Appendix F: Hazardous Materials Supporting Information

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MEMO

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From: Johnny Caspers, Ed Ballman

Date: December 3, 2020

Subject: Preliminary Hydrologic and Hydraulic Modeling for the Proposed Giovannoni Logistics Center

Introduction & Project Description

The Giovannoni project (Project) is located on a 208-acre site in the City of American Canyon. The site sits to the west of Highway 29, north of Green Island Road, and south of the developing Napa Logistics Park. The existing property consists of open space, with a total elevation variance of roughly 30 feet; two highpoints to the southeast and southwest of the Project area slope gradually north to a seasonal wetland that discharges into No Name Creek. Along with the Project area, the creek collects runoff from roughly 280 acres of vineyards, open space and previously developed industrial land uses, the majority of which lies to the east of Highway 29.

The first phase of the Project, referred to as the Giovannoni Logistics Center East and covered herein, proposes the construction of two warehouses (gross square footage of the two buildings is roughly one million square feet) along with parking lots to accommodate semi-trucks, trailers, and worker vehicles on roughly 70 acres. The runoff from the developed area will be managed by multiple stormwater facilities on the northern side of the Property designed to meet flood control requirements set forth by the City of American Canyon Department of Public Works and stormwater treatment and flow-duration control requirements outlined in the state-wide MS4 General Permit.

Although not yet constructed, the City of American Canyon plans to extend Devlin Road from its current terminus at the southern end of the Napa Logistics Park, south to intersect with Green Island Road (see **Figure 1)**. This planned extension will serve as the western boundary for the first phase of the Project. Stormwater runoff that, prior to the construction of the road, would flow from east to west through the northern portion of the site will now be directed through four 2-ft by 4-ft concrete box culverts located beneath the roadway. A hydrologic and hydraulic analysis for the new roadway, entitled Devlin Road and Vine Trail Extension, was completed in August 2020 by GHD and will be referred to herein as the “Devlin Road Analysis”.

Purpose of the Study

This study seeks to model, assess, and outline how the changes in existing, and proposed land cover, along with the proposed construction of Devlin Road, will impact the hydrology and hydraulics of the creek directly downstream of the Project area and along the reach to its confluence with the Napa River.

Standards & Methods

In compliance with American Canyon Department of Public Works Engineering Standards and Specifications for Public Improvements (1995) where stormwater detention is utilized, Contra Costa County Flood Control (Flood Control) methodology was used to create the hydrologic model of the pre- and post-project conditions[1]. The following documents were relied upon to inform the modeling and design process:

- Engineering Standards and Specifications for Public Improvements, American Canyon Department of Public Works, May 1995.
- BASMAA Post-Construction Manual, Bay Area Stormwater Management Agencies Association, January 2019.
- HEC-HMS Guidance for Flood Control, Unit Hydrograph Method, March 2018
- HEC-HMS Template Model, Flood Control, June 2016
- HYDRO-6 Program Parameters, Flood Control, March 2018
- Mean Seasonal Isohyets Compiled from Precipitation Records (1900-1960), File: isohyetal_cnty, Napa County GIS, January 2011.

Background and Assumptions

For pre-project conditions, the Project site topography (in the proposed development area) has a maximum elevation of approximately 50 feet in the southeast corner and a minimum of approximately 22 feet in the northwest. The post-project grading will utilize this variance to facilitate runoff.

Soil data was obtained from the NRCS's Soil Survey online database. The database stated that the Project area is comprised of three main soils: Haire loam, Haire clay loam, and Clear Lake clay. These soils, characterized by low rates of infiltration, all fall into the NRCS Hydrologic Soil Group "D".

Infiltration rates for pre- and post-project conditions were ascertained from Table 1 of the Flood Control HYDRO-6 Program Parameters. The lower bound of the infiltration rates provided was used due to the "D" Soil Group classification outlined above; a rate of 0.17 inches/hour was assumed for existing conditions, and 0.03 inches/hour was assumed for proposed industrial conditions. For watersheds that contained multiple land use categories a weighted average was calculated.

[1] Based upon Sections 4.02.A and 4.02.C of the City of American Canyon Department of Public Works Engineering Standards and Specifications for Public Improvements Manual, it is our understanding that the Unit Hydrograph Method outlined by the Contra Costa County Flood Control District is the preferred design method for detention basin analyses.

N-values were determined using Figure 1 (for areas less than 200 acres) of the HYDRO-6 Program Parameters; for pre-project areas a value of 0.065 was assumed, characterizing the site as currently undeveloped, and for post-project areas N-values ranging from 0.029 to 0.04 were estimated using the area-based extrapolation method.

The mean annual precipitation (MAP) for the Project area is 20 inches. This value was used in the GHD Devlin Road Analysis and cross-referenced with an isohyet GIS layer available on the Napa County GIS online database. Precipitation falling on the Project footprint currently sheet flows from southwest to northeast where it enters the wetland area and, ultimately, the unnamed tributary to the Napa River.

Facilities Being Modeled

Detention Upstream of Devlin Road

The construction of Devlin Road will impede the flow of water to No Name Creek during large storm events; therefore, to accurately represent the post-development conditions a detention element was included in the model to account for the active storage provided by the elevated roadway during large flow events. Separate storage relationships were developed for the pre- and post-project conditions to assure that any changes in the open space detention volume east of Devlin is accounted for. The stage-storage relationships used in the modeling are included in **Table 1.** Specifics of the culvert design, provided in the Devlin Road Analysis, were used to inform the modeled culvert discharge.

Table 1. Devlin Road Elevation-Storage Relationships

Elevation	Pre-Project Storage	Post-Project Storage	Change in Storage
ft	*acre-feet*	*acre-feet*	*%*
34	0.0	0.0	0
34.5	0.1	0.1	-27
35	0.8	0.6	-24
35.5	2.3	1.7	-27
36	4.9	3.4	-31
36.5	9.4	6.1	-35
37	15.6	9.8	-37

Drainage Management Areas

The proposed design divides the Project area into two drainage management areas (DMAs) comprised of a mix of parking lot, roof area, and pervious landscaping. The tentative mapping shows that the eastern DMA A is 31.4 acres in size while DMA B to the west is 27.2 acres[2]. In conjunction with Flood Control standards, the DMAs are modeled under the industrial land use classification (see **Attachment 1** for model parameters).

[2] Modeled DMA acreages shown in Attachment 1 and Figure 1 are slightly larger than what is provided in the tentative mapping to comply with peak flow modeling requirements; in contrast to water quality, peak flow modeling in HMS requires that rain falling on the footprints of stormwater management facilities is accounted for in basin sizing and flow reduction.

Stormwater Facilities

To meet the flood control requirement outlined by the City of American Canyon in their Engineering Standards and Specifications Manual (post-project peak flows must be reduced to 90% of the pre-project peak) three detention basins are proposed on site. DMA A will have two detention basins and a dedicated bioretention area for water quality, while DMA B will be serviced by one basin sized to comply with both flood control and water quality treatment standards. The bioretention facilities were sized based on the "4% Rule" outlined in the BASMAA Post-Construction Manual. Furthermore, detention basins and bioretention facilities will also be designed to comply with the 2-year hydromodification requirement required for the regional MS4 permit.

Model and Calculation Parameters

To assess the performance of the proposed stormwater facilities during large storm events, a hydrologic model was developed using the U.S. Army Corps of Engineers' HEC-HMS software and modeling protocols outlined in Flood Control's HEC-HMS Guidance Manual.

Input parameters for the HEC-HMS model were compiled from site-specific topography and precipitation information, preliminary Project plans, soil survey information, and additional input recommendations from Flood Control's HEC-HMS Guidance Manual. **Attachment 1** shows land use parameters that were used to calculate lag time (in hours) for both modeled conditions.

Model runs were developed for three conditions: existing conditions, existing conditions with the addition of Devlin Road, and the proposed Project conditions (per current CBG design). For the three conditions, model runs were developed for the 2-, 10-, and 100-year design storm recurrence intervals using a 24-hour storm duration[3]. These storm events were based on a mean annual precipitation of 20 inches and design storm coefficients and rainfall totals specified by Flood Control methodology.

Model Results

Prior to assessing the effect of the projected development, it is important to understand how the construction of Devlin Road will change the hydrology of the local watershed at large. **Table 3** shows a comparison of the model results for the watershed prior to, and after, the construction of Devlin Road.

Table 3. Summary of HMS Modeling Results for Devlin Road Construction

Scenario	Peak Flow (cfs)		
	2-yr 24-hour	10-yr 24-hour	100-yr 24-hour
No Development	93	170	354
Devlin Road Only	73	124	229

[3] The 10- and 100- year design storms utilized the Contra Costa County Flood Control 24-hour storm distribution curve with a peak percent runoff of 11.5%, whereas the 2-year storm was modeled using the Flood Control's 21.2% curve. The higher peaking storm distribution was utilized in the smaller storm event to more accurately assess hydromodification requirements.

Based on the modeled conditions, the construction of the roadway reduces the peak flow for the 2-, 10-, and 100-year 24-hour storm events by 22%, 27%, and 35%, respectively. These results are wholly dependent on the construction of Devlin Road: water is detained behind the elevated roadway and metered out through the box culverts. Beyond the nominal increase in impervious area incurred by the surface of the roadway, these results reflect no change in land use from the pre-project, no development condition. When the post-development land use changes are added to the Devlin Road scenario in HMS the results show an increase in peak flow shown below in **Table 4.**

Table 4. Summary of HMS Modeling Results for All Scenarios

Scenario	Peak Flow (cfs)		
	2-yr 24-hour	10-yr 24-hour	100-yr 24-hour
No Development	93	170	354
Devlin Road Only	73	124	229
Post Development	75	128	241

While these results show a net increase in the peak flow after the development of the Project area, it is important to understand what factor is driving this change. Focusing on the results from the project site provides a better understanding of the cause for this increase (see **Table 5**).

Table 5. Summary of HMS Modeling Results for Project Site Only

Scenario	Peak Flow (cfs)		
	2-yr 24-hour	10-yr 24-hour	100-yr 24-hour
Devlin Road Only	23	35	73
Post Development	11	16	38

As indicated by the table above, the proposed stormwater facilities go far beyond the required level of peak flow reduction for the design storm events. These results, when viewed in conjunction with the data in **Table 3**, attest to the impact that the reduced detention behind Devlin Road has on the system at large. The roughly thirty percent decrease at all elevations in the stage-storage relationship (refer back to **Table 1**) creates a scenario where the culvert is experiencing a higher water surface elevation for each storm event, despite a marked reduction in peak flows leaving the project site before and after development.

As **Table 4** indicates, the construction of Devlin Road is predicted to greatly reduce the pre-project peak flow rate as water is backed up to the east of the roadway and metered out through the four 2-foot by 4-foot box culverts. However, through further analysis one can see that this benefit is largely derived from the detention provided by the undeveloped Giovannoni property.

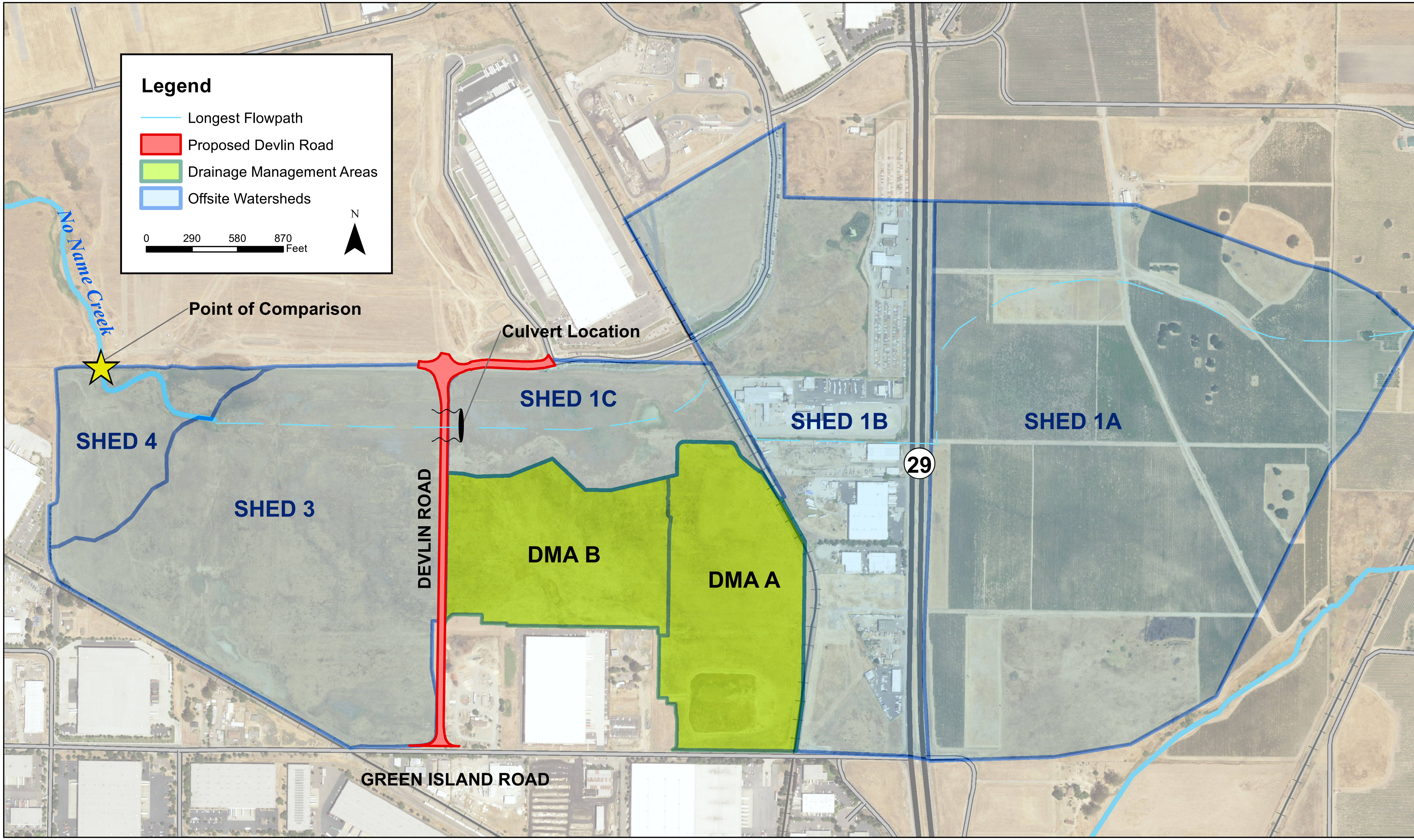
Conclusion

Based upon the outcomes for the three modeled conditions, multiple changes from the pre-project scenario are evident. First off, the construction of Devlin Road will largely constrict the flowrate from the watershed to No Name Creek; the 100-yr discharge drops to 65% of the pre-project peak flow with the addition of the roadway. Secondly, the peak flow increases to 68% of the pre-project condition for the 100-year storm event after the development of the Project area, but still remains well within the flood control requirements set forth by the City of American Canyon. By viewing this proposed development on the scale of the regional watershed the combined construction of Devlin Road and the Project area will not create adverse effects related to flood control or hydromodification downstream of the development.

Attachment 1. Hydrologic Model Subbasin Parameters for Giovannoni Project American Canyon, Napa County, California.

Modeled Condition	Shed[1]	Area	Infiltration	N	L	Lc	Elevation		Slope	Lag[2,3]
							High	Low		
		acres	*(in/hr)*		*(feet)*	*(feet)*	*(feet)*	*(feet)*	*(feet)*	*(hours)*
No Development	**Watershed 1A**	186.2	0.17	0.065	3880	2208	275	60	293	0.339
	Watershed 1B	96.1	0.10	0.040	3511	506	54	34	30	0.177
	Watershed 1C	64.2	0.17	0.065	4369	2434	54	25	35	0.550
	Watershed 2	68.4	0.17	0.065	4505	2336	54	25	34	0.551
	Watershed 3	52.5	0.17	0.065	3327	1665	44	22	34	0.431
	Watershed 4	19.6	0.17	0.065	1293	484	44	18	104	0.167
Devlin Road Only	**Watershed 1A**	186.2	0.17	0.065	3880	2208	275	60	293	0.339
	Watershed 1B	96.1	0.10	0.040	3511	506	54	34	30	0.177
	Watershed 1C*	91.1	0.17	0.065	2767	1434	47	32	29	0.550
	Watershed 3*	94.5	0.17	0.065	3269	1665	44	22	34	0.414
	Watershed 4	19.6	0.17	0.065	1293	484	44	18	104	0.167
Post-Development	**DMA A**	37.8	0.03	0.028	2620	1060	48	44	8	0.188
	DMA B	31.4	0.03	0.028	2000	1410	40	34	16	0.167
	Watershed 1A	186.2	0.17	0.065	3880	2208	275	60	293	0.339
	Watershed 1B	96.1	0.10	0.040	3511	506	54	34	30	0.177
	Watershed 1C**	29.0	0.17	0.065	2840	1050	47	32	96	0.550
	Watershed 3*	94.4	0.17	0.065	3269	1382	44	26	34	0.431
	Watershed 4	19.6	0.17	0.065	1293	484	44	18	64	0.167

1. Refer to Figure 1 for location. Asterisks denote that a shed was changed to comply to changes in project conditions; however, the general location of the sheds are maintained across the scenarios.
2. Contra Costa Flood Control District Methodology Lag Time Equation: 24 x N x (L*Lc / S^0.05)^0.38.
3. A minimum Lag Time of 0.167 hours was assumed during modeling.



Balance Hydrologics

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Figure 1. Giovannoni Modeling Overview
American Canyon, Napa, California