Infrastructure and Growth: Continued

ESP 171 Urban and Regional Planning
Professor Susan Handy
5/17/16
What happens when a city doesn’t have adequate infrastructure?

- Roads
- Water/Sewer
- Stormwater
WHAT WORKS

Mayors: Flint Could Happen to Us
A third of mayors fear that they have jeopardized lives to cut infrastructure costs.

By BEN WOFFORD | April 25, 2016

Nearly 1 in 3 American mayors think they may already have hurt their own citizens by making cost-saving decisions on critical infrastructure—a startling admission of fearfulness and accountability from the nation’s top urban executives on the heels of the Flint water crisis.

http://www.politico.com/magazine/story/2016/04/whatworksmayorssurveyflintinfrastructure213854
Traditional question:
How can cities ensure that growth does not overwhelm infrastructure?

Newer question:
How can cities use infrastructure to influence the rate and type of growth?
### Review: Local Tools for Matching Growth and Infrastructure

| Capital Improvement Programs (CIP) | Cities decide which projects to fund first  
Cities find funding for capital projects  
* Assessment districts |
|-----------------------------------|------------------------------------------------------------------------------------------|
| Exactions                         | Developers are required to give city:  
• Physical – infrastructure, land dedication  
• Financial – in-lieu fees, impact fees |
| Adequate Public Facilities (APF) Standards | Developers must show that there is enough capacity to accommodate proposed development  
* Concurrency in WA, FL |
| Traffic Impact Analyses (TIA)     | Developers must analyze impacts of project on traffic  
* Trip generation rates |

**Encourage infill or add to sprawl...?**
Traffic Impact Studies - Process

1. Existing LOS in area
2. Projected LOS in future
3. New trips generated by project
4. Projected LOS in future with new trips added
5. Mitigations, if needed
Level of Service (LOS)

\[ \text{LOS} = f (\text{delay}) = f (\text{volume}/\text{capacity}) \]

<table>
<thead>
<tr>
<th>LOS</th>
<th>Average Intersection Delay</th>
<th>Average Freeway Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&lt; 10 seconds</td>
<td>&gt;55 mph</td>
</tr>
<tr>
<td>B</td>
<td>&gt;10-20 seconds</td>
<td>50 mph</td>
</tr>
<tr>
<td>C</td>
<td>&gt;20-35 seconds</td>
<td>45 mph</td>
</tr>
<tr>
<td>D</td>
<td>&gt;35-55 seconds</td>
<td>40 mph</td>
</tr>
<tr>
<td>E</td>
<td>&gt;55-80 seconds</td>
<td>35 mph</td>
</tr>
<tr>
<td>F</td>
<td>&gt;80 seconds</td>
<td>&lt;20 mph</td>
</tr>
</tbody>
</table>
TIA Mitigations?

- LOS = f (volume/capacity)
- What can you do to increase LOS?
An important TIA Issue

Are LOS and traffic congestion the main concerns from an environmental standpoint...?
SB743 Environmental Quality

2013 bill instituted a shift from LOS to VMT (vehicle miles traveled) for traffic impact analysis for CEQA

Questions:
- How to predict VMT for proposed projects?
- How much VMT is a significant impact?
Impact 4.14-5: Increase in vehicle miles travelled.

Nishi Site and West Olive Drive

The project would increase local and regional vehicle miles traveled as a result of people driving to and from the project site on a daily basis. Taking into account local and regional VMT reduction goals, the project may impede the ability of the City/region to achieve established goals. This would be a potentially significant impact because of projected increases in VMT.

Increase over current situation, but relative to equal amount of development in different community...?
TRANSPORTATION IMPACT STUDY
DAVIS HOTEL - CONFERENCE CENTER

Prepared for:
City of Davis

Fehr & Peers
2990 Lava Ridge Court
Suite 200
Roseville, CA 95661
June 2015

### Who’s Responsible for What

<table>
<thead>
<tr>
<th>Level of Government</th>
<th>Water</th>
<th>Transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>$$$, policies</td>
<td>$$$, policies</td>
</tr>
<tr>
<td>State</td>
<td>Water projects</td>
<td>Highways outside metro areas, High speed rail</td>
</tr>
<tr>
<td>Regional</td>
<td>Water systems</td>
<td>Highways inside metro areas, Transit systems, Major roads and bike/ped facilities</td>
</tr>
<tr>
<td>Local</td>
<td>Water systems, Sewer systems, Stormwater systems</td>
<td>Local streets, Bike/ped facilities</td>
</tr>
</tbody>
</table>
How do we coordinate state/regional infrastructure with local decisions about growth...?

How do we coordinate infrastructure outside the boundaries with growth inside the boundaries...?
Regional Transportation Planning

See Dr. Sperling’s ECI165 course or my graduate TTP220 course
## Transportation Planning Agencies

<table>
<thead>
<tr>
<th>Level</th>
<th>Agency</th>
<th>Funding</th>
<th>Long-Range Plans</th>
<th>Project Selection</th>
<th>Project Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>US DOT</td>
<td>Federal gas tax</td>
<td>Sets requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State</td>
<td>Caltrans</td>
<td>State gas tax</td>
<td>For state</td>
<td>Outside metro areas</td>
<td>Build and maintain highways</td>
</tr>
<tr>
<td>Region</td>
<td>MPOs</td>
<td>Regional sales tax</td>
<td>For metro area</td>
<td>Inside metro areas</td>
<td></td>
</tr>
<tr>
<td>Transit agencies</td>
<td>Regional sales tax</td>
<td>For transit</td>
<td></td>
<td>Build and operate transit facilities</td>
<td></td>
</tr>
</tbody>
</table>

### Local
- Cities
- Misc.
- GP for city
- CIP for city
- City streets
Federal Policy: FAST-Act

Fixing America’s Surface Transportation Act; passed by Congress in 2015

→ Authorized $305 billion in federal spending for surface transportation for 5 years

→ Sets requirements for planning process for Metropolitan Planning Organizations (MPOs)
“When a bridge falls, when a water main fails, or when a train crashes, news crews and commentators report on the sorry state of our nation’s infrastructure. Policymakers on both sides of the aisle say we need to do something to fix our roads and rails, our ports and pipes. This flurry of activity lasts for a few days, but then little to nothing happens.”

- Robert Puentes, 5/19/15
What’s the problem?

Some more John Oliver
Metropolitan Planning Organizations
SACOG — Sacramento Area Council of Governments
MPO’s transportation planning and programming responsibilities

**Planning:**
- Developing a vision
- Creating policies and strategies to support the vision
- Long-term horizon

**Programming:**
- Prioritizing proposed projects
- Matching projects with available funds
- Short-term horizon

<table>
<thead>
<tr>
<th>Regional Transportation Plan (RTP)</th>
<th>Transportation Improvement Program (TIP)</th>
</tr>
</thead>
</table>

**Regional Transportation Plan (RTP)**

**Transportation Improvement Program (TIP)**
Example: SACOG

Financial Stewardship
Between 2008 and 2035, we project the region will spend $35.2 billion in federal, state and local funds on transportation.

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road and Highway Maintenance and Rehabilitation</td>
<td>$11.5 billion</td>
</tr>
<tr>
<td>Transit Investments</td>
<td>$11.3 billion</td>
</tr>
<tr>
<td>Road and Highway Capital Improvements</td>
<td>$7.4 billion</td>
</tr>
<tr>
<td>Bicycle and Pedestrian Improvements</td>
<td>$2.8 billion</td>
</tr>
<tr>
<td>Planning, Programs, and Enhancements</td>
<td>$2.2 billion</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$35.2 billion</strong></td>
</tr>
</tbody>
</table>

$35.2 billion!
## ISSUE:
Transportation vs. Land Use Planning

<table>
<thead>
<tr>
<th>Level of Government</th>
<th>Transportation agencies</th>
<th>Land use agencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>US DOT - FHWA, FTA</td>
<td>Various (federal lands only)</td>
</tr>
<tr>
<td>State</td>
<td>State DOT (Caltrans)</td>
<td>Various (state lands only)</td>
</tr>
<tr>
<td>Regional</td>
<td>MPO Transit agency</td>
<td>None</td>
</tr>
<tr>
<td>Local</td>
<td>City and County – Public works dept</td>
<td>City and County – Planning dept</td>
</tr>
</tbody>
</table>
So what happens to development if we build this...
Roads in undeveloped areas → Increased sprawl → More driving

**Why more sprawl?** Faster speeds mean people can travel farther in given amount of time.

**What else matters?** Local policy about land development. Sprawl is not a given!
Or what happens to development if we build this...
KINGS COUNTY
SAYS
NO
TO
HIGH SPEED RAIL
The High-Speed Rail Station Area Master Plan will chart Fresno’s strategy to turn the state and federal investment in high-speed rail into job growth, wealth creation, and downtown development that enriches our community for decades to come.

Bay Area Rapid Transit

Rail service to new areas → Increased sprawl → Transit use but also driving...

Development outside the boundaries...

Rail service to existing areas → Increased density → Transit use and walking...

Development inside the boundaries...
Or what happens to development if we worry about LOS on existing highways...
## What is Level of Service (LOS) for a Typical Freeway Segment?

<table>
<thead>
<tr>
<th>LOS</th>
<th>Definition</th>
<th>Typ. Illustration</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Represents a free-flow operation. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.</td>
<td>![Typical illustration]</td>
</tr>
<tr>
<td>B</td>
<td>Represents reasonably free-flow operation. The ability to maneuver within the traffic stream is slightly restricted.</td>
<td>![Typical illustration]</td>
</tr>
<tr>
<td>C</td>
<td>Represents a traffic flow with speeds near or at free-flow speed of the freeway. Ability to maneuver within the traffic stream is noticeably restricted.</td>
<td>![Typical illustration]</td>
</tr>
<tr>
<td>D</td>
<td>Represents speeds that begin to decline with increased density. Ability to maneuver within the traffic stream is noticeably limited.</td>
<td>![Typical illustration]</td>
</tr>
<tr>
<td>E</td>
<td>Represents operation at its capacity. Vehicles are closely spaced within the traffic stream and there are virtually no useable gaps to maneuver.</td>
<td>![Typical illustration]</td>
</tr>
<tr>
<td>F</td>
<td>Represents a breakdown of vehicle flow. This condition exists within queues forming behind the breakdown points.</td>
<td>![Typical illustration]</td>
</tr>
</tbody>
</table>

**LOS = f(V/C)**
I-405 widening
Bigger roads in developed areas → Increased sprawl → More driving

A Vicious Cycle
A deserted 20-lane highway runs through Myanmar's empty capital city.
Transportation - Land Use Connections

- Transportation investments influence what kind of development goes where, i.e. land use patterns
- Land use patterns influence what kind of travel goes where, i.e. travel patterns

See my article on website
The T-LU Challenge

• **MPOs have...**
  – Responsibility for transportation planning

• **Cities and counties have...**
  – Responsibility for land use planning

• **How can we coordinate what MPOs and cities/counties do...?**
  – Voluntary efforts, e.g. SACOG’s Blueprint
  – Required efforts, e.g. SB375’s Sustainable Communities Strategies
SACOG’s Blueprint Plan - 2004

Base Case

Preferred Scenario
Financial Incentives
From MPO to local governments
From local governments to private developers

Transit-Oriented Development
SB375
Sustainable Communities Planning Act of 2008

Targets for per capita GHG emissions reduction from cars and trucks for metropolitan areas, by reducing vehicle-miles-traveled (VMT)

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacramento</td>
<td>7%</td>
<td>16%</td>
</tr>
<tr>
<td>Bay Area</td>
<td>7%</td>
<td>15%</td>
</tr>
<tr>
<td>LA region</td>
<td>8%</td>
<td>13%</td>
</tr>
<tr>
<td>San Diego</td>
<td>7%</td>
<td>13%</td>
</tr>
</tbody>
</table>
Sustainable Communities Strategies (SCS)

- Transportation projects consistent with SCS get funding
- Development projects consistent with SCS get CEQA streamlining
SCAG’s RTP/SCS video
Traditional options revived
See Disney’s 1958 “Magic Highway USA”
SB375 Issue

How to get local governments to do what they’re supposed to do according to the SCS?

$327 million grant program to incentivize projects in Priority Development Areas (PDAs) consistent with SCS

OneBayArea

$120 million Affordable Housing and Sustainable Communities Program

http://www.mtc.ca.gov/funding/onebayarea/OBAG_flyer.pdf
Water Supply

See Mark Lubell’s ESP 169 Water Policy
Water Supply

• **Projects:** State Water Project, Central Valley Project, Owens Valley Aqueduct, Colorado Aqueduct, Hetch Hetchy, etc.

• **Agencies:** Department of Water Resources, plus irrigation districts, municipal water districts, 426 mutual water companies, cities, counties
“The linchpins of California’s water delivery systems are the massive federal Central Valley Project (CVP) and the State Water Project (SWP).”
Fig. 5-9

The Wind Gap Pumping Plant transports State water over the Tehachapis to Southern California

Courtesy: Department of Water Resources
Proposed Delta Water Tunnel Project
The issue...

Fig. 5-11
California Water Budget, 2020


Implications for local planning?

Source: http://www.opr.ca.gov/publications/PDFs/79515.pdf
LOCAL WATER USAGE
Nearly all of the region’s water districts use more water per capita than the state average of 198 gallons of water per person per day, according to figures each district submitted to the state as part of a new law requiring use reductions.

Housing lot size
One way to reduce water use is to reduce the size of housing lots, since so much water is used for outdoor irrigation. The typical lot used for single-home construction varies substantially by community.

Gallons of water used per person per day by local water districts
- 250 or less
- 251-300
- 301-400
- 401-600
- No data/rural area

New home median lot size in square feet, 2001-2012

Source: California Department of Water Resources

Source: Bee analysis of housing permit data via Sacramento Area Council of Governments

The Sacramento Bee
Dougherty Valley

“Contra County Supervisors approved plans to begin the first phase of the controversial Dougherty Valley development near Danville. Placed in undeveloped land east of I-680, the eventual 11,000 home development has been criticized for its taking of open space, increased traffic congestion, and strain on water supplies.”
- Contra Costa Times

- Specific Plan approved and EIR certified by County in 1992
- Specific Plan listed EBMUD as water supplier and proposed annexation to district
- EBMUD objected and sued, developer sued back
- New state legislation to link land use decisions to water availability
State Water Legislation

- **SB 901 of 1995**: local governments must consult with water agencies when considering approval of projects of more than 500 units.

- **SB 221 of 2001**: prohibits cities and counties from approving new subdivisions creating more than 500 new residential units unless it can be shown that an adequate water supply is available.

- **SB 610 of 2001**: requires cities and counties to review detailed water supply assessment reports as part of environmental review process for various types of large development projects.
Issues

• Does this give water agencies de facto veto over new development...?
• Does this mean more coordination between land use and water planning...?
Bolinas’ $300,000 water meters
City of Folsom Annexation – approved 1/19/12

- 3,500 acres south of Highway 50 – 10,000 homes and 7.2 million square feet of commercial, office and retail space and public school facilities over 25 years
- $250 million to bring water to site plus "reassignment" of 8,000 acre-feet of water a year from an agricultural water district
- $1 billion in infrastructure needed to provide the area with solid waste, electrical and gas distribution systems, roadways, schools and so on

"It's a legal tangle," Stork said. "But, in a nutshell ... they (the Bureau of Reclamation) can say, 'No. ... We have an overstressed system, and we're not going to let you assign that water to the city of Folsom.' "

http://www.sacbee.com/2011/06/05/3677748/folsom-expansion-hinges-on-water.html#mi_rss=Folsom/El%20Dorado%20News#storylink=cpy
Will the drought stop growth in California...?

_Tapped Out_

California has been slow to recover from the housing-market collapse. Now persistent drought conditions could lead to additional water-tap restrictions, further denting home construction there.

**New single-family housing permits in California**

<table>
<thead>
<tr>
<th>Year</th>
<th>Permits</th>
</tr>
</thead>
<tbody>
<tr>
<td>'05</td>
<td>15.0 thousand</td>
</tr>
<tr>
<td>'06</td>
<td>12.5 thousand</td>
</tr>
<tr>
<td>'07</td>
<td>10.0 thousand</td>
</tr>
<tr>
<td>'08</td>
<td>7.5 thousand</td>
</tr>
<tr>
<td>'09</td>
<td>5.0 thousand</td>
</tr>
<tr>
<td>'10</td>
<td>2.5 thousand</td>
</tr>
<tr>
<td>'11</td>
<td>0.0 thousand</td>
</tr>
</tbody>
</table>

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**Typical annual indoor water use**

Three-bedroom California home built to code, by year of construction

<table>
<thead>
<tr>
<th>Year</th>
<th>Clothes washer</th>
<th>Toilets</th>
<th>Faucets</th>
<th>Shower</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>80 gallons</td>
<td>60 gallons</td>
<td>40 gallons</td>
<td>20 gallons</td>
</tr>
<tr>
<td>1990</td>
<td>60 gallons</td>
<td>40 gallons</td>
<td>20 gallons</td>
<td>20 gallons</td>
</tr>
<tr>
<td>2013</td>
<td>40 gallons</td>
<td>20 gallons</td>
<td>10 gallons</td>
<td>10 gallons</td>
</tr>
</tbody>
</table>

_Sources_: U.S. Census Bureau via Federal Reserve Bank of St. Louis (permits); California Homebuilding Foundation (water use)

**THE WALL STREET JOURNAL.**
Sacramento wants to grow; will drought say no?
Sacramento Bee, 5/9/15

The six-county Sacramento region is projecting 285,000 new housing units over 25 years, expanding the region by nearly 30 percent. Much of that growth is envisioned as the sort of suburban expansion that has made Sacramento residents among the biggest water users in the state.

Cathedral City, California
Changes to California’s Snowpack: percent of 1995-2005 average

SWE = snow water equivalent
California historical and projected decrease in April snowpack, 1961-2099 (Source: Cayan et al 2006).
How do we coordinate infrastructure outside the boundaries with growth inside the boundaries...?

How do we protect land and other resources outside the boundaries...?
## Coming up

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thursday, 5/19</td>
<td><strong>Guest speaker: Developer!</strong></td>
</tr>
<tr>
<td>Tuesday, 5/24</td>
<td>Lecture: <em>Habitat conservation</em> Bring 2 copies of draft papers!</td>
</tr>
<tr>
<td>Wednesday, 5/25</td>
<td>Peer review of papers in section!</td>
</tr>
<tr>
<td>Thursday, 5/26</td>
<td><strong>Guest speaker: Ag conservation</strong></td>
</tr>
<tr>
<td>Tuesday, 5/31</td>
<td>Lecture: <em>Disaster planning</em></td>
</tr>
<tr>
<td>Wednesday, 6/1</td>
<td>Review for final in section Papers due on SmartSite by 11:59pm!</td>
</tr>
<tr>
<td>Thursday, 6/2</td>
<td>Course wrap-up and tips for final</td>
</tr>
</tbody>
</table>