

Haae, Glenn

From: Haae, Glenn
Sent: Sunday, May 10, 2020 10:35 AM
To: Sage Kiyonaga
Subject: Molokai ISWFM Renewal Application - Comments/Questions #2

Hi Sage,

Additional questions for Molokai ISWFM from Tetra Tech, mainly regarding the sedimentation basin.

- In the County's response by their Consultant, it appears that there was used a simplified basin sizing calculation to support the sizing of the sedimentation basin ($V_s = Q_{peak} * T_c$). Is there a reference (book / paper) to that simplified calculation and if that calculation is conservative or not in relation to a basin routing model? We have only found one reference in a technical presentation suggesting that this is an un-conservative calculation.
- On construction plan sheets 1-5 there is reference to removal of the existing basin discharge structure and no replacement. In the second to last sentence of the first paragraph of section 5.2 of the design report, the Consultant, indicates that that the existing discharge structure will be utilized.
- In the modeling of both the proposed there appears to be three calculated options for the discharge pipe which include a 36-inch, 48-inch, and 60-inch pipe. I am unsure of what is existing and could not find reference on the structures size and geometry to verify proper modeling or if a new pipe was to indeed be added.
- The Consultant did use, in our opinion, conservative input parameters for the peak flow model including for soil, vegetation, etc..
- Although the basin could very well be sized appropriately there is not enough information here to evaluate the adequacy of the design including if the basin was to be for no discharge, peak flow reduction, basic sedimentation removal or a combination thereof.

Let me know if you have questions.

Thanks, Glenn

Glenn Haae
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A-Mehr Inc.

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May 28, 2020

Mr. Sage Kiyonaga, P.E.
Department of Environmental Management
Solid Waste Division
County of Maui
2200 Main Street, Suite 225
Wailuku, Hawaii 96793

SUBJECT: RESPONSE TO COMMENTS, PHASE 5 & 6 SWFP APPLICATION
MOLOKAI INTEGRATED SOLID WASTE MANAGEMENT FACILITY
SOLID WASTE MANAGEMENT PERMIT LF-0070-09

Dear Mr. Kiyonaga:

A-Mehr, Inc., at the request of the County of Maui, has reviewed comments regarding the Molokai ISWMP Phase 5 & 6 SWFP Application received via email on May 10, 2020 from Mr. Glenn Haae, P.E. of the Department of Health (DOH), Solid and Hazardous Waste Branch. The comments contained a series of questions pertaining to the facility stormwater basin and are addressed in the following.

The hydrology study (Appendix D of the Design Report) reflected the analysis before the County elected to expand the stormwater basin and improve the outlet structure.

With the proposed design, the existing weir structure will be utilized exclusively as the basin outlet to minimize off site discharge events, reduce peak flow discharge off-site, and maximize sediment retention in the event of discharge. Based on our experience, we used a simplified basin sizing calculation to estimate the required storage capacity of the sedimentation basin for the landfill during the post-closure (vegetated) conditions, sufficient to contain runoff from at 25-year, 24- hour storm.

The TR-55 hydrology analysis was re-run for the proposed expanded facility and enlarged basin (as reflected in the SWMF Permit Application) and is attached. The analysis reflects the increased capacity of the basin and utilization of the weir overflow structure. All other input parameters used for the original analysis in Appendix D (representing very conservative operational conditions of the landfill) remained unchanged for the updated hydrology analysis.

In the updated hydrology analysis, the peak flows for each subarea, reach, and the basin remain the same. The enlarged basin, utilizing the weir overflow as the outlet, is modeled to have a peak discharge of 52.25 cfs as compared to the prior hydrology analysis for the site which predicted a peak basin discharge of 88.97 cfs with the former pipe outlet structure and existing permitted basin (no enlarged capacity).

The analysis, based on conservative assumptions, demonstrates the basin will function in a manner protective of downstream properties, maximize water retention, maximize sediment retention, and limit off site discharges. The proposed improvements to the basin significantly minimize off site discharge events and maximize sediment retention in the event of discharge.

The proposed stormwater facilities during post-closure period are expected to perform significantly better than the operational conditions and the peak discharge from the sedimentation basin will be significantly reduced or eliminated when the vegetative cover is established over the final closure cover.

Should you have any questions, please contact me at 949-206-0157.

Sincerely,

A handwritten signature in black ink, appearing to read "M. Ali Mehrzarin". The signature is stylized and written in a cursive-like font.

A-Mehr, Inc.
M. Ali Mehrzarin, P.E.
Principal Engineer

WinTR-55 Current Data Description

--- Identification Data ---

User: A-Mehr Date: 5/27/2020
 Project: Molokai Final Grades Units: English
 SubTitle: Drainage System w/ Wier Areal Units: Acres
 State: Hawaii
 County: Maui
 Filename: C:\Users\alfra\AppData\Roaming\WinTR-55\MISWMF Final Grades-weir & lrg basin
 SUBMITTAL 05262020.w55

--- Sub-Area Data ---

Name	Description	Reach	Area (ac)	RCN	Tc
A1	Entrance Area	R1	5.9	91	.154
A2	Phase 3 NW	R2.1	2.6	89	.129
A3	Central Landfill	R4	6.1	89	.129
A4	Phase 2-3 SW	R2.2	2.1	89	0.1
A5	Phase 1 & 4 NE	R3.1	5.1	89	.127
A6	Phase 6 NE	R3.2	1.6	89	0.1
A7	Scrap Metal & GW	R3.2	5.6	94	.154
A8	Phase 5 & 6	R3.3	2.4	89	0.1
A9	Phase 5 S	Pond	4.1	89	0.1
A10	Phase 5SE	R2.2	2.3	91	0.129

Total area: 37.80 (ac)

--- Storm Data ---

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
4.0	5.0	6.0	7.0	8.0	10.0	.0

Storm Data Source: User-provided custom storm data
 Rainfall Distribution Type: Type I
 Dimensionless Unit Hydrograph: <standard>

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Molokai Final Grades
Drainage System w/ Wier
Maui County, Hawaii

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
4.0	5.0	6.0	7.0	8.0	10.0	.0

Storm Data Source: User-provided custom storm data

Rainfall Distribution Type: Type I

Dimensionless Unit Hydrograph: <standard>

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Molokai Final Grades
Drainage System w/ Wier
Maui County, Hawaii

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 25-Yr (cfs)
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SUBAREAS

A1	24.90
A2	11.06
A3	25.95
A4	9.37
A5	21.78
A6	7.14
A7	24.52
A8	10.71
A9	18.31
A10	10.08

REACHES

R1	24.90
Down	24.90
R2.1	11.06
Down	11.05
R4	25.95
Down	25.93
R2.2	80.26
Down	80.26
R3.1	21.78
Down	21.75
R3.2	53.00
Down	53.00
R3.3	62.95
Down	62.93
Pond	160.00
Down	52.25

OUTLET 52.25

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Molokai Final Grades
Drainage System w/ Wier
Maui County, Hawaii

Hydrograph Peak/Peak Time Table

Sub-Area Peak Flow and Peak Time (hr) by Rainfall Return Period
or Reach 25-Yr
Identifier (cfs)
 (hr)

SUBAREAS

A1	24.90
	9.96
A2	11.06
	9.95
A3	25.95
	9.95
A4	9.37
	9.93
A5	21.78
	9.94
A6	7.14
	9.93
A7	24.52
	9.96
A8	10.71
	9.93
A9	18.31
	9.93
A10	10.08
	9.94

REACHES

R1	24.90
	9.96
Down	24.90
	9.97
R2.1	11.06
	9.95
Down	11.05
	9.95
R4	25.95
	9.95
Down	25.93
	9.97
R2.2	80.26
	9.96
Down	80.26
	9.96
R3.1	21.78
	9.94
Down	21.75

	9.96
R3.2	53.00
	9.95
Down	53.00
	9.96
R3.3	62.95
	9.96
Down	62.93
	9.97
Pond	160.00
	9.96
Down	52.25
	10.19

OUTLET	52.25
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Molokai Final Grades
Drainage System w/ Wier
Maui County, Hawaii

Structure Output Table

Reach Peak Flow (PF), Storage Volume (SV), Stage (STG)
Identifier by Rainfall Return Period
Structure
Identifier 25-Yr

Reach: Pond
Weir : Pond
15 (ft)
PF (cfs) 52.25
SV (ac ft) 4.82
STG (ft) 1.13

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Molokai Final Grades
Drainage System w/ Weir
Maui County, Hawaii

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
A1	5.90	0.154	91	R1	Entrance Area
A2	2.60	0.129	89	R2.1	Phase 3 NW
A3	6.10	0.129	89	R4	Central Landfill
A4	2.10	0.100	89	R2.2	Phase 2-3 SW
A5	5.10	0.127	89	R3.1	Phase 1 & 4 NE
A6	1.60	0.100	89	R3.2	Phase 6 NE
A7	5.60	0.154	94	R3.2	Scrap Metal & GW
A8	2.40	0.100	89	R3.3	Phase 5 & 6
A9	4.10	0.100	89	Pond	Phase 5 S
A10	2.30	0.129	91	R2.2	Phase 5SE

Total Area: 37.80 (ac)

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Molokai Final Grades
Drainage System w/ Weir
Maui County, Hawaii

Reach Summary Table

Reach Identifier	Receiving Reach Identifier	Reach Length (ft)	Routing Method
R1	R2.2	837	CHANNEL
R2.1	R2.2	558	CHANNEL
R4	R2.2	1393	CHANNEL
R2.2	Pond	234	CHANNEL
R3.1	R3.2	708	CHANNEL
R3.2	R3.3	636	CHANNEL
R3.3	Pond	652	CHANNEL
Pond	Outlet		STRUCTURE (Pond)

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A9

SHEET	100	0.3000	0.150	0.049
SHALLOW	100	0.3000	0.050	0.003
SHALLOW	100	0.0300	0.050	0.010

Time of Concentration 0.1
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A10

SHEET	100	0.0300	0.150	0.124
SHALLOW	50	0.0300	0.050	0.005

Time of Concentration 0.129
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Molokai Final Grades
Drainage System w/ Wier
Maui County, Hawaii

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
A1	CN directly entered by user	-	5.9	91
	Total Area / Weighted Curve Number		5.9 ===	91 ==
A2	CN directly entered by user	-	2.6	89
	Total Area / Weighted Curve Number		2.6 ===	89 ==
A3	CN directly entered by user	-	6.1	89
	Total Area / Weighted Curve Number		6.1 ===	89 ==
A4	CN directly entered by user	-	2.1	89
	Total Area / Weighted Curve Number		2.1 ===	89 ==
A5	CN directly entered by user	-	5.1	89
	Total Area / Weighted Curve Number		5.1 ===	89 ==
A6	CN directly entered by user	-	1.6	89
	Total Area / Weighted Curve Number		1.6 ===	89 ==
A7	CN directly entered by user	-	5.6	94
	Total Area / Weighted Curve Number		5.6 ===	94 ==
A8	CN directly entered by user	-	2.4	89
	Total Area / Weighted Curve Number		2.4 ===	89 ==
A9	CN directly entered by user	-	4.1	89
	Total Area / Weighted Curve Number		4.1 ===	89 ==
A10	CN directly entered by user	-	2.3	91
	Total Area / Weighted Curve Number		2.3 ===	91 ==

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Molokai Final Grades
 Drainage System w/ Weir
 Maui County, Hawaii

Reach Channel Rating Details

Reach Identifier	Reach Length (ft)	Reach Manning's n	Friction Slope (ft/ft)	Bottom Width (ft)	Side Slope
R1	837	0.015	0.046	12	1 :1
R2.1	558	0.015	0.037	12	1 :1
R4	1393	0.015	0.033	12	1 :1
R2.2	234	0.015	0.038	12	1 :1
R3.1	708	0.015	0.02	12	1 :1
R3.2	636	0.015	0.028	12	1 :1
R3.3	652	0.015	0.037	12	1 :1
Pond	(This reach is a structure: Pond)				

Reach Identifier	Stage (ft)	Flow (cfs)	End Area (sq ft)	Top Width (ft)	Friction Slope (ft/ft)
R1	0.0	0.000	0	12	0.046
	0.5	79.811	6.3	13	
	1.0	253.016	13	14	
	2.0	809.023	28	16	
	5.0	3963.790	85	22	
	10.0	14496.192	220	32	
	20.0	60282.300	640	52	
R2.1	0.0	0.000	0	12	0.037
	0.5	71.579	6.3	13	
	1.0	226.919	13	14	
	2.0	725.576	28	16	
	5.0	3554.942	85	22	
	10.0	13000.973	220	32	
	20.0	54064.446	640	52	
R4	0.0	0.000	0	12	0.033
	0.5	67.599	6.3	13	
	1.0	214.302	13	14	
	2.0	685.234	28	16	
	5.0	3357.289	85	22	
	10.0	12278.123	220	32	
	20.0	51058.478	640	52	
R2.2	0.0	0.000	0	12	0.038
	0.5	72.540	6.3	13	
	1.0	229.965	13	14	
	2.0	735.316	28	16	
	5.0	3602.662	85	22	
	10.0	13175.491	220	32	
	20.0	54790.176	640	52	
R3.1	0.0	0.000	0	12	0.02
	0.5	52.626	6.3	13	
	1.0	166.834	13	14	
	2.0	533.454	28	16	
	5.0	2613.646	85	22	
	10.0	9558.506	220	32	
	20.0	39748.971	640	52	

R3.2	0.0	0.000	0	12	0.028
	0.5	62.268	6.3	13	
	1.0	197.401	13	14	
	2.0	631.191	28	16	
	5.0	3092.507	85	22	
	10.0	11309.777	220	32	
	20.0	47031.617	640	52	

R3.3	0.0	0.000	0	12	0.037
	0.5	71.579	6.3	13	
	1.0	226.919	13	14	
	2.0	725.576	28	16	
	5.0	3554.942	85	22	
	10.0	13000.973	220	32	
	20.0	54064.446	640	52	

Pond (This reach is a structure: Pond)

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Molokai Final Grades
Drainage System w/ Weir
Maui County, Hawaii

Structure Description - User Entered

Reach Identifier	Surface Area @ Crest (ac)	Height Above Crest (ft)	Surface Area @ Ht Above (ac)	Pipe Diameter (in)	Head on Pipe (ft)	Weir Length (ft)
Pond	4.25					15

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Molokai Final Grades
Drainage System w/ Weir
Maui County, Hawaii

Structure Rating Details - Computed

Reach Identifier	Stage (ft)	Pool Storage (ac ft)	Flows (cfs) @ Weir Length		
			Length #1 15ft	Length #2 ft	Length #3 ft
Pond	0	0.00	0.000		
	0.5	2.13	14.849		
	1	4.25	42.000		
	2	8.50	118.794		
	5	21.25	469.574		
	10	42.50	1328.157		
	20	85.00	3756.594		