City of Sausalito Priority Sewer Rehabilitation Projects – Phase I

January 27, 2009

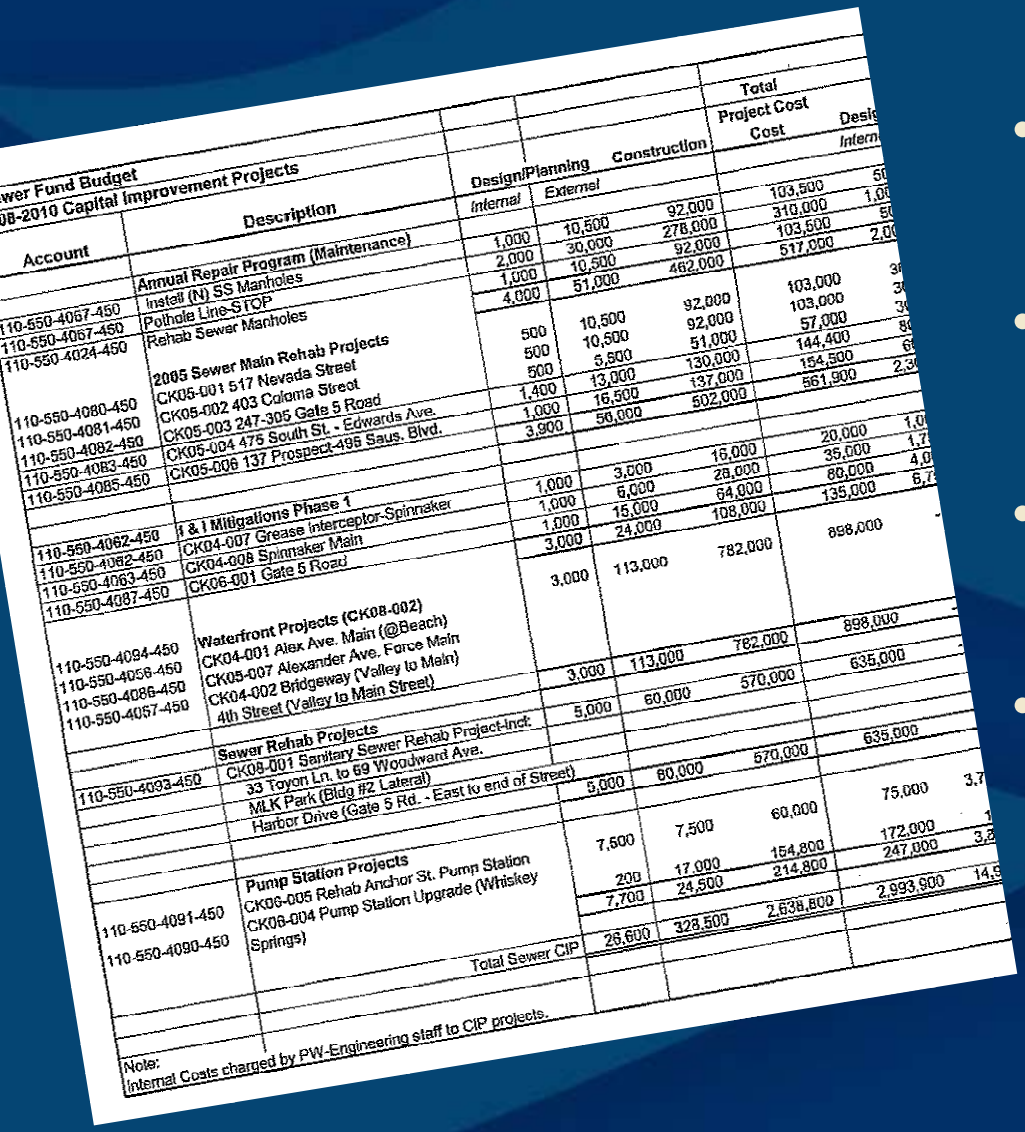
Vivian Housen, P.E.
Nancy McWilliams, P.E.

WEST YOST ASSOCIATES
Consulting Engineers

Agenda

- Project Background
- Summary of Findings
- Project Descriptions
- Estimated Project Costs
- Rehabilitation Methods
- Next Steps

Project Background

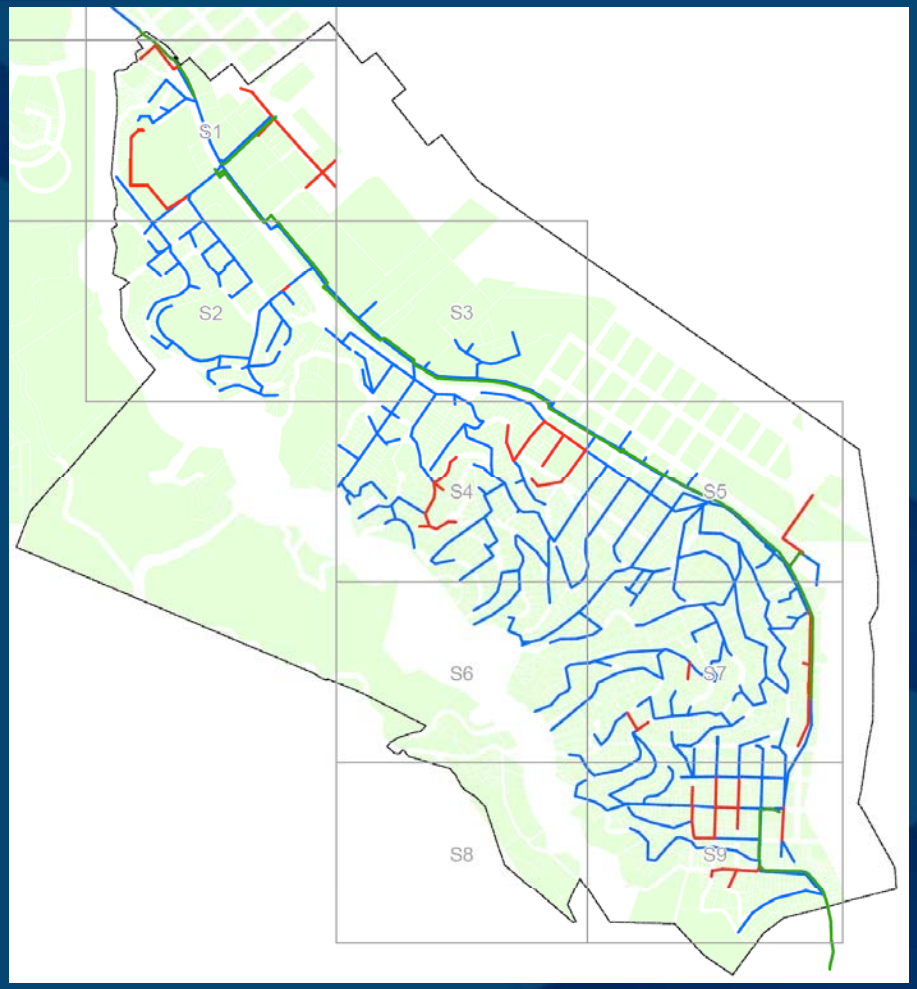


Account	Description	Design/Planning Internal	Design/Planning External	Construction	Total Project Cost
	Annual Repair Program (Maintenance)				
110-550-4067-450	Install (N) SS Manholes	1,000	10,500	92,000	103,500
110-550-4067-450	Pothole Line-STOP	2,000	30,000	278,000	310,000
110-550-4024-450	Rehab Sewer Manholes	1,000	10,500	92,000	103,500
		4,000	51,000	462,000	517,000
	2005 Sewer Main Rehab Projects				
110-550-4080-450	CK05-001 517 Nevada Street	500	10,500	92,000	103,000
110-550-4081-450	CK05-002 403 Coloma Street	500	10,500	92,000	103,000
110-550-4082-450	CK05-003 247-305 Gate 5 Road	500	5,500	51,000	57,000
110-550-4083-450	CK05-004 475 South St. - Edwards Ave.	1,400	13,000	130,000	144,400
110-550-4085-450	CK05-006 137 Prospect-495 Saus. Blvd.	1,000	16,500	137,000	154,500
		3,900	56,000	502,000	561,900
	I & I Mitigations Phase 1				
110-550-4062-450	CK04-007 Grease Interceptor-Spinnaker	1,000	3,000	16,000	20,000
110-550-4062-450	CK04-008 Spinnaker Main	1,000	6,000	28,000	35,000
110-550-4063-450	CK06-001 Gate 5 Road	1,000	15,000	64,000	80,000
110-550-4087-450		3,000	24,000	108,000	135,000
		3,000	113,000	782,000	898,000
	Waterfront Projects (CK08-002)				
110-550-4094-450	CK04-001 Alex Ave. Main (@Beach)	3,000	113,000	782,000	898,000
110-550-4056-450	CK05-007 Alexander Ave. Force Main				
110-550-4086-450	CK04-002 Bridgeway (Valley to Main)	5,000	60,000	570,000	635,000
110-550-4057-450	4th Street (Valley to Main Street)				
		5,000	60,000	570,000	635,000
	Sewer Rehab Projects				
110-550-4093-450	CK08-001 Sanitary Sewer Rehab Project-Incl:				
	33 Toyon Ln. to 69 Woodward Ave.				
	MLK Park (Bldg #2 Lateral)				
	Harbor Drive (Gate 5 Rd. - East to end of Street)	5,000	60,000	60,000	75,000
	Pump Station Projects				
110-550-4091-450	CK06-005 Rehab Anchor St. Pump Station	7,500	7,500	154,800	172,000
110-550-4090-450	CK06-004 Pump Station Upgrade (Whiskey Springs)	200	17,000	214,800	247,000
		7,700	24,500	2,638,800	2,993,900
	Total Sewer CIP	26,600	328,500		

Note:
Internal Costs charged by PW-Engineering staff to CIP projects.

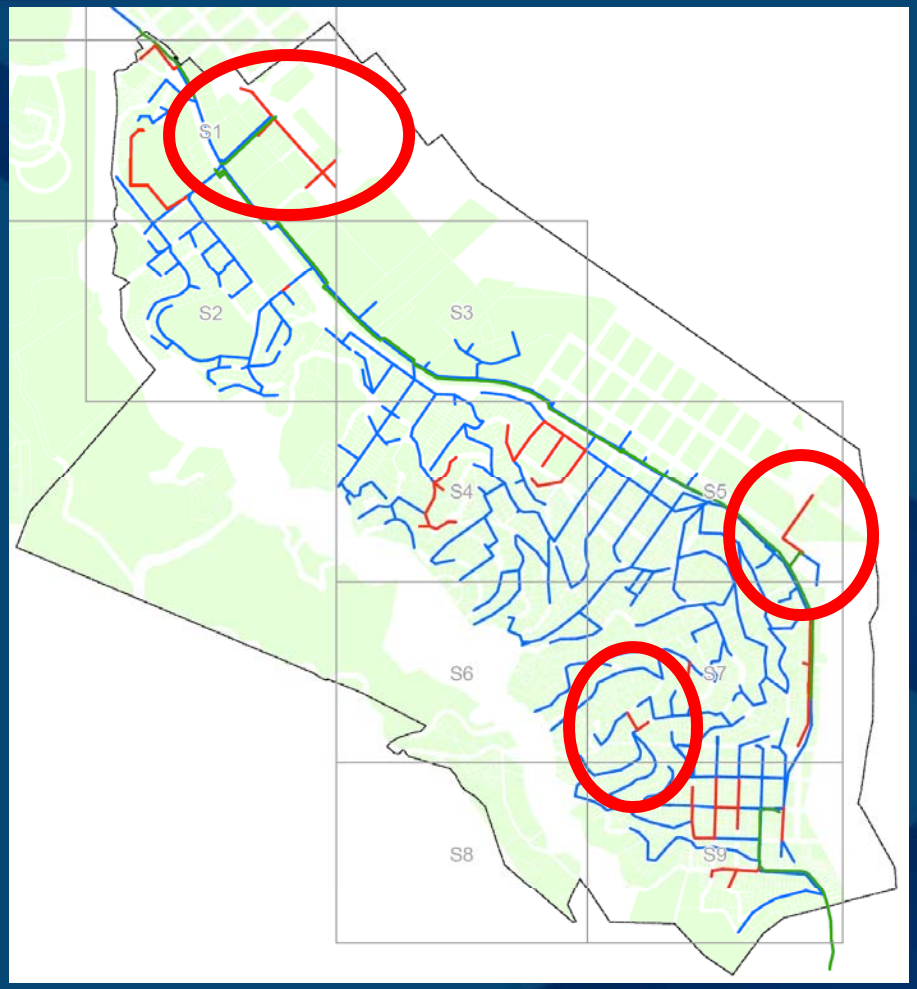
- 17 projects were identified in the budget
- Goal is to reduce I/I ~ Redefine, evaluate, prioritize
- Recommend additional projects if beneficial to City
- Develop 5-year CIP

Summary of Findings



- Projects located throughout City
- Highest I/I issues were close to the Bay
  - Settlement (bay mud)
  - High groundwater (tidal)

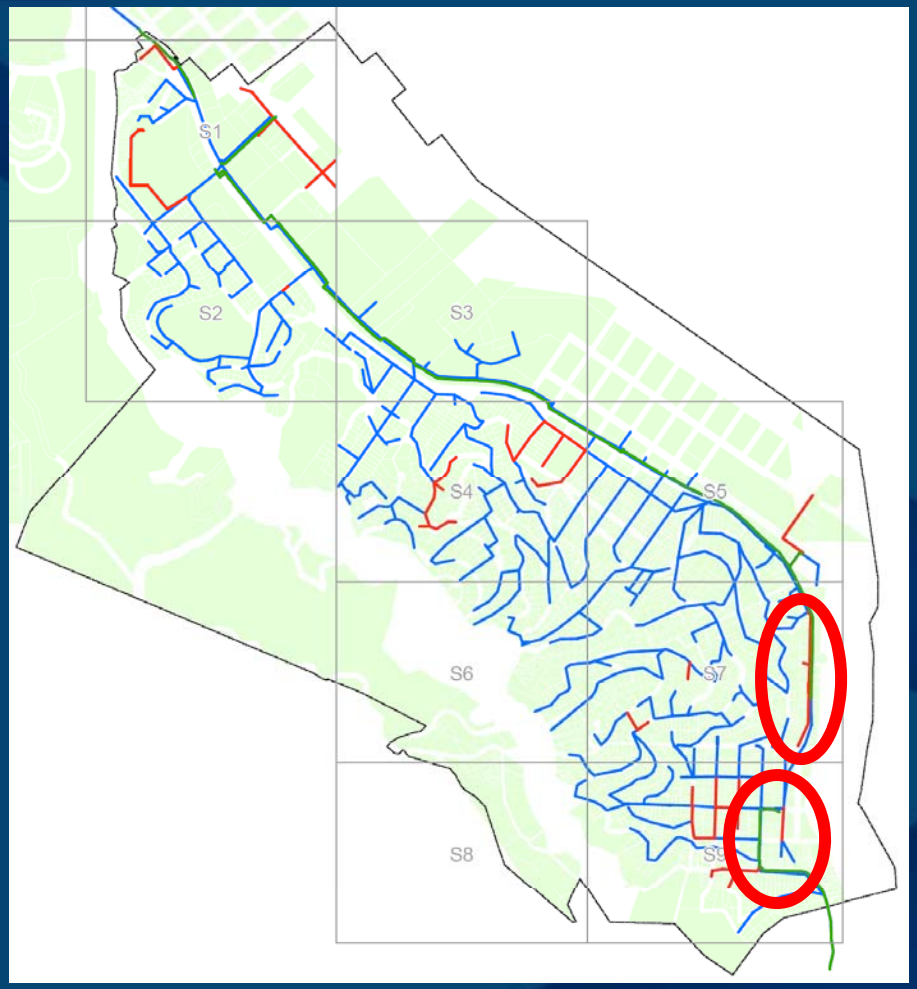
Summary of Findings



Priority 1 Projects

- Known I/I and maintenance issues
- Straightforward to implement
- Other project drivers (Prospect Avenue Stairway)

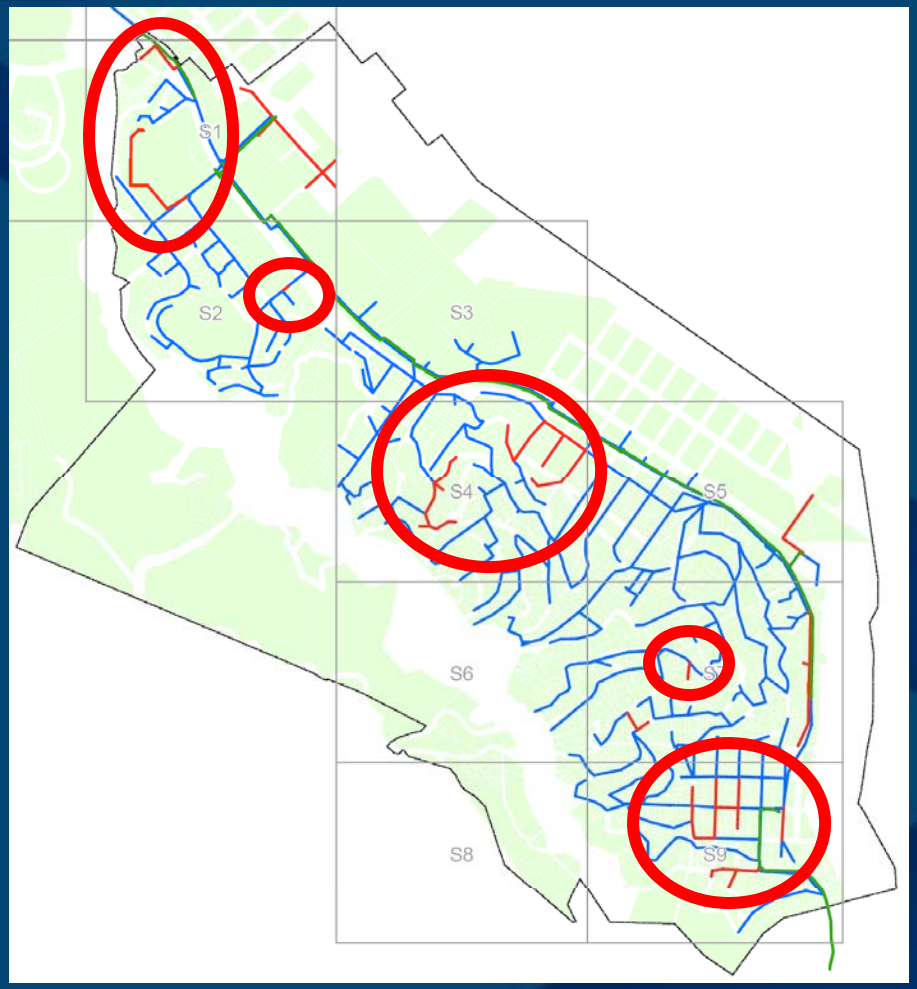
Summary of Findings



Priority 2 Projects

- Known I/I and maintenance issues
- Complex environmental issues cause projects to be deferred

Summary of Findings



Priority 3 Projects

- Known maintenance issues
- I/I reduction is not the primary driver

Project 1a – Gate 5 Road

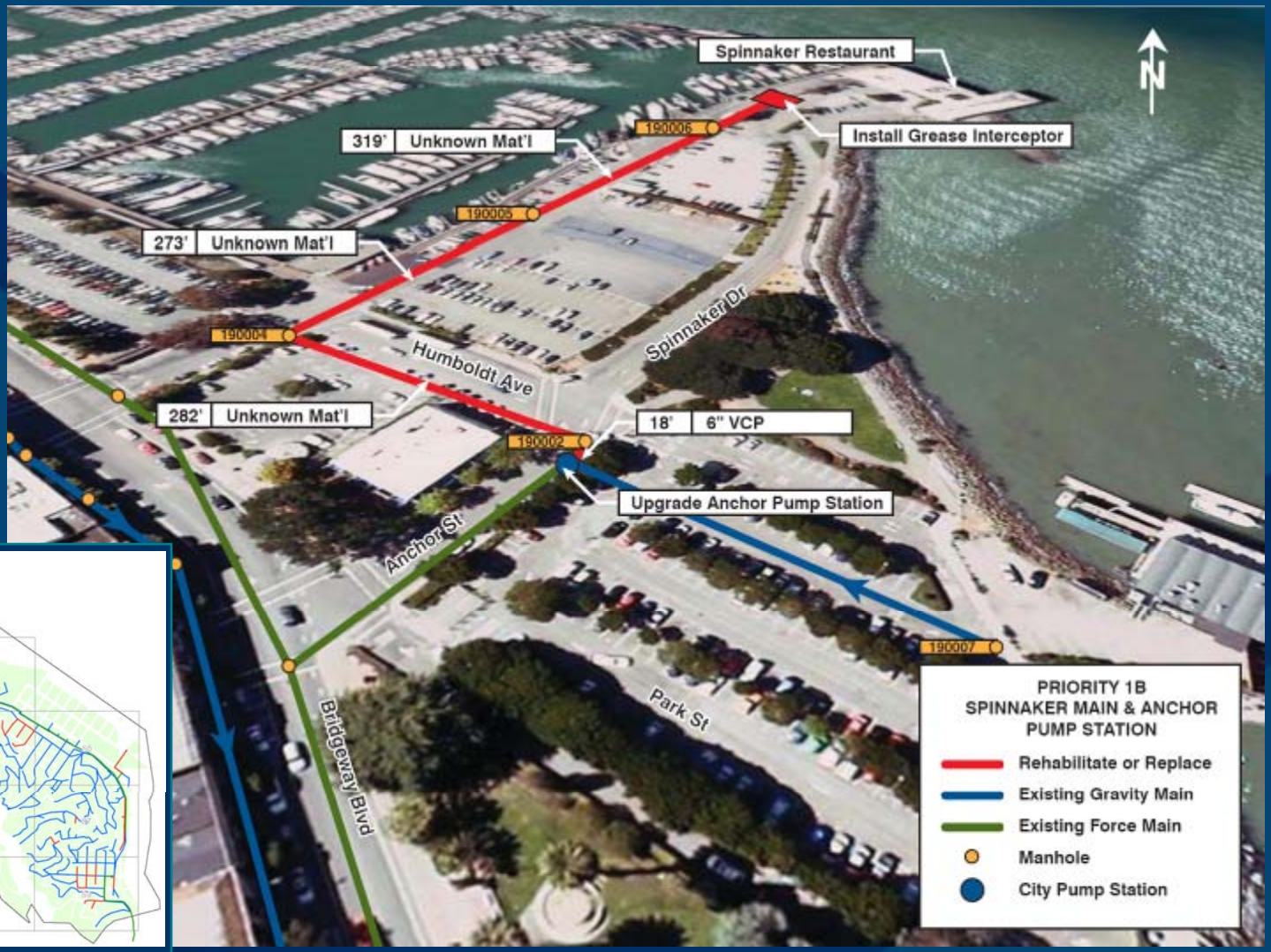
Project 1a – Gate 5 Road

Project Drivers: Infiltration and Inflow

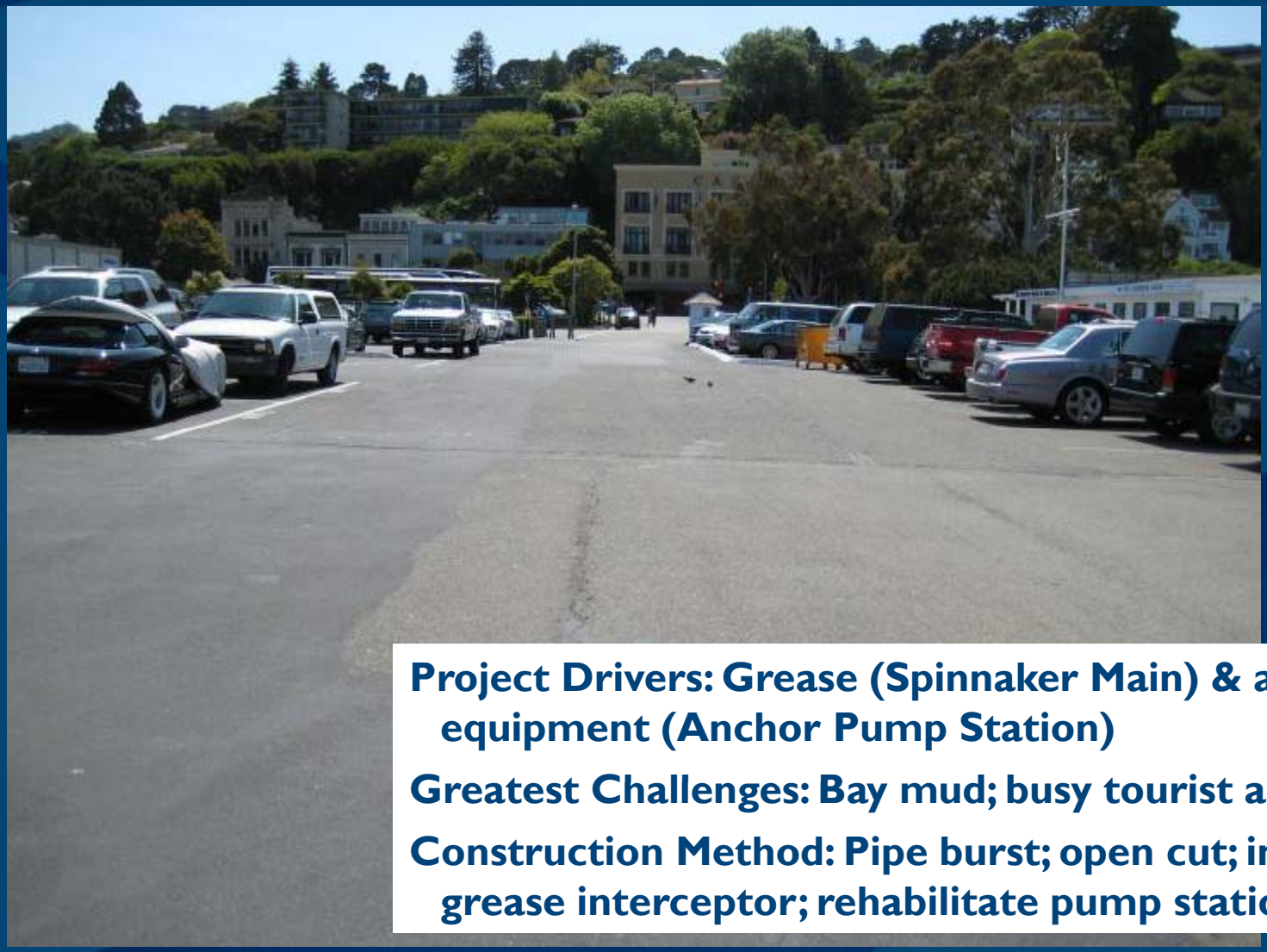
Greatest Challenges: Bay mud; groundwater

Construction Methods: Pipe burst; open cut

Project 1b – Spinnaker Main & Anchor Pump Station



Project 1b – Spinnaker Main & Anchor Pump Station



Project Drivers: Grease (Spinnaker Main) & aging equipment (Anchor Pump Station)

Greatest Challenges: Bay mud; busy tourist area

Construction Method: Pipe burst; open cut; install grease interceptor; rehabilitate pump station

Project 1c – Prospect Avenue

Project 1c – Prospect Avenue

Project Drivers: Maintenance issues; coordination with stairway project

Greatest Challenges: Construction access; steep hill; established trees; private property

Construction Methods: Consider cured in place pipe

Project 2a – Bridgeway Waterfront

Project 2a – Bridgeway Waterfront

Project Drivers: Infiltration and Inflow

Greatest Challenges: Primary transportation corridor; hard rock

Construction Methods: Open cut

Project 2b – Bridgeway Valley to Main

+ Alexander Avenue Projects

Project 2b – Bridgeway Valley to Main

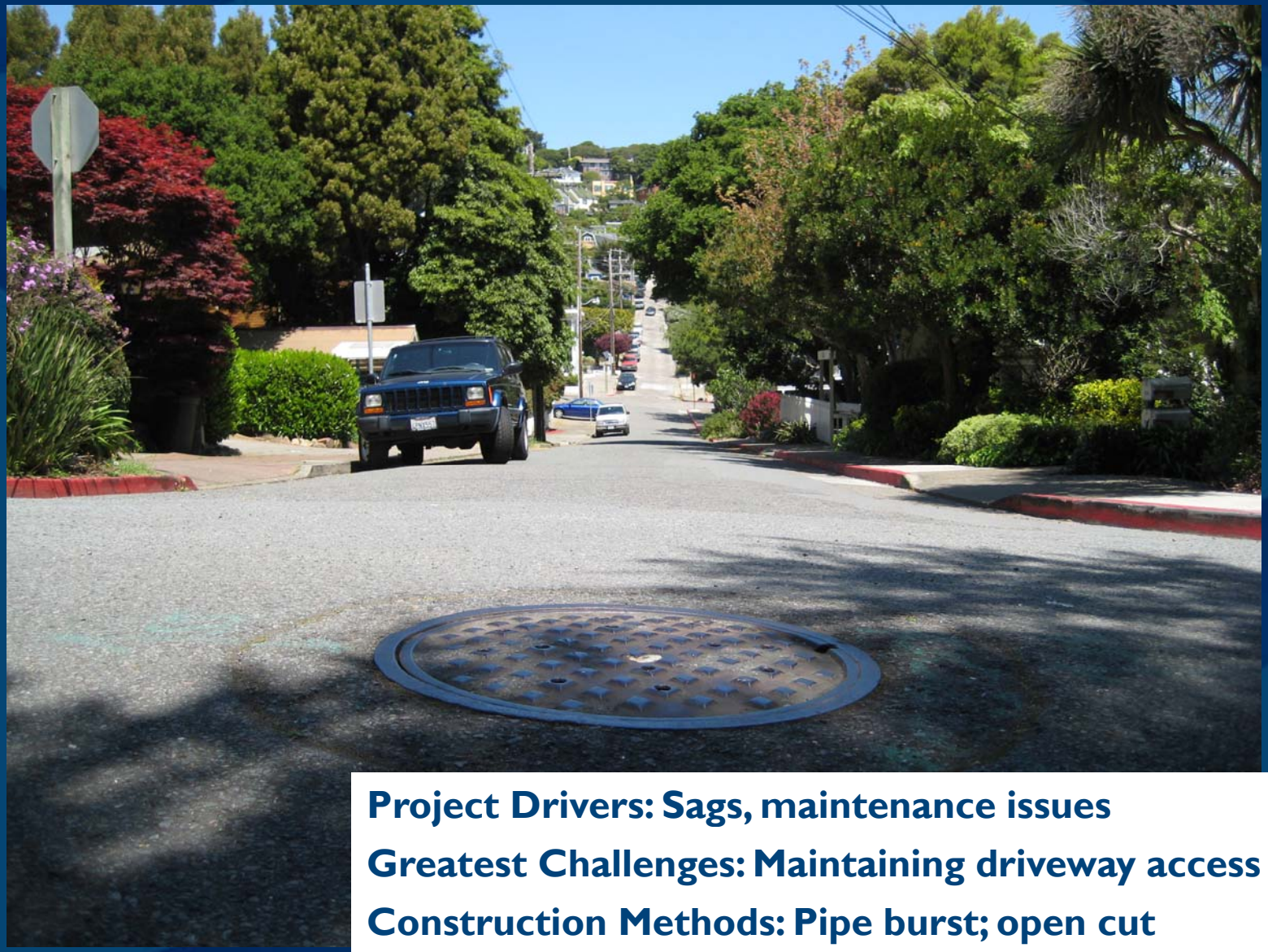
Project Drivers: Infiltration and Inflow

Greatest Challenges: Within tidal zone

Construction Methods: Open cut with watertight shoring

Project 3a – Hurricane Gulch

Project 3a – Hurricane Gulch



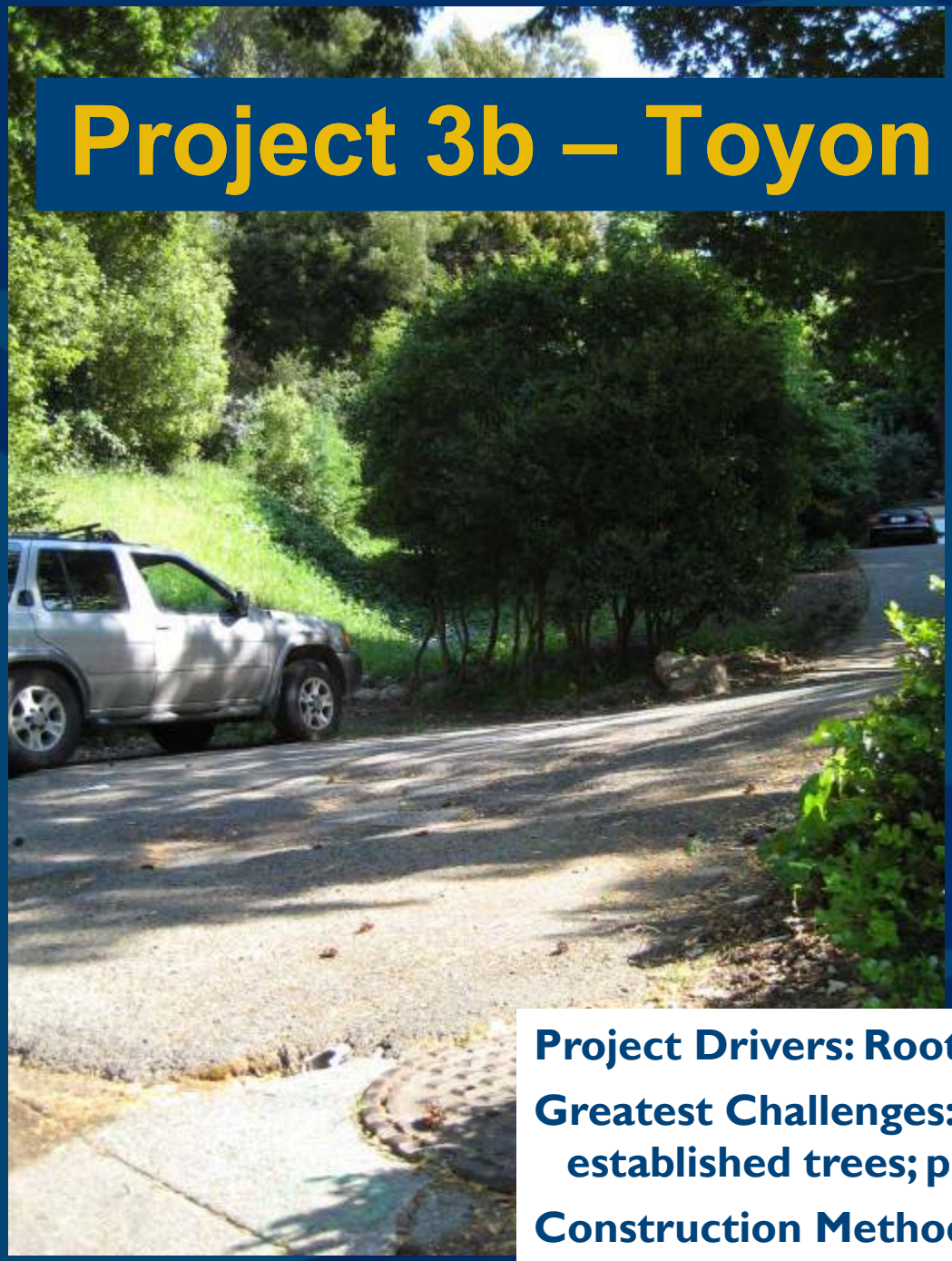
Project Drivers: Sags, maintenance issues

Greatest Challenges: Maintaining driveway access

Construction Methods: Pipe burst; open cut

Project 3b – Toyon to Woodward

Project 3b – Toyon to Woodward

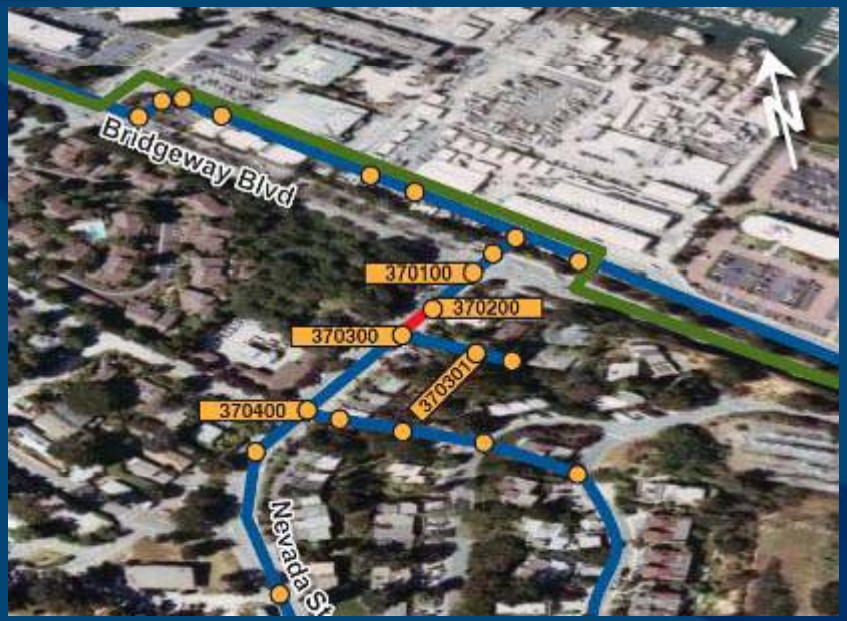


Project Drivers: Roots, maintenance issues

Greatest Challenges: Construction access; steep hill; established trees; private property

Construction Methods: Consider cured in place pipe

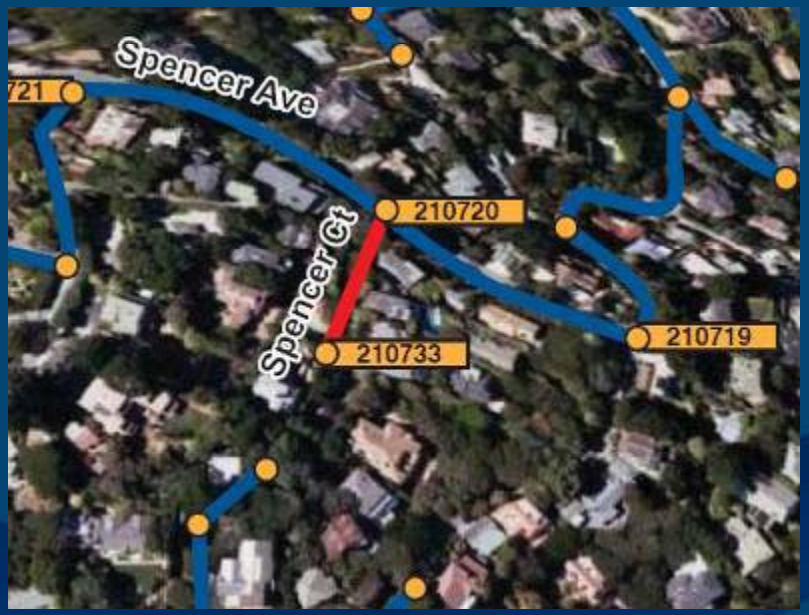
Project 3d – MLK Jr. Park / Bridgeway North



+ Whiskey Springs Pump Station

Project 3c - 517 Nevada

Project 3e – Napa & Bee Park Streets



Project 3f – Spencer Court

Project Drivers: Maintenance issues

Greatest Challenges: Similar to earlier projects

Construction Methods: Pipe burst; open cut

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Estimated Project Costs

Priority	Project Name	Estimated Cost
1a	Gate 5 Road	$900,000
1b	Spinnaker & Anchor PS	$565,000
1c	Prospect Avenue	$160,000
2a	Bridgeway Waterfront	$690,000
2b	Alexander Ave / Bridgeway	$985,000
3a	Hurricane Gulch	$975,000
3b	Toyon Lane to Woodward	$570,000
3c and 3d	517 Nevada, MLK, Bridgeway No.	$940,000
3e and 3f	Napa, Bee Park, Spencer Ct.	$1,520,000
Future	Whiskey Springs PS	$335,000
	Total	$7,640,000

Estimated Project Costs

Table 2. City of Sausalito Priority Sewer Projects 5-Year Capital Improvement Plan

City CIP #	Priority	Project Name	Estimated Cost [1]	FY08/09	FY09/10	FY10/11	FY11/12	FY12/13
See below	1a	Gate 5 Road	$900,000	$450,000	$450,000			
See below	1b	Spinnaker Main and Grease Interceptor, Anchor PS	$565,000		$282,500	$282,500		
CK05-006	1c	Prospect Ave to Sausalito Blvd	$160,000	$160,000				
New	2a	Bridgeway Waterfront	$690,000			$345,000	$345,000	
See below	2b & 2c	Alexander Ave FM & Bridgeway Valley to Main	$985,000		$985,000			
See below	3a	Hurricane Gulch	$975,000			$975,000		
CK08-001 (partial)	3b	Toyon Lane to Woodward Ave	$570,000			$142,500	$427,500	
See below	3c & 3d	Nevada St, MLK Lateral No. 2, Bridgeway North	$940,000				$313,333	$626,667
New	3e & 3f	Napa St., Bee Park St., Spencer Court	$1,520,000				$304,000	$1,216,000
CK06-004	Future	Whiskey Springs Pump Station	$335,000				$335,000	
Total			$7,640,000	$610,000	$1,717,500	$1,745,000	$1,724,833	$1,842,667

[1] Costs based on ENR CCI, San Francisco, Dec 2008 include 30% design contingency, engineering, construction management, and administration.

Estimated Project Costs

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CK06-004	Future	Whiskey Springs Pump S[illegible]	$335,000				$335,000	
		Total	$7,640,000	$610,000	$1,717,500	$1,745,000	$1,724,833	$1,842,667

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City of Sausalito Priority 1 Sewers project

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Rehabilitation Methods

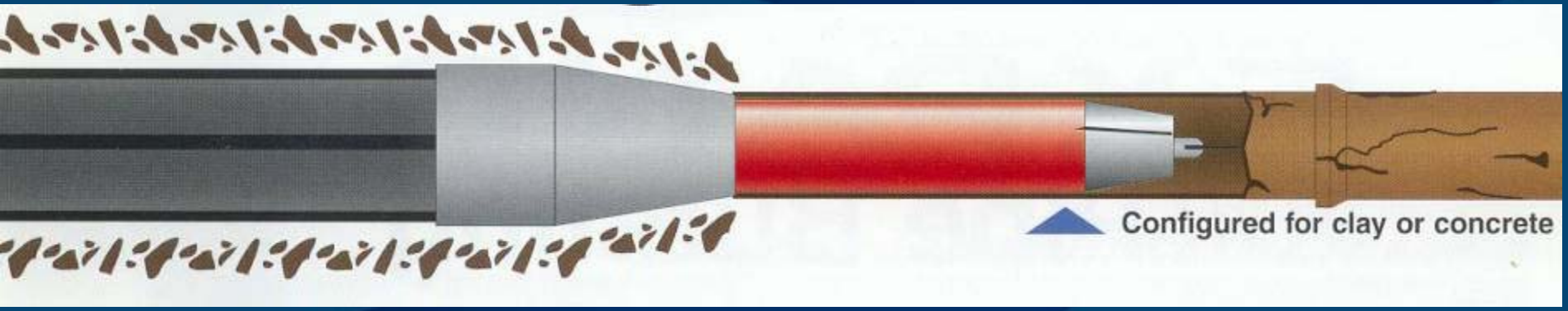
- Open Cut
- Pipe Bursting
- Cured in Place Pipe
- Close Fitting Liners

Rehabilitation Methods
Open Cut

- Dig trench
- Install shoring & dewatering
- Install pipe and connect laterals
- Backfill and compact
- Repave

Rehabilitation Methods
Pipe Bursting

- Excavate insertion pit
- Excavate and restore all laterals
- Bypass flow
- Pull bursting head through existing pipe followed by new HDPE pipe
- Seal manhole penetrations
- Restore flow



Rehabilitation Methods Cured in Place Pipe

- Bypass flow
- Insert liner
- Invert liner with water or air
- Cure water with water or steam
- Connect laterals (from inside pipe)
- Restore flows

Rehabilitation Methods Close Fitting Liners

- Bypass flow
- Insert liner
- Invert liner with water or steam
- Connect laterals (from inside pipe)
- Restore flows

Trenchless Construction Methods Horizontal Directional Drill

- Drill, ream, and pull HDPE pipe string into place
- Good for small diameter pipes
- Can install up to 3,000 feet
- Not considered in initial evaluation due to cost (2x to 3x other methods)

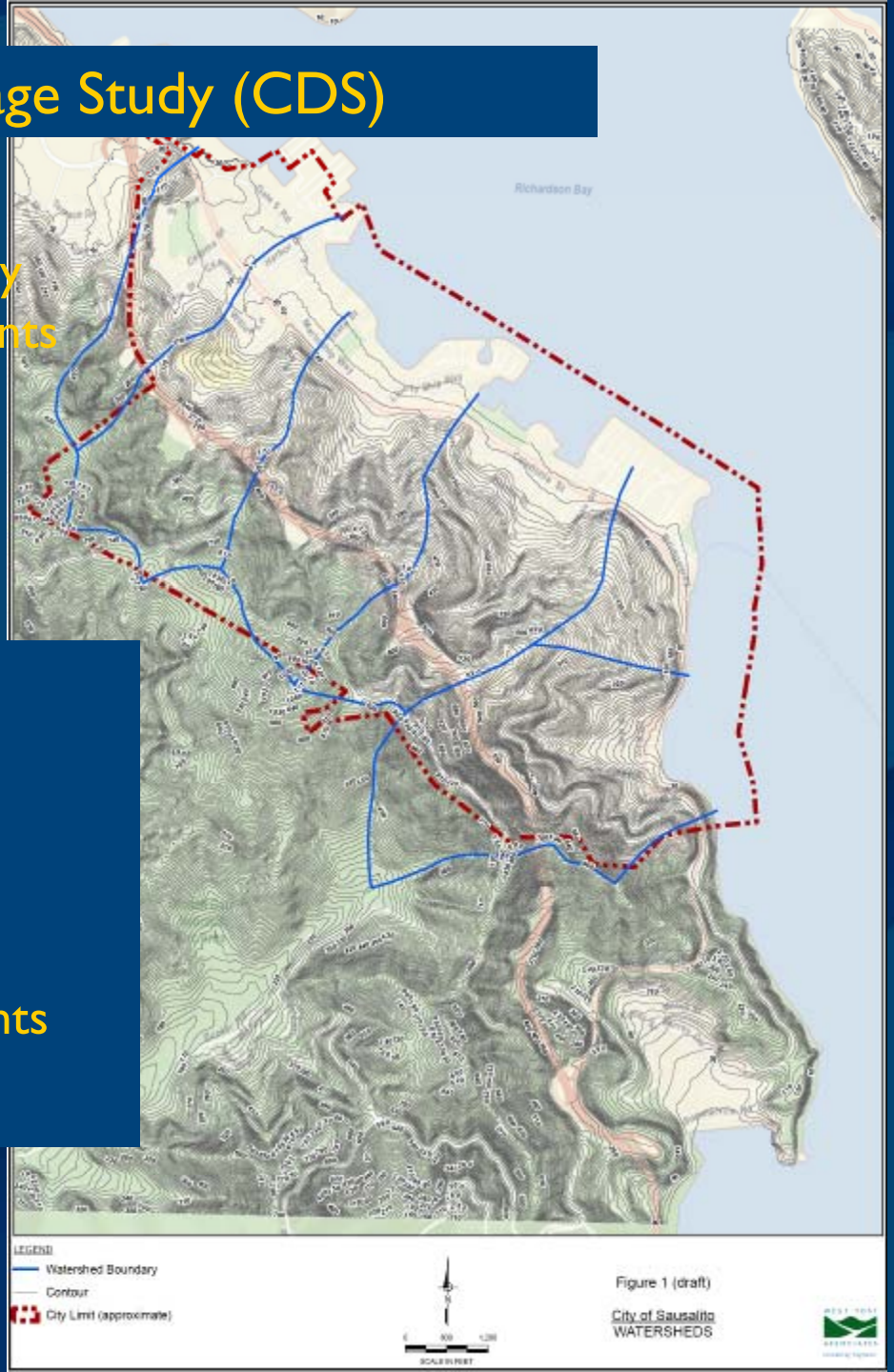
Next Steps

- Design and construct Priority 1 projects
- Initiate design of Priority 2 projects
- Complete documentation for SRF loan funding / economic stimulus
- Be “shovel ready”
- Consider similar studies and risk-based prioritization for remainder of sewer system

City of Sausalito Conceptual Drainage Study (CDS)

Goal: Provide information needed to apply for funding for stormwater improvements

Budget: $30,000

Tasks:

- Review existing information
- Perform hydraulic modeling for two watersheds
- Recommend flood control improvements
- Provide planning level cost estimates