National Park Service
U.S. Department of Interior

Unites States Forest Service
U.S. Department of Agriculture

City of Seward, Alaska

**Value Analysis Study**
**January 17-19, 2006**

# Kenai Fjords National Park

Seward, Alaska

# Mary Lowell Center
# Value Analysis FINAL Report

**January 31, 2006**


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# Value Analysis Study
# Mary Lowell Center Project

Kenai Fjords National Park
Seward, Alaska

January 31, 2006

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**Value Analysis Study**
**Mary Lowell Center Project**

Kenai Fjords National Park
Seward, Alaska

January 31, 2006

# FORWARD

This report includes recommendations for the Mary Lowell Center (MLC) Project at Kenai Fjords National Park (KFNP) in Seward, Alaska. They stem from a value analysis (VA) workshop initiated by the United States National Park Service (NPS), the United States Forest Service (USFS), and The City of Seward (COS). The workshop was held at the NPS Alaska Regional Office from January 17-19, 2006.

Coordination of this VA was done by Paul Schrooten from the NPS Alaska Regional Office in Anchorage, Alaska. Stephen Kirk, a value specialist & president of Kirk Associates, led the team's deliberations during the workshop.

**Value Analysis Study**
**Mary Lowell Center Project**

Kenai Fjords National Park
Seward, Alaska

January 31, 2006

# SECTION A: EXECUTIVE SUMMARY

*"He has the right to criticize who has the heart to help." Abraham Lincoln*

## Summary Description of Project:

The National Park Service, the U.S. Forest Service, and the City of Seward are preparing to construct a 40,000 sf cooperatively funded, built and operated Administrative Headquarters / Conference Center in Seward, AK (PMIS 28510). This facility is currently projected to contain the following:

- Kenai Fjords NP;
- Seward Ranger District Headquarters of Chugach National Forest;
- Caines Head State Recreation Area and Resurrection Bay State Marine Parks;
- National Marine Fisheries Service; and
- The City of Seward or a representative of the City to manage the proposed conference center.

The new facility, entitled the Mary Lowell Center (MLC), would replace the following:

- 5,000 sq. foot VC/Headquarters NPS building in Seward's Boat Harbor,
- 4,600 square feet of additional rented off-site office space,
- 2,500 square foot District Headquarters of Chugach NF, located in downtown Seward, and
- Smaller offices used by NMFS, and AK State Parks.

Visitation at Kenai Fjords in the past 10 years has increased from 60,000 to more than 290,000 and the permanent park staff has tripled. The resulting services in the new facility would include:

- Information / orientation and trip planning,
- Regional ecosystem-based natural and cultural exhibits,
- Rotating exhibit space,
- A natural history bookstore,
- Centralized permitting,
- A 100 seat auditorium for audio-visual presentations,
- Environmental education facilities, and
- Shared administrative spaces / services for all of the partners.

The park's new Ocean Alaska Science and Learning Center (OASLC), a partnership research and education collaboration with the Alaska Sealife Center, would also have space in the new facility.

This facility would be a cornerstone of a new multi-agency Waterfront Revitalization project commissioned by the City of Seward. Other facilities that will result from this project include expansion of University of Alaska and Sealife Center infrastructure, waterfront "greenspace" design, bike paths and trails, a recreational fishing dock, and construction of a new City library / museum.

Co-locating state offices, federal offices, and visitor facilities in Seward would also provide "one-stop" services for thousands of yearly visitors and a location for year-round community activities. Ecosystem focused exhibits, audio-visual presentations and school programs would address the resource-related needs of all area agencies. Sharing administrative spaces and functions would help participating agencies economize on FTE's and space while reducing duplicative efforts.

## Project Budget / Schedule

The programmed NPS net construction costs for the project is $16,300,000.

The project schedule for Schematic Package is highlighted as follows:

- March 2006 NPS Development Advisory Board (DAB)
- September 2006 Design Development Submittal
- March 2007 Construction Documents Submittal
- June 2007 Construction Start
- October 2008 Substantial Completion
- May 2009 First Full Season for Operations.

## Value Analysis Objectives

The VA workshop focused on:

1. Identify the best approach for selecting a "go forward" plan addressing the VA teams "weak features" via Choosing By Advantages;
2. Identify alternatives to address the following focus areas:
    a. Minimize the new facilities energy use;
    b. Minimize the maintenance needs;
    c. Confirm LEED points for consideration;
    d. Maximize Operational Effectiveness.
3. Identify 90% and 75% alternatives per NPS mandates.

## Alternatives Considered

The VA team reviewed the original schematic design and developed two additional alternatives for consideration. The alternatives involved split or same level plans with the functions associated around atriums or upper floors. The three alternatives evaluated using Choosing by Advantages or CBA included:

- Alternative 1: Original Design – Split Levels & Split Public / Staff Functions: $14,569,000.
- Alternative 2: Modified Layout – Same Levels & Split Public / Staff Functions: $13,224,000
- Alternative 3: Modified Layout – Same Levels & Same Public / Staff Functions: $12,457,000.

A more detailed description of each alternative can be found in Section B, Phase III Evaluation (Part 2 – Choosing by Advantages).

## Preferred Alternative (via Choosing By Advantages -CBA)

Alternative 2 was identified as the preferred alternative. The advantages over the other alternatives included the following:

- Best convenience for visitor and employee entry to building
- Best visitor / employee overall flow and no elevation changes required on first floor
- Exhibit area is 700 SF larger and better flow of visitors
- Better efficiency of space use
- Best aesthetics/ architecture for City of Seward
- Best visitor safety due to on-site drop-off
- Better quality of office space
- Best degree of community use promotion.

## Summary of Recommendations

During the study, 95 ideas were developed to improve value or performance. Some ideas added initial costs but are still value enhancements because they improve performance, reliability, or reduce maintenance while achieving a balance of functional requirements within the budget. The following recommendations summary (**Figure 1**), in addition to the CBA, represents the VA teams 20 ideas chosen to be developed into recommendations.

Also included in the summary, per NPS guidelines, is the 90% and 75% alternatives. These recommendations are developed to obtain a 10% or 25% cost reduction while still achieving the basic functions of the MLC. Highlights of the 90% proposal include moving the boilers inside, limiting radiant flooring, separating the exhibit and general contractor contracts, and allowing contractor buy out right after award. The 75% proposal includes these options and revising the entire HVAC system including eliminating the thermal mass, eliminating the 2$^{nd}$ and 3$^{rd}$ floor atriums, and combining the multi-purpose and conferencing rooms. These are not recommended as they largely ignore the operating, energy, and maintenance goals identified in the NPS. It is an option that responds to potential unforeseen construction cost overages.

Also generated were 6 design suggestions. These suggestions are to help improve the project by forwarding ideas to the design team and are included in Figure 1.

## Comparative Costs

It was the consensus of the VA team that all the potential alternatives could be accomplished within the given budget. The study resulted in approximately $4,159,400 of potential savings from the VA proposals (including the CBA). Additional proposals adding $2,576,900 in initial costs were recommended because of either improved performance or reduced life cycle costs / maintenance needs. For life cycle costing, a 20 year useful life and 3.1% discount rate were used.

## VALUE ANALYSIS RECOMMENDATIONS SUMMARY

Figure 1

Project: **Mary Lowell Center**
**Kenai Fjords National Park**
Location: **Seward, Alaska**

| VA No. | Proposal Description | Benefits: Better Visitor Expnce | Better Performance | Less Energy (LEED) | Reduced O&M | Improved Aesthetics | Improved Schedule | Other Benefits | Potential Savings ( ) indicates cost increase: Initial | Life Cycle |
|---|---|---|---|---|---|---|---|---|---|---|
| CBA | Revise current layout | X | X | X | X | X | X | Enlarged Exhibit Space | $1,345,500 | $1,579,300 |
| 1 | Pursue other renewable or alternative energy options ilo wood chips. | | | X | X | | | Increased Reliability | $305,000 | ($56,200) |
| 3 | Computer model the natural ventilation in the atrium to validate it's effectiveness and performance | X | X | X | X | | | Confirms System Effectiveness | ($10,000) | ($10,000) |
| 7 | Add blank section in each AHU for future cooling coil | X | X | | | | | Improves Flexibility | ($3,100) | ($3,100) |
| 9 | Move boilers into building (if not using wood chip fuel) | X | X | X | X | | | Eliminates Maint. Bldg | $412,500 | $51,300 |
| 12 | Provide single freight / passenger elevator for building ilo 2 separate ones | | | | X | | | Space savings | $132,800 | $173,000 |
| 19 | Limit radiant floor heat to first 10'-0" of perimeter floor | | | X | X | | X | Faster heating response | $189,700 | $189,700 |
| 20 | Eliminate radiant floor heat in basement | | X | | X | | X | Maintains zone control | $54,800 | $54,800 |
| 23 | Omit skylights over stairs and reception area / use only clerestory | | X | | X | | X | Less heat loss | $93,500 | $108,400 |
| 34 | Separate construction contracts for exhibits and GC | | | | X | | X | Separates expertise | $508,600 | $508,600 |
| 35 | Adjust estimate | | | | | | X | More accurate costs | $36,500 | $36,500 |
| 36 | Increase escalation from 3.5% to 7.5% | | | | | | X | More realistic Cost | ($2,335,300) | ($2,335,300) |
| 37 | Let contractor buy out job up front with government to provide secure storage | | | | | | X | Reduced risk (bid surprise) | $504,100 | $504,100 |
| 41 | Add crosswalk & waiting area for bus drop-off / loading area | X | X | | | | | Improves safety | ($98,600) | ($98,600) |
| 59 | Omit standby generator | | | X | X | | X | Reduces area | $235,200 | $244,800 |
| 67-69 | Reduce contractor's general conditions costs | | X | | | | | Leverages local assets | $129,600 | $129,600 |
| 71 | Omit underfloor distribution and use overhead distribution | | | | X | | | Easier system access | $164,000 | $164,000 |
| 80-81 | Incorporate public art into building (include ANHA and leverage Rasmussen Foundation) | X | | | | X | | Reinforces community | $47,600 | $44,000 |
| 82 | Consider an underground stormwater treatment package | X | X | | X | | | No subsurface contamination | ($200) | ($200) |
| 83 | Consider moment frame instead of brace frame at exterior wall | | | | | X | | Fewer lateral supports | ($106,300) | ($106,300) |
| 84 | Link occupancy sensor to the space ventilation system | | | X | X | | | Supports LEED | ($23,400) | ($23,400) |
| | | | | | | | | | | |
| **Summary of VA Recommendations** | | | | | | | | | | |
| | *Savings Potential (Not Including cost increases or multiple options)* | | | | | | | | *$4,159,400* | *$3,731,900* |
| | *Cost Adds* | | | | | | | | *($2,576,900)* | *($2,576,900)* |

## VALUE ANALYSIS RECOMMENDATIONS SUMMARY

Figure 1

Project: **Mary Lowell Center**
**Kenai Fjords National Park**
Location: **Seward, Alaska**

| VA No. | Proposal Description | Benefits: Better Visitor Expnce | Better Performance | Less Energy (LEED) | Reduced O&M | Improved Aesthetics | Improved Schedule | Other Benefits | Potential Savings ( ) indicates cost increase: Initial | Life Cycle |
|---|---|---|---|---|---|---|---|---|---|---|
| 90% | Consider moving the boilers inside, limiting radiant flooring, separating the exhibit and general contractor contracts, and allowing contractor buy out right after award | | | | | | | | $1,782,400 | Improved |
| 75% | Consider 90% + revising the entire HVAC system including eliminating the thermal mass, eliminating the 2nd and 3rd floor atriums, and combining the multi-purpose and conferencing rooms | | | | | | | | $4,400,900 | Improved |
| **Design Suggestions** | | | | | | | | | | |
| 15 | Provide engineering solution to hide above ground electrical lines (improve visual appearance) | X | X | | | | | Removes visual impact | Design Suggestion | Design Suggestion |
| 27 | Omit retractable raked seating system in conference room | | X | | X | | | Better visibility | Design Suggestion | Design Suggestion |
| 52-57 | Modify the LEED points considered for the project | | | X | X | | X | Leverages lessons learned | Design Suggestion | Design Suggestion |
| 64 | Retain and incorporate character of facade of historic Solly's in new building design | | | | X | X | | More local related Vernacular | Design Suggestion | Design Suggestion |
| 70 | Consider alternative construction contract method | | X | | | | X | Minimizes change orders | Design Suggestion | Design Suggestion |
| 78 | Minimize types of light fixture lamps | | | X | X | | | Reduces parts inventory | Design Suggestion | Design Suggestion |

**Value Analysis Study**
**Mary Lowell Center Project**

Kenai Fjords National Park
Seward, Alaska

January 31, 2006

# SECTION B: VALUE ANALYSIS STUDY

## Phase I Information

### *Study Specifics*

The study team was composed of a mix of professional subject matter experts and included members with varied operations and maintenance experience. Members of the park staff, USFS staff, and the City of Seward grounded the team with knowledge of the intricacies of managing and working on this site.
The VA team members consisted of:

**PARTICIPANTS:**

| Name/ Title: | Job Function: |
|---|---|
| **National Park Service, Kenai Fjords National Park** | |
| Jeff Mow | Park Superintendent |
| Amy Ireland | Exhibit Design |
| Jim Ireland | Exhibit Design |
| **National Park Service, Alaska Regional Office** | |
| Paul Schrooten | NPS Project Manager |
| Steve Peterson | Historic Architecture |
| Mary Miner | Civil Engineering |
| **National Park Service, Denali National Park** | |
| Joe Durrenberger | Park O&M, LEED |
| **Unites States Forest Service** | |
| Darrell Neal | Civil Engineering |
| **City of Seward** | |
| Kirsten Vesel | Partnerships |
| **Coffman Engineers** | |
| Walter Heins | Mechanical Engineering, Commissioning |
| **RIM Architects** | |
| Jim Dougherty | Architecture / Design |

| | |
|---|---|
| **MA Engineering** | |
| Saline Sassine | Electrical Engineering |
| **The Portico Group (Design Team)** | |
| Paul Sorensen | Project Manager |
| Alissa Rupp | Project Architect |
| Justin Lyon | Exhibit Design |
| **Tetra Tech / KCM Inc. (Design Team)** | |
| Andre Sidler | Structural |
| **Stantec Engineering (Design Team)** | |
| Frank Lufkin | Mechanical |
| **USKH, Inc (Design Team)** | |
| Gary Hable | Electrical |
| **Candela (Design Team)** | |
| Denise Fong | Lighting Designer |
| **Paladino & Company, Inc. (Des Tm)** | |
| Brad Pease | Sustainable Design |
| **Bluewater Project Management, Inc. (Design Team)** | |
| John Langer | Estimator |
| **Kirk Associates** | |
| Stephen Kirk | Facilitator / VE Team Leader |
| Steve Garrett | Estimating |

Stephen Kirk, a value specialist & principal of Kirk Associates, led the team's deliberations during the workshop.

The team reviewed the reconstruction alternatives, considered cost estimates, and prepared a “function logic diagram” as a part of the workshop. Certain value analysis used analytical tools and methods during the 3-day workshop to focus the VA team on the issues, problems and opportunities presented by the proposed rehabilitation. The VA agenda, in conformance with the standards of NPS and SAVE International, can be found in **Section C** of this report.

The VA workshop focused on:

1. Identify the best approach for selecting a “go forward” plan addressing the VA teams “weak features” via Choosing By Advantages;
2. Identify alternatives to address the following focus areas:
    a. Minimize the new facilities energy use;
    b. Minimize the maintenance needs;
    c. Confirm LEED points for consideration;
    d. Maximize Operational Effectiveness.
3. Identify 90% and 75% alternatives per NPS mandates.

### *Project Background*

Visitation at Kenai Fjords in the past 10 years has increased from 60,000 to more than 290,000 and the permanent park staff has tripled. The 5,000 square foot Seward visitor center / headquarters and offsite offices are inadequate and largely inaccessible for both visitors and staff.

A multi-agency facility incorporating the needs of the NPS, Forest Service, Alaska State Parks, the City of Seward and others was proposed in the 1996 Development Concept Plan. An MOU was signed by the NPS, USFS, State Parks, City of Seward, and Seward Chamber of Commerce in May 1996 and renewed in January 1998. The City of Seward provided $50,000 for a conceptual design which was completed in January 1997 by GDM Inc. City land set aside for this project in that study was later rejected due to geo-technical considerations.

In January, 1999 the University of Alaska's Institute of Marine Science agreed to sell their current visitor facility in Seward for joint use as a multi-agency visitor center and administrative headquarters. They later withdrew their offer to sell. The partners then became involved with the larger vision Seward Waterfront Revitalization project. The USFS received approval for new offices and visitor facilities contingent on their partnering with NPS in a common building. Land acquisition and initial planning and design funds were received by the NPS and USFS in 1998 and 2001. The NPS has also received additional Congressional earmark funding in 2005 and 2006 to further complete design and site preparation.

### *Design Presentation*

The Portico Group provided the 35% Schematic Design Report. The very well done, thorough report included information and analysis that helped ground the VA team with a clear understanding of the project. The following documents were provided to the VA team:

- From The Portico Group:
  - 35% Schematic Design Report
- National Park Service provided:
  - Original PMIS information.
- Kirk Associates provided:
  - Value Models used in the workshop.

### *Stakeholders, Primary Interests and Concerns*

The following table reflects the projects primary stakeholders, their interest and the concerns reflected over the Mary Lowell Center Project.

| **Stakeholders** | **Primary Interest** |
|---|---|
| • *Visitors to Seward 40,000 Annually*<br>  • *Group Tours*<br>  • *Students (K-16)*<br>  • *Package tours via bus, cruise ships, trains (heaviest May –September)*<br>  • *Local Residents*<br>  • *Regional / State Residents*<br>  • *Repeat visitors*<br>  • *Conference Attendees*<br>  • *Camper / RV'ers* | • *Experience and Quality of Region*<br>• *Touring Kenai Fjords NP*<br>• *Chugach National Forest*<br>• *Touring the Historic Downtown*<br>• *Research*<br>• *Educational Programs*<br>• *Interpretive stories and exhibits*<br>• *Purchase Alaska Memorabilia / Books*<br>• *Natural History (fjords, glaciers)*<br>• *Sea Life Center*<br>• *4th of July Festivities* |
| • *Special Interest Groups*<br>  • *Fishermen*<br>  • *Eco Tours*<br>  • *Avid Sportsmen*<br>  • *Military Recreation Camp* | • *Fishing / Silver Salmon Derby*<br>• *Experience and Quality of Region*<br>• *Sport Activities*<br>• *Whale Watching* |
| • *Federal Government*<br>  • *Senator Stevens*<br>  • *National Park Service*<br>  • *United States Forest Service*<br>  • *National Marine Fisheries* | • *KFNP Improvements*<br>• *Regional Interests*<br>• *Park / Forest Management & Operations*<br>• *Partnerships* |
| • *State Government*<br>  • *State officials* | • *Protection of resources*<br>• *Regional economy* |
| • *Local Governments*<br>  • *City of Seward Officials*<br>  • *Police and Fire Department* | • *Protection of Resources*<br>• *Local Economy*<br>• *Regional Influences*<br>• *Building Codes / Safety*<br>• *Tourism*<br>• *City Beautification* |
| • *Other Local Groups*<br>  • *Seward Historical Commission*<br>  • *Chamber of Commerce*<br>  • *Preservation Groups* | • *Economy*<br>• *Neighborhood Stability (keep character)*<br>• *City Beautification*<br>• *Partnerships*<br>• *Park / Public space influence* |
| • *Local Businesses*<br>  • *ANHA* | • *Visitor experience*<br>• *Bookstores economy (non profit)* |
| • *Design Team* | • *All of the above* |

### *FAST Diagram*

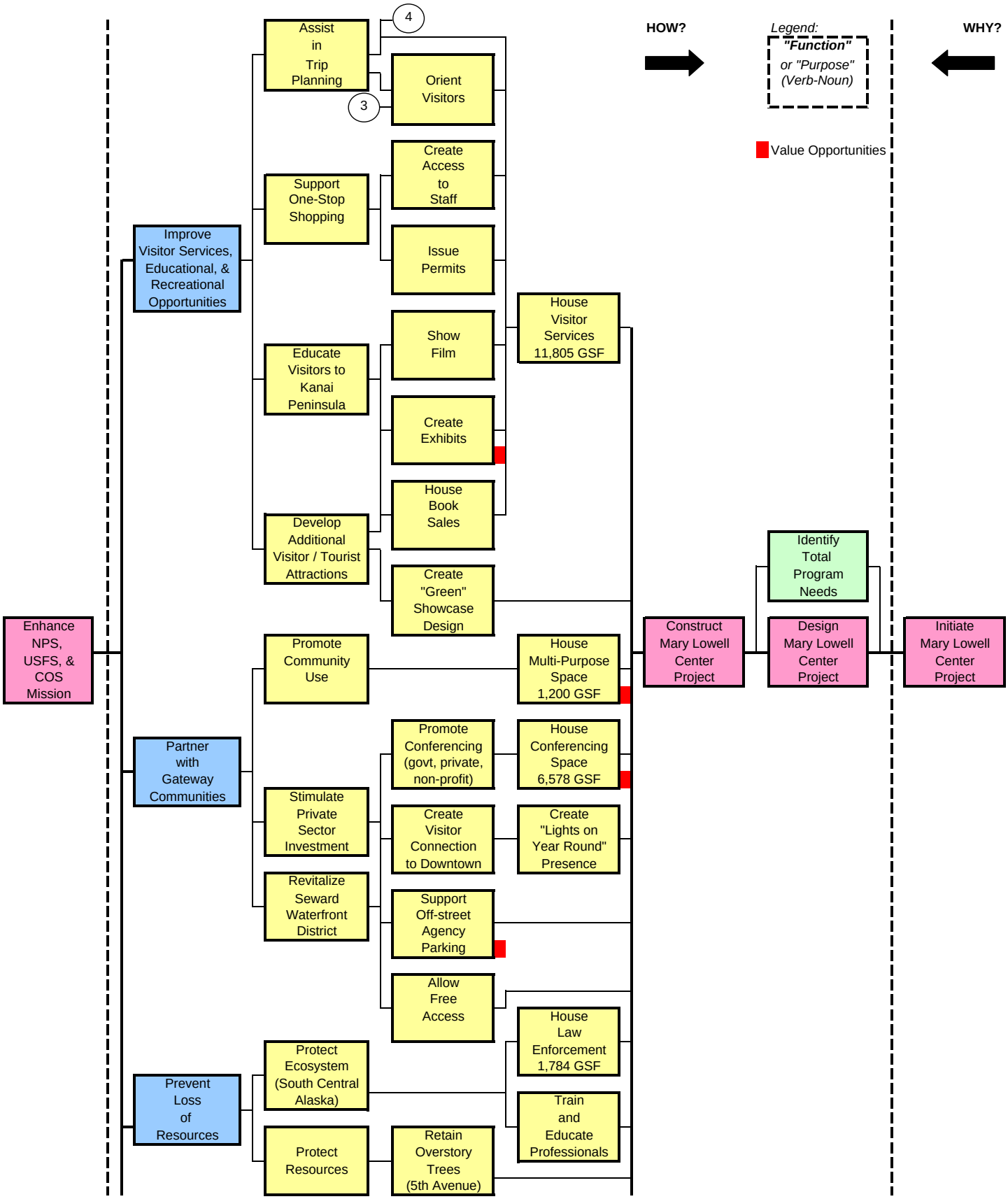
Function analysis is core to any value study. For this project, the VA team prepared a Function Analysis System Technique (FAST) diagram to help understand the overall purpose of the MLC Project. This diagram describes the essential project functions that will "Enhance The NPS / Kenai Fjords National Park mission." The FAST diagram (**Figure 2**) can be found on the following page.

# Mary Lowell Center

**Kenai Fjords National Park**

Function Logic Diagram

Figure 2

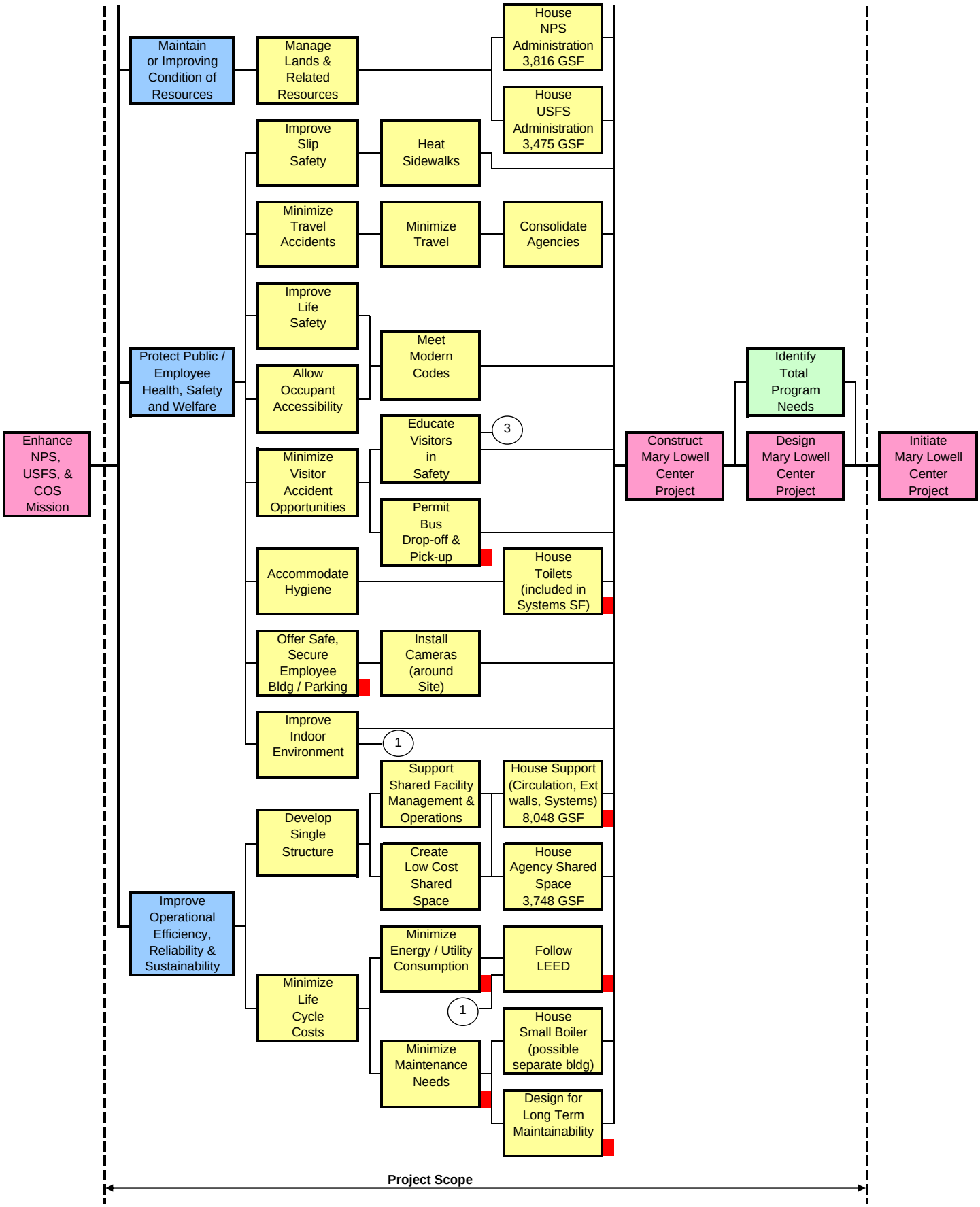


# Mary Lowell Center

**Kenai Fjords National Park**

Function Logic Diagram

Figure 2



### *Cost Model*

The overall net construction cost model summary developed by Kirk Associates is shown as **Figure 3**. The estimate breakdown was based on the original cost information provided to the VA team. The detailed SD estimate can be referenced in Section C of this report.

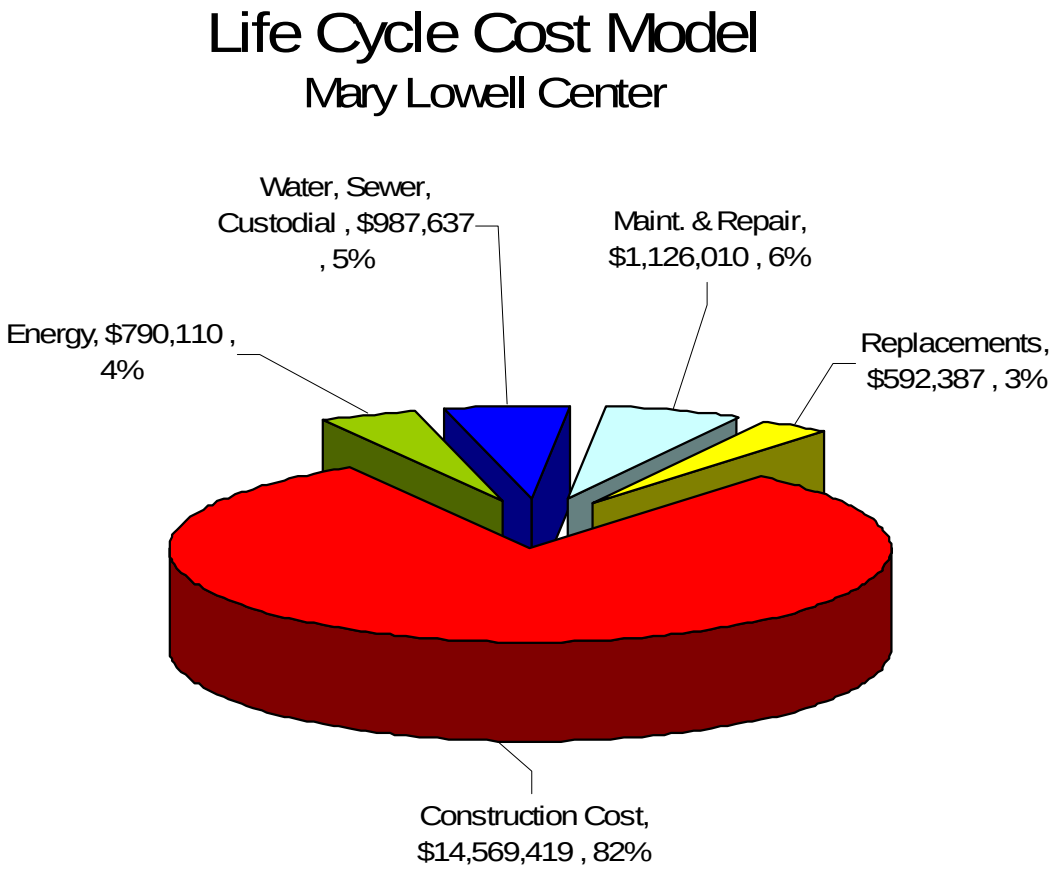
**Figure 3**

**Mary Lowell Center Project Cost Model**

| | |
|---|---|
| 011 - Site Preparation | 185,693 |
| 012 - Site Improvements | 291,242 |
| 013 - Site Mechanical | 102,766 |
| 014 - Site Electrical | 96,798 |
| 021 - Standard Foundations | 68,395 |
| 022 - Slab on Grade | 150,527 |
| 031 - Floor/Wall Construction | 1,844,485 |
| 032 - Roof Construction | 234,752 |
| 033 - Stair Construction | 112,120 |
| 041 - Exterior Walls | 250,690 |
| 042 - Exterior Doors and Windows | 344,877 |
| 051 - Roofing | 150,226 |
| 052 - Skylights | 100,825 |
| 061 - Partitions and Doors | 377,163 |
| 062 - Interior Finishes | 458,622 |
| 063 - Specialties | 169,500 |
| 07 - Conveying Systems | 160,000 |
| 081 - Plumbing | 240,475 |
| 082 - HVAC | 964,709 |
| 083 - Fire Protection | 148,674 |
| 091 - Service and Distribution | 243,300 |
| 092 - Lighting and Power | 424,962 |
| 093 - Special Electrical Systems | 785,253 |
| 101 - Fixed and Movable Equipment | 3,485 |
| 102 - Furnishings | 66,500 |
| 11 - Special Construction | 1,345,500 |
| 12 - General Requirements | 3,007,537 |
| 13 - Contingencies | 2,240,343 |
| **Total Construction Cost:** | **$14,569,400** |

### *Life Cycle Cost Model*

To better understand the total ownership costs for the project, the VA team prepared the following life cycle cost model for the project is shown as **Figure 4**. This diagram helped the team focus on life cycle cost items for savings. The energy costs were approximated by the design team. Maintenance & repair costs were approximated based on similar projects in this area. Economic factors included a 20 useful life and a discount rate of 3.1% used for calculating the present worth cost (net present value).




| Components | PW Cost | PW Cost/ GSF | Percent | Annual Cost | Annual Cost /GSF |
|---|---|---|---|---|---|
| Construction Cost | $14,569,419 | $351.60 | 80.6% | $988,370 | $23.85 |
| Energy | $790,110 | $19.07 | 4.4% | $53,600 | $1.29 |
| Water, Sewer, Custodial | $987,637 | $23.83 | 5.5% | $67,000 | $1.62 |
| Maint. & Repair | $1,126,010 | $27.17 | 6.2% | $76,387 | $1.84 |
| Replacements | $592,387 | $14.30 | 3.3% | $40,187 | $0.97 |
| Total | $18,065,563 | $435.97 | 100% | $1,225,544 | $29.58 |

A graphical “Pareto” diagram helped the team focus on maintenance and repair (**Figure 4A**), along with replacement costs (**Figure 4B**) associated with this project. Similar area projects and 2005 Maintenance & Repair Costs from Whitestone were referenced.

**Figure 4A**

## Maintenance & Repair Cost
## Mary Lowell Center

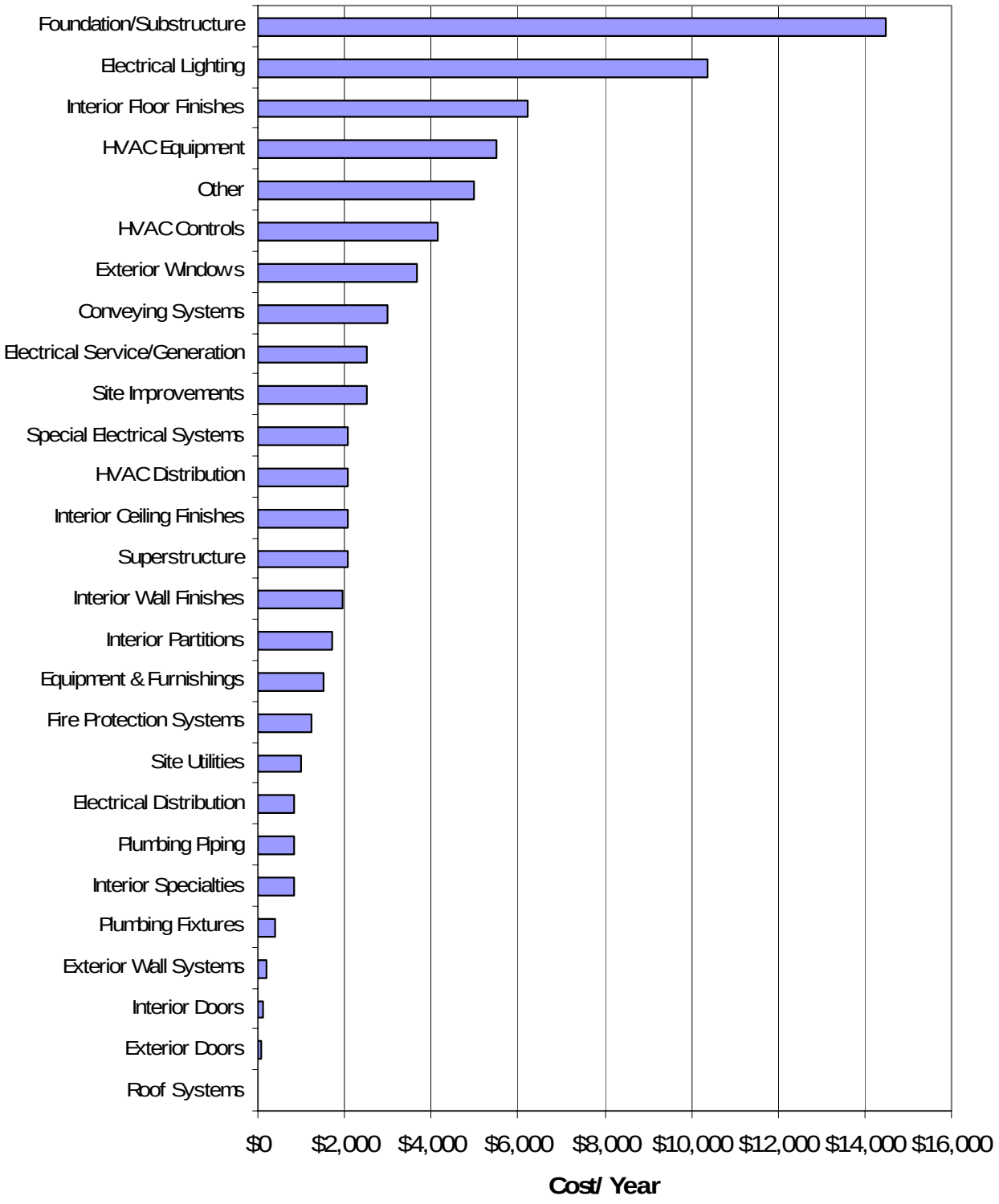
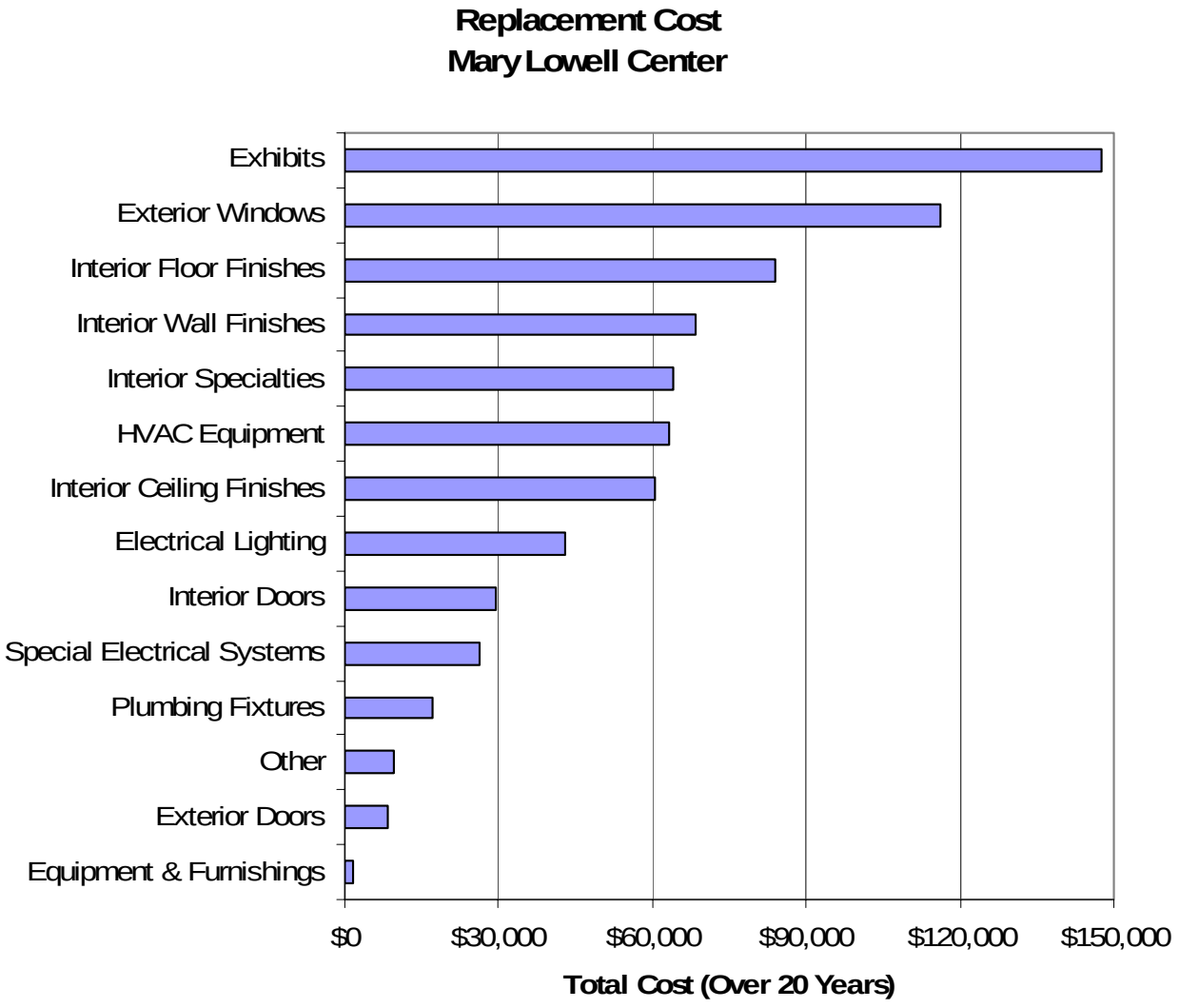


**Figure 4B**



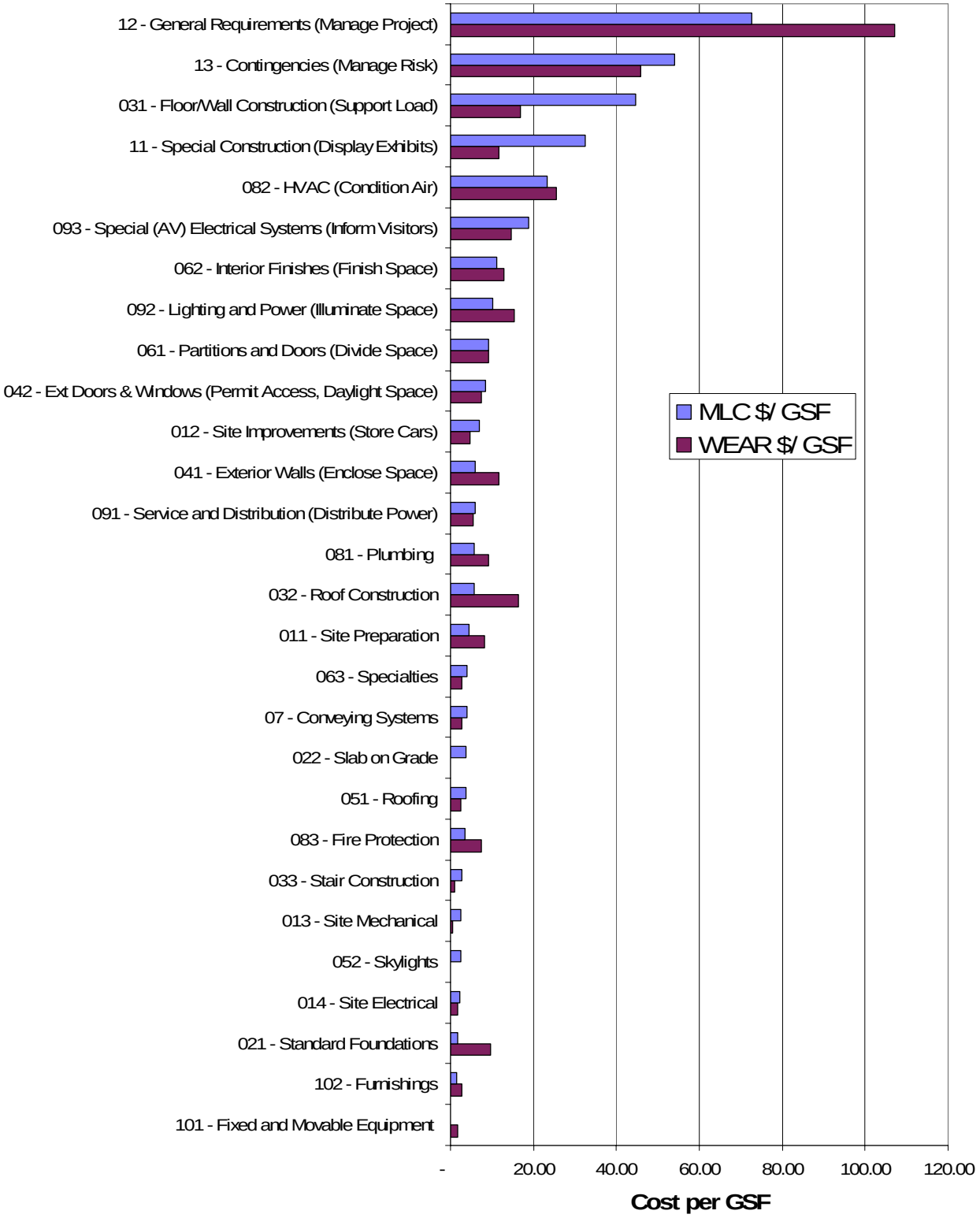

### *Function Cost Model ($ / GSF)*

Identifying functions helps the VA team gain new insight about the project. The function cost model is later used to creatively explore alternatives to meet the functions at reduced cost. For this project, the VA team prepared a function cost model (**Figure 5**) to help understand the overall costs relative to the MLC functions. This diagram shows the cost estimated for the project and the "worth" based on the similar projects. In this case the WEAR project is the Northwest Arctic Heritage & Cultural Center, Western Artic Parklands in Kotzebue, Alaska. The costs were adjusted for location and time to provide a regional example of anticipated system costs for a similar project.

**Figure 5**

# Function Cost Model ($/ GSF)

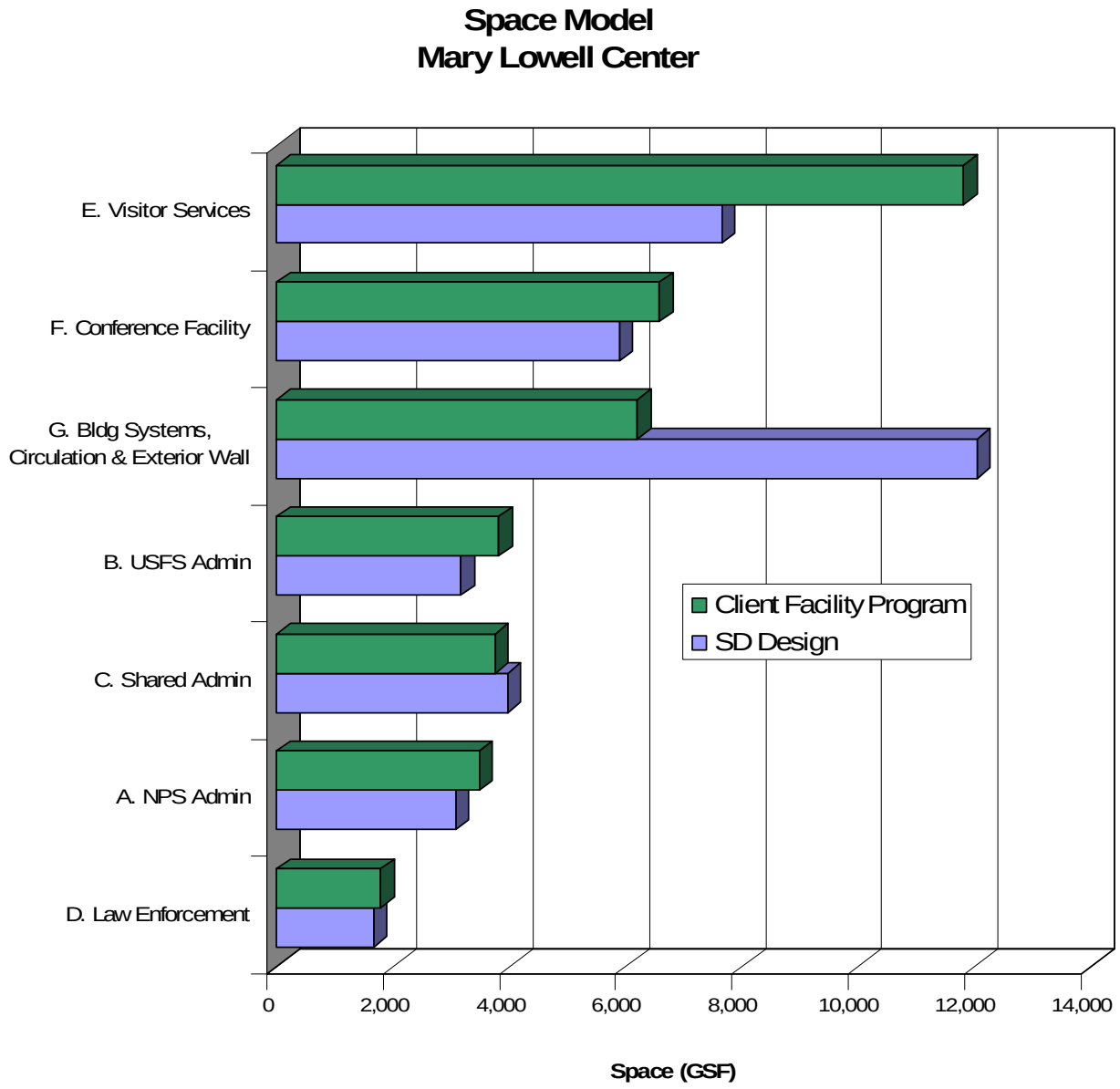
## Mary Lowell Center, Seward, AK



### *Space Model*

The space model (**Figure 6)** helped the VA team identify the largest components of space within the MLC. This model also provided insight to the team in developing alternatives to maximize value for the MLC.

**Figure 6**




### *Force Field Analysis*

In generating ideas for improvement, the VE team used this tool to identify "best" and "weakest" project features. The best features were identified so the VE team would retain these characteristics. The weakest features were identified so they could be improved. The result of this analysis is as follows:

**Best Features**

- Flexible location for showing film (from 1 to 150 persons)
- Front entry aesthetics (including balcony and windows)

- Maximizing views
- Organizing offices by functions ilo agencies
- Site visibility and access
- Daylighting sensor controls
- Focus on reduced energy
- Project design documentation
- Separation of functions (public verses government)
- Building expresses “integration of organizations”
- Design creates hub as “Town Center”
- Separation of multi-use area from remainder of building
- Atrium (aesthetics, daylighting, ventilation, interaction)
- Operable windows
- Seasonal awareness flexibility of design
- Massing and form reflects historical Seward character
- Interpretive design provides texture and immersive flor
- Use of passive ventilation (natural)
- Thermal mass
- Amount of daylighting provided supports good working environment
- Integrated LEED approach
- Use of renewable fuels (wood chips)
- Use of rain screen for moisture control
- One-stop shopping for visitors
- Good community involvement in design
- 360 degree face of building
- Multi-purpose design builds on community needs / support
- Meets foreseeable agency growth requirements

**Weakest Features**

- Circulation in exhibit gallery (may be too small to accommodate bus load)
- Wood fired boiler (too much unknowns, e.g. where will wood come from, pollution from burning wood, wood chip storage, maintenance & operating needs, etc.)
- Remote located boiler building (loss of efficiency)
- Safety concerns about loading / unloading of busses
- Location of service area (visibility, trash, odor, etc.)
- Overhead power lines in alley (visual problem)
- Level 1 circulation is split (public to agency)
- Atrium is contrived (too small of a space)
- No protection or control of wind at 2$^{nd}$ level balconies
- Loss of parking for remote boiler and bio-swale
- Maintenance of moveable items (skylights, raked seating, moveable features, thermal screens in atrium, etc.)
- Employees do not have views to water (best views used by stairs / meeting)
- Re-use of Solly wood beams verses retaining in fire resistant structure
- Re-visit LCC assumptions for mechanical system design selection
- Use of exterior wall brace frames (limits flexibility) instead of using moment frames

- Too many types of light fixtures
- Occupancy sensors not linked to space ventilation system
- Quality of circulation space
- Need for freight elevator and passenger elevator
- Design of exterior elevations (articulation, glazing, too much)
- Code issues about B occupancy being separated on two floors with open atrium (fire resistant)
- Floor opening looks down on reception area (must keep tidy)
- Generator located in main building
- No method of filtering dust and smoke for natural ventilation (very prone)
- Security risk of having open windows
- Location of mechanical room (access to equipment from North grade)
- No mechanical cooling provided (could be comfort issue, indoor air quality in high humidity environment, mold issues, etc.)
- Layout / space use of multi-purpose room
- Steel painted sash (salt water environments)
- Doing entire job with single General Contractor (limits flexibility in picking best contractor for very different skill set)
- Not enough individual controls for user comfort
- Not sure if mechanical system corresponds to needs of seasonal staff (can that be shut down like private areas)
- No secured parking for government vehicles

### *LEED Sustainability Model*

The LEED sustainability model (**Figure 7**) was created by the design team and helped the VA team identify additional value opportunities. The self assessment narrative described which points the design team was considering acquiring in the MLC project. The VA team evaluated the LEED points considered and found additional points that could be taken with no significant cost increases. Also uncovered were those points under consideration that could become very costly items. Much of the discussion centered on lessons learned from similar NPS projects in Alaska that have recently become USGBC Silver Certified.

LEED-NC

Figure 7

# LEED-NC Version 2.2 Registered Project Checklist

Mary Lowell Center
Seward, Alaska

## Sustainable Sites — 14 Points

| Yes | ? | No | | | |
|---|---|---|---|---|---|
| Y | | | Prereq 1 | **Construction Activity Pollution Prevention** | Required |
| 1 | | | Credit 1 | **Site Selection** | 1 |
| | | 1 | Credit 2 | **Development Density & Community Connectivity** | 1 |
| | | 1 | Credit 3 | **Brownfield Redevelopment** | 1 |
| | | 1 | Credit 4.1 | **Alternative Transportation**, Public Transportation Access | 1 |
| 1 | | | Credit 4.2 | **Alternative Transportation**, Bicycle Storage & Changing Rooms | 1 |
| | | 1 | Credit 4.3 | **Alternative Transportation**, Low-Emitting and Fuel-Efficient Vehicles | 1 |
| 1 | | | Credit 4.4 | **Alternative Transportation**, Parking Capacity | 1 |
| | | 1 | Credit 5.1 | **Site Development,** Protect of Restore Habitat | 1 |
| | | 1 | Credit 5.2 | **Site Development,** Maximize Open Space | 1 |
| | 1 | | Credit 6.1 | **Stormwater Design,** Quantity Control | 1 |
| | | 1 | Credit 6.2 | **Stormwater Design,** Quality Control | 1 |
| | | 1 | Credit 7.1 | **Heat Island Effect,** Non-Roof | 1 |
| | 1 | | Credit 7.2 | **Heat Island Effect,** Roof | 1 |
| 1 | | | Credit 8 | **Light Pollution Reduction** | 1 |

## Water Efficiency — 5 Points

| Yes | ? | No | | | |
|---|---|---|---|---|---|
| 1 | | | Credit 1.1 | **Water Efficient Landscaping**, Reduce by 50% | 1 |
| 1 | | | Credit 1.2 | **Water Efficient Landscaping**, No Potable Use or No Irrigation | 1 |
| | | 1 | Credit 2 | **Innovative Wastewater Technologies** | 1 |
| 1 | | | Credit 3.1 | **Water Use Reduction**, 20% Reduction | 1 |
| 1 | | | Credit 3.2 | **Water Use Reduction**, 30% Reduction | 1 |

## Energy & Atmosphere — 17 Points

| Yes | ? | No | | | |
|---|---|---|---|---|---|
| Y | | | Prereq 1 | **Fundamental Commissioning of the Building Energy Systems** | Required |
| Y | | | Prereq 2 | **Minimum Energy Performance** | Required |
| Y | | | Prereq 3 | **Fundamental Refrigerant Management** | Required |
| 6 | 2 | 2 | Credit 1 | **Optimize Energy Performance** | 1 to 10 |
| | 3 | | Credit 2 | **On-Site Renewable Energy** | 1 to 3 |
| | 1 | | Credit 3 | **Enhanced Commissioning** | 1 |
| 1 | | | Credit 4 | **Enhanced Refrigerant Management** | 1 |
| | 1 | | Credit 5 | **Measurement & Verification** | 1 |
| | | 1 | Credit 6 | **Green Power** | 1 |

## Innovation & Design Process — 5 Points

| Yes | ? | No | | | |
|---|---|---|---|---|---|
| 1 | | | Credit 1.1 | **Innovation in Design**: Green Building Education | 1 |
| 1 | | | Credit 1.2 | **Innovation in Design**: Green Housekeeping | 1 |
| 1 | | | Credit 1.3 | **Innovation in Design**: Exemplary Water Effeciency | 1 |
| | 1 | | Credit 1.4 | **Innovation in Design**: Sustainable Wood Fuel Harvesting | 1 |
| 1 | | | Credit 2 | **LEED® Accredited Professional** | 1 |

## Materials & Resources — 13 Points

| Yes | ? | No | | | |
|---|---|---|---|---|---|
| Y | | | Prereq 1 | **Storage & Collection of Recyclables** | Required |
| | | 1 | Credit 1.1 | **Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof | 1 |
| | | 1 | Credit 1.2 | **Building Reuse**, Maintain 100% of Existing Walls, Floors & Roof | 1 |
| | | 1 | Credit 1.3 | **Building Reuse**, Maintain 50% of Interior Non-Structural Elements | 1 |
| | 1 | | Credit 2.1 | **Construction Waste Management**, Divert 50% from Disposal | 1 |
| | | 1 | Credit 2.2 | **Construction Waste Management**, Divert 75% from Disposal | 1 |
| | | 1 | Credit 3.1 | **Materials Reuse**, 5% | 1 |
| | | 1 | Credit 3.2 | **Materials Reuse**,10% | 1 |
| 1 | | | Credit 4.1 | **Recycled Content**, 10% (post-consumer + ½ pre-consumer) | 1 |
| | 1 | | Credit 4.2 | **Recycled Content**, 20% (post-consumer + ½ pre-consumer) | 1 |
| | 1 | | Credit 5.1 | **Regional Materials**, 10% Extracted, Processed & Manufactured Regionally | 1 |
| | | 1 | Credit 5.2 | **Regional Materials**, 20% Extracted, Processed & Manufactured Regionally | 1 |
| | | 1 | Credit 6 | **Rapidly Renewable Materials** | 1 |
| | | 1 | Credit 7 | **Certified Wood** | 1 |

## Indoor Environmental Quality — 15 Points

| Yes | ? | No | | | |
|---|---|---|---|---|---|
| Y | | | Prereq 1 | **Minimum IAQ Performance** | Required |
| Y | | | Prereq 2 | **Environmental Tobacco Smoke** (ETS) **Control** | Required |
| 1 | | | Credit 1 | **Outdoor Air Delivery Monitoring** | 1 |
| | 1 | | Credit 2 | **Increased Ventilation** | 1 |
| 1 | | | Credit 3.1 | **Construction IAQ Management Plan**, During Construction | 1 |
| | 1 | | Credit 3.2 | **Construction IAQ Management Plan**, Before Occupancy | 1 |
| 1 | | | Credit 4.1 | **Low-Emitting Materials**, Adhesives & Sealants | 1 |
| 1 | | | Credit 4.2 | **Low-Emitting Materials**, Paints & Coatings | 1 |
| 1 | | | Credit 4.3 | **Low-Emitting Materials**, Carpet Systems | 1 |
| 1 | | | Credit 4.4 | **Low-Emitting Materials**, Composite Wood & Agrifiber Products | 1 |
| 1 | | | Credit 5 | **Indoor Chemical & Pollutant Source Control** | 1 |
| | 1 | | Credit 6.1 | **Controllability of Systems**, Lighting | 1 |
| 1 | | | Credit 6.2 | **Controllability of Systems**, Thermal Comfort | 1 |
| 1 | | | Credit 7.1 | **Thermal Comfort**, Design | 1 |
| 1 | | | Credit 7.2 | **Thermal Comfort**, Verification | 1 |
| 1 | | | Credit 8.1 | **Daylight & Views**, Daylight 75% of Spaces | 1 |
| 1 | | | Credit 8.2 | **Daylight & Views**, Views for 90% of Spaces | 1 |

## Project Totals (pre-certification estimates) — 69 Points

| Yes | ? | No |
|---|---|---|
| 32 | 16 | 21 |

**Certified** 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points

## Phase II Creativity (Creative Idea Listing)

### *Creative Ideas*

**Figure 8** lists the 95 creative ideas generated during the "brainstorming" portion of the VA workshop. These ideas were evaluated by the team and ranked according the weather the idea offered performance or cost improvements. The Kenai Fjords Superintendent and the City of Seward also identified those ideas they would like to see developed. The team then selected the ideas they felt were most appropriate for development into recommendations. The recommended ideas (indicated in **bold type**) were developed into VA proposals by the team. These VA Proposal number correlates with the idea number (e.g. idea 22 becomes VA Proposal 22).

# CREATIVE IDEAS

***Brainstorming***

Figure 8

Key: P=Performance
C=Cost
S=City of Seward
N=Superintendent of NPS Park
**Bold** = Ideas developed into proposals
Note: ilo = in lieu of; DS = Design Suggestion

Project: **Mary Lowell Center**
**Kenai Fjords National Park**
Location: **Seward, Alaska**
Date: **January 17-19, 2006**

| No. | Description: | | |
|---|---|---|---|
| **1** | **Pursue other renewable or alternative energy options ilo wood chips.** | | PCN |
| | Consider: | | |
| | - fish oil | | |
| | - coal gasification | | |
| | - propane (green compliant) | | |
| | - biodeisel | | |
| | - wind (perhaps off site) | | |
| 2 | Re-configure multi purpose room as dedicated theatre (don't do film in this location) | | |
| **3** | **Computer model the natural ventilation in the atrium to validate it's effectiveness and performance** | | PN |
| 4 | Clarify function of Atrium in Winter months (uses, | | |
| 5 | Omit stairs in Atrium (not used in winter) | | |
| 6 | Delete prominade (primary entry vestibule) | | |
| **7** | **Add blank section in each AHU for future cooling coil** | | PC |
| 8 | Put all spaces with high ceiling requirements on the same floor ($ savings) | | |
| **9** | **Move boilers into building (if not using wood chip fuel)** | | PC |
| 10 | Combine public and employee restrooms (potentially on all floors) | | |
| 11 | Provide access to boiler room from alley into basement | | |
| **12** | **Provide single freight / passenger elevator for building ilo 2 separate ones** | | C |
| 13 | Provide screen to hide service area and dumbster | | S |
| 14 | Provide historical elements to exterior fenestration (primary windows) | | S |
| **15** | **Provide engineering solution to hide above ground electrical lines (improve visual appearance)** | DS | PSN |
| 16 | Consider deleting thermal mass in Atrium to have opportunity for windows / daylighting | | C |
| 17 | Don't have split level floor on first floor | | C |
| 18 | Provide digital controls of windows | | |
| **19** | **Limit radiant floor heat to first 10'-0" of perimeter floor** | | C |
| **20** | **Eliminate radiant floor heat in basement** | | C |

# CREATIVE IDEAS

***Brainstorming***

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| No. | Description: | | |
|---|---|---|---|
| 21 | Consider perimiter baseboard radiant heating system | | C |
| 22 | Consider ceiling radiant panels (allow use of space at perimeter wall) | | |
| **23** | **Omit skylights over stairs and reception area / use only clerestory** | | C |
| 24 | Consider providing more clearstory ilo skylights | | C |
| 25 | Consider single ply / TPO / EPDM roofing ilo built-up roofing | | |
| 26 | Relocate north offices more to the south side | | |
| **27** | **Omit retractable raked seating system in conference room** | DS | CS |
| 28 | Re-configure multi-purpose room for improved effeciency | | S |
| 29 | Combine grand stair with existing stair | | |
| 30 | Reduce size and volume of building | | S |
| 31 | Return Washington Street vacated area as potential plaza | | |
| 32 | Allow daylight into Exhibit Area | | |
| 33 | Consider reducing circle size and creating space around inside and outside for exhibits | | PN |
| **34** | **Separate construction contracts for exhibits and GC** | | C |
| **35** | **Add cost of security system to estimate (not just conduit / wire)** | | P |
| **36** | **Increase escalation from 3.5% to 7.5%** | | C |
| **37** | **Let contractor buy out job up front with government to provide secure storage** | | C |
| 38 | Have local Alaksan contractor / estimator do an independent estimate to confirm price | | |
| 39 | Consider other bid options: | | |
| | - paving | | |
| | - raised floor | | |
| | - M & E | | |
| 40 | Consider improvements to Exhibit Area: | See VA 33 | N |
| | - Entry and separate exit | | |
| | - Increase size (SF) | | |
| | - Omit curve, use full corners | | |

# CREATIVE IDEAS

***Brainstorming***

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| No. | Description: | | |
|---|---|---|---|
| **41** | **Add crosswalk & waiting area for bus drop-off / loading area** | | S |
| | - Center across street (bus drop-off area) | | |
| | - Create covered waiting area at multi-purpose building | | |
| | - Create look similar to original Solly's | | |
| 42 | Add bus and handicap drop-off area | | S |
| 43 | Develop design of ANHA to assure enough space for display / sales | | |
| 44 | Combine public and private restrooms on 1st (employees can use 2nd floor RR in peak visitation) | | |
| 45 | Move public toilets on 1st floor to south side of exhibits | | |
| 46 | Combine employee restrooms for only 2nd floor (delete 1st and 3rd floor RR) | | N |
| 47 | Combine employee toilet with public on only the 2nd floor | | CSN |
| 48 | Combine grand stairs with exist stairs | | CSN |
| 49 | Eliminate atrium stairs | | C |
| 50 | Move exit stairs to interior location (saves perimeter for offices) | | |
| 51 | Consider granite cobbles ilo concrete pavers (maintenance problems with pavers / spalling) | | |
| **52** | **Add LEED point for "Green" energy power** | DS | P |
| 53 | Add LEED point for innovation for purchase of 100% of green power | in VA 52 | |
| 54 | Eliminate LEED point for IAQ 4.1 as construction adhesives will make it very difficult to option | in VA 52 | |
| 55 | Eliminate LEED point for IAQ 5 will be difficult to optain (Dinali experience) | in VA 52 | C |
| 56 | Consider eliminating LEED point IDP 1.3 because this is a high cost item that is difficult to achieve | in VA 52 | C |
| 57 | Identify weather the project will optain Silver Certification with USGBC | in VA 52 | S |
| 58 | Locate government vehicles on 3rd Street lot ilo in prime location (could be used for public use in peak time) | | S |
| **59** | **Omit standby generator** | | CN |
| 60 | Locate generator in parking lot ilo in building (high cost space, noise, etc.) | | |
| 61 | Incroporate snow loads Seward city code requirements into design | | S |
| 62 | Minimize builing height to improve fire / safety (per limits on city fire equipment) | | C |
| 63 | Incorporate utility relocation costs in estimate | Included in 15 | CS |

# CREATIVE IDEAS

***Brainstorming***

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Date: **January 17-19, 2006**

| No. | Description: | | |
|---|---|---|---|
| **64** | **Retain and incorporate character of facade of historic Solly's in new building design** | DS | PS |
| 65 | Locate building service / dumpster entry further North (minimal visual pedestrian impact from Washington St) | | S |
| 66 | Add height restriction to 1 story for building sites immediately to West of site (retain views) | | S |
| **67** | **Offer NPS house East of site for contractor office / housing then demo for parking after project completio** | | C |
| 68 | Have City offer RV park area for contractor employees | | in VA 67 |
| 69 | Advertise project ASAP after funding is known to get most favorable price / bid | | in VA 67 |
| **70** | **Consider alternative construction contract method** | DS | PCN |
| | Bid items: 1. Participate in design during CD = $_____ | | |
| | 2. Cost to construct project = $_____ | | |
| **71** | **Omit underfloor distribution and use overhead distribution** | | C |
| 72 | Consider solar shading ilo thermal mass concrete wall (reduces structural steel tonage and foundations) | | CN |
| 73 | Consider wide flange or typical columns ilo tube steel (very high cost steel component) | | C |
| 74 | Add chiller for mechanical cooling and omit thermal wall | | |
| 75 | Omit Atrium area and increase functional program per floor | | C |
| 76 | Have Atrium area on only the 2nd and 3rd floor | | |
| 77 | Reprogram space around Atrium area for offices | | N |
| **78** | **Minimize types of light fixture lamps** | DS | C |
| 79 | Verify hazardous material abatement needs and whether they should be included in estimate | | |
| **80** | **Incorporate public art ($100,000) into building, possibly working with ANHA for best community approach** | | PN |
| 81 | Leverage Rasmussen Funds (private) for matching fees for purchasing art in project | | in VA 81 |
| **82** | **Consider an underground stormwater treatment package** | | PC |
| **83** | **Consider moment frame instead of brace frame at exterior wall** | | C |
| **84** | **Link occupancy sensor to the space ventilation system** | | PC |
| 85 | Simplify articulation of elevations to reflect more Seward character ilo Seattle aesthetics | | |
| 86 | Verify code requirements for exising needs of 2nd floor meeting room | | |
| 87 | Verify code requirements for Atriums over 2 floors (smoke evacuation, systems needs, reliable standby power) | | |

# CREATIVE IDEAS

Figure 8

***Brainstorming***

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Project: **Mary Lowell Center**
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| No. | Description: | |
|---|---|---|
| 88 | Consider using no operable windows on 1st floor (improved security, noise control) | |
| 89 | Consider provision for de-humidification if humidity becomes an issue in the building | See VA 7 |
| 90 | Use other metal windows and doors to minimize corrosion (painted / coated steel, aluminum, etc.) | |
| 91 | Consider using solid vinyl windows ilo metal (fire resistant rating) | |
| 92 | Add more thermostats for individual control | |
| 93 | Create ability to "shut-down" seasonal work areas / offices in winter to reduce energy use | |
| 94 | Use 15'-0" set back ilo 12'-0" for alley way to avoid protecting windows in related assembly (code) | |
| 95 | Use wainscot on CMU walls on corridor walls to improve durability / reduce maintenance cost | |

## Phase III Evaluation (Part 1 - Evaluation Factors & Definitions)

As the first task of the evaluation phase the team developed and discussed the factors which would be used to evaluate the CBA alternatives. The study team then defined variables and sub factors to tailor the evaluation factors to the needs of this project. The following is a table of the evaluation factors and definitions used.

| | |
|---|---|
| **NPS OBJECTIVE: Protect Cultural and Natural Resources** | |
| **NPS OBJECTIVE: Provide for Visitor Enjoyment** | |
| **Factor 1: Improve visitor services, educational and recreational opportunities** | |
| Sub-factor | Definitions/Variables |
| Entry to Site / Building | • Convenience of visitor and employee entry to building |
| Flow / Circulation | • Ease of visitor and employee travel in building<br>• Level changes |
| Space Efficiency | • Efficiency of space use |
| Lobby Size | • Lobby size / functional adequacy |
| Aesthetics / Architecture | • Character of historic Solly building<br>• Aesthetics |
| **NPS OBJECTIVE: Improve efficiency of park operations** | |
| **Factor 2: Improve operational efficiency and sustainability** | |
| Sub-factor | Definitions/Variables |
| Quality of Office Space | • Views / comfort |
| **NPS OBJECTIVE: Improve health, safety, and welfare** | |
| **Factor 3: Protect employee and public health, safety and welfare.** | |
| Sub-factor | Definitions/Variables |
| Potential Hazards | • Visitor safety<br>• Employee safety |
| **NPS OBJECTIVE: Partner with Gateway Communities** | |
| **Factor 4: Develop / Improve Partnerships with Gateway Communities.** | |
| Sub-factor | Definitions/Variables |
| Promote Community Use | • Degree of community use promotion |
| **SPECIAL FACTOR: COST** | |
| Sub-factor | Definition/Variables |
| INITIAL COST (Short-term) | • Capital Costs |
| LIFE CYCLE COST (Long-term) | • Operating & Maintenance Costs<br>• Staffing Costs |

There were also proposals that did not involve alternatives for the MLC. Criteria for those VA Proposals were as follows:

- Performance:
  - *Aesthetics*
  - *Visitor Flow / Circulation*
  - *Work flow*
  - *Building Support Space*
  - *Maintenance*
- Cost
  - *Life Cycle / Initial Costs*
  - *LEED / Energy*

## Phase III Evaluation (Part 2 – Choosing by Advantages)

The 3 selected alternatives were evaluated using a process called Choosing by Advantages **(Figure 9)**, where decisions are based on the importance of advantages between alternatives. The evaluation involves the identification of the attributes or characteristics of each alternative relative to the evaluation criteria, a determination of the advantages for each alternative within each evaluation factor, and then the weighing of importance of each advantage.

The highest importance advantage is identified in each factor. The paramount advantage, across factors, was determined and assigned a weight determined by the team. Remaining advantages were rated on the same scale. Construction and life cycle costs were developed for each alternative. Recommendations are based on a balance of cost and importance.

The evaluation sheets form the basis for presenting the developed alternatives and design sketches and cost estimates are attached. The evaluation tables present many types of information. Attributes of an alternative are shown above the dotted line in the tables. Advantages between alternatives are shown below the dotted line. An anchor statement summarizes those advantages. The advantage with the highest importance within a factor is indicated by a highlight around the advantage cell. The advantages are all rated on a common scale.

The VA team reviewed the original schematic design and developed two additional alternatives for consideration. The alternatives involved split or same level plans with the functions associated around atriums or upper floors. The three alternatives evaluated using Choosing by Advantages or CBA included:

- Alternative 1: Original Design – Split Levels & Split Public / Staff Functions: $14,569,000.
- Alternative 2: Modified Layout – Same Levels & Split Public / Staff Functions: $13,224,000
- Alternative 3: Modified Layout – Same Levels & Same Public / Staff Functions: $12,457,000.

The study team evaluated the benefit or importance of an advantage to be realized from the Alternatives 1-3 (see CBA Matrix). Alternative 2, the new current design alternative, includes basic revisions which increased benefits and reduced cost. On purely a benefit or importance basis the new alternative provides the greatest advantage to the NPS. Initial cost estimates for the 3 alternatives were developed. Results were graphed with importance or benefit on the vertical scale and initial cost on the horizontal scale. The negative slope from the preferred alternative to the other alternatives reflects poor value for the additional $1,340,000 (Alt 1) or reduced $760,000 (Alt 3) invested.

# Value Analysis Recommendation

Figure 9

**Project:** **Mary Lowell Center, Seward, Alaska** — **VA No.**

**Item:** **Building Layout** — **CBA-1**

## Original Design

The original design (alternative 1) is a combination of 2 levels on half of the site and 3 level plus basement on the other half of the site. The structure is a steel, and has a number of LEED sustainable features. See floor plans.

## Proposed Design

The suggested alternative 2 maintains key facets of the original design such as natural cooling, community space on both the first and second floors, views to the water, and LEED sustainability. It groups the toilets and stairs, simplifies internal circulation, creates a single flat floor on the first floor (omitting half level changes), increases the size of the exhibit area and has improved space efficiency. Offices are re-oriented to improve views to the street. See the following floor plans.

## Advantages

**Advantages of Alternative 2:**

- Best convenience for visitor and employee entry to building
- Best visitor and employee overall flow and no elevation changes required on first floor
- Exhibit area is 700 SF larger and better flow of visitors
- Better efficiency of space use
- Best aesthetics/ architecture for City of Seward
- Best visitor safety due to on-site drop-off
- Better quality of office space
- Best degree of community use promotion

**Advantages of Alternative 1: (Original Design)**

- Better visitor and employee overall flow with elevation changes required on first floor
- Best lobby size (500 SF Larger lobby for better functionality
- Better aesthetics/ architecture for City of Seward
- Better degree of community use promotion

## Life Cycle Cost Summary

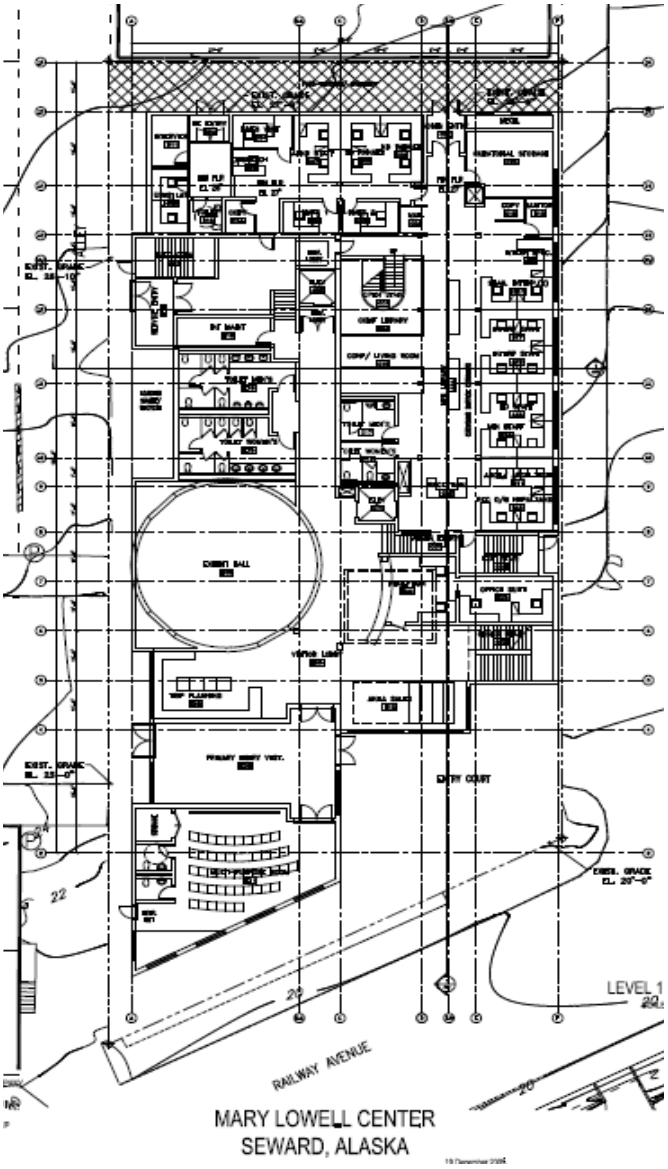
| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design (Alternative 1)** | **14,569,419** | **18,063,375** |
| **Proposed Design (Preferred Alternative 2)** | **13,223,902** | **16,484,062** |
| **Potential Savings** | **1,345,517** | **1,579,313** |

## Sketch Worksheet

**Project:** **Mary Lowell Center, Seward, Alaska** **VA No.**
**Item:** **Building Layout** **CBA-1**

■ **Original Design** ☐ **Proposed Design**

### Alt. 1: First Floor



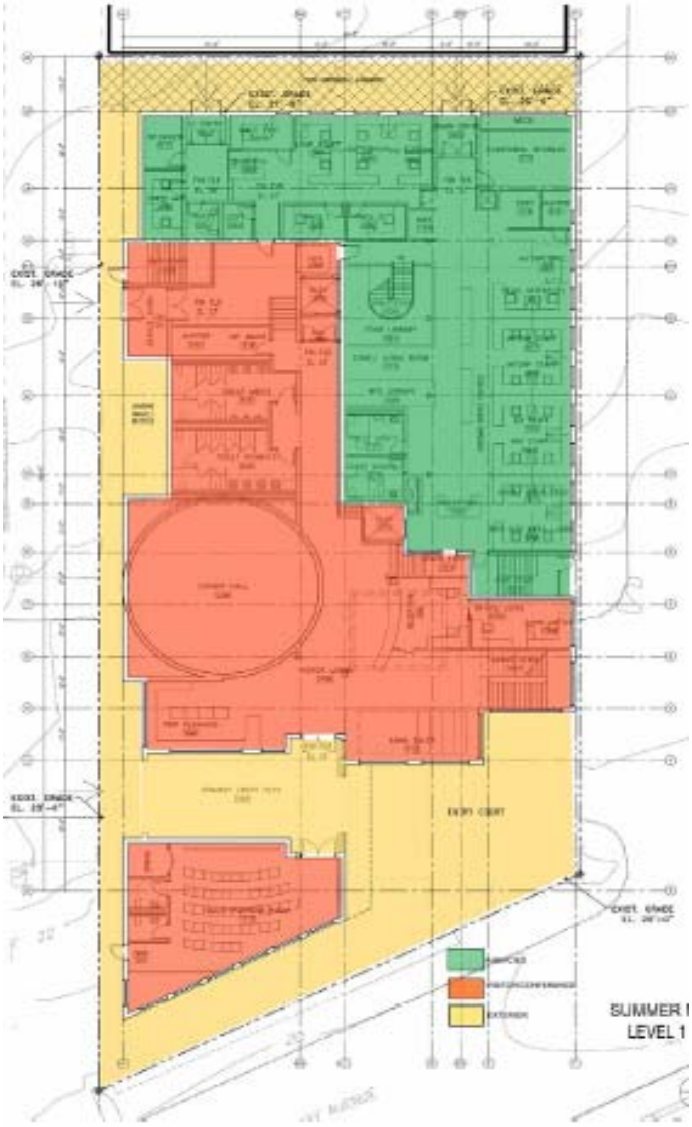




*Figure A-9: First Floor Plan, Summer*

## Sketch Worksheet

**Project:** **Mary Lowell Center, Seward, Alaska** **VA No.**
**Item:** **Building Layout** **CBA-1**

■ **Original Design** ☐ **Proposed Design**

### Alt. 1: 2nd Floor

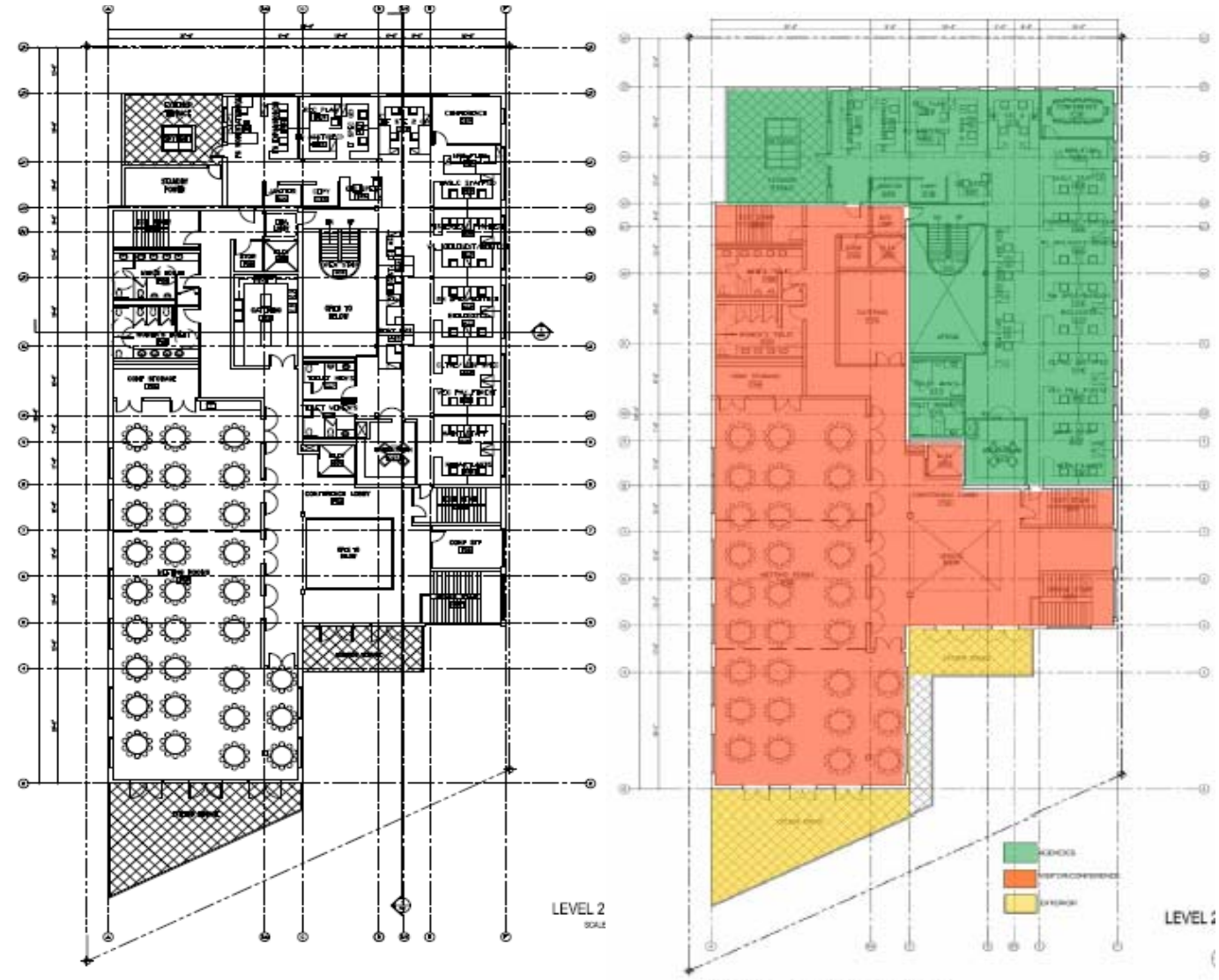



*Figure A-11: Second Floor*

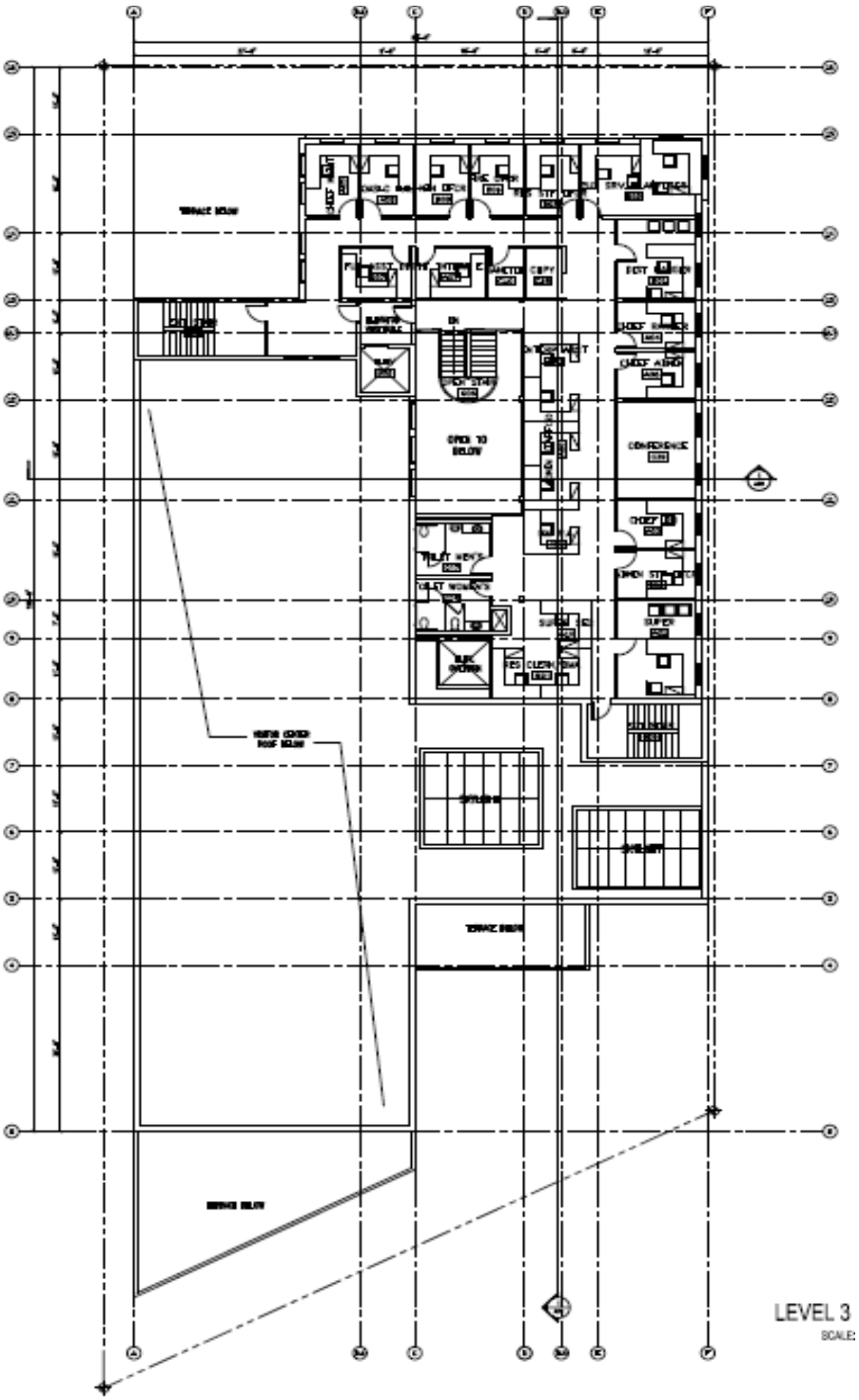
MARY LOWELL CENTER
SEWARD, ALASKA

## Sketch Worksheet

**Project:** Mary Lowell Center, Seward, Alaska **VA No.**
**Item:** Building Layout **CBA-1**

■ **Original Design** ☐ **Proposed Design**

### Alt. 1: 3nd Floor

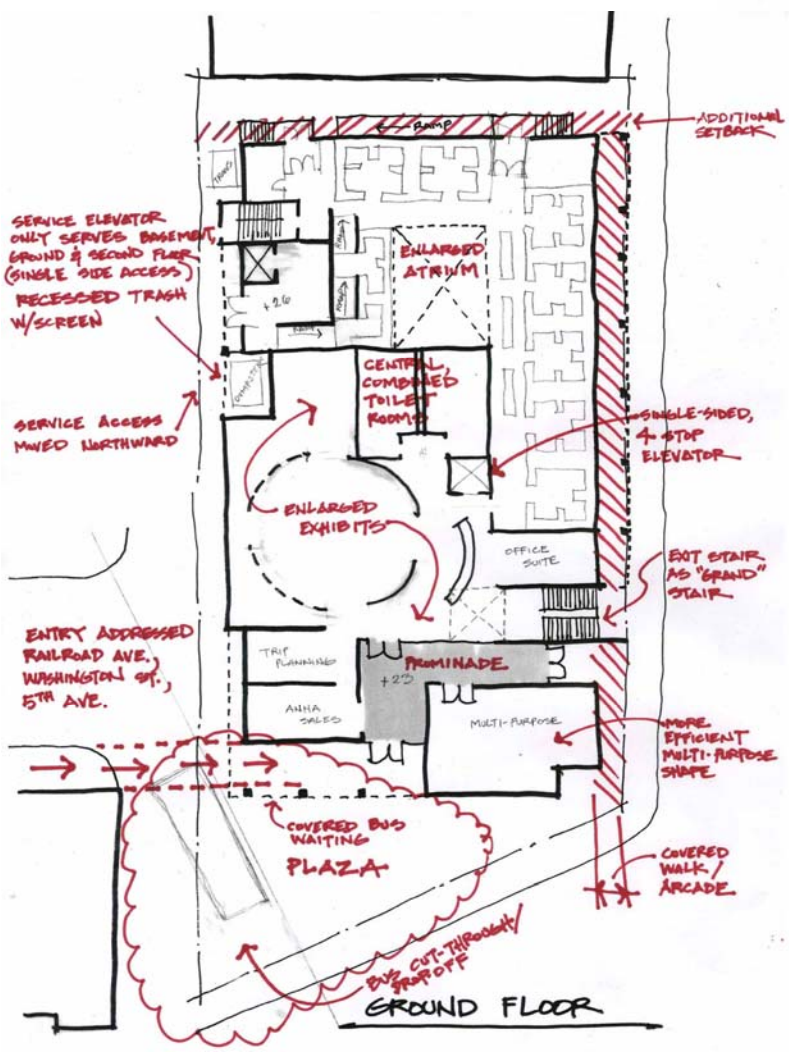


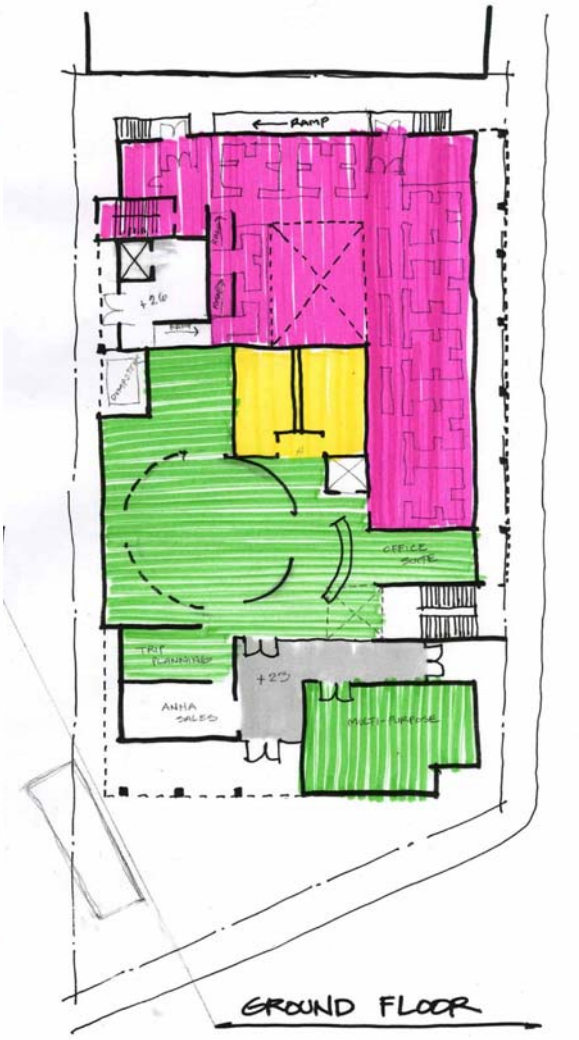
## Sketch Worksheet

**Project:** Mary Lowell Center, Seward, Alaska **VA No.**
**Item:** Building Layout **CBA-1**

☐ **Original Design** ■ **Proposed Design**

### Alt. 2: First Floor



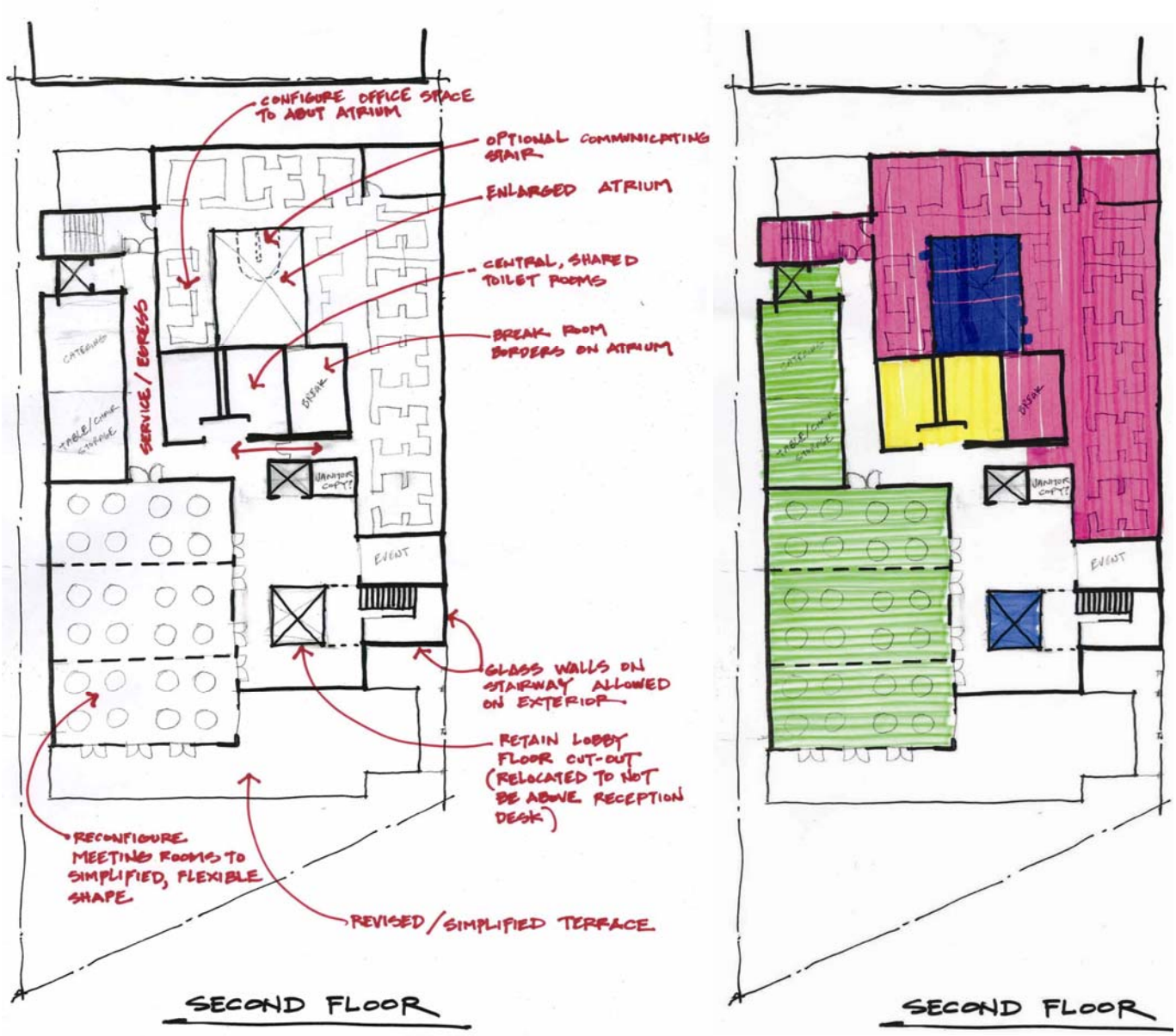



## Sketch Worksheet

**Project:** Mary Lowell Center, Seward, Alaska **VA No.**
**Item:** Building Layout **CBA-1**

☐ **Original Design** ■ **Proposed Design**

### Alt. 2: 2nd Floor



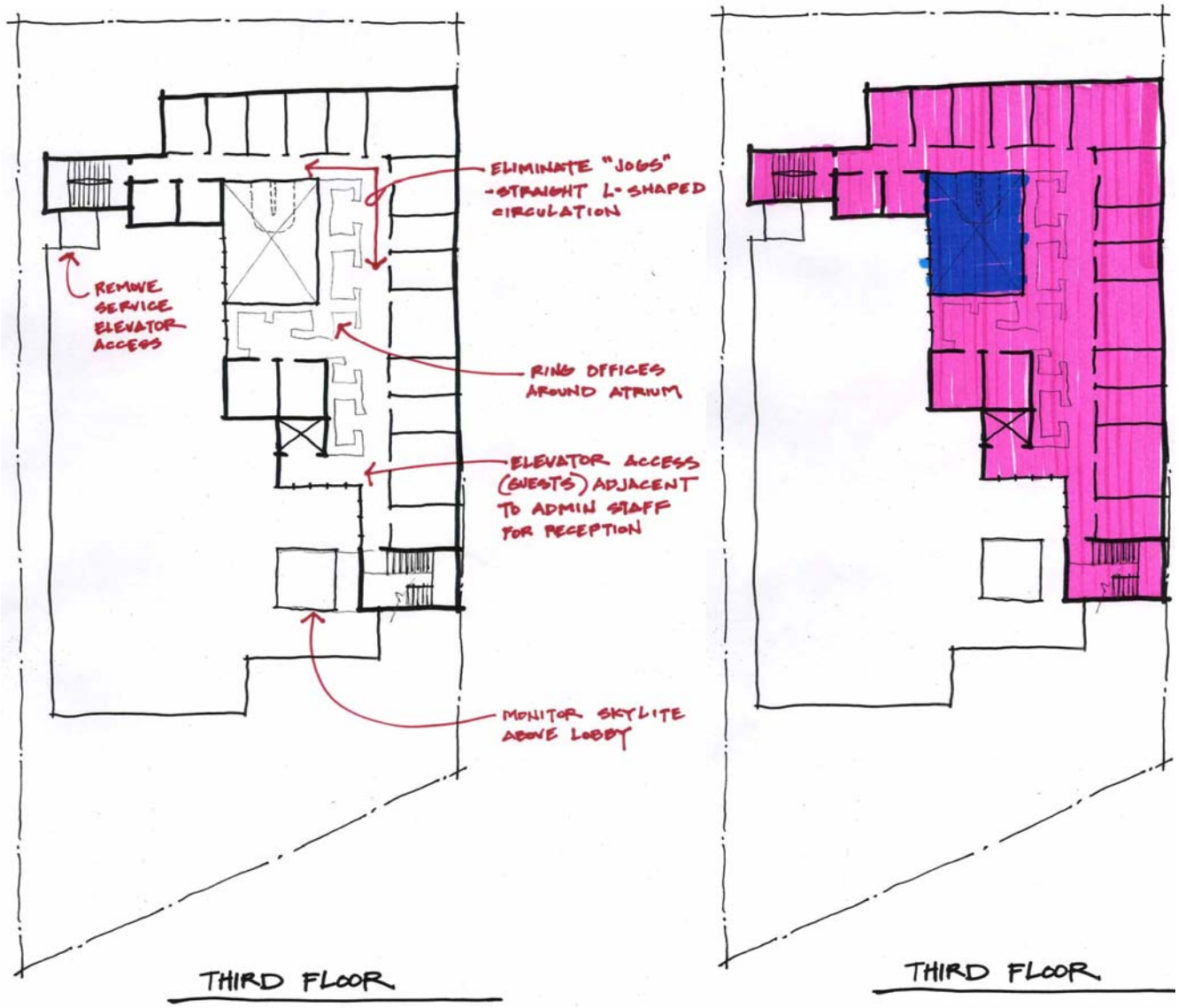
## Sketch Worksheet

**Project:** Mary Lowell Center, Seward, Alaska
**Item:** Building Layout

**VA No.**
**CBA-1**

☐ **Original Design** ■ **Proposed Design**

### Alt. 2: 3rd Floor

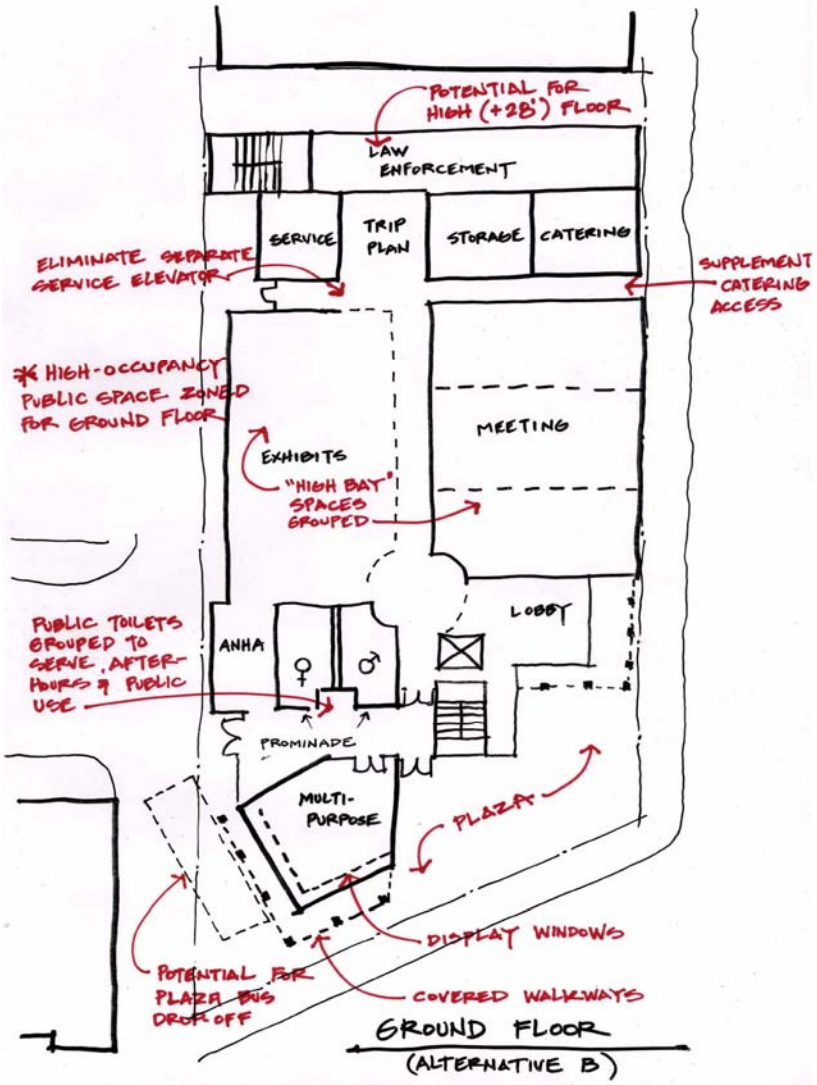


## Sketch Worksheet

**Project:** Mary Lowell Center, Seward, Alaska **VA No.**
**Item:** Building Layout **CBA-1**

☐ **Original Design** ■ **Alternative Design**

### Alt. 3: First Floor



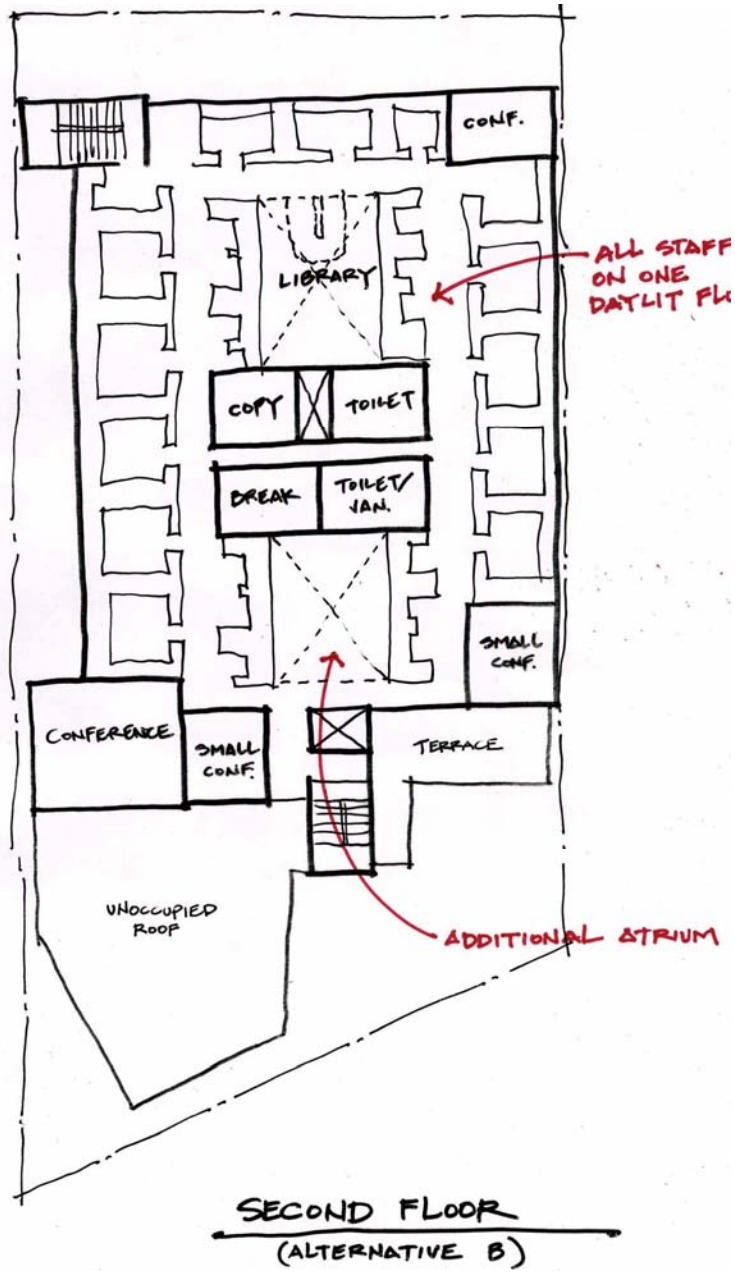
## Sketch Worksheet

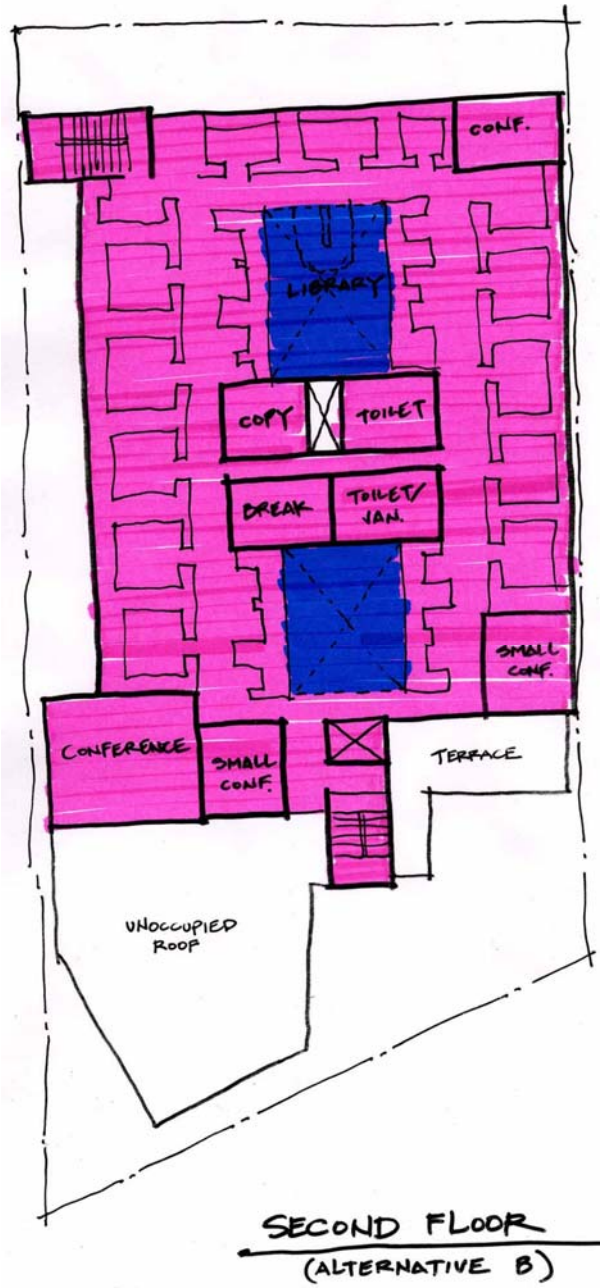
**Project:** Mary Lowell Center, Seward, Alaska
**Item:** Building Layout

**VA No.**
**CBA-1**

☐ **Original Design** ■ **Alternative Design**

### Alt. 3: 2nd Floor



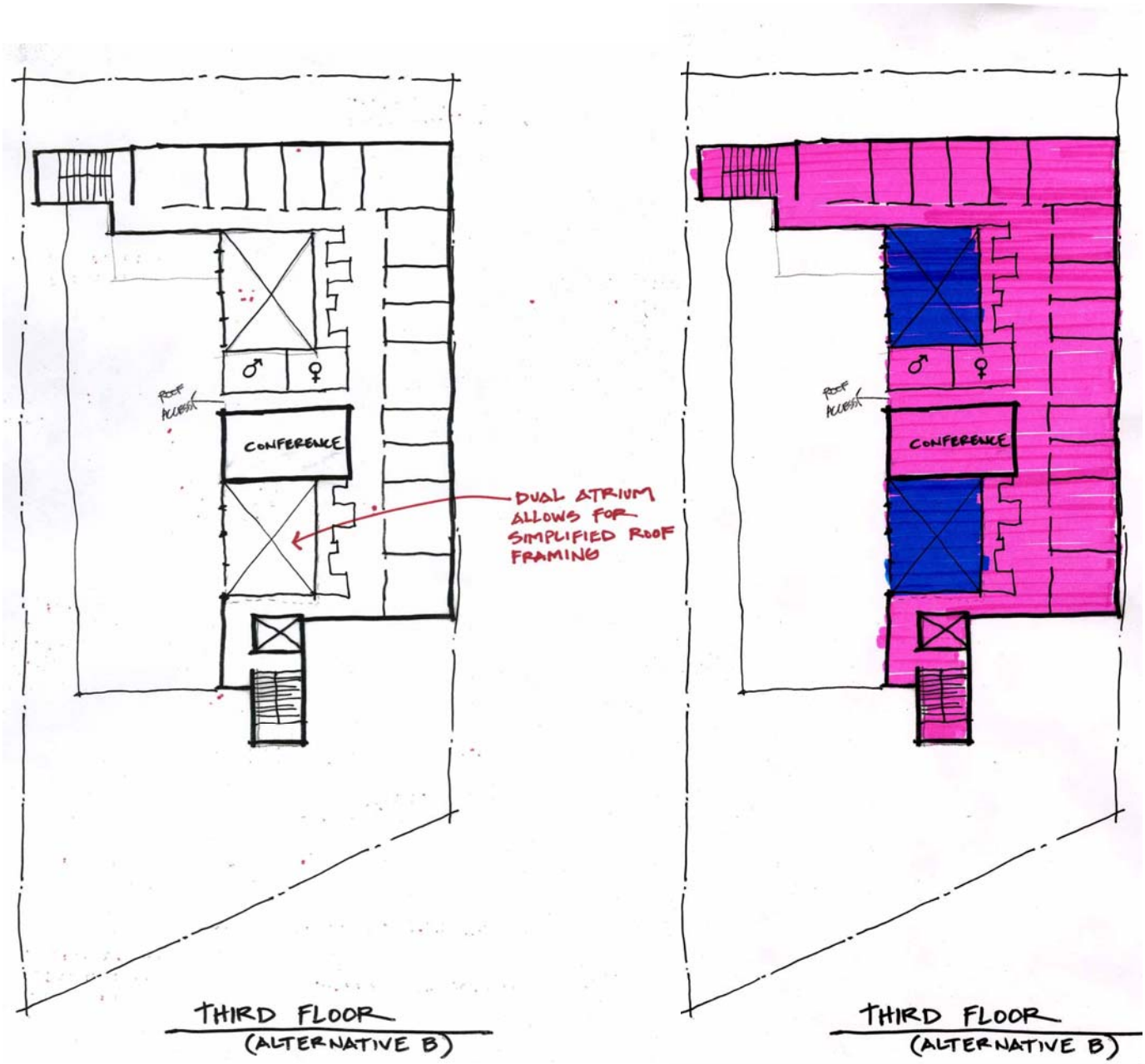



## Sketch Worksheet

**Project:** Mary Lowell Center, Seward, Alaska **VA No.**
**Item:** Building Layout **CBA-1**

☐ **Original Design** ■ **Alternative Design**

### Alt. 3: 3rd Floor



## Choosing By Advantages

**Project/Location:** **Mary Lowell Center, Seward, Alaska**

**Component:** **Building Layout**
**Functions:** **Enhance Visitor Enjoyment & Consolidate Operation**

| Factors | Alternative 1<br>Original Layout | | Alternative 2<br>Modified Layout, space efficiency, functions on same floors as original | | Alternative 3<br>Modified Layout, public on 1st floor offices on upper floors | |
|---|---|---|---|---|---|---|
| **Improve Visitor Services, Education, Recreation Opportunities** | | | | | | |
| **Sub Factor: Entry to Site/ Bldg** | | | | | | |
| ***Attributes:***<br>***- Convenience of visitor and employee entry to building*** | - Bus drop-off off-site somewhat convenient | | - Bus drop-off on-site is convenient<br>- Employee entries are convenient (staff interacting with public are on 1st floor) | | - Bus drop-off on-site is convenient<br>- Employee entries are fairly convenient (all must go to upper floors | |
| ***Advantages:*** | ---------- | 0 | **Best convenience for visitor and employee entry to building** | 70 | **Better convenience for visitor but least convenient to employees** | 50 |
| **Sub Factor: Flow/ Circulation** | | | | | | |
| ***Attributes:***<br>***- Ease of visitor and employee travel in building -***<br>***Level changes*** | - Easy for visitor to travel around building<br>- Moderately easy for employee to travel around building<br>- Level changes required on the floor | | - Easy for visitor to travel around building<br>- Easy for employee to travel around building<br>- No level changes on the floor | | - Somewhat difficult for visitor to travel around building since all services are on several floors (permit finding is difficult)<br>- Easy for employee to travel around building<br>- No level changes on the floor | |
| ***Advantages:*** | **Better visitor and employee overall flow with elevation changes required on first floor** | 55 | **Best visitor and employee overall flow and no elevation changes required on first floor** | 65 | ---------- | 0 |
| **Sub Factor: Exhibits** | | | | | | |
| ***Attributes:***<br>***- Size of exhibit area***<br>***- Flow of visitors*** | - Exhibit area is 1300 SF<br>- Fair flow of visitors (one entry & exit) | | - Exhibit area is 2000 SF<br>- Good flow of visitors | | - Exhibit area is 2500 SF -<br>Good flow of visitors | |
| ***Advantages:*** | ---------- | 0 | **Exhibit area is 700 SF larger and better flow of visitors** | 70 | **Exhibit area is 1,200 SF larger and better flow of visitors** | 80 |
| **Sub Factor: Space Efficiency** | | | | | | |
| ***Attributes:***<br>***- Efficiency of space use*** | - Spaces such as multipurpose room, circulation, toilets (public & government), elevators (double sided), atrium and stairs (grand & exit) are somewhat efficiently arranged | | - Spaces such as multipurpose room, circulation, toilets (combined), elevators (single sided), atrium and stairs (combined) are efficiently arranged | | - Spaces such as multipurpose room, circulation, toilets (combined), elevators (single sided), atrium and stairs (combined) are very efficiently arranged | |
| ***Advantages:*** | ---------- | 0 | **Better efficiency of space use** | 40 | **Most efficiency of space use** | 45 |
| **Sub Factor: Lobby Size** | | | | | | |
| ***Attributes:***<br>***- Lobby size/functional adequacy*** | - 1000 SF of Lobby (adequate for function) | | - 500 SF of Lobby (too small for function) | | - 1000 SF of Lobby (adequate for function) | |
| ***Advantages:*** | **Best lobby size (500 SF Larger lobby for better functionality** | 50 | ---------- | - | **Best lobby size (500 SF Larger lobby for better functionality** | 50 |
| **Sub Factor: Aesthetics/ Architecture** | | | | | | |

## Choosing By Advantages

**Project/Location:** **Mary Lowell Center, Seward, Alaska**

**Component:** **Building Layout**
**Functions:** **Enhance Visitor Enjoyment & Consolidate Operation**

| Factors | Alternative 1<br>Original Layout | | Alternative 2<br>Modified Layout, space efficiency, functions on same floors as original | | Alternative 3<br>Modified Layout, public on 1st floor offices on upper floors | |
|---|---|---|---|---|---|---|
| ***Attributes:***<br>***- Character of historic Solly bldg - Aesthetics*** | Fair expression of historic Solly building<br>- Dumpster visible from Washington Street<br>- Good opportunity to express exhibits on Washington Street and gov't agency activities in display window box<br>- triangular form at entry | | Good expression of historic Solly building -<br>Dumpster recessed and less visual from Washington Street -<br>Good opportunity to express exhibits on Washington Street and gov't agency activities in display window box -<br>(include triangular form at entry) | | Fair expression of historic Solly building -<br>Dumpster recessed and less visual from Washington Street -<br>Good opportunity to express exhibits on Washington Street and gov't agency activities in display window box | |
| ***Advantages:*** | **Better aesthetics/ architecture for City of Seward** | **3** | **Best aesthetics/ architecture for City of Seward** | **5** | ---------- | **-** |
| **Protect Public & Employee Health, Safety, Welfare** | | | | | | |
| **Sub Factor: Potential Hazards** | | | | | | |
| ***Attributes:***<br>***- Visitor safety***<br>***- Employee safety*** | Visitor bus drop-off and pick-up across street with potential vehicular safety concerns | | Visitor bus drop-off and pick-up on site for vehicular safety | | Visitor bus drop-off and pick-up on site for vehicular safety | |
| ***Advantages:*** | ---------- | **0** | **Best visitor safety due to on-site drop-off** | **60** | **Best visitor safety due to on-site drop-off** | **60** |
| **Improve Operational Efficiency, Reliability and Sustainability** | | | | | | |
| **Sub Factor: Quality of Office Space** | | | | | | |
| ***Attributes:***<br>***- Views, comfort*** | Some offices located on perimeter with good views (few offices on atrium) | | Many offices located on perimeter with good views (many interior offices on atrium) | | Most offices located on perimeter with good views (all interior offices on atrium) | |
| ***Advantages:*** | ---------- | **0** | **Better quality of office space** | **30** | **Best quality of office space** | **35** |
| **Partner with Gateway Communities** | | | | | | |
| ***Attributes:***<br>***- Degree of community use promotion*** | Good promotion of community use due to good views to water, outside balconies, dedicated grand staircase, etc. | | Very good promotion of community use due to more efficient multi-purpose room, better layout of space, more functional balconies, better bus queuing | | Fair promotion of community use due to lack of unobstructed views to water, no outside balconies, etc. | |
| ***Advantages:*** | **Better degree of community use promotion** | **98** | **Best degree of community use promotion** | **100** | ---------- | **0** |
| **Total Importance of Advantages (Benefits)** | | **206** | | **440** | | **320** |
| **Initial Cost** | $14,569,419 | | $13,223,902 | | $12,457,299 | |
| **Life Cycle Cost** | $18,063,375 | | $16,484,062 | | $15,598,805 | |
| **Benefit to Cost Ratio Initial Cost** | 14.14 | | 33.27 | | 25.69 | |
| **Benefit to Cost Ratio Life Cycle Cost** | 11.40 | | 26.69 | | 20.51 | |

## LIFE CYCLE COST ANALYSIS (LCCA)

Project/Location: **Mary Lowell Center, Seward, Alaska**

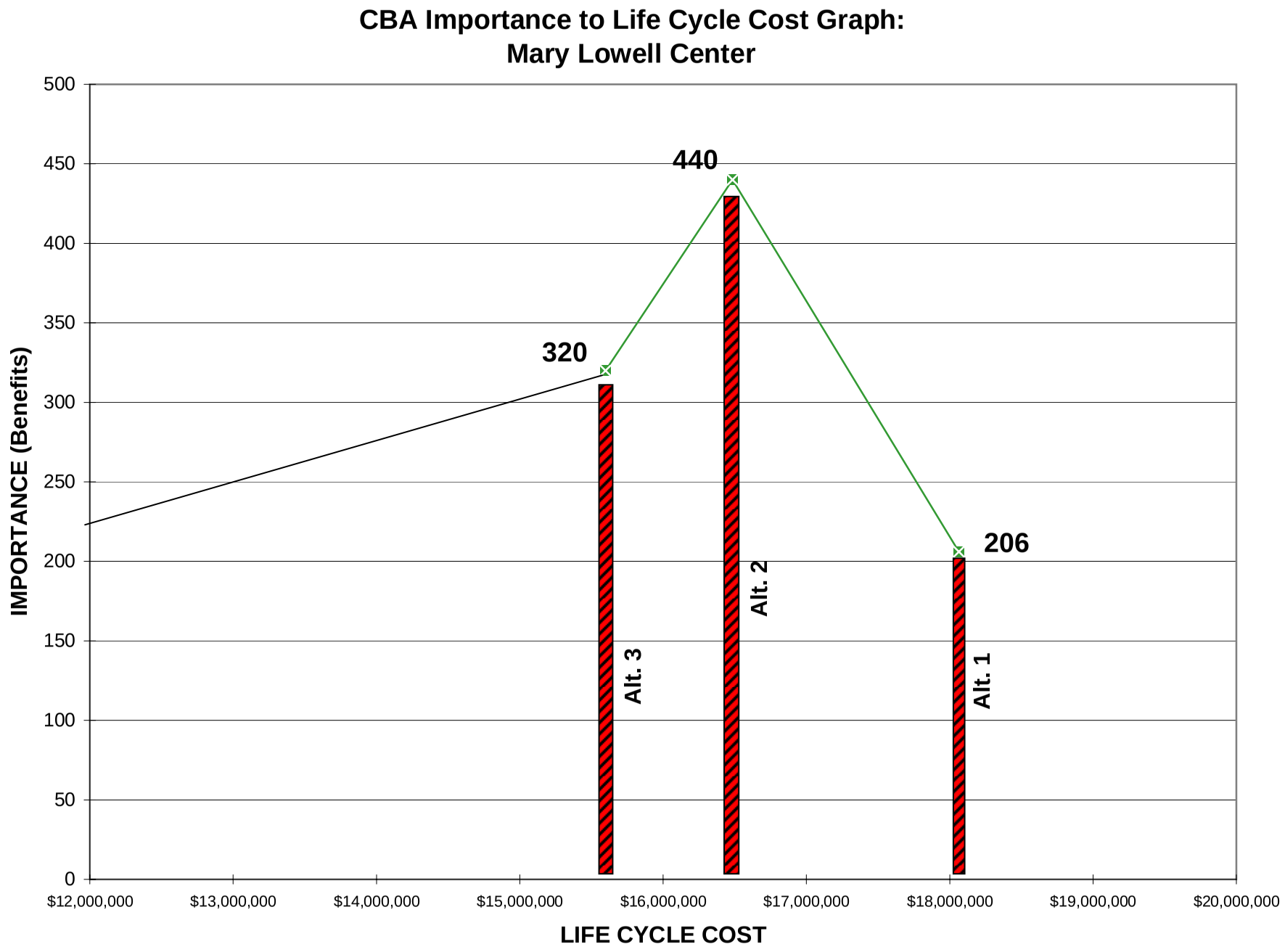
Subject: **Building Layout**

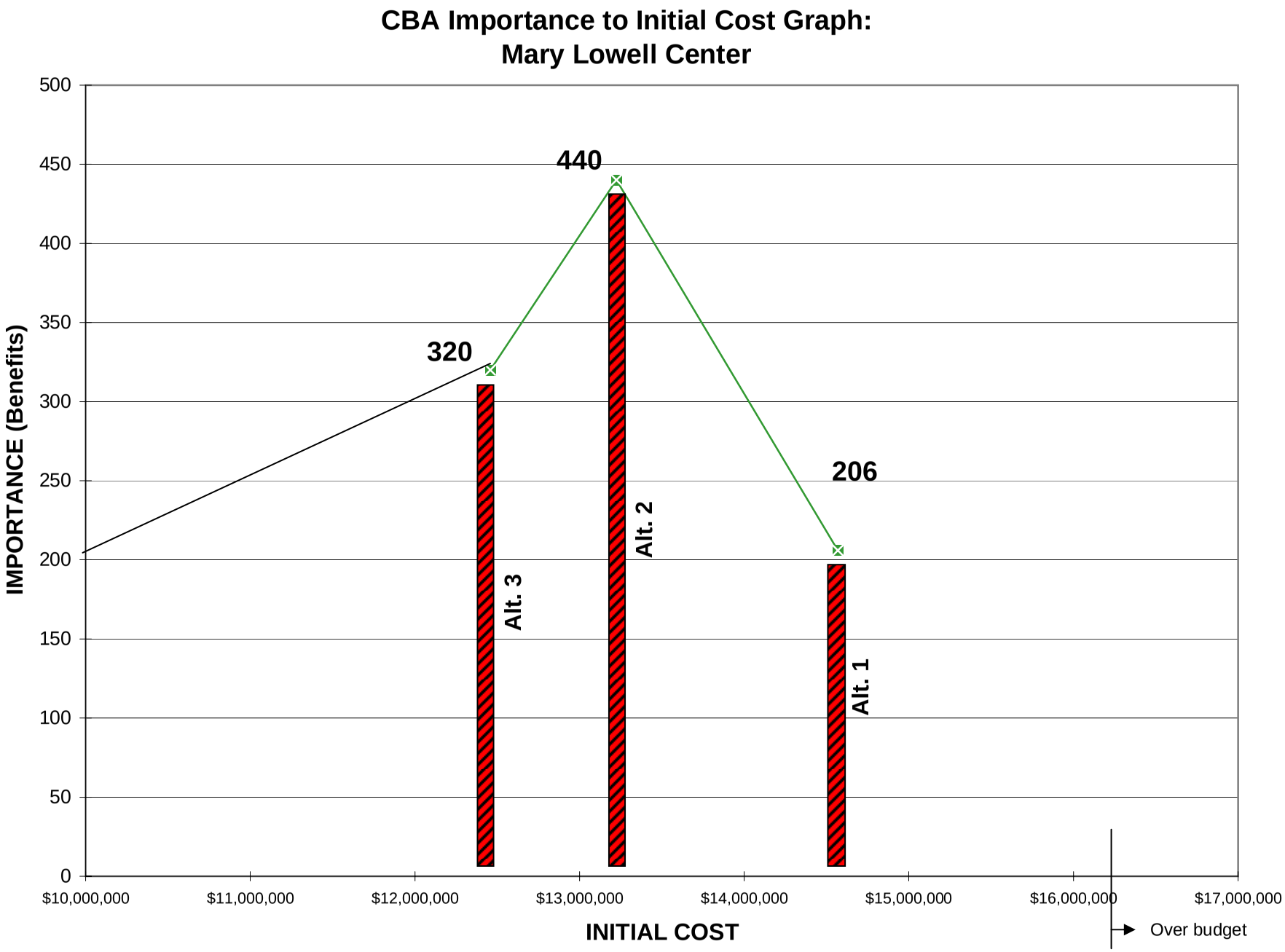
Description: **Enhance Visitor Enjoyment & Consolidate Operation**

Project Life Cycle = **20 Years**

Discount Rate = **3.1%**

| | | | | | Alternative 1 | | Alternative 2 | | Alternative 3 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Original Layout | | Modified Layout, space efficiency, functions on same floors as original | | Modified Layout, public on 1st floor offices on upper floors | |
| **INITIAL COSTS** | **Quantity** | **UM** | **Unit Price** | | **Est.** | **PW** | **Est.** | **PW** | **Est.** | **PW** |
| A. Alternative 1: Construction Cost | 41,438 | GSF | $351.60 | | 14,569,419 | 14,569,419 | 0 | 0 | 0 | 0 |
| B. Alternative 2: Construction Cost | 38,330 | GSF | $345.00 | | 0 | 0 | 13,223,902 | 13,223,902 | 0 | 0 |
| C. Alternative 3: Construction Cost | 38,330 | GSF | $325.00 | | 0 | 0 | 0 | 0 | 12,457,299 | 12,457,299 |
| D. | | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total Initial Cost** | | | | | | **14,569,419** | | **13,223,902** | | **12,457,299** |
| **REPLACEMENT COST/ SALVAGE VALUE** | | | | | | | | | | |
| **Description** | **Year** | | **PW Factor** | | | | | | | |
| A. | 0 | | 1.0000 | | 0 | 0 | 0 | 0 | 0 | 0 |
| B. | 0 | | 1.0000 | | 0 | 0 | 0 | 0 | 0 | 0 |
| C. | 0 | | 1.0000 | | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total Replacement/Salvage Costs** | | | | | | **0** | | **0** | | **0** |
| **ANNUAL COSTS** | | **Diff.** | | | | | | | | |
| **Description** | **Cost/SF** | **Escl. %** | **PWA** | | | | | | | |
| A. Energy, Alt. 1 | $1.29 | 0.00% | 14.741 | | 53,455 | 787,973 | 0 | 0 | 0 | 0 |
| B. Energy, Alt. 2 | $1.29 | 0.00% | 14.741 | | 0 | 0 | 49,446 | 728,875 | 0 | 0 |
| B. Energy, Alt. 3 | $1.29 | 0.00% | 14.741 | | 0 | 0 | 0 | 0 | 49,446 | 728,875 |
| C. Water, Sewer, Custodial, Alt. 1 | $1.62 | 0.00% | 14.741 | | 67,130 | 989,547 | 0 | 0 | 0 | 0 |
| C. Water, Sewer, Custodial, Alt. 2 | $1.62 | 0.00% | 14.741 | | 0 | 0 | 62,095 | 915,331 | 0 | 0 |
| C. Water, Sewer, Custodial, Alt. 3 | $1.62 | 0.00% | 14.741 | | 0 | 0 | 0 | 0 | 62,095 | 915,331 |
| D. Maint. & Repair, Alt. 1 | $1.84 | 0.00% | 14.741 | | 76,246 | 1,123,930 | 0 | 0 | 0 | 0 |
| C. Maint & Repair, Alt. 2 (bus drop-off) | $1.89 | 0.00% | 14.741 | | 0 | 0 | 72,444 | 1,067,886 | 0 | 0 |
| C. Maint & Repair, Alt. 3 Bus dropoff, one elev, no terraces) | $1.75 | 0.00% | 14.741 | | 0 | 0 | 0 | 0 | 67,078 | 988,783 |
| D. Replacements, Alt. 1 | $0.97 | 0.00% | 14.741 | | 40,195 | 592,506 | 0 | 0 | 0 | 0 |
| D. Replacements, Alt. 2 | $0.97 | 0.00% | 14.741 | | 0 | 0 | 37,180 | 548,068 | 0 | 0 |
| D. Replacements, Alt. 3 (one elev) | $0.90 | 0.00% | 14.741 | | 0 | 0 | 0 | 0 | 34,497 | 508,517 |
| **Total Annual Costs (Present Worth)** | | | | | | **3,493,956** | | **3,260,160** | | **3,141,506** |
| **Total Life Cycle Costs (Present Worth)** | | | | | | **18,063,375** | | **16,484,062** | | **15,598,805** |
| | | | **PP Factor** | | | | | | | |
| **Total Life Cycle Costs (Annualized)** | | | **0.0678** | | **1,225,396** | **Per Year** | **1,118,257** | **Per Year** | **1,058,202** | **Per Year** |


CBA Importance to Life Cycle Cost Graph:
Mary Lowell Center
IMPORTANCE (Benefits)
500
450
400
350
300
250
200
150
100
50
0
$12,000,000
$13,000,000
$14,000,000
$15,000,000
$16,000,000
$17,000,000
$18,000,000
$19,000,000
$20,000,000
LIFE CYCLE COST
320
440
206
Alt. 3
Alt. 2
Alt. 1


CBA Importance to Initial Cost Graph:
Mary Lowell Center
IMPORTANCE (Benefits)
500
450
400
350
300
250
200
150
100
50
0
320
440
206
Alt. 3
Alt. 2
Alt. 1
$10,000,000
$11,000,000
$12,000,000
$13,000,000
$14,000,000
$15,000,000
$16,000,000
$17,000,000
INITIAL COST
Over budget

## Phase IV  Development

The following ideas were selected for further development by the team during the development phase of the VA study.

| VA No. | Idea |
|---|---|
| CBA | Revise current layout |
| 1 | Pursue other renewable or alternative energy options ilo wood chips. |
| 3 | Computer model the natural ventilation in the atrium to validate it's effectiveness and performance |
| 7 | Add blank section in each AHU for future cooling coil |
| 9 | Move boilers into building (if not using wood chip fuel) |
| 12 | Provide single freight / passenger elevator for building ilo 2 separate ones |
| 19 | Limit radiant floor heat to first 10'-0" of perimeter floor |
| 20 | Eliminate radiant floor heat in basement |
| 23 | Omit skylights over stairs and reception area / use only clerestory |
| 34 | Separate construction contracts for exhibits and GC |
| 35 | Adjust estimate |
| 36 | Increase escalation from 3.5% to 7.5% |
| 37 | Let contractor buy out job up front with government to provide secure storage |
| 41 | Add crosswalk & waiting area for bus drop-off / loading area |
| 59 | Omit standby generator |
| 67-69 | Reduce contractor's general conditions costs |
| 71 | Omit underfloor distribution and use overhead distribution |
| 80-81 | Incorporate public art into building (include ANHA and leverage Rasmussen Foundation) |
| 82 | Consider an underground stormwater treatment package |
| 83 | Consider moment frame instead of brace frame at exterior wall |
| 84 | Link occupancy sensor to the space ventilation system |

## Part V Recommendations (Proposals, 90 & 75% Alternatives)

### *Value Analysis Proposal Development*

The VA team recommendations have been documented in the following proposals. They include a complete description of each VA proposal, sketches where necessary and cost estimates used as a basis for initial costs. Some recommendations will generate significant savings for the project. Other ideas not developed may add costs but would improve performance or generate life cycle cost savings. Due to time constraints, some ideas were not developed into proposals that may warrant additional consideration.

### *90% and 75% Alternatives*

In response to NPS criteria, each workshop must identify 90% and 75% alternatives. These are alternatives developed to reduce the project cost by either 10% or 25% should the budget be further constrained during the project's development into design or construction. Both alternatives are based on accomplishing the project functions with only the respective percentage of the original budget. These alternatives are usually more drastic in nature and are considered more of a contingency plan than a probable recommendation.

Also, 90% and 75% alternatives were developed per NPS. They are summarized as follows:

- 90% Alternative: Moving the boilers inside, limiting radiant flooring, separating the exhibit and general contractor contracts, and allowing contractor buy out right after award;
- 75% Alternative: Includes the 90% options and revising the entire HVAC system including eliminating the thermal mass, eliminating the 2nd and 3rd floor atriums, and combining the multi-purpose and conferencing rooms.

These were not recommended items as they largely ignore the immediate needs identified in the project purpose.

# VA PROPOSALS

## Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Pursue Alternative Renewable and Alternative Energy Sources** **1**

### Original Design

Schematic design references the use of wood chips, fish oil and biodiesel as potential alternative fuels for heating the visitor center. The design proposes constructing mechanical structure on the adjacent proposed parking lot. The mechanical would connect to the Center through a below grade (street) utilidor. Schematic design also questioned the reliability of fish oil and biodiesel supplies in Seward. They acknowledge the supply problem in the community.

### Proposed Design

The VA explored the use of wood chips as an alternative heating source and discounted the technology as unrealistic for Seward. Woodchipping technology does not exist within the Kenai region. The VA recommends dismissing this technology.

The VA also explored wind generated electrical power to supplement power needs.

The VA acknowledged that fish oil and biodiesel have potential. Current difficulties may include a distributor who will deliver unblended product potentially requiring that dual storage and mixing facilities would need to be developed at the site or a vendor with a dual tank truck who could deliver 80% diesel and 20% fish oil. The VA recommends that a dual storage and mixing system is unreasonable and will not be pursued. The VA team recommends that the project should be proactive in encouraging the development of a local market for delivery of preblended fuels. Recommend:

* Design a heating system capable of utilizing fish oil or biodiesel when product availability increases.
* Available source and technology could be available in the next 3-5 years.
* The NPS is currently using fish oil for equipment operations at Denali National Park.

### Advantages and Disadvantages

**Advantages - Not using Wood Chips**

- Relies on more conventional fuel sources
- Deletes mechanical building on parking lots

**Advantages - Using Fish Oil or BioDiesel**

- Supplements potential local industry
- Reduces dependency on fossil fuels
- If mixed, uses traditional technology

**Advantages - Wind Power Generation,**

- Capitalizes on abundant renewable resource
- Clean, non combustible fuel source

**Disadvantages - All**

- WC - Unavailable wood chip supply / new industry in area
- WC - Burdens existing maintenance staff (added work)
- WC - Costs to construct maintenance building
- FO & BD: No delivery infrastructure / no blended supply source / is a new technology
- FO & BD: Park staff learning curve
- Wind: Project demand doesn't warrant infrastructure cost of turbine / not locat to site

### Discussion

NPS/USFS wishes to pursue the use of alternative fuels however, current costs, technological constraints, limited maintenance staff requires that the design proceed carefully. Designers are requested to proceed with design which would facilitate future equipment additions and/or changes to adopt to fish oil or biodiesel.

Architect stated that wood chip technology would have a $21,000 annual fuel savings. Current biodiesel and Fish Oil cost are unknown. A&E to investigate to determine feasibility. The desire of the VA team is to pursue this alternative providing it minimizes maintenance commitment and cost increases. Design team to verify actual costs per BTU.

### Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **229,400** | **547,800** |
| **Proposed Design** | **179,700** | **859,300** |
| **Potential Savings** | **49,700** | **(311,500)** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Pursue Alternative Renewable and Alternative Energy Sources** **1**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Original boiler | 1 | ls | 146,790 | 146,790 |
| Utilidor w/ removable cover | No change | | | |
| Utilidor piping | No change | | | |
| Subtotal | | | | 146,790 |
| Markup | 56% | | | 82,643 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **229,400** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Different Boiler | 1 | ls | 85,000 | 85,000 |
| Equipment mods for future installation | 1 | ls | 5,000 | 5,000 |
| (for future burner) | | | | |
| Upsize fuel tank | 1 | ls | 25,000 | 25,000 |
| (7,000 gallon tank) | | | | |
| Subtotal | | | | 115,000 |
| Markup | 56% | | | 64,745 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **179,700** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings** | **49,700** |

# LIFE CYCLE COST ANALYSIS (LCCA)

**Project / Location:** **Mary Lowell Center, Kenai Fjords National Park, AK**

**Item:** **Pursue Alternative Renewable and Alternative Energy Sources**

**VA No.** **1**

| **Description:** | | | | **Original Design** | | **Proposed Design** | |
|---|---|---|---|---|---|---|---|
| | | | | Wood Chip technology | | Fish Oil/BioDiesel | |
| Project Life Cycle = | **20** | **Years** | | | | | |
| Discount Rate = | **3.10%** | | | | | | |
| Present Time = | **Date of Occupancy** | | | | | | |
| **INITIAL COSTS** | **Quantity** | **UM** | **Unit Price** | **Est.** | **PW** | **Est.** | **PW** |
| A. Wood Chip technology | | | | 229,400 | 229,400 | 0 | 0 |
| B. Fish Oil/BioDiesel | | | | 0 | 0 | 179,700 | 179,700 |
| C. | | | | | 0 | | 0 |
| D. | | | | | 0 | | 0 |
| E. | | | | | 0 | | 0 |
| F. | | | | | 0 | | 0 |
| G. | | | | | 0 | | 0 |
| H. | | | | | 0 | | 0 |
| I. | | | | | 0 | | 0 |
| J. | | | | | 0 | | 0 |
| **Total Initial Cost** | | | | | **229,400** | | **179,700** |
| **Initial Cost PW Savings (Compared to Original Design)** | | | | | | | **49,700** |
| **REPLACEMENT COST/ SALVAGE VALUE** | | | | | | | |
| **Description** | | **Year** | **PW Factor** | | | | |
| A. Same equipment (replacement figures) | | | | | 0 | | 0 |
| B. | | | | | 0 | | 0 |
| C. | | | | | 0 | | 0 |
| D. | | | | | 0 | | 0 |
| E. | | | | | 0 | | 0 |
| F. | | | | | 0 | | 0 |
| G. | | | | | 0 | | 0 |
| H. | | | | | 0 | | 0 |
| I. Salvage Value | | | | | 0 | | 0 |
| **Total Replacement/Salvage Costs** | | | | | **0** | | **0** |
| **ANNUAL COSTS** | | | | | | | |
| **Description** | | **Escl. %** | **PWA** | | | | |
| A. Energy Wood Chips (case #2) | | 0.0% | 14.741 | 21,600 | 318,402 | | 0 |
| B. Energy Fish Oil/Bio Diesel (case #3) | | 0.0% | 14.741 | | 0 | 46,100 | 679,553 |
| C. ( costs from SD submittal) | | 0.0% | 14.741 | | 0 | | 0 |
| D. | | 0.0% | 14.741 | | 0 | | 0 |
| E. | | 0.0% | 14.741 | | 0 | | 0 |
| F. | | 0.0% | 14.741 | | 0 | | 0 |
| **Total Annual Costs (Present Worth)** | | | | | **318,402** | | **679,553** |
| **Total Life Cycle Costs (Present Worth)** | | | | | **547,800** | | **859,300** |
| **Life Cycle Savings (Compared to Original Design)** | | | | | | | **(311,500)** |
| | | | **PP Factor** | | | | |
| **Total Life Cycle Costs (Annualized)** | | | **0.0678** | **37,162** | **Per Year** | **58,294** | **Per Year** |

PW: Present Worth
PWA: Present Worth of Annuity
PP: Periodic Payment

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Computer model the natural ventilation in the atrium to validate it's effectiveness and performance** **3**

## Original Design

Computer modeling is not included in the SD submittal. The design and performance are presumed by virtue of the designer's experience.

## Proposed Design

Designer to perform computer modeling of the natural ventilation including stack effect, ventilation air distribution, solar effects, wind effects, and thermal mass. Model the system with multiple thermal mass options (maximum, partial, and minimum).

## Advantages and Disadvantages

**Advantages:**

- Employee comfort / performance depends on natural ventilation performance
- Visitor comfort / satisfaction depends on natural ventilation performance
- Reduced thermal mass saves cost (the optimum amount should be utilized)
-
-

**Disadvantages:**

- Cost of the analysis
-
-
-

## Discussion

The natural ventilation should be very effective in Seward, but its performance depends on proper design. The thermal mass is very extensive and may be excessive causing ripple effects in the seismic design. By optimizing the thermal mass and the stack design, the ventilation will achieve project goals at the optimum initial cost. ***The optimum solution is unknown at this time.***

Assumptions: The cost of the ventilation analysis *is* in this estimate.

The cost impacts (and potential savings) of the thermal mass wall are *not* in this estimate.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **0** | **0** |
| **Proposed Design (analysis fee only)** | **10,000** | **10,000** |
| **Potential Savings** | **(10,000)** | **(10,000)** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Computer model the natural ventilation in the atrium to validate it's effectiveness and performance** **3**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| No ventilation analysis | 0 | each | 10,000 | 0 |
| Subtotal | | | | 0 |
| Markup | 0% | | | 0 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **0** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Ventilation analysis by computer modelling | 1 | each | 10,000 | 10,000 |
| Subtotal | | | | 10,000 |
| Markup | 0% | | | 0 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **10,000** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings** | **(10,000)** |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Add blank section to air handlers to accommodate a future chilled water coil** **7**

## Original Design

Air handlers do not have chilled water coils or space for future coils.

## Proposed Design

The air handlers are procured with a blank 2'-0" section which can be retrofitted with chilled water coils at a later date. No coils are procured at this time.

## Advantages and Disadvantages

**Advantages:**

- Mechanical cooling can be added to the project if ever determined to be necessary
- Impact of retrofitting with mechanical cooling is minimized
- 
- 
- 

**Disadvantages:**

- Cost of the air handler sections
- 
- 
- 

## Discussion

As a low-cost hedge against future need for mechanical cooling or dehumidfication, add a blank section (about 2' long) to each AHU at this time. Detail and specify this requirement in the contract documents. If mechanical cooling or dehumidification is ever determined as necessary, such as due to a change in the building program or a climate change, cooling coils could be added to satisfy the need. Potential savings compared to remodelling the AHUs in the fan room are considerable.
Assumptions: No net increase of fan room area. The LCCA is calculated based on a retrofit in year 5 and considers the coils only. The chilled water source is not part of this proposal or LCCA.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **0** | **77,300** |
| **Proposed Design** | **3,100** | **20,300** |
| **Potential Savings** | **(3,100)** | **57,000** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Add blank section to air handlers to accommodate a future chilled water coil** **7**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| No section to accommodate future coil | 0 | | | 0 |
| Subtotal | | | | 0 |
| Markup | 56% | | | 0 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **0** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Blank coil section in each AHU | 4 | each | 500 | 2,000 |
| Additional space in mech room | 1 | each | 0 | 0 |
| Subtotal | | | | 2,000 |
| Markup | 56% | | | 1,126 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **3,100** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings** | **(3,100)** |

# LIFE CYCLE COST ANALYSIS (LCCA)

**Project / Location:** Mary Lowell Center, Kenai Fjords National Park, AK

**Item:** Add blank section to air handlers to accommodate a future chilled water coil

**VA No.** 7

| Description: | | | | Original Design | | Proposed Design | |
|---|---|---|---|---|---|---|---|
| Add chilled water coils to AHUs | | | | | | AHUs and mechanical room have space to accommodate coils | |
| Project Life Cycle = 20 Years | | | | AHU and mechanical room do not have space to accommodate coils | | | |
| Discount Rate = 3.10% | | | | | | | |
| Present Time = Date of Occupancy | | | | | | | |
| **INITIAL COSTS** | **Quantity** | **UM** | **Unit Price** | **Est.** | **PW** | **Est.** | **PW** |
| A. Add blank section to AHUs when new | | | | 0 | 0 | 3,100 | 3,100 |
| B. | | | | 0 | 0 | 0 | 0 |
| C. | | | | | 0 | | 0 |
| D. | | | | | 0 | | 0 |
| E. | | | | | 0 | | 0 |
| F. | | | | | 0 | | 0 |
| G. | | | | | 0 | | 0 |
| H. | | | | | 0 | | 0 |
| I. | | | | | 0 | | 0 |
| J. | | | | | 0 | | 0 |
| **Total Initial Cost** | | | | | **0** | | **3,100** |
| **Initial Cost PW Savings (Compared to Original Design)** | | | | | | | **(3,100)** |
| **REPLACEMENT COST/ SALVAGE VALUE** | | | | | | | |
| **Description** | | **Year** | **PW Factor** | | | | |
| C. Retrofit cooling coil to 4 AHUs | | 5 | 0.8584 | 50,000 | 42,921 | 20,000 | 17,168 |
| B. Rearrange Mech room equip & ducts | | 5 | 0.8584 | 40,000 | 34,337 | 0 | 0 |
| Chiller, piping, elec service costs | | | | | | | |
| D. are considered equal in either design | | | | | 0 | | 0 |
| E. | | | | | 0 | | 0 |
| F. | | | | | 0 | | 0 |
| G. | | | | | 0 | | 0 |
| H. | | | | | 0 | | 0 |
| I. Salvage Value | | | | | 0 | | 0 |
| **Total Replacement/Salvage Costs** | | | | | **77,258** | | **17,168** |
| **ANNUAL COSTS** | | | | | | | |
| **Description** | | **Escl. %** | **PWA** | | | | |
| A. | | 0.0% | 14.741 | | 0 | | 0 |
| B. | | 0.0% | 14.741 | | 0 | | 0 |
| C. | | 0.0% | 14.741 | | 0 | | 0 |
| D. | | 0.0% | 14.741 | | 0 | | 0 |
| E. | | 0.0% | 14.741 | | 0 | | 0 |
| F. | | 0.0% | 14.741 | | 0 | | 0 |
| **Total Annual Costs (Present Worth)** | | | | | **0** | | **0** |
| **Total Life Cycle Costs (Present Worth)** | | | | | **77,300** | | **20,300** |
| **Life Cycle Savings (Compared to Original Design)** | | | | | | | **57,000** |
| | | | **PP Factor** | | | | |
| **Total Life Cycle Costs (Annualized)** | | | **0.0678** | **5,244** | **Per Year** | **1,377** | **Per Year** |

PW: Present Worth
PWA: Present Worth of Annuity
PP: Periodic Payment

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Move boilers into the building** **9**

## Original Design

A separate building is being proposed to house the boilers and all associated equipment. Hot water is being supplied to the building via a mechanical utilidor located below the frost line.

## Proposed Design

We recommend that the boilers and all associated equipment are relocated in the building. Boiler room could be located either in the basement or on the third floor. The boiler will be diesel type boilers with provision to use either a bio-diesel of fish oil mixture in the future. A larger diesel storage tanks will be needed. The projected tank size could be in the range of 6,000 to 7,000 gallons capacity. The tanks could be located at the parking lot across the street.

## Advantages and Disadvantages

**Advantages:**

- Lower initial cost
- No LEED disadvantage
- Lower operating & maintenance costs (distribution piping located inside building)
- Eliminates maintenance building (approximately 1,000 SF)
-

**Disadvantages:**

- Bigger tank
-
-
-

## Discussion

Achieves VE goal of reducing cost without compromise on performance and function.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **592,200** | **910,600** |
| **Proposed Design** | **179,700** | **859,300** |
| **Potential Savings** | **412,500** | **51,300** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Move boilers into the building** **9**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Boiler Plant construction | 1 | ls | 140,616 | 140,616 |
| Utilidor w/ removable conver | 1 | ls | 61,000 | 61,000 |
| Utilidor piping | 1 | ls | 30,500 | 30,500 |
| Boiler installation cost | 1 | ls | 146,790 | 146,790 |
| Subtotal | | | | 378,906 |
| Markup | 56% | | | 213,324 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **592,200** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Equipment mods for future installation | 1 | ls | 5,000 | 5,000 |
| Upsize fuel tank | 1 | ls | 25,000 | 25,000 |
| Boilers installation cost | 1 | ls | 85,000 | 85,000 |
| The space allocated to the generator will | | | | |
| be used for boiler sapce.( I.e no increase | | | | |
| in building overall sqauare footage) | | | | |
| Subtotal | | | | 115,000 |
| Markup | 56% | | | 64,745 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **179,700** |

**Potential Savings**

**Potential Savings** **412,500**

# LIFE CYCLE COST ANALYSIS (LCCA)

**Project / Location:** Mary Lowell Center, Kenai Fjords National Park, AK

**Item:** Move boilers into the building

**VA No.** 9

| Description: | | | | Original Design | | Proposed Design | |
|---|---|---|---|---|---|---|---|
| Project Life Cycle = | 20 | Years | | | | | |
| Discount Rate = | 3.10% | | | | | | |
| Present Time = | Date of Occupancy | | | | | | |
| **INITIAL COSTS** | **Quantity** | **UM** | **Unit Price** | **Est.** | **PW** | **Est.** | **PW** |
| A. Remote boilers installation | | | | 592,200 | 592,200 | | 0 |
| B. Boilers inside the building | | | | | 0 | 179,700 | 179,700 |
| C. | | | | | 0 | | 0 |
| D. | | | | | 0 | | 0 |
| E. | | | | | 0 | | 0 |
| F. | | | | | 0 | | 0 |
| G. | | | | | 0 | | 0 |
| H. | | | | | 0 | | 0 |
| I. | | | | | 0 | | 0 |
| J. | | | | | 0 | | 0 |
| **Total Initial Cost** | | | | | **592,200** | | **179,700** |
| **Initial Cost PW Savings (Compared to Original Design)** | | | | | | | **412,500** |
| **REPLACEMENT COST/ SALVAGE VALUE** | | | | | | | |
| **Description** | | **Year** | **PW Factor** | | | | |
| A. | | | | | 0 | | 0 |
| B. | | | | | 0 | | 0 |
| C. | | | | | 0 | | 0 |
| D. | | | | | 0 | | 0 |
| E. | | | | | 0 | | 0 |
| F. | | | | | 0 | | 0 |
| G. | | | | | 0 | | 0 |
| H. | | | | | 0 | | 0 |
| I. Salvage Value | | | | | 0 | | 0 |
| **Total Replacement/Salvage Costs** | | | | | **0** | | **0** |
| **ANNUAL COSTS** | | | | | | | |
| **Description** | | **Escl. %** | **PWA** | | | | |
| A. Energy Wood Chips | | 0.0% | 14.741 | 21,600 | 318,402 | | 0 |
| B. Energy Fish Oil/Bio Diesel | | 2.0% | 14.741 | | 0 | 46,100 | 679,553 |
| C. | | 0.0% | 14.741 | | 0 | | 0 |
| D. | | 0.0% | 14.741 | | 0 | | 0 |
| E. | | 0.0% | 14.741 | | 0 | | 0 |
| F. | | 0.0% | 14.741 | | 0 | | 0 |
| **Total Annual Costs (Present Worth)** | | | | | **318,402** | | **679,553** |
| **Total Life Cycle Costs (Present Worth)** | | | | | **910,600** | | **859,300** |
| **Life Cycle Savings (Compared to Original Design)** | | | | | | | **51,300** |
| | | | **PP Factor** | | | | |
| **Total Life Cycle Costs (Annualized)** | | | **0.0678** | **61,774** | **Per Year** | | **Per Year** |

PW: Present Worth
PWA: Present Worth of Annuity
PP: Periodic Payment

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park** **VA No.**
**Item:** **Provide single elevator ilo two** **12**

## Original Design

Current design has one service elevator and one passenger elevator.

## Proposed Design

Provide one elevator to meet the needs of passengers / accessibility and servicing the building.

## Advantages and Disadvantages

**Advantages:**

- Less energy
- Less maintenance and repair cost
- Lower initial cost
- Building floor space savings
-

**Disadvantages:**

- Peak use may require longer waiting time
- No redundancy
-

## Discussion

This proposal can also be considered for the 90% and 75% alternatives.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **273,500** | **379,000** |
| **Proposed Design** | **140,700** | **206,000** |
| **Potential Savings** | **132,800** | **173,000** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park** **VA No.**
**Item:** **Provide single elevator ilo two** **12**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Passenger three-stop hydraulic elevator, 3,500# | 1 | EA | 75,000 | 75,000 |
| Passenger four-stop hydraulic elevator, 3,500# | 1 | EA | 80,000 | 80,000 |
| Elevator enclosure | 2 | EA | 10,000 | 20,000 |
| Subtotal | | | | 175,000 |
| Markup (contingency, general cond, location) | 56.3% | | | 98,525 |
| | | | **Total Cost** | **273,500** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Passenger four-stop hydraulic elevator, 3,500# | 1 | EA | 80,000 | 80,000 |
| Elevator enclosure | 1 | EA | 10,000 | 10,000 |
| Subtotal | | | | 90,000 |
| Markup | 56.3% | | | 50,670 |
| | | | **Total Cost** | **140,700** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings** | **132,800** |

# LIFE CYCLE COST ANALYSIS (LCCA)

**Project/Location:** **Mary Lowell Center, Kenai Fjords National Park**
**Item:** **Provide single elevator ilo two**

VA No.
**12**

| **Description:** | | | | **Original Design** | | **Proposed Design** | |
|---|---|---|---|---|---|---|---|
| Project Life Cycle = | **20** | **Years** | | Two elevators | | Single Elevator | |
| Discount Rate = | **3.10%** | | | Service and Passenger | | Service/ Passenger | |
| Present Time = | **Date of Occupancy** | | | | | | |
| **INITIAL COSTS** | **Quantity** | **UM** | **Unit Price** | **Est.** | **PW** | **Est.** | **PW** |
| A. Two elevators | | | | 273,500 | 273,500 | 0 | 0 |
| B. Single Elevator | | | | | 0 | 140,700 | 140,700 |
| C. | | | | | 0 | | 0 |
| D. | | | | | 0 | | 0 |
| E. | | | | | 0 | | 0 |
| F. | | | | | 0 | | 0 |
| G. | | | | | 0 | | 0 |
| H. | | | | | 0 | | 0 |
| I. | | | | | 0 | | 0 |
| J. | | | | | 0 | | 0 |
| **Total Initial Cost** | | | | | **273,500** | | **140,700** |
| **Initial Cost PW Savings (Compared to Original Design)** | | | | | | | **132,800** |
| **REPLACEMENT COST/ SALVAGE VALUE** | | | | | | | |
| **Description** | | **Year** | **PW Factor** | | | | |
| A. | | | | | 0 | | 0 |
| B. | | | | | 0 | | 0 |
| C. | | | | | 0 | | 0 |
| D. | | | | | 0 | | 0 |
| E. | | | | | 0 | | 0 |
| F. | | | | | 0 | | 0 |
| G. | | | | | 0 | | 0 |
| H. | | | | | 0 | | 0 |
| I. Salvage Value | | | | | 0 | | 0 |
| **Total Replacement/Salvage Costs** | | | | | **0** | | **0** |
| **ANNUAL COSTS** | | | | | | | |
| **Description** | | **Escl. %** | **PWA** | | | | |
| A. Maintenance Service Contract | | 0.0% | 14.741 | 4,000 | 58,963 | 2,000 | 29,482 |
| B. Energy | | 2.0% | 17.904 | 2,600 | 46,550 | 2,000 | 35,808 |
| C. | | 0.0% | 14.741 | | 0 | | 0 |
| D. | | 0.0% | 14.741 | | 0 | | 0 |
| E. | | 0.0% | 14.741 | | 0 | | 0 |
| F. | | 0.0% | 14.741 | | 0 | | 0 |
| **Total Annual Costs (Present Worth)** | | | | | **105,513** | | **65,289** |
| **Total Life Cycle Costs (Present Worth)** | | | | | **379,000** | | **206,000** |
| **Life Cycle Savings (Compared to Original Design)** | | | | | | | **173,000** |
| | | | **PP Factor** | | | | |
| **Total Life Cycle Costs (Annualized)** | | | **0.0678** | **25,711** | **Per Year** | **13,975** | **Per Year** |

PW: Present Worth
PWA: Present Worth of Annuity
PP: Periodic Payment

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Limit radiant heat to first 10 feet of perimeter floors** **19**

## Original Design

Drawing M-6 indicates that radiant floor heating is being used throughout the building except for Conference and Retail / Exhibit areas.

## Proposed Design

We recommend that radiant floor heat is installed up to 10 feet from the building perimeter walls. Use the overhead VAV system to supply conditioned air the interior spaces. Add hot water reheat coils to the boxes.

## Advantages and Disadvantages

**Advantages:**

- Lower initial cost
- Reheat in VAV boxes provides faster response to space heating needs
- Maintains zone control included in the current design
-
-

**Disadvantages:**

- May affect energy credit (LEED)
-
-
-

## Discussion

Achieves VE goal of reducing cost without compromise on performance and function.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **306,900** | **306,900** |
| **Proposed Design** | **117,200** | **117,200** |
| **Potential Savings** | **189,700** | **189,700** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Limit radiant heat to first 10 feet of perimeter floors** **19**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Radiant heat throughout | 32,723 | SF | 6.00 | 196,338 |
| Subtotal | | | | 196,338 |
| Markup | 56% | | | 110,538 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **306,900** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Limit radiant heat to 10' perimeter | 7,500 | SF | 6.00 | 45,000 |
| Reheat coil to VAV boxes | 20 | | 1,500 | 30,000 |
| Subtotal | | | | 75,000 |
| Markup | 56% | | | 42,225 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **117,200** |

**Potential Savings**

**Potential Savings** **189,700**

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Eliminate radiant heat from basement** **20**

## Original Design

Drawing M-6 indicates that radiant heat is being proposed for the basement floor.

## Proposed Design

We recommend that radiant floor heat be eliminated from the proposed design for the basement and add hot water reheat coils for the VAV boxes.

## Advantages and Disadvantages

**Advantages:**

- Lower initial cost
- Reheat in VAV boxes provides faster response to space heating needs
- Maintains zone control included in the current design
-
-

**Disadvantages:**

- May affect energy credit (LEED)
-
-
-

## Discussion

Achieves VE goal of reducing cost without compromise on performance and function. Coordinate with proposal No. 19.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **71,200** | **71,200** |
| **Proposed Design** | **16,400** | **16,400** |
| **Potential Savings** | **54,800** | **54,800** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Eliminate radiant heat from basement** **20**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Radiant heat in Basement | 7,596 | sf | 6.00 | 45,576 |
| Subtotal | | | | 45,576 |
| Markup | 56% | | | 25,659 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **71,200** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Add hot water reheat to vav boxes | 7 | Unit | 1,500 | 10,500 |
| Subtotal | | | | 10,500 |
| Markup | 56% | | | 5,912 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **16,400** |

**Potential Savings**

**Potential Savings** **54,800**

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park** **VA No.**

**Item:** **Omit skylights over stairs and reception area / use only clerestory** **23**

## Original Design

Current design indicates a skylight and clerestory over the grand stair and reception area. Another skylight and clerestory is shown over the atrium.

## Proposed Design

Since grand stair and reception area is near an outside wall, the need of daylighting through the skylights is not functionally necessary and can be eliminated. Although small, consider also omitting skylight over north terrace. Also consider simplifying the atrium skylight. A clerestory approach should be used to meet the daylight needs of the facility.

## Advantages and Disadvantages

**Advantages:**

- Lower initial cost
- Less maintenance and repair cost
- Less heat loss
- 
- 

**Disadvantages:**

- Less daylight (although not significant loss with windows in stairs)
- Aesthetics, stairs less grand
- 

## Discussion

This proposal can also be considered for the 90% and 75% alternatives. We have community provided information that skylights will be a maintenance issue. Local buildings, particularly the Sea Life Center, are experiencing problems with their skylights. It is not clear that all the skylights are combined with clerestories but the approach should be to use only clerestories.

## Life Cycle Cost Summary

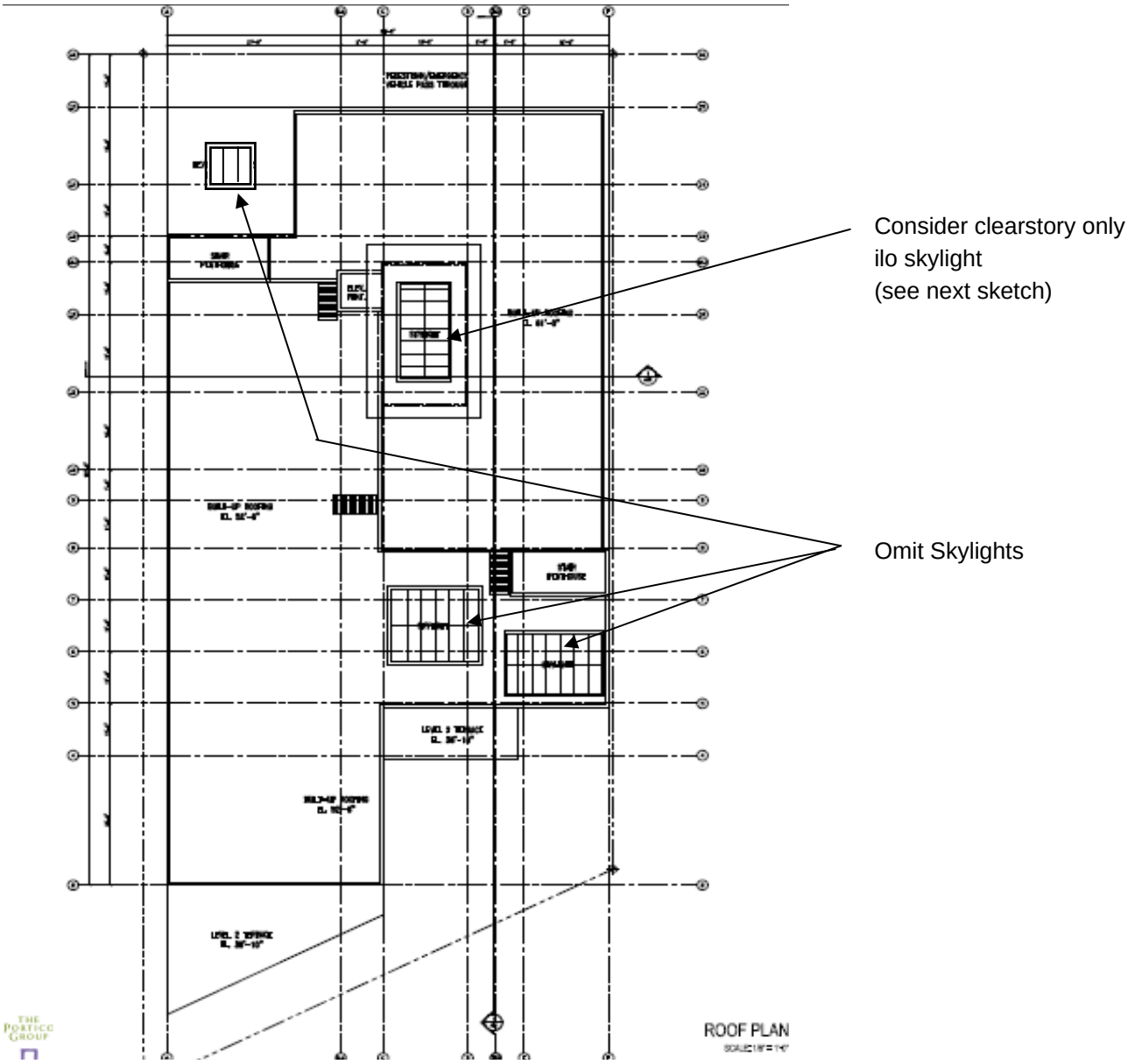
| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **112,600** | **127,500** |
| **Proposed Design** | **19,100** | **19,100** |
| **Potential Savings** | **93,500** | **108,400** |

## Sketch Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park** **VA No.**

**Item:** **Omit skylights over stairs and reception area / use only clerestory** **23**

**Original Design** **Proposed Design**

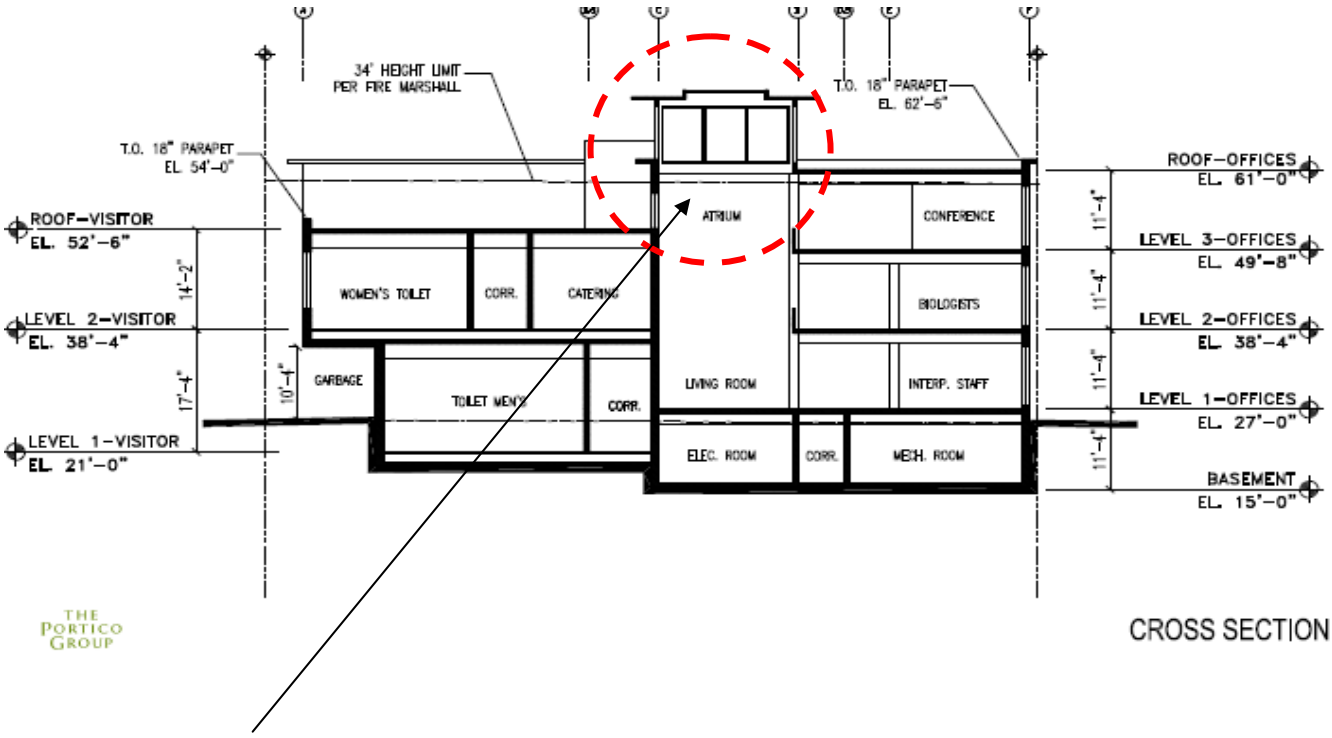


## Sketch Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park** **VA No.**

**Item:** **Omit skylights over stairs and reception area / use only clerestory** **23**

**Original Design** **Proposed Design**




Simplify, consider clearstory only

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park** **VA No.**
**Item:** **Omit skylights over stairs and reception area / use only clerestory** **23**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Skylight at reception | 325 | SF | 100 | 32,500 |
| Operable skylight at grand stair | 295 | SF | 115 | 33,925 |
| Skylight at north terrace | 56 | SF | 100 | 5,600 |
| Subtotal | | | | 72,025 |
| Markup (contingency, general cond, location) | 56.3% | | | 40,550 |
| | | | **Total Cost** | **112,600** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Roof structure | 676 | SF | 13.22 | 8,937 |
| Rigid Insulation | 676 | SF | 1.95 | 1,318 |
| Vapor barrier | 676 | SF | 0.20 | 135 |
| EDPM roofing | 676 | SF | 2.75 | 1,859 |
| Subtotal | | | | 12,249 |
| Markup | 56.3% | | | 6,896 |
| | | | **Total Cost** | **19,100** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings** | **93,500** |

# LIFE CYCLE COST ANALYSIS (LCCA)

**Project/Location:** **Mary Lowell Center, Kenai Fjords National Park**

**Item:** **Omit skylights over stairs and reception area / use only clerestory**

VA No. **23**

| **Description:** | | | | | **Original Design** | | **Proposed Design** | |
|---|---|---|---|---|---|---|---|---|
| Project Life Cycle = | **20** | **Years** | | | Two elevators | | Single Elevator | |
| Discount Rate = | **3.10%** | | | | Service and Passenger | | Service/ Passenger | |
| Present Time = | **Date of Occupancy** | | | | | | | |
| **INITIAL COSTS** | | **Quantity** | **UM** | **Unit Price** | **Est.** | **PW** | **Est.** | **PW** |
| A. Two elevators | | | | | 112,600 | 112,600 | 0 | 0 |
| B. Single Elevator | | | | | | 0 | 19,100 | 19,100 |
| C. | | | | | | 0 | | 0 |
| D. | | | | | | 0 | | 0 |
| E. | | | | | | 0 | | 0 |
| F. | | | | | | 0 | | 0 |
| G. | | | | | | 0 | | 0 |
| H. | | | | | | 0 | | 0 |
| I. | | | | | | 0 | | 0 |
| J. | | | | | | 0 | | 0 |
| **Total Initial Cost** | | | | | | **112,600** | | **19,100** |
| **Initial Cost PW Savings (Compared to Original Design)** | | | | | | | | **93,500** |
| **REPLACEMENT COST/ SALVAGE VALUE** | | | | | | | | |
| **Description** | | | **Year** | **PW Factor** | | | | |
| A. | | | | | | 0 | | 0 |
| B. | | | | | | 0 | | 0 |
| C. | | | | | | 0 | | 0 |
| D. | | | | | | 0 | | 0 |
| E. | | | | | | 0 | | 0 |
| F. | | | | | | 0 | | 0 |
| G. | | | | | | 0 | | 0 |
| H. | | | | | | 0 | | 0 |
| I. Salvage Value | | | | | | 0 | | 0 |
| **Total Replacement/Salvage Costs** | | | | | | **0** | | **0** |
| **ANNUAL COSTS** | | | | | | | | |
| **Description** | | **Cost/ SF** | **Escl. %** | **PWA** | | | | |
| A. Maintenance of Skylights | | 1.50 | 0.0% | 14.741 | 1,014 | 14,947 | 0 | 0 |
| B. Energy (heat loss vs. lighting saved) | | | 2.0% | 17.904 | Same | 0 | Same | 0 |
| C. | | | 0.0% | 14.741 | | 0 | | 0 |
| D. | | | 0.0% | 14.741 | | 0 | | 0 |
| E. | | | 0.0% | 14.741 | | 0 | | 0 |
| F. | | | 0.0% | 14.741 | | 0 | | 0 |
| **Total Annual Costs (Present Worth)** | | | | | | **14,947** | | **0** |
| **Total Life Cycle Costs (Present Worth)** | | | | | | **127,500** | | **19,100** |
| **Life Cycle Savings (Compared to Original Design)** | | | | | | | | **108,400** |
| | | | | **PP Factor** | | | | |
| **Total Life Cycle Costs (Annualized)** | | | | **0.0678** | **8,649** | **Per Year** | **1,296** | **Per Year** |

PW: Present Worth
PWA: Present Worth of Annuity
PP: Periodic Payment

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park** **VA No.**

**Item:** **Separate construction contracts for exhibits and GC** **34**

## Original Design

Exhibit construction is included as part of the general contruction contract.

## Proposed Design

Separate construction contract for exhibits from the general contract to avoid general markup from the prime contractor.

## Advantages and Disadvantages

**Advantages:**

- Cost savings
- Allows use of process to select best qualified for each skill (exhibit vs GC)
- Allows more time to finish exhibit design (can continue during bid/award for GC)
-
-

**Disadvantages:**

- Requires contract & installation coordination by government
-
-

## Discussion

Could also be used for 90% & 75% alternatives.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **2,103,000** | **2,103,000** |
| **Proposed Design** | **1,594,400** | **1,594,400** |
| **Potential Savings** | **508,600** | **508,600** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park** **VA No.**
**Item:** **Separate construction contracts for exhibits and GC** **34**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Ancillary features | 1 | LS | 70,000 | 70,000 |
| General gallery conditions | 1 | LS | 270,000 | 270,000 |
| Exhibits 1 ,2 & 3 | 1 | LS | 162,500 | 162,500 |
| Exhibits 4 & 5 | 1 | LS | 130,000 | 130,000 |
| Exhibits 6 & 7 | 1 | LS | 116,000 | 116,000 |
| Exhibit 8 | 1 | LS | 97,000 | 97,000 |
| Show | 1 | LS | 400,000 | 400,000 |
| Shipping and installation labor | 1 | LS | 100,000 | 100,000 |
| *Costs provided by exhibitry consultant* | | | | |
| Subtotal | | | | 1,345,500 |
| Markup (contingency, general cond, OH&P) | 56.3% | | | 757,517 |
| | | | **Total Cost** | **2,103,000** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Ancillary features | 1 | LS | 70,000 | 70,000 |
| General gallery conditions | 1 | LS | 270,000 | 270,000 |
| Exhibits 1 ,2 & 3 | 1 | LS | 162,500 | 162,500 |
| Exhibits 4 & 5 | 1 | LS | 130,000 | 130,000 |
| Exhibits 6 & 7 | 1 | LS | 116,000 | 116,000 |
| Exhibit 8 | 1 | LS | 97,000 | 97,000 |
| Show | 1 | LS | 400,000 | 400,000 |
| Shipping and installation labor | 1 | LS | 100,000 | 100,000 |
| Subtotal | | | | 1,345,500 |
| Markup (contingency & escalation only) | 18.5% | | | 248,918 |
| | | | **Total Cost** | **1,594,400** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings** | **508,600** |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Estimate adjustments** **35**

## Original Design

Some of the items in the estimate need to be adjusted.

## Proposed Design

Adjust estimate to better identify current thinking with the design (see cost worksheet for specific items).

## Advantages and Disadvantages

**Advantages:**

- More accurate costs
- Better understanding of current design cost
- 
- 
- 

**Disadvantages:**

- 
- 
- 
- 

## Discussion

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **3,775,700** | **3,775,700** |
| **Proposed Design** | **3,739,200** | **3,739,200** |
| **Potential Savings** | **36,500** | **36,500** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Estimate adjustments** **35**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Security system | 1 | LS | 30,000 | 30,000 |
| Non-Hazardous demolition | 1 | LS | 28,500 | 28,500 |
| Hazardous abatement / disposal | 1 | LS | 0 | 0 |
| Ashpalt Repair on Washington Street | 2,775 | SF | 4.50 | 12,500 |
| Landscape | 1 | Allow | 10,000 | 10,000 |
| Coated corrugated metal siding (maintenance) | 1,792 | Wall SF | 5.50 | 9,856 |
| Urinal screens | 0 | EA | 355.00 | 0 |
| AV System | 1 | Allow | 494,000 | 494,000 |
| Residential Appliances | 1 | Allow | 2,660 | 2,660 |
| Exhibits | 1 | LS | 1,345,500 | 1,345,500 |
| Project Overhead (4.5%) | 1 | LS | 482,652 | 482,652 |
| | | | | |
| | | | | |
| | | | | |
| Subtotal | | | | 2,415,668 |
| Markup | 56% | | | 1,360,021 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **3,775,700** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Security system (more) | 1 | LS | 40,000 | 40,000 |
| Non-Hazardous demo / Site remedation | 1 | LS | 405,000 | 405,000 |
| Hazardous abatement / disposal | 1 | LS | 118,500 | 118,500 |
| Replace asphalt on Washington Street | 11,100 | SF | 6.00 | 66,600 |
| Landscape | 1 | Allow | 25,000 | 25,000 |
| Wood siding (residential, if boiler bld stays) | 1,792 | Wall SF | 4.00 | 7,168 |
| Urinal screens | 3 | EA | 355.00 | 1,065 |
| AV System | 1 | Allow | 200,000 | 200,000 |
| No appliances (refrig, oven, DW) | 1 | Allow | 0 | 0 |
| Exhibits (original budget) | 1 | LS | 1,100,000 | 1,100,000 |
| Project Overhead (4%) | 1 | LS | 429,000 | 429,000 |
| | | | | |
| | | | | |
| | | | | |
| Subtotal | | | | 2,392,333 |
| Markup | 56% | | | 1,346,883 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **3,739,200** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings** | **36,500** |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Increase project escalation from 3.5% to 7.5%** **36**

## Original Design

Original escalation identified in project estimate reflects one year of 3.5% escalation.

## Proposed Design

Increase escalation to better reflect current market conditions, which means escalation of 5-10%. The team recommends 7.5%.

## Advantages and Disadvantages

**Advantages:**

- Escalation better reflects know market conditions
- Risk of over budget at bid is reduced
- 
- 
- 

**Disadvantages:**

- Increase in project cost
- 
- 
- 

## Discussion

It is understood that construction activity will likely begin in late 2007 and include a 16 month construction period. Carrying the escalation to midpoint of construction means through May 2007. It is also well documented that a continuous stream of projects will not begin to taper off until well after 2007. Known projects include Airport projects in Fairbanks and Anchorage, Military housing development in Ft. Wainwright and Clear Air Force Station, Housing Privatization Project in Elmendorf AFB, Relocation of C17's squadron, 22 story and 15 story high rise Anchorage, 500+ housing projects, etc.

Projecting potential escalation is always difficult. Increasing this factor should more accurately reflect the nature of projects in this area, which seems to be a much higher escalation.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **611,100** | **611,100** |
| **Proposed Design** | **2,946,400** | **2,946,400** |
| **Potential Savings** | **(2,335,300)** | **(2,335,300)** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Increase project escalation from 3.5% to 7.5%** **36**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Current escalation | 3.5% | Percent | 11,170,900 | 390,982 |
| one year at 3.5% | | | | |
| Subtotal | | | | 390,982 |
| Markup | 56% | | | 220,123 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **611,100** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Proposed escalation | 16.9% | Percent | 11,170,900 | 1,885,089 |
| 2.25 years at 7.5% | | | | |
| means carried until 5/2008 | | | | |
| Subtotal | | | | 1,885,089 |
| Markup | 56% | | | 1,061,305 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **2,946,400** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings** | **(2,335,300)** |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Let contractor buy out job up front with government to provide secure storage** **37**

## Original Design

Project completion follows traditional design bid build delivery method.

## Proposed Design

Document in contract the allowance to pre-purchase the bulk of the high cost items prior to construction and store until needed. This would save the cost of the material escalation.

## Advantages and Disadvantages

**Advantages:**

- Pre-purchasing eliminates potential cost of inflation
- Risk of bid surprise is reduced (possible schedule impacts)
-
-
-

**Disadvantages:**

- May involve warranty issues
- If costs go down for a certain trade we would have paid too much
- Storage of materials could be provided by NPS maintenance (contractor advantage)
-

## Discussion

The bid environment in the regional market is following significant escalation due to the number of projects. One method to off set the increase in material cost would be to pre-purchase the bulk of the high cost items directly after award to negate the escalation fees. It is understood that escalation for labor will not be included.

A condition of pre-purchasing some of the materials is that the items must be stored in either on-site secured storage or in a storage area that is totally bonded. It is assumed this storage will be provided by the NPS in the fenced in maintenance area.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **6,562,500** | **6,562,500** |
| **Proposed Design** | **6,058,400** | **6,058,400** |
| **Potential Savings** | **504,100** | **504,100** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Let contractor buy out job up front with government to provide secure storage** **37**

**Original Design**

| | | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|---|
| Material cost of project | | 1 | LS | 6,171,503 | 6,171,503 |
| Current escalation | | 1 | LS | 390,982 | 390,982 |
| Subtotal | | | | | 6,562,485 |
| Markup | no markup | 0% | | | 0 |
| | (contingency, general conditions, escalation) | | | **Total Cost** | **6,562,500** |

**Proposed Design**

| | | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|---|
| Material cost of project (pre-purchased) | | 1 | LS | 2,777,176 | 2,777,176 |
| | Pre-purchase 50% of material, save 10-15% | | | | |
| Remaining materials (50%) | | 1 | LS | 3,085,752 | 3,085,752 |
| Remaining escalation (50%) | | 1 | LS | 195,491 | 195,491 |
| Subtotal | | | | | 6,058,419 |
| Markup | no markup | 0% | | | 0 |
| | (contingency, general conditions, escalation) | | | **Total Cost** | **6,058,400** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings** | **504,100** |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Add crosswalk & waiting area for bus drop-off / loading area** **41**

## Original Design

Visitor traffic from buses is not accommodated.

## Proposed Design

Add a visitor-friendly covered waiting area (protection from weather) in the MLC Plaza and a cross-walk to the bus parking across Railway Avenue.

## Advantages and Disadvantages

**Advantages:**

- Improved visitor safety
- Improved visitor comfort
- Improved visitor experience
- 
- 

**Disadvantages:**

- Cost of plaza cover and crosswalk
- Visual impact of awning and wind screens
- Need to provide for drainage (at road where raised table is)
- 

## Discussion

Visitors arriving by bus would not have an established crosswalk. Add signage, striping, and raised roadbed at the crosswalk. Add rain awning and wind protection screens to accommodate 40 persons on the plaza. Considerable public safety, visitor comfort, and enhanced visitor experience benefits are derived from this proposal.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **0** | **0** |
| **Proposed Design** | **(98,600)** | **(98,600)** |
| **Potential Savings** | **(98,600)** | **(98,600)** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Add crosswalk & waiting area for bus drop-off / loading area** **41**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| No additional features | 0 | | | 0 |
| Subtotal | | | | 0 |
| Markup | 56% | | | 0 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **0** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Signage, raised roadbed, awning, windscreen | 1 | lot | 63,059 | 63,059 |
| Subtotal | | | | 63,059 |
| Markup | 56% | | | 35,502 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **98,600** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings** | **(98,600)** |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Eliminate standby generator** **59**

## Original Design

A 250 kVa generator for standby electrical power is provided.

## Proposed Design

Eliminate the on-site standby generator.

## Advantages and Disadvantages

**Advantages:**

- Reduces building size
- Operating coat savings
- Maintenance cost savings
- 
- 

**Disadvantages:**

- Rely on Seward electric company to provide standby power
- 
- 
- 

## Discussion

Seward electric company, which purchases electric power from Chugach Electric and resells it in the City of Seward, has standby power on its grid. A dedicated generator for this project not required. This saves floor space, operating and maintenance costs, and initial cost. The SD narrative for this project discussed standby power for fire pump, but there is no fire pump in the project. An automatic transfer switch *could* be used (as determined by electrical engineer) to shed electric loads while under standby power.

The room could be re-used for an interior boiler (cost not analyzed as part of the VA).

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **235,200** | **244,800** |
| **Proposed Design** | **0** | **0** |
| **Potential Savings** | **235,200** | **244,800** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Eliminate standby generator** **59**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Standby Generator, 250 KW | 1 | ea | 50,000 | 50,000 |
| Automatic Transfer Switch | 1 | ea | 16,500 | 16,500 |
| Generator Room | 240 | SF | 350 | 84,000 |
| Subtotal | | | | 150,500 |
| Markup | 56% | | | 84,732 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **235,200** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Standby Generator, 250 KW | | | | 0 |
| Automatic Transfer Switch | | | | |
| Generator Room | | | | |
| Subtotal | | | | 0 |
| Markup | 56% | | | 0 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **0** |

**Potential Savings**

**Potential Savings** **235,200**

# LIFE CYCLE COST ANALYSIS (LCCA)

**Project / Location:** Mary Lowell Center, Kenai Fjords National Park, AK

**Item:** Eliminate standby generator

**VA No.** 59

| Description: | | | | Original Design | | Proposed Design | |
|---|---|---|---|---|---|---|---|
| Project Life Cycle = | 20 | Years | | | | | |
| Discount Rate = | 3.10% | | | | | | |
| Present Time = | Date of Occupancy | | | | | | |
| **INITIAL COSTS** | **Quantity** | **UM** | **Unit Price** | **Est.** | **PW** | **Est.** | **PW** |
| A. Original Design | | | | 235,200 | 235,200 | 0 | 0 |
| B. Proposed Design | | | | 0 | 0 | 0 | 0 |
| C. | | | | | 0 | | 0 |
| D. | | | | | 0 | | 0 |
| E. | | | | | 0 | | 0 |
| F. | | | | | 0 | | 0 |
| G. | | | | | 0 | | 0 |
| H. | | | | | 0 | | 0 |
| I. | | | | | 0 | | 0 |
| J. | | | | | 0 | | 0 |
| **Total Initial Cost** | | | | | **235,200** | | **0** |
| **Initial Cost PW Savings (Compared to Original Design)** | | | | | | | **0** |
| **REPLACEMENT COST/ SALVAGE VALUE** | | | | | | | |
| **Description** | | **Year** | **PW Factor** | | | | |
| A. Emergency generator replacement | | | | | 0 | | 0 |
| B. (after 20 years) | | | | | 0 | | 0 |
| C. | | | | | 0 | | 0 |
| D. | | | | | 0 | | 0 |
| E. | | | | | 0 | | 0 |
| F. | | | | | 0 | | 0 |
| G. | | | | | 0 | | 0 |
| H. | | | | | 0 | | 0 |
| I. Salvage Value | | | | | 0 | | 0 |
| **Total Replacement/Salvage Costs** | | | | | **0** | | **0** |
| **ANNUAL COSTS** | | | | | | | |
| **Description** | | **Escl. %** | **PWA** | | | | |
| A. Annual maintenance | | 0.0% | 14.741 | 500 | 7,370 | | 0 |
| B. Energy | | 2.0% | 14.741 | 150 | 2,211 | | 0 |
| C. | | 0.0% | 14.741 | | 0 | | 0 |
| D. | | 0.0% | 14.741 | | 0 | | 0 |
| E. | | 0.0% | 14.741 | | 0 | | 0 |
| F. | | 0.0% | 14.741 | | 0 | | 0 |
| **Total Annual Costs (Present Worth)** | | | | | **9,582** | | **0** |
| **Total Life Cycle Costs (Present Worth)** | | | | | **244,800** | | **-** |
| **Life Cycle Savings (Compared to Original Design)** | | | | | | | **244,800** |
| | | | **PP Factor** | | | | |
| **Total Life Cycle Costs (Annualized)** | | | **0.0678** | **16,607** | **Per Year** | **-** | **Per Year** |

PW: Present Worth
PWA: Present Worth of Annuity
PP: Periodic Payment

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Reduce contractor's general conditions costs** **67-69**

## Original Design

Contractor provided field office and employee housing. The contractor would rent trailers for field offices and house their superintendent and construction crews in the hotel rooms in the local community.

## Proposed Design

Allow the contractor to use the Mai house for the project duration as project office space and/or housing for management staff. At the end of the project, the contractor would continue to be responsible for demolition of the residence and construction of the parking on the lot. Have the City of Seward allow the contractor to use the city owned RV campground for a construction camp at no cost other than utilities. Bid the project during the January/February time period versus later in the year.

## Advantages and Disadvantages

**Advantages:**

- Using Mai house eliminates rent, mobilize job trailors, provides temporary utility connections
- Mai house has existing utility infrastructure and can accommodate office / residence for superintendent
- Allowing the contractor to use the city RV campground consolidates construction crews in one location and provides potentially reduced costs (workers live in their own RV's, no hotel rental), lower Per diems
- Reduces the contractor's exposure to the high cost of peak season rates
- Provides opportunity to have some control over labor's behavior and affect on tourists
- Bidding after the new year takes advantage of contractor's slow time, generally the greatest capacity

**Disadvantages:**

- Potential loss of revenue to local hotels industry (off season)
- Potential loss of revenue to the City of Seward from RV campground
- No down side to the use of the Mai house by the contractor.
- Funding does not always get approved in time to bid during the most favorable time period.

## Discussion

There can be a 30% difference in bid prices between bids obtained shortly after the new year versus mid summer. There is also a big difference between the number of bidders who will respond to the solicitation.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design #67** | **33,600** | |
| **Proposed Design** | **0** | |
| **Potential Savings** | **33,600** | |
| | | |
| **Original Design #68** | **259,200** | **0** |
| **Proposed Design** | **43,200 to 129,600** | **0** |
| **Potential Savings** | **129,600 to 216,000** | **0** |
| | | |
| **Original Design #69** | **see discussion** | **0** |
| **Proposed Design** | | **0** |
| **Potential Savings** | | **0** |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Omit underfloor distribution and use overhead distribution** **71**

## Original Design

Underfloor air distribution in the conference center, multipurpose room, and public lobby/exhbit space. (8715 square feet).

## Proposed Design

Eliminate the underfloor distribution. Design with ducted overhead ventilation air distribution. New flooring would be a mixture of linoleum, ceramic tile, and carpet. Room height can be reduced by 18" for wall framing and finishing savings.

## Advantages and Disadvantages

**Advantages:**

- Reduced initial cost
- Reduced maintenance cost
- 
- 
- 

**Disadvantages:**

- Increased mixing of air will increase heating cost
- Reduced flexibility fur future changes in air distribution
- 
- 

## Discussion

The underflool air distribution relies on a raised flooring system. Cleaning the underfloor plenum is a recurring maintenance expense. The overhead distribution will ventilate the spaces effectively without the need for raised flooring or the need for routine cleaning. The overhead ducts are less easily modified to accommodate future changes to the space plan. Ceiling changes are not accounted for in the cost analysis of this VA recommendation.

The tean suggest considering adding in-floor IT infrasture on an 8'-0" grid for added flexibility.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **334,100** | **334,100** |
| **Proposed Design** | **170,100** | **170,100** |
| **Potential Savings** | **164,000** | **164,000** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Omit underfloor distribution and use overhead distribution** **71**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| 18" raised floor | 8,715 | sf | 18 | 156,870 |
| Carpet tiles | 970 | sy | 51 | 49,470 |
| concrete sealer | 8,715 | sf | 1 | 7,408 |
| Subtotal | | | | 213,748 |
| Markup | 56% | | | 120,340 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **334,100** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| floor finish (blended cost of carpet, tile, & linoleum) | 8,715 | sf | 10 | 87,150 |
| Reduced wall framing | -975 | sf | 2 | (2,194) |
| Reduced Gyp Board | -975 | sf | 2 | (1,794) |
| Reduced wall finishing | -975 | sf | 1 | (819) |
| Spiral Ductwork | 1,000 | lb | 5 | 4,500 |
| Outlets / diffusers | 1 | lot | 2,000 | 2,000 |
| VAV boxes | 10 | ea | 1,000 | 10,000 |
| DDC controls | 1 | lot | 10,000 | 10,000 |
| Subtotal | | | | 108,843 |
| Markup | 56% | | | 61,279 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **170,100** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings** | **164,000** |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Incorporate public art into building (include ANHA and leverage Rasmussen Foundation)** **80-81**

## Original Design

Recommended locations included plaza sculpture and exterior wall mural on west elevation, but no allowance in cost estimate.

## Proposed Design

Assign incorporated artwork to the citizen advisory committee to make sure the partnership (including ANHA as a facilitating entity) and community mutually reach consensus on incorporating public art into the project. The goal should be to set aside funds that represent up to 1% of the net construction cost and would ideally come from the project and matched from other sources. At the very least if the other sources do not materialize, some public art is realized using a small portion of the project funds.

## Advantages and Disadvantages

**Advantages:**

- Reinforce community support and ownership in the facility
- Enhance the aesthetics of public space
- Provide historical or cultural context
- 
- 

**Disadvantages:**

- Funds could be used for other project elements
- Artwork is highly subjective as to its perceived value and acceptability
- 
- 

## Discussion

Specific areas to consider for integrated public art include:

Plaza sculpture, plaza ground plane, mural on exterior wall of west elevation, sales area compacting cubicle, promenade/lobby ceiling space, lobby/toilet corridor walls, cornice details on parapet, etc.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **117,200** | **188,400** |
| **Proposed Design** | **69,600** | **144,400** |
| **Potential Savings** | **47,600** | **44,000** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Incorporate public art into building (include ANHA and leverage Rasmussen Foundation)** **80-81**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Plaza Sculpture | 1 | ea | 50,000 | 50,000 |
| Wall mural | 1 | ea | 25,000 | 25,000 |
| Subtotal | | | | 75,000 |
| Markup | 56% | | | 42,225 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **117,200** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Plaza Sculpture | 1 | ea | 25,000 | 25,000 |
| Wall mural | 1 | ea | 12,500 | 12,500 |
| Cornice relief | 18 | ea | 250 | 4,500 |
| Sales area modular painting | 1 | ea | 2,500 | 2,500 |
| Subtotal | | | | 44,500 |
| Markup | 56% | | | 25,054 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **69,600** |

**Potential Savings**

**Potential Savings** **47,600**

# LIFE CYCLE COST ANALYSIS (LCCA)

**Project / Location:** Mary Lowell Center, Kenai Fjords National Park, AK

**Item:** Incorporate public art into building (include ANHA and leverage Rasmussen Foundation)

**VA No.** 80-81

| Description: | | | | Original Design | | Proposed Design | |
|---|---|---|---|---|---|---|---|
| | | | | Original Art | | Original + More Art | |
| Project Life Cycle = | 20 | Years | | | | | |
| Discount Rate = | 3.10% | | | | | | |
| Present Time = | Date of Occupancy | | | | | | |
| **INITIAL COSTS** | **Quantity** | **UM** | **Unit Price** | **Est.** | **PW** | **Est.** | **PW** |
| A. Original Design | | | | 117,200 | 117,200 | 0 | 0 |
| B. Proposed Design | | | | 0 | 0 | 69,600 | 69,600 |
| C. | | | | | 0 | | 0 |
| D. | | | | | 0 | | 0 |
| E. | | | | | 0 | | 0 |
| F. | | | | | 0 | | 0 |
| G. | | | | | 0 | | 0 |
| H. | | | | | 0 | | 0 |
| I. | | | | | 0 | | 0 |
| J. | | | | | 0 | | 0 |
| **Total Initial Cost** | | | | | **117,200** | | **69,600** |
| **Initial Cost PW Savings (Compared to Original Design)** | | | | | | | **47,600** |
| **REPLACEMENT COST/ SALVAGE VALUE** | | | | | | | |
| **Description** | | **Year** | **PW Factor** | | | | |
| A. Plaza sculpture | | 50 | 0.2173 | | 0 | | 0 |
| B. Wall mural | | 20 | 0.5430 | 25,000 | 13,575 | 25,000 | 13,575 |
| C. Cornice relief | | 50 | 0.2173 | | 0 | | 0 |
| D. Sales area modular painting | | 10 | 0.7369 | | 0 | 5,000 | 3,684 |
| E. | | | | | 0 | | 0 |
| F. | | | | | 0 | | 0 |
| G. | | | | | 0 | | 0 |
| H. | | | | | 0 | | 0 |
| I. Salvage Value | | 20 | 0.5430 | 1,000 | 543 | 1,000 | 543 |
| **Total Replacement/Salvage Costs** | | | | | **14,118** | | **17,802** |
| **ANNUAL COSTS** | | | | | | | |
| **Description** | | **Escl. %** | **PWA** | | | | |
| A. Clean sculpture | | 4.0% | 21.939 | 450 | 9,872 | 450 | 9,872 |
| B. Clean/patch mural | | 4.0% | 14.741 | 2,200 | 32,430 | 2,200 | 32,430 |
| C. Clean/patch cornice | | 4.0% | 14.741 | 250 | 3,685 | 250 | 3,685 |
| D. Clean/touch up paint on sales | | 4.0% | 14.741 | 750 | 11,056 | 750 | 11,056 |
| E. | | 0.0% | 14.741 | | 0 | | 0 |
| F. | | 0.0% | 14.741 | | 0 | | 0 |
| **Total Annual Costs (Present Worth)** | | | | | **57,043** | | **57,043** |
| **Total Life Cycle Costs (Present Worth)** | | | | | **188,400** | | **144,400** |
| **Life Cycle Savings (Compared to Original Design)** | | | | | | | **44,000** |
| | | | **PP Factor** | | | | |
| **Total Life Cycle Costs (Annualized)** | | | **0.0678** | **12,781** | **Per Year** | **9,796** | **Per Year** |

PW: Present Worth
PWA: Present Worth of Annuity
PP: Periodic Payment

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Consider an underground stormwater treatment package** **82**

## Original Design

The current design uses a bio swale to treat stormwater runoff from the parking lot.

## Proposed Design

Utilize a commercially available underground stormwater treatment package.

## Advantages and Disadvantages

**Advantages:**

- Guaranteed quality treatment of runoff entering Resurrection Bay
- Zero surface or subsurface contamination
- Maximizes parking area
- Reduces grounds maintenance
- Soil infiltration and swale capacity study not required

**Disadvantages:**

- Requires periodic pumping of waste
-
-
-

## Discussion

Functionality of the bioswale is uncertain according to the report due to unknown soil infiltration characteristics. Also, while total suspended solids would be filtered by a functional swale, treatment of oil / grease runoff from the parking area is not adressed.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **46,700** | **46,700** |
| **Proposed Design** | **46,900** | **46,900** |
| **Potential Savings** | **(200)** | **(200)** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Consider an underground stormwater treatment package** **82**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| 12" storm drain | 150 | lf | 20 | 2,925 |
| Outlet structure | 1 | ea | 5,500 | 5,500 |
| catch basins | 3 | ea | 1,750 | 5,250 |
| Swale | 2,400 | sf | 7 | 16,200 |
| Subtotal | | | | 29,875 |
| Markup | 56% | | | 16,820 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **46,700** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Stormwater Treatment package unit | 1 | ea | 30,000 | 30,000 |
| Subtotal | | | | 30,000 |
| Markup | 56% | | | 16,890 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **46,900** |

**Potential Savings**

**Potential Savings** **(200)**

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Use a moment structural frame ilo a braced frame** **83**

## Original Design

The current structural system on the exterior wall uses a braced frame system.

## Proposed Design

Use a moment connection structural design and fee up the possible interference with the glazing at the exterior wall.

## Advantages and Disadvantages

**Advantages:**

- Fewer lateral frames across windows on the exterior
- 
- 
- 
- 

**Disadvantages:**

- Higher initial cost
- 
- 
- 

## Discussion

The current design has braced frames that utilize diagonal framing members which cross in front of windows. A moment frame structure would keep the windows open and make the space plan more flexible. The building elevations show a lot of windows which are more compatible with the moment frame design.
The estimate includes an increase of 1 pound of steel per square foot.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **1,488,000** | **1,488,000** |
| **Proposed Design** | **1,594,300** | **1,594,300** |
| **Potential Savings** | **(106,300)** | **(106,300)** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Use a moment structural frame ilo a braced frame** **83**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Brace frame design | 280 | ton | 3,400 | 952,000 |
| means 13.6 lbs / SF from dividing 280 tons x 2,000 lbs by 41,438 GSF | | | | |
| Subtotal | | | | 952,000 |
| Markup | 56% | | | 535,976 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **1,488,000** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Moment frame design | 300 | ton | 3,400 | 1,020,000 |
| means 14.6 lbs / SF which equates to 300 tons | | | | |
| Subtotal | | | | 1,020,000 |
| Markup | 56% | | | 574,260 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **1,594,300** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings** | **(106,300)** |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Link occupancy sensor to the space ventilation system** **84**

## Original Design

It is not clear from the HVAC drawings whether the motion sensors being used for lighting control is incorporated into the buildings HVAC system control.

## Proposed Design

Incorporate motion sensors into the HVAC design linked to the lighting controls and the outside air (ventilation air) in areas with high ventilation requirements such as the Changing rooms, seasonal offices, Conference rooms, Interview, etc. The proposed design will turn off the lights and switch the VAV boxes to unoccupied mode.

## Advantages and Disadvantages

**Advantages:**

- Lower operating cost
- Help obtain LEED point
- 
- 
- 

**Disadvantages:**

- Higher initial cost
- 
- 
- 

## Discussion

The use of motion sensors for lighting and HVAC control is highly recommended due to the higher cost of energy. The timer on each sensor is adjustable and could be changed to accommodate each space needs.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **0** | **93,100** |
| **Proposed Design** | **23,400** | **23,400** |
| **Potential Savings** | **(23,400)** | **69,700** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Link occupancy sensor to the space ventilation system** **84**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| No HVAC Control | 1 | | | 0 |
| Subtotal | | | | 0 |
| Markup | 56% | | | 0 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **0** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Add HVAC control to motion sensor | 1 | ls | 15,000 | 15,000 |
| Subtotal | | | | 15,000 |
| Markup | 56% | | | 8,445 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **23,400** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings** | **(23,400)** |

# LIFE CYCLE COST ANALYSIS (LCCA)

**Project / Location:** **Mary Lowell Center, Kenai Fjords National Park, AK**

**Item:** **Link occupancy sensor to the space ventilation system**

**VA No.** **84**

| **Description:** | | | | **Original Design** | | **Proposed Design** | |
|---|---|---|---|---|---|---|---|
| Project Life Cycle = | **20** | **Years** | | No linked HVAC control | | HVAC control linked to motion sensor | |
| Discount Rate = | **3.10%** | | | | | | |
| Present Time = | **Date of Occupancy** | | | | | | |
| **INITIAL COSTS** | **Quantity** | **UM** | **Unit Price** | **Est.** | **PW** | **Est.** | **PW** |
| A. Original Design | | | | 0 | 0 | 0 | 0 |
| B. Proposed design | | | | 0 | 0 | 23,400 | 23,400 |
| C. | | | | | 0 | | 0 |
| D. | | | | | 0 | | 0 |
| E. | | | | | 0 | | 0 |
| F. | | | | | 0 | | 0 |
| G. | | | | | 0 | | 0 |
| H. | | | | | 0 | | 0 |
| I. | | | | | 0 | | 0 |
| J. | | | | | 0 | | 0 |
| **Total Initial Cost** | | | | | **0** | | **23,400** |
| **Initial Cost PW Savings (Compared to Original Design)** | | | | | | | **(23,400)** |
| **REPLACEMENT COST/ SALVAGE VALUE** | | | | | | | |
| **Description** | | **Year** | **PW Factor** | | | | |
| A. | | | | | 0 | | 0 |
| B. | | | | | 0 | | 0 |
| C. | | | | | 0 | | 0 |
| D. | | | | | 0 | | 0 |
| E. | | | | | 0 | | 0 |
| F. | | | | | 0 | | 0 |
| G. | | | | | 0 | | 0 |
| H. | | | | | 0 | | 0 |
| I. Salvage Value | | | | | 0 | | 0 |
| **Total Replacement/Salvage Costs** | | | | | **0** | | **0** |
| **ANNUAL COSTS** | | | | | | | |
| **Description** | | **Escl. %** | **PWA** | | | | |
| A. Annual Energy Saving | | 2.0% | 17.904 | 5,200 | 93,100 | | 0 |
| B. | | 0.0% | 14.741 | | 0 | | 0 |
| C. | | 0.0% | 14.741 | | 0 | | 0 |
| D. | | 0.0% | 14.741 | | 0 | | 0 |
| E. | | 0.0% | 14.741 | | 0 | | 0 |
| F. | | 0.0% | 14.741 | | 0 | | 0 |
| **Total Annual Costs (Present Worth)** | | | | | **93,100** | | **0** |
| **Total Life Cycle Costs (Present Worth)** | | | | | **93,100** | | **23,400** |
| **Life Cycle Savings (Compared to Original Design)** | | | | | | | **69,700** |
| | | | **PP Factor** | | | | |
| **Total Life Cycle Costs (Annualized)** | | | **0.0678** | **6,316** | **Per Year** | **1,587** | **Per Year** |

PW: Present Worth
PWA: Present Worth of Annuity
PP: Periodic Payment

# 90% & 75% DESIGN ALTERNATIVES

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Consider options to reduce construction cost by 10%** **90%**

## Original Design

Original design is per SD submittal.

## Proposed Design

As a contingency plan, the team has proposed ideas to save 10% of the aniticipated $16.3 million without sacrificing any of the functions.

## Advantages and Disadvantages

**Advantages:**

- Reduced initial costs
- More manufacturers could be used (lower bids)
-
-
-

**Disadvantages:**

- Less historically accurate
-
-

## Discussion

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **0** | **0** |
| **Proposed Design** | **(1,784,200)** | **(1,784,200)** |
| **Potential Savings** | **1,784,200** | **1,784,200** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Consider options to reduce construction cost by 10%** **90%**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| | | | | 0 |
| Subtotal | | | | 0 |
| Markup | 56% | | | 0 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **0** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Provide boilers into building (VA 9) | 1 | LS | (263,900) | (263,900) |
| Limit radiant flooring (VA19 & 20) | 1 | LS | (231,400) | (231,400) |
| Separate exhibit and GC contracts (VA 34) | 1 | LS | (325,400) | (325,400) |
| Let contractor buy out job (VA 37) | 1 | LS | (320,793) | (320,793) |
| Subtotal | | | | (1,141,493) |
| Markup | 56% | | | (642,661) |
| (contingency, general conditions, escalation) | | | **Total Cost** | **(1,784,200)** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings ($)** | **1,784,200** |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Consider options to reduce construction cost by 25%** **75%**

## Original Design

Original design is per SD submittal.

## Proposed Design

As a contingency plan, the team has proposed ideas to save 25% of the aniticipated $16.3 million without sacrificing any of the functions.

## Advantages and Disadvantages

**Advantages:**

- Reduced initial costs
- More manufacturers could be used (lower bids)
-
-
-

**Disadvantages:**

- Less historically accurate
-
-

## Discussion

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | **0** | **0** |
| **Proposed Design** | **(4,400,900)** | **(4,400,900)** |
| **Potential Savings** | **4,400,900** | **4,400,900** |

# Cost Worksheet

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Consider options to reduce construction cost by 25%** **75%**

**Original Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| | | | | 0 |
| Subtotal | | | | 0 |
| Markup | 56% | | | 0 |
| (contingency, general conditions, escalation) | | | **Total Cost** | **0** |

**Proposed Design**

| | Quantity | Unit | Unit Cost | Total |
|---|---|---|---|---|
| Provide boilers into building (VA 9) | 1 | LS | (263,900) | (263,900) |
| Limit radiant floor htg (VA19 & 20) | 1 | LS | (231,400) | (231,400) |
| Omit skylights use clerestory (VA 23) | 1 | LS | (59,800) | (59,800) |
| Separate exhibit and GC contracts (VA 34) | 1 | LS | (325,400) | (325,400) |
| Let contractor buy out job (VA 37) | 1 | LS | (320,793) | (320,793) |
| Omit standby generator (VA 59) | 1 | LS | (150,480) | (150,480) |
| Reduce general conditions (VA 67-69 | 1 | LS | (82,917) | (82,917) |
| Use finetube HVAC system ilo radiant floor | 1 | LS | (146,000) | (146,000) |
| Add public art (VA 80-81) | 1 | LS | (30,454) | (30,454) |
| Omit underfloor distribution (VA 71) | 1 | LS | (104,926) | (104,926) |
| Eliminate thermal mass | 1 | LS | (116,820) | (116,820) |
| Eliminate atrium (2nd and 3rd floor) | 1 | LS | (561,600) | (561,600) |
| Combine multi-purpose / conference | 1 | LS | (421,200) | (421,200) |
| Subtotal | | | | (2,815,691) |
| Markup | 56% | | | (1,585,234) |
| (contingency, general conditions, escalation) | | | **Total Cost** | **(4,400,900)** |

**Potential Savings**

| | |
|---|---|
| **Potential Savings ($)** | **4,400,900** |

## Part VI  Implementation

Implementation of the value study recommendations will rest with the design and the client teams, as work progresses onto the next stages.  Value analysis may be required throughout any re-design phases.

An Implementation Summary (**figure 10**) has been included to help the team track those recommendations that have been included during the project's continuing development.

## Items To Be Considered Further (Design Suggestions)

Some of the ideas selected by the team will need further consideration.  These ideas have been included as "Design Suggestions."  Here, the VA team documented the original design, proposed design, and recorded the advantages / disadvantages.  No cost estimates were developed as it will rest with the project team to consider implementation of the idea as work progresses onto the next stages.

## VA Team

The study team was composed of a mix of professional disciplines and varied National Park Service design, operations and maintenance experience.  Members of the park staff grounded the team with knowledge of the intricacies of managing and working on this site. The VA team consisted of members from:

- Kenai Fjords National Park;
- National Park Service, Alaska Regional Office;
- National Park Service, Denali National Park;
- United States Forest Service;
- City of Seward;
- Coffman Engineers;
- RIM Architects;
- MA Engineering;
- The Portico Group;
- Tetra Tech / KCM Inc.;
- Stantec Engineering;
- USKH, Inc;
- Candela;
- Paladino & Company, Inc.
- Bluewater Project Management, Inc.; and
- Kirk Associates (value analysis facilitation)

Stephen Kirk, a value specialist & principal of Kirk Associates, led the team's deliberations during the workshop.  A list of VA team participants is contained on **Figure 11** that follows.

## Acknowledgements

It would be a serious oversight in documenting this study without acknowledging the significant contributions made by the well-informed, spirited and cooperative staff of the VA team members.  Their hard work and input from their specific area of expertise made the VA Study a success.

## VALUE ANALYSIS IMPLEMENTATION SUMMARY

Figure 10

Project: **Mary Lowell Center**
**Kenai Fjords National Park**
Location: **Seward, Alaska**

| VE No. | Proposal Description | Implementation | |
|---|---|---|---|
| | | Implemented | Not Implemented (Give Reasons) |
| CBA | Revise current layout | | |
| 1 | Pursue other renewable or alternative energy options ilo wood chips. | | |
| 3 | Computer model the natural ventilation in the atrium to validate it's effectiveness and performance | | |
| 7 | Add blank section in each AHU for future cooling coil | | |
| 9 | Move boilers into building (if not using wood chip fuel) | | |
| 12 | Provide single freight / passenger elevator for building ilo 2 separate ones | | |
| 15 | Provide engineering solution to hide above ground electrical lines (improve visual appearance) | | |
| 19 | Limit radiant floor heat to first 10'-0" of perimeter floor | | |
| 20 | Eliminate radiant floor heat in basement | | |
| 23 | Omit skylights over stairs and reception area / use only clerestory | | |
| 27 | Omit retractable raked seating system in conference room | | |
| 34 | Separate construction contracts for exhibits and GC | | |
| 35 | Adjust estimate | | |
| 36 | Increase escalation from 3.5% to 7.5% | | |
| 37 | Let contractor buy out job up front with government to provide secure storage | | |
| 38 | Have local Alaksan contractor / estimator do an independent estimate to confirm price | | |
| 41 | Add crosswalk & waiting area for bus drop-off / loading area | | |
| 52-57 | Modify the LEED points considered for the project | | |
| 59 | Omit standby generator | | |
| 64 | Retain and incorporate character of facade of historic Solly's in new building design | | |
| 67-69 | Reduce contractor's general conditions costs | | |
| 70 | Consider alternative construction contract method | | |
| 71 | Omit underfloor distribution and use overhead distribution | | |
| 78 | Minimize types of light fixture lamps | | |
| 80-81 | Incorporate public art into building (include ANHA and leverage Rasmussen Foundation) | | |
| 82 | Consider an underground stormwater treatment package | | |
| 83 | Consider moment frame instead of brace frame at exterior wall | | |
| 84 | Link occupancy sensor to the space ventilation system | | |
| **Design Suggestions** | | | |
| 15 | Provide engineering solution to hide above ground electrical lines (improve visual appearance) | | |
| 27 | Omit retractable raked seating system in conference room | | |
| 38 | Have local Alaksan contractor / estimator do an independent estimate to confirm price | | |
| 52-57 | Modify the LEED points considered for the project | | |
| 64 | Retain and incorporate character of facade of historic Solly's in new building design | | |
| 70 | Consider alternative construction contract method | | |
| 78 | Minimize types of light fixture lamps | | |

# DESIGN SUGGESTIONS

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Provide engineering solution to remove overhead electric in the alley** **15**

## Original Design

Existing overhead electric (OHE) lines and utility poles with transformers run north and south along the alley on the west side of the building.

## Proposed Design

Consider options in addressing the removal of at least the most Southern pole.

## Advantages and Disadvantages

**Advantages:**

- Negative visual impact of OHE and poles are mitigated
- Vehicular impediment of poles is removed
- Possibility of improved efficiency from new conductors and transformers
- 
- 

**Disadvantages:**

- Added cost
- 
- 
- 

## Discussion

With the proposed changes involved in the South part of the site, more pedestrian traffic will use the alley. The Sea Life Center is also purchasing the site West of the project which would mean additional draw to the area. The current most Southern pole location is basically in the middle of the alley. The city / NPS / USFS would like this pole at least moved or addresses in a different manner.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | | |
| **Proposed Design** | | |
| **Potential Savings** | **Design Suggestion** | |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Omit retractable raked seating system in conference room** **27**

## Original Design

Not in original design. This proposal emerged during the VA workshop. Retractable raked seating for approximately 100 people was suggested by NPS personnel to enhance the film viewing experience in the conference room.

## Proposed Design

Omit retractable seating, see discussion below.

## Advantages and Disadvantages

**Advantages:**

- Improved visibility, theater style seating
- 
- 
- 
- 

**Disadvantages:**

- Space required for seat storage when not in use
- cost
- 
- 

## Discussion

After group discussion, consensus was arrived at to omit the suggested raked seating for logistical reasons. The AV system will be designed to utilize the standard seating (loose chairs) that are projected to be purchased for conference center use. Incorporating this feature has a cost impact upwards of $10,000.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | | |
| **Proposed Design** | | |
| **Potential Savings** | **Design Suggestion** | |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Modify the LEED points considered for the project** **52-57**

## Original Design

The LEED assumptions are very clearly documented. This includes not taking 1 point for EA 6.0 (35% green power) and 1 point for 100% green power. The design includes 1 point for EQ 4.1 (low emitting materials, adhesives, & sealants), and 1 point for ID 1.3 credit (exemplary performance in water efficiency). The estimate does not include the cost of certifying the project with USGBC.

## Proposed Design

Reconsider the LEED points is these areas. Include taking 1 point for EA 6.0 (35% green power) and 1 point for 100% green power. Do not include 1 point for EQ 4.1 (low emitting materials, adhesives, & sealants), and 1 point for ID 1.3 credit (exemplary performance in water efficiency). Finally, include the cost of certifying the project with USGBC.

## Advantages and Disadvantages

**Advantages:**

- Maintains the same number of LEED points
- Should reduce construction cost for obtaining LEED points
- Includes certification in the project (as design is very LEED incorporated)
- Leverages lessons learned for NPS
- Incorporates UAF expertise in commissioning

**Disadvantages:**

- The cost of certifying the project is added

## Discussion

The VA team includes NPS staff that obtained Silver Certification at Denali National Park. This proposal includes some of the lessons learned from that project. They include:
- Per NPS Chugach Electric is a green power provider. They can be used for not only 35% but also 100% of the power needs for the project. If not, NPS at Denali can provide contacts for green energy providers (Renewable Choice in Boulder, Colorado via renewablechoice.com). This means an added 2 points. Premium is 0.2 cents per KWH, which means $6,200 dollars (total for two years).
- EQ 4.1 will be difficult to achieve primarily due to the construction adhesives used in the project per the Denali team. This means a reduction of 1 point.
- ID 1.3 is a costly and difficult point to achieve. We suggest not trying to achieve this point, especially considering the added maintenance associated with low water use fixtures.
- Include the cost of certifying the project. This would include approximately $100,000 in fees and would be funded through the Planning and Design budget and supplemented through some DOE FEMP and Green Energy Parks funds. University of Alaska students / staff could be involved in the certification process to benefit their program. Ron Johnson at UAF has monitoring and commissioning expertise that should be leveraged.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | | |
| **Proposed Design** | | |
| **Potential Savings** | **Design Suggestion** | |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Retain and incorporate character of facade of historic Solly's in new building design** **64**

## Original Design

The schematic document presents a design that attempts to address the narrow storefront character of the commercial grid typical of Seward's historic commercial waterfront district. The designed exterior facades take advantage of varying materials, facade treatments and heights to breakdown the massing of the building. Less successful are some of the playful window fenestration and applied features that are without precedence in Seward.

## Proposed Design

Study and redesign window and door fenestration to reflect a design more in keeping with the vernacular character of Seward. One feature with historic precedence, the covered arcade of Solly's, was referenced as one potential opportunity to provide protected cover and make reference to Solly's.

## Advantages and Disadvantages

**Advantages:**

- Builds upon the architecture of Seward's commercial area
- Reflects more traditional downtown Seward motif
- O & M needs are linked to local available trades (depends on exterior materials)
-
-

**Disadvantages:**

- Dramatically different exterior would help make the building more prominent
-
-
-

## Discussion

The VA team and attending stakeholders focused on the window fenestration as an area that is less successful and perhaps too "Seattlesque" in its execution.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | | |
| **Proposed Design** | | |
| **Potential Savings** | **Design Suggestion** | |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**
**Item:** **Consider alternative construction contract method** **70**

## Original Design

Construction of the Mary Lowell Center proposes a traditional design, bid, build contract procurement method.

## Proposed Design

The VA team addressed the current "hot" construction environment in Alaska and the potential difficulties of procuring competitive bids and reliable contractor's for the construction of the Mary Lowell Center. Alaska's best general contractors are engaged in other large scale projects, often as part of a select bidders basis or negotiated contracts. The VA analyzed the potential impacts of the heated bidding environment and material acquisition. In the opinion of the VA team, that market will persist for the foreseeable future.

The VA team proposed an alternative method of construction contract procurement and proposed using a two part qualifications based contractor selection process. The intent of this procurement process is to enter into a design assistance relationship between the A&E and General Contractor. This method was used on another federal project in Alaska (Homer).

Knowing that the Mary Lowell Center will be forced to

## Advantages and Disadvantages

**Advantages:**

- Provides access to a quality contractor in an over inflated construction climate
- Implements a VA process from the GC's perspective into contract documents
- Guarantees a project cost at the end of CD preparation
- Guarantees a project cost in a very heated and noncompetitive market
- Minimize change orders
- Early contractor selection assures that project design is completed on budget at prescribed time
- Guarantees a project cost in a very heated and noncompetitive market
- Minimize change orders
-
-

## Discussion

The two part qualifications based contractor selection process would;
Part I: Advertise for the services of a general contractor in the preparation of the contract documents to insure constructability and compliance with budget and schedule constraints,
Part II: With the successful completion of Part I, a construction contract would be negotiated with the participating general contractor.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | | |
| **Proposed Design** | | |
| **Potential Savings** | **Design Suggestion** | |

# Value Analysis Recommendation

**Project:** **Mary Lowell Center, Kenai Fjords National Park, AK** **VA No.**

**Item:** **Minimize types of light fixture lamps** **78**

## Original Design

The design does not provide detail on the quantity and type of light fixture types and lamps.

## Proposed Design

Reduce and unify the same types of light fixtures where applicable throughout the building. Maximize "greening" as much as possible to reduce universal hazardous waste. For the exhibits try to select standard fixture rather than using museum lighting.

## Advantages and Disadvantages

**Advantages:**

- Reduce number of bulb types
- Maximize the same types of bulbs
- Reduce life cycle costs
- Ability to use green-tip bulbs (32T8)
-

**Disadvantages:**

- Architectural view of fixtures
- Potential overuse of lighting
-
-

## Discussion

Ability to maximize the same types of bulbs, and reduce the different types for backstock. The ability to use green-tip bulbs and reduce the universal hazardous waste of fluorescent light bulbs.

## Life Cycle Cost Summary

| | Initial Cost | Life Cycle Cost |
|---|---|---|
| **Original Design** | | |
| **Proposed Design** | | |
| **Potential Savings** | **Design Suggestion** | |

# ATTENDANCE LIST

Figure 11

***Value Study***

| | |
|---|---|
| Project: | **Mary Lowell Center** |
| | **Kenai Fjords National Park** |
| Location: | **Seward, Alaska** |
| Date: | **January 17-19, 2006** |

## PARTICIPANTS:

| Name/ Title: | Job Function: | Organization/Address: | Phone/ Fax/ e-mail: |
|---|---|---|---|
| **National Park Service, Kenai Fjords National Park** | | | |
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| **National Park Service, Alaska Regional Office** | | | |
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| **City of Seward** | | | |
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# ATTENDANCE LIST

Figure 11

***Value Study***

| | |
|---|---|
| Project: | **Mary Lowell Center** |
| | **Kenai Fjords National Park** |
| Location: | **Seward, Alaska** |
| Date: | **January 17-19, 2006** |

## PARTICIPANTS:

| Name/ Title: | Job Function: | Organization/Address: | Phone/ Fax/ e-mail: |
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**Value Analysis Study**
**Mary Lowell Center Project**

Kenai Fjords National Park
Seward, Alaska

January 31, 2006

# SECTION C: APPENDIX

The appendix includes the following:

- Value Analysis Process
- Workshop Agenda
- Reference Documents
  - From The Design Team:
    - Select SD Drawings.
- Cost Estimates
    - Class B SD estimate.

## VALUE ANALYSIS PROCESS

### INTRODUCTION

Value Analysis (VA) is an organized, creative process, which focuses attention on the requirements of a project for the purpose of achieving essential functions and attendant benefits at the lowest, total costs for materials, equipment, staffing, energy usage, facilities, professional services, maintenance, etc. over the life of the project. In other words, value engineering is a systematic approach to obtain optimum ***value*** for each dollar spent. As a result of thorough investigation, using experienced, multi-disciplined teams, value and economy are improved by the study of alternate systems, concepts, materials, methods and procedures.

A Certified Value Specialist (CVS) guides a value analysis study. Experience has shown that project studies performed by a person or team with little or no value engineering leadership will tend to steer in the direction of a superficial review and concentrate on errors made by others. A value analysis study, on the other hand, focuses on both reducing the total cost of ownership and improving overall performance. Application of the VA methodology and coordination of the activities before and after the study also significantly increase the probability the recommendations will be implemented.

This approach has been successfully applied to projects of all types and magnitudes and allows value analysis teams to be responsive to clients by producing practical results. The VA approach also encourages participation of the clients in the study in order to take advantage of their experience and knowledge. Multi-disciplined teams, using a value

analysis job plan, analyze the functions of the buildings, products or processes under study, identify high cost areas, ascertain the benefits sought and propose alternatives to those planned or currently being used.

A value analysis job plan is organized into three distinct parts: (1) Pre-Study Preparation, (2) Study Workshop Phase, and (3) Post-Study Implementation.

## PRE-STUDY PREPARATION

The success of a value analysis study is largely dependent on proper preparation and coordination. Information and documents are furnished by the client and distributed to the team to enable them to prepare for their role in the study. All participants are briefed on the project and their responsibility prior to the study. The pre-study activities include the following tasks:

- Identification of context of the value analysis study.
- Review of project documentation and distribution of information to team members. The VA team relies on the client for the completeness and organization of the material to be used.
- Finalization of team and team assignments.
- Preparation of analytic models, as appropriate.
- Finalization of arrangements for workshop.

Each VA study is designed in response to the goals of the client. The analytic models developed prior to the workshop are consistent with these goals and are based on the information provided to the study team. While not every model is used for every study, it is important the team have sufficient data to develop at least a few of the analytic models to ensure a measure of thoroughness and perspective.

## STUDY WORKSHOP PHASE

During the workshop portion of a value analysis study, a Study Plan is followed which usually includes specific phases to ensure a thoughtful, professional analysis.

### *Information Phase*

At the beginning of a value analysis study, it is important to understand the background and decisions that have influenced the development of the client's goals. For this reason, the client normally describes the history and scope of the project.

### *Function Phase*

The functions of the project are the controlling elements in the overall value engineering approach. Explicitly identifying the functions that drive the project is essential to the team because it forces the participants to think in terms of the purposes for the project and the desired results and costs associated with those functions.

### *Creativity Phase*
This step in a value analysis study involves the listing of creative ideas. During this portion of a workshop, the value analysis team thinks of as many ways as possible to provide the necessary functions, keeping in mind the benefits important to the client and, at the same time, the need to reduce costs in a responsible manner. During this creative session, judgement about the ideas is not permitted.

### *Evaluation Phase*
All of the information created up to this point must undergo careful consideration. The value analysis team assesses the ideas stemming from the creativity session to test, first, whether the creativity session addressed the problem areas, opportunities and functions identified earlier and, second, whether the specific strategies generated during the creativity session can be, at least in a preliminary fashion, linked with them.

### *Development Phase*
The development phase includes preparing sketches, engineering calculations, cost estimates and life cycle cost analyses to verify the idea adds value to the project. The results of this effort are then used to prepare a presentation.

### *Recommendation Phase*
The last phase of the value analysis study involves the presentation of recommendations. The team carefully reviews the recommendations before they are formally presented, generally on the last day of the workshop. The recommendations, the rationale that went into the development of each proposal and a summary of the cost savings are presented at this time so that the client can begin an evaluation of the value analysis recommendations prior to the receipt of the report itself.

## POST-STUDY PROCEDURES
The post-study portion of a value analysis study includes the preparation of a report describing the activities undertaken during the study and incorporating the recommendations stemming from the workshop. This post-study effort may require follow-up to resolve questions remaining from the study. Either the value analysis team leader or an appropriate team member may work directly with the client to further implementation strategies.

**MARY LOWELL CENTER**
**KENAI FJORDS NATIONAL PARK**
**CHUGACH NATIONAL FOREST – SEWARD DISTRICT**
**CITY OF SEWARD, ALASKA**

**VALUE ANALYSIS SCHEMATIC DESIGN (35%) WORKSHOP**
**January 17 - 19, 2006**

**THREE DAY AGENDA**

---

**Day 1**

8:00 a.m. **INTRODUCTION TO WORKSHOP/INFORMATION PHASE**

Welcome & Opening Remarks
Team Member Introductions
Objectives of Workshop
Workshop Organization & Agenda

8:15 **VALUE ANALYSIS BRIEFING**

8:30 **PROJECT DESIGN PRESENTATION** (By Design Team via telephone and NPS Project Manager)

Facility Program and Objectives (including Sustainability)
Master Site Plan and Site Analysis
Site and Building Layout
Building/ Site Systems (Arch., Struct., Mech., Elec., Civil/Landscape)
Results of Various Reports, Studies, Tests, Surveys, etc.
Project Budget and Schedule
LEED Checklist
"Value Listening" Exercise (by VA Team)

10:00 **COST & OTHER VALUE MODELS**

Cost Model
Space, Quality, Risk, LEED Sustainability Models, as appropriate

10:30 **FORCE FIELD ANALYSIS** (Design Team/Owner/Users)

Best Project Features
Weakest Features
Ideas for Value Enhancement

11:00 **SUMMARY OF FORCE FIELD FINDINGS**

12:00 **LUNCH**

## VALUE ANALYSIS WORKSHOP

## THREE DAY AGENDA

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**Day 1** Continued

1:00 pm **FUNCTION ANALYSIS PHASE**

Prepare Function Logic Diagram
Associate Costs to Functions

2:00 **CREATIVITY PHASE**

Brainstorm Ideas to Meet Functions (Project Objectives)
Think of Ideal Solutions
Identify High Cost Elements for Value Enhancement

5:30 **ADJOURN**

**Day 2**

8:00 a.m. **CREATIVITY PHASE** (continued)

Brainstorm Large Variety of Ideas
Generate Ideas for Basic Functions
90% and 75% Design Alternatives

11:00 **EVALUATION PHASE**

Discuss Idea Advantages & Disadvantages
Evaluate Ideas by Comparison
Rank Ideas for Further Investigation

12:00 **LUNCH**

1:00 **SUMMARIZE IDEAS FOR DEVELOPMENT**

1:30 **PROPOSAL DEVELOPMENT** (Individual VA Team members/ Teams)

Team Member Proposal Development Assignments
Prepare Design Alternatives
Cost Estimate of Alternatives
Sketches of Alternatives
Choosing by Advantages (CBA), as appropriate

5:30 **ADJOURN**

## VALUE ANALYSIS (VA) WORKSHOP

## THREE DAY AGENDA

---

**Day 3**

8:00 a.m. **CHOOSING BY ADVANTAGES**

Define CBA Alternatives
Define Evaluation Factors
Identify Attributes & Advantages
Score Importance of Advantages
Determine Total Importance of Each Alternative

9:00 **ECONOMIC ANALYSIS**

Estimate Construction Costs
Estimate O & M Costs & Rental Income
Determine Life Cycle Cost of Each Alternative

10:00 **IMPORTANCE TO LCC GRAPHS/ RECONSIDERATION**

Importance to Cost Graphs
Reconsideration, Other Alternatives
CBA/ LCC/ Importance to Cost Graph Updates
Consensus of Preferred Alternative

---

8:00 a.m. **PROPOSAL DEVELOPMENT (Concurrent, as required)**

Cost Estimate of Alternatives
Sketches of Alternatives
Life Cycle Cost Calculations
Written Proposals (Present, Proposed, Discussion)

12:00 **LUNCH**

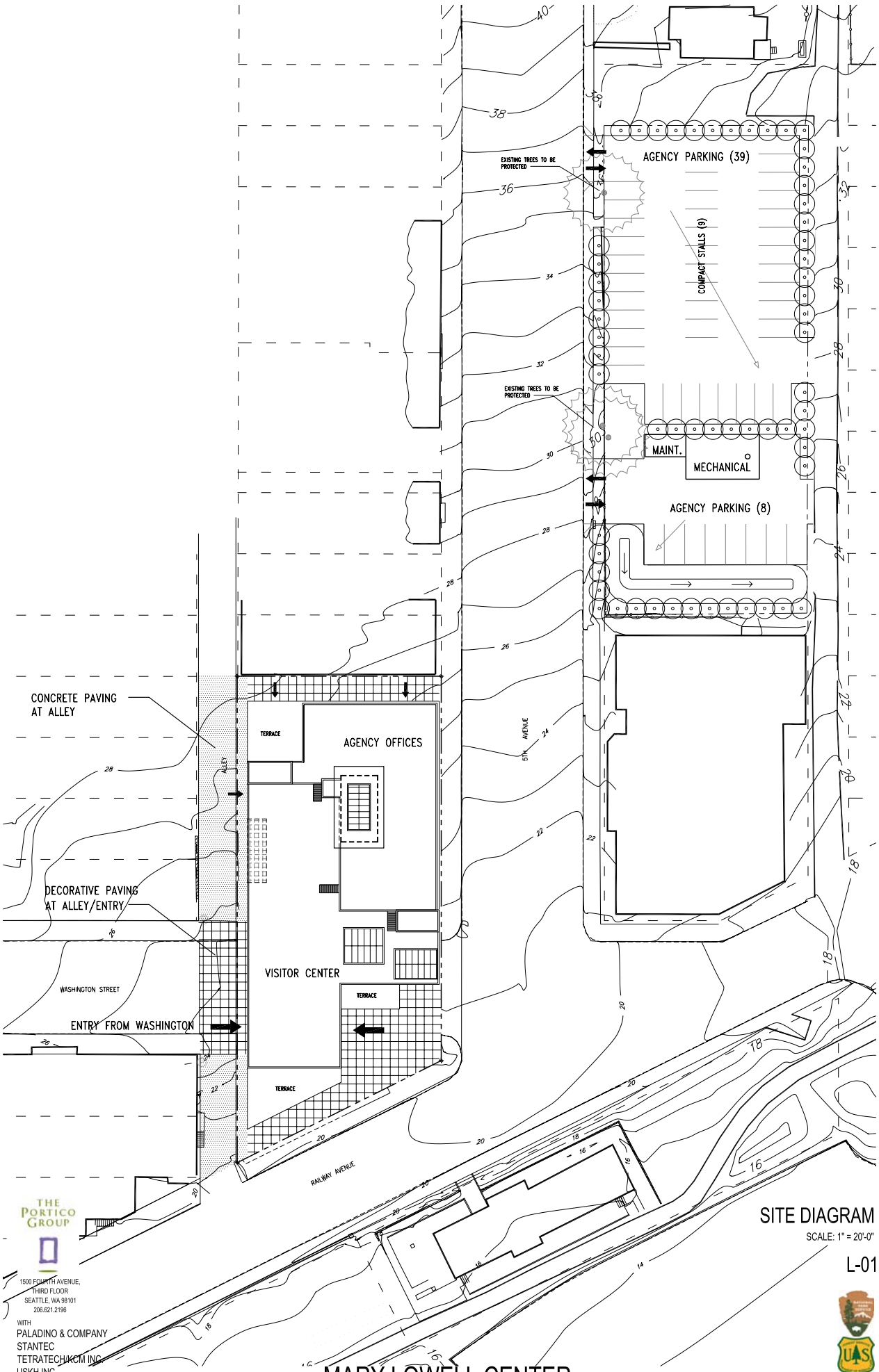
12:30 **PROPOSAL DEVELOPMENT (Continued)**

4:00 **PRESENTATION PHASE**

Summary of VA Process (Steps, Models, Function Analysis, etc.)
VA Proposals & Performance Improvements/ Cost Savings
Next Steps (VA Implementation Plan)

5:00 **ADJOURN/CELEBRATION!**

# REFERENCE DOCUMENTS




THE PORTICO GROUP

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THIRD FLOOR
SEATTLE, WA 98101
206.621.2196

WITH
PALADINO & COMPANY
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TETRATECH/KCM INC
USKH INC
NB DESIGN GROUP
CANDELA
SPARLING
BRC

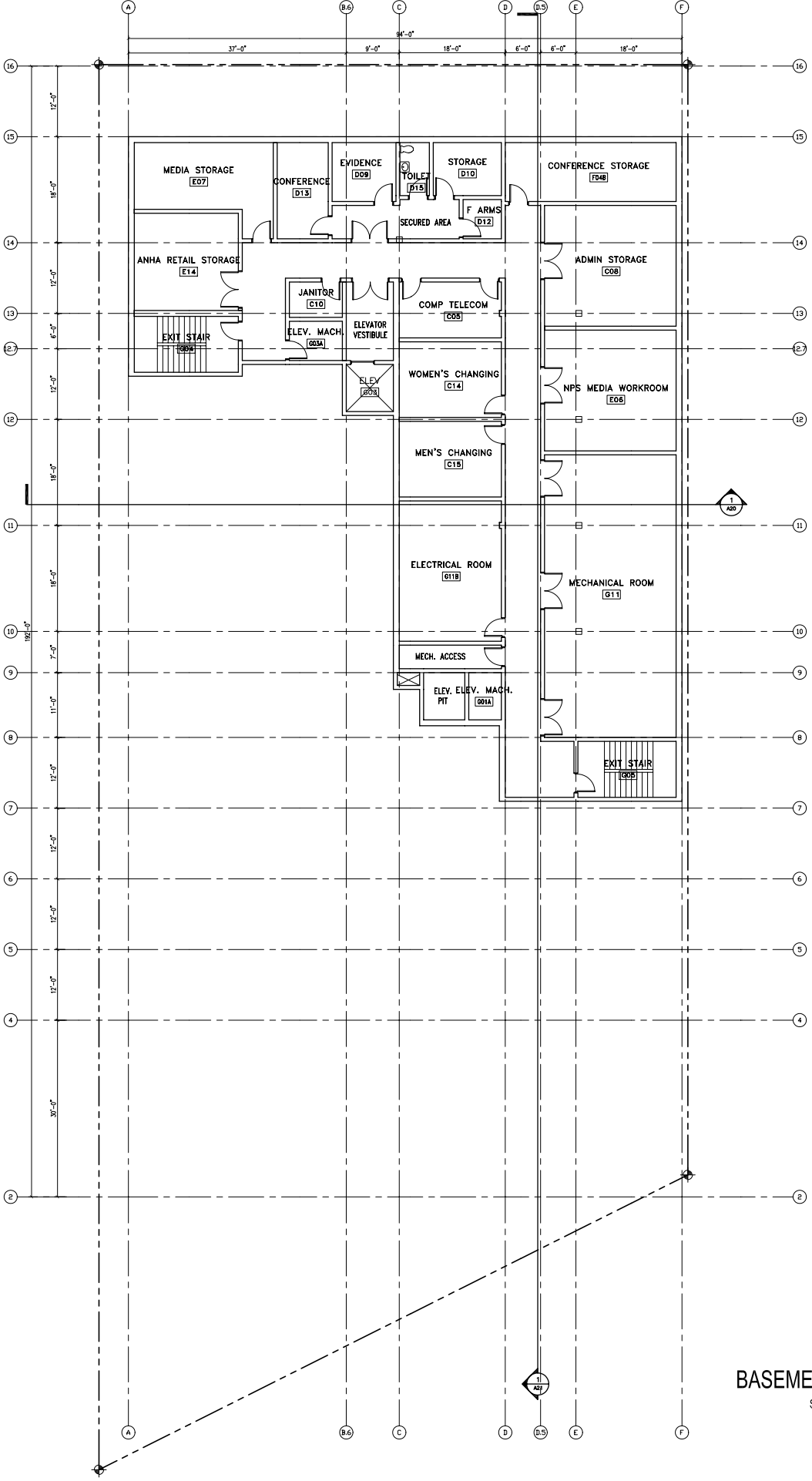
# SITE DIAGRAM

SCALE: 1" = 20'-0"

L-01

# MARY LOWELL CENTER
# SEWARD, ALASKA

19 December 2005




# BASEMENT PLAN

SCALE: 1/8" = 1'-0"

A-00

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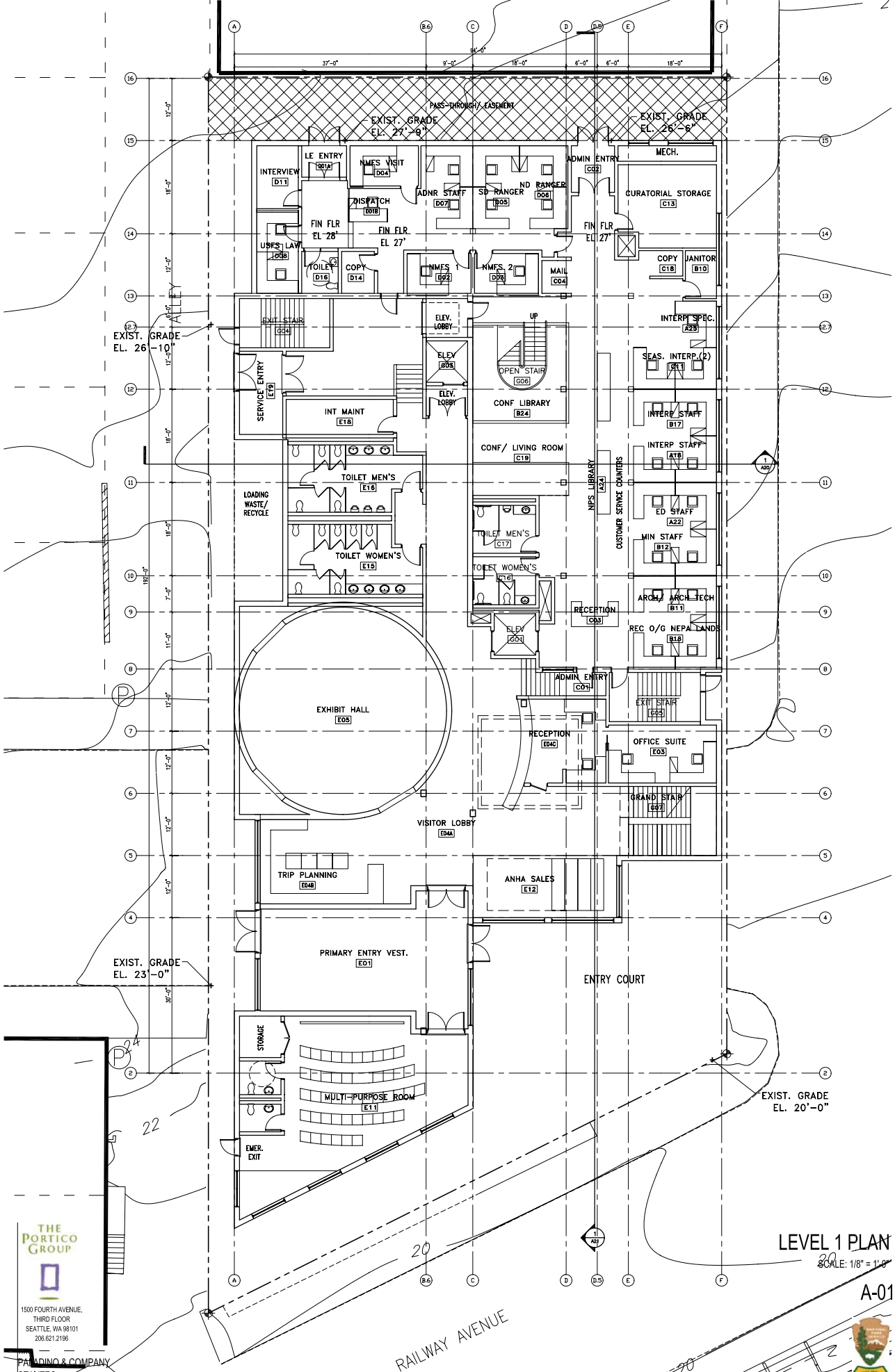
# MARY LOWELL CENTER
# SEWARD, ALASKA

19 December 2005

N

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# LEVEL 1 PLAN

SCALE: 1/8" = 1'-0"

A-01

# MARY LOWELL CENTER
# SEWARD, ALASKA



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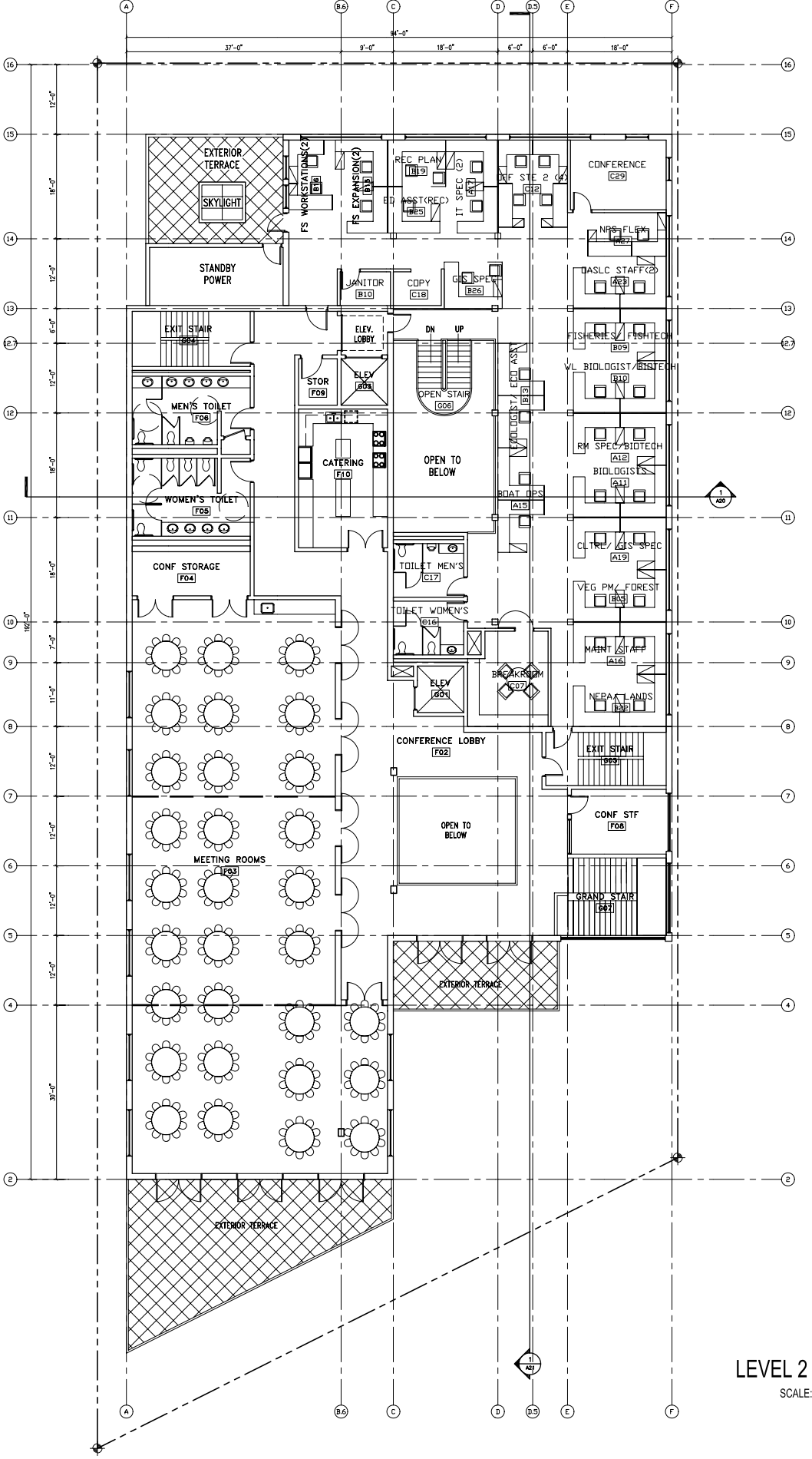


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# LEVEL 2 PLAN

SCALE: 1/8" = 1'-0"

A-02

# MARY LOWELL CENTER
# SEWARD, ALASKA



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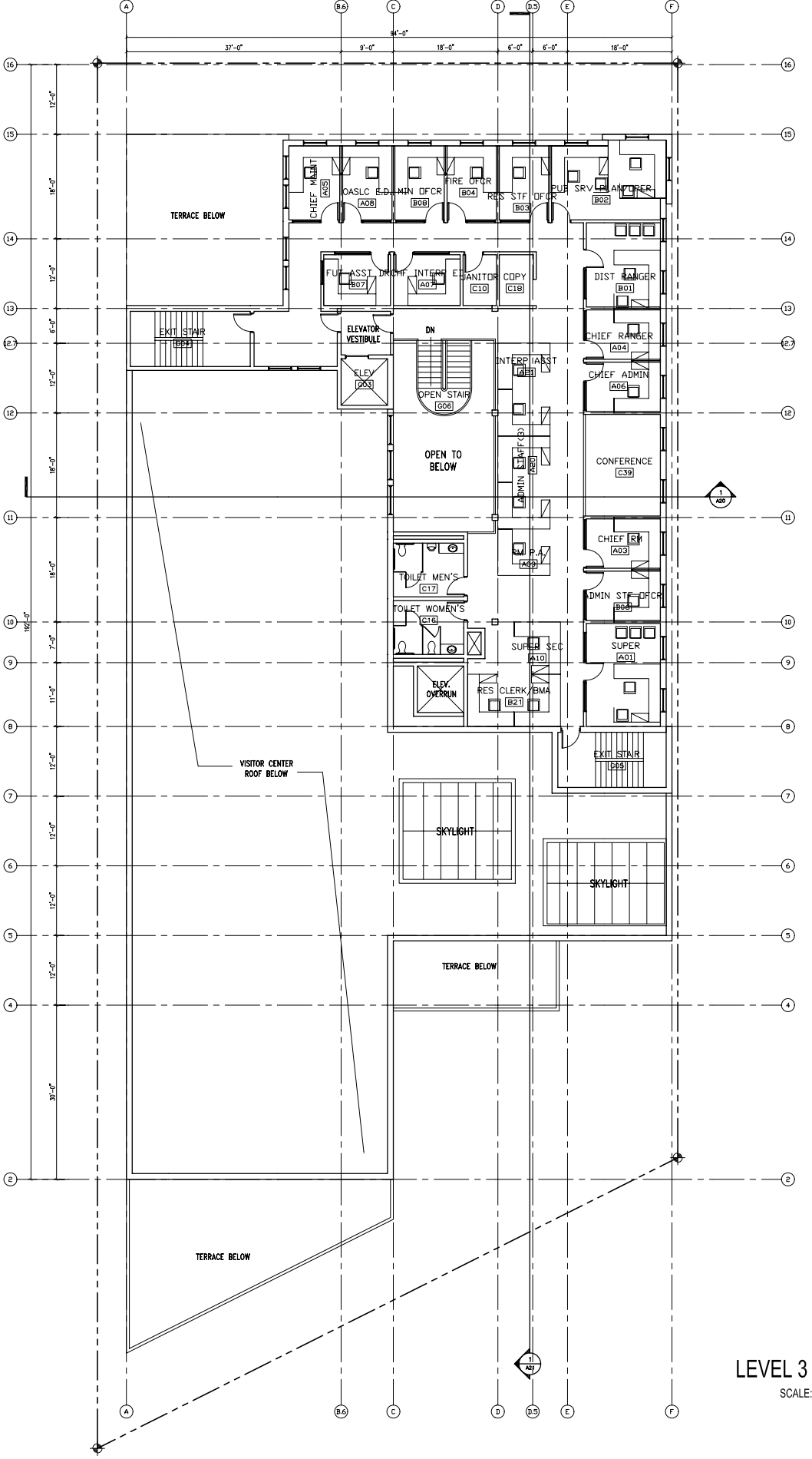


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# LEVEL 3 PLAN

SCALE: 1/8" = 1'-0"

A-03

# MARY LOWELL CENTER
# SEWARD, ALASKA



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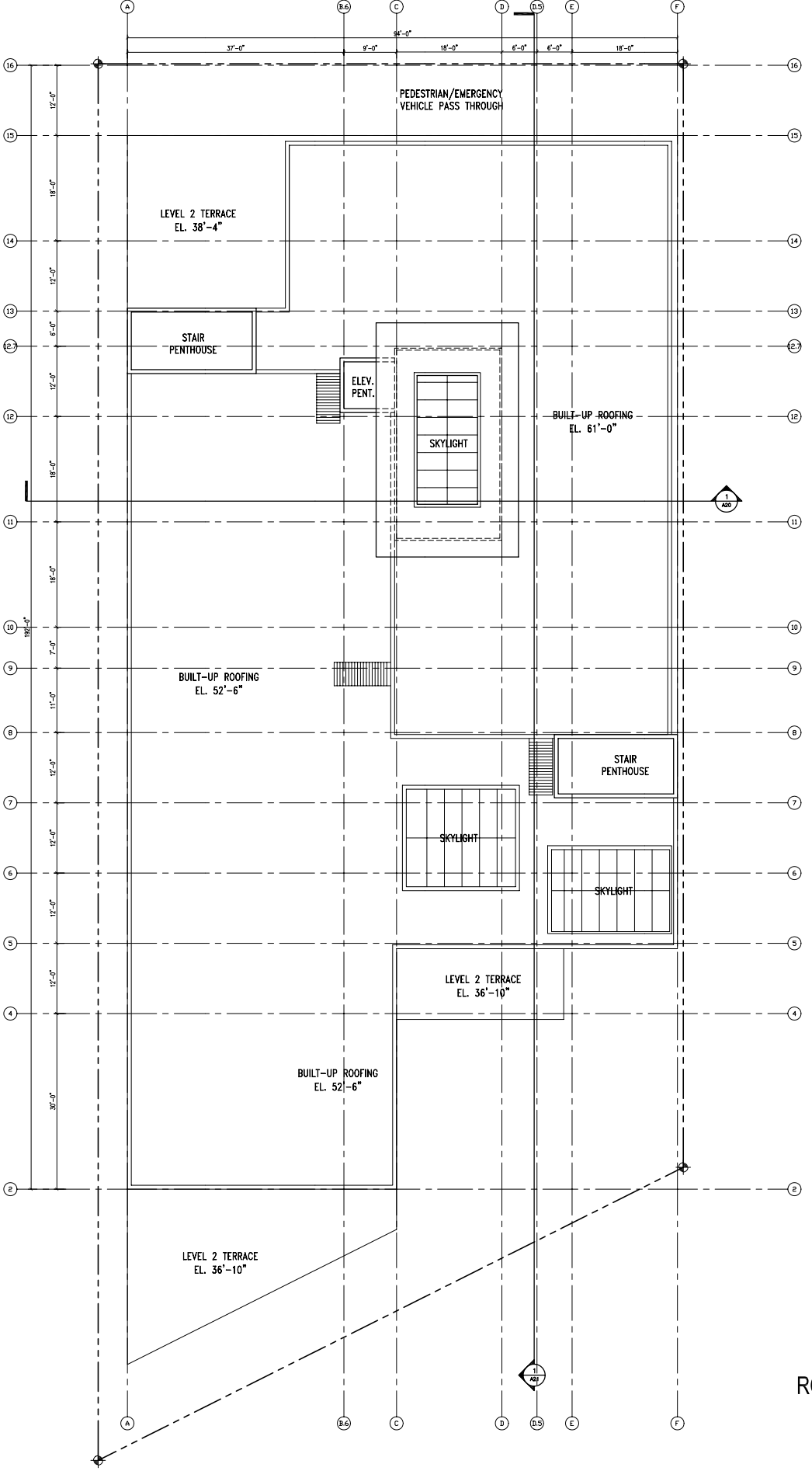


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# ROOF PLAN

SCALE: 1/8" = 1'-0"

A-04

# MARY LOWELL CENTER
# SEWARD, ALASKA



19 December 2005

# SOUTH ELEVATION

SCALE: $\frac{1}{8}$"= 1'-0"

A-10

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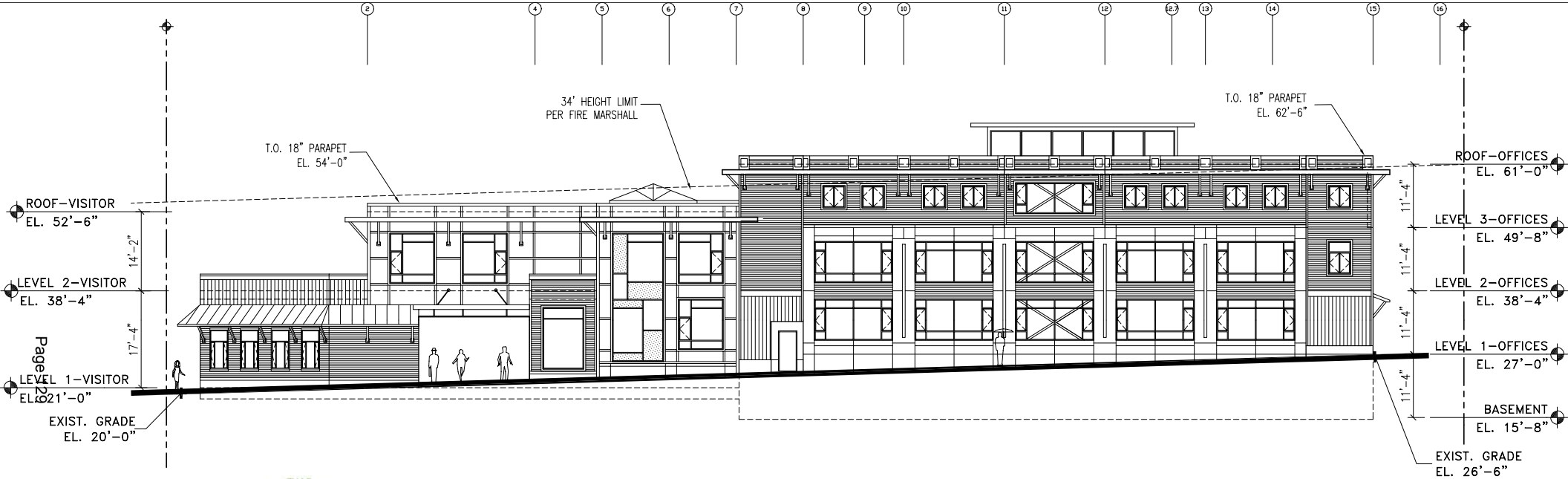


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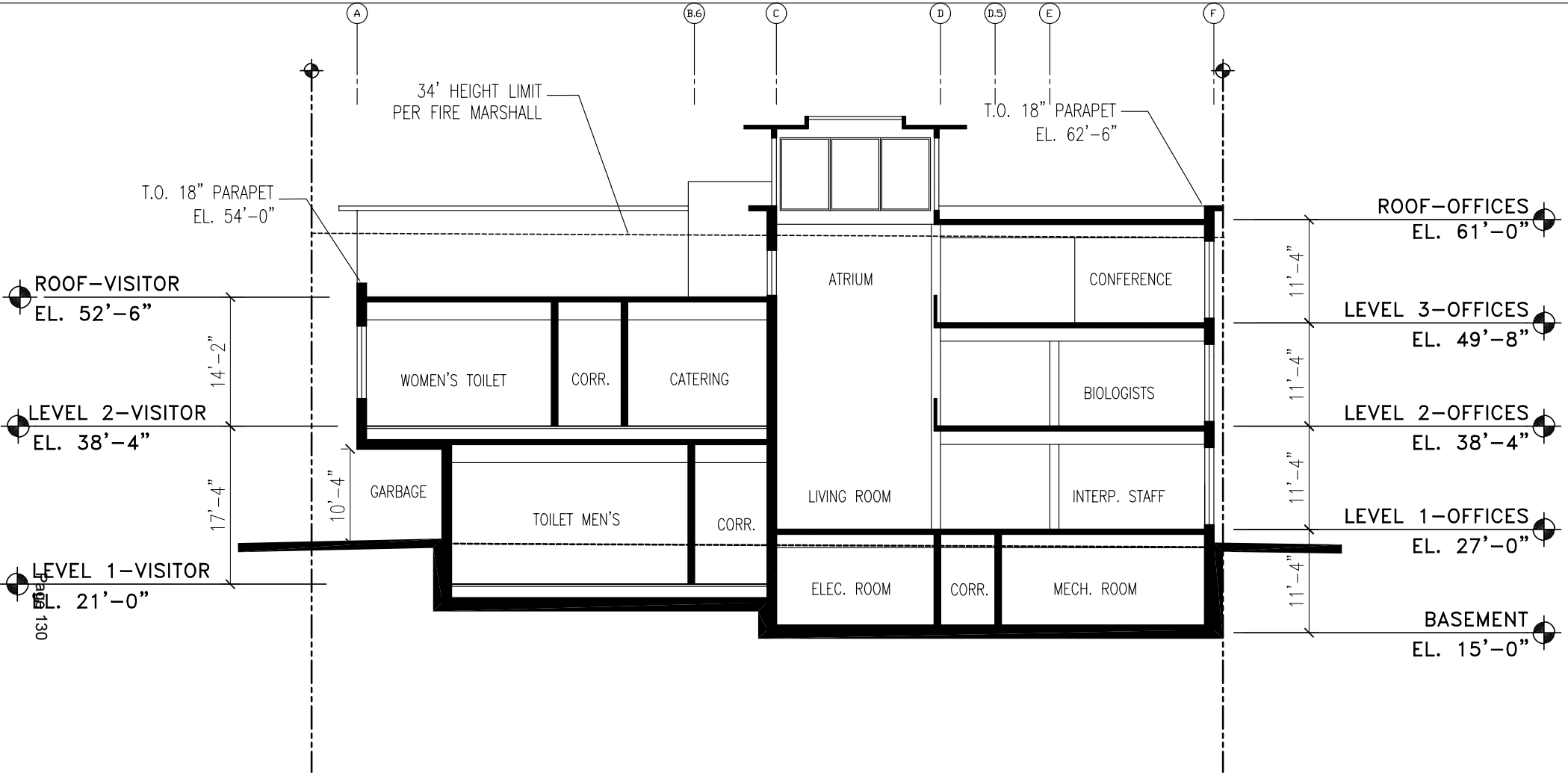
# MARY LOWELL CENTER
# SEWARD, ALASKA

19 December 2005

## EAST ELEVATION

SCALE: $\frac{3}{8}$"= 1'-0"

A-11



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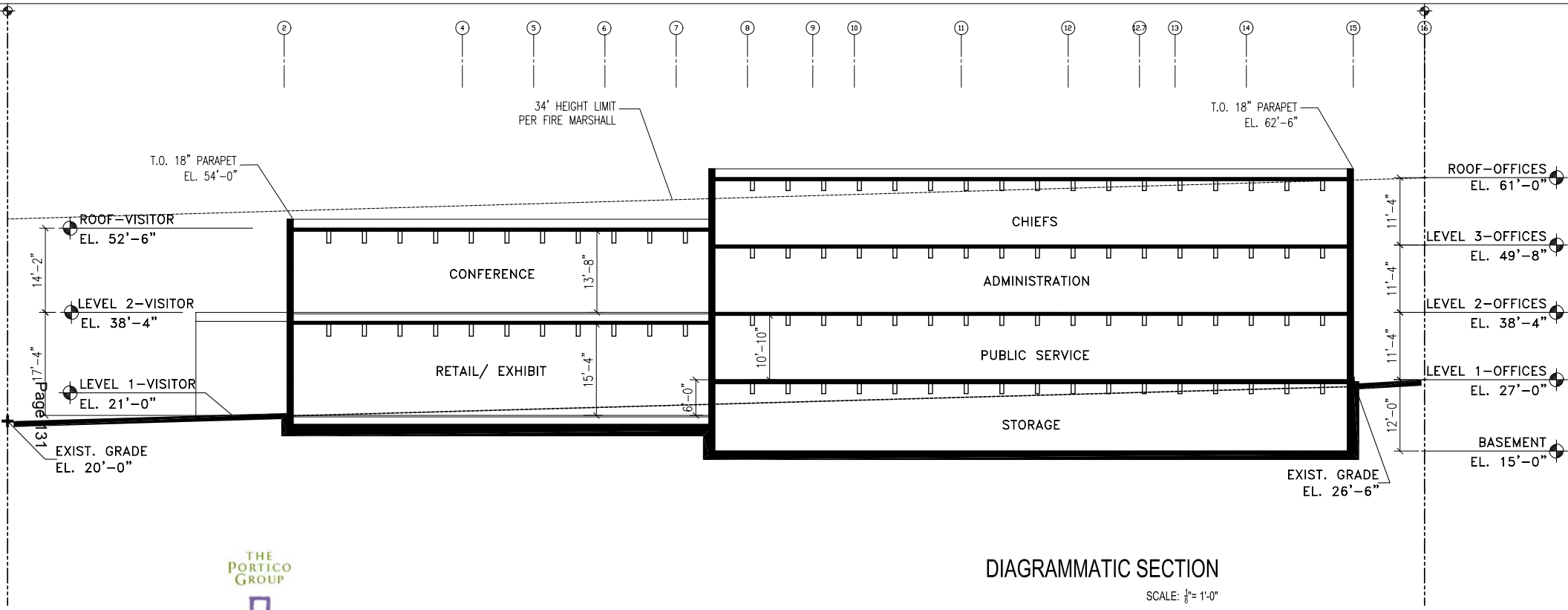
# CROSS SECTION

SCALE: $\frac{1}{8}$" = 1'-0"

A-20

# MARY LOWELL CENTER
# SEWARD, ALASKA

19 December 2005



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# DIAGRAMMATIC SECTION

SCALE: $\frac{1}{8}$"= 1'-0"

A-21

# MARY LOWELL CENTER
# SEWARD, ALASKA

19 December 2005

# COST ESTIMATE

# Mary Lowell Center
## Seward, Alaska

# Schematic Design Phase
# Construction Cost Estimate
## December 19, 2005

This estimate has been prepared by Bluewater Project Management Services, LLC for:

The Portico Group
1500 4th Avenue
3rd Floor
Seattle, WA 98101-1670
Phone: 206.621.2196
Fax: 206.621.2199
Email: psorenson@porticogroup.com
www.porticogroup.com

## Table of Contents:

Page 2 Summary
Page 3 Check
Page 4 Estimate backup

## Project Description:

The project consists of the construction of a new 41,438 GSF Multi-Agency Center for the NPS and USFS in Seward, Alaska. The new center will include spaces for administrative offices, education programs, interpretive exhibits and programs, visitor information and conferencing facilities. The project also consists of the construction of a seperate heating plant and associated site-related work.

## Estimate Assumptions:

This estimate was based on the schematic design drawings and sketches, schematic design report dated December 12, 2005 and discussions with the design team.

All costs are based on current market prices for materials, including transportation and the current labor rates for government contracts in Alaska under the "Davis Bacon Act".

In addition to the basic building costs for work items, costs are applied for general requirements and profit. This element includes all site operating costs, mobilization and demobilization, together with the general contractors home office expenses , taxes, insurance, bonds, and profit.

For estimating purposes, it is assumed that this project will bid in Spring 2005, start May 2005, and be completed within 16 months from commencement of onsite work.
This project will be constructed under a single fixed price publicly bid contract .

This is a statement of probable construction cost only and actual bids will vary. This estimate excludes architectural/engineering and bid preparation fees, administrative costs,
costs for loose furniture and furnishings, etc., relocation costs and exhibit costs.

This estimate assumes normal escalation based on the current economic climate in Alaska. No consideration has been given to the probable impact on construction costs resulting from increased activity in the lumber and steel supply markets.

## SUMMARY

| | TOTAL | |
|---|---|---|
| 01 - SITE WORK | $ 676,499 | |
| 02 - SUBSTRUCTURE | 218,922 | |
| 03 - SUPERSTRUCTURE | 2,191,357 | |
| 04 - EXTERIOR CLOSURE | 595,567 | |
| 05 - ROOF SYSTEMS | 251,051 | |
| 06 - INTERIOR CONSTRUCTION | 1,005,285 | |
| 07 - CONVEYING SYSTEMS | 160,000 | |
| 08 - MECHANICAL | 1,353,858 | |
| 09 - ELECTRICAL | 1,453,515 | |
| 10 - EQUIPMENT | 69,985 | |
| 11 - SPECIAL CONSTRUCTION | 1,345,500 | |
| SUBTOTAL: | $ 9,321,539 | |
| 12 - GENERAL REQUIREMENTS | 3,007,537 | 0.68 |
| SUBTOTAL: | $ 12,329,076 | |
| 13 - CONTINGENCIES | 2,240,343 | |
| **TOTAL ESTIMATED CONSTRUCTION COST:** | **$ 14,569,419** | |

| | |
|---|---|
| 56.30% | Estimate contingency<br>Escalation<br>General Requirements |
| 5,248,026 | Other Contingencies |

City of Seward
US Forest Service
National Park Service

The Portico Group

# General Cost Summary

| ELEMENT | Material | Labor | Total Material/Labor | TOTAL COST | RATE $/SF FLOOR AREA |
|---|---|---|---|---|---|
| 01 - SITE WORK | | | | 676,499 | 16.33 |
| 011 - Site Preparation | 33,900 | 151,793 | 185,693 | | 4.48 |
| 012 - Site Improvements | 188,746 | 102,496 | 291,242 | | 7.03 |
| 013 - Site Mechanical | 65,011 | 37,755 | 102,766 | | 2.48 |
| 014 - Site Electrical | 66,426 | 30,372 | 96,798 | | 2.34 |
| 02 - SUBSTRUCTURE | | | | 218,922 | 5.28 |
| 021 - Standard Foundations | 18,245 | 50,150 | 68,395 | | 1.65 |
| 022 - Slab on Grade | 73,256 | 77,271 | 150,527 | | 3.63 |
| 03 - SUPERSTRUCTURE | | | | 2,191,357 | 52.88 |
| 031 - Floor/Wall Construction | 1,050,839 | 793,646 | 1,844,485 | | 44.51 |
| 032 - Roof Construction | 144,879 | 89,873 | 234,752 | | 5.67 |
| 033 - Stair Construction | 81,585 | 30,535 | 112,120 | | 2.71 |
| 04 - EXTERIOR CLOSURE | | | | 595,567 | 14.37 |
| 041 - Exterior Walls | 121,918 | 128,772 | 250,690 | | 6.05 |
| 042 - Exterior Doors and Windows | 275,393 | 69,484 | 344,877 | | 8.32 |
| 05 - ROOF SYSTEMS | | | | 251,051 | 6.06 |
| 051 - Roofing | 101,772 | 48,454 | 150,226 | | 3.63 |
| 052 - Skylights | 86,365 | 14,460 | 100,825 | | 2.43 |
| 06 - INTERIOR CONSTRUCTION | | | | 1,005,285 | 24.26 |
| 061 - Partitions and Doors | 220,427 | 156,736 | 377,163 | | 9.10 |
| 062 - Interior Finishes | 270,701 | 187,921 | 458,622 | | 11.07 |
| 063 - Specialties | 124,675 | 44,825 | 169,500 | | 4.09 |
| 07 - CONVEYING SYSTEMS | 130,000 | 30,000 | 160,000 | 160,000 | 3.86 |
| 08 - MECHANICAL | | | | 1,353,858 | 32.67 |
| 081 - Plumbing | 130,220 | 110,255 | 240,475 | | 5.80 |
| 082 - HVAC | 565,766 | 398,943 | 964,709 | | 23.28 |
| 083 - Fire Protection | 72,157 | 76,517 | 148,674 | | 3.59 |
| 09 - ELECTRICAL | | | | 1,453,515 | 35.08 |
| 091 - Service and Distribution | 176,750 | 66,550 | 243,300 | | 5.87 |
| 092 - Lighting and Power | 210,211 | 214,751 | 424,962 | | 10.26 |
| 093 - Special Electrical Systems | 660,236 | 125,017 | 785,253 | | 18.95 |
| 094 - Site Electrical | 0 | 0 | 0 | | 0.00 |
| 10 - EQUIPMENT | | | | 69,985 | 1.69 |
| 101 - Fixed and Movable Equipment | 3,025 | 460 | 3,485 | | 0.08 |
| 102 - Furnishings | 53,500 | 13,000 | 66,500 | | 1.60 |
| 11 - SPECIAL CONSTRUCTION | 1,245,500 | 100,000 | 1,345,500 | 1,345,500 | 32.47 |
| **SUBTOTAL:** | **$ 6,171,503** | **$ 3,150,036** | | **$ 9,321,539** | |
| 12 - GENERAL REQUIREMENTS | | | | 3,007,537 | 72.58 |
| 13 - CONTINGENCIES | | | | 2,240,343 | 54.06 |
| **TOTAL ESTIMATED CONSTRUCTION COST:** | | | | **$ 14,569,419** | $351.60 /SF |
| | | | GROSS FLOOR AREA: | | 41,438 SF |