folsom, and Lincoln benefit from modern developer-built road mileage that boosts funding formulas without adding major rehabilitation liabilities yet, but should attend to an increasing load of preventive maintenance to keep ahead of the curve.
  - Rural counties end up as losers in funding formulas, but many must deal with resource-based economies such as agriculture, logging, or mining that pound old narrow roads with heavy trucks.
  - Cities often must deal with extra costs due to utilities in the roadbed, pavement damage from past utility work, and landscaping in the right of way; counties must consider adding paved shoulders; and Caltrans faces added costs for complex traffic handling and night work.
  - Increases of more than 50% in the cost of fuel and asphalt and nearly 100% in the cost of concrete and steel since 2004 are further squeezing beleaguered budgets for road maintenance and bridge repairs, affecting both local agencies and Caltrans.

Road System Condition and Performance

- City and county public works agencies do a creditable job at keeping roads serviceable, given the shortfall of funding they have to work with.
- Deferred maintenance is the Achilles heel of the whole system – deferred maintenance forces a costlier fix and shortens the cycle when rehabilitation comes due – but essentially all cities and counties have been deferring more of both maintenance and rehabilitation than they should.
  - A good understanding of cumulative deferred maintenance is elusive: no one tracks it directly, there is no common standard among agencies, some try to inflate it and others hide it, it is a moving target, and the real damage is building up out of sight under the pavement.
  - The MTP for 2025 estimated deferred maintenance at $780 million regionwide, from a sketchy survey done in 1999; a better estimate today would probably show closer to $1.2 billion, growing by about $100 million per year. The attached chart shows an unsupported extrapolation.
  - Deferred maintenance is a hard habit to escape, because of the up-front cost to recover deteriorated pavements.
- Pavement in bad condition causes additional vehicle operating cost for the motorist.
  - The average urban motorist in the U.S. pays $396 annually in added costs due to bad roads.

- Statewide, California motorists face the fourth highest extra costs of any state due to bad roads, 59% above average.
- Sacramento motorists average $609 in extra costs, sixth highest among 52 urban areas greater than 1 million population nationwide and 54% higher than the average for these 52 urban areas.

Comparisons

- The Conditions & Performance Report to Congress in 2002 indicated an average 15% deferred maintenance rate nationwide; the SR8 Study to the Legislature in 1999 estimated a 30% rate for California.
- California since the mid-1980s has gained a reputation around the country for poor quality roads, a reversal from the mid-1960s when California's road system was widely envied as the best anywhere.
  - The effects of continuing deferred maintenance and rehabilitation on roads in this region and statewide are showing up clearly.
  - The Road Information Program reported that California's six metro areas with more than 1 million population ranked first, second, third, fourth, sixth, and tenth worst out of 52 such areas nationwide for urban road condition; Sacramento is the one ranking sixth-worst.
  - Statewide, interstate highway condition slipped slightly from 1995 to 2000: good-or-very-good condition fell from 36% of mileage to 33% and mediocre-or-poor condition rose from 43% of mileage to 47%.
  - Statewide, rural arterial road condition deteriorated even more from 1995 to 2000: good-or-very-good condition fell from 27% of mileage to 21% and mediocre-or-poor condition rose from 9% of mileage to 16%; other rural roads are in worse shape, with 30% being rated mediocre-to-poor.
  - Statewide, urban arterial street condition declined alarmingly from 1995 to 2000: good-or-very-good condition fell from 29% of mileage to 14% and mediocre-or-poor condition rose from 21% of mileage to 51%; other urban streets are in much worse shape, with 75% being rated mediocre-to-poor.
  - California's roads are noticeably worse than the national average, which showed 43% of all roads in good-or-very-good condition and just 15% in mediocre-or-poor condition in 2002.
- Though we have no Sacramento-specific study or survey, the numbers imply that road conditions in this region are little different than the statewide average.

- Some local agencies still use general funds for road maintenance, but other local funds dedicated to transportation are typically restricted only to capital improvements.
  - In 1976 local general funds used to cover 40% of city street maintenance costs and 20% of county road maintenance costs – property access is one of the basic purposes for property taxation – but that source has shrunk dramatically since Proposition 13 in 1978, averaging less than 10% today, and zero in some cities and counties.
  - Other local revenues used for transportation, including developer fees, assessments, and bonds, generally are dedicated to capital improvements, not maintenance or rehabilitation.
- Caltrans has been able to double its expenditures for maintenance and rehabilitation since the mid-1990s by shifting state and federal funds from the State Transportation Improvement Program (STIP), an elastic funding option not available to local agencies.

Factors Affecting Road Maintenance and Rehabilitation

- Texas Transportation Institute studies conclude that it costs less in the long run to have good roads than bad roads – if you keep up with preventive maintenance continuously.
- Deferred maintenance drives up long term cost; it shortens the cycle for rehabilitation, which is four times as costly. Deferred rehabilitation compounds the problem, often leading to pavement failure and the need to reconstruct the whole roadbed, at ten times the cost.
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  - One fully-loaded 80,000-pound truck causes as much pavement wear as 10,000 autos, and trucks' numbers are growing: heavy truck travel grew at a 50% greater rate than auto travel since 1990.
  - The original concrete pavement from the 1950s still serves Highway 160 just north of downtown Sacramento, largely because it has carried very little heavy truck traffic for the past 40 years.
- Local agencies point to damage from heavier trucks as a rising factor in poor pavement condition.
  - Caltrans designs state highway pavements for today's heavy trucks, but heavy trucks do major damage to older rural county roads and urban arterials not built for 80,000-pound loads.

SACOG ISSUE PAPER ON SYSTEM RETROFITS

In this paper, "system retrofits" refers to improvements to the existing transportation system for one of several possible reasons – to improve the function of a facility such as a road or public transit with new technology, to meet federal or state laws for accessibility, to correct unsafe conditions, to create a better environment for walking and biking, or to meet the desires of a community. A retrofit, as opposed to simple maintenance, improves a facility. Some of the key policy questions in system retrofit are:

- Is it a priority compared to maintenance and operations, or compared to expansion of the transportation system to growing areas?
- Which are the highest priority types retrofits?
- Given the high costs of some kinds of retrofits, can they be phased in over time?
- What are the risks and tradeoffs of delay?
- How can retrofits enhance our Blueprint-based transportation plan?

The following is a discussion of system retrofits relevant to our region.

High-Tech Improvements

Intelligent Transportation Systems (or ITS) uses computers, communication and roadway technologies to improve traffic flow, transit operations, incident management, emergency response, pedestrian and bicycle movement, and traveler information. Some of the common applications are roadway cameras, automated message signs, traffic signal upgrades, transit signal preemption, queue jumping, and bus rapid transit improvements.

- High tech improvements that are feasible have been planned for the region, but funding for full-scale implementation still must be found.
  - The 2005 ITS Strategic Deployment Plan includes improvements such as automated highway message signs, crosswalk signals with pedestrian countdown timers, real-time train or bus arrival time message signs (such as seen at BART stations), and intersection signal preemption for buses. The Plan identifies corridors, including Sunrise and Hazel Avenues in Sacramento, where near-term ITS strategies are planned by local agencies.
  - The Plan also extends the control of traffic operations through a Traffic Operations Center over more of the arterial network and calls for the coordination of traffic information and operations between cities and counties and Caltrans.

- Basic "smart corridor" improvements that are connected to the Traffic Operations Center (cameras, message signs, signal timing, and fiber optics) cost approximately $600,000/mile. Smart corridors with transit-specific enhancements cost roughly $1 million per mile. The additional technologies include transit signal preemption, queue jumping, and other bus rapid transit improvements.
- Corridors targeted for reinvestment could consider ITS to handle increases in traffic, transit service, pedestrian and bicycle mobility as envisioned in Blueprint, at less than a quarter the cost of adding new lanes.
- ITS features, particularly the timing of signals, can add 10% to 20% to road capacity at modest cost.
- ITS features can be installed to speed up buses and light rail, increase productivity, and improve finances for Regional Transit and other transit operators. A recent report by the San Francisco Planning and Urban Research Association (SPUR) recommends these ITS features – traffic signal timing to favor transit, traffic signal priority technology that extends green lights as transit approaches, prepaid fare vending, and real-time next bus arrival times at transit stops – as part of a package of improvements to make Muni more efficient, speed it up by 25%, attract more riders, and reverse its declining productivity trend.
- Although favored by local agencies, ITS has been criticized by some who believe ITS encourages driving and higher speed traffic, or can create unsafe walking and biking conditions.
- Other high-tech applications that can help travelers are the 511 phone number and website for real-time travel information available to the public, and the rapid dispatch of Freeway Service Patrol trucks to assist incapacitated vehicles on the freeway.

Soundwalls

- Residents adjacent to freeways, arterials, and railroads have frequently requested soundwalls to protect them from noise. Traditionally a low priority for regional funds, SACOG is developing a soundwall funding policy.
  - Road noise is caused by engine noise, exhaust noise, and tire whine. More trucks lead to higher engine and exhaust noise. Tire whine increases with vehicle speed and pavement conditions.
  - Soundwalls are the typical method used to mitigate road noise, and a high quality concrete block wall costs an average $1.3 million per mile to construct.
  - Quieter pavements can reduce tire whine but are expensive and hard to justify if the pavement is otherwise still serviceable.
  - Soundwalls can also serve as a safety barrier or to screen residents from roadways.
  - Caltrans is responsible to build soundwalls as environmental mitigation when it builds new freeways or adds capacity to older ones, and some soundwalls are built by developers or local governments, but if no road project on adjacent development is being

built, there presently is no program to fund soundwalls as noise increases along with traffic.

- Caltrans has created a preliminary inventory of soundwall retrofit needs in this region, a list of 42 projects along 30 miles of freeways, local streets, and railroads. At an average cost of $1.3 million/mile, building these soundwalls would cost approximately $39.0 million.
- Since the passage of Senate Bill 45 in 1997, responsibility to fund retrofit soundwalls along state highways has devolved from the state to regional agencies such as SACOG. Soundwalls don't typically compete well for regional funding against other transportation priorities, and SACOG is considering the creation of a soundwall policy to allow at least some to be funded.

Americans with Disabilities Act (ADA) Compliance

- Compliance with the federal ADA, an act that affirms the civil right of disabled access to the transportation system, will be very costly and must be phased through time.
  - The ADA requires public agencies to prepare transition plans that show how they intend to provide for disabled access to streets, roads, and walkways. The deadline for transition plans was 1995; in our region, plans have been completed by the Cities of Sacramento, Citrus Heights, Galt, and Rancho Cordova, and the Counties of Sacramento and El Dorado.
  - These plans include a schedule for providing curb ramps at intersections and access improvements on public walkways; walkways serving public facilities receive priority for retrofit.
  - Comprehensive pedestrian improvements to a major street intersection are expensive, averaging $250,000/intersection to provide accessible pedestrian signals (APS), ramps, improved lighting and special paving material for the crosswalks.
  - Public agencies partnered with utility companies are responsible for removal of barriers in sidewalks such as utility poles.
  - Although the total regional cost of ADA compliance is not known at this time, Sacramento County has estimated that it would cost $67 million to bring curb ramps, accessible signals, and sidewalks in the unincorporated county into ADA compliance.

Bike Lane and Sidewalk Connectivity

- The 2050 Blueprint preferred land use scenario for our region envisions a much larger and more complete bicycle and pedestrian network that will allow and encourage greater use of those travel modes.
  - The bicycle/pedestrian share of trips in the Blueprint preferred scenario in 2050 is estimated at 13%, versus 6.9% today.
  - There are currently approximately 500 miles of Class I (separated bike/pedestrian paths), 1,900 miles of Class II (on-street bike lanes), and 115 miles of Class III (bike routes) in the region.

- Other kinds of improvements that are supportive of bicycle travel are bike racks on buses, bicycle parking, and lockers and shower rooms provided by employers.
- The Metropolitan Transportation Plan 2025 included $350 million over the next 20 years for bicycle and pedestrian facilities. SACOG has recently completed a Regional Bicycle, Pedestrian, and Trails Master Plan with a detailed and prioritized capital project list of almost 300 projects, of which 126 are considered high priority and ready to implement. Many of the projects do not yet have costs.
- The cost of bicycle and pedestrian projects depends on factors such as land costs, and pavement types. If a street is being rehabilitated or repaved, widening and striping for bicycles is much less expensive.
- Projects listed in the Master Plan are eligible for SACOG's Bicycle and Pedestrian Funding Program. The program provides federal funding to local agencies on a biannual basis; the 2006 round of funding is estimated at $4-8 million.
- SACOG's Community Design Funding program is another source for bicycle and pedestrian facilities that are connected to land developments consistent with the Blueprint principles. This round of funding is estimated at $15 million in 2006.
- Developers of new areas are expected to provide high quality bicycle and pedestrian facilities as part of the basic public infrastructure.

Street Improvements

- A number of techniques, costing between $60,000 and $1 million per mile, can be used to improve street safety and aesthetics, and landscaping makes biking and walking more enjoyable. Paying for the ongoing maintenance of landscaping is a perennial problem, though.
  - Major street safety enhancements include "no turn" lanes at intersections, improved lighting, and signage, special paving, and median strips.
  - Traffic calming is typically installed when neighborhood streets experience unsafe cut-through or high-speed traffic. Methods include street narrowing or changes in alignment, installation of barriers, speed bumps, roundabouts, sidewalk bulbouts and refuge islands at intersections, pavement treatments and other street changes. According to a study by Reid Ewing of Fehr & Peers Associates[1], while the impacts are case-specific, traffic calming measures generally have the desired effect of reducing speeds, volumes, and collisions.
  - Traffic calming is often controversial, since vehicles may simply divert to nearby streets or drivers may resent being forced to slow down.
  - Pedestrians and bicyclists can benefit from traffic calming if it's designed correctly.
  - Average traffic calming costs are $60,000 per application for the most common elements, including speed bumps, crosswalks and signage.

[1] Ewing, Reid, "Impacts of Traffic Calming," Transportation Research Board Circular E-C019: Urban Street Symposium.

- Streetscaping includes a landscaped buffers between streets and sidewalks, landscaped median islands, lighting, signage, and street furniture.
- Streetscaping is usually considered an amenity to neighborhoods and business areas since it provides shade for walking and biking and improves street aesthetics.
- Average costs for major streetscaping run as high as $3 million per mile for improved lighting, landscaping, signage and street furniture.
- Landscaping maintenance costs are ongoing and usually the responsibility of cities and counties. The City of Sacramento uses a cost of 2-14 cents per square foot for these maintenance costs.

Local Bridges and Rail System Upgrades

- Many local bridges and railroad/road intersections in our region are old and for safety reasons need to be replaced, reconstructed, or widened. Rail station updates that improve the functionality of the system are also envisioned.
  - Caltrans maintains a list of 218 local bridges in the SACOG region in need of retrofit. The roughly $130 million cost of this work (based on an assumption of $2,000 per square meter) can be partially covered by the federal highway bridge replacement program, but not all, and match funding is a challenge for many local agencies. Regional funds are used on some very high priority local bridges.
  - Caltrans also maintains a list of unprotected railroad/road intersections, but very little federal or state money has been available to fund these types improvements, which would fall to the region to fund. Federal reauthorization legislation funds a new Safety Program starting in 2007, with rail grade crossings as an eligible category of project.
  - Renovating and reconfiguring the Sacramento Amtrak station (also called the Sacramento Valley Station or the Sacramento Intermodal Transportation Facility) has been planned for years and is moving forward. The cost of this project, which will involve new track alignments, moving and renovation of the old SP depot, sidewalks, a parking garage, new freeway ramps, bus and light rail connections, is estimated to be at least $350 million. As of now, there is no identified funding except for a small federal earmark.

Storm Drainage

- Based on Caltrans reports, there is an approximately $15 million unmet need in this region for drainage system improvements and water treatment facilities on state highways, to satisfy water quality board permits. These upgrades would ensure that state highway storm drains comply with federal and state water quality standards in rural areas. The cost in urban areas remains undefined.
- Local agencies would need to spend a much larger sum for local street and road storm water runoff, probably greater than $50 million, if water quality boards decide to emphasize water pollution from street runoff. Runoff from nearby properties, such as from roofs, parking areas, and landscaping, that ends up in street drains complicates the problem in urban areas.

Other types of retrofits not covered in this paper, which could also have significant costs to the region, are:

- freeway landscaping and lighting
- paving of shoulders on rural highway and urban freeways
- cul-de-sac passthroughs
- pedestrian-bicycle crossings of barriers such as freeways, rivers, creeks, and railroads

In conclusion, very few of these types of retrofits have any dedicated sources of funding available to them, probably because they don't fit neatly into the categories of "new system" or "maintenance." To fund them, the region will have to consider some or all of these a priority for use of regional discretionary funding.