

Technical Memorandum

Update to Flow Scenarios TM

Subject: Update to Flow Scenarios TM

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Date: March 9, 2006

Reference:

1 Purpose

The purpose of this Technical Memorandum (TM) is to update the attached Flow Scenarios TM dated December 2005 and submitted as part of the Administrative Draft Stream Management Master Plan (ADSMMP). The previous TM is attached to this appendix.

2 Updates

Updates to Figure 3 on page F-8 of the Flow Scenarios TM are required based on recent communications with the City of Pleasanton (City). This figure currently shows the floodplain on the Del Prado neighborhood area. As discussed in Chapter 1 and Chapter 3, the FEMA floodplain used to cover parts of the Valley Trails and Del Prado neighborhoods. Based on an August 2005 LOMR approved by FEMA, the Valley Trails neighborhood was removed from the floodplain. Additional LOMAs have also been recently submitted by property owners in the Del Prado neighborhood. These LOMAs have been approved by FEMA and the Del Prado floodplain shown in Figure 3 (see page F-8) will be removed in the next FIRM. A figure depicting this change is shown below.



¹The area of Pleasanton located within the dotted yellow line will be removed from the 100-year event FEMA floodplain due to recently filed LOMAs not yet reflected in the FEMA floodplain map (City of Pleasanton, February 2006).

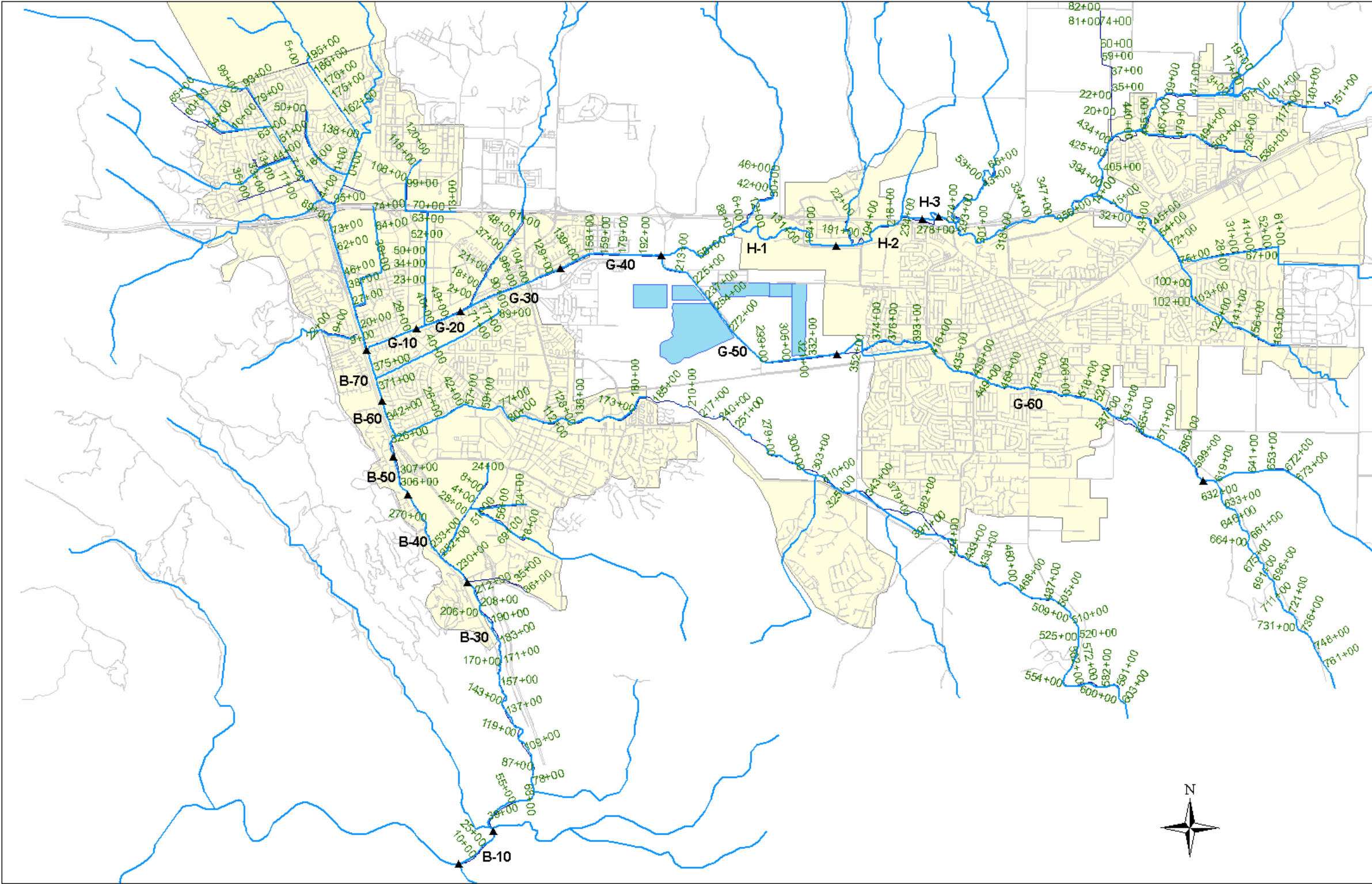
Appendix F Flow Scenarios

As discussed in Section 4 (Regional Storage at Chain of Lakes), flows were estimated to represent channel hydraulic conditions under three scenarios: the No Project, Green Book, and SMMP scenarios. Flows were based on multiple studies summarizing hydrologic and hydraulic modeling results conducted by Schaaf & Wheeler (S&W 2000) and West Yost & Associates (WYA 2001b). These studies utilized Zone 7's reach delineation of their flood control channels to present their results. This reach delineation is listed in Table 1 and shown in Figure 1.

Table 1: Zone 7 Flood Control Channel Reach Delineation

Stream	Reach Number	Stationing	Approximate Location
Arroyo las Positas	H-3	STA 227+00 to 208+00	From Portola Avenue (downstream of the confluence with Cayetano Creek) to East Airway Boulevard
	H-2	STA 208+00 to 92+00	From Reach H-3 to Airway Boulevard (immediately downstream of the confluence with Collier Canyon Creek)
	H-1	STA 92+00 to 00+00	From Reach H-2 to the confluence with Arroyo Mocho
Arroyo Mocho	G-60	STA 620+00 to 350+00	From Mines Road to Stanley Boulevard (near the crossing with Isabel Avenue)
	G-50	STA 350+00 to 177+00	From Reach G-60 to the confluence with Arroyo las Positas
	G-40	STA 177+00 to 150+00	From the confluence with Arroyo las Positas to Garden Court (upstream of the Santa Rita Road crossing)
	G-30	STA 150+00 to 70+00	From Reach G-30 to Harvey Court (immediately downstream of the confluence with Tassajara Creek)
	G-20	STA 70+00 to 40+00	From Reach G-20 to Arthur Drive (immediately downstream of the confluence with Chabot Canal and upstream of the Hopyard Road crossing)
	G-10	STA 40+00 to 00+00	From Reach G-20 to the confluence with ADLL
Alamo Canal	F-10	STA 11+00 to 00+00	From Siesta Court to its confluence with ADLL
Arroyo de la Laguna	B-70	STA 392+00 to 373+00	From its confluence with Arroyo Mocho to Grand Canyon Court (in the Valley Trails neighborhood)
	B-60	STA 373+00 to 335+00	From Reach B-70 to Tapestry Way (immediately downstream of it's the confluence with Arroyo del Valle)
	B-50	STA 335+00 to 308+00	From Reach B-60 to Arroyo Drive
	B-40	STA 308+00 to 238+00	From Reach B-50 to Happy Valley Road (immediately downstream of Castlewood Drive)
	B-30	STA 238+00 to 32+00	From Reach B-40 to its confluence with Sinbad Creek
	B-10	STA 32+00 to 00+00	From Reach B-10 to its confluence with Alameda Creek

Figure 1: Zone 7 Flood Control Channel Reaches



A discussion of assumptions taken under each scenario and estimated flows follows.

F.1 No Project Scenario

In this case, flows were estimated assuming a 100-year flood event under future build-out development conditions. In addition, it was assumed that flood control channels would remain unchanged and therefore the channels would maintain their current conveyance capacities. Conveyance capacities were obtained from an Issue Paper developed by West Yost & Associates and dated March 2002 (WYA 2002b). This Issue Paper has been attached to the CD accompanying this report.

Estimated flows under this scenario are listed in Table 2. Flows were estimated from 100-year peak design flows developed by Schaaf & Wheeler (S&W, 2000) in combination with existing channel capacities identified by West Yost & Associates (WYA 2002b). Both of these studies can be found in the attached CD.

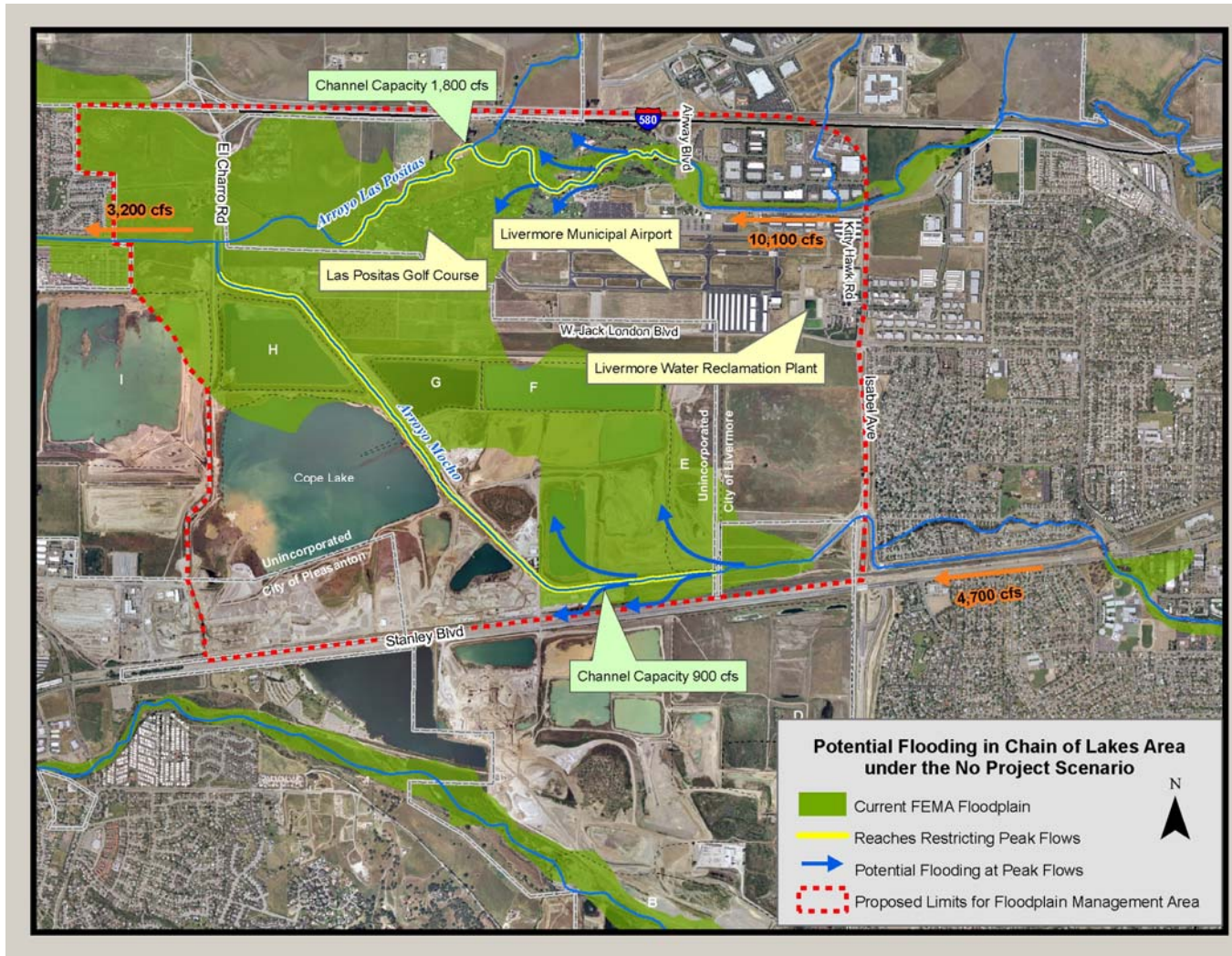
Table 2: No Project Scenario 100-Year Flows

Stream	Reach	Existing Channel Capacities ¹ (cfs)	100-Year Peak Design Flows ² (cfs)	"No Project" Scenario Flows (cfs)
Arroyo las Positas	H-3		9,000	9,000
	H-2	1,800	9,600	1,800
	H-1		10,100	2,300
Arroyo Mocho	G-60		4,700	4,700
	G-50	900	4,700	900
	G-40		12,700	3,200
	G-30	16,200	13,100	3,600
	G-20		16,500	7,700
	G-10	18,200	16,900	8,100
Alamo Canal	F-10	8,500	9,000	6,500 ³
Arroyo de la Laguna	B-70		23,400	14,600
	B-60	19,600	23,400	16,200
	B-50	18,730	25,500	18,600
	B-40		25,800	18,900
	B-30		26,100	19,200
	B-10		27,000	20,100
¹ WYA, 2002b ² S&W, 2000 ³ The peak 100-year design flow when Alamo Canal is at its peak is 9,000 cfs (Shaaf & Wheeler, June 2000). However, when Arroyo Mocho (Reach G-10) is at its peak, flows at Alamo Canal are 6,500 cfs.				

As shown in Table 2 and Figure 2, both Arroyo Mocho (at Reach G-50) and Arroyo las Positas (at Reach H-1) are currently under capacity. As a result, the 100-year peak design flows through these reaches will overtop the channel banks onto the floodplain. The current FEMA 100-year floodplain shown in Figure 2 may therefore expand beyond its current boundaries to potentially cover the Livermore Municipal Airport, Las Positas Golf Course, Livermore Water Reclamation Plant and properties along Stanley Boulevard.

It is important to note that the “No Project” Scenario flows were not modeled. Instead, it was assumed that the channels had a similar hydrograph resulting in peaks occurring concurrently. As a result, the downstream flows were calculated by adding peak flows from upstream tributaries plus runoff from the subwatershed draining into that reach. This methodology represents a conservative estimate since peaks were assumed to occur concurrently.

Figure 2: No Project Scenario Flows at the Chain of Lakes Area



F.2 Green Book Scenario

Under this scenario, flood control channels (with the exception of ADLL below the Bernal Avenue Bridge crossing) were assumed to be improved to Green Book standards. As a result, the channel's conveyance capacity was assumed to be improved to convey 100-year peak design flows under future build-out development conditions. These flows were obtained from the hydrologic analysis conducted by Schaaf & Wheeler (S&W 2000).

ADLL, from Bernal Avenue to its confluence with Alameda Creek was assumed to retain its current channel capacity (18,730 cfs). ADLL's channel capacity at the Bernal Avenue Bridge crossing was obtained from hydraulic modeling conducted by West Yost & Associates and later modified by RMC. A detailed discussion of the modeling conducted is provided in a Technical Memorandum (TM) (Hydraulic Analysis TM) developed by RMC and attached in Appendix D.

Estimated flows are listed in Table 3.

Table 3: Green Book Scenario 100-Year Flows

Stream	Reach	Existing Channel Capacities ¹ (cfs)	100-Year Peak Design Flows ² (cfs)	Green Book Capacities ² (cfs)	Green Book Scenario Flows (cfs)
Arroyo las Positas	H-3		9,000		9,000
	H-2	1,800	9,600	9,600	9,600
	H-1		10,100		10,100
Arroyo Mocho	G-60		4,700		4,700
	G-50	900	4,700	4,700	4,700
	G-40		12,700		12,700
	G-30	16,200	13,100		13,100
	G-20		16,500		16,500
	G-10	18,200	16,900		16,900
Alamo Canal	F-10	8,500	6,500		6,500
Arroyo de la Laguna	B-70		23,400		23,400
	B-60	19,600	23,400		23,400
	B-50	18,730	25,500		25,500
	B-40		25,800		-
	B-30		26,100		-
	B-10		27,000		-
¹ WYA, March 2002					
² S&W, June 2000					

As shown in Table 3, Arroyo las Positas and Arroyo Mocho were assumed to be improved to convey the 100-year peak design flows. As a result, 100-year flows would be fully conveyed through the channels up to the Bernal Avenue Bridge crossing.

As shown in Figure 3, the upstream reaches of ADLL (Reach B-60 and B-70) would be impacted from backwater effects caused by lower ADLL's capacity constraints (18,730 cfs) when compared to the expected 100-year peak design flows (25,500 cfs). This backwater would in turn impact Pleasanton Canal causing it to back up and pond to elevations greater than the canal's design depth (WYA, November 2001). The backwater would also impact the lower reaches of Arroyo Mocho causing it to

overtop from its confluence with ADLL to approximately 1,800 feet downstream of the Stoneridge Drive crossing. Backwater in Arroyo Mocho would in turn affect runoff from the Chabot Canal causing it to overtop, as shown in Figure 5 (WYA, November 2001). This scenario was modeled by West Yost & Associates under the title “Alternative 3A”. Hydraulic profiles showing water surface elevations for ADLL and lower Arroyo Mocho are shown in Figure 4. A detailed discussion of this scenario can be found in the WYA November 2001 report. An electronic copy of this report has been included in the accompanying CD.

Figure 3: Green Book Scenario 100-Year Flows at ADLL and Lower Arroyo Mocho

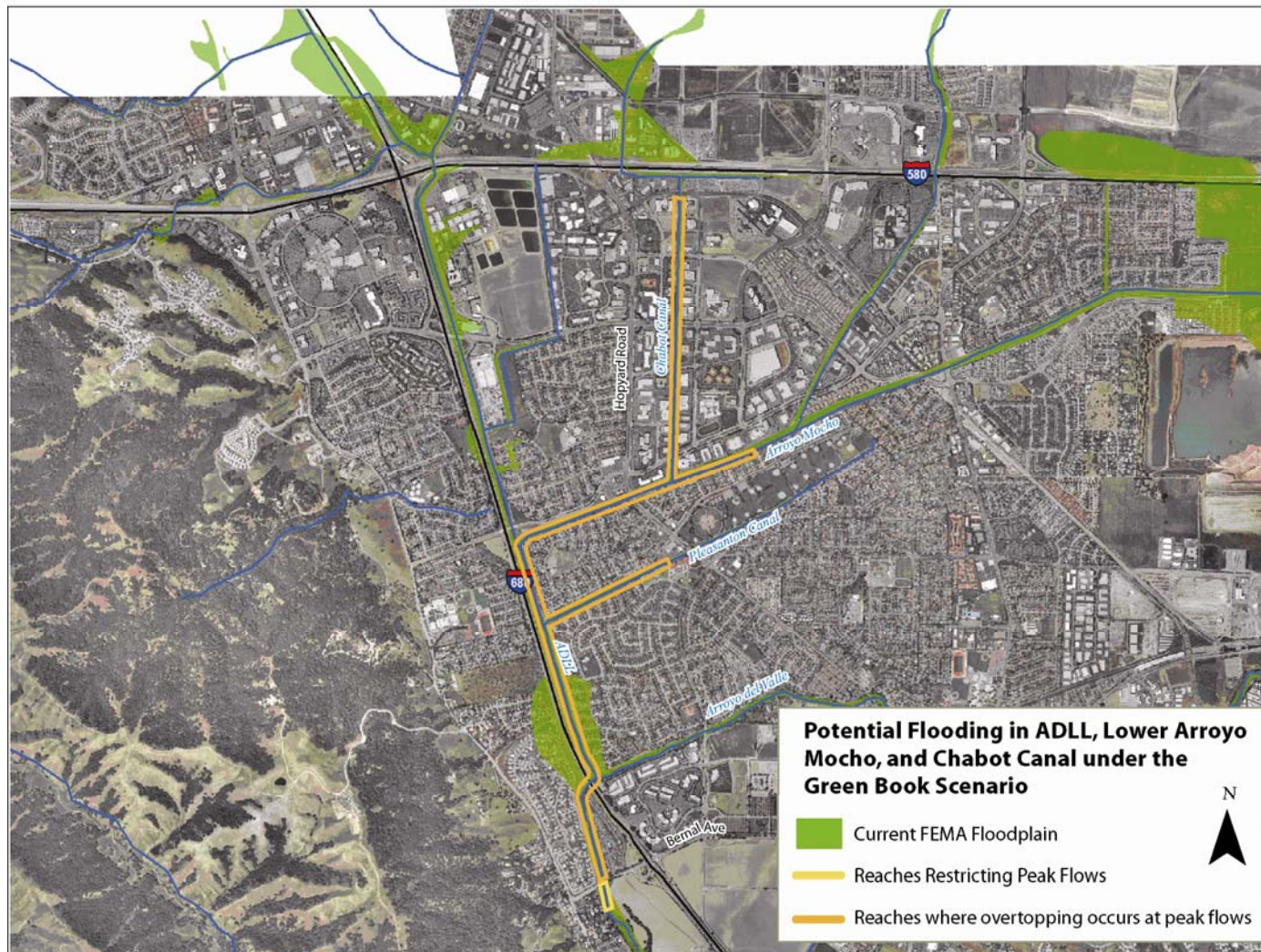


Figure 4: Green Book Scenario Hydraulic Profile for ADLL and lower Arroyo Mocho

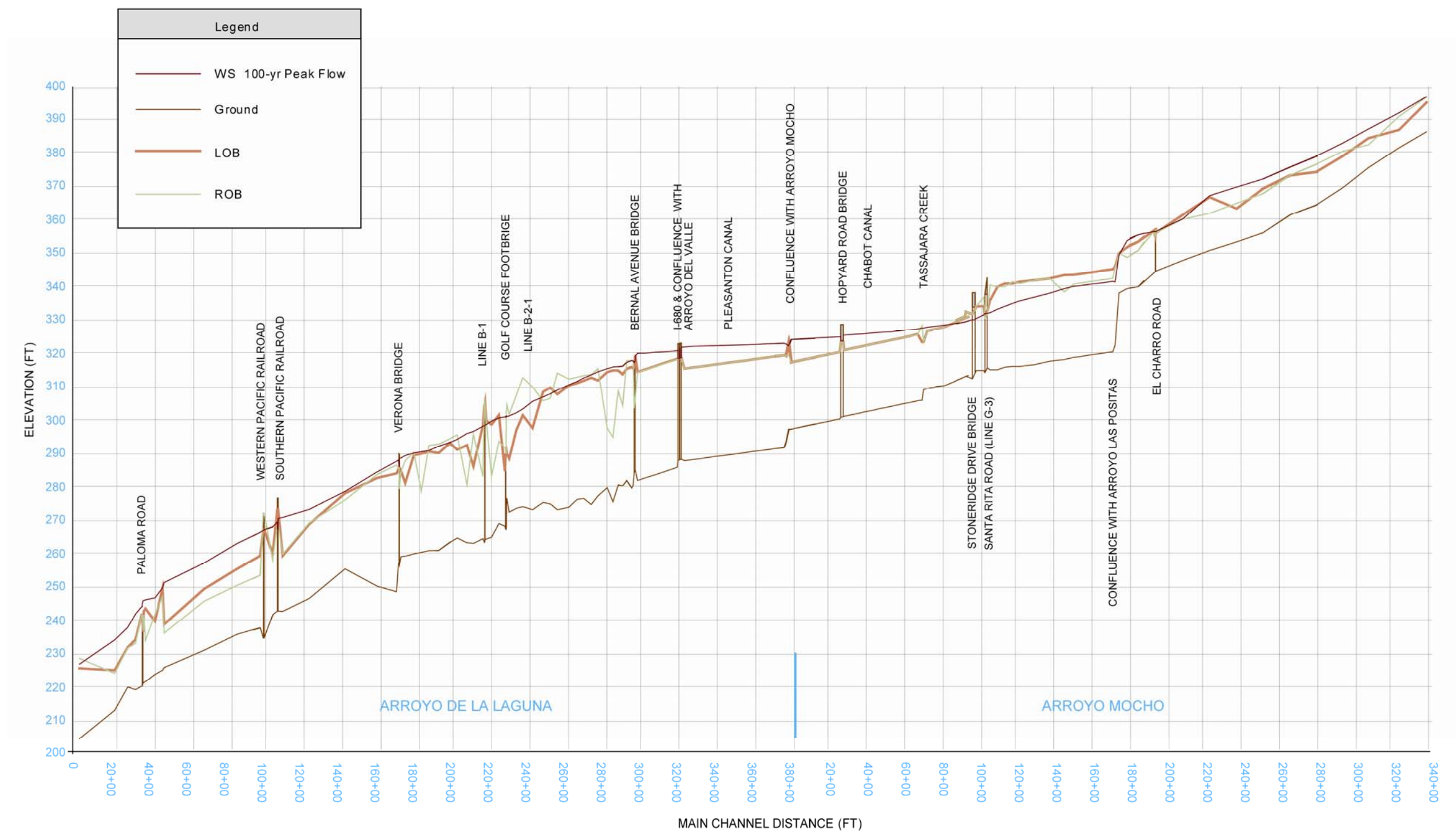
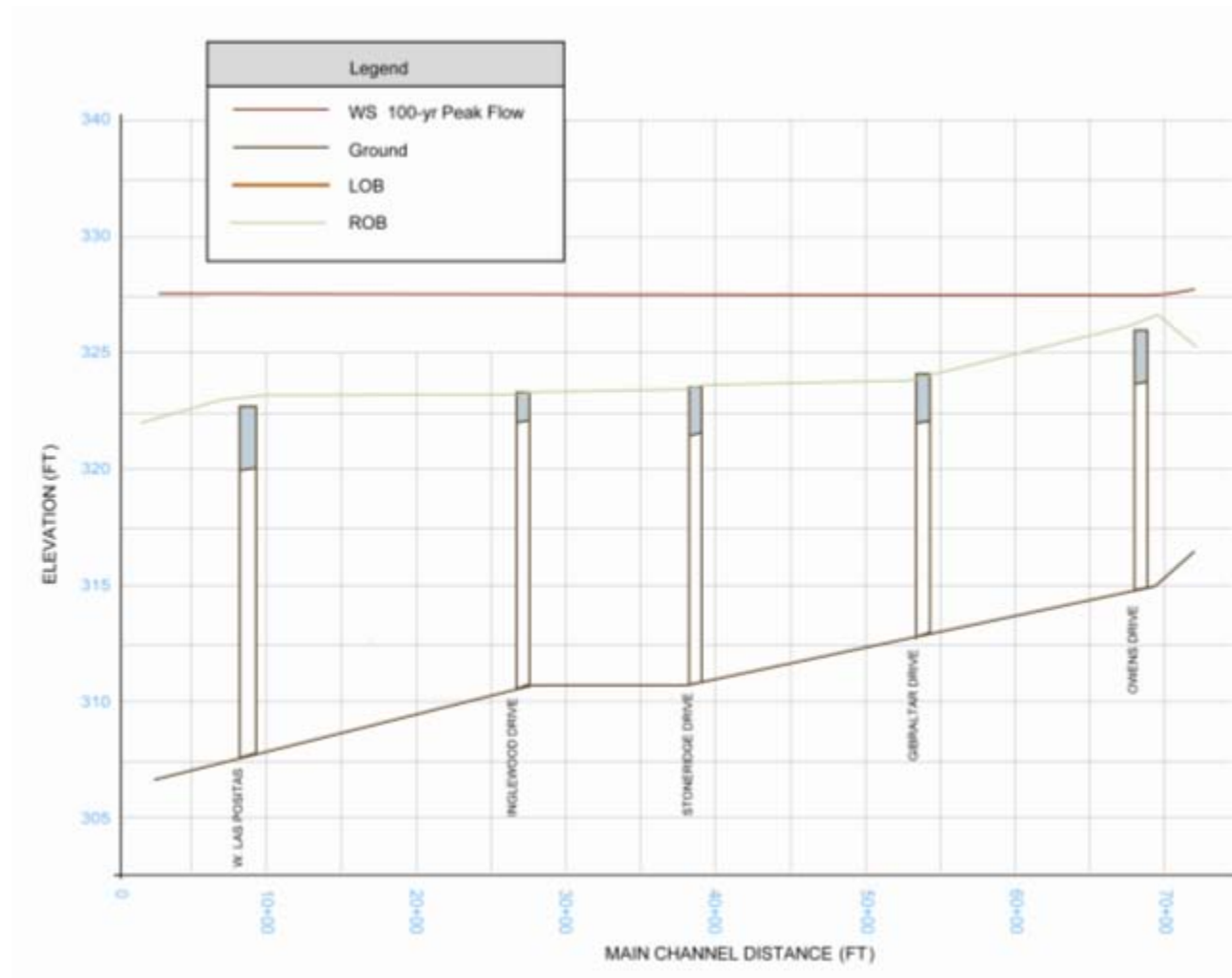


Figure 5: Green Book Scenario Chabot Canal Hydraulic Profile When Arroyo Mocho is at Peak Flows



F.3 SMMP Scenario

Under this scenario, channels were assumed to be improved to SMMP recommendations and future build-out 100-year flows were assumed to be retained at the Chain of Lakes. This scenario was discussed in detail in Section 4. Estimated flows are listed in Table 4 and shown in Figure 6.

Table 4: SMMP Scenario 100-Year Flows

Stream	Reach	SMMP Channel Capacities (cfs)	100-Year Peak Design Flows ¹ (cfs)	SMMP Diversion Flows (cfs)	SMMP Scenario Flows (cfs)
Arroyo las Positas	H-3		9,000		9,000
	H-2		9,600		9,600
	H-1	10,100	10,100	6,400 to 8,700	1,400 to 3,700
Arroyo Mocho	G-60		4,700		4,700
	G-50	1,300	4,700	3,400	1,300
	G-40		12,700		2,000 to 5,000
	G-30		13,100		3,300
	G-20		16,500		7,000
	G-10		16,900		7,800
Alamo Canal	F-10		6,500		6,500
Arroyo de la Laguna	B-70		23,400		16,290
	B-60		23,400		16,310
	B-50	18,730	25,500		18,730
	B-40		25,800		19,030
	B-30		26,100		19,330
	B-10		27,000		20,230
¹ S&W 2000					

The SMMP Scenario flows for reaches G-50 and H-1 are based on the recommended diversion flows into the Chain of Lakes. The SMMP flows downstream of Reach G-40 represent modeled flows obtained from the West Yost & Associate's hydraulic modeling (Alternative 4) conducted to estimate flows with approximately 4,400 acre-feet of storage (WYA, November 2001). Results for this alternative, including the expected hydraulic profile for ADLL and lower Arroyo Mocho, were discussed in Chapter 4. Flows through reaches G-50 and H-1 are conservative with respect to downstream modeled flows since West Yost & Associates assumed the flows through Reach G-50 would be slightly larger (2,075 cfs) than the recommended SMMP flow (1,300 cfs).

As recommended in Chapter 4 and the Chain of Lakes regional detention projects (projects R.5-3 and R.6-2), hydrologic and hydraulic modeling should be conducted to determine flows in the channels with implementation of the Chain of Lakes Regional Storage Solution.

Figure 6: SMMP Scenario 100-Year Peak Design Flows

