TABLE I – DISCHARGE POINT INFORMATION & DISCHARGE QUANTITY

| Discharge Point | LOCATION | Latitude | Longitude | Class | C | I (in/hr) | A (Acres) | Q (cfs) |
|---|---|---|---|---|---|---|---|---|
| 1 | Pacific Ocean | 21.68751D | 158.02833D | A | 0.69 | 3.622 | 0.80 | 2.00 |
| 2 | Pacific Ocean | 21.68814D | 158.02733D | A | 0.66 | 3.622 | 0.25 | 0.60 |
| 3 | Pacific Ocean | 21.68886D | 158.02532D | A | 0.66 | 3.622 | 1.63 | 3.92 |
| 4 | Waialee Gulch | 21.68978D | 158.02133D | 2 | 0.67 | 3.622 | 0.44 | 1.06 |
| 5 | Waialee Gulch | 21.68967D | 158.02127D | 2 | 0.65 | 3.622 | 0.38 | 0.89 |
| 6 | Waialee Gulch | 21.69085D | 158.02147D | 2 | 0.71 | 3.622 | 0.70 | 1.80 |
| 7 | Pacific Ocean | 21.69274D | 158.02056D | A | 0.65 | 3.622 | 0.76 | 1.78 |
| 8 | Pahipahialua Gulch | 21.69086D | 158.01830D | 2 | 0.65 | 3.622 | 0.77 | 1.81 |
| 9 | Kawela Stream | 21.69506D | 158.01057D | 2 | 0.65 | 3.622 | 1.48 | 3.48 |
| 10 | Kawela Stream | 21.65906D to 21.69504D | 158.01057D to 158.00978D | 2 | 0.73 | 3.622 | 0.28 | 0.74 |
| 11 | Kawela Stream | 21.69504D | 158.00969D | 2 | 0.58 | 3.622 | 2.10 | 4.41 |
| 12 | Kawela Stream | 21.69493D | 158.00971D | 2 | 0.65 | 3.622 | 1.62 | 3.80 |
| 13 | Kawela Stream | 21.69493D | 158.00965D | 2 | 0.78 | 3.622 | 1.40 | 3.96 |
| 14 | Pacific Ocean | 21.70004D | 158.00093D | A | 0.66 | 3.622 | 1.35 | 3.23 |
| 15 | Oio Gulch | 21.69764D | 157.99221D | 2 | 0.58 | 3.622 | 1.26 | 2.63 |
| 16 | Oio Gulch | 21.69755D | 157.99219D | 2 | 0.78 | 3.622 | 0.84 | 2.37 |
| 17 | Pacific Ocean | 21.70501D | 157.98944D | A | 0.66 | 3.622 | 2.06 | 4.91 |
| 18 | Hoolapa Gulch | 21.69744D | 157.98162D | 2 | 0.67 | 3.622 | 4.08 | 9.89 |
| 19 | Hoolapa Gulch | 21.69322D | 157.97788D | 2 | 0.61 | 3.622 | 0.37 | 0.81 |
| 20 | Hoolapa Gulch | 21.69311D | 157.97788D | 2 | 0.78 | 3.622 | 0.25 | 0.71 |
| 21 | Kii Stream | 21.69353D | 157.96961D | 2 | 0.63 | 3.622 | 3.46 | 7.93 |
| 22 | Kalaeokahipa Stream | 21.68828D | 157.96602D | 2 | 0.58 | 3.622 | 0.63 | 1.31 |

| Discharge Point | LOCATION | Latitude | Longitude | Class | C | I (in/hr) | A (Acres) | Q (cfs) |
|---|---|---|---|---|---|---|---|---|
| 23 | Kalaeokahipa Stream | 21.68816D | 157.96608D | 2 | 0.62 | 3.622 | 0.65 | 1.47 |
| 24 | Kalaeokahipa Stream | 21.68824D | 157.96597D | 2 | 0.60 | 3.622 | 1.86 | 4.04 |
| 25 | Kalaeokahipa Stream | 21.68813D | 157.96603D | 2 | 0.60 | 3.622 | 1.86 | 4.04 |
| 26 | Kii Stream | 21.68058D | 157.95649D | 2 | 0.60 | 3.622 | 1.10 | 2.39 |
| 27 | Kii Stream | 21.68045D | 157.95661D | 2 | 0.60 | 3.622 | 1.10 | 2.39 |
| 28 | Unnamed Stream (Tributary to Kii Stream) | 21.67791D | 157.95290D | 2 | 0.61 | 3.622 | 1.12 | 2.46 |
| 29 | Unnamed Stream (Tributary to Kii Stream) | 21.67777D | 157.95293D | 2 | 0.59 | 3.622 | 1.10 | 2.35 |
| 30 | Unnamed Stream (Tributary to Kii Stream) | 21.67787D | 157.95275D | 2 | 0.85 | 3.622 | 0.55 | 1.68 |
| 31 | Unnamed Stream (Tributary to Kii Stream) | 21.67773D | 157.95278D | 2 | 0.60 | 3.622 | 0.16 | 0.35 |
| 32 | Unnamed Stream (Tributary to Kii Stream) | 21.67789D | 157.95275D | 2 | 0.77 | 3.622 | 0.41 | 1.14 |
| 33 | Unnamed Stream (Tributary to Kii Stream) | 21.68055D | 157.95244D | 2 | 0.77 | 3.622 | 1.35 | 3.77 |
| 34 | Malaekahana Stream | 21.67251D | 157.94109D | 2 | 0.70 | 3.622 | 1.96 | 4.98 |
| 35 | Malaekahana Stream | 21.67232D | 157.94109D | 2 | 0.70 | 3.622 | 1.96 | 4.98 |
| 36 | Malaekahana Stream | 21.67249D | 157.94097D | 2 | 0.69 | 3.622 | 0.26 | 0.65 |
| 37 | Malaekahana Stream | 21.67230D | 157.94105D | 2 | 0.80 | 3.622 | 0.53 | 1.53 |
| 38 | Pacific Ocean | 21.66957D | 157.93701D | A | 0.66 | 3.622 | 1.70 | 4.06 |
| 39 | Malaekahana Stream | 21.66832D | 157.94031D | 2 | 0.66 | 3.622 | 1.90 | 4.54 |
| 40 | Pacific Ocean | 21.66217D | 157.93133D | A | 0.66 | 3.622 | 2.92 | 6.98 |
| 41 | Waiapuka Stream | 21.65958D | 157.93622D | 2 | 0.66 | 3.622 | 2.95 | 7.05 |
| 42 | Kahawainui Stream | 21.65413D | 157.92993D | 2 | 0.73 | 3.622 | 0.14 | 0.37 |

RUNOFF CALCULATIONS

Given:

Area Disturbed 1-1 = 0.42 Acres
Area Disturbed 1-2 = 0.38 Acres

Area Disturbed 2-1 = 0.13 Acres
Area Disturbed 2-2 = 0.12 Acres

Area Disturbed 3-1 = 0.85 Acres
Area Disturbed 3-A-1 = 0.53 Acres
Area Disturbed 3-B-1 = 0.25 Acres

Area Disturbed 4-1 = 0.44 Acres

Area Disturbed 5-1 = 0.38 Acres

Area Disturbed 6-1 = 0.34 Acres
Area Disturbed 6-2 = 0.36 Acres

Area Disturbed 7-1 = 0.76 Acres

Area Disturbed 8-1 = 0.77 Acres

Area Disturbed 9-1 = 1.48 Acres

Area Disturbed 10-1 = 0.28 Acres

Area Disturbed 11-1 = 2.10 Acres

Area Disturbed 12-1 = 1.62 Acres

Area Disturbed 13-1 = 1.40 Acres

Area Disturbed 14-1 = 0.81 Acres
Area Disturbed 14-2 = 0.54 Acres

Area Disturbed 15-1 = 1.26 Acres

Area Disturbed 16-1 = 0.84 Acres

Area Disturbed 17-1 = 1.22 Acres
Area Disturbed 17-2 = 0.84 Acres

Area Disturbed 18-1 = 0.41 Acres
Area Disturbed 18-A-1 = 0.28 Acres
Area Disturbed 18-2 = 0.71 Acres
Area Disturbed 18-B-1 = 0.52 Acres
Area Disturbed 18-3 = 1.30 Acres
Area Disturbed 18-C-1 = 0.86 Acres

Area Disturbed 19-1 = 0.37 Acres

Area Disturbed 20-1 = 0.25 Acres

Area Disturbed 21-1 = 2.06 Acres
Area Disturbed 21-2 = 0.40 Acres
Area Disturbed 21-3 = 1.00 Acres

Area Disturbed 22-1 = 0.63 Acres

Area Disturbed 23-1 = 0.65 Acres

Area Disturbed 24-1 = 1.86 Acres

Area Disturbed 25-1 = 1.08 Acres
Area Disturbed 25-2 = 0.78 Acres

Area Disturbed 26-1 = 1.10 Acres

Area Disturbed 27-1 = 1.10 Acres

Area Disturbed 28-1 = 1.12 Acres

Area Disturbed 29-1 = 1.10 Acres

Area Disturbed 30-1 = 0.55 Acres

Area Disturbed 31-1 = 0.16 Acres

Area Disturbed 32-A-1 = 0.17 Acres
Area Disturbed 32-B-1 = 0.24 Acres

Area Disturbed 33-1 = 0.62 Acres
Area Disturbed 33-2 = 0.73 Acres

Area Disturbed 34-1 = 1.96 Acres

Area Disturbed 35-1 = 1.96 Acres

Area Disturbed 36-1 = 0.26 Acres

Area Disturbed 37-1 = 0.53 Acres

Area Disturbed 38-1 = 1.70 Acres

Area Disturbed 39-1 = 1.90 Acres

Area Disturbed 40-1 = 2.92 Acres

Area Disturbed 41-1 = 2.95 Acres

Area Disturbed 42-1 = 0.14 Acres

C = 0.90 (AC Pavement)
C = 0.30 (Grassed Surfaces)

i = (2-yr, 1-hr event) = 1.61 in./hr.

tc (All Areas) = 10 min. (minimum)

Cf (All Areas) = 2.25

I = i x Cf
I=1.61 in/hour x 2.25 = 3.622 in/hour

Since project area is less than 100 acres, the Rational Formula will be used to calculate potential runoff.

Find: Runoff for a 2-yr 1-hr rainfall event (Q)

Solution: Q = C x I x A

Q1-1 = (0.69) x (3.622 in/hr) x (0.42 Acs)
**Q1-1 = 1.05 cfs**

Q1-2 = (0.69) x (3.622 in/hr) x (0.38 Acs)
**Q1-2 = 0.95 cfs**

Q2-1 = (0.66) x (3.622 in/hr) x (0.13 Acs)
**Q2-1 = 0.31 cfs**

Q2-2 = (0.66) x (3.622 in/hr) x (0.12 Acs)
**Q2-2 = 0.29 cfs**

Q3-1 = (0.66) x (3.622 in/hr) x (0.85 Acs)
**Q3-1 = 2.04 cfs**

Q3-A-1= (0.66) x (3.622 in/hr) x (0.53 Acs)
**Q3-A-1 = 1.28 cfs**

Q3-B-1 = (0.66) x (3.622 in/hr) x (0.25 Acs)
**Q3-B-1 = 0.60 cfs**

Q4-1 = (0.67) x (3.622 in/hr) x (0.44 Acs)
**Q4-1 = 1.06 cfs**

Q5-1 = (0.65) x (3.622 in/hr) x (0.38 Acs)
**Q5-1 = 0.89 cfs**

Q6-1 = (0.71) x (3.622 in/hr) x (0.34 Acs)
**Q6-1 = 0.87 cfs**

Q6-2 = (0.71) x (3.622 in/hr) x (0.36 Acs)
**Q6-2 = 0.93 cfs**

Q7-1 = (0.65) x (3.622 in/hr) x (0.76 Acs)
**Q7-1 = 1.78 cfs**

Q8-1 = (0.65) x (3.622 in/hr) x (0.77 Acs)
**Q8-1 = 1.81 cfs**

Q9-1 = (0.65) x (3.622 in/hr) x (1.48 Acs)
**Q9-1 = 3.48 cfs**

Q10-1 = (0.73) x (3.622 in/hr) x (0.28 Acs)
**Q10-1 = 0.74 cfs**

Q11-1 = (0.58) x (3.622 in/hr) x (2.10 Acs)
**Q11-1 = 4.41 cfs**

Q12-1 = (0.65) x (3.622 in/hr) x (1.62 Acs)
**Q12-1 = 3.80 cfs**

Q13-1 = (0.78) x (3.622 in/hr) x (1.40 Acs)
**Q13-1 = 3.96 cfs**

Q14-1 = (0.66) x (3.622 in/hr) x (0.81 Acs)
**Q14-1 = 1.94 cfs**

Q14-2 = (0.66) x (3.622 in/hr) x (0.54 Acs)
**Q14-2 = 1.29 cfs**

Q15-1 = (0.58) x (3.622 in/hr) x (1.26 Acs)
**Q15-1 = 2.63 cfs**

Q16-1 = (0.78) x (3.622 in/hr) x (0.84 Acs)
**Q16-1 = 2.37 cfs**

Q17-1 = (0.66) x (3.622 in/hr) x (2.06 Acs)
**Q17-1 = 4.91 cfs**

Q18-1 = (0.67) x (3.622 in/hr) x (0.41 Acs)
**Q18-1 = 0.99 cfs**

Q18-A-1 = (0.67) x (3.622 in/hr) x (0.28 Acs)
**Q18-A-1 = 0.68 cfs**

Q18-2 = (0.67) x (3.622 in/hr) x (0.71 Acs)
**Q18-2 = 1.72 cfs**

Q18-B-1 = (0.67) x (3.622 in/hr) x (0.52 Acs)
**Q18-B-1 = 1.26 cfs**

Q18-3 = (0.67) x (3.622 in/hr) x (1.30 Acs)
**Q18-3 = 3.15 cfs**

Q18-C-1 = (0.67) x (3.622 in/hr) x (0.86 Acs)
**Q18-C-1 = 2.09 cfs**

Q19-1 = (0.61) x (3.622 in/hr) x (0.37 Acs)
**Q19-1 = 0.81 cfs**

Q20-1 = (0.78) x (3.622 in/hr) x (0.25 Acs)
**Q20-1 = 0.71 cfs**

Q21-1 = (0.63) x (3.622 in/hr) x (2.06 Acs)
**Q21-1 = 4.71 cfs**

Q21-2 = (0.63) x (3.622 in/hr) x (0.40 Acs)
**Q21-2 = 0.92 cfs**

Q21-3 = (0.63) x (3.622 in/hr) x (1.00 Acs)
**Q21-3 = 2.30 cfs**

Q22-1 = (0.58) x (3.622 in/hr) x (0.63 Acs)
**Q22-1 = 1.31 cfs**

Q23-1 = (0.62) x (3.622 in/hr) x (0.65 Acs)
**Q23-1 = 1.47 cfs**

Q24-1 = (0.60) x (3.622 in/hr) x (1.86 Acs)
**Q24-1 = 4.04 cfs**

Q25-1 = (0.60) x (3.622 in/hr) x (1.08 Acs)
**Q25-1 = 2.35 cfs**

Q25-2 = (0.60) x (3.622 in/hr) x (0.78 Acs)
**Q25-2 = 1.69 cfs**

Q26-1 = (0.60) x (3.622 in/hr) x (1.10 Acs)
**Q26-1 = 2.39 cfs**

Q27-1 = (0.60) x (3.622 in/hr) x (1.10 Acs)
**Q27-1 = 2.39 cfs**

Q28-1 = (0.61) x (3.622 in/hr) x (1.12 Acs)
**Q28-1 = 2.46 cfs**

Q29-1 = (0.59) x (3.622 in/hr) x (1.10 Acs)
**Q29-1 = 2.35 cfs**

Q30-1 = (0.85) x (3.622 in/hr) x (0.55 Acs)
**Q30-1 = 1.68 cfs**

Q31-1 = (0.60) x (3.622 in/hr) x (0.16 Acs)
**Q31-1 = 0.35 cfs**

Q32-A-1 = (0.77) x (3.622 in/hr) x (0.17 Acs)
**Q32-A-1 = 0.47 cfs**

Q32-B-1 = (0.77) x (3.622 in/hr) x (0.24 Acs)
**Q32-B-1 = 0.67 cfs**

Q33-1 = (0.77) x (3.622 in/hr) x (0.62 Acs)
**Q33-1 = 1.73 cfs**

Q33-2 = (0.77) x (3.622 in/hr) x (0.73 Acs)
**Q33-2 = 2.04 cfs**

Q34-1 = (0.70) x (3.622 in/hr) x (1.96 Acs)
**Q34-1 = 4.98 cfs**

Q35-1 = (0.70) x (3.622 in/hr) x (1.96 Acs)
**Q35-1 = 4.98 cfs**

Q36-1 = (0.69) x (3.622 in/hr) x (0.26 Acs)
**Q36-1 = 0.65 cfs**

Q37-1 = (0.80) x (3.622 in/hr) x (0.53 Acs)
**Q37-1 = 1.53 cfs**

Q38-1 = (0.66) x (3.622 in/hr) x (1.70 Acs)
**Q38-1 = 4.06 cfs**

Q39-1 = (0.66) x (3.622 in/hr) x (1.90 Acs)
**Q39-1 = 4.54 cfs**

Q40-1 = (0.66) x (3.622 in/hr) x (2.92 Acs)
**Q40-1 = 6.98 cfs**

Q41-1 = (0.66) x (3.622 in/hr) x (2.95 Acs)
**Q41-1 = 7.05 cfs**

Q42-1 = (0.73) x (3.622 in/hr) x (0.14 Acs)
**Q42-1 = 0.37 cfs**