

Kapolei Interchange Complex, Phase 2

APPENDIX B

Figure 5 – Existing Drainage Conditions Map

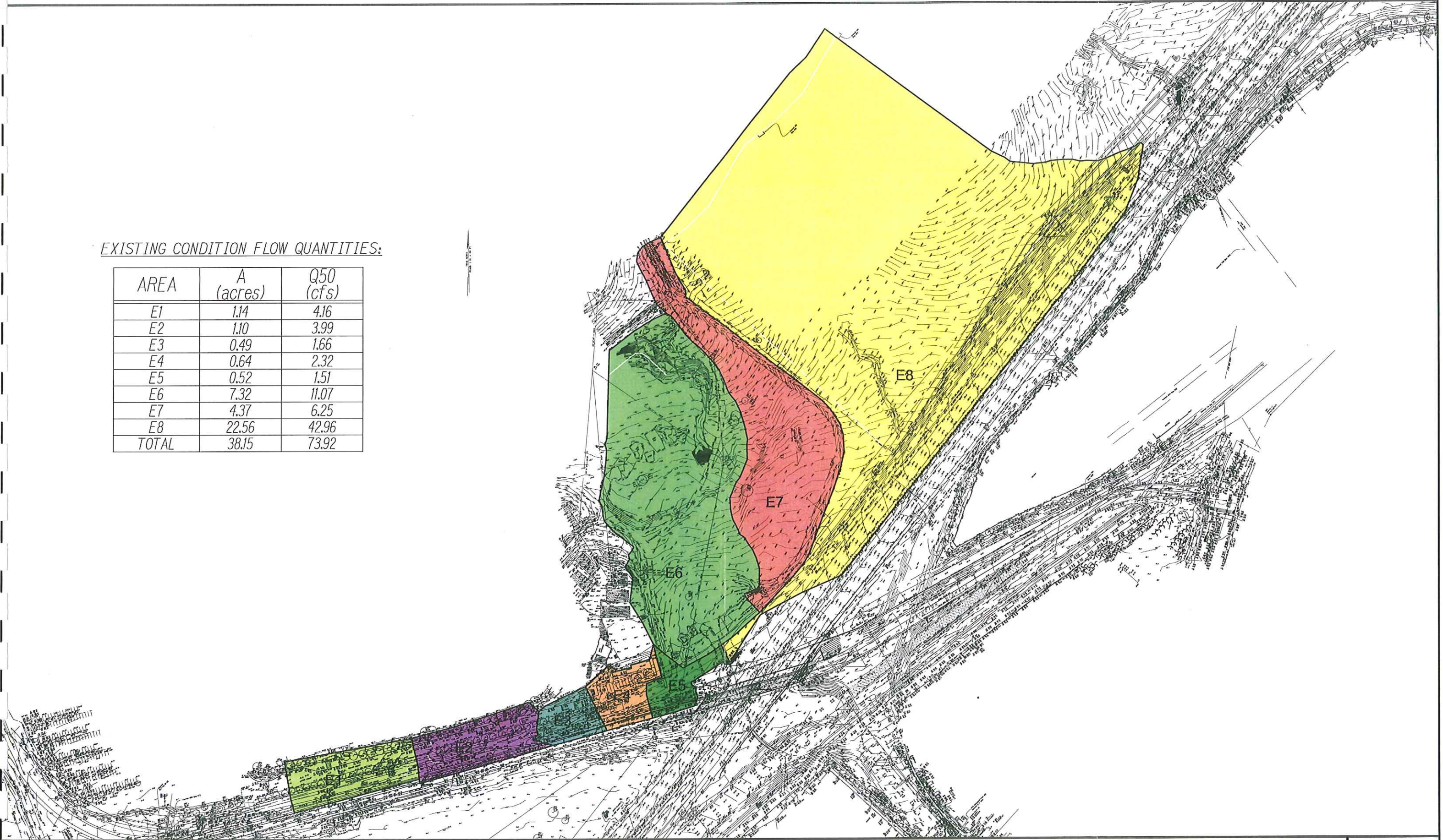
Figure 6,7,8 – Proposed Drainage Conditions Map

Table 1: Required Flow-Through Based Water Quality Flow Calculations

Table 2: Proposed Conditions Hydrology Calculations

EXISTING CONDITION FLOW QUANTITIES:

AREA	A (acres)	Q50 (cfs)
E1	1.14	4.16
E2	1.10	3.99
E3	0.49	1.66
E4	0.64	2.32
E5	0.52	1.51
E6	7.32	11.07
E7	4.37	6.25
E8	22.56	42.96
TOTAL	38.15	73.92

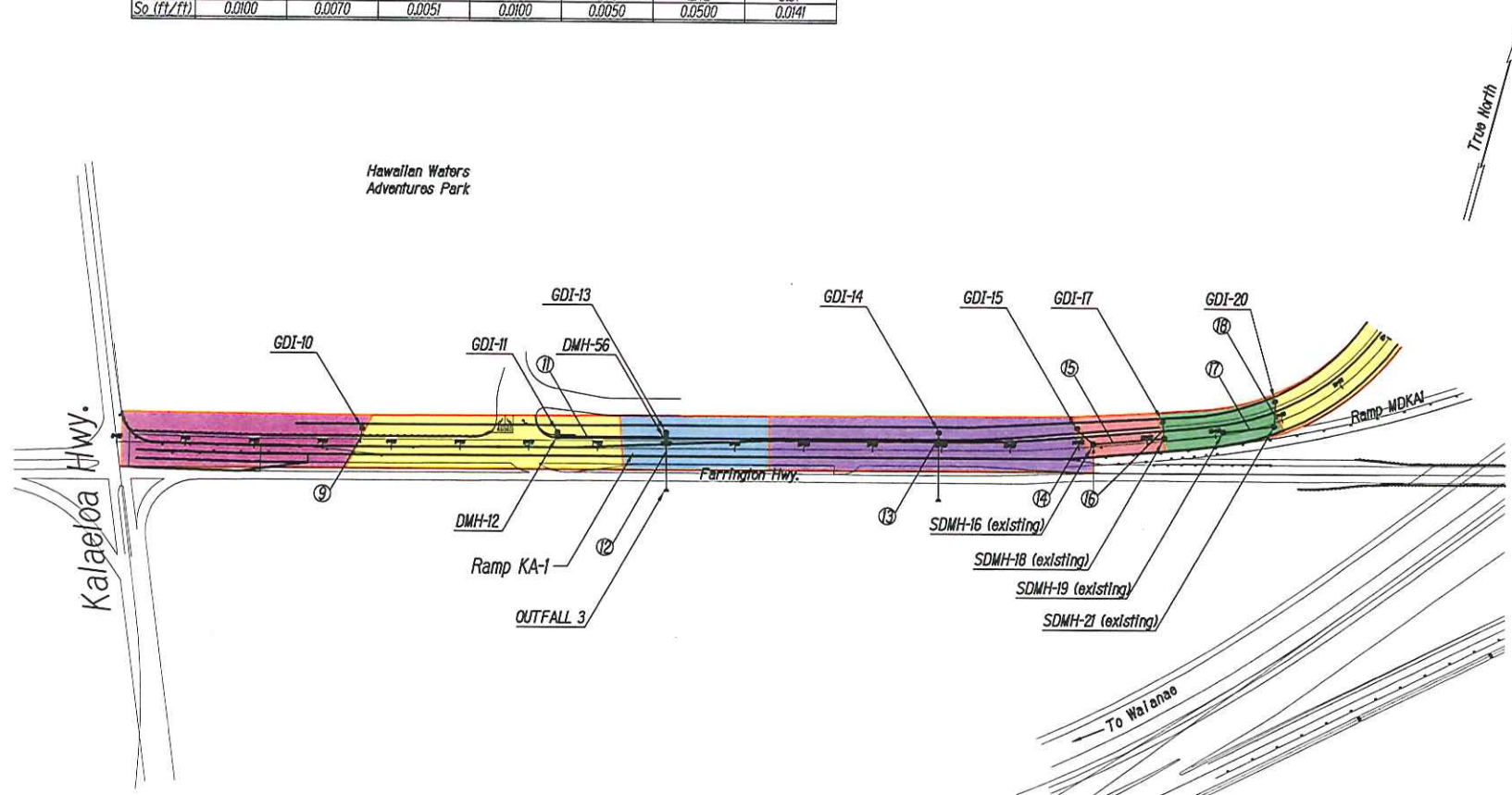


INTERSTATE ROUTE H-1, ADDITION AND MODIFICATION OF FREEWAY ACCESS
PALALAI INTERCHANGE TO MAKAKILO INTERCHANGE (KAPOLEI INTERCHANGE COMPLEX) PHASE 2

EXISTING DRAINAGE CONDITIONS MAP

FIGURE
5

HYDRAULIC DATA							
PIPE	⑨	⑩	⑪	⑬	⑮	⑯	⑱
24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT
Q (cfs)	3.87	4.23	6.63	5.16	0.99	1.37	2.09
A (ac)	0.63	0.68	0.39	0.83	0.16	0.22	0.34
V (fps)	0.98	5.13	5.20	6.24	2.73	2.42	5.37
So (ft/ft)	0.0100	0.0070	0.0051	0.0100	0.0050	0.0500	0.0141

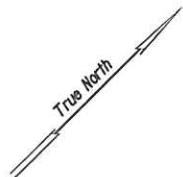


Inlet	A (acres)	Q50 (cfs)
GDI-9	0.21	1.30
GDI-10	0.63	3.87
GDI-11	0.68	4.23
GDI-13	0.39	2.39
GDI-14	0.83	5.16
GDI-15	0.16	0.99
GDI-17	0.22	1.37
GDI-20	0.34	2.09

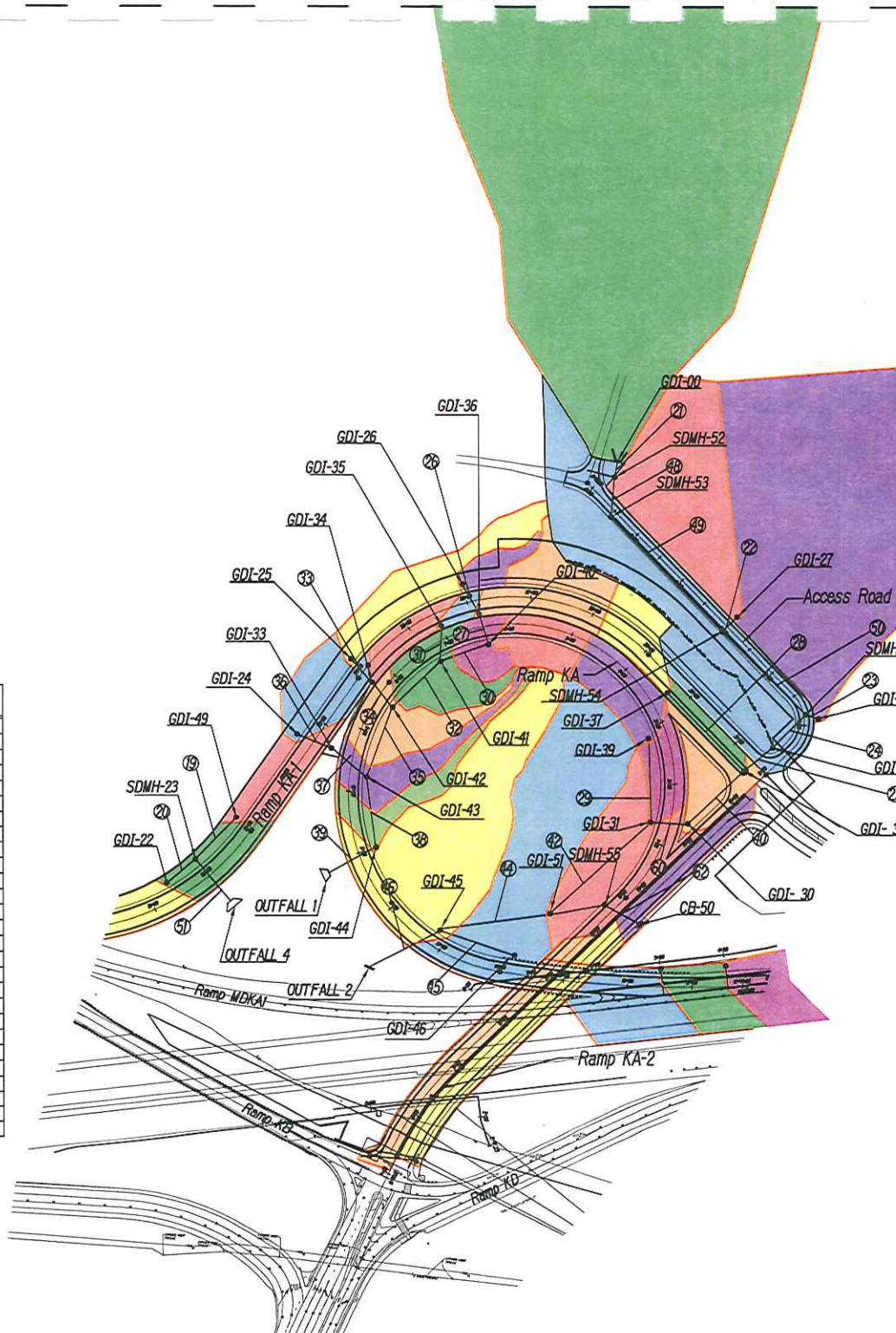
INTERSTATE ROUTE H-1, ADDITION AND MODIFICATION OF FREEWAY ACCESS
Palakiki Interchange to Makakilo Interchange (Kapolei Interchange Complex)
Phase 2

PROPOSED DRAINAGE CONDITIONS MAP

FIGURE 6



Inlet	A (acres)	Q50 (cfs)
GDI-00	23.01	11317
GDI-22	0.24	1.47
GDI-24	0.33	2.02
GDI-25	0.46	1.42
GDI-26	0.12	0.41
GDI-27	1.00	1.95
GDI-28	3.84	7.52
GDI-30	0.28	1.74
GDI-31	0.21	1.29
GDI-32	1.60	9.92
GDI-33	0.03	0.18
GDI-34	0.14	0.89
GDI-35	0.05	0.31
GDI-36	0.41	2.54
GDI-37	0.23	1.45
GDI-38	0.11	0.65
GDI-39	0.29	1.82
GDI-40	0.22	1.38
GDI-41	0.33	1.33
GDI-42	0.33	1.33
GDI-43	0.28	0.95
GDI-44	0.24	0.81
GDI-45	1.35	3.75
GDI-46	1.90	5.35
GDI-49	0.27	1.66
CB-50	0.21	1.33
GDI-51	0.70	3.18



HYDRAULIC DATA				
	(19)	(20)	(21)	(22)
PIPE	24" CULVERT	24" CULVERT	60" CULVERT	24" CULVERT
Q (cfs)	1.66	1.47	11317	1.95
A (ac)	0.27	0.24	23.01	1.00
V (fps)	8.48	4.07	39.44	6.97
So (ft/ft)	0.0627	0.0086	0.1948	0.0313
	(23)	(24)	(25)	(26)
PIPE	24" CULVERT	60" CULVERT	60" CULVERT	24" CULVERT
Q (cfs)	7.52	122.65	132.57	0.41
A (ac)	3.84	1.60	1.60	0.12
V (fps)	9.55	15.34	14.15	2.62
So (ft/ft)	0.0250	0.0132	0.0100	0.0075
	(27)	(28)	(29)	(30)
PIPE	24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT
Q (cfs)	2.95	1.45	1.82	4.33
A (ac)	0.41	0.23	0.29	0.22
V (fps)	8.99	8.70	8.05	11.54
So (ft/ft)	0.0560	0.0760	0.0500	0.0671
	(31)	(32)	(33)	(34)
PIPE	24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT
Q (cfs)	0.31	5.97	1.42	2.31
A (ac)	0.05	0.33	0.46	0.14
V (fps)	6.34	12.71	3.55	9.63
So (ft/ft)	0.1018	0.0674	0.0060	0.0680
	(35)	(36)	(37)	(38)
PIPE	24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT
Q (cfs)	9.59	2.02	2.20	12.74
A (ac)	0.34	0.33	0.03	0.28
V (fps)	14.48	3.73	7.47	15.37
So (ft/ft)	0.0660	0.0052	0.0278	0.0622
	(39)	(40)	(41)	(42)
PIPE	24" CULVERT	60" CULVERT	60" CULVERT	60" CULVERT
Q (cfs)	13.56	134.67	139.53	144.04
A (ac)	0.24	0.11	0.21	1.35
V (fps)	17.21	11.54	30.92	26.32
So (ft/ft)	0.0812	0.0058	0.0828	0.0515
	(43)	(44)	(45)	(46)
PIPE	36" CULVERT	60" CULVERT	60" CULVERT	60" CULVERT
Q (cfs)	5.35	153.14	113.77	113.17
A (ac)	1.90	1.35	1.60	1.60
V (fps)	5.48	14.84	30.42	28.16
So (ft/ft)	0.0078	0.0103	0.0937	0.0754
	(47)	(48)	(49)	(50)
PIPE	60" CULVERT	60" CULVERT	60" CULVERT	24" CULVERT
Q (cfs)	115.13	313	136.42	1.33
A (ac)	1.60	0.24	0.28	0.70
V (fps)	31.96	10.11	33.65	3.75
So (ft/ft)	0.0061	0.0603	0.1069	0.074

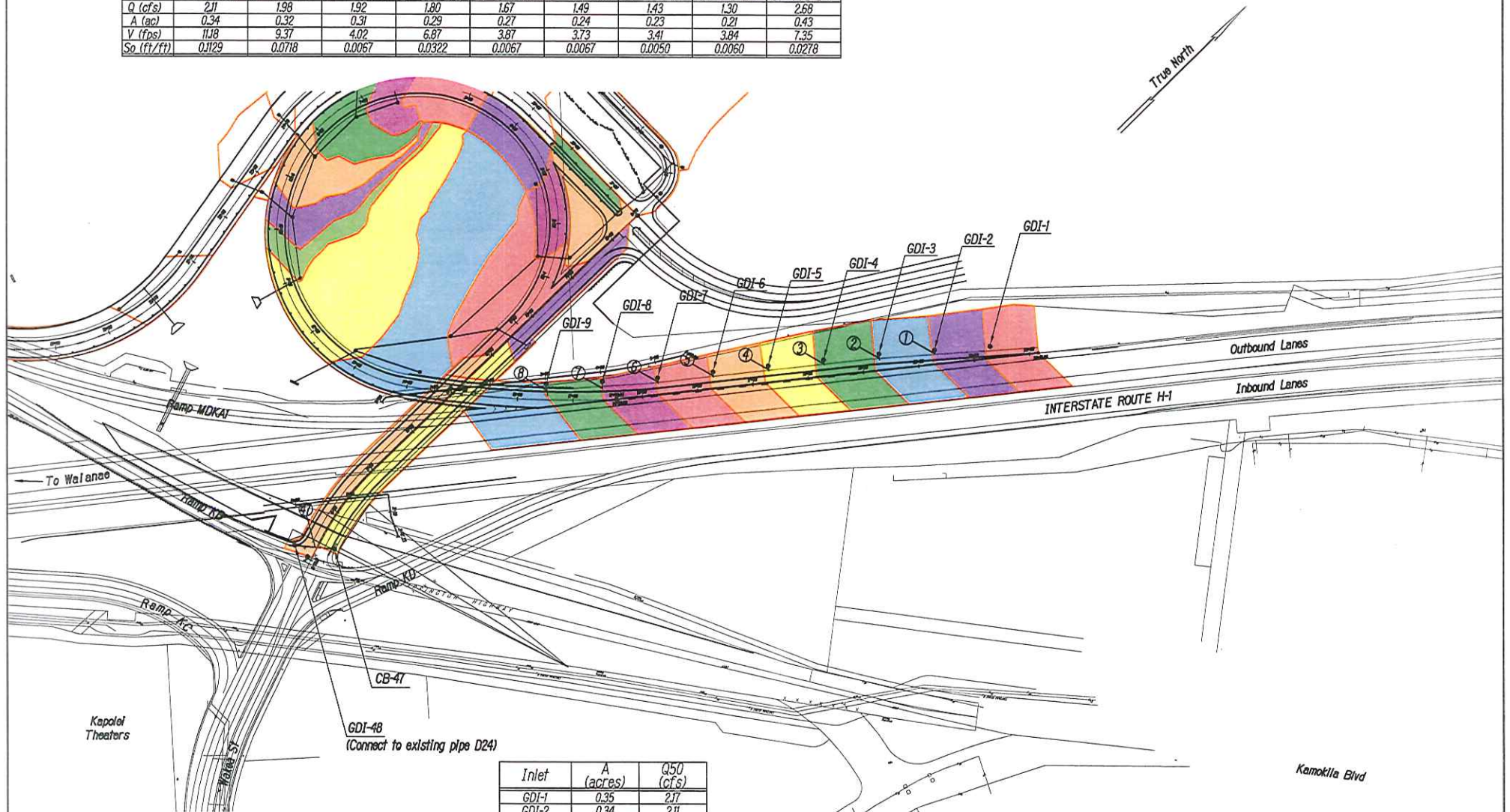
INTERSTATE ROUTE H-1, ADDITION AND MODIFICATION OF FREEWAY ACCESS
Palali Interchange to Makalo Interchange (Kapoiei Interchange Complex)
Phase 2

PROPOSED DRAINAGE CONDITIONS MAP

FIGURE 7

HYDRAULIC DATA

PIPE	①	②	③	④	⑤	⑥	⑦	⑧	⑨
24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT	24" CULVERT
Q (cfs)	2.11	1.98	1.92	1.80	1.67	1.49	1.43	1.30	2.68
A (ac)	0.34	0.32	0.31	0.29	0.27	0.24	0.23	0.21	0.43
V (fps)	11.18	9.37	4.02	6.87	3.87	3.73	3.41	3.84	7.35
So (ft/ft)	0.1129	0.0718	0.0067	0.0322	0.0067	0.0067	0.0050	0.0060	0.0278



Inlet	A (acres)	Q50 (cfs)
GDI-1	0.35	2.17
GDI-2	0.34	2.11
GDI-3	0.32	1.98
GDI-4	0.31	1.92
GDI-5	0.29	1.80
GDI-6	0.27	1.67
GDI-7	0.24	1.49
GDI-8	0.23	1.43
GDI-9	0.21	1.30
CB-47	0.43	2.68
GDI-48	0.38	2.34

INTERSTATE ROUTE H-1, ADDITION AND MODIFICATION OF FREEWAY ACCESS
Palatali Interchange to Makakilo Interchange (Kapolei Interchange Complex)
Phase 2

PROPOSED DRAINAGE CONDITIONS MAP

FIGURE 8

Table 1 - Flow-Through Based Water Quality Flow Calculations

$$WQFR = C * 0.4" * A$$

WQFR = Required Water Quality Flow Rate In Cubic Feet Per Second

C = Runoff Coefficient

0.4" = Rainfall intensity of 0.4 inches per hour

A - Area of the Project Site in Acres

Project Site Weighted C =	0.69	
Area =	22	acres

WQRF =	6.04	cfs
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The hydrodynamic device is designed to treat the required water quality flow rate and pass the peak design storm rate (50 year - 1 hr storm) flow.

Table 2 - Proposed Conditions Hydrology Calculations

Total Project Proposed Condition Hydrology Calculations:

Area	Inlet	Area (ft ²)	Imp. Area (ft ²)	Area (acre)	CF	I	i _{corrected}	C	Q
GDI-00	GDI-00	1,002,171	700,000	23.01	2.33	2.80	6.52	0.75	113.17
GDI-01	GDI-01	15,246	15,246	0.35	2.33	2.80	6.52	0.95	2.17
GDI-02	GDI-02	14,810	14,810	0.34	2.33	2.80	6.52	0.95	2.11
GDI-03	GDI-03	13,939	13,939	0.32	2.33	2.80	6.52	0.95	1.98
GDI-04	GDI-04	13,504	13,504	0.31	2.33	2.80	6.52	0.95	1.92
GDI-05	GDI-05	12,632	12,632	0.29	2.33	2.80	6.52	0.95	1.80
GDI-06	GDI-06	11,761	11,761	0.27	2.33	2.80	6.52	0.95	1.67
GDI-07	GDI-07	10,454	10,454	0.24	2.33	2.80	6.52	0.95	1.49
GDI-08	GDI-08	10,018	10,018	0.23	2.33	2.80	6.52	0.95	1.43
GDI-09	GDI-09	9,148	9,148	0.21	2.33	2.80	6.52	0.95	1.30
GDI-10	GDI-10	27,232	27,232	0.63	2.33	2.80	6.52	0.95	3.87
GDI-11	GDI-11	29,751	29,751	0.68	2.33	2.80	6.52	0.95	4.23
GDI-13	GDI-13	16,832	16,832	0.39	2.33	2.80	6.52	0.95	2.39
GDI-14	GDI-14	36,272	36,272	0.83	2.33	2.80	6.52	0.95	5.16
GDI-15	GDI-15	6,927	6,927	0.16	2.33	2.80	6.52	0.95	0.99
GDI-17	GDI-17	9,641	9,641	0.22	2.33	2.80	6.52	0.95	1.37
GDI-20	GDI-20	14,676	14,676	0.34	2.33	2.80	6.52	0.95	2.09
GDI-22	GDI-22	10,347	10,347	0.24	2.33	2.80	6.52	0.95	1.47
GDI-24	GDI-24	14,192	14,192	0.33	2.33	2.80	6.52	0.95	2.02
GDI-25	GDI-25	20,105	5,327	0.46	2.33	2.80	6.52	0.47	1.42
GDI-26	GDI-26	5,120	1,800	0.12	2.33	2.80	6.52	0.53	0.41
GDI-27	GDI-27	43,468	0	1.00	2.33	2.80	6.52	0.30	1.95
GDI-28	GDI-28	167,353	0	3.84	2.33	2.80	6.52	0.30	7.52
GDI-30	GDI-30	12,245	12,245	0.28	2.33	2.80	6.52	0.95	1.74
GDI-31	GDI-31	9,060	9,060	0.21	2.33	2.80	6.52	0.95	1.29
GDI-32	GDI-32	69,736	69,736	1.60	2.33	2.80	6.52	0.95	9.92
GDI-33	GDI-33	1,288	1,288	0.03	2.33	2.80	6.52	0.95	0.18
GDI-34	GDI-34	6,273	6,273	0.14	2.33	2.80	6.52	0.95	0.89
GDI-35	GDI-35	2,172	2,172	0.05	2.33	2.80	6.52	0.95	0.31
GDI-36	GDI-36	17,884	17,884	0.41	2.33	2.80	6.52	0.95	2.54
GDI-37	GDI-37	10,198	10,198	0.23	2.33	2.80	6.52	0.95	1.45
GDI-38	GDI-38	4,601	4,601	0.11	2.33	2.80	6.52	0.95	0.65
GDI-39	GDI-39	12,797	12,797	0.29	2.33	2.80	6.52	0.95	1.82
GDI-40	GDI-40	9,675	9,675	0.22	2.33	2.80	6.52	0.95	1.38
GDI-41	GDI-41	14,183	7,136	0.33	2.33	2.80	6.52	0.63	1.33
GDI-42	GDI-42	14,940	6,560	0.34	2.33	2.80	6.52	0.59	1.31
GDI-43	GDI-43	12,411	4,033	0.28	2.33	2.80	6.52	0.51	0.95
GDI-44	GDI-44	10,602	3,436	0.24	2.33	2.80	6.52	0.51	0.81
GDI-45	GDI-45	58,718	11,404	1.35	2.33	2.80	6.52	0.43	3.75
GDI-46	GDI-46	82,638	16,787	1.90	2.33	2.80	6.52	0.43	5.35
CB-47	CB-47	18,845	18,845	0.43	2.33	2.80	6.52	0.95	2.68
GDI-48	GDI-48	16,474	16,474	0.38	2.33	2.80	6.52	0.95	2.34
GDI-49	GDI-49	11,682	11,682	0.27	2.33	2.80	6.52	0.95	1.66
CB-50	CB-50	9,361	9,361	0.21	2.33	2.80	6.52	0.95	1.33
GDI-51	GDI-51	30,381	18,662	0.70	2.33	2.80	6.52	0.70	3.18

 Drainage Areas contributing to the flow through the hydrodynamic device

Drainage Areas Contributing to Total Flow Through Hydrodynamic Device:

Area	Inlet	Q (cfs)
GDI-24	GDI-24	2.02
GDI-25	GDI-25	1.42
GDI-26	GDI-26	0.41
GDI-33	GDI-33	0.18
GDI-34	GDI-34	0.89
GDI-35	GDI-35	0.31
GDI-36	GDI-36	2.54
GDI-40	GDI-40	1.38
GDI-41	GDI-41	1.33
GDI-42	GDI-42	1.31
GDI-43	GDI-43	0.95
GDI-44	GDI-44	0.81
Total		13.56

Conclusion:

The flow through hydrodynamic device is designed to treat the required flow of 6.04 cfs (Appendix B, Table 1) and has the capacity to pass the 50 year - 1 hr peak design storm runoff flow of 13.56 cfs.