

Infrastructure and Climate Change



John Gage & Gordon Wozniak
February 24, 2017

Berkeley

Drought



Flooding



What is Berkeley's Vision for 2050?

Align Climate Action & Resilience Goals with Infrastructure Modernization

- Carbon Neutral
- Water Neutral, conservation & flooding
 - Rainwater capture & reuse
 - Permeable surfaces
 - Grey water
- Fiscally sustainable
 - Durable – lower maintenance costs
 - E.g. LED street lights
 - E.g. Branch libraries seismic/energy upgrades
 - Infrastructure replacement fund
- Resilient and Beautiful City
 1. Undergrounding & fiber optics
 2. Parks & greenways
 3. Fishing pier
 4. Camps

Think Big!!

All Funds (in millions)	Adopted FY 2015	Adopted FY 2016	% Change	Adopted FY 2017	% Change
Operating Budget	\$ 293.9	\$ 303.0	3%	\$ 301.6	2%
Capital Budget	\$ 29.5	\$ 36.1	22%	\$ 32.9	12%
Total:	\$ 323.4	\$ 339.1	5%	\$ 334.5	3%

FY2015 → FY2050

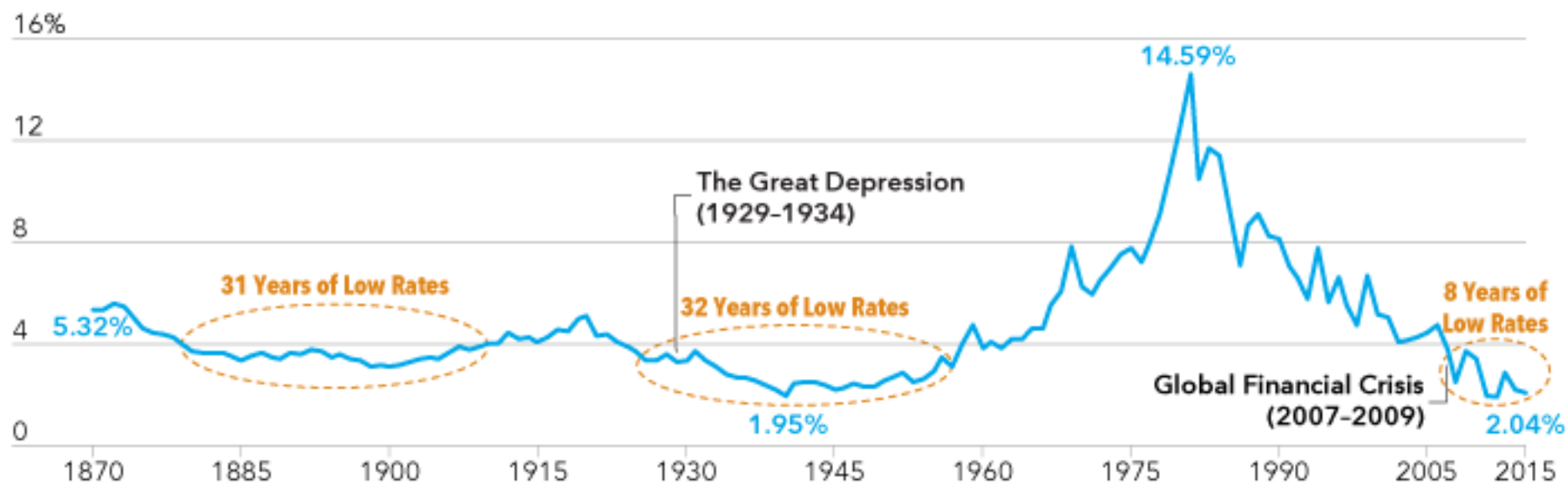


How does Berkeley Finance Infrastructure2050?

To Bond or Not to Bond?

A short review of Berkeley's Bond History

10-year Treasury Yields

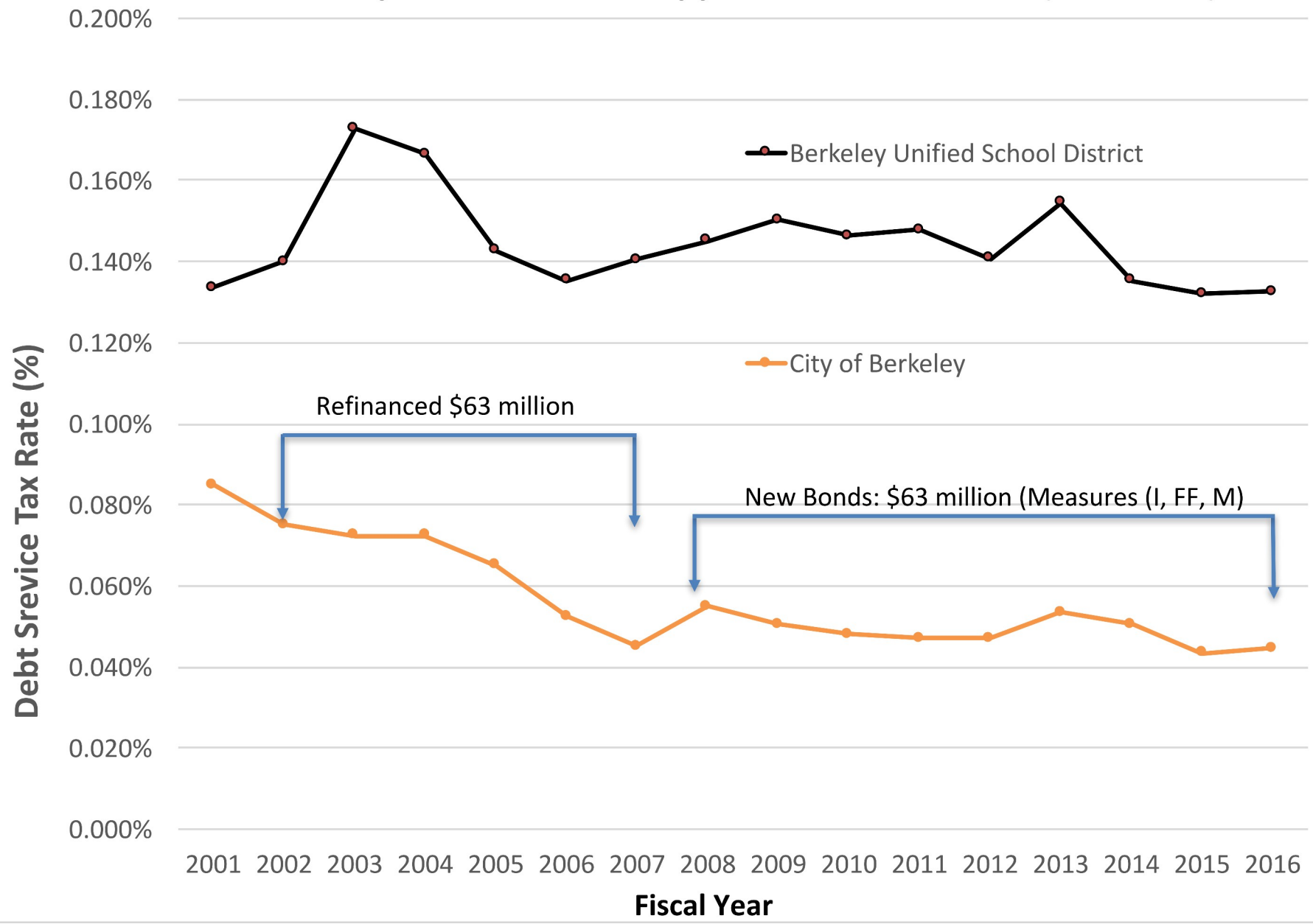


COB General Obligation (GO) Bonds

(2000 – 2016)

Year	Amount	Description
2002	\$17.8 M	Measure G – Fire Safety
2007	\$4.3 M	Measure G – Fire Safety
2007	\$41.2 M	Measure S
Bond Refinancing (2002 -07)	\$62.3 M	
2008	\$7.2 M	Measure I – Animal Shelter
2009	\$10.0 M	Measure FF – Branch Libraries
2010	\$16.0 M	Measure FF – Branch Libraries
2014	\$15.0 M	Measure M – Street & Watershed
2016	\$15.0 M	Measure M – Street & Watershed
New Bonds (2008 – 2016)	\$63.2 M	

Comparison of Voter Approved Debt Service (Tax Rates)

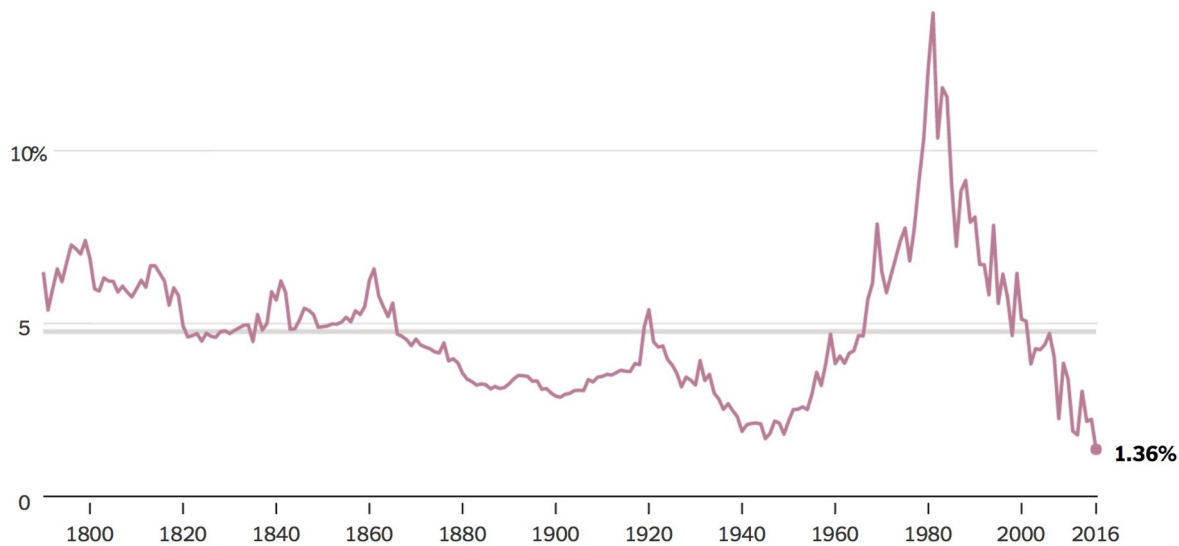


Why has Berkeley's Debt Service Tax Rate Decreased and then stayed constant while \$62 M in New Bonds were issued?

Interest Rates Are at Lowest Level in U.S. History

Last week, long-term Treasury rates fell to a new low.

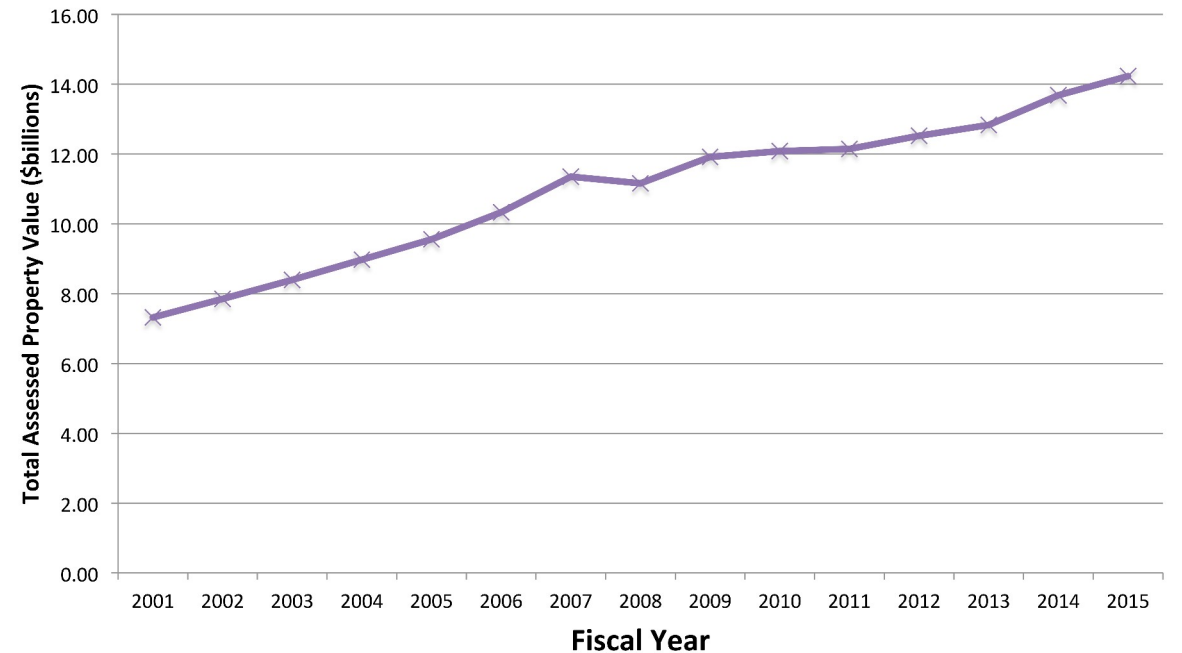
Yield on 10-Year Treasury Bond



Gray line represents average since 1790

Source: Global Financial Data through 2015; Federal Reserve for 2016

COB Assessed Property Values for FYs2001 - 2015)

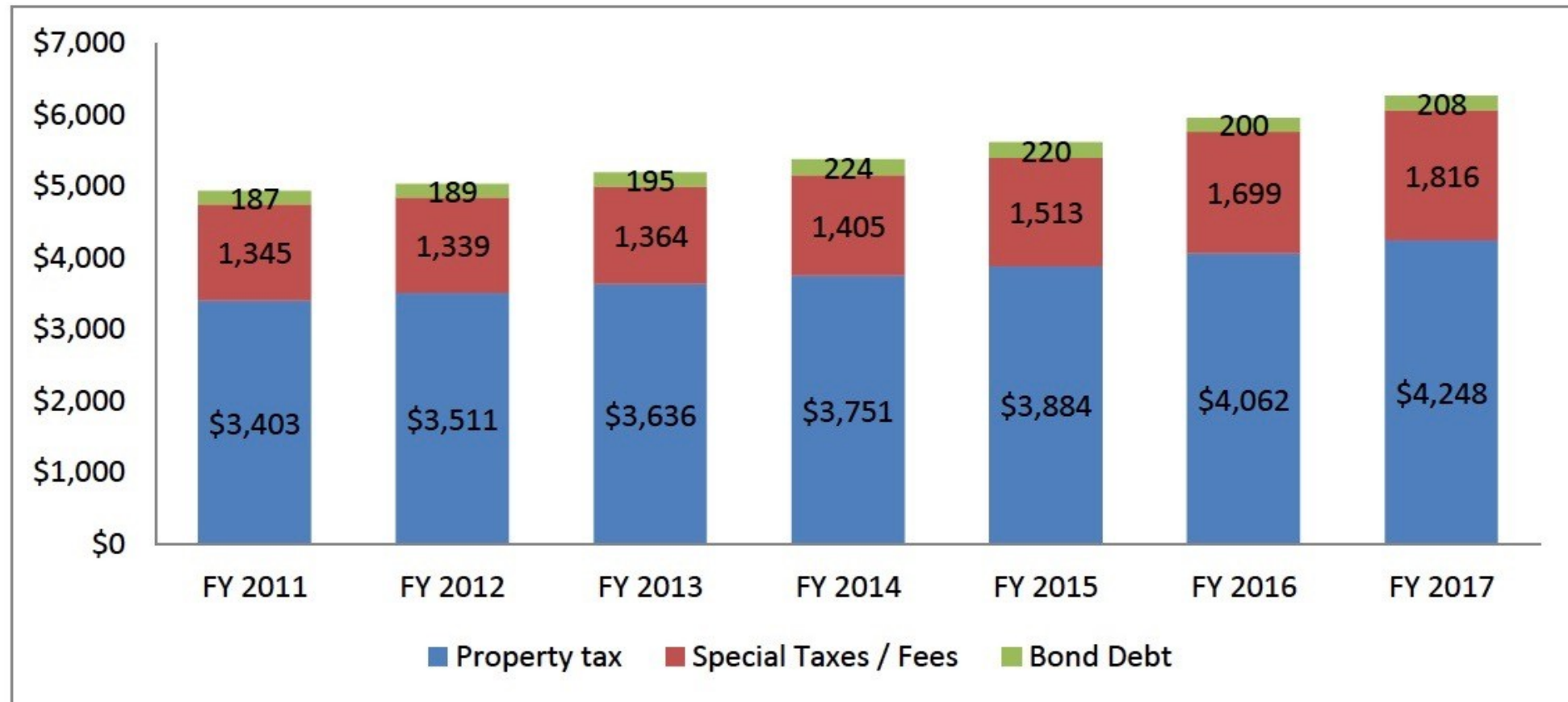


Comparison Taxes and Tax Rates for 2000/1 to 2016/17 (141 Parkside Drive)

Year	Countywide Property Tax based on AV (\$)	COB Tax Rate (%)	COB Tax Amount (\$)	BUSD Tax Rate (%)	BUSD Tax Amount (\$)
2000/1	\$5,369	0.0867%	\$465	0.1250%	\$671
2016/17	\$6,991	0.0445	\$311	0.1327%	\$927
% Change	+30.2%	-48.7%	-33.1%	+6.2%	+38.2%

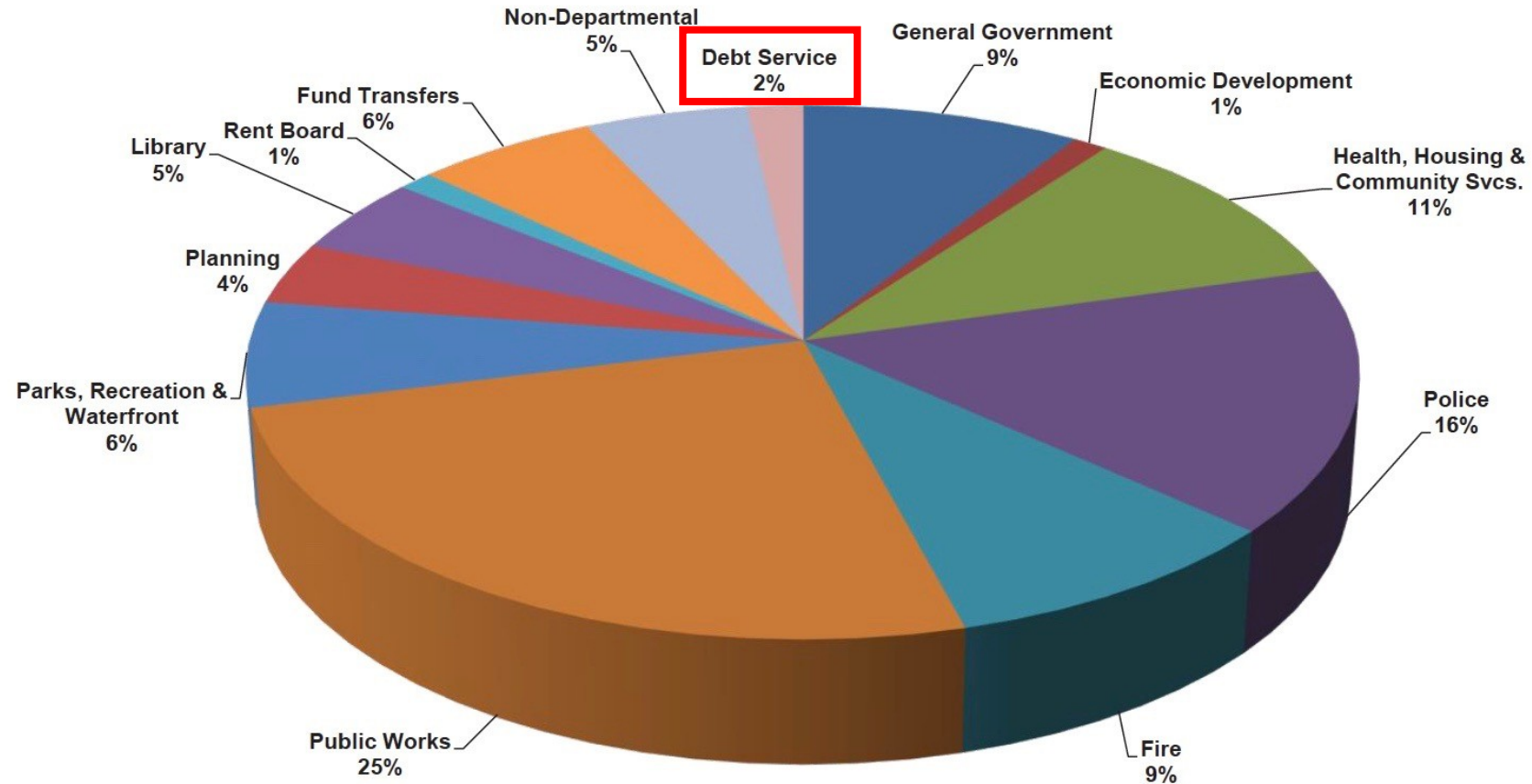
Annual Berkeley Property Taxes: FYs2011 -17

(average assessed value – 1900 ft2)



Debt Service is 2% of Total Budget

**All Funds Expenditures by Department
FY 2016 & FY 2017 Biennial Budget
\$783,375,227 (Gross)
\$673,572,076 (Net)**



Possible Bond Refinancing

Council ask City Manager to review refinancing of existing GO Bonds for potential fiscal savings

GO Bonds	Interest Rate	Amount
• Measure G (2002 & 2007 Series A)	2.0 – 7.5%	\$9.8M
• Measure S (Series B)	4.04 – 5.6%	\$28.6M
• Animal Shelter 2008	3.5 – 4.3%	\$6.4M
• Branch Libraries 2009	1.25 – 5.3%	\$9.3M
• Branch Libraries 2010	3.0 – 5.0%	\$14.7

Berkeley, Sewage and San Francisco Bay



Berkeley and other East Bay cities have reached a settlement with the EPA to upgrade their sewer lines, which should prevent raw sewage from spilling into the bay during storms. Photo: dogefrost

COB signs Consent Decree with US EPA to stop the release of partially treated sewage into SF Bay

2014 – Consent Decree requires COB

- Reduce inflow and infiltration
- Reduce sanitary sewer overflows
- Repair and replace aging sewer pipelines

2026

- Replace 50 miles of sewer pipeline
- Replace all noncompliant manholes
- Perform condition assessment on 25 miles of sewer annually
- Increased required maintenance activities

Berkeley's Sanitary Sewer Service Rates

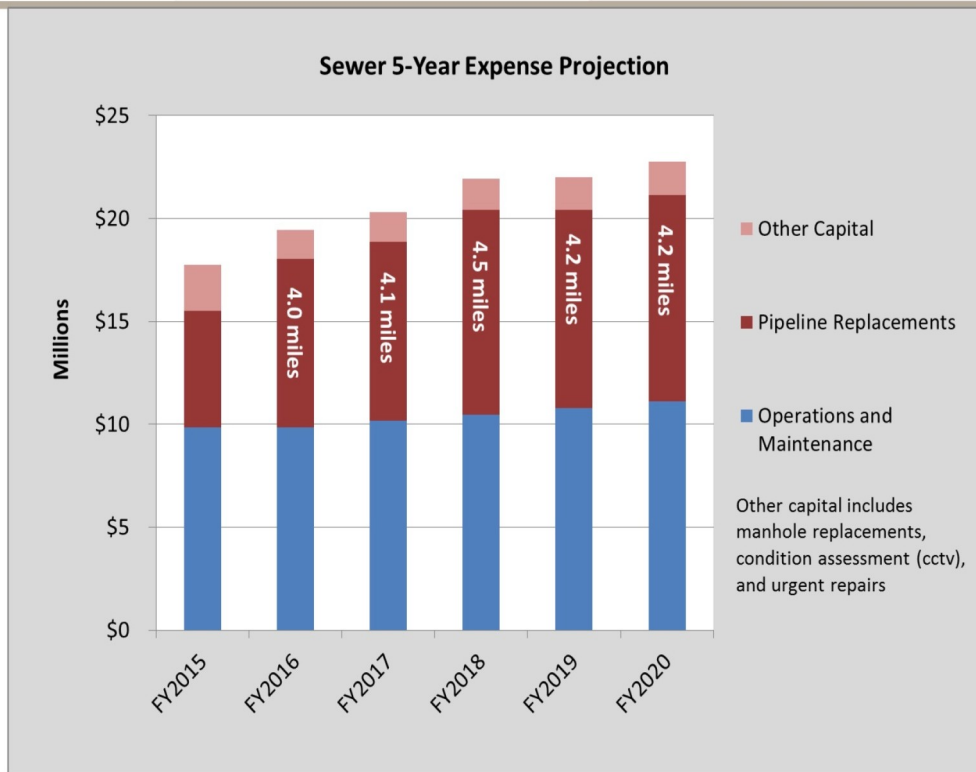
(Adopted by Council in June 2015)

Single Family

FY 2016	+46.0%
FY 2017	+24.2%
FY 2018	+14.2%
FY 2019	+7.0%
FY 2020	+3.6%
Total	+131%

COB Proposed: Sanitary Sewer Capital Spending

Funding Needs Projection



Capital Project

- ~4 miles/yr of pipeline replacement
- Fund with \$100M Revenue bond – similar to new parking garage
- Use sewer fee increase to pay bonds

Benefits

- complete project in 5 vs 10 years
- Less pollution in SF Bay
- Lower maintenance costs?
- Lower peak sewer fees?

Water Neutral by 2050

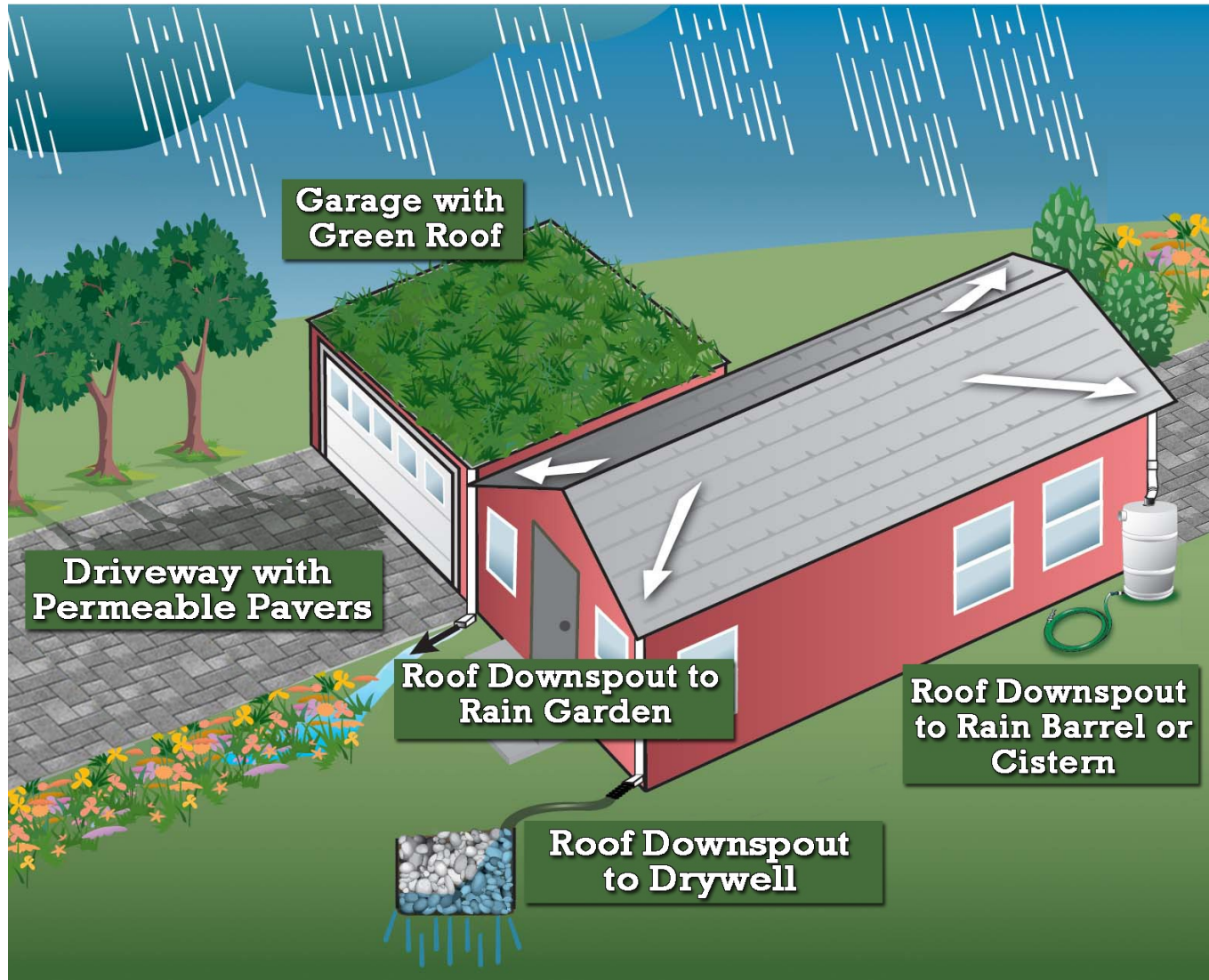
Water capture & Reuse

Permeable Surfaces

Slow Runoff and Recharge Aquifers

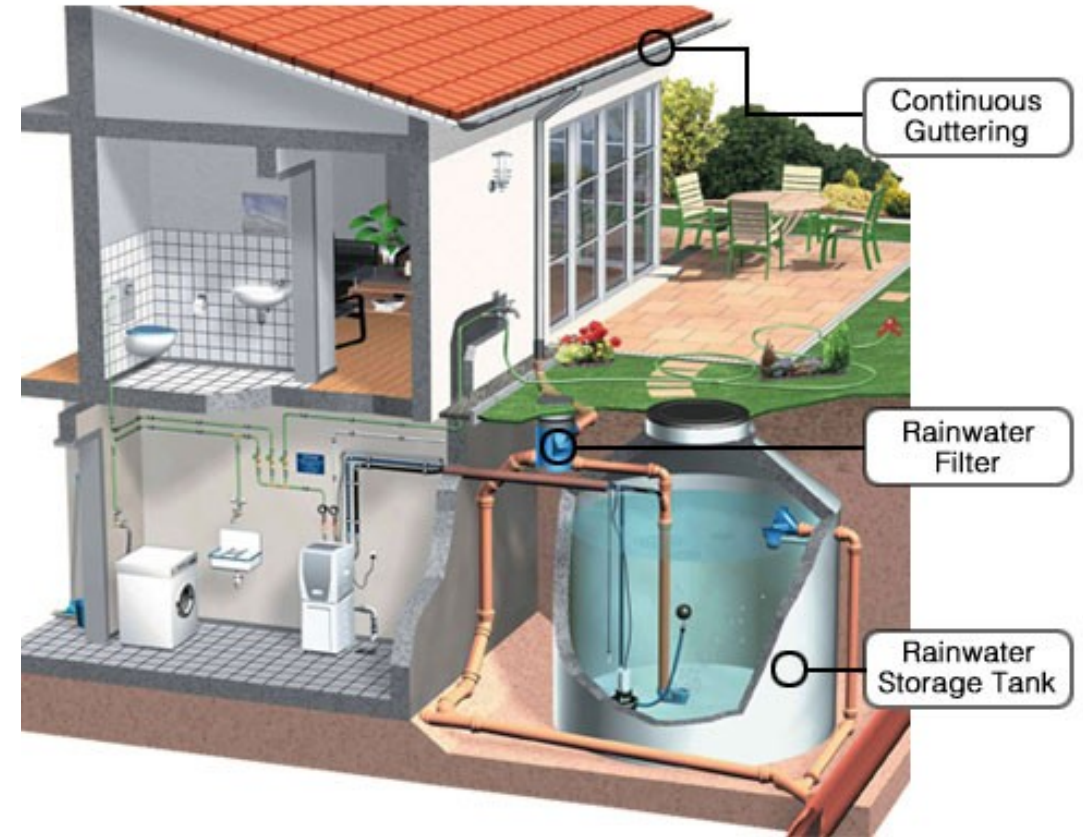
Reduce Flooding and Mitigate Drought

Water Neutral



Permeable Paving & Rainwater Retention Systems

Reduce Runoff & Flooding

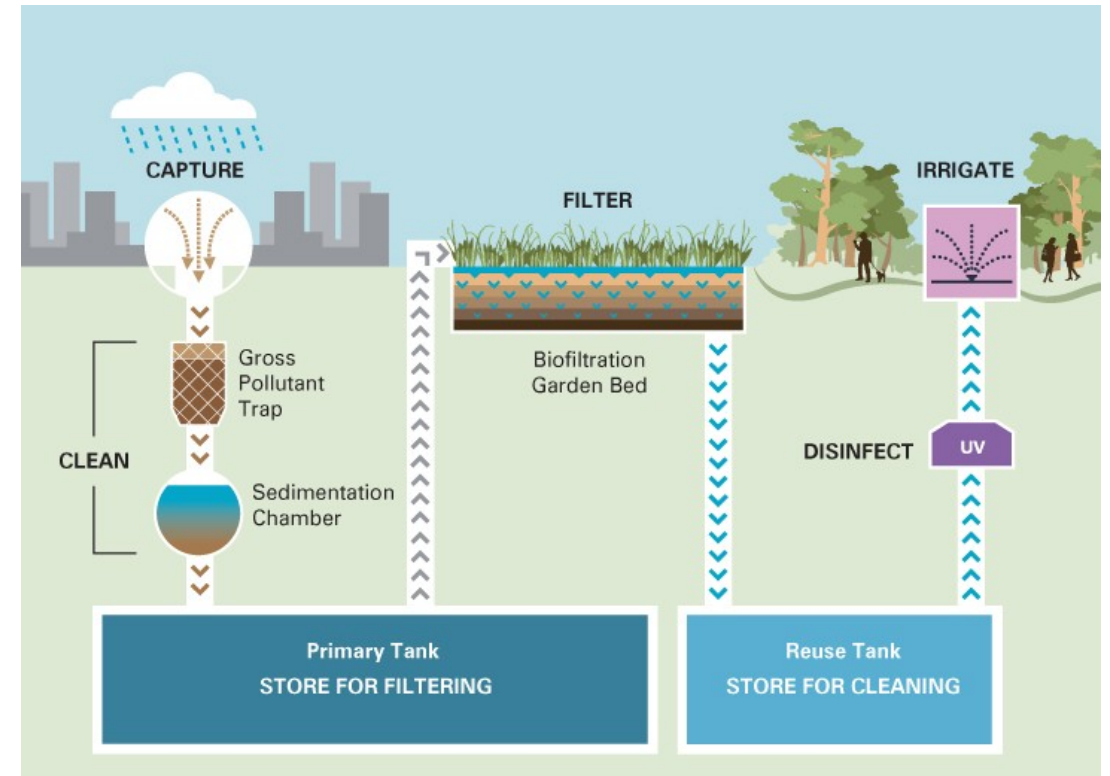


Permeable Surfaces and Rainwater Retention & Reuse

Berkeley 2016



Berkeley 2050



Resilience and Undergrounding

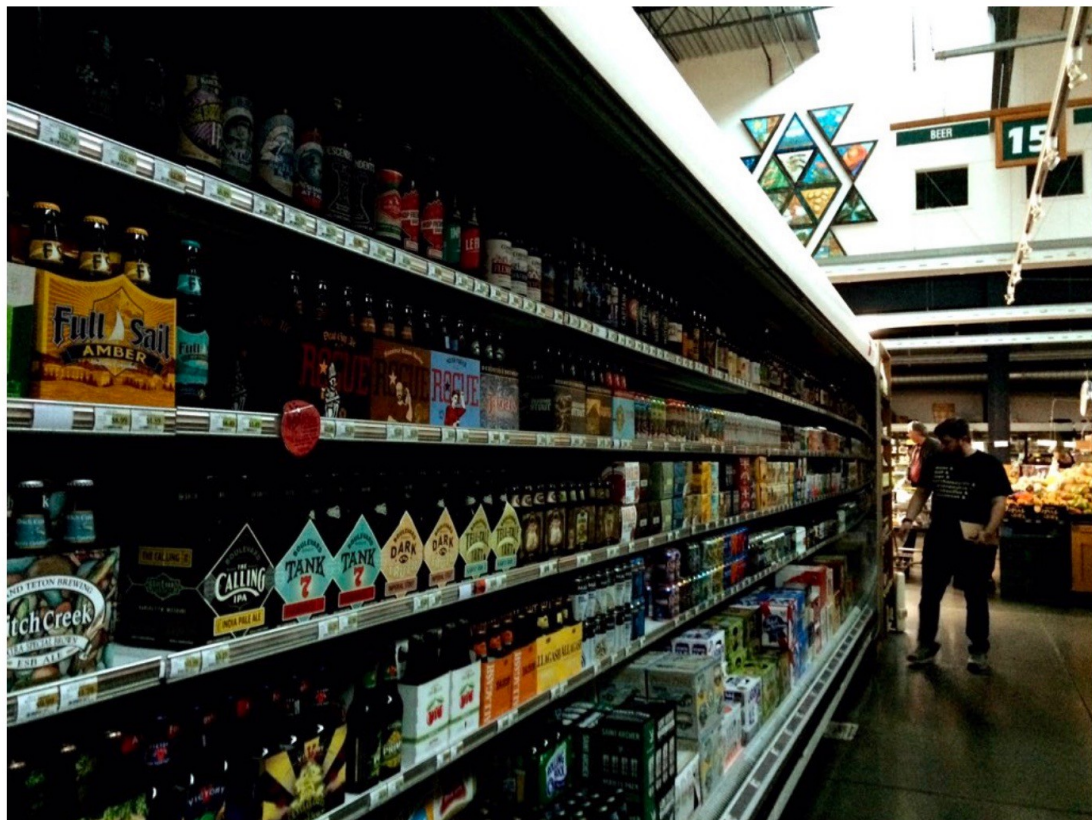
Utilities

- Arterials + collectors - \$135M
- Residential streets - \$600M

Install fiber – Cost ??

Add pedestrian scale streetlights – Cost??

Breaking: Power outages affect large swaths of Berkeley

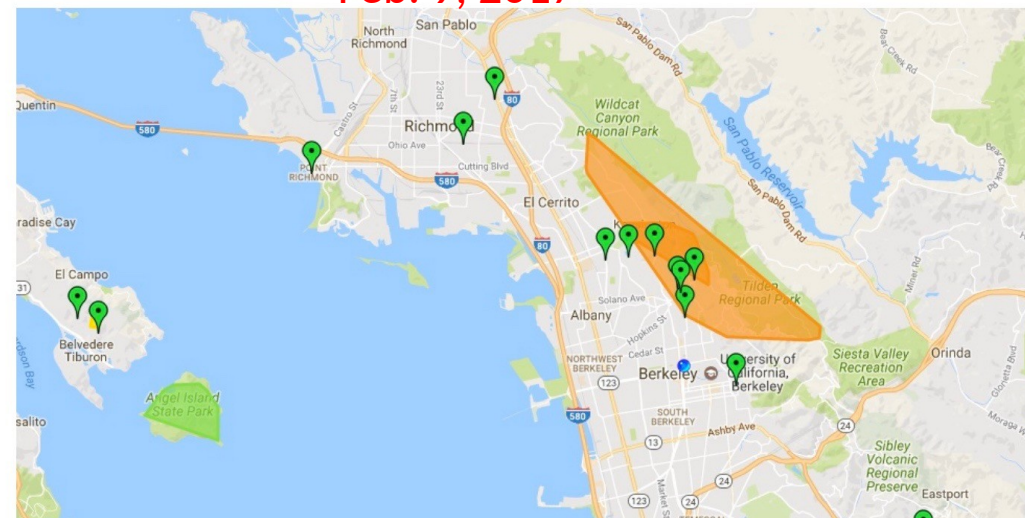


The power outage hit Berkeley Bowl West. Photo: Guillaume Pierre

Update 4:28 p.m. Despite what PG&E has told Berkeleyside, readers are saying their power is still out. According to the outage map, there are 18 outages still reported in Berkeley that are impacting 8,160 customers.

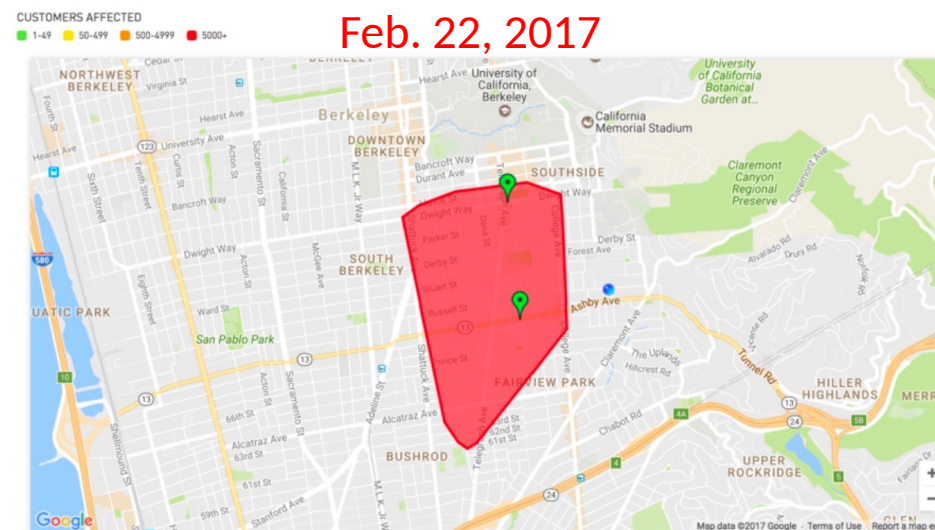
Update: At peak, 4,800 affected by Berkeley Hills power outage, now mostly resolved

Feb. 9, 2017



The PG&E power outage map at around 1:50 p.m. Check the latest numbers on the [online PG&E outage map](#)

Feb. 22, 2017



At 9:45 p.m., PG&E's outage map was showing over 5,000 customers affected in an area stretching from the south campus neighborhood into North Oakland

Undergrounding: San Diego



Mission Boulevard, circa
1972 - Before
Undergrounding



Mission Boulevard, circa
1972 - After
Undergrounding



Photo of Street With Utility
Poles



Photo of Street Without
Utility Poles

Berkeley Undergrounding

37.9 miles of Arterial and Collector streets

1. Finance undergrounding with increase in UUT.
2. Dedicate 2.5% of existing UUT to residential undergrounding

Utility Users Tax (7.5%) → ~\$14.5 million/yr

Increase UUT 2.5% to 10.0% → ~4.7M/yr

Issue \$135 million of Revenue Bonds

* Finance RBs with income stream from UUT

Negotiate with PG&E and other utilities for cost sharing

Install conduit and fiber optic cable

Residential Streets???

150 miles of residential streets

- ~\$600 million to underground

Cost Reduction

- Work with Utilities to partially finance undergrounding costs
- Energy Conservation model (PG&E)

2018 Ballot Measure: increase UUT 7.5% to 10%

- City Council -> Sweeter
 1. Sweeter - dedicate 2.5% from the existing 7.5% to underground residential areas.
 2. Creates additional revenue stream of ~\$4.7M/yr
 3. Issue ~\$135M in Revenue Bonds

Transfer Tax Seismic Rebate

Over 30 years financed improved seismic safety

Expand Rebate to cover

- energy efficiency
- solar power
- battery backups
- water conservation
- storm water capture & reuse

30 Year Capital Financing Plan

(\$30M x 30 yrs = \$900M)

GO Bonds

- Assessed Values → x4
- Ask Voter to set Debt-Service Rate at FY2000 value of 0.0867%

Revenue Bonds

- Use \$10M capital steam in sewer fund to issue bonds

UUT increase by 2.5% to 10%

- Use \$4.7M increase to fund revenue bonds for collectors & arterials
- Dedicate 1/3 of current UUT to undergrounding residential streets
- Ask Utility & Insurance Companies to subsidize residential undergrounding

Property Transfer Tax

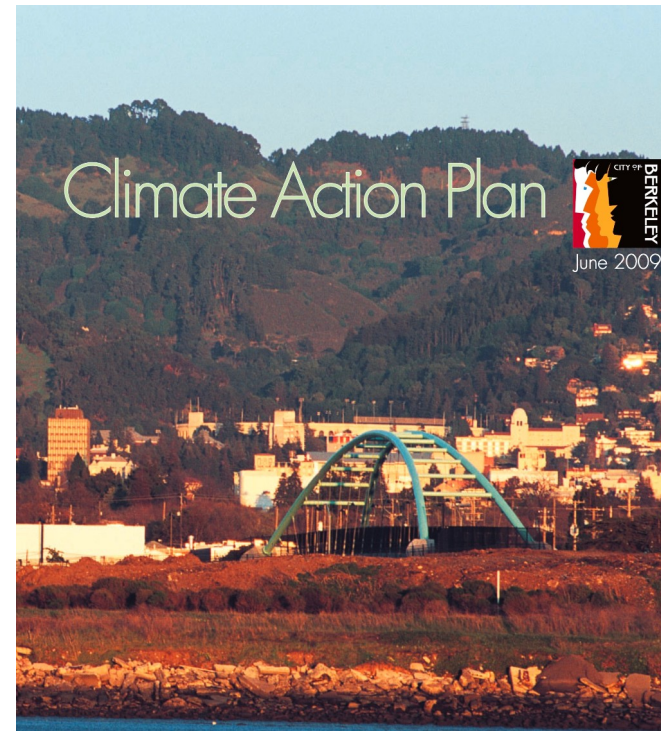
- Broaden Seismic Exemption to include energy & water efficiency

Partnerships

- EBMUD, Utilities, Insurance Companies

Climate Action Goal

- 2050 reduce GHGs by 80%
- Modest progress
- Limited grant funding



Infrastructure

- No Goal
- No Plan
- \$100 M – Measure T1



City Council Takeaways

1. Adopt goal to modernize and green Berkeley's infrastructure by 2050
 - Aligns infrastructure modernization with Climate Action Plan
 - Improves resilience
2. Develop Vision for Infrastructure Plan for Berkeley2050
 - UCBerkeley
 - Berkeley Lab
3. Drought/Flooding
 - EBMUD
3. Resilience/Undergrounding/Flooding
 - Insurance Companies
 - Utilities
5. Develop incentives to invest in new infrastructure
 - similar to solar, energy efficiency, and recycling programs

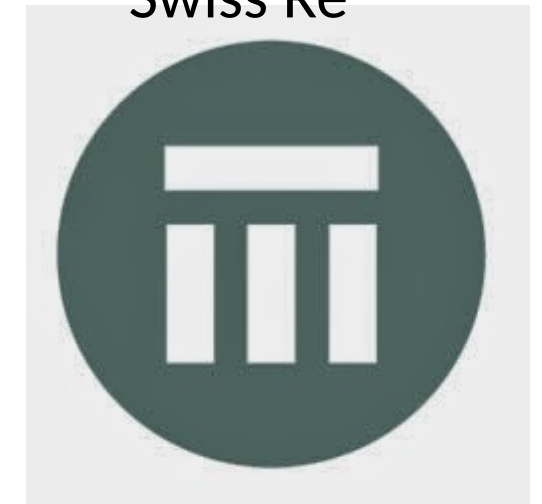
Resilience Partners: Utility and Insurance Companies



Munich Re



Swiss Re



The End

Future Cities

Rising
Seas



Green &
Modern



Berkeley 2050?

Transportation

- Separated Bike Lanes
- Free shuttle buses
- Expanded Car Share
- Electric charging stations on street lights



Rule 20A Funds

PG&E continues to provide an allocation to the City of Berkeley under Rule 20A. The following table describes the allocation balance for 2016:

City of Berkeley 2016 Estimate of Current Rule 20A Account Balance		
	Allocations	Estimated Expenditures
(a) Account Balance as of 05/13/14	\$6,365,851	
(b) 2015 Allocation	+\$528,394	
(c) 2016 Allocation	+\$523,888	
(d) 5 year borrow	+\$2,619,440	
(e) Total Available Allocations	=\$10,037,573	
(f) Grizzly Peak Blvd - Current FAC		-\$4,682,736
(g) Vistamont Ave - Preliminary Ballpark Figure		-\$6,085,703
(h) Adjusted Account Balance as of 5/17/16	=\$730,866	

Use of General Fund Capital Improvement Program Reserves

	Adopted FY 2016	Adopted FY 2017	Proposed FY 2018	Proposed FY 2019	Proposed FY 2020	Total
Facilities	2.1	2.2	0.9	0.9	0.9	
Information System*	0.7	0.9	0.9	0.9	0.9	
Parks	0.4	0.4	0.4	0.4	0.4	
Sidewalks	0.6	0.6	0.6	0.6	0.6	
Streets	1.9	1.9	1.9	1.9	1.9	
Transportation	0.2	0.2	0.2	0.2	0.2	
Debt	0.9	0.9	0.9	0.9	0.9	
Total General Fund	6.8	7.1	5.8	5.8	5.8	31.4

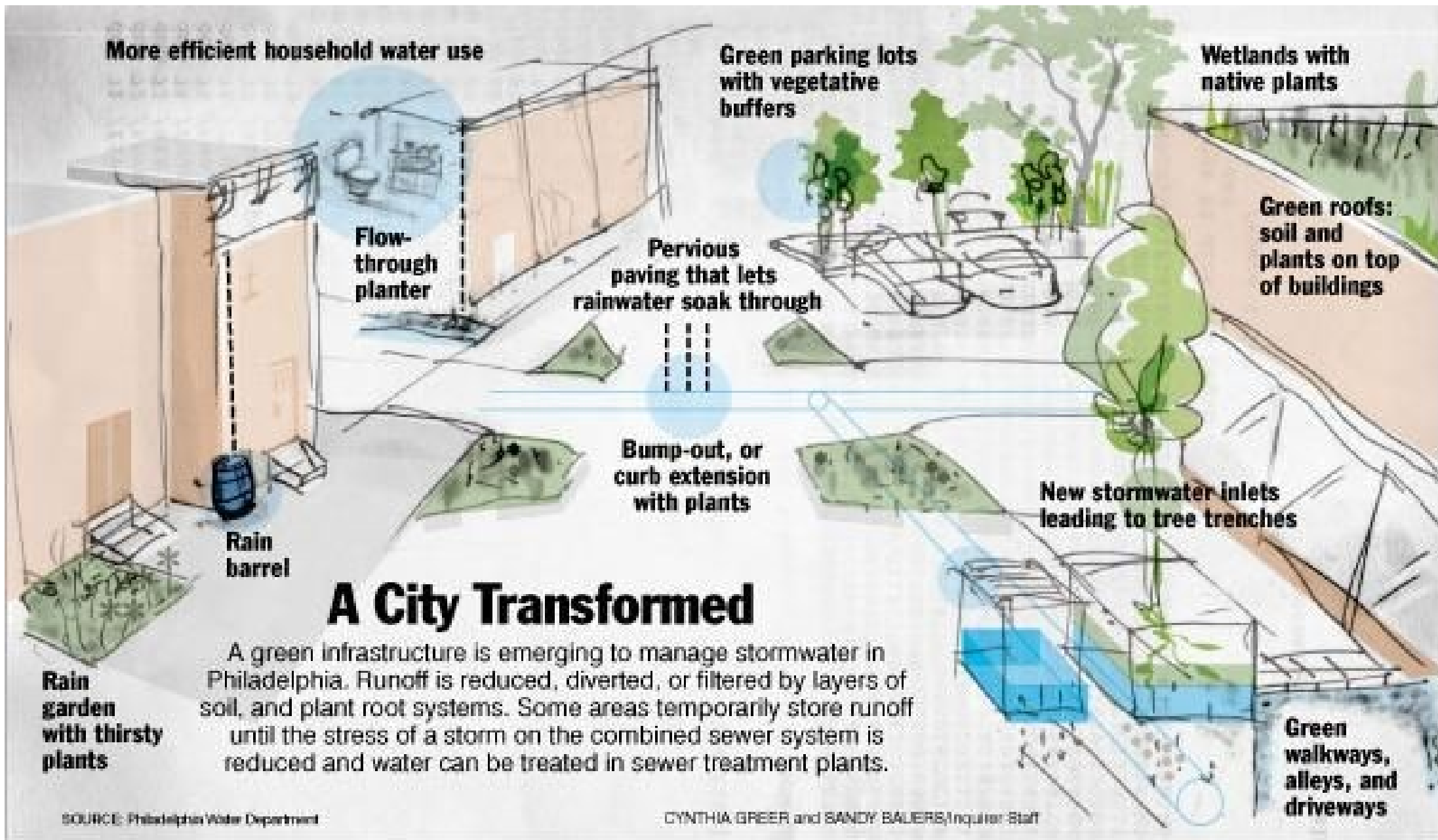
Bonds, Refinancing, Infrastructure, Climate Change and Clean Water

John Gage & Gordon Wozniak

February 21, 2017

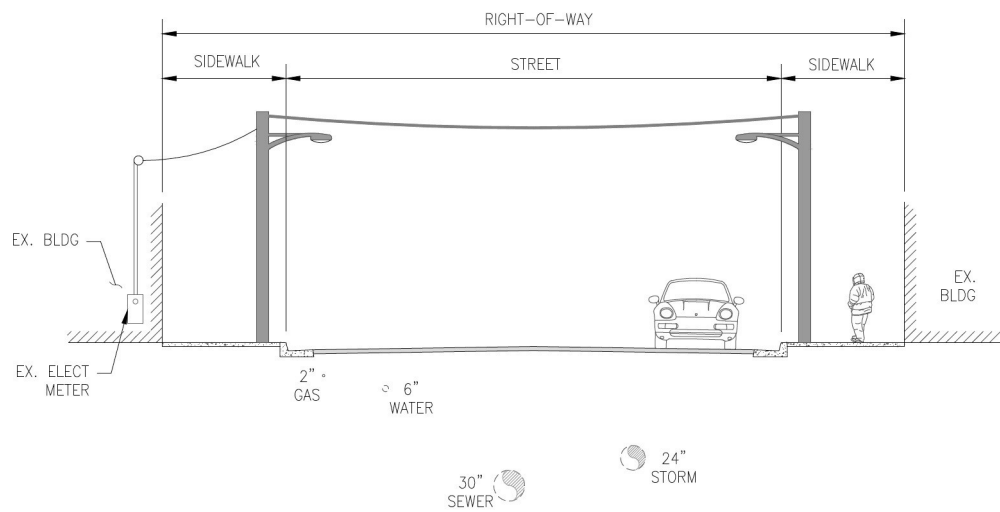
City Council

1. Adopt goal of completely modernizing and greening Berkeley's infrastructure by 2050
 - Aligns 100% infrastructure modernization with Climate Action Plan
2. Develop Vision for Infrastructure Plan for Berkeley2050
 - Green – lower carbon footprint
 - Durable – lower maintenance costs
 - Resilient and Beautiful City
 - Undergrounding & communication
 - Transportation
 - Water conservation & flooding
 - Water Neutral by 2050
 - fiscally sustainable – savings accrue to infrastructure replacement fund
 - Meets CAP 2050 goals
 - Engage UCB in this planning effort
3. Two examples –
 - Replacing streetlights with LEDs - \$3 Million load (1%)
 - Branch library modernizations – resilient & lower carbon footprint

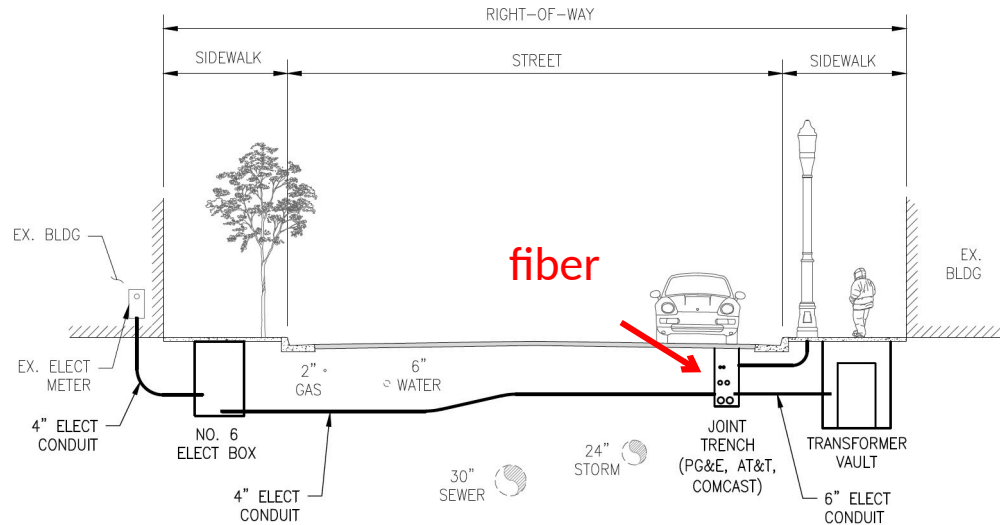


Flooding in Berkeley





BEFORE: STREET SECTION WITH OVERHEAD UTILITIES



AFTER: STREET SECTION WITH UNDERGROUND UTILITIES

- NOTES:
 1. LOCATIONS ASSUME ADEQUATE CLEARANCES
 2. SHADED FACILITIES ARE EXISTING

FIGURE - 1

**DIAGRAMS OF TYPICAL STREET SECTION SHOWING OVERHEAD
AND UNDERGROUND FACILITIES IN COMMERCIAL AREA**

SCALE: NTS

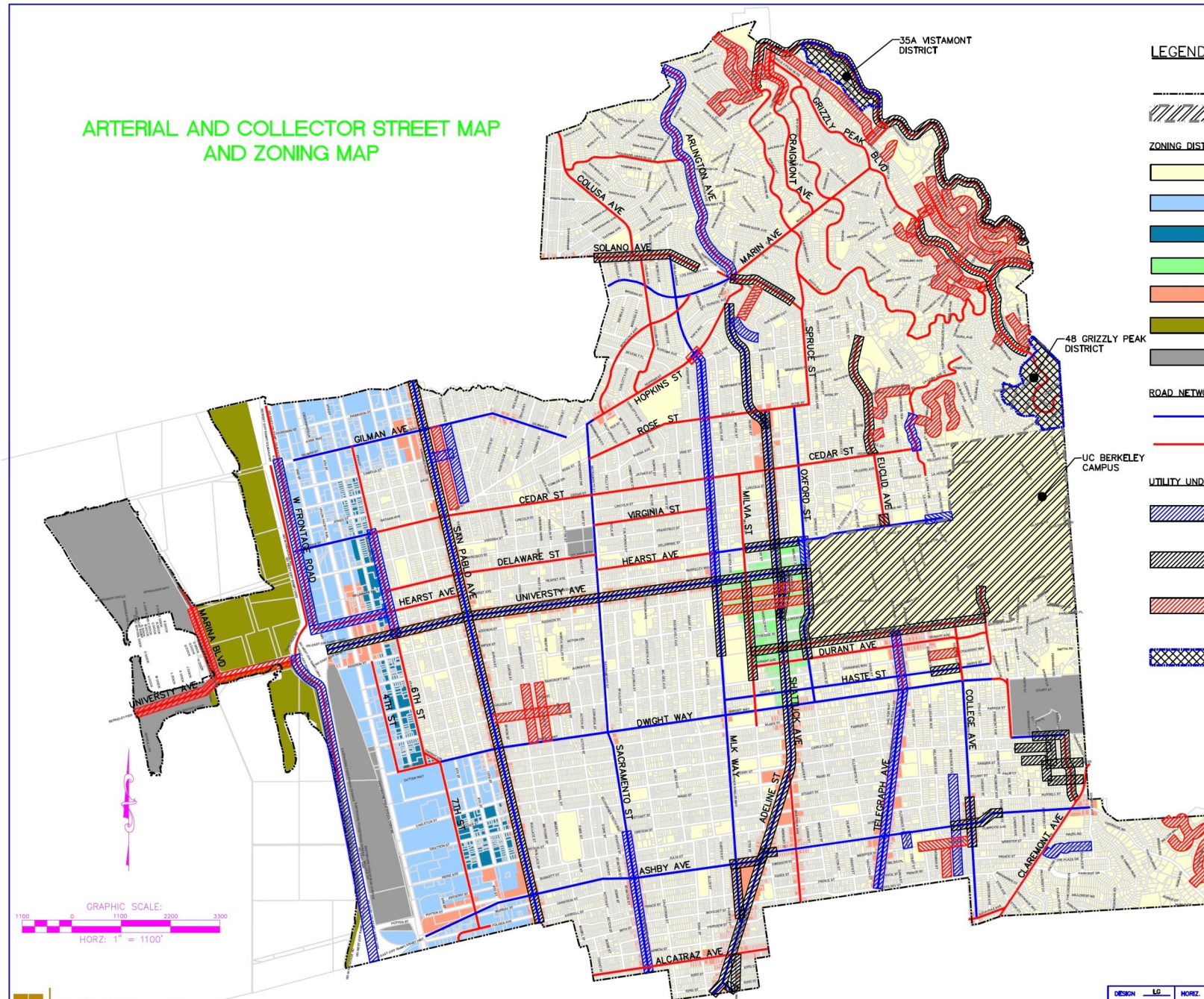
TABLE 1: Summary of Undergrounding Lengths and Costs				
Arterial Streets	Length (Feet)	Length (Miles)	Estimated Cost	% Underground
Total arterial streets	135,095	25.6	N/A	N/A
Total arterial streets undergrounded	66,015	12.5	N/A	49%
Non-residential arterial streets to be undergrounded*	14,830	2.8	\$11,380,000	11%
Residential arterial streets to be undergrounded**	54,250	10.3	\$31,550,000	40%
Total arterial streets to be undergrounded	69,080	13.1	\$42,930,000	51%
Collector Streets				
Total collector streets	190,460	36.1	N/A	N/A
Total collector streets undergrounded	59,660	11.3	N/A	31%
Non-residential collector streets to be undergrounded*	23,275	4.4	\$15,100,000	12%
Residential collector streets to be undergrounded**	107,525	20.4	\$76,770,000	57%
Total collector streets to be undergrounded	130,800	24.8	\$91,870,000	69%
Residential Streets				
Total residential streets***	832,666	157.7	N/A	N/A
Total residential streets undergrounded	57,267	10.8	N/A	7%
Total residential streets to be undergrounded	775,399	149.9	N/A	93%

* Non-residential includes Zones M, C-DMU, C, and SP

** Residential includes Zones MUR and R

*** Residential Streets include all non-arterial and non-collector streets falling in multiple zones

ARTERIAL AND COLLECTOR STREET MAP AND ZONING MAP



LEGEND:

— CITY RIGHT-OF-WAY
 UC BERKELEY CAMPUS

ZONING DISTRICTS:

RESIDENTIAL (DISTRICTS R-1, R-1A, R-2, R-2A, R-3, R-4, R-5, ES-R, R-S, R-SMU)
 MANUFACTURING (DISTRICTS M, MM, MULI)
 MIXED USE-RESIDENTIAL (DISTRICT MUR)
 COMMERCIAL DOWNTOWN MIXED USE (DISTRICT C-DMU)
 COMMERCIAL (DISTRICTS C-1, C-E, C-N, C-NS, C-SA, C-SO, C-T, C-W)
 SPECIFIC PLAN (DISTRICT SP)
 UNCLASSIFIED (DISTRICT U)

ROAD NETWORK:

ARTERIAL ROADS
 COLLECTOR ROADS

UTILITY UNDERGROUNDING HISTORY:

STREET SEGMENTS ALREADY UNDERGROUNDED PER "UNDERGROUNDING OF OVERHEAD UTILITY WIRES - A BRIEF HISTORY"
 STREET SEGMENTS ALREADY UNDERGROUNDED PER GOOGLE MAP STREET VIEW
 STREET SEGMENTS ALREADY UNDERGROUNDED PER PG&E'S MAP "GENERAL AND APPROXIMATE LOCATIONS OF UNDERGROUND ELECTRIC DISTRIBUTION LINES IN THE CITY OF BERKELEY"
 PROPOSED UNDERGROUNDING DISTRICTS
 * DISTRICT 48 GRIZZLY PEAK
 * DISTRICT 35A VISTAMONT

NOTE:

- THIS BASELINE STUDY IS PRIMARILY FOCUSED ON UNDERGROUNDING THE EXISTING OVERHEAD UTILITIES IN THE ARTERIAL-COLLECTOR STREET NETWORK.
- THE ENTIRE STREET SEGMENTS OUTSIDE THE ARTERIAL-COLLECTOR ROAD NETWORK HAVE NOT BEEN TABULATED AND PLOTTED AS PART OF THIS STUDY.
- THE UNDERGROUNDED SEGMENTS OUTSIDE THE ARTERIAL-COLLECTOR ROAD NETWORK SHOWN IN THIS MAP ARE PER AVAILABLE DATA PROVIDED BY THE CITY.

ATTACHMENT 1

UTILITY USERS TAX cont.

Forecast of UUT Revenues

UUT is expected to decrease approximately 1% from FY 2016 to FY2017. This projected decrease is due to expected decreases in cable, telephone and cellular rates, continued growth in electric and gas categories, and flat growth in land-line phones. Projections are based on current trend analysis.

UTILITY USERS TAX	Actual Revenue			Projected Revenue		
	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
Total Collections	\$14,350,002	14,321,714	14,302,057	\$14,447,392	\$14,194,436	\$14,221,412
\$ Change	114,882	(28,288)	(19,657)	145,335	(252,956)	26,976
% Change	.8%	(.2%)	(.1%)	1.02%	(.0175%)	.19%
Cable	1,550,496	1,266,308	1,327,856	1,341,400	1,317,925	1,219,158
Gas/Elec	8,203,483	8,165,997	8,288,863	8,372,864	8,226,214	8,654,252
Phone	1,943,961	2,043,473	2,102,760	2,124,208	2,087,034	1,784,257
Cellular	2,652,062	2,845,936	2,582,578	2,608,920	2,563,263	2,563,745

Reduce Flooding – Special GO Bond

- Permeable Surfaces
- Water retention and capture systems
- Water conservation Incentives
 - EBMUD

Mitigate Drought

- Residential storm water capture & storage
 - Seismic Rebate in Transfer Tax
 - Expand to cover water & energy efficiency
- New multiunit buildings – require onsite storm water capture & storage
- Incentives to capture and reuse rainwater
 - EBMUD

Resilience

1. New modern infrastructure will improve Berkeley's resilience
 - Reduce recovery cost of a major disaster
2. Approach Insurers about helping to fund new infrastructure
 - E.g. solar and energy efficiency programs
3. Federal Funds??

Property Taxes: 141 Parkside Drive

Tax Year	Net Assessment (\$)	Tax Rate (%)	Tax (\$)	Special Assessments (\$)	Total Tax (\$)
2000/01	536,908	1.2344	6,628	1,835	8,462
2016/17	699,159	1.2168	8,507	4,557	13,064
% Change	+30.2 %	-1.4%	+28.3%	+148%	+54.4%