



2020 Concept Plan for Managed Use of the Ha'ikū Stairs

Background

Friends of Ha'ikū Stairs (FHS) was formed as 501(c)(3) non-profit group in 1987 in order to protect the Ha'ikū Stairs and its surrounding environment. Our team of volunteers come from all walks of life and include hikers, gardeners, structural engineers, doctors, botanists, and residents of the surrounding neighborhood.

For many years, FHS led people on safe, legal climbs up the Ha'ikū Stairs to conduct routine maintenance. We climbed the Stairs in order to maintain them, but also for the breathtaking experience, the camaraderie, and the fun. When climbing the 3,922 steps to the summit of Pu'u Keahi a Kahoe, our team of experts (until very recently) led volunteers in duties such as carrying out repairs to individual stair modules, controlling invasive species, tackling trash and graffiti, and mitigating run-off.

We have always carried out our mission in cooperation and compliance with the varying agencies who have responsibilities related to the Stairs and to their access. We maintain a flawless safety record, and hold up-to-date liability insurance.

The following Concept Plan outlines how FHS would run the Ha'ikū Stairs under managed access in order to save the Stairs, mitigate potential risks, and best serve the public interest.

Overview

A plan for managed use of Ha'ikū Stairs is constrained by several variables, including limitations on the number of daily climbers that can safely and sustainably be accommodated on the Stairs. Constraints on operation, as well as business organization, climber management, route requirements, operations, security, revenue distribution, and startup costs are detailed in the subsequent sections.

Constraints on Operations

Managed access to the Ha'ikū Stairs is subject to several provisions which provide boundaries and constraints on operation of the Stairs. These include:

1. **Limiting the total number of climbers allowed per day.** Modeling and experience show that limiting climbers to a maximum of 80 per day is best for safe and sustainable operation of the Stairs. Attachment 1, Ha'ikū Stairs Capacity Model is an output of the modeled duration of the climbing day for a random distribution of 80 climbers, and reflects loading on various segments of the Stairs. This calculation has been made for initial planning purposes. However, once operations begin, experience may indicate a capacity to safely modify this number over time. Stairs capacity is discussed in greater detail in a section below.
2. **Safety Program.** Coordinate regularly with HFD on potential rescue operations as may be needed for retrieval of incapacitated hikers, and conduct drills as required. Hold safety Briefings for all climbers. Safety needs to be a dynamic program based on continuing evaluation, feedback and observation.
3. **Climbing by Reservations.** An online reservation system with electronic ticketing will allow an orderly process for managing the daily number of climbers. The system will allow climbers to evaluate their physical ability and associated risks in climbing the Stairs. The system will allow climbers to review and sign the liability waiver required for all climbers.
4. **Tiered Rate Structure.** Establish a market rate for visitors and a discounted rate for kama'āina and military; Provide other fee structures for approved, organized educational, scientific or culturally affiliated groups.
5. **Right of Way.** With cooperation by the designated managing city agency, establish an appropriate route and procedures for access to the Stairs, and negotiate permitted access through other government agency lands; several alternative routes are summarized below.
6. **Liability Insurance and Release Forms.** Climbers need to sign hold harmless/liability release provisions and all management and operational entities need to carry adequate insurance to indemnify governmental and private parties, and property owners from liability.

7. **Security.** Security procedures and roving neighborhood guards will be necessary to prevent unauthorized access and protect the neighborhood from trespassing by errant, would-be hikers.

Business Organization

In order to protect the public interest while providing a sustainable business operation, we propose a contractual arrangement such as a joint venture between Friends of Ha'ikū Stairs (FHS) and an experienced operations partner (the Operator). FHS would have the mission to preserve and operate Ha'ikū Stairs in the public interest, and the commercial entity would be responsible for daily operations and the financial viability of the venture.

All discussions below assume this joint venture structure.

Climber Management

On-line Sign-Up

Potential climbers access the Ha'ikū Stairs through its website, which:

1. describes the climb,
2. outlines the physical demands,
3. describes potential risks,
4. contains liability waiver information and agreement,
5. requires a prospective climber to perform a self-evaluation of capacity to make the climb,
6. provides a calendar with available dates and capacity allowing reservations to be made on a first come, first served basis, and,
7. allows the climber to registers with a date and time and make payment.

Climber Check in

On the day of the climb, the climber arrives at the off-site check-in location to:

1. show proof of registration and be confirmed as checked-in,
2. be added to the day's climbing roster,
3. be further briefed and given their high-visibility safety vest,
4. be given an identifying RFID wristband.
5. afforded the opportunity to purchase merchandise

From there the climbers would be batched into small groups and taken by shuttle van to the designated trail-head drop off area in or near Ha'ikū Valley, depending on the access option

selected. The climbers would be then be guided to an assembly area at the bottom of the Stairs to:

1. be further briefed on potential hazards,
2. be shown safe techniques for climbing and descending, and,
3. be shown techniques for safe passing on the Stairs, and,
4. be started up at regular intervals, uniformly spaced.

Climber Supervision

Two staff members would be stationed at the bottom of the Stairs to manage starting and finishing, and at least two additional staff members would be stationed at locations along the Stairs such as the platforms or Upper Hoist House building. To supplement staffing on the Stairs, there would be additional opportunities for volunteer docents as well as interns.

The staff and docents would perform the following functions:

1. provide educational information,
2. check the visible condition of the hikers for signs of heat stress or other health issues,
3. help manage integration of ascending and descending hikers along certain stretches of the Stairs to reduce passing encounters,
4. sweep the Stairs upon descent at end of the day, and,
5. respond to injured climbers in accordance with a safety plan and staff training.

Location of Staff on the Stairs

The staff on the Stairs would operate several stations. The first station could be located on the first ridge near stair sections 60 to 70, where there is a relatively broad, flat spot. This location is useful for security purposes because it is just above known trails used by trespassers. It is also a good place to check in on ascending climbers before the first steep pitch. Other stations include pad 1, pad 2, and the Upper Hoist House near the top of the Stairs.

End of the Day

Upon return to the bottom of the Stairs, hikers will be,

1. marked off on the day's climbing roster,
2. assembled into groups, and,
3. transported back to the original check-in point where merchandise would be available for purchase.

Implementation

Potential Route

A number of potential routes to the Stairs have been identified over the years by FHS, Kāneʻohe Neighborhood Board (KNB) and the Board of Water Supply Final Environmental Impact Statement (BWS FEIS). Criteria for potential routes include: mitigation of trespassing and neighborhood nuisance, efficiency, management of parking, distance to walk, and security of the Stairs. License or right-of-passage would be required for use of governmental or private lands including in all cases crossing or traversing the H3 service road, and variously the Omega Station Transmitter building parking lot and access roadway for climber transfer and drop off/pick up.

Our preference for operational reasons and for minimizing impact to the neighborhood would be for the following access route: up Haʻikū Road and along the old Haʻikū Road to the base of the Stairs. At present the road that connects the old Haʻikū Road and the base of the Stairs is an unimproved road across DHHL land. With some basic improvements, vehicles can drive along this road to the base of the Stairs. The support of the City would be necessary in negotiating right of access.

Haʻikū Road to Old Omega Station Transmitter Building

Shuttle van transfer up Haʻikū Road from off-site check in location to an assembly area near the base of the Stairs. Approximately 10 round trips per day would be the maximum loading on community streets. This option minimizes the impact to the neighborhood.

Proposed Security Plan

An effective security plan to prevent illegal trespassing on the Stairs is critical to the success of the venture. This will be expensive at the onset. It is reported that BWS currently spends \$250,000 on this. Our concept plan allocates \$350,000 annually for security. Once the operation is established and it becomes clear that attempts at illegal trespassing will not be successful, then the security operation can be scaled back and costs reduced.

Substantial and effective fencing would be installed at the base of the Stairs and at other strategic areas in Haʻikū Valley and on the Stairs.

Technology will be used to support an effective security plan wherever possible. These will include the use of security cameras with night vision capability, radios and walkie talkies, color coded RFID wrist bands, and RFID check-in stations.

It is anticipated that at least one security guard will be on duty, 24 hours a day at the bottom of the Stairs. At night, an additional guard will be necessary at a key point on the lower part of the Stairs. Beyond this point it would be impossible to gain access to the Stairs. Further guards such as a roving guard in the adjoining community to detect and deter any illegal hikers would be necessary at the beginning of operations, as well as an off-duty police officer to issue citations to illegal trespassers.

FHS also proposes that a Security Planning Group be set up to help implement and supervise the security operation. This group would comprise:

1. Representatives from the adjoining neighborhood,
2. Honolulu Police Department (HPD),
3. the private security company,
4. the Operator, and,
5. the Friends of Ha'ikū Stairs (FHS).

This group would meet frequently and as necessary to address all reasonable concerns and implement solutions as they arose. Meetings would be moderated by an impartial moderator.

Ha'ikū Stairs Capacity

Modeling flow

A capacity model was developed to evaluate a reasonable, fair-weather, maximum number of daily climbers that could be safely and sustainably managed on the Stairs (Attachment 1). The model inputs a test number of climbers in a steady flow starting at 0700 in equal intervals of several minutes each with the last starting the climb at a time determined by the test number of climbers and starting interval. The Stairs' loading was considered in three segments based on climbing characteristics: Bottom to Pad 1, Pad 1 to Pad 2, and Pad 2 to the top.

The modeling was performed to consider potential likely time duration for all climbers to reach the top and descend to the bottom, the number of passing interactions along narrow segments of the Stairs, and loading on the platforms at various times of day. A climbing speed was randomly assigned to each starting climber. For this purpose, a look-up table was created with the fastest climbers able to reach the top in one hour and the slowest taking four hours (based on experience), with the majority normally distributed between these extremes. Duration of rest stops at pads 1 and 2 and at the top were also random look-ups.

The modeled outputs were created using a 10 iteration Monte Carlo routine for 80 climbers starting at 0700 in 3-minute intervals, and reflects peak loading periods throughout the day, and that all climbers can finish the climb and descent before the end of daylight. During initial operation of the Stairs, use of RFID wristbands is anticipated for managing climber registration, and for gathering data by which to manage the spacing of downclimbing time periods and up climbing periods on certain narrow stairway segments during busy times of the day, and to evaluate stairway capacity changes as may be indicated by the data. Based on the modeled evaluation, an estimated fair-weather daily capacity of 80 climbers is a reasonable starting point for planning. Data gathered during initial operations would be used to adjust this figure as appropriate.

Effects of weather

Cost and revenue estimates using the 80-climber assumption are presented in the Attachments. 80 climbers is a reasonable capacity number for fair weather, and assumes demand will be sufficient to provide that number routinely on fair days, but the daily number should be reduced to reflect the likely effects of the weather conditions in mitigating demand. For this purpose, Wilson Tunnel rain gauge data (Attachment 2) is used to estimate the reduction in climbing demand due to inclement weather. The fair-weather maximum number is reduced on expected days of prolonged or intense rainfall, during which demand to climb is estimated to be reduced, and for more extreme events management may stop allowing climbers to go up due to hazardous conditions.

The rainfall data is used to estimate the total annual climbers in Attachment 2, Ha'ikū Stairs Revenue Projection. In the attachment, three different splits between visitor and kama'aina (including military) climbers evaluated, as well as three different fees structures. For the purposes of this plan, FHS selected a ratio of 50 visitors to 30 kama'aina climbers and a fee structure of \$100 for visitors and \$20 for kama'aina.

Organizational Structure

Following issuance of a license to operate the Ha'ikū Stairs, FHS will contract with an Operations Partner to begin operations. FHS would be responsible for the overall program while the Operator will employ all the staff and hold contracts with subcontractors such as security services and web site hosting services.

The Operator would provide funding for any necessary capital improvements and start-up operational expenses. The Operator's contract would have negotiated terms for recovery of costs, including a minimum period of operation, subject to compliance with public interest provisions and associated audits, and would include revenue distribution as follows:

- providing to the Operator a return on invested capital, any loans and startup costs plus reasonable profit, and a reasonable profit on its work;
- FHS’s management expenses, and,
- funding for a variety of programs for Ha’ikū Stairs and Valley, including:
 - Ecological restoration and educational programs,
 - Reserve funds for annual maintenance of the Stairs, and,
 - To provide for continuing operations throughout the year, including periods of reduced revenue due to prolonged inclement weather.

Staffing

A total of eight staff people, including FHS and Operator employees, are estimated to be required for routine operations. The anticipated personnel needs for both FHS and the Operator are illustrated below. Training in education elements, climber management and safety would be required of all field operators.

Although FHS and the Operator have different roles and therefore different personnel needs, the program will require close coordination between the two entities, and revenues must cover the costs of both. At the top level, the FHS Program Manager (PM) will manage the entire project and will report to the FHS board of directors and the Government PM. The Operations Manager will report to the FHS PM.

Reporting to the Operation Manager will be the line staff. The Operator will have direct responsibility for the booking, registration, accounting and field operations. FHS will have oversight for public interest provisions.

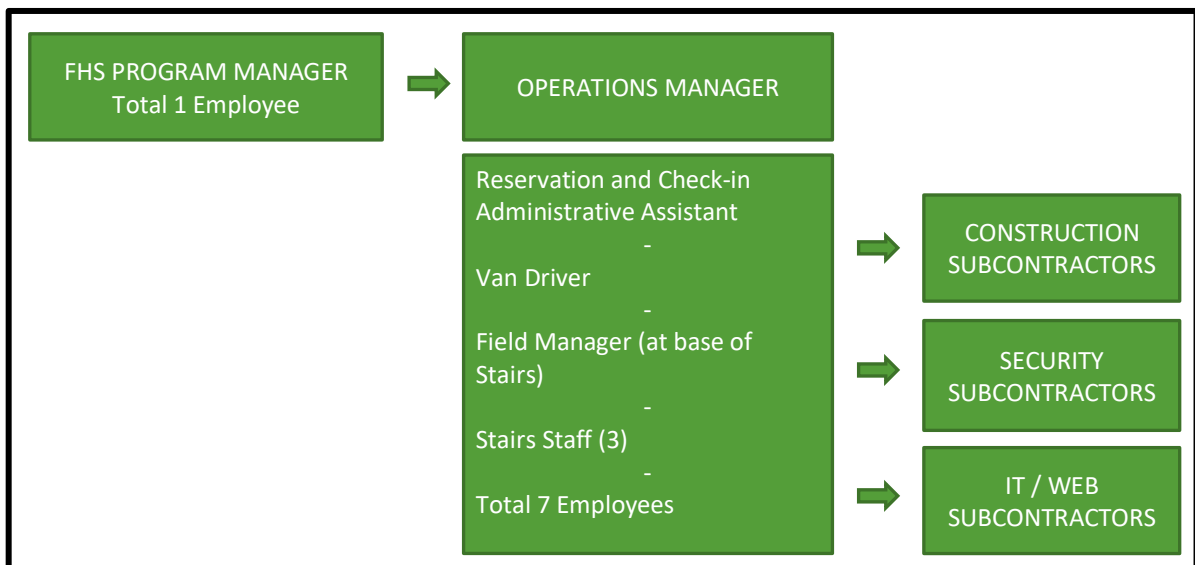


Figure 1: Staffing

Operations

The daily operation of the Stairs is outlined from the climber's perspective in the section below. The outline assumes that the climbers reach the Stairs by shuttle van to the base of the Stairs. In this scenario there are five locations:

1. Offsite check-in, assembly, RFID bracelet fitting, educational/cultural video, and shuttle pickup
2. Shuttle drop-off to the Base of Stairs
3. Segment 1 – Base of Stairs to Pad 1
4. Segment 2 – Pad 1 to Pad 2
5. Segment 3 – Pad 2 to Top

Making a reservation, checking in, and traveling to the Stairs are activities that comprise the initial elements of contact with potential climbers, as described below.

Reservations

Climbers will access the website for information on the Stairs, check on the availability of climbing slots and register to climb on a certain date/time. Upon payment the climber will be issued a ticket to climb and logged onto the daily roster. Prior to booking, the website will provide information on the minimum physical requirements to climb and allow for the climber to perform a self-evaluation of his/her ability to meet the physical demands. An online hold harmless waiver and indemnity will be presented for review and acceptance.

Off-site Check-in

On the day of the climb, participants will find their way to the off-site check-in location. The location will have parking available and serve as a meeting and assembly area for initial check-in. The structure can be either a temporary structure such as a construction site modular office or rented store-front space. Rented space is accounted for in the cost estimate used herein.

Climbers will be checked against the daily climber reservation roster, signed liability waivers will be collected, and there will be a physical confirmation of the climber's ability to participate, including proper footwear and attire. Once accepted to climb, the climbers will be issued an RFID bracelet to track progress and identify them as being on the day's climbing roster and properly registered.

Walk-ins, if space is available, may be added to the roster, after completing the other administrative steps. Once cleared to go, the climbers are assembled for shuttle van pickup. Sale of drinking water, hiking snacks, and other merchandise can be made at this location.

Shuttle Van

Climbers would be batched in van loads of 10 to 15 persons and shuttled to the bottom of the Stairs. The van will drop off and pick up passengers in a continuing cycle, and will be in constant communication with the Off-site Check-in and the Field Manager. The shuttle ride could serve as a further opportunity to introduce Ha'ikū Valley and the Stairs to climbers. This could be by audio recording or spoken by a guide.

Stairs Base

The Stairs base is the entry to the bottom of the Stairs and is the heart of the field operation. This entry point will be manned by the Field Manager who serves as the Stairs greeter as well as the Health and Safety Officer. The Field Manager will have safety training and will be first aid/CPR certified and will make a final determination on whether a person appears to have a condition disqualifying them from making the climb.

From this location, the Field Manager is in constant contact with the off-site check-in and the on-Stairs staff. The Field Manager will also be the local incident commander for directing rescues or emergency evacuations from the Stairs. All information needed for management attention, such as weather, structural conditions, and safety are collected here for operational control. Once cleared to climb, climbers start up the Stairs at suitable intervals.

Stairs Segments

For operational purposes, the Stairs are divided into three segments; base to pad 1, pad 1 to pad 2, and pad 2 to top. There will be at least two staff assigned to the Stairs. As the climbers go up the Stairs, some will be faster than others. The staff will manage the flow of climbers to reduce passing interactions on the lower two segments. The staff will also perform a key function in the education program. At the end of the day the descending staff will “sweep” the Stairs of late returning climbers.

Return

The climbers may stay at the top and at pads along the way for as long as they like until the end of the day. Upon descent, the climbers will be checked out on the way down by RFID detector or manually, and then ride the shuttle back to the off-site base. At the end of the day, the sweep of the Stairs and bottom check off will ensure all climbers to be accounted for. There would be further opportunities to purchase merchandise at the offsite check-in location.

Capital, Revenue and Expense Projections

In order to have a sustainable managed access model, there must be sufficient revenue from climber fees to offset operating costs and capital investment costs. To this end the rainfall mitigated projected revenue, capital amortization, and operating expense analysis were developed for the management model summarized above, Below is a discussion of capital requirements, estimated revenues, and expenses.

Capital Costs

The capital cost requirements are listed in Attachment 4. The major capital requirement is the repair of the Ha'ikū Stairs which the FEIS estimated at \$838,832.

Other costs include:

- Access path improvements,
- Two shelters and two toilets,
- Fencing and gates
- Signage (safety and directional)
- Office furniture and equipment
- RFID, radios, security cameras and iPads

Altogether a capital outlay of \$886,832 is anticipated. This outlay is capitalized and a straight-line seven year depreciation is included in the expense analysis

Other Startup Tasks

In order to start the operations, there are several startup tasks that need to be performed. The Contractor needs sufficient funds to conduct startup tasks prior to receiving revenue. These include:

- Hire personnel to administer the contract and operate the Stairs,
- Develop website for making climbing reservations,
- Establish an RFID bracelet reading system suitable for registration purposes and tracking progress along the Stairs and in transit,
- Create system for collection of fees, orientation, and registration,
- Create elements of the Field Operations as outlined herein,
- Create safety program,
- Create QC program,
- Create community engagement program, and,
- Initiate bookkeeping and accounting.

Revenue

Projected revenue was developed using 80 climbers per day fair weather carrying capacity estimate (Attachment 3). This number is the estimated maximum sustainable capacity of the Stairs, and assumes sufficient regular fair-weather demand from hikers wanting to climb. Limiting factors that constrain capacity include the number of passing encounters on narrow sections of the Stairs, which affects quality of the experience, wear and tear to the Stairs and surrounding terrain, and time required for all climbers to complete the round trip. Since rainfall will reduce the number of climbers safe to climb or wanting to climb, as well as the safe climbing rate, rainfall data are used to reduce the number of daily climbers, and thus projected revenue. A 10-year rainfall history from the Wilson Tunnel Rain Gauge Data is used to estimate the anticipated number of rain days at the Stairs (Attachment 2).

Generally suitable conditions for climbing Ha'ikū Stairs exist 250 to 300 days a year, when daily rainfall totals are less than ½ inch. For days with ½ inch of rainfall or more, representing days with severe frontal weather conditions, the projected number of climbers is reduced to zero. For days with lesser amounts of rain, constituting periodic trade wind showers, reduced numbers of climbers are estimated as a % of daily maximum. In estimating revenue, effective daily climbers ranged from 100% down to 70% of 80 climbers, based on different expected average rainfall brackets.

After accounting for rainfall, several splits and rates were used to estimate revenues. Attachment 3 presents three different kama'aina / visitor splits and 3 different fee rates. FHS decided on the following ratio of 50 visitor spaces for every 30 spaces for kama'aina. The fee for visitors would be \$100, and the fee for kama'aina would be \$20.

Other revenues would come from Merchandise sales and sponsorships/grants. All revenues are presented in Attachment 5, Income and Expenses. FHS estimates merchandise sales of \$20 per visitor climber and \$10 per kama'aina climber. There is significant potential for revenue from sponsorships and grants as well. FHS has a conservative estimate of \$50,000 for this revenue source.

Counting all sources of revenue, the annual gross revenue is estimated to be \$2,078,600. Offsetting the revenues are costs of goods sold listed as: payment processing fees, cost of merchandise, general excise tax and access fees estimated in the FEIS as 4%. After these are taken into consideration, the net annual income is projected at \$1,674,938.

Expenses

All expenses are also shown in Attachment 5. The estimated annual operating expense is \$862,400. The two largest components of operating expenses are salaries and the security contract. Other costs include office, communications, marketing, vehicle expense, and Stairs maintenance

Routine maintenance of the Stairs is estimated to be the replacement of rails and treads as needed. Based on past experience, this could be carried out by volunteer workers at cost of materials. Maintenance work on the Stairs consists of hauling material to where needed, followed by nuts and bolt removal of deteriorated pieces and replacement with new parts, in addition to trimming alien vegetation and keeping passageway clear.

An annual depreciation cost of \$126,690 is included as a final expense cost bringing a total annual expense of \$989,090.

Profit and Loss, Startup Funds

Consideration of all sources of revenue less expenses yields an annual profit of \$685,848. This is a healthy profit 33% of gross revenues.

An initial startup capital investment and pre-revenue operating funds is required of the Operator. The startup investment should be the total startup capital plus sufficient direct expenses to commence revenue-generating operations. If you consider sufficient funds to be of one half of annual expenses, then this would be \$431,200. FHS estimates a fund of \$1,318,032 sufficient to startup the operation.

It is anticipated that after FHS accounts for administrative costs, and the Operator takes a suitable return on invested capital and negotiated profit, there will be funds available for the ecological restoration programs and cultural/educational programs related to the Stairs and to the proposed Ha'ikū Valley Cultural Park and Preserve.

Cultural Issues

We recognize the importance of addressing Hawaiian cultural issues in this Ha'ikū Stairs Conceptual Plan. Potential cultural issues will be addressed at the onset with key Hawaiian community groups such as the Ko'olau Foundation with whom we maintain a working agreement. The following points are considered key:

- Climbing the Ha'ikū Stairs will be a cultural and educational experience and not just a recreational experience;

- Staff/docents/guides will be recruited from knowledgeable kama'aina residents and area students wherever possible;
- Hawaiian cultural values will be incorporated at every level, for example,
 - Respect for the mountain and 'āina is paramount;
 - A pule (Hawaiian blessing) will be offered before each group climbs the Stairs;
 - Education on the history of native Hawaiians in Ha'ikū Valley;
- Education regarding native Hawaiian plants together with detailed information on native plant preservation and restoration will be incorporated;
- Relevant research projects related to Ha'ikū Stairs and Ha'ikū Valley will be developed and made available for students from Kamehameha Schools, Windward Community College and any other relevant educational institutions.

Conclusion

The foregoing analysis finds that managed use is a feasible business operation and a beneficial use of the Stairs for the Ko'olaupoko Community. The plan developed for managed use of Ha'ikū Stairs is practically and economically feasible, mitigates risk, and attends to the concerns of the community.

Feasibility is subject to negotiated agreements with the City for reasonable access as well as a reasonable time to recoup capital and start-up costs. Due to the uncertain nature of some cost elements, substantial risk would be borne for the operation. These cost elements include the required amount of start-up costs for repair of the Stairs to an "acceptable" condition, the rate of interest at which the required funds would be obtained, the payback period required of the lender, and any periodic fees associated with land agencies such as the City and DHHL.

Consideration of a longer period of the managed use agreement seems reasonable considering the cost of capital and the time required to repair of the Stairs. This should be accommodated in the negotiated period of the agreement for operations of the Stairs, to facilitate suitable repayment terms.

Ha'ikū Stairs is a wonder of the world that has existed since 1942 and that can not only be saved but can also serve as an engine of renewal for the community. As clearly demonstrated in the foregoing analysis, managed use of Ha'ikū Stairs would reduce liability, relieve the BWS of their responsibility, alleviate neighborhood concerns, and provide an unparalleled experience.

Attachments

Attachment 1: Climbing Capacity Model

Attachment 2: Rainfall Data

Attachment 3 Ha'ikū Stairs Revenue Projections

Attachment 4 Ha'ikū Stairs Capital Costs

Attachment 5 Ha'ikū Stairs Income and Expense Projections

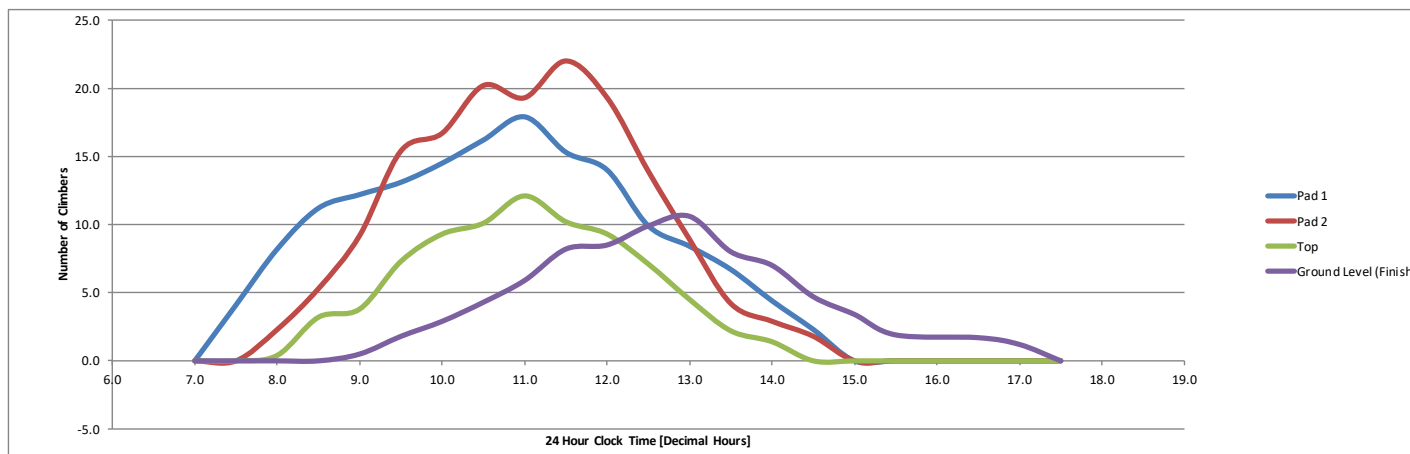
Attachment 1 Ha'ikū Stairs Capacity Model

Loading on Pads 1, 2, Top, and Finish

time **Pad 1** **Pad 2** **Top** **finish**

time	Pad 1	Pad 2	Top	finish
7.0	0.0	0.0	0.0	0.0
7.5	4.1	0.0	0.0	0.0
8.0	8.2	2.3	0.4	0.0
8.5	11.2	5.3	3.2	0.0
9.0	12.2	9.2	3.8	0.5
9.5	13.1	15.4	7.3	1.8
10.0	14.5	16.7	9.3	2.9
10.5	16.2	20.2	10.1	4.3
11.0	17.9	19.3	12.1	5.9
11.5	15.3	22.0	10.2	8.2
12.0	14.0	19.3	9.3	8.5
12.5	9.9	13.9	7.1	9.9
13.0	8.4	8.9	4.5	10.6
13.5	6.7	4.2	2.2	8.0
14.0	4.4	2.9	1.4	7.0
14.5	2.3	1.8	0.0	4.7
15.0	0.0	0.0	0.0	3.4
15.5	0.0	0.0	0.0	1.9
16.5	0.0	0.0	0.0	1.7
17.0	0.0	0.0	0.0	1.2
17.5	0	0	0	0

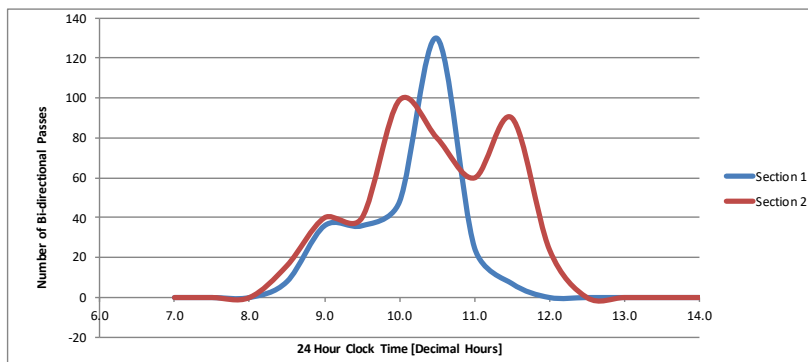
Composite: Loading on Pads 1, 2, Top, and Finish by Half Hour Increments



Passing Interactions Up/Down

	Sec 1	Sec 2
7.0	0	0
7.5	0	0
8.0	0	0
8.5	8	16
9.0	36	40
9.5	36	40
10.0	48	99
10.5	130	80
11.0	25	60
11.5	7	90
12.0	0	24
12.5	0	0
13.0	0	0
13.5	0	0
14.0	0	0

Passing Interactions on Sections 1 and 2 Going Opposite Direction



Interpretation of Outputs:

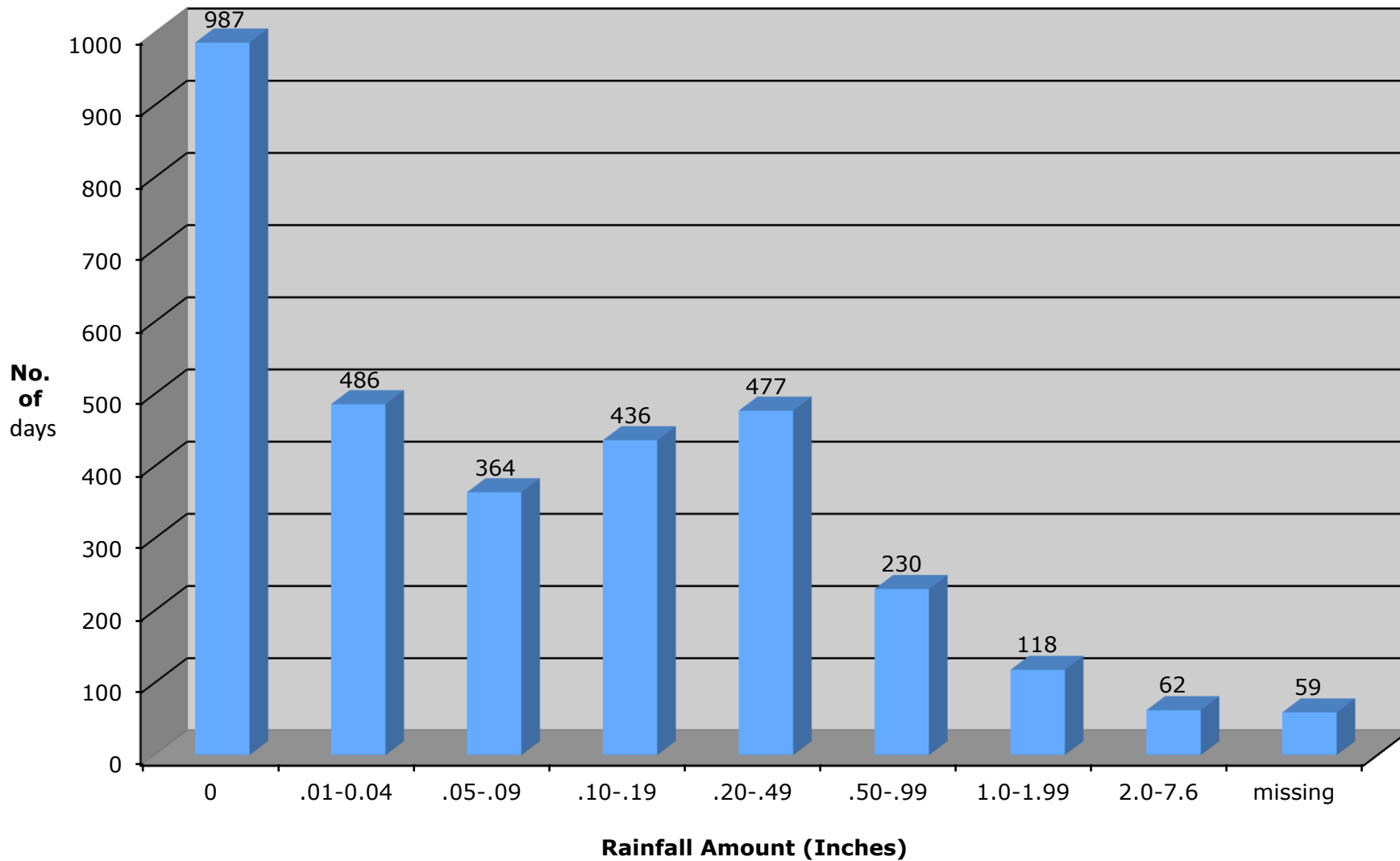
1. Composite loading of pads includes both up and down climbers
2. Peak loading occurs at Pads 1 & 2 from 8:00 to about 13:30, considering pad capacity
3. Passing interaction values are the number of up/down interactions in every half hour increment
4. Section 1 peak loading is from about 10:00 to 11:00
Section 2 from about 9:00 to 11:30
5. The Top Ridge section above Pad 2 is not a limiting element because of pads 3 and 4, and because the stairs are wide enough to allow easy passage

- NOTES
- 1 Spread sheet model of 80 climbers. Starting at 0700 in equal intervals of 3 minutes ending at 11:00.
 - 2 Speed up and speed down are random lookups from table ranging from 1 to 4 hours to reach the top
 - 3 Time spent at platforms and top are random lookups from table ranging from 1 to 25 minutes.
 - 4 Data tables graphed are the average values of a 10 iteration monte carlo routine
 - 5 Time on the horizontal axis is represented by decimal hours, not minutes.
 - 6 Section 1 is the segment between the bottom and platform 1 roughly 1/2 way to the top. Section 2 is between platform up and the second platform on the top ridge.

Speed distribution ranges from fastest 1% getting to pad 2 in 46 min to 98 % exceeding the slowest time of 3 hours, or 9.8 sections per min for the fastest, to 2.8 for the slowest.

Attachment 2
Haiku Stairs Revenue and Expense Projection

Kaneohe Mauka 10-year Rainfall Data 1989.06-1998.06
(Missing data: 1990.08, 1992.08, 1997.10)



Attachment 3 Ha'ikū Stairs Revenue Projections

Rainfall Amount	Number of Days per decade	% of data days	Adjusted to 365 days	% max climbers	Effective Person Climbing Days	Number of Climbers /Year	kama'aina/visitor split 1		kama'aina/visitor split 2		kama'aina/visitor split 3	
							kama'aina	visitor	kama'aina	visitor	kama'aina	visitor
						80	40	40	30	50	20	60
0	987	31%	114	1	114	9120	4560	4560	3420	5700	2280	6840
.01-0.04	486	15%	56	0.98	55	4400	2200	2200	1650	2750	1100	3300
.05-.09	364	12%	42	0.97	41	3280	1640	1640	1230	2050	820	2460
.10-.19	436	14%	50	0.9	45	3600	1800	1800	1350	2250	900	2700
.20-.49	477	15%	55	0.7	39	3120	1560	1560	1170	1950	780	2340
.50-.99	230	7%	27	0	0	0	0	0	0	0	0	0
1.0-1.99	118	4%	14	0	0	0	0	0	0	0	0	0
2.0-7.6	62	2%	7	0	0	0	0	0	0	0	0	0
missing sum data	59 3160		365		294	23520	11760	11760	8820	14700	5880	17640

Rate:
Amount:
Annual Estimated Revenues

	kama'aina	visitor	kama'aina	visitor	kama'aina	visitor
	\$5	\$75	\$5	\$75	\$5	\$75
	\$58,800	\$882,000	\$44,100	\$1,102,500	\$29,400	\$1,323,000
Revenue Rate 1	\$940,800		\$1,146,600		\$1,352,400	

	kama'aina	visitor	kama'aina	visitor	kama'aina	visitor
	\$10	\$75	\$10	\$75	\$10	\$75
	\$117,600	\$882,000	\$88,200	\$1,102,500	\$58,800	\$1,323,000
Revenue Rate 2	\$999,600		\$1,190,700		\$1,381,800	

	kama'aina	visitor	kama'aina	visitor	kama'aina	visitor
	\$20	\$100	\$20	\$100	\$20	\$100
	\$235,200	\$1,176,000	\$176,400	\$1,470,000	\$117,600	\$1,764,000
Revenue Rate 3	\$1,411,200		\$1,646,400		\$1,881,600	

Attachment 4 Ha'ikū Stairs Capital Costs

Capital Costs

Repair structure (cost from FEIS)	\$	838,832.00
Access path improvements (use volunteers)	\$	2,000.00
2 shelter and 2 toilet	\$	20,000.00
Fencing and gates at stair base	\$	10,000.00
Signage, safety or directional	\$	4,000.00
Furniture/ equipment	\$	2,000.00
RFID, radios, security cameras and ipads	\$	10,000.00
All Capital	\$	886,832.00
<u>Capital Depreciation (7 year) per year</u>	\$	<u>126,690</u>

Attachment 5
Haikū Stairs Income and Expense Projections

ANNUAL INCOME

ITEM	QTY	RATE	INCOME
Fees based on 23520 climbers per year (see climber revenue sheet)			
Visitor Climbing Fees (split 2, rev 3)	14,700	\$ 100	\$ 1,470,000.00
Kaimaaina and Military (split 2, rev 3)	8,820	\$ 20	\$ 176,400.00
Merchandise sales visitors	14,700	\$ 20	\$ 294,000.00
Merchandise sales other	8,820	\$ 10	\$ 88,200.00
<u>Sponsorship and Grants</u>	10	\$ 5,000	<u>\$ 50,000.00</u>
Gross Income			\$ 2,078,600
<u>Cost of Goods</u>			
Payment processing		2% \$	(40,572.00)
Merchandise Purchase		30% \$	(114,660.00)
General Excise Tax (excluding sponsorship and grants)		4.5% \$	(91,287.00)
<u>Access Fees (only on climbing fees)</u>		4.0% \$	<u>(65,856.00)</u>
Total Cost of Goods			\$ (312,375.00)

NET ANNUAL INCOME

\$ 1,674,938.00

ANNUAL EXPENSES

ITEM	QTY	RATE	COST
<u>Salaries</u>			
Program Managers (FHS and Operations)	2	\$ 80,000	\$ 160,000.00
Staff (admin, driver)	2	\$ 40,000	\$ 80,000.00
<u>Staff (field manager and 3 stair docents)</u>	4	\$ 40,000	<u>\$ 160,000.00</u>
Total Salaries			\$ 400,000.00
<u>Other Costs</u>			
Security Service Contracted	1	\$ 350,000	\$ 350,000.00
wireless/cell/internet service	12	\$ 200	\$ 2,400.00
Website, advertising, communications	12	\$ 2,000	\$ 24,000.00
Stairs maintenance	12	\$ 1,000	\$ 12,000.00
Utilities	12	\$ 300	\$ 3,600.00
Office Rent	12	\$ 3,000	\$ 36,000.00
Office expenses	12	\$ 200	\$ 2,400.00
vehicle operating costs	12	\$ 1,000	\$ 12,000.00
<u>Liability Insurance</u>	1	\$ 20,000	<u>\$ 20,000.00</u>
Total Other Costs			\$ 462,400.00
<u>Total Operating Expenses</u>			<u>\$ 862,400.00</u>

Capital Depreciation (7 year) per year

\$ 126,690.00

TOTAL ANNUAL EXPENSES

\$ 989,090.00

PROFIT / (LOSS)

\$ 685,848 33%