Value Engineering Study

Dining Facility Prototypes

Prepared for

Norfolk District

US Army

Corps of Engineers

January 6, 2009

CH2MHILL

US Army Corps of Engineers
Dining Facility Prototypes
Value Engineering Study

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January 6, 2009

Michael S. Atamanchuk, P.E., Norfolk District Project Manager
US Army Corps of Engineers, Norfolk
Norfolk District
803 Front Street
Norfolk, VA 23510

Dear Michael:

Subject: Value Engineering Report, Dining Facility Prototypes

CH2M HILL is pleased to submit this Value Engineering (VE) report for Dining Facility Prototypes for the US Army Corps of Engineers Center of Standardization. CH2M HILL conducted the VE study at the Virginia Beach Office on December 15-19, 2008.

Representatives from the Norfolk District of the Corps and Robert Bain from Clark-Nexsen assisted the CH2M Hill Value Engineering Team by presenting the 90-100% prototype design, and explaining the project assumptions and criteria to date, and the operational considerations leading to the alternative floor plans.

The team followed the standard Value Methodology process including function analysis, speculation, analysis, and development, with an outbrief at the end of the week to present its recommendations as a work in progress. As part of the VE study, a variety of potential cost-saving ideas were explored. Additionally, the charrette/VE team investigated ideas that could possibly enhance the functional operation of the project. Numerous observations were written on a variety of subjects to serve as reminders to the design team and stakeholders as the design is further developed.

CH2M HILL appreciated this opportunity to provide Value Engineering services on the dining facility project. We wish you continued success through design completion and distribution of the prototypes. Please contact Steve Andresen of our Virginia Beach office at (757) 671-8311, or me at (843) 801-1359 should you have any questions or comments concerning this Preliminary VE report.

Sincerely,

CH2M HILL

William S. Easley, CVS, PE
Value Engineering Team Facilitator

cc: Steve Andresen/VBO
Phil Smith/VBO
Value Engineering Team Members:
Rob Edgerton/PDX
Gene Smarr/ATL
Farid Razavi/PDX
Jesus Gonzalez/KNV
Beth Trautwein/GNV

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VE Overview

Introduction

Value Engineering (VE) is a structured process emphasizing thorough analysis of project functions using team dynamics to expand design options creatively. Public and private organizations conduct VE workshops, or studies, for their major projects in order to improve project delivery and reduce costs while meeting the intended functions, and by maximizing function for roughly the same cost. CH2M HILL conducts two types of VE studies:

- Concept-level VE studies
- Mid-design VE studies

The study on the dining facility prototypes is considered a mid-design VE study.

Value Engineering can be represented by the following Value Equation: V = F/C.

- "V" stands for Value from the Owner's perspective. Value is achieved by either reducing cost but still accommodating the Basic Function, or by enhancing function for the same cost.
- "F" stands for Function. Basic Functions of the subject project under study can be described by simple verb-noun definitions, such as: "Apply Coating," "Reduce Cycle Time," "Satisfy Customer," and many other functions.
- "C" stands for Cost of the function. High-cost functions become the subject of brainstorming, because various alternatives may be able to accomplish the basic function at a reduced cost.

This VE study of the dining facility prototypes was conducted by CH2M HILL directly for the Norfolk District of the US Army Corps of Engineers, center of standardization for dining facilities. The meeting was held at the Virginia Beach office of CH2M HILL on December 15-19, 2008 with an overview of the design from Robert Bain, an architect for Clark Nexsen, and participation from the Corps' Norfolk District and a full CH2M HILL Value Engineering Team.

The proposals and observations from the VE study are included in this Value Engineering Report. Following the VE study and presentation, the Corps and other stakeholders are requested to coordinate with the design team to determine the final disposition of the VE proposals and observations (Accepted, Rejected, or Modified). The VE team will then complete a Final VE report documenting the study results.

Project Description

The Norfolk District of the US Army Corps of Engineers is the Center of Standardization of Armed Forces Dining Facilities. Between May and November 2008, Clark Nexsen was contracted to develop prototype designs for various size facilities. Prior to final acceptance of the completed design, CH2M HILL was contracted to perform a Value Engineering Study on five of the prototype designs:

- 201 – 500 soldier Permanent Party Dining Facility
- 501 – 800 soldier Permanent Party Dining Facility
- 801 – 1300 soldier Training Dining Facility
- 1301 – 2600 soldier Training Dining Facility (one-story)
- 1301 – 2600 soldier Training Dining Facility (two-story)

The five buildings incorporated modular design with similar elements repeated. The purpose of the study was to identify possible cost saving and project enhancement items. The modularity of the designs will enable improvements illustrated on building type to be carried over to the others.

Since the subjects of the study were prototype building designs, there were several areas of opportunity for savings that were not addressed, because they were related to site adaptation of the prototypes. The drawings noted that the exterior envelope, foundation, superstructure and roof type, which often encompass a major portion of construction costs, would be designed by the site adaptation architect-engineer.

Value Engineering Study Participants

The Value Engineering (VE) study for Dining Facility Prototypes for the US Army Corps of Engineers Center of Standardization was conducted the VE study at the Virginia Beach Office on December 15-19, 2008. Representatives from the Norfolk District of the Corps and Robert Bain from Clark-Nexsen assisted the CH2M Hill Value Engineering Team by presenting the 90-100% prototype design, and explaining the project assumptions and criteria to date, and the operational considerations leading to the alternative floor plans.

A list of attendees is included as Appendix B. The Value Engineering Team members included:

- PM - Steve Andresen, PE, CH2M HILL /VBO
- Facilitator/Civil - Bill Easley, CVS, PE, CH2M HILL /SPB
- Mechanical - Gene Smarr, PE, CH2M HILL /ATL
- Electrical - Farid Razavi, PE, CH2M HILL /PDX
- Civil/Structural - Jesus Gonzalez, PE, CH2M HILL /KNV
- Cost Estimating - Rob Edgerton, CH2M HILL /PDX
- Architectural - Beth Trautwein, AIA NCARB LEED AP, CH2M HILL /GNV

Value Engineering Study Methodology

During the Value Engineering study, and as noted in the Agenda attached as Appendix A, the team completed the following phases in accordance with standard Value Methodology:

Information Phase

This phase included introductions, review of the week's agenda, and an introduction to the prototype designs by Robert Bain, an architect with Clark Nexsen, and representatives of the Norfolk District of the US Army Corps of Engineers, David Gary and Lisa Bobotas. The CH2M HILL VE Team was given an excellent opportunity to review the design drawings and ask the architect and the Corps personnel further questions about design intent, constraints, and lessons learned.

Function Analysis Phase

The biggest difference between Value Engineering studies and general brainstorming sessions is the Function Analysis phase, where the team breaks down the purpose of the project, rather than the features. In looking at the "big picture", it empowers the multi-disciplined group to ask Why and How, instead of following along with the status quo. This approach breaks down designers' natural resistance to paths never or rarely explored, and loosens up the team's creativity before entering the Speculation phase. Functions are described in a two-word phrase with an active verb and a measureable noun. These are then related to one another into a logical Function Analysis System Technique (FAST) diagram to define the ultimate or highest order functions of the project and draw paths to how these will be accomplished. This FAST diagram is shown in Appendix C.

Basic functions are then generally selected for further analysis on the basis of their apparent cost, cost-to-worth ratios, and potential for improvement. A formal brainstorming session generated numerous alternative methods to achieve the selected basic functions.

Speculation Phase

All of the ideas raised during the brainstorming session were recorded. One of the key rules during the creativity phase is not to criticize any ideas. It interrupts free flow of thought, and it inhibits openness. This is true whether one is commenting on another person's suggestions or one's own.

Analysis Phase

Once the team completed the speculation list, they were finally allowed to express their professional technical opinions as the ideas were screened for technical merits, operational improvement, cost-effectiveness, sustainability and efficiency. All of the ideas generated during the Speculation phase are listed in an appendix, along with one of four ratings:

P	Proposal, Write up in detail
S	Suggestion; brief paragraph (Sometimes referenced as Observations or Comments)
X	Reject
BD	Being Done Already

The VE team then refined and combined the selected ideas into more comprehensive scope descriptions for subsequent analysis.

Development Phase

A more detailed technical examination of alternative ideas followed, including approximate quantities, costs, and calculations for ideas shown to have potential for significant savings, where possible. In general, some of the recommendations which passed the screening during the Analysis (or Evaluation) Phase often fall out during development as closer study shows the flaws.

Presentation Phase

The ideas developed by the team as proposals or suggestions were presented to Corps representatives and the CH2M HILL project managers in an out-briefing on Friday, December 19, 2008, as a work in progress. The compilation of ideas, observations, calculations, and cost analyses is hereby presented in this report.

Implementation Phase

Following review by the Corps, design team and other stakeholders, any comments or changes regarding approval or rejection of proposals and suggestions will be incorporated into a final report. Documentation of these decisions will be attached to this report, along with confirmation of implemented cost avoidance for upward reporting by the Norfolk District Value Engineering Officer. The final action to be performed, however, will be implementation of approved improvements into the design.

Value Engineering Study Results

The VE team identified numerous ideas during the Creative Phase to generate ideas for design alternatives. The VE team then reviewed the most promising ideas to evaluate whether they merited a formal proposal. Although the VE team did not completely develop every idea, team members followed the sequence of steps listed below when developing proposals:

1. Prepare a short proposal description
2. Identify advantages and disadvantages
3. Prepare a narrative discussing the idea
4. Calculate potential cost savings
5. Conclude whether the idea should be proposed, based on calculations

The proposals studied can be found in *Table 1 – Summary of Developed Proposals.* During this evaluation process, a variety of implemental cost-savings opportunities were found. Proposals ideas that were found to be viable can be found in Table 1.

The **VE Summary** section also contains *Table 2 – Summary of Developed Suggestions.* The Value Engineering Proposals and Observations are presented in detail in the subsequent **VE Observations** and **VE Proposal** sections of this report. *Table 3 – VE Ideas that Failed During Analysis Phase* is also included for documentation purposes.

TABLE 1: Summary of Developed Proposals

Proposal No.	Proposal Description	Estimated Initial Cost Saving (Increase)[1]	Recommended Disposition per PDT	Estimated Accepted Cost Saving	PDT COMMENTS
A1	Change roof structure to low slope and delete mansards. Use more standard sizes of structural members	$450,000			
A2	Replace high clerestories with lower skylights integrated with the roof. Utilize flat roof while providing for clerestory windows and shielding equipment	$450,000			
A3	Integrate canopy structure into structure for building	$24,000			
A4	Use Commercial Skylights instead of built up light well	$428,000			
A5	Use spray applied closed cell foam insulation for exterior wall cavities and roof/ceiling insulation	($29,000) Initial, $29,000 LCC			
A6	Provide Unisex Toilet for Employees in Lieu of Separate Sec Facilities	$25,000			
A7	Provide outdoor eating canopy and seating	($50,000)			
A8	Relocate Short Order Cooking Station to Eliminate Employee Cross Circulation	$25,000			

Proposal No.	Proposal Description	Estimated Initial Cost Saving (Increase)[1]	Recommended Disposition per PDT	Estimated Accepted Cost Saving	PDT COMMENTS
A9	Non-Cost Servery Design Comments based on Circulation Concerns $0				
A10	Use one dumbwaiter in place of second elevator in the two-story 2600 AIT dining facility	$92,000			
A11	Eliminate One Passenger Elevator	$120,000			
S1	Use Pre-engineered structure for Troop Canopies	$25,000	Not Recommended		
S2	Use Fabric Structures for Troop Canopies	($7,000)			
S3	Use single canopy for double-queue area outside of two-story 2600 soldier facility	$45,000			
M1	Delete air curtain at entrances or exits with air locks	$19,000			
M2	Use dual-flush commodes	($250) per valve			
M3	Use timed metering valves in lieu of motion control on lavatory faucets	$170 per faucet			
M4	Combine Rooftop Air Units (RTUs). Combine Makeup Air Units (MAUs)	$90,000			
M5	Relocate the Elevator Equipment Room for the two story dining facility	$6,300			
M6	Use Separate HVAC Zones for dining areas	$2,000			

Proposal No.	Proposal Description	Estimated Initial Cost Saving (Increase)[1]	Recommended Disposition per PDT	Estimated Accepted Cost Saving	PDT COMMENTS
M7	Use 1/8 Gallon Flush Urinals instead of waterless urinals	$7,000			
M8	Use Instantaneous Electric Water Heaters at the lavatories in the restrooms	$1,000			
M9	Delete Shower in 500 & 800 Meal Facility	$9,000			
M10	Consider using PEX tubing in lieu of copper pipe for small diameter runs				
E1	Use communications closet in lieu of communications room	$20,000			
E2	Use LED lighting in Dining Areas	$9,000			

Notes:

[1] The Initial Savings (or increase if in parenthesis) represents the difference between the current design approach, and the VE proposal, and is expressed in year 2010 costs, which is the anticipated year of midpoint of construction according to the engineer's cost estimates.

* Cost avoidance is difficult to determine at this point of design.

** Proposal is recommended as a quality improvement rather than for cost savings

TABLE 2: Summary of Developed Suggestions

Suggestion No.	Description	Recommended Disposition per PDT	PDT COMMENTS
P1	Out-source Food Preparation		
P2	Consider Design Facility for Multi-Purpose Use		
P3	Consider Integrating Facility as an Addition or Adaptive Reuse of Another Existing Building		
P4	Emphasize that VE will still be required on site-adapted features, i.e., skin assemblies, roof structures, and AT/FP requirements		
P5	Include note with design package that "green cleaning products" will have to be well-documented in order to claim LEED point.		
A1	Relocate Room # 134 (FIELD FEED)		
A2	Provide Access to Restrooms in Prototype 500 and 800 Dining Facilities		
A3	Provide narrative for LEED Checklist as Part of Prototype Building Information Packages		
A4	Allow Polyisocyanurate for Building Insulation		
A5	Consider Use of Exterior Sun Shades and other Exterior Window Shading Devices		
A6	Conversion to 12"Meal Tray		
A7	Acoustical Wall Treatment		
A8	Varied Height of Light Fixtures		
A9	Use of Certified Structural Wood		
A10	Heat Island Affect LEED Point SS 7.2		

Suggestion No.	Description	Recommended Disposition per PDT	PDT COMMENTS
A11	Operable Windows in the Clerestory		
A12	Eliminate gaps between serving stations		
A13	Improve Circulation Between Kitchen and Servery (first floor-2600 Prototype)		
A14	Relocate or shield exterior stairs on two-story facility to avoid wind-driven rain		
A15	Add soffit or screening to prevent bird roosting under canopy		
A16	Identify safe spaces for emergencies (tornado, earthquake)		
A17	Confirm that enough wooden doors are being used to count LEED point per spreadsheet		
C1	Prohibit any parking within 82' of building		
C2	Provide access control gates at both ends of drive-thru		
C3	Use permeable pavement for parking areas		
S1	Specify Polyethylene Vapor Retarders		
S2	Use of epoxy anchors in lieu of cast-in-place anchors		
S3	Use more consistency of sizes for structural members		
M1	Use Ceiling Fans under Queue Line Canopies outside the Buildings		
M2	Capture Rainwater for Urinal Use and for Can Washing		
M3	Recover waste heat from dishwashing for use other places.		
M4	Use non-electric solar hot water heating.		
M5	Consider Acquiring Green Energy for the Facility.		

Suggestion No.	Description	Recommended Disposition per PDT	PDT COMMENTS
E1	Use three phase and higher voltages when possible.		
E2	Prepare and plan for site emergency generator's location.		
E3	Show more details on power distribution to kitchen and servery area equipment		
E4	Show more exterior lighting		
E5	Show under slab utilities		
E6	Consider dimmable T1 lighting controlled by ambient controls being counted as "innovative design" under LEED		

TABLE 3: Summary of Ideas Failed During Analysis or Development Phase

Proposal No.	Proposal Description	Reason for Failing Idea
1	Delete use of trays	This would be a major change to how dining facilities are operated Army-wide. It would also increase risk of diners spilling food or drink on the floor, which would increase maintenance costs and risk of falls
4	Take equipment off roof - use mechanical room	This change would be part of site-adaptation, and it would probably be discouraged or disapproved for AT/FP reasons, and for lessened equipment efficiency.
5	Take equipment off roof - use exterior equipment fenced off	Same as previous.
11	Use solatubes to bring daylighting into serving lines	This would increase concerns of roof leaks, and the daylighting conveyed would not necessarily "feel" like natural light.
12	Use Kalwal for natural daylighting between parapet and flat roof	Kalwal is more expensive than glass.
13	Use revolving doors for 1300 or 2600 soldier AIT	This idea was debated for a while, but it would not move as many troops through doors as quickly as regular doorways. Air curtain/fly fans will perform same function as revolving door in providing a buffer between indoor air and outdoor air
14	Use revolving doors for 500-800 PP DF	Same as previous.
15	Use air curtain at all entrances	Being done.
17	Eliminate drive-through	It is an option on the design; most facilities have not included this feature due to space and AT/FP concerns.
18	Show drive-through as an option	Being done.
20	Reduce size of communication room	Proposal prepared to replace communication room with a closet.
21	Consider green roof	This would increase structural costs, and might create concerns over leakage and/or mold.
22	Maximize use of gas-operated	Being done as part of site-adaptation.

Proposal No.	Proposal Description	Reason for Failing Idea
	kitchen equipment	
24	Use all-electric kitchen equipment	Being done.
25	Use fluorescent tube lighting throughout	Not amenable to pleasant dining environment to have same type of lighting all the time.
28	Use dimmable T1 lighting	Being done.
29	Consider dimmable T1 lighting controlled by ambient controls being counted as "innovative design" under LEED	This has become so common that it cannot be considered innovative any more.
30	Use uniform lighting level	Same reason as # 25 above.
31	Use banks of lights in conjunction with ambient lighting controls rather than dimmers	Being done.
33	Use fabric ducts with exposed ceiling in dining area	Fabric ducts would reduce noise in dining area compared to sheet metal ducts, but they might be difficult to clean.
36	Use alternate for quarry tile floor (porcelain tile paver with through color)	Being done. It should be noted that specification for porcelain tiles can be written to require recycled content, which might help on LEED.
43	Consider metal siding for exterior walls	Being done.
54	Provide dumbwaiters and ADA lift in lieu of elevators	One elevator would probably still be required for occasional freight purposes.
55	Eliminate second story	Two-story prototype needed for some sites due to space restriction.
57	Relocate elevators	Central location is optimum spot for operational purposes of moving food between kitchen and upstairs servery.
59	Move bike racks beyond 82' for AT/FP concerns	Pavement is of greater concern than bike racks.
62	Use VCT in place of quarry tile in dining area	Vinyl tile is a slippery material when wet and would not be a safe walking surface should water be tracked into the facility. Plans and specs do not show any requirement for quarry tile.
63	Use stamped, stained and sealed concrete in place of porcelain tile in dining area	The issue of this material is not maintenance but initial installation. If properly installed the aesthetic, safety and performance of the material is excellent. However, quality in installers

Proposal No.	Proposal Description	Reason for Failing Idea
		is hard to control.
65	Provide gear racks in dining area	Space is limited.
66	Pre-wire dining area for use as classrooms (electrical, data)	This would be a significant increase in cost for an un-mandated purpose.
72	Use geography-based prototypes	This would increase design costs, and site adapt effort is still required.
73	Combine grounding grid and geothermal coils	If geothermal energy is being tapped, coils would be much more extensive than surface area needed for grounding.
74	Use water-source heat pump	Part of site adaptation, and it would probably not work well, considering the spikes in heating and cooling needed during meal times rather than an extended requirement over the day.
79	Use solar energy - photoelectric	Site adaptation item.
81	Relocate tray washing to back of facility	Current arrangement works much better, allowing troops to drop off trays and dishes on the way out.
82	Use three restrooms so that gender ratio is flexible	Would increase cost for little reason.
86	Use ceiling fans in dining area	While these are popular with some dining hall managers (Reference some of the hammerhead barracks at Fort Knox), they are considered dust collectors by many others. Based on the UFC and TB Med 530, the VE team decided not to recommend this as an option.
88	Use PVC piping	Being done
89	Use metal-clad wiring in lieu of conduits	Considering the large amount of equipment in the kitchen, using flexible conduit could end up like a bowl of spaghetti
90	Maximize reflected lighting	While this might be attractive for mood lighting in some applications, it is not an efficient way to light a dining facility
92	Enhance carry-out and eliminate drive-through as an option	See response to Idea # 17
93	Use motorized exterior sunscreens	This would be a site-adaptation idea.
94	Pre-qualify furniture	Being done
96	Use cable trays	Due to the complexity of the equipment to be connected, this is not recommended.
97	Eliminate drinking stations in	Minimal cost reduction, and it would be

Proposal No.	Proposal Description	Reason for Failing Idea
	serving area in 500-800 PP units	inconvenient for diners.
98	Provide one drinking station per dining area instead of two in 1300 and 2600 AIT facilities	Minimal cost reduction, and it would be inconvenient for diners.
99	Confirm fixture count in restrooms, considering number of people and time limitation	Restrooms have enough fixtures per code, but the team still feels this will be another imposition on troops with little time to spare
101	Reduce quantity of beam flange bracing (or note that it's not required for each beam)	Being done
103	Use recovered heat from dishwashing or kitchen for hot air hand drying in restrooms; eliminate paper towels	Not as energy-efficient as developed suggestion to transfer recovered heat to hot water for hand-washing.
107	Use water-dispersing waterfall in lieu of downspouts	No, this wasn't serious
114	Use zoned occupancy sensors (separate for each dining area and kitchen)	Being done
115	Step back ventilation rate during unoccupied periods	Being done
120	Use foam-filled block	Not as cost-effective as other means
121	Use glass block to bring in natural light	Not cost-effective
124	Utilize cut and fill to prevent depressing truck dock below grade, especially in areas subject to freezing	Normally done as part of site adaptation
125	Use argon-filled windows to reduce UV	Being done
131	Use radiant heating to prevent ice on ramps and in queuing areas	This would be a site adaptation; it is also not necessarily the most effective technique
133	Avoid artificial bumps in roof just for daylighting	Skylights are already discouraged; an option for a better-blended clerestory is being addressed as a proposal
134	Get feedback on lessons learned	Being done

Value Engineering Proposal Nos. A-1

Change roof structure to low slope and delete mansards. Use more standard sizes of structural members

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$450,000	$0	$450,000

Advantages	Disadvantages
1. Lower first cost 2. Easier Construction & Erection process	1. Less flexibility for design of space with fixed column grid spacing.

Proposal Description

VE Team's Understanding of the Current Design Concept:

Current design has multiple mansard configurations and uses many different member sizes and configurations.

VE Team's Proposal:

VE team suggests that structure use a low slope roof and standard/consistent column grid spacing.

Calculations – Operating Cost

Current Design Concept:

33076 SF @ $32.79 / SF	$1,084,000
	$
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$INCL
Total, Rounded	**$1,050,000**

Value Engineering Team's Proposal:

33076 SF @ $18.00/SF	$600,000
	$
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$INCL
Total, Rounded	**$600,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$450,000**

Value Engineering Team Recommendation

The Value Engineering team recommends this suggestion for further consideration.

Value Engineering Proposal Nos. A-2

Replace high clerestories with lower skylights integrated with the roof. Utilize flat roof while providing for clerestory windows and shielding equipment

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$450,000	N/A	$450,000

Advantages	Disadvantages
1. Reduce cost. 2. Facilitates construction 3. Easier to contribute to LEED Heat Island Effect (roof) Point.	1. Proper flashing detailing is more critical.

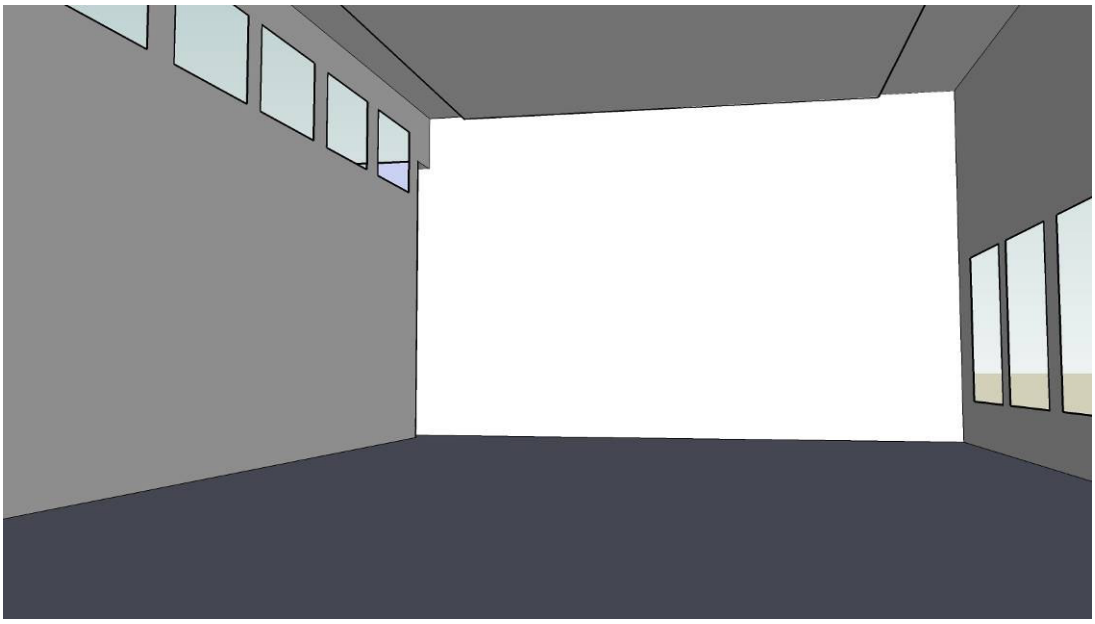
Proposal Description

VE Team's Understanding of the Current Design Concept:

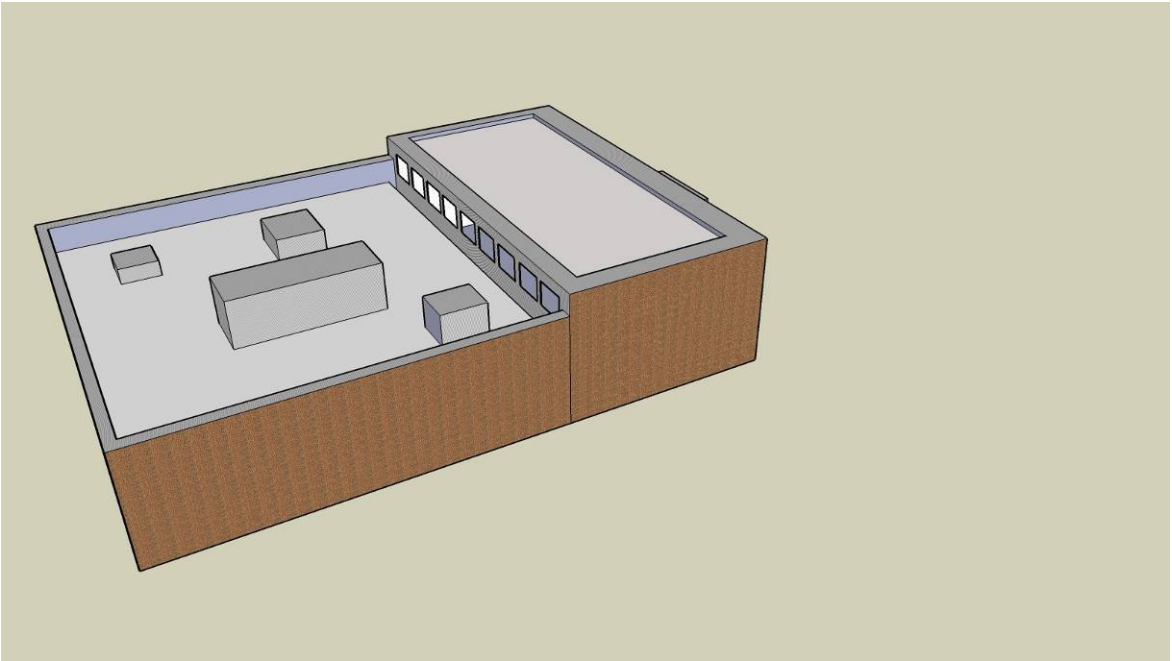
The current scheme for the permanent party facilities presents a Clerestory projecting approximately 8 ft. from the roof structure. The proposed roof plan is complex using integrated roof clerestories of 2 types.

VE Team's Proposal:

Simplify the approach to incorporating interior building natural light and shielding equipment with a simple parapet. Accomplish these design parameters with a simple forms approach, as shown in the attached drawings. The VE Team proposes using prefabricated skylight type covers with a low rise curb for support



INTERIOR VIEW OF FLAT ROOF CLERESTORY APPLICATION



EXTERIOR VIEW OF VARIED HEIGHT FLAT ROOF, CLERESTORY WINDOWS, PARAPET EQUIPMENT SHIELD APPLICATION

Calculations – Operating Cost

Current Design Concept:

33076 SF @ $32.79 / SF	$1,084,000
	$
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$INCL
Total, Rounded	**$1,050,000**

Value Engineering Team's Proposal:

33076 SF @ $18.00/SF	$600,000
	$
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$INCL
Total, Rounded	**$600,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$450,000**

Calculations – Future Cost

N/A – No likely difference in long term performance and maintenance requirements.

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal for further consideration to reduce costs and improve compliance of roof structure with sustainable design.

Value Engineering Proposal No. A-3

Integrate canopy structure into structure for building

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$24,000	N/A	$24,000

Advantages	Disadvantages
1. Allows access to restrooms without being exposed to rain water. 2. Eliminates open area between canopies and building and reduces coverage area.	1. Requires revising the design and slope for the canopies. 2. Will require additional flashing and detailing at the joint between building wall and canopy roof.

Proposal Description

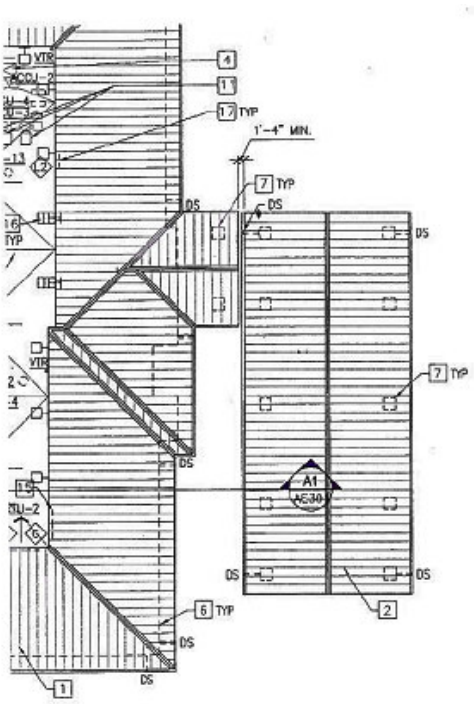
VE Team's Understanding of the Current Design Concept:

The current scheme presents on each side of the Trainee Dining facilities main canopies completely isolated from the building structure and a separate small canopy for the entrance to the vestibule. There is a gap (approximately 1'-8") between the main canopy and the small canopy which will allow exposure to rain water. For the 2600 Soldier (two story) structure there are two main canopies next to each other with a small gap between them (approximately 1'-4") that will also allow exposure to rain water.

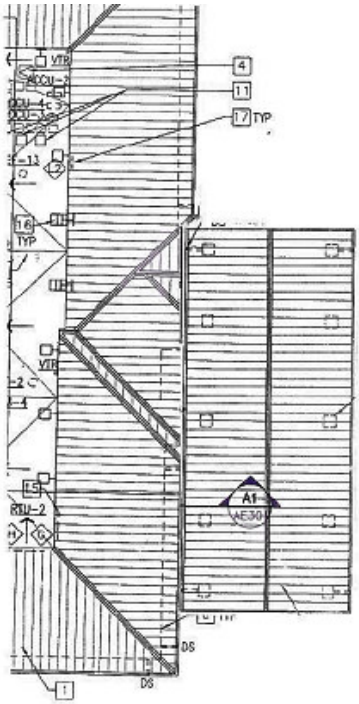
In order to access the exterior restrooms the soldiers would have to walk from the canopy to an open area exposing them to rain water.

VE Team's Proposal:

In order to eliminate exposure to rain water and reduce coverage area, the proposed scheme combines all the canopies into one and brings them next to the building.



CURRENT SCHEME



PROPOSED SCHEME

Calculations – Initial Capital Cost

Value Engineering Team's Proposal:

Decrease Canopy area by 150 SF @ $157.73/SF	$24,000
	$
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	INCLUDED
Total, Rounded	**$24,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$24,000**

Calculations – Future Cost

N/A – No likely difference in long term performance and maintenance requirements.

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal for further consideration.

Value Engineering Proposal No. A-4

Use Commercial Skylights instead of built up light well

Cost Saving

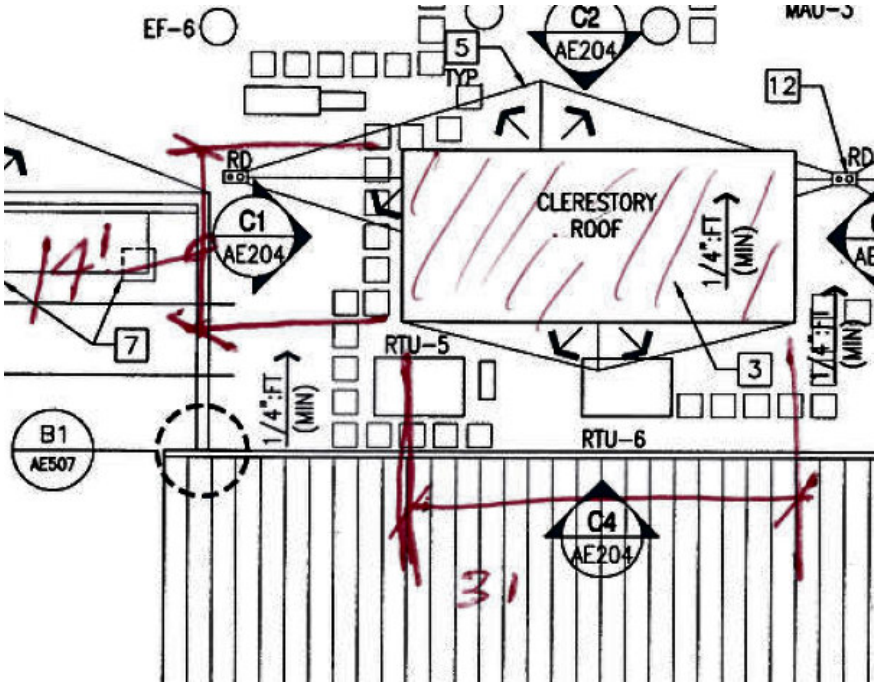
Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$428,000	N/A	$

Advantages	Disadvantages
1. Reduce cost over the built up light well. 2. More honest construction than the built up light well. 3. Easier to maintain commercial skylight.	1. Removes a design feature.

Proposal Description

VE Team's Understanding of the Current Design Concept:

Drawings show a raised rectangular light well with glass in the vertical portion.



VE Team's Proposal:

Replace the light transmitting structure with commercial skylights about 8 feet square. Commercial skylights are pre-engineered and warranted by the manufacturer. Many glass coatings and shadings are available.

Discussion of Proposal and Design Condition Assumptions

This proposal is applicable to the 500 and 800 soldier facility. The marked-up drawing above includes a detail from Drawings AE106 and AE204, respectively.

Replacing the light transmitting structure with commercial skylights will reduce the structure cost and will be a more integrated use of the roof structure, since it will eliminate a structure for which the main purpose is to allow light into the space.

The roof loading should also be slightly reduced as well since the skylight loading will be less and will be more spread out over the roof.

Calculations – Initial Capital Cost

Current Design Concept:

1061 SF of wall and roof	318,300
	$
	$
Subtotal	**$318,300**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	127,320
Total	$445,620
Total, Rounded	**$446,000**

Value Engineering Team's Proposal:

4 at 8 x 8 skylights (256 sf) ($25/sf)	$6,400
Installed	$6,400
	$
Subtotal	**$12,800**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$5,120
Total	$17,920
Total, Rounded	**$18,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$428,000**

Calculations – Future Cost

N/A

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal for further consideration because it will reduce first cost and will accommodate improving the roof structure for cost savings.

Value Engineering Proposal No. A-5

Use spray applied closed cell foam insulation for exterior wall cavities and roof/ceiling insulation

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$(29,000)	$58,000	$29,000

Advantages	Disadvantages
1. Easier Installation (ability to install in small and tight locations). 2. Much higher air and vapor intrusion resistance. 3. Mold resistance 4. Improves structure lateral load capacity 5. Less thermal conductance when metal studs and framing is being used. 6. Reduced heating & cooling costs due to higher efficiency and lower air intrusion.	1. Requires a trained installer 2. Higher first cost

Proposal Description

VE Team's Understanding of the Current Design Concept:

Current design calls for use of fiberglass batt insulation in wall cavity

VE Team's Proposal:

Team proposes the use of spray foam insulation (Icynene).

Calculations – Initial Capital Cost

Current Design Concept:

9300@ $1.16	$10,805
	$
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$INCL
Total, Rounded	**$10,800**

Value Engineering Team's Proposal:

9300@ $4.25	$39,525
	$
Subtotal	**$39,525**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$INCL
Total, Rounded	**$40,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$(29,000)**

Calculations – Future Cost

While the initial cost of the insulation is higher, its improved performance provides life-cycle savings through energy reduction. There are no additional costs for maintenance or replacement.

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal because the improved thermal performance of the spray insulation pays for itself in energy consumption reduction.

Value Engineering Proposal No. A-6

Provide Unisex Toilet for Employees in Lieu of Separate Sec Facilities

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$25,000	N/A	$25,000

Advantages	Disadvantages
1. The elimination of one toilet room will provide alternate uses for the square footage. 2. Reduces cost for plumbing, fixtures, and special features. 3. IBC allows for unisex facilities if the plumbing inspector of the AHJ "Authority Having Jurisdiction" approves the usage of the unisex facility.	1. Longer potential wait for available toilet facility. 2. Separate facilities may be required per 2006 IBC 106.1.1 2: "Separate facilities are required for men and women for B use when occupant load is greater than 15."

Proposal Description

VE Team's Understanding of the Current Design Concept:

Current design provides separate single user toilet facilities for each sex.

VE Team's Proposal:

In smaller occupancy facility plans (500-800), employee numbers do not appear to merit separate facilities.

Calculations – Initial Capital Cost

Current Design Concept:

(2) Separate Sex Toilet Rooms including Markup and Contingency	$50.000
	$
	$
Subtotal	**$50,000**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	INCLUDED

Total	$50,000
Total, Rounded	**$50,000**

Value Engineering Team's Proposal:

(1) Unisex Toilet Room including Markup and Contingency	$25,000
	$
	$
Subtotal	**$25,000**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	INCLUDED
Total	$25,000
Total, Rounded	**$25,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$25,000**

Calculations – Future Cost

N/A – No likely difference in long term performance and maintenance requirements.

Value Engineering Team Recommendation

This proposal reduces cost and frees up some space, but it may impact staff productivity, depending on the number of staff.

Value Engineering Proposal No. A-7

Provide outdoor eating canopy and seating

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$(50,000)*	$0	$(50,000)

Advantages	Disadvantages
1. Improves morale during nice weather.	1. Additional Maintenance

Proposal Description

VE Team's Understanding of the Current Design Concept:

Current design only shows and allows for inside dining.

VE Team's Proposal:

VE team suggests that outdoor dining area and cover be provided in 500/800 PP facilities.

Calculations – Operating Cost

Current Design Concept:

Total, Rounded	**$0**

Value Engineering Team's Proposal:

1000 SF @ $30/SF	$30,000
Seating	$20,000
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$INCL
Total, Rounded	**$(50,000)**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$(50,000)**

Value Engineering Team Recommendation

The Value Engineering team recommends this suggestion for further consideration.

Value Engineering Proposal No. A-8

Relocate Short Order Cooking Station to Eliminate Employee Cross Circulation

Cost Saving

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$25,000	N/A	$25,000

Advantages	Disadvantages
1. Develops a straight circulation through servery without employee crossover movement between Short Order Area to Kitchen. 2. Creates an opportunity for another solution combining queue line canopy and toilet rooms and entrance in the 1300 Prototype.	1. Establishes entrance square footage outside the rectangular shape of a simple building.

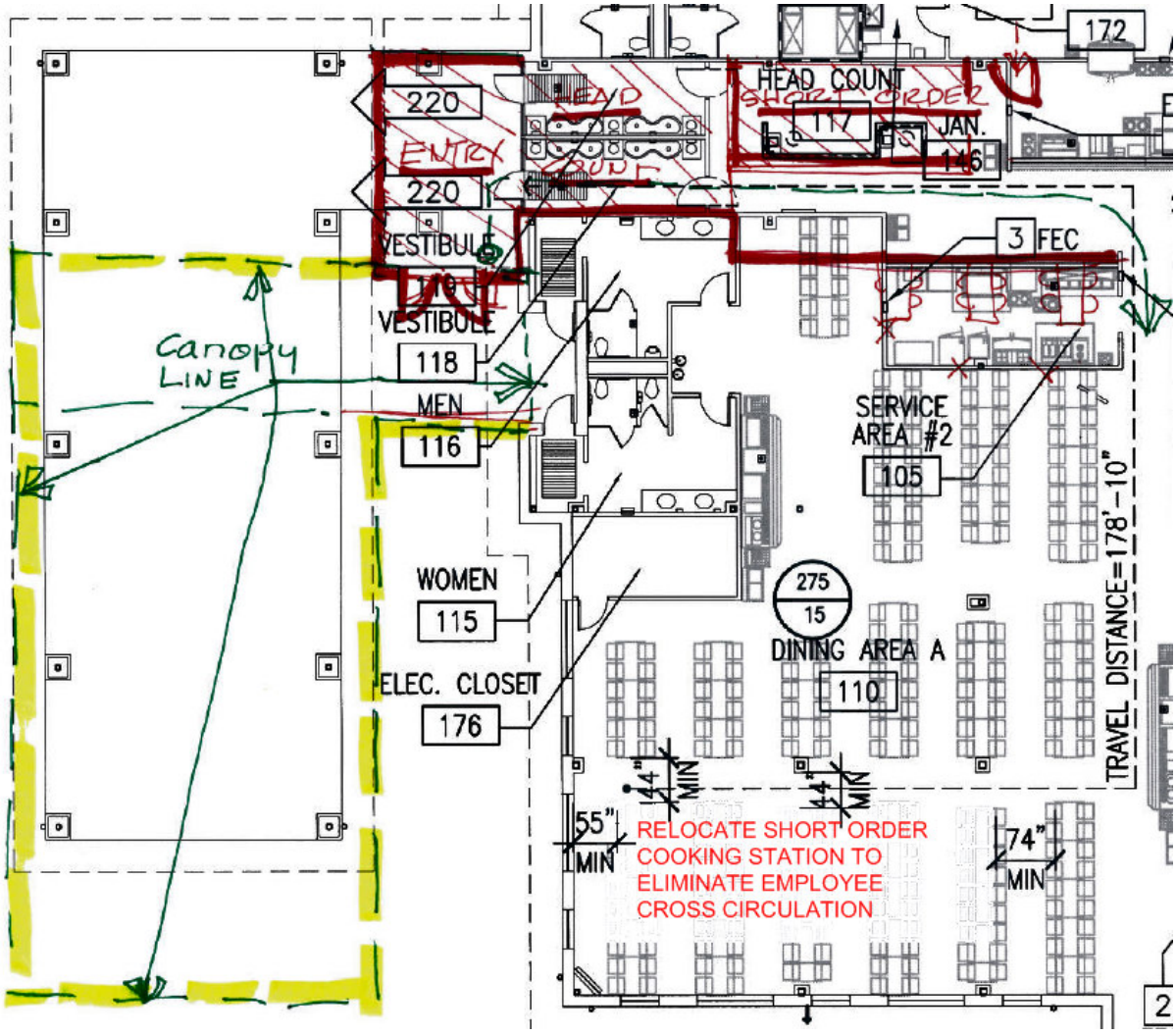
Proposal Description

VE Team's Understanding of the Current Design Concept:

It is understood that two lines of soldiers are expected to move through Servery. Ruling concern in this proposal is the cross circulation of short order supplies and personnel that must cross two lines of traffic.

VE Team's Proposal:

This solution straightens out the line allows for direct connection for supplies and personnel between the kitchen and the short order area.



Calculations – Initial Capital Cost

Current Design Concept:

220 SF @ $157.73	$34,701
	$
	$
Subtotal	**$34,701**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$INCL
Total	$
Total, Rounded	**$35,000**

Value Engineering Team's Proposal:

220 SF @ $35.00	$7,700
	$
	$
Subtotal	**$7,700**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$INCL
Total	$
Total, Rounded	**$10,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$25,000**

Calculations – Future Cost

N/A – No likely difference in long term performance and maintenance requirements.

Value Engineering Team Recommendation

This proposal is recommended in order to improve traffic flow for soldiers.

Value Engineering Proposal No. A-9

Non-Cost Servery Design Comments based on Circulation Concerns

Advantages	Disadvantages
1. Removes awkward corner in circulation route. 2. Removes barrier to smooth tray movement from the specific servery stations on to the next station. 3. Removes potential bottleneck transition between servery stations to Salad Bar. 4. Creates a possibility of Stand-Up eating stations for latecomers.	5. None.

Proposal Description

VE Team's Understanding of the Current Design Concept:

Design team has indicated that soldiers are moving in two different lines. Circulation shown in not fluid and these comments are meant only to possibly redefine the circulation corridor shape.

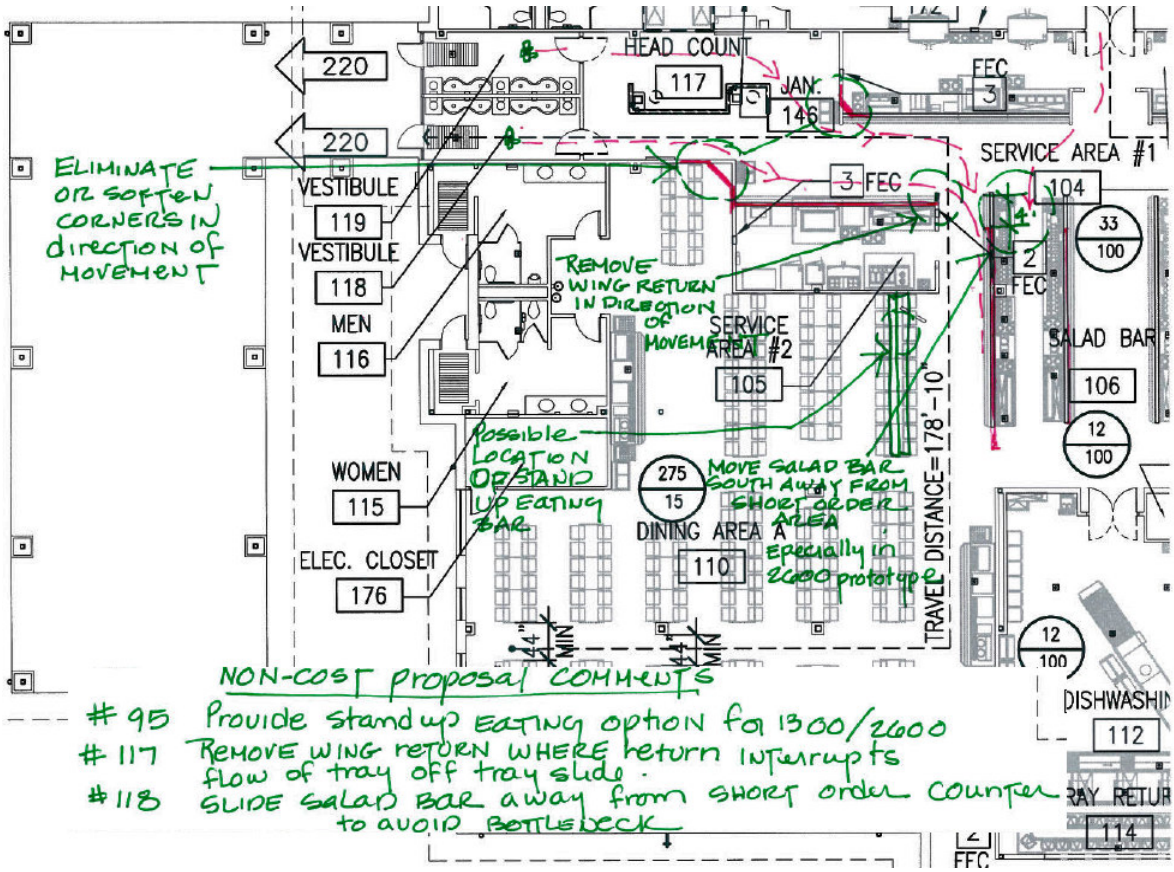
VE Team's Proposal:

The plan below illustrates the following recommendations:

- Provide stand-up eating option for 1300/2600 AIT facilities.
- Remove the wing return where the return interrupts the flow of trays off the tray slide.
- Slide the salad bar away from the short order counter to avoid creating a bottleneck.

The first idea was to provide an alternative for eating quick meals. During the outbrief, however, it was noted that personnel in the AIT facilities march in, get their food, and all sit and eat as a uniform group. The idea may actually be more applicable to the 500/800 person facilities since customers there would be more appreciative of alternatives.

The latter two ideas were prompted by concern that potential movement will occur between lines causing movement of line delays.



Value Engineering Team Recommendation

The first idea was to provide an alternative for eating quick meals. During the outbrief, however, it was noted that personnel in the AIT facilities march in, get their food, and all sit and eat as a uniform group. The idea may actually be more applicable to the 500/800 person facilities since customers there would be more appreciative of alternatives.

The latter two ideas were prompted by concern that potential movement will occur between lines causing movement of line delays. While it is understood that, without the wing return, trays could be pushed off the tray slide, the team agreed that personnel would find it easier to move the trays horizontally without having to lift them and lower them.

Value Engineering Proposal No. A-10

Use one dumbwaiter in place of second elevator in the two-story 2600 AIT dining facility

Cost Saving

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$92,000	N/A	$92,000

Advantages	Disadvantages
1. A Dumbwaiter would move food from floor to floor without moving personnel. 2. The two dumbwaiters would cost less than two passenger elevators and would take up less room.	1. Personnel needed on another floor would still need to use the elevator. 2. Diners who were handicapped would still need to use the elevator.

Proposal Description

VE Team's Understanding of the Current Design Concept:

This proposal developed from an observation of the circulation interaction between soldier queue lines and servery and kitchen help conflicts. The two elevators size has caused constriction of kitchen to servery openings and cross circulation of employees.

VE Team's Proposal:

If dumbwaiters were utilized for moving prepared food trays, two units could be installed enabling food to move between floors without being accompanied by employees. The programmatic information neither validates this substitution nor invalidates such an approach. However, the spatial size of two elevators and the affect on circulation and elevator utilization on the second floor demands examination of this alternative.

Discussion of Proposal and Design Condition Assumptions

The 30" x 30" x 36" high dumbwaiter will carry 200 pounds. A cut sheet on a typical commercial vendor is included for additional information.

Calculations – Initial Capital Cost

Current Design Concept:

TWO ADA PASSENGER ELEVATORS including Markup and Contingency	$240,000
	$
	$
Subtotal	**$240,000**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	INCLUDED
Total	$240,000
Total, Rounded	**$240,000**

Value Engineering Team's Proposal:

TWO 30" X 30" X 36" DUMBWAITERS including Markup and Contingency	$28,000
ONE ADA PASSENGER ELEVATOR	$120,000
	$
	$
Subtotal	**$**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$
Total	$
Total, Rounded	**$148,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$92,000**

Calculations – Future Cost

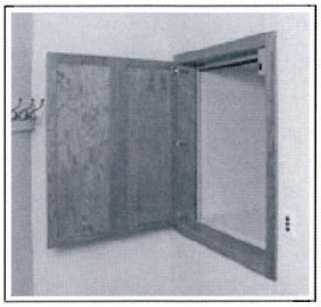
N/A – No likely difference in long term performance and maintenance requirements.

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal for cost reduction, space reduction in a very tight operational area, and accommodation of both personnel movement and moving food.

AMERIGLIDE EXPRESS DUMBWAITER

Call and Speak with an Expert



+Enlarge Picture

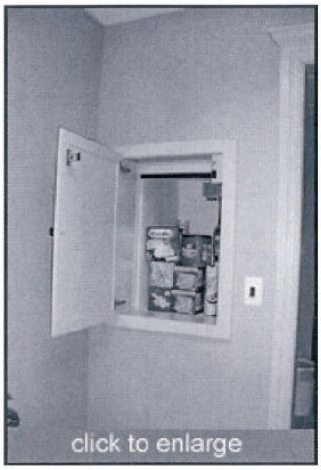
Owner's Manual

AmeriGlide Express Brochure

AmeriGlide Express Planning Guide

AmeriGlide Express Dumbwaiter Installation Documents

AmeriGlide Express Dumbwaiter Technical Drawings



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Plus Shipping

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No more wrestling with heavy loads of laundry, bags of groceries, and other hard-to-carry items! With the easy-to-install AmeriGlide Express dumbwaiter, moving goods and supplies in your multi-storied home is now fast and easy. You'll wonder how you lived without it.

The Express Dumbwaiter at a Glance:

- Carries up to 100 pounds (units that carry up to 200 pounds are available)
- Standard car's interior dimensions are 20" wide x 20" deep x 30" high (custom sizes available up to 30" x 30" x 36")
- 5-year warranty on drive train and 2-year warranty on parts
- 1/3hp 90vdc motor
- 115 vac grounded outlet

Fast and Easy Installation. Unlike most electric dumbwaiters, which rely on complex pulley systems, AmeriGlide's express dumbwaiter is pre-assembled in our factory. That means there are no pulleys to install, no intricate rail systems to assemble, and no complicated wiring to figure out! Installation is as easy as 1-2-3...

1. Connect sections of track
2. Secure the drive cable to the header
3. Route the wires to the control buttons and door interlocks

And to facilitate installation and routine maintenance, simply use the temporary plug-in bypass control.

Designed to Fit Your Life. The express dumbwaiter by AmeriGlide, designed to meet ANSI standards, can travel up to 28' at a speed of 20 ft/minute while allowing for two to four stops along the way. You'll appreciate design features like the two automatic, low-voltage (24V) control switches and the durable ivory powder-coated steel panel walls and doors. (Stainless steel is also available.) Because we know price is an important consideration, we offer one of the best values on the market!

Durability Is Key. Made in the USA of durable materials like extruded aluminum for the tracks and aircraft cable rated at 1,800-pound breaking strength, your new dumbwaiter comes with a five-year warranty on the drive train and a two-year warranty on parts. We also use low-voltage hoistway door interlocks (either G.A.L. or electromechanical, depending on your application). The system has upper and lower terminal limits and Final limit standard

Ready to order your AmeriGlide Express Dumbwaiter? Contact one of our dumbwaiter experts today to find out more about this product or to ask any questions you may have.

http://www.ameriglide.com/AmeriGlide-Express-Dumbwaiter.htm 12/17/2008

Value Engineering Proposal No. A-11

Eliminate One Passenger Elevator

Cost Saving

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$120,000	N/A	$120,000

Advantages	Disadvantages
1. Open square footage for better circulation between the Kitchen and the Servery.	1. Potential slower food movement to the second floor Servery.

Proposal Description

VE Team's Understanding of the Current Design Concept:

Although we did not discuss this issue with the design team, the assumption is that the two elevators provide redundancy of the system in case one elevator is not in service. The other reason for two elevators might be a time/food delivery study during peak second floor use.

VE Team's Proposal:

It does not appear that the employee numbers or potential handicapped users warrant two elevators. The cost of the elevator and the space it takes up are both issues of this proposal.

Discussion of Proposal and Design Condition Assumptions

It is our assumption that the elevator serves employees, handicapped diners and food delivery.

Calculations – Initial Capital Cost

Current Design Concept:

(2) Elevators including Markup and Contingency	$240.000
	$
	$
Subtotal	**$240,000**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	INCLUDED
Total	$240,000

Total, Rounded	**$240,000**

Value Engineering Team's Proposal:

(1) Elevators including Markup and Contingency	$120,000
	$
	$
Subtotal	**$120,000**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	INCLUDED
Total	$120,000
Total, Rounded	**$120,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$120,000**

Calculations – Future Cost

N/A – No significant difference in long term performance and maintenance requirements. While one might expect maintenance costs to be cut in half, there would not be any reduction on use, so the same amount of maintenance would still be needed.

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal for further consideration to reduce costs, but more importantly to reduce the space intrusion on the active corridor between the kitchen and the servery.

Value Engineering Proposal No. S-1

Use Pre-engineered structure for Troop Canopies

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$25,000	$0	$25,000

Advantages	Disadvantages
1. Lighter weight will require smaller structural members	1. Architecture is undesirable 2. Less flexibility in design consideration and integration

Proposal Description

VE Team's Understanding of the Current Design Concept:

Current design calls for standard metal truss pitched roof construction.

VE Team's Proposal:

Team proposes use of a pre-engineered metal building structure. Initial cost is lower.

Calculations – Initial Capital Cost

Current Design Concept:

220 SF @ $157.73	$34,701
	$
	$
Subtotal	**$34,701**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$INCL
Total	$
Total, Rounded	**$35,000**

Value Engineering Team's Proposal:

220 SF @ $35.00	$7,700
	$
	$
Subtotal	**$7,700**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$INCL
Total	$
Total, Rounded	**$10,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$25,000**

Calculations – Future Cost

N/A – No likely difference in long term performance and maintenance requirements.

Value Engineering Team Recommendation

This proposal is not recommended because its appearance would clash with the style of the dining facility, and cost savings are not significant.

Value Engineering Proposal No. S-2

Use Fabric Structures for Troop Canopies

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$(7000)	$0	$(7000)

Advantages	Disadvantages
1. Architecturally more flexible and interesting 2. Lighter weight will require smaller structural members 3. Less likely to become a bird nest attractant.	1. Higher initial cost.

Proposal Description

VE Team's Understanding of the Current Design Concept:

Current design calls for standard metal truss pitched roof construction.

VE Team's Proposal:

Team proposes use of a stressed fabric canopy structure utilizing light weight space frame truss. Fabric structure will provide fewer nesting perches for birds, and provide a more architecturally interesting structure. Example of this type of structure may be found at http://www.asfi.net/products_canopies.html.

Calculations – Future Cost

N/A – No likely difference in long term performance and maintenance requirements.

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal for further consideration as an aesthetically interesting entry to the dining facilities which stand apart from the more permanent appearance of the main structure, but still provides shelter from the elements for troops waiting for their meals.

Value Engineering Proposal No. S-3

Use single canopy for double-queue area outside of two-story 2600 soldier facility

Cost Saving (Increase)

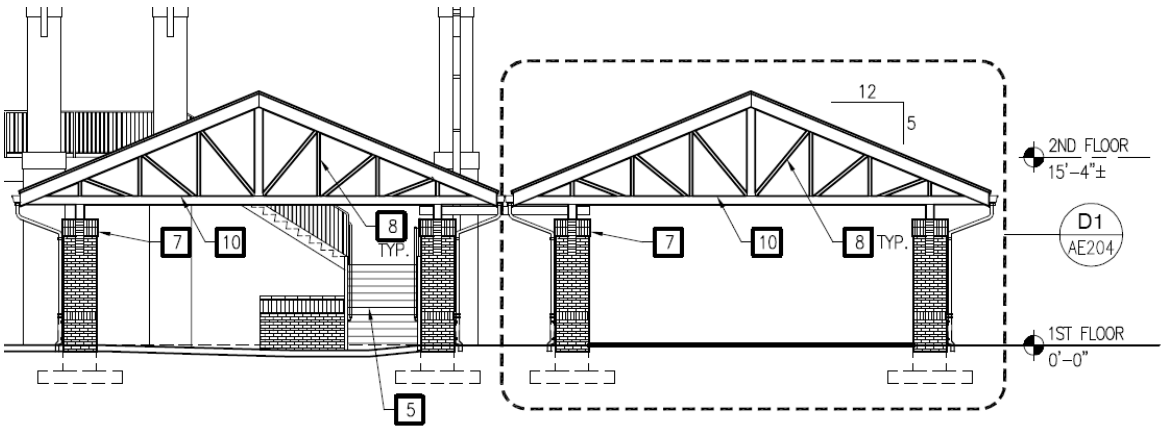
Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$45,000	N/A	$45,000

Advantages	Disadvantages
1. Simplifies design. 2. Reduces materials and cost. 3. Eliminates one location where rain will hit troops or create slipping hazard. 4. Reduces physical footprint of construction.	1. Slightly reduces physical separation between two companies while queuing.

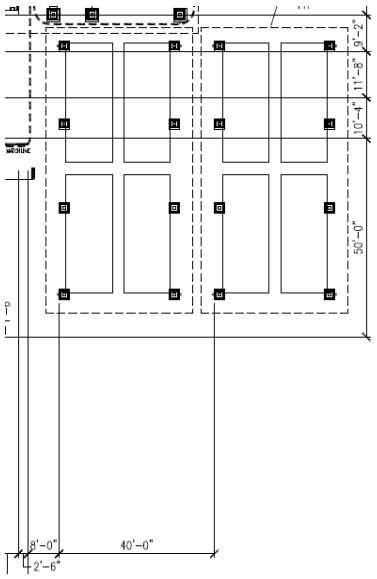
Proposal Description

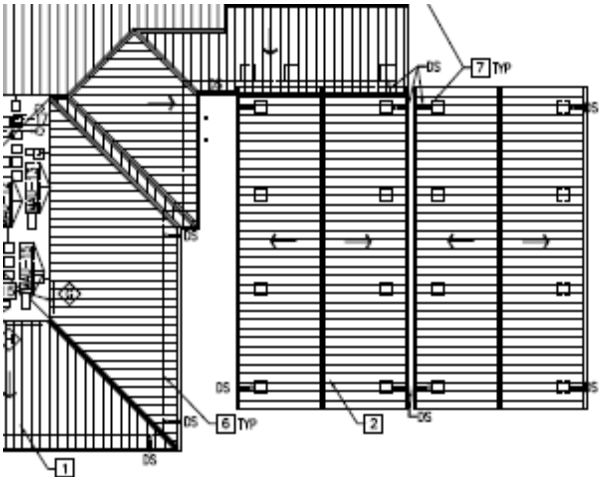
VE Team's Understanding of the Current Design Concept:

Outside the two-story 2600 AIT dining facility, two queuing areas are shown side-by-side with separate structures, including columns, roofs, gutters and downspouts.



The following roof plan shows how the two structures convey storm water toward the narrow divide between them. Any rain falling between the two gutters would land on the shared slab.





VE Team's Proposal:

Use steel columns with a shallow-slope (1:12) standing seam metal roof with one column line between the two queuing areas. Some manufacturers can accommodate slopes as shallow as ¼ v : 12 h (http://www.archmetalroof.com/products/structural/238T/238_main.htm).

Calculations – Initial Capital Cost

Current Design Concept:

Type in quantities and unit prices	$
Roofing 4 x 40 (@ 5v:12h) x 85' = 7400 SF	$74000
Columns 16 x 14' height (11'-10' above ground)	$40000
Slab 80x85 =6800* $10	$68000
Guttering (4 – 85' lengths and 8 – 12' downspouts)	$2900
Subtotal	**$**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$
Total	$
Total, Rounded	**$185,000**

Value Engineering Team's Proposal:

Roofing 2 x 35 (@ 1v:12h) x 85' = 6000 SF	$60000
Columns 8 x 14' height (12' above ground)	$20,000
Slab 70x85	**$59,500**
Guttering (2 – 85' lengths and 4 – 12' downspouts)	**$1410**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$
Total	$
Total, Rounded	**$140,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$45,000**

Calculations – Future Cost

N/A – No significant difference in long term performance and maintenance requirements.

Value Engineering Team Recommendation

This proposal is recommended in order to simplify design and construction, reduce building footprint reduce cost, and, most importantly, reduce rain falling on troops waiting to be fed.

Value Engineering Proposal No. M-1

Delete air curtain at entrances or exits with air locks.

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$19,000	N/A	$19,000

Advantages	Disadvantages
1. Reduces cost. 2. Does not increase risk of pests getting in. 3. Air curtains and fly fans blowing air in people's faces as they enter buildings often bother them.	1. Ensures that flies won't come in if the air is not correctly balanced or if doors are held open.

Proposal Description

VE Team's Understanding of the Current Design Concept:

In the draft RFP, Section 011000, Paragraph 3.1.10, Special Equipment Requirements, requires "an air curtain/fly fan on the interior side of all exterior doors, except for mechanical/electrical rooms and doors for emergency exit only. Air curtain/fly fan shall be full width of door opening."

VE Team's Proposal:

At entrances and exits which provide air lock capabilities with interior and exterior paired doors, eliminate the air curtains.

Discussion of Proposal and Design Condition Assumptions

Air curtains are not specifically required by TB-MED 530. While many of the entrances and exits for the dining facilities are referenced as "vestibules", only the doors entering the head count area in the 500- and 800- person facilities have an actual air lock. As long as the pressure inside is greater than the pressure outside, this provides a buffer to reduce the loss of conditioned air and discourage entry of flies or other pests, and fly fans or air curtains would not be needed.

Calculations – Initial Capital Cost

Current Design Concept:

Air curtains at 9' wide doorway to vestibules, two for each 500- or 800-PP dining facility @ $9,616 ea	$19,232
	$
	$
Subtotal	**$19,232**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$
Total	$
Total, Rounded	**$19,000**

Value Engineering Team's Proposal:

	$
	$
Subtotal	**$0**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$0
Total	$0
Total, Rounded	**$0**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$19,000**

Calculations – Future Cost

N/A – Minimal difference in long term performance and maintenance requirements, because air curtains are still required for facilities, and this proposal only eliminates two fans per facility.

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal, but it would be preferred to design the vestibules as air locks. Air locks would be much more effective for energy loss reduction.

Value Engineering Proposal No. M-2

Use dual-flush commodes

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
($4,000) for 2600 AIT	N/A	($4,000) for 2600 AIT
($2,500) for 1300 AIT		($2,500) for 1300 AIT
($1,500) for 500-800 PP		($1,500) for 500-800 PP

Advantages	Disadvantages
1. Reduces water consumption. 2. Not very complicated.	3. Costs more than conventional valves.

Proposal Description

VE Team's Understanding of the Current Design Concept:

The restrooms use standard toilets.

VE Team's Proposal:

Use dual-flush commodes to reduce water consumption. The simplicity of pulling a handle up to dispose of liquid waste only vs. down for solid waste and paper will reduce the water used by ½ gallon per flush when used for liquid waste.

Calculations – Initial Capital Cost

Value Engineering Team's Proposal:

Additional cost per valve (16 valves in 2600 AIT; 10 in 1300 AIT; 6 in 500-800 PP)	($180)
	$
	$
Subtotal	**($180)**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	($72)
Total	($252)
Total, Rounded -- PER VALVE	**($250)**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**($250) per valve**

Calculations – Future Cost

N/A – No likely difference in long term performance and maintenance requirements.

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal for further consideration for water conservation, especially in areas subject to drought. The valves add minimal cost and save water. This will help toward the LEED goal, as noted in checklist items WE 3.1 and 3.2 for water conservation.

Value Engineering Proposal No. M-3

Use timed metering valves in lieu of motion control on lavatory faucets

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$170 per faucet	N/A	$170 each
$3400 for 2600 AIT		$3400 for 2600 AIT
$2040 for 1300 AIT		$2040 for 1300 AIT
$1020 in 500-800 PP facility		$1020 in 500-800 PP facility

Advantages	Disadvantages
1. Saves water. 2. Shuts off without using hands. 3. Does not require wiring. 4. Not sensitive to dirty sensor. 5. Allows use of cold, hot or both taps. 6. Lower cost.	1. Requires hands (or an elbow) to turn on.

Proposal Description

VE Team's Understanding of the Current Design Concept:

Specification 220000, Paragraph 2.4.1, Automatic Controls, requires "automatic, sensor operated faucets to comply with ASSE 1037 and UL 1951 for lavatory faucets. Faucet systems shall consist of solenoid-activated valves with light beam sensors."

VE Team's Proposal:

Use a timed metering faucet to allow easy operation and automatic shut-off.

MOEN TWO HANDLE METERING FAUCET

Moen® Sani-Stream® Two Handle Metering Bath Faucet - Chrome Finish - Adjustable Timing Cycle From 5 To 60 Seconds - Vandal Resistant Handles And Aerator - .5 GPM @ 60 PSI - Mfg #8886

Calculations – Initial Capital Cost

Current Design Concept:

Motion sensing faucet (20 in 2600 AIT, 12 in 1300 AIT, and 6 in 500-800 PP facility)	$450
	$
	$
Subtotal	**$450**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	Included
Total	$450
Total, Rounded (PER FAUCET)	**$450**

Value Engineering Team's Proposal:

Timed metering faucet (20 in 2600 AIT, 12 in 1300 AIT, and 6 in 500-800 PP facility)	$200
	$
	$
Subtotal	**$**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$80
Total	$280
Total, Rounded (PER FAUCET)	**$280**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$170 PER FAUCET**

Calculations – Future Cost

N/A – No likely difference in long term performance and maintenance requirements.

Value Engineering Team Recommendation

This proposal is recommended in order to save money without any reduction in quality or function.

Value Engineering Proposal No. M-4

Combine Rooftop Air Units (RTUs). Combine Makeup Air Units (MAUs)

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$90,000	N/A	$90,000

Advantages	Disadvantages
1. Reduces number of AHUs. 2. Reduces Cost. 3. Improves roof loading.	1. Controls are less flexible.

Proposal Description

VE Team's Understanding of the Current Design Concept:

Drawing M-602 now showing 7 MAUs and 8 RTUs on the roof.

VE Team's Proposal:

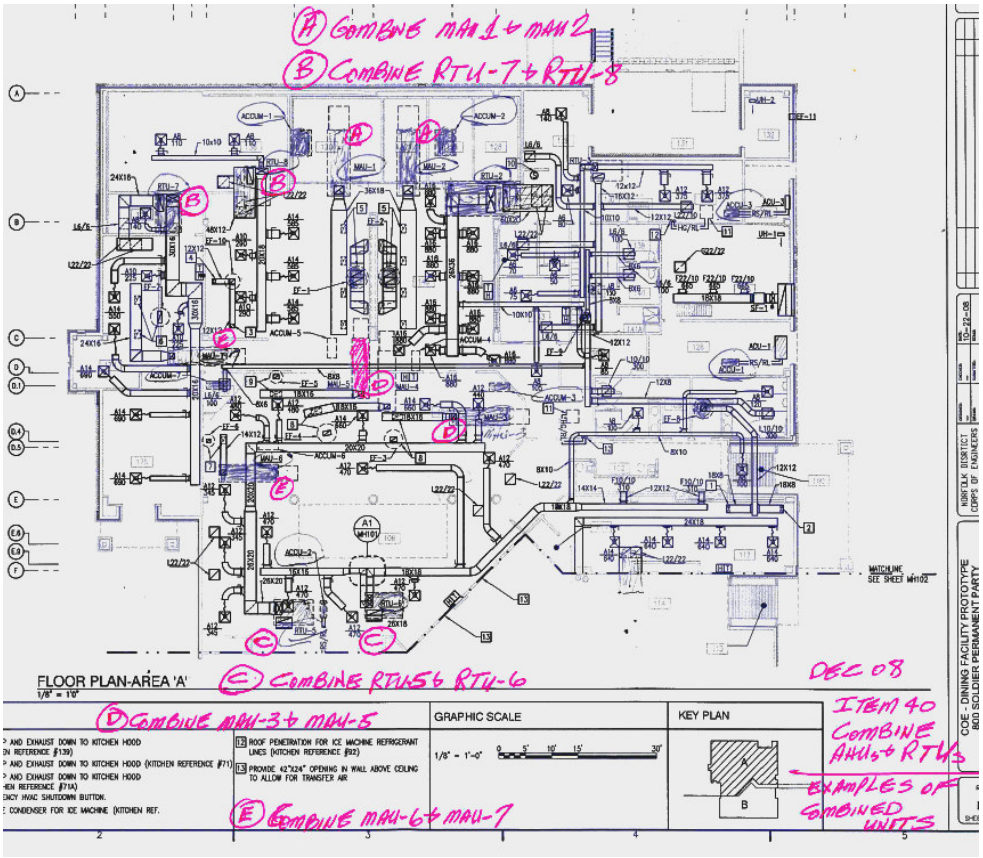
Reduce the number of MAUs and RTUs. Combine MAUs to four units. Combine the RTUs to four units. Units to be combined are shown below in the markup of Drawing MH101 for the 800 soldier facility.

Discussion of Proposal and Design Condition Assumptions

This is for the 500-800 soldier facility. Other facilities will be similar.

Allow more than one hood to be served by a MAU- approximately one MAU per two hoods. Do not air condition the makeup air, temper it for cold weather operation.

Combine HVAC zones so that the number of RTUs is reduced. Modify the controls to handle the added load and area.



Calculations – Initial Capital Cost

Current Design Concept:

7 MAUs at $3,450 each	$24,150
8 RTUs at $ 20,000 each	$160,000
	$
Subtotal	**$184,150**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$73,760
Total	$257,910
Total, Rounded	**$258,000**

Value Engineering Team's Proposal:

4 MAUs at 5,000 each	$20,000
4 RTUs at $ 25,000 each	$100,000
	$
Subtotal	**$120,000**

Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$48,000
Total	$168,000
Total, Rounded	**$168,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$90,000**

Calculations – Future Cost

N/A

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal for further consideration because it will reduce first cost and will accommodate improving the roof structure for cost savings.

Value Engineering Proposal No. M-5

Relocate the Elevator Equipment Room for the two story dining facility

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$6,300	N/A	$

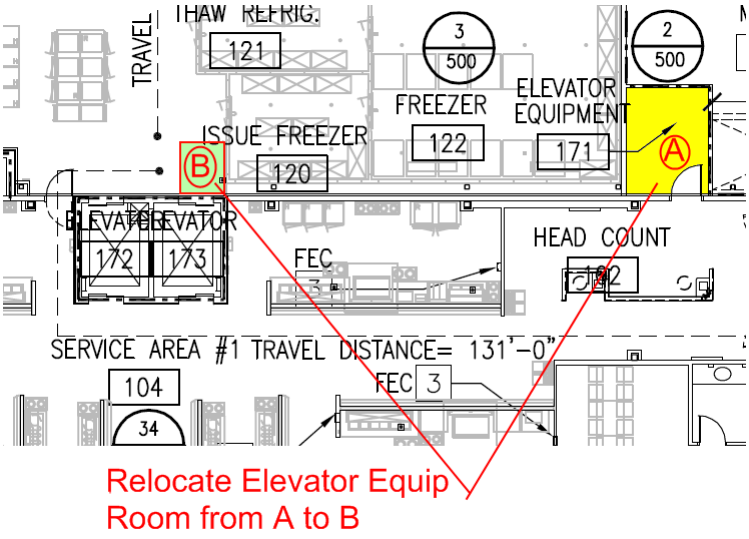
Advantages	Disadvantages
1. Will make elevator maintenance easier. 2. Will reduce the cost of electrical and mechanical connections to the elevator. 3. Controls are simplified with an adjacent elevator mechanical room.	1. Room layout may be more challenging.

Proposal Description

VE Team's Understanding of the Current Design Concept:
The Elevator Equipment Room is located about 30 feet from the elevators being served.

VE Team's Proposal:

Relocate the Elevator Equipment room adjacent to the elevators. This will allow hydraulic and electrical connections to be closer to the use point. Will simplify maintenance and improve elevator operation. A possible site for relocated Elevator Equipment Room is shown in the sketch below:



Discussion of Proposal and Design Condition Assumptions

This is for the 2600 two story soldier dining facility.

Elevators usually have the equipment room adjacent to the elevators. Hydraulic elevators operate better with minimum hydraulic piping. The first cost will be less for the hydraulic piping, the electrical connections, and the controls wiring with the equipment room adjacent to the elevators. The Elevator Equipment Room can possibly be relocated behind and adjacent to the elevators.

Maintenance will be easier with the Equipment Room adjacent to the Elevator.

Calculations – Initial Capital Cost

Current Design Concept:

60 feet of hydraulic piping $30/foot	$1,800
60 feet of power wiring $25/foot	$1,500
60 feet of Control wiring $20/foot	$1,200
Assume same square footage for equipment room.	
Subtotal	**$4,500**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$1,800
Total	$6,300
Total, Rounded	**$6,300**

Value Engineering Team's Proposal:

Minimal hydraulic piping $30/foot	$0
Minimal power wiring $25/foot	$0
Minimal Control wiring $20/foot	$
Subtotal	**$0**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$0
Total	$0
Total, Rounded	**$0**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$6,300**

Calculations – Future Cost

N/A

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal for further consideration because placing the elevator equipment room next to the elevator will improve elevator operation and make maintenance easier. It will also reduce first cost.

Value Engineering Proposal No. M-6

Use Separate HVAC Zones for dining areas

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$2,000	N/A	$2,000

Advantages	Disadvantages
1. Will reduce energy usage for less than full load occupancy. 2. Will encourage multi-use occupancy.	1. Controls are more complicated.

Proposal Description

VE Team's Understanding of the Current Design Concept:
The current design includes unoccupied usage, but does not encourage it.

VE Team's Proposal:

Configure the controls to allow for separate usage of the separate dining rooms. Provide occupied and un-occupied switch in each dining area. This will reduce energy usage at part load times and encourage multi-use of the space.

Discussion of Proposal and Design Condition Assumptions

Use Separate HVAC Zones for dining areas to reduce energy when one zone is not in use. This is for the 2600 soldier dining facility one story and also for the two story facility.

This proposal directly addresses part load use of the dining facility and multi-use of the dining area. At part load conditions, this proposal will save energy and encourage other usage of the facility. Multi-use of the facility will increase the efficiency of operation because the building will be put to good use when it would otherwise be under utilized.

Calculations – Initial Capital Cost

Current Design Concept:

Assume usage without zoning control at 2 hr per day. ($1.2/Therm and $.08/kWhr)	$3,000
	$
Subtotal	**$3,000**

Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$1,200
Total	$4,200
Total, Rounded	**$4,000**

Value Engineering Team's Proposal:

Assume usage with zoning control at 1 hr per day. ($1.2/Therm and $.08/kW hr)	$1,500
	$0
	$
Subtotal	**$1,500**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$600
Total	$2,100
Total, Rounded	**$2,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$2,000**

Calculations – Future Cost

No significant difference in maintenance cost is expected.

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal for further consideration because it will reduce the cost of operation at low patron loads and it will encourage the use of the dining room for other purposes.

Value Engineering Proposal No. M-7

Use 1/8 Gallon Flush Urinals instead of waterless urinals

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$0	N/A	$0

Advantages	Disadvantages
1. Will reduce maintenance effort for the urinals. 2. Will increase user acceptance. 3. Still helps qualify for LEED credit for reduction in water consumption. 4. Same approximate cost.	1. Perception that LEED credit is reduced.

Proposal Description

VE Team's Understanding of the Current Design Concept:

The documents show waterless urinals for the restrooms.

VE Team's Proposal:

Eliminate the waterless urinals and replace them with 1/8 gallon flush urinals. Waterless urinals are a maintenance problem and they produce odors. In recent surveys of users, waterless urinals have received negative input.

Discussion of Proposal and Design Condition Assumptions

This is for all the 500 soldier dining facility. The other facilities are similar.

Waterless urinals require constant maintenance with clean out and fluid replacement required. Waterless urinals are used go gain a LEED point, the 1/8 gallon flush provides the LEED point and functions as a normal valved and flushed urinal.

Calculations – Initial Capital Cost

Current Design Concept:

Waterless urinals – 2 in the design.	$2,000
Maintenance in addition to piped and valved urinal- cost per year.	$2,500

Water and chemical cost per year.	$ 50
	$
Subtotal	**$4,550**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$1,820
Total	$6,370
Total, Rounded	**$6,000**

Value Engineering Team's Proposal:

Piped and Valved Urinal	$2,000
Maintenance for urinals.	$2,500
Water cost per year (not chemical cost).	$50
Subtotal	**$4,500**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$1,800
Total	$6,300
Total, Rounded	**$6.000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$0**

Calculations – Future Cost

Reduces maintenance costs.

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal for further consideration because it provides the same LEED point with greater user acceptance.

Value Engineering Proposal No. M-8

Use Instantaneous Electric Water Heaters at the lavatories in the restrooms

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$1,000	N/A	$1,000

Advantages	Disadvantages
1. Will reduce cost of piping. 2. Will reduce cost of stored water.	1. Some electrical required.

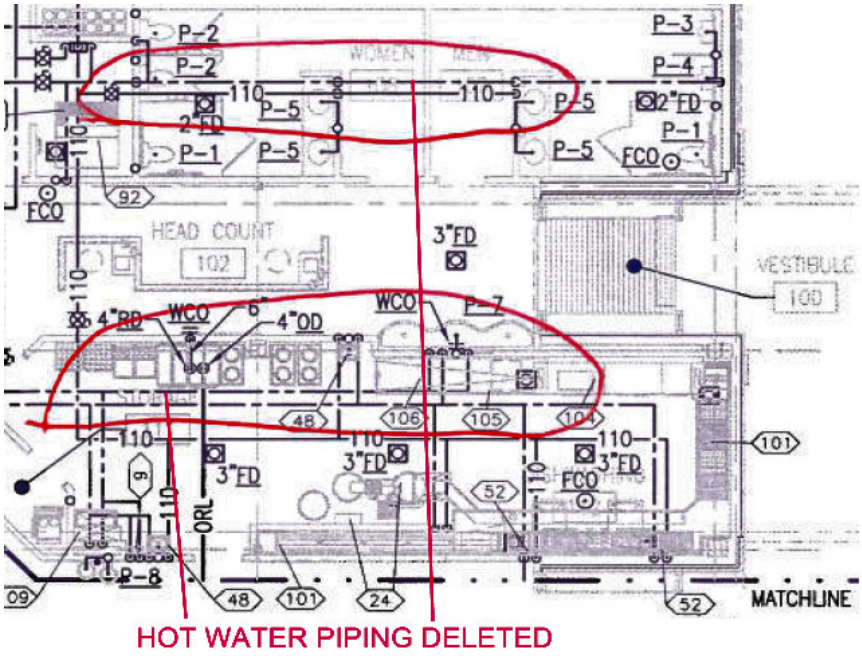
Proposal Description

VE Team's Understanding of the Current Design Concept:

Drawing PL103 shows 110 F hot water piped to the lavatories in the restrooms and for the hand wash at the entry. This is for the 800 soldier dining facility. The other units are similar.

VE Team's Proposal:

Use Instantaneous Electric HW units for the lavatories in the restrooms. Use Instantaneous Electric Water Heaters for entry hand wash. This will eliminate piping and reduce the amount of hot water to be stored.



Discussion of Proposal and Design Condition Assumptions

This is for all the 800 soldier dining facility. The other facilities are similar.

This will eliminate 150 feet of piping and reduce the amount of hot water to be stored by a small amount. No water storage is required for the Instantaneous Water Heaters.

Calculations – Initial Capital Cost

Current Design Concept:

150 ft hot water piping ($13/foot)	$1,950
150 ft hot water pipe insulation. ($5/foot)	$750
	$
Subtotal	**$2,700**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$1,080
Total	$4,860
Total, Rounded	**$5,000**

Value Engineering Team's Proposal:

Lavatory water heater IEWH (Instant Electric Water Heater) (2 required)	$1,000
Hand wash IEWH – one required	$900
Electrical	$500
Subtotal	**$2,400**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	$960
Total	$3,360
Total, Rounded	**$4,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$1000**

Calculations – Future Cost

N/A

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal for further consideration because it provides water at the point of use and reduces hot water piping and reduces the amount of stored hot water.

Value Engineering Proposal No. M-9

Delete Shower in 500 & 800 Meal Facility

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$4,500	$4,500	$9,000

Advantages	Disadvantages
1. Gain valuable and needed space for field feeding 2. Cost Savings 3. Better utilization of space 4. Eliminates need to clean shower room	1. Loss of shower if you have staff that needs to shower at work (bikers, joggers, etc.)

Proposal Description

VE Team's Understanding of the Current Design Concept:

Current 500-800 meal facility provides a single shower space to obtain a LEED point.

VE Team's Proposal:

Delete shower from kitchen staff locker room. The 500-800 facility is short on space, especially for the field feeding function. Reallocating this space to other functions is warranted when the probable shower use frequency is very low.

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal for further consideration if there is another way to get the LEED point, since these showers are probably rarely used.

Value Engineering Proposal No. M-10

Proposal Title

Use Polyethylene Tubing (PEX) instead of copper piping for pipe sizes one inch and less for water service.

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$11,000	N/A	$11,000

Advantages	Disadvantages
1. Will reduce first cost for piping material. 2. Will reduce installation cost for piping.	1. PEX is not as rugged as copper pipe, will need to install to reduce incidence of physical damage.

Proposal Description

VE Team's Understanding of the Current Design Concept:

The documents show copper piping for water in small sizes.

VE Team's Proposal:

Use PEX tubing instead of copper piping for piping sizes one inch and less for water service. Refer to the attached 800 solder facility drawing PL 103 for reference.

Discussion of Proposal and Design Condition Assumptions

The cost analysis below is for the 800 soldier dining facility. Other facilities will be similar. Cost savings will be repeated for each facility. The estimate for the current design shows 2,500 LF of copper piping one inch or less for a total direct cost of $15,500. This is an average of the line items below from the cost estimate provided with the prototype design. Note that this does not include tees, elbows, or insulation, which would not affect the cost significantly.

Code	Description	Quantity	Unit Cost
22 111 323 21	Pipe, copper, tubing, solder, 1/2" diameter, type L, includes coupling & clevis hanger assembly 10' O.C.	1,379.62 L.F.	$5.21/LF
22 111 323 21	Pipe, copper, tubing, solder, 3/4" diameter, type L, includes coupling & clevis hanger	820.23 L.F.	$6.64/LF

	assembly 10' O.C.		
22 111 323 22	Pipe, copper, tubing, solder, 1" diameter, type L, includes coupling & clevis hanger assembly 10' O.C.	282.98 L.F.	$8.62/LF

Calculations – Initial Capital Cost

Current Design Concept:

Linear feet of copper water piping (2500 feet) hot and cold for pipe one inch and less.	$15,500
Installation of copper water piping for hot and cold lines for one inch pipe and less.	
Assume pipe insulation is not a factor in the comparison of PEX and copper.	
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	**$6,000**
Total, Rounded	**$21,500**

Value Engineering Team's Proposal:

Linear feet of PEX tubing (2500 feet) for water in sizes one inch and less.	$7,500
Installation of PEX tubing for water in sizes one inch and less.	
Assume pipe insulation is not a factor in the comparison of PEX and copper.	
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	3,000
Total, Rounded	**$10,500**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$11,000**

Calculations – Future Cost

No significant differences are expected in maintenance or replacement costs.

Value Engineering Team Recommendation

The Value Engineering team recommends this proposal for further consideration because it provides lower first cost and lower installation cost.

Value Engineering Proposal No. E-1

Use communications closet in lieu of communications room

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$20,000	0	$20,000

Advantages	Disadvantages
1. Save on floor space and related construction 2. Save on HVAC equipment and installation 3. Save on electrical installation and energy	1. Does not follow Owner's requirements and standards for communication rooms.

Proposal Description

VE Team's Understanding of the Current Design Concept:

Telecommunication room size is 8'-10" X 11'-8. This follows general and standard requirements for communication rooms' sizes for Owner.

VE Team's Proposal:

Provide (1) 8'-00" W x 4'-00" Depth, with height from the floor to ceiling structure telecommunication closet with double leaf doors opening 120 degrees each.

Discussion of Proposal and Design Condition Assumptions

Proposed space required for telecommunication equipment for such facility is too large for the type and number of equipment being installed in this room.

Standard telecommunication room requires separate and dedicated HVAC system in addition to normal building HVAC system.

Numbers of data, telephone and cable TV outlets for this type of facility are very limited.

Communication equipment required for such facilities are minimal and do not generally has any active components dissipating heat. Therefore, it does not require much ventilation.

Communication equipment required for such facilities are usually mounted on 4'-00" WX 8'-00 plywood back board.

Electrical working space clearance of 3'-00" is required from the face of equipment.

Maintenance, future additions and upgrades needed for this type of facilities are very limited. Therefore minimal access is required after the initial constructions.

Providing communications closet will reduce the size of real estate and related construction costs.

Closet eliminates the need for additional and separate HVAC equipment. Closet can be ventilated by building normal HVAC system.

Closets save costs on construction, HVAC and electrical energy.

Calculations are based on providing an 8′-00″ Width x 4′-00″ Depth X Height (from the floor to ceiling structure) telecommunication closet with double leaf doors (each opening with 120 degrees swing) in lieu of a full size communication room.

Calculations – Initial Capital Cost

Current Design Concept:

100 SF @ $321.74	$32,174
	$
	$
Subtotal	**$32,174**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	INCLUDED
Total	$32,174
Total, Rounded	**$32,000**

Value Engineering Team's Proposal:

36 SF @ $321.74	$11,583
	$
	$
Subtotal	**$11,583**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	INCLUDED
Total	$11,583
Total, Rounded	**$12,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$20,000**

Calculations – Future Cost

N/A – No likely difference in long term performance and maintenance requirements.

Value Engineering Team Recommendation

Provide an 8′-00″ Width x 4′-00″ Depth X Height (from the floor to ceiling structure) telecommunication closet with double leaf doors (each opening with 120 degrees swing) in lieu of a full size communication room.

Value Engineering Proposal No. E-2

Use LED lighting in Dining Areas

Cost Saving (Increase)

Initial Saving (Increase): +	Future Saving (Increase) Present Worth Basis =	Net Life Cycle Saving (Increase):
$(6,000)	$15,000	$9,000

Advantages	Disadvantages
1. Lower power consumption than fluorescent. 2. Longer life of light source 3. Lower maintenance 4. Reduced cooling costs due to higher efficiency and lower heat production.	1. New technology 2. Higher first cost

Proposal Description

VE Team's Understanding of the Current Design Concept:

Current design calls for use of standard lighting fixtures (fluorescent & incandescent) in dining areas.

VE Team's Proposal:

Use LED lighting in Dining Areas. New technology LED light fixtures are now available from CREE that are of a "can" or 2x2 lay-in configuration. These fixtures provide a better light spectrum than either incandescent or fluorescent lights, use 85% less energy, do not contain mercury, and have an average live of approximately 50,000 hours between luminaire changes. One private sector application is shown below:

Calculations – Operating Cost

Current Design Concept:

Power Consumption 30 fixtures @ 0.08/day x 365 x 20 years	$17,520
	$
Subtotal	**$17,520**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	INCLUDED
Total	$17,520
Total, Rounded	**$18,000**

Value Engineering Team's Proposal:

Power Consumption 30 LED fixtures @ 0.01/day x 365 x 20 years	$2,628
	$
Subtotal	**$2,628**
Markup, 40% (for Mobilization @ 10%, Construction Engineering & Inspection @ 15%, and Contingency @ 15%)	INCLUDED
Total	$2,628
Total, Rounded	**$3,000**

Net Initial Capital Cost Saving (Increase):

Current Design Cost – VE Cost: $ # from above - $ # from above =	**$15,000**

Calculations – Initial Cost

Assumed a premium cost of $200 per fixture over standard fixtures to purchase LED 2x2 lay-in fixture.

30 x $200 = $6,000

Value Engineering Team Recommendation

The Value Engineering team recommends this suggestion for further consideration.

Value Engineering Suggestions

Building Footprint and Program

P-1 Out-source Food Preparation

Out-source the food preparation for the facility. Eliminate the kitchen, reduce the foot print and cater the food service. Commercial catering firms will be cost efficient and will provide food at many levels of service. This will reduce the cost of the building and eliminate the kitchen and most of the kitchen staff. Using the competition of the commercial market will reduce food service cost. This is a similar idea to the food court facilities that have commercial restraints on several bases.

P-2 Consider Design Facility for Multi-Purpose Use

It is conceivable that this facility can serve other Base purposes other than providing a location for three meals a day. A base is a small community. Although, the kitchen may have activity all day, it is doubtful the seating area will be occupied all day. This comment is especially true for the 1300 and 2600 Training Food Facility where the eating function is not done at leisure. Therefore, consideration should be given to providing additional storage closets where other groups using the space during the day and after dinner can store group items. This would give greater value to the money expanded for this facility.

P-3 Consider Integrating Facility as an Addition or Adaptive Reuse of another Existing Building

The prototype is for "green" field sites. Sustainability and LEED implies utilization of existing resources and the cost efficiency of not creating another stand alone building with four exterior walls. Cost reduction can be obtained by analyzing options on any given base. This prototype should address the possibility of adding it to an existing structure or reusing a portion of an existing structure, perhaps to house seating. .. This possibility should be examined per situation before utilizing the prototype as basis for designing a new dining facility.

P-4 Emphasize that VE will still be required on site-adapted features, i.e., skin assemblies, roof structures, and AT/FP requirements

The prototype plans include a note that the project data information is site-specific for Fort Benning, GA, to establish design assumptions for structural, architectural, mechanical, plumbing and electrical disciplines, and that the site adapt AE shall site adapt the prototype design "as required and coordinate all design and code requirements for all design disciplines per site location." Since the exterior skin, structure, and mechanical and electrical systems, as well as the site design are not pinned down by this prototype design, there are still several areas of opportunity for value engineering savings to be mined. This needs to be flagged for the attention of the project manager and value engineering officer of

the USACE Districts which will be site-adapting these designs in order to program for a study at the appropriate time per ER 11-1-321.

P-5 Include note with design package that "green cleaning products" will have to be well-documented in order to claim LEED point.

In order to document a Green Housekeeping Innovation program, the project team must provide:

- A contractual or procedural requirement for operations staff to comply with the guidelines, including a written program for training and implementation,
- A clear set of acceptable performance level standards by which to measure progress or achievement, and
- Documentation of the program's housekeeping policies and environmental cleaning solution specifications, including
- A list of approved and prohibited chemicals and practices.

Architectural

A-1 Relocate Room # 134 (FIELD FEED)

The circulation flow from the Loading Dock Space #131 is critical for the receiving of food supplies. The major circulation of goods will be coming into the facility. However, the Field Feeding space # 134 will be a staging space for prepared foods leaving the facility via the Loading Dock. In order to streamline circulation in Receiving Room 129, it is suggested that the Field Feed space be moved adjacent to Space 128 "Produce Refrigeration". The Loading dock would move to the east and the Can Wash Room132 and Command Room 145 would move down into the space vacated by the Field Feed. Figure 1 shows current arrangement for 800 PP facility; 500 PP facility is identical. Figure 2 shows current arrangement for 2600 AIT facility. See Figure 3 below for proposed solution for 500 PP and 800 PP facilities.

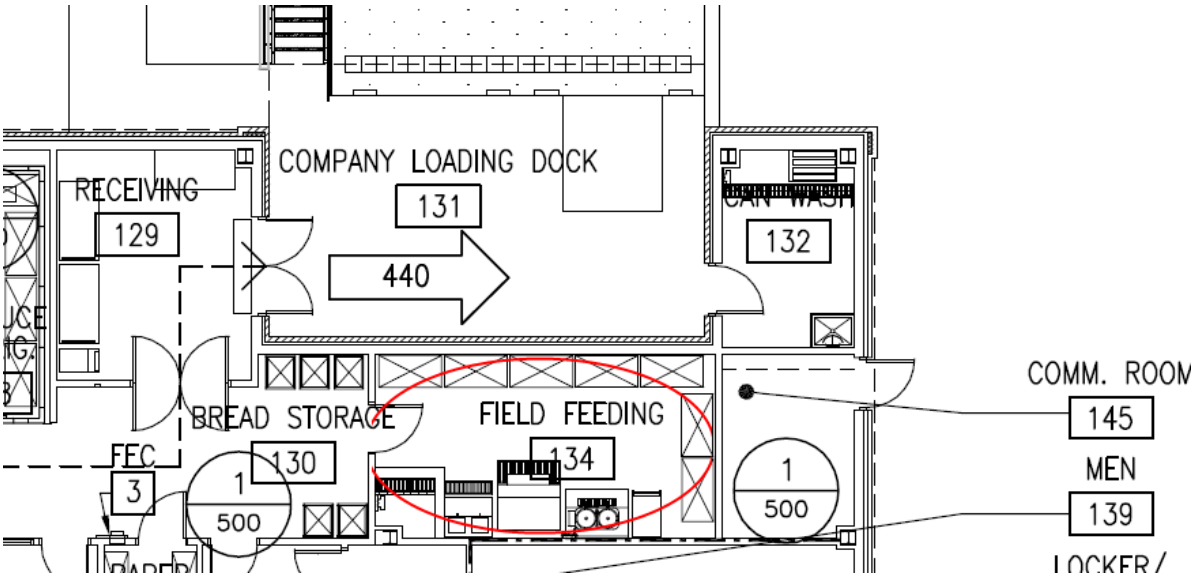


FIGURE 1: CURRENT FIELD FEED LOCATION FOR 500/800 PP FACILITY

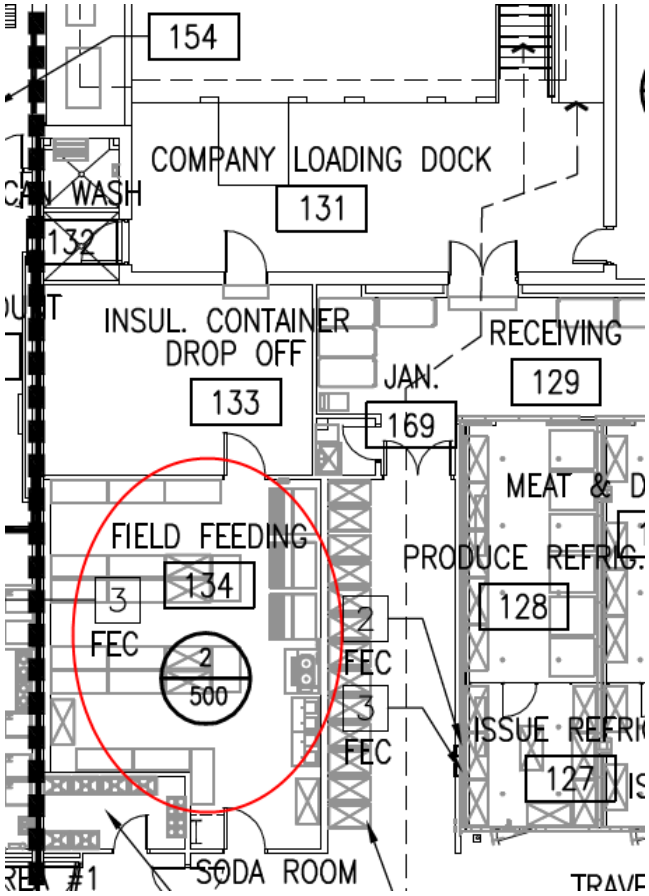


FIGURE 2: CURRENT FIELD FEED LOCATION FOR 2600 AIT FACILITY

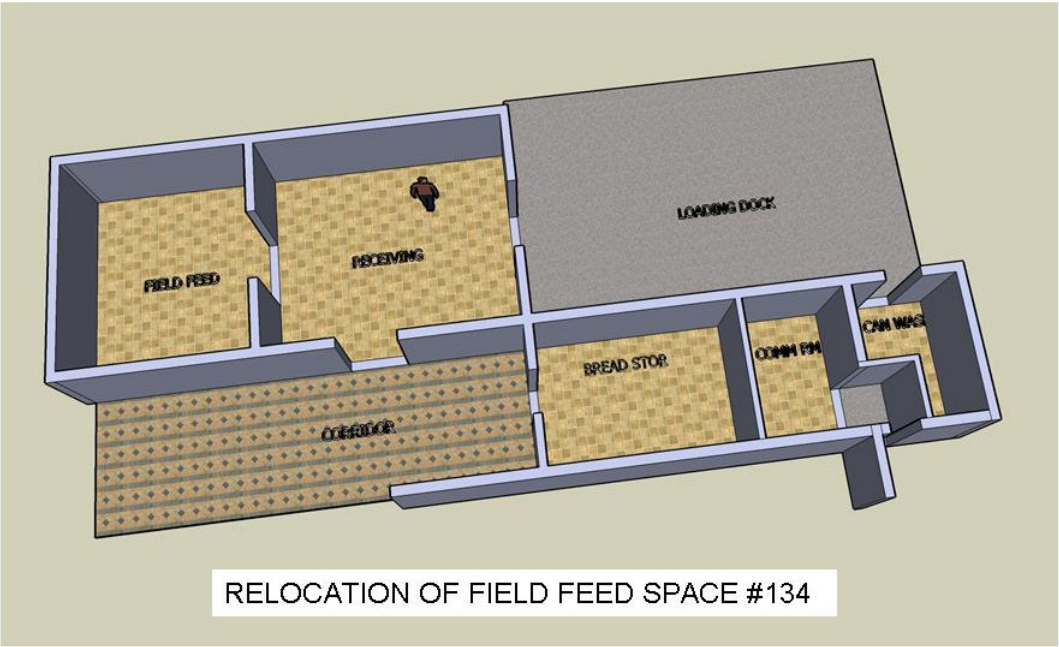
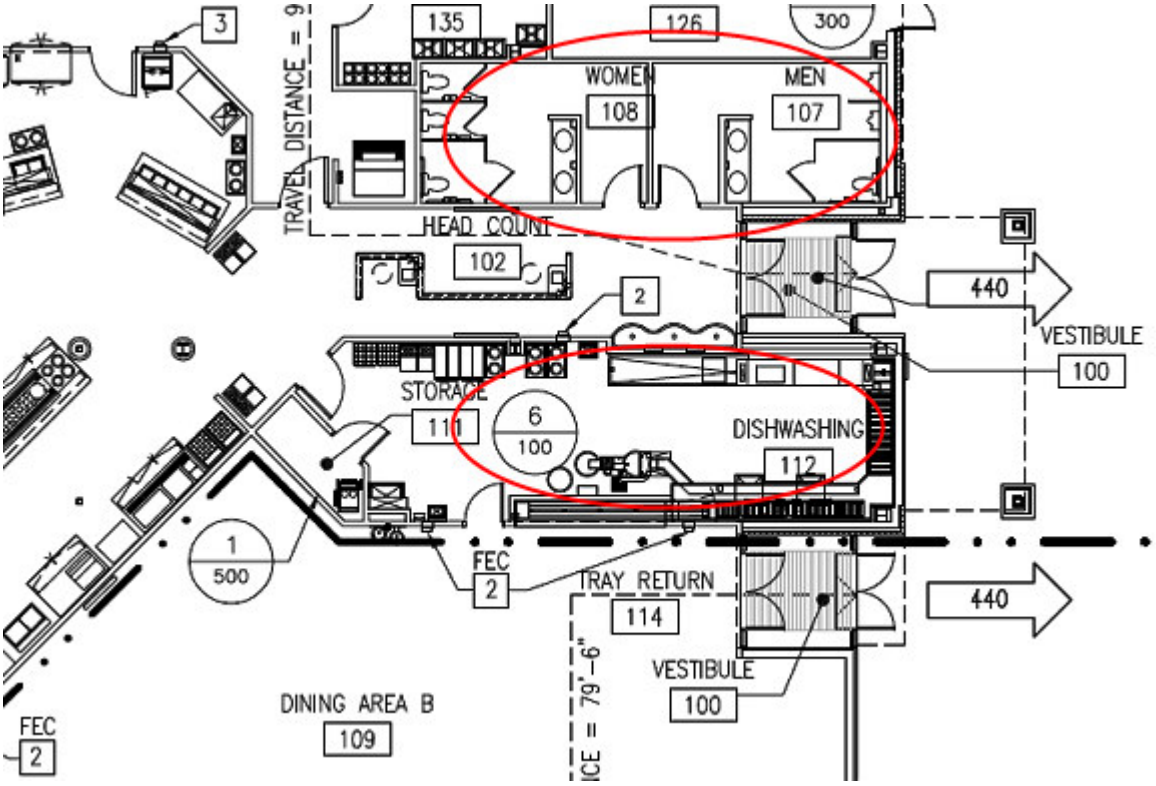


FIGURE 3: PROPOSED RELOCATION FOR 500/800 PP FACILITY

A-2 Provide Access to Restrooms in Prototype 500 and 800 Dining Facilities

Consideration should be given to relocating the Dishwashing Space #112 in such a way that access to the Restrooms can be provided from the sitting area. As shown in the drawing below, a diner would have to travel through the servery in order to reach the entrance of the restrooms which is west of the entry doors in Vestibule Space #100. If a small corridor or door could be located between the Dining Areas and the Vestibules, a diner could also use the restrooms after he has eaten.



A-3 Provide narrative for LEED Checklist as Part of Prototype Building Information Packages

In reviewing the LEED checklist as documented in the prototype documents, current checklist lists points taken which have no documented basis. It has been discussed that the prototype is not site plan specific, climate specific or building envelope specific. It would be more consistent to list only points which are presented in the documents and leave the remainder of the points to be achieved to the bidder or proposer. The LEED worksheet developed for the prototype design is attached at the end of this report. Some cells have been highlighted under the column "Taken" which should be moved into the "Maybe" column, especially since some of them require action by the installation where the dining facility will be built.

A-4 Allow Polyisocyanurate for Building Insulation

Polyisocyanurate Insulation has a high R-value per inch thickness. It has not been included in the specifications for rigid insulation with polystyrene and mineral board. It is

mentioned as part of Recycled content. It should be included as an option for roof and/or wall insulation.

A-5 Consider Use of Exterior Sun Shades and other Exterior Window Shading Devices

Depending on the climate and geography of the location of future Dining Facilities, exterior sun screens may be applicable where the level or normal sun is very strong and it is more valuable to benefit the HVAC loads of the project to keep sun radiation away from glazing surfaces. These sun screens can be fixed, manually operated or electrically operated. Sun screening can come in the form of awnings, shutters or blinds. This application is more pertinent to the south, east and west elevations where strong light which is present and portions can be refracted away from the exterior glazing. The remaining level of light which still contacts the windows will maintain the level of natural light required for functions and comfort of occupants while lowering thermal heat gain through the glazing. Furthermore, the sun screen may allow the glazing assembly to be less expensive in the affected windows. This is not expected to detract from the LEED recommendation for natural daylighting, and should help lower the air conditioning load.

A-6 Conversion to 12"Meal Tray

Military specified serving tray is 14" deep which mandates a deeper table and in turn requires more square footage and larger table width. Consideration should be given to using smaller trays on the basis that beverages are distributed in the table area rather than in the Servery in the 1500 and 2600 occupancy prototypes.

A-7 Acoustical Wall Treatment

Although the specifications have a section on acoustical wall treatment., prototype should include acoustical design criteria. Certain geometries and hard materials can create reverb which can affect the quality of interior spaces.

A-8 Varied Height of Light Fixtures

Quality of an interior space derives from many sources. One way to create a sense of place in a rectangular space with a constant height ceiling and simple wall finishes is to vary the height of light sources in coordination with furniture and activity locations. The same type of light at ceiling height, suspended below the ceiling or attached to wall can create uneven distribution and light patterns in the space. This adds a perceptional dynamic that is not found in a uniformly lit space of ceiling mounted light fixtures. Prototype should take advantage of these possibilities in lighting table height, bar height and standing height furniture groupings in the prototypes.

A-9 Use of Certified Structural Wood

Consideration should be given to the possibility of using structural wood in the dining portions of the facilities as a way to establish an exposed structure which is also aesthetic. The excerpt below from TB Med 530 allows exposed joists and rafters in areas outside of food establishment operations, which refers to food preparation and serving areas.

Using certified wood for the structure would also increase the opportunity for harvesting LEED points because the prototype shown does not use either an exposed structure ceiling in the dining spaces or a great quantity of certified wood. It will also add a dramatic ambience to the dining experience similar to many private sector restaurants, helping morale.

Section III. WALLS AND CEILINGS

6-9. Construction

a. Walls and ceiling (including doors, windows, skylights, and similar closures) of all areas where FOOD ESTABLISHMENT operations are conducted (including walk-in refrigeration units, EMPLOYEES' dressing and locker areas, toilet rooms, vestibules, and other similar areas) WILL be designed, constructed, and installed so they are—

(1) SMOOTH with SMOOTH junctures.
(2) Nonabsorbent.
(3) Durable.
(4) Light-colored.
(5) EASILY CLEANABLE (such as quarry tile, SEALED ceramic tile, or other APPROVED material).

b. Binding cement, mortar, or grout (epoxy) jointed materials WILL be waterproof, grease proof, and erosion resistant.

c. Gypsum wallboard or similar pervious material WILL not be used—

(1) On steel studs in FOOD preparation, serving, storage, SELF-SERVICING AREAS; WAREWASHING and pot and pan washing areas; toilet areas; or other areas subject to water damage or high humidity.
(2) In areas used by mobile FOOD service EQUIPMENT.

d. Water-resistant gypsum wallboard protected by a cement backerboard or green board and ceramic tile may be used to sheath stud walls.

e. Except in areas used only for dry storage, concrete, porous blocks, or bricks used for indoor wall construction WILL be finished and SEALED to provide a SMOOTH, nonabsorbent, EASILY CLEANABLE surface.

f. Acoustical materials used in areas exposed to grease or high humidity WILL be constructed and installed to provide a reasonably nonabsorbent, EASILY CLEANABLE surface. These materials require periodic replacement to maintain sanitary standards.

g. Exposed corners of glazed structural units, concrete masonry unit partitions, and columns subject to damage from portable FOOD service EQUIPMENT SHALL be protected through use of corner protective guards. These guards SHOULD extend at least 72 in (180 cm) above the finished floor.

6-10. Maintenance

Maintain walls and ceilings, including doors, windows, skylights, and similar closures, in good repair. Asbestos material WILL be handled per TB MED 513.

6-11. Exposed Construction

Studs, joists, and rafters, or other unfinished building materials WILL not be exposed. However, if exposed in areas outside the FOOD ESTABLISHMENT operations (including walk-in refrigeration units, EMPLOYEES' dressing and locker areas, toilet rooms, vestibules, and other similar rooms or areas), they WILL be finished to provide a SMOOTH, EASILY CLEANABLE surface.

6-12. Attachments

Light fixtures, vent covers, wall-mounted fans, poster boards, blackboards, decorative materials, and similar EQUIPMENT attached to walls and ceilings WILL be—

a. EASILY CLEANABLE.
b. Maintained in good repair.
c. Mounted so as to minimize vermin harborage or entrance to the unit.

EXCERPT FROM TB MED 530:
OCCUPATIONAL AND ENVIRONMENTAL HEALTH
FOOD SANITATION, 30 OCTOBER 2002

A-10 Heat Island Affect LEED Point SS 7.2

The LEED worksheet attached in Appendix E shows a point taken under Sustainable Sites 7.2, indicating that 30% of the roof footprint of the building will have low emissivity roofing. With the mansard construction shown on the plans and equipment mounted on the roof top, analysis should be done to see if the point can be readily obtained. Another option

would be to locate equipment on grade; however, this is part of site-adaptation, and it is usually discouraged for AT/FP reasons, and it is less efficient.

A-11 Operable Windows in the Clerestory

Operable windows are often encouraged under sustainable design to improve indoor air quality (IAQ) and to provide ventilation in the event of a blackout. However, they are discouraged in this application because they would present a risk of leakage, could allow pests to intrude if screens are torn, and they would be difficult to clean, which is a greater concern than fixed windows or translucent panels would present.

A-12 Eliminate gaps between serving stations

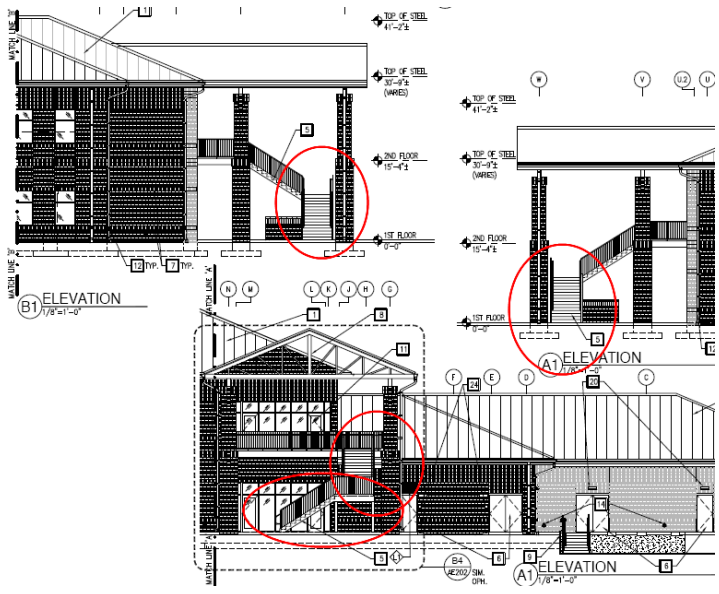
In the facilities of lower occupancy where the servery stations are disconnected, suggestion is made that lift-up gates incorporating tray rail or similar barriers be designed so that dinners crowding each station do not stand in the openings between stations while waiting to place orders or receive orders. Diners infringing into back of the Servery areas can disrupt normal operation of the facility.

A-13 Improve Circulation Between Kitchen and Servery (first floor-2600 Prototype)

The First Floor Plan on the two-story 2600 Soldier Facility shows some constriction of circulation due to the location of the elevators. Since the connection between Servery and the Kitchen is so functionally important, one door does not meet meal time traffic. See attached drawing.

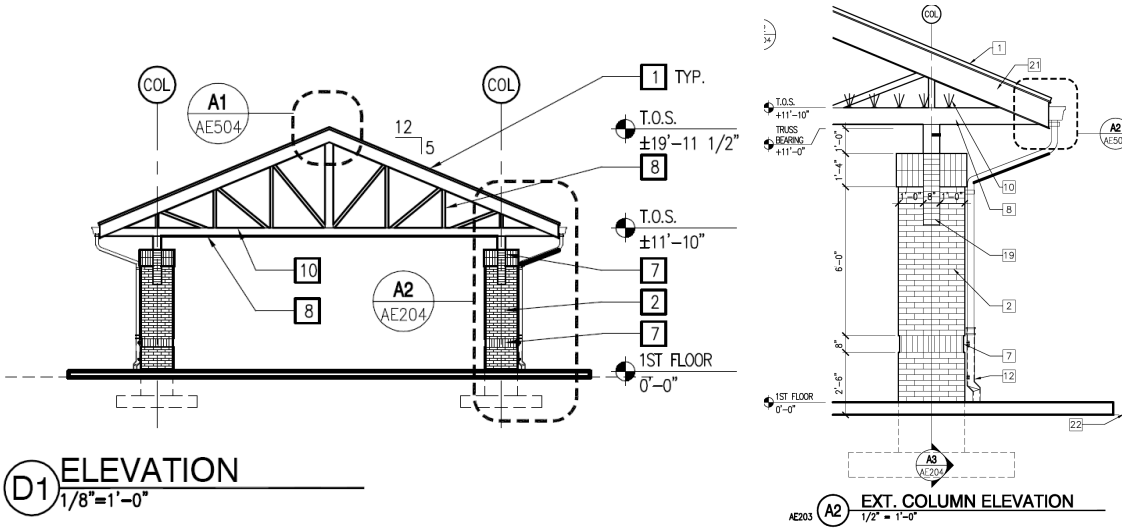
A-14 Relocate or shield exterior stairs on two-story facility to avoid wind-driven rain

The exterior stairs from the queuing area to the second story dining areas are protected only from strictly vertical rain. It is suggested to relocate the stairs or put up a screen to protect the troops climbing potentially wet stairs.



A-15 Add soffit or screening to prevent bird roosting under canopy

While the details of the framing for the canopy indicates placement of 7" ledge stainless steel bird spikes, diagonal members still present opportunities for bird roosting, which would be a nuisance to soldiers waiting for meals. It is suggested to use soffits, screening or an alternative non-truss frame to eliminate this.



A-16 Identify safe spaces for emergencies (tornado, earthquake)

Since these facilities may be occupied by a large number of people during unexpected emergencies, consideration should be given to the spaces which could be designated by the site adapt AE as safe spaces for tornados, earthquakes, or other local concerns.

A-17 Confirm that enough wooden doors are being used to count LEED point per spreadsheet

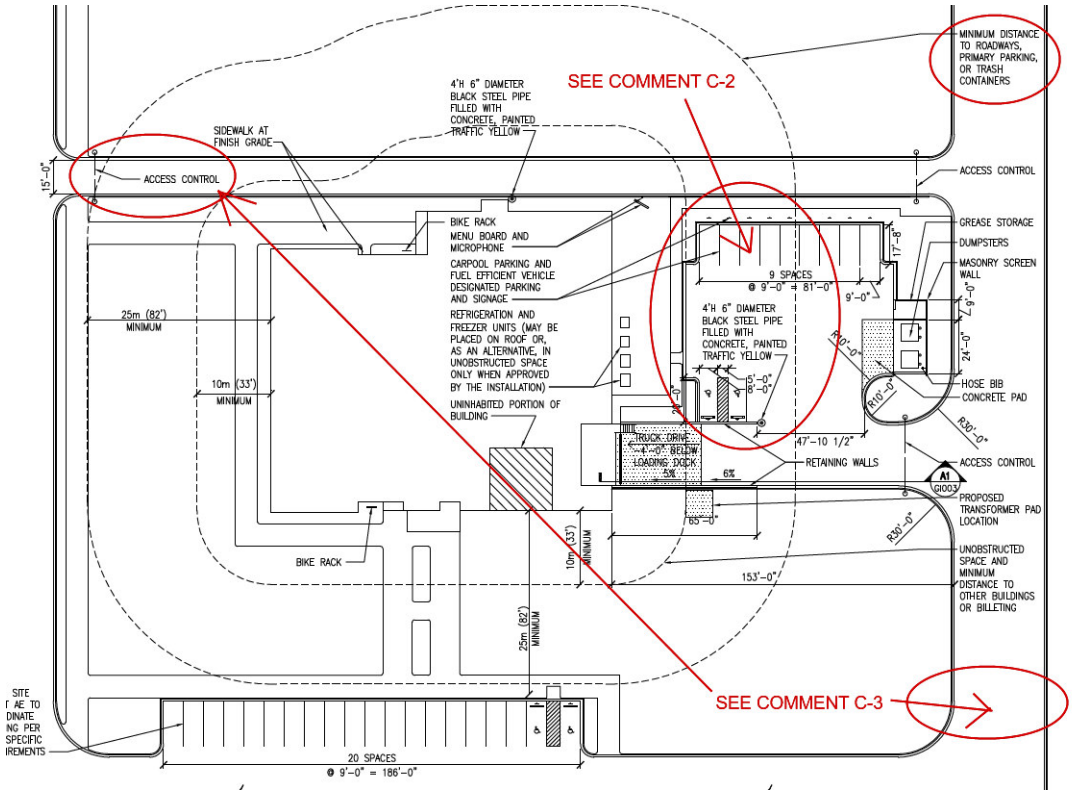
The U.S. Green Building Council (USGBC) has proposed a major change for certified wood in its LEED Rating System. Previously, LEED awarded credit to projects that used wood certified to the standards of the Forest Stewardship Council (FSC) for at least half of their wood-based materials. Now, USGBC has broadened the credit, recognizing any forest-certification program that meets its criteria. However, it is not clear whether there is a minimum amount of new wood being used on the project for this standard to be utilized as a metric.

Site Civil/Infrastructure/ Landscaping

C-1 Prohibit any parking within 82' of building

While the parking areas may be considered outside the scope of the prototype design, the detail below from the plans for the 800 PP dining facility (which also applies to the 500 PP facility) shows parking spaces for employees inside the minimum setback distance per AT/FP criteria. While this requirement may not be applicable at all locations, it may be

misleading to show this detail on the prototype. The plans for the 1300 AIT facility show parking for staff, but outside the 82' perimeter.



C-2 Provide access control gates at both ends of drive-through lane

While the parking areas may be considered outside the scope of the prototype design, the detail above shows an access gate at the entrance to the drive-through lane, but not at the other end. If access gates are going to be used, they should be used at both potential entrances.

C-3 Use permeable pavement for parking areas

While the parking areas are outside the scope of the prototype design, it is still suggested that permeable pavement could be used for any parking areas to be built with future site adaptations in order to reduce storm water runoff, as recommended by the EPA at the following link: http://www.epa.gov/owow/nps/pavements.pdf. Storm water management is an important way to pick up more LEED points.

Structural

S-1 Specify Polyethylene Vapor Retarders

The following specification lists attributes and product manufacturers of vapor retarder found to be a better in cast-in-place slab installation. This material resists perforation which causes the retarder to fail and become ineffective. It is suggested that this material be added to the specification section for Cast-In-Place Concrete.

High-strength Kraft paper, laminated with bi-directional glass reinforcing fibers, with polyethylene coating on both surfaces:

Weight: 4.2 pounds per 100 square feet.
Permeability Value: 0.10 in accordance with ASTM E96, Procedure A.
Water Resistance: 76 hours minimum in accordance with ASTM D779.
Dry Tensile Strength (Pounds per 1-inch Width): MD 75 and CMD 35.
Wet Tensile Strength (psi): MD 5,000 psi and CMD 2,800 psi in accordance with ASTM D828.
Puncture Resistance: 120 beach units.

Manufacturers and Products:

Fortifiber Corp.; Moistop Underslab.
Reef Industries, Inc.; Griffolyn-65G.

Ancillary Materials:

Fasteners, Tape, Adhesive, or Sealant as recommended by vapor retarder manufacturer.

S-2 Use of epoxy anchors in lieu of cast-in-place anchors

Due to the fact that in general the structures are low rise and have small loadings, it might be cost effective, and save time, especially during construction, to use epoxy anchors (like the Hilti-Hit RE-500) in lieu of the cast-in place anchors for the column bases that are shown on the drawings. Obviously due consideration should be given to the quality control requirements for the installation of the epoxy anchors (i.e. install per manufacturer's recommendations) and design loading requirements.

S-3 Use more consistency of sizes for structural members

The structural drawings include a large variety of structural shapes. While the amount of steel may have optimized during design, it is suggested that using less variety could allow the contractor to economize through bulk purchase and reduce the risk of workers using the wrong sizes.

Plumbing, Heating, Ventilation, and Air Conditioning

M-1 Use Ceiling Fans under Queue Line Canopies outside the Buildings

Depending on geographic or climate locations of the proposed use of the prototype, use of exterior rated ceiling fans would be an additional user comfort companion to the exterior canopies which are used as assembly areas in preparation to entering the servery lines inside the building for 1300 and 2600 soldiers.

M-2 Capture Rainwater for Urinal Use and for Can Washing

Capture rainwater for use in flushing urinals and for can wash. This can be done by connecting the down spouts to a holding tank with domestic pumping station to the required fixtures. A backflow preventer will be needed to prevent cross contamination. This will conserve water and provide a LEED point.

M-3 Recover waste heat from dishwashing for use other places.

Recover the heat from dishwashing using a heat exchanger for use elsewhere in the building. This can be done with a heat exchanger pumped on sides, one for waste dishwasher water and one for the building hot water. The heat could be used for preheat for hot water for the kitchen, or for make up air pre-heating. It could also be used as preheating for hand washing. The recovered heat can be used for ice melting on ramps and queuing areas. This will save energy and will provide a LEED point.

M-4 Use non-electric solar hot water heating.

Solar water heating units can be mounted on the roof and used to supplement the hot water requirement for the building. Solar water heating can be done direct or indirect, indirect may be the best way for the facility to prevent contamination and to simplify winter operations. The Solar loop is pumped through the collector and a heat exchanger. Building hot water is pumped through the heat exchanger and stored in a holding tank. The building hot water will have supplemental heat to assist the solar heating as needed. This will save cost of heating water and will provide a LEED point.

M-5 Consider Acquiring Green Energy for the Facility.

Consider acquiring a portion of the energy need for the facility as Green Energy. This may increase the cost of energy but will reduce the carbon footprint and provide a LEED point. This is a relatively new idea but is gaining acceptance with local governments and utilities.

Electrical

E-1 Use three phase and higher voltages when possible.

It is recommended to work with kitchen and mechanical equipments' manufacturers when possible to select equipments operating from 3 phase power source instead of single phase and preferably 480V(or higher) instead of 208V. This will provide cost savings on electrical equipment and related installations.

If this dining facility would be used as a protocol for construction of dining facilities overseas, then, it is recommended to provide equivalent drawings and documentations specifying equipment and installations corresponding to operating voltages and frequencies in those countries.

E-2 Prepare and plan for site emergency generator's location.

Connecting outdoors emergency generator(s) to main switchboards or transfer switch(es) requires preplanning. Location of generator(s) and the routing of raceways and wiring between generator(s) and main switchboards within the building need to be identified and planned to avoid future conflicts. Division of responsibilities between building scope (usually to 5 feet from the building shell) and site work and point of interface between these two scopes must be clearly identified.

A dining facility with such high power demands may require more than one standard size emergency generator. Most of military bases have smaller standard size generators available to them. Under slab raceways need to be provided adequately from electrical room and

extended to pull boxes outside the building (or simply be stubbed up at 5-feet from the building shell) for future connection to generator(s) on the pad.

It is recommended to identify the generator pads locations as part of the dining facility construction. The underground conduits, generator termination and connection boxes need to be all identified and located. It maybe advantageous to pull cables all the way to the generator pad, terminate at weather proof backup generator's termination enclosures as part of facility scope and not site scope. Installation of generator pad grounding systems and bounding to building grounding system can be performed as part of facility scope to avoid future unwanted excavations.

To avoid undesired wall penetrations, future installation conflicts and higher costs of fix ups, electrical drawings are recommended to show the generator pads, the required generator sizes, underground and under slab raceways, wire sizes and connections details on plans, electrical one line diagram and details.

E-3 Show more details on power distribution to kitchen and servery area equipment

To provide uniform electrical installations for such dining facilities, standard details of wiring systems and related installation should be developed and included within the construction drawing packages. Servery area equipments requiring power and located not adjacent to room's or area walls present special electrical installation challenges. These types of electrical installations require planning, coordination and specific details identifying routing of raceways from panel boards to servery equipment. Identifying types of proposed raceways, types of terminations and related installation details for typical equipment.

In-floor raceways and floor terminal boxes, ducts installations, finishes and penetrations requires multi-disciplines coordination (with architects for flooring, interior designer for esthetics, structural engineer for installation of raceways in slab or under slab or penetrating through floors and kitchen equipment manufacturer).

It is recommended to provide standard details identifying typical electrical installations for kitchen and servery equipments.

E-4 Show more exterior lighting

Exterior lighting is provided at all exit and emergency exit doors to provide illumination of exit path to the refuge areas during emergency. Usual practice requires these lights to be emergency type fixtures with battery backup kits. Light fixtures shown within this drawing package and shown adjacent to the exit doors are not identified as emergency type. Not all exist doors have such lights either.

Additionally for security purposes, there are usually exterior light fixtures installed on the shell of the building to provide illumination around the building. These lights have not been provided.

Exterior security and emergency lights fixtures are usually controlled manually and/or automatically through photo cells and /or building management system through lighting control panel.

E-5 Show under slab utilities

It is important to identify and plan for utilities entry points to the building. Utilities such as water, electrical, communications and also swage will require under slab conduits and piping installations with entries at specific points within the building. As an example, for electrical systems; adequate under slab conduits are required to bring service feeders into the building, to connect grounding and lightning protection systems to building ground bars, connect switchboards or transfer switches to outdoor generator(s), outdoors area lighting, outdoors irrigation system control, automatic gate control and security, parking lighting and etc.

It is recommended to provide drawings clearly identifying all underground and under slab utilities, point of connection to site utilities with adequate quantities for future expansions.

Agenda for Value Engineering Study
Dining Facility Prototypes

Location: CH2M HILL, INC, Virginia Beach Office
5700 Cleveland Street, Suite 101
Virginia Beach, VA 23462

Monday, December 15, 2008	*Phase 1 – Information*
	VE ORIENTATION MEETING
8:00 a.m. to 8:15 a.m.	INTRODUCTIONS
8:15 a.m. to 8:30 a.m.	OVERVIEW OF AGENDA AND VE STUDY PROCESS - VE Team Leader
8:30 a.m. to 4:00 p.m.	OVERVIEW OF PROJECT
Break, 10:00 to 10:15 a.m.	• Presentation of Project by Clark Nexsen
Lunch, 12:00 to 1:00 p.m.	• UFC 4-722-01 (Dining Facilities)
Break, 2:45 to 3:00 p.m.	• Drawings for five prototypes, specifications, etc.
	• Estimates for five prototypes
	• Relationship between “standard” prototype and Army’s Military Transformation program
	• Design Objectives and Constraints
	• Project Funding/Constraints
	• Scheduling Requirements/Commitments
	• Other Sensitive Issues
	• General Comments
	• Basic Project Assumptions
	• Project Locations (and Installation Design Guides) vs. Prototype Design Restrictions
	• Safety Criteria in Design
	• Construction Phasing/Scheduling/Traffic Control
	• Other Sensitive Issues or Stakeholder Concerns
4:00 p.m. to 5:00 p.m.	TEAM FOCUS QUESTIONS AND ANSWERS
	Review findings of day and assess whether any additional information is needed.

Tuesday, December 16, 2008	*Phase 2 – Function Analysis*
8:00 a.m. to 9:45 a.m.	FUNCTIONAL ANALYSIS
Break, 9:45 to 10:00 a.m.	• Identify significant project functions with opportunities for cost reduction or functional enhancement • Build Function Analysis System Technique (FAST) Diagram • Identify relationship between functions and cost elements • Compare worth/cost to determine value index
	Phase 3 – Speculation
10:00 a.m. to 2:45 p.m. *Lunch from 12:00 to 12:30 p.m.* *Break from 2:45 to 3:00 p.m.*	• Brainstorming
	Phase 4 – Evaluation
3:00 p.m. to 5:00 p.m.	SCREENING OF BRAINSTORMING IDEAS • Key Advantages and Disadvantages of Each Alternative • Are there any Fatal Flaws that Preclude an Alternative? • Are there other Alternatives that Should be Considered? • Select the Most Promising Alternative(s) for Further Ranking and Development • Can idea be quantified as a proposal or is a general observation for the PDT to consider as design proceeds?
Wednesday, December 17, 2008	*Phase 5 – Development*
8:00 a.m. to 5:00 p.m. *Lunch 12:00 to 12:30 p.m.* *Breaks as needed*	DEVELOPMENT • Value Engineering team researches and develops proposals and observations • Advantages, disadvantages, initial and life-cycle cost analyses, illustration of proposals are assembled for report (and for outbrief)

Thursday, December 18, 2008	*Phase 5 – Development – Continued*
8:00 a.m. to 5:00 p.m. *Lunch and breaks as needed*	Team continues work on writing proposals and observations
Friday, December 19, 2008	*Phase 5 – Development – Continued*
8:00 a.m. to 12:00 p.m. *Lunch 12:00 to 1:00 p.m.*	Team completes work on writing proposals and observations, and preparing presentation for outbrief
	Phase 6 – Presentation
1:00 p.m. to 3:00 p.m.	EXECUTIVE SUMMARY PRESENTATION to Corps of Engineers and Design Team *(This Presentation will conclude the Value Engineering Study, with a finished report to be furnished by Jan 12, 2009.)*
Follow-up	*Post-Study – Implementation* *The Implementation Phase will be subsequent to the VE Study. CH2M HILL suggests that a meeting be held with appropriate stakeholders and design team members following review to determine acceptance, rejection, or modification of the VE proposals or recommended alternative, and incorporation into the prototype design as appropriate. CH2M HILL would then follow-up with a final report summarizing the VE Study and the final disposition of the VE proposals. (Note that resolution of each proposal needs to be identified in order for USACE Value Engineering Officer to report VE Study results upward through VERS.)*

DINING FACILITY PROTOTYPES
Value Engineering Workshop December 15-19, 2008

ATTENDEES

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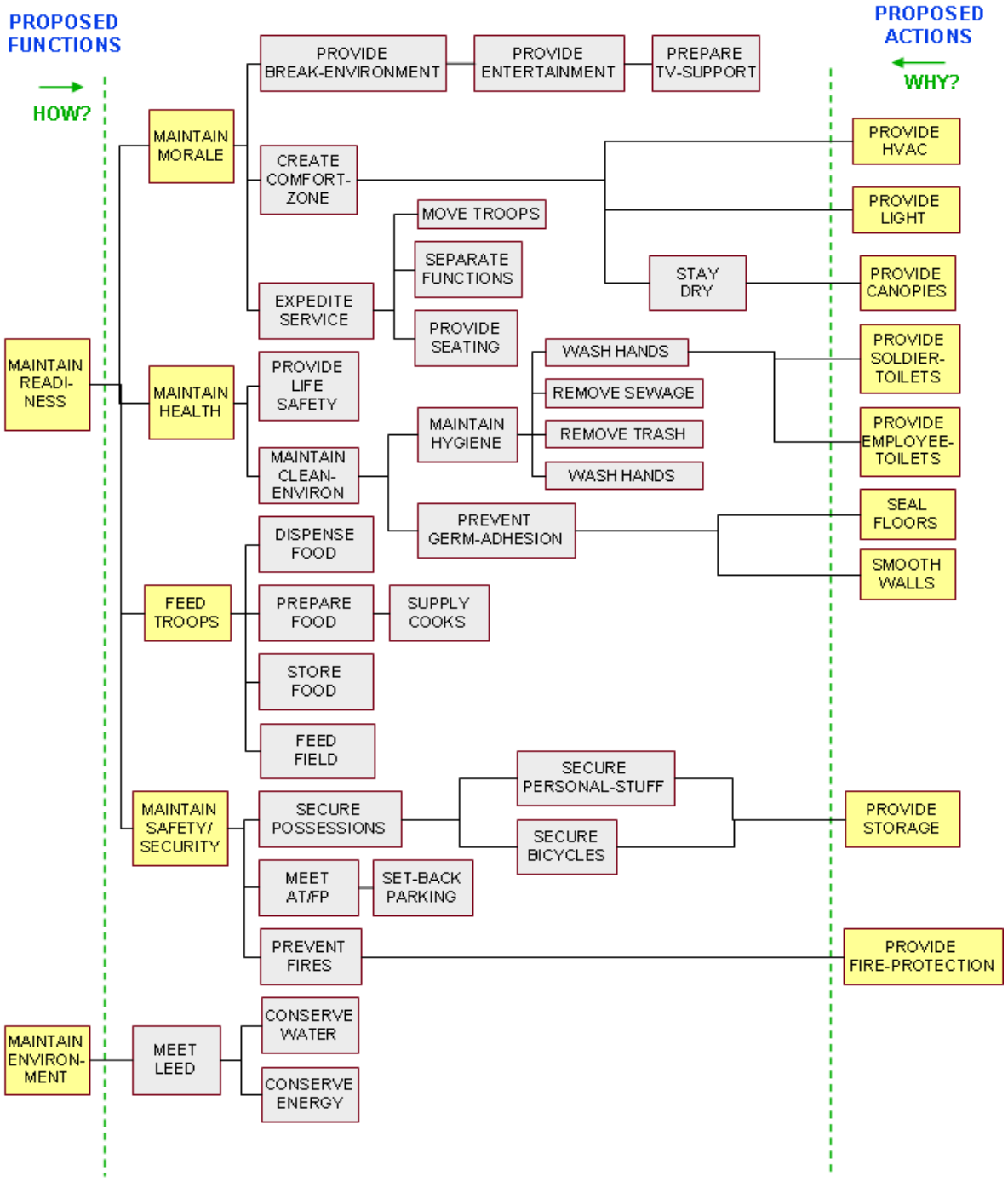
* Value Engineering Team Member


CREATE COMFORT ZONE
Provide Light
Provide HVAC
Provide Beverage Service
Provide Break Environment
PROVIDE ENTERTAINMENT
MAINTAIN MORALE
EXPEDITE SERVICE
Separate Functions
Provide Seating
Make troop
Provide Group Exit
REFILL DRINKS
Provide Condiments
PROVIDE CARRY-OUT SERVICE
ACCOMMODATE DRIVE-THRU
Provide Queue
Conserve Water
Conserve Energy
MAINTAIN ENVIRONMENT
HOW?
STAY DRY
Dispense Food
FEED TROOPS
PREPARE FIELD-FORM
PREPARE FOOD
SERVE FOOD
LIFE SAFETY
PROVIDE POWER/WATER
PROVIDE FUEL PRODUCTS
Maintain Health
REMOVE TRASH
WASH BOOTS
WASH HANDS
ACCOMMODATE PERSONAL HYGIENE
Provide Soldier Toilets
Maintain Facility
Provide Toilet Facilities for Employees
PREVENT GERM ADHESION
PROVIDE CLEAN SURFACES
REMOVE SEWAGE
MAINTAIN SECURITY
SET BACK
RECEIVE FOOD
Employees Handle
WHY?

The following diagram does not include all of the functions shown in the photograph above, but it presents a good snapshot of the diversity of functions the team selected and the relationships between them:

FUNCTION ANALYSIS SYSTEM TECHNIQUE (FAST) DIAGRAM
DINING FACILITY PROTOTYPES



Speculation List

Creativity and Evaluation Phases

The following speculation list includes ideas expressed during the charrette process and also added during a brief free-form brainstorming session. One of the rules practiced during the brainstorming process in Value Engineering is not to criticize other participants' ideas. However, even the ideas gathered during the charrette demonstrated a high level of creativity among the participants from both the various stakeholders and the design team.

During the charrette, many of the ideas proposed were rejected or accepted in whole or part on the spot. However, since these ideas reflected changes to the charrette package presented at the beginning of the two-day session, they are still included in this Value Engineering report as proposed changes. In the chart below, the third column contains one of the following resolution codes. The decisions made during the Evaluation (or Analysis) phase are generally not binding in Value Engineering studies, since the ideas have not yet been developed fully or presented to the design team and stakeholders, however, some of the ideas floated during the charrette are already being implemented into the design since the design team and stakeholders were present.

P	Proposal, Write up in detail
O	Observation; brief paragraph
I	Implemented during Charrette
X	Reject
BD	Being Done Already

Note that the numbers for the speculation list ideas do not match the proposal numbers in the report, since some ideas were rejected, some were developed as observations and others were combined.

Idea No.	Description	P / S / X / BD
1	Delete use of trays	X
2	Use standard size tray	S
3	Step height of roof. Keep flat roof and shield equipment.	P
4	Take equipment off roof - use mechanical room	X
5	Take equipment off roof - use exterior equipment fenced off	X
6	Delete shower	P
7	Use pre-engineered metal structure for troop canopies	P
8	Use fabric structures for troop canopies (http://www.asfi.net/products_canopies.html)	P
9	Integrate canopy structure into structure for building	P
10	Use skylights	P
11	Use solatubes to bring daylighting into serving lines	X
12	Use Kalwal for natural daylighting between parapet and flat roof	X

13	Use revolving doors for 1300 or 2600 soldier AIT	X
14	Use revolving doors for 500-800 PP DF	X
15	Use air curtain at all entrances	BD
16	Delete air curtain everywhere except truck dock	P
17	Eliminate drive-through	X
18	Show drive-through as an option	BD
19	Move field feeding closer to loading dock	S
20	Reduce size of communication room	X
21	Consider green roof	X
22	Maximize use of gas-operated kitchen equipment	BD
23	Use three-phase higher voltage power for kitchen equipment	S
24	Use all-electric kitchen equipment	BD
25	Use fluorescent tube lighting throughout	X
26	Use LED in lieu of halogen lights (Reference Friendly's Restaurants)	S
27	Vary lighting height	S
28	Use dimmable T1 lighting	BD
29	Consider dimmable T1 lighting controlled by ambient controls being counted as "innovative design" under LEED	X
30	Use uniform lighting level	X
31	Use banks of lights in conjunction with ambient lighting controls rather than dimmers	BD
32	Use exposed ceiling structure for dining area (w/34)	S
33	Use fabric ducts with exposed ceiling in dining area	X
34	Use flexible ducts with exposed ceiling in dining area (w/32)	S
35	Use more consistency of sizes for structural members	P
36	Use alternate for quarry tile floor (porcelain tile paver with through color)	BD
37	Relocate short-order cooking station	P
38	Eliminate gaps between serving stations	P
39	Enhance openings between servery and kitchen	P
40	Combine make-up air units	P
41	Reutilize waste heat from dishwashing area	S
42	Capture rainwater for urinal flushing and canwashing	S
43	Consider metal siding for exterior walls	BD
44	Emphasize that VE will still be required on site-adapted features, i.e., skin assemblies and roof structures	S
45	Out-source food preparation (for off-site cooking)	S
46	Provide for emergency power (w/48)	S
47	Design facility for multi-function use	S
48	Prepare site for emergency generator location (size pad and design structural support) (w/46)	S
49	Prohibit any parking within 82' of building	S
50	Provide access control gates at both ends of drive-thru	S
51	Eliminate return air ducts in dining area; use plenum	P
52	Integrate dining facility with other facilities (green design) w/47	S
53	Recover waste heat from dishwashing, food prep for use within building and elsewhere	S
54	Provide dumbwaiters and ADA lift in lieu of elevators	X
55	Eliminate second story	X

56	Use dumbwaiter in place of second elevator	P
57	Relocate elevators	X
58	Eliminate one elevator	P
59	Move bike racks beyond 82' for AT/FP concerns	X
60	Relocate elevator equipment room next to elevators	P
61	Eliminate mansard roof	P
62	Use VCT in place of quarry tile in dining area	X
63	Use stamped, stained and sealed concrete in place of porcelain tile in dining area	X
64	Do NOT use linoleum tile in place of porcelain tile in dining area	S
65	Provide gear racks in dining area	X
66	Pre-wire dining area for use as classrooms (electrical, data)	X
67	Use communication closet in lieu of room	P
68	Use automated operable windows in clerestories	X
69	Add option for outdoor eating area for 500-800 PP facilities (especially in dry climates) w/70	S
70	Use fabric structure for outdoor eating area w/69	S
71	Separate zones to reduce energy consumption if full size of facility isn't needed	P
72	Use geography-based prototypes	X
73	Combine grounding grid and geothermal coils	X
74	Use water-source heat pump	X
75	Use 1/8 gallon urinals	P
76	Use dual-flush commodes	P
77	Use timed or motion-control valves on faucets	P
78	Use on-demand (instantaneous or tankless) water heaters in low-use locations (loading dock and restrooms)	P
79	Use solar energy - photoelectric	X
80	Use non-electric solar water heating	S
81	Relocate tray washing to back of facility	X
82	Use three restrooms so that gender ratio is flexible	S
83	Provide acoustical wall treatment	S
84	Use unisex toilet for servery staff in 500-800 PP facilities	P
85	Use epoxy anchors in lieu of cast-in-place anchors	S
86	Use ceiling fans in dining area	X
87	Use permeable pavement for parking areas	S
88	Use PVC piping	BD
89	Use metal-clad wiring in lieu of conduits	X
90	Maximize reflected lighting	X
91	Use single canopy for double-queue area outside of two-story 2600 soldier facility	P
92	Enhance carry-out and eliminate drive-through as an option	X
93	Use motorized exterior sunscreens	X
94	Pre-qualify furniture	BD
95	Use stand-up dining area as a dining option	P
96	Use cable trays	X
97	Eliminate drinking stations in serving area in 500-800 PP units	X
98	Provide one drinking station per dining area instead of two in 1300 and 2600 AIT facilities	X

99	Confirm fixture count in restrooms, considering number of people and time limitation	X
100	Provide access to restrooms from dining facility in 500-800 PP units	S
101	Reduce quantity of beam flange bracing (or note that it's not required for each beam)	BD
102	Use certified structural wood where practical, i.e., with exposed ceiling in dining facility	S
103	Use recovered heat from dishwashing or kitchen for hot air hand drying in restrooms; eliminate paper towels	X
104	Use recovered heat from dishwashing or kitchen to pre-heat water for hand-washing	P
105	Relocate exterior stairs on two-story facility to avoid wind-driven rain	S
106	Shield exterior stairs on two-story facility to avoid wind-driven rain	S
107	Use water-dispersing waterfall in lieu of downspouts	X
108	Provide full documentation on LEED checklist with COS package to demonstrate how the points are earned	S
109	Identify safe spaces for emergencies (tornado, earthquake)	S
110	Add comment to RFP to encourage acquiring green energy from power company	S
111	Use clerestories integrated into the roof	P
112	Simplify roof w/111	P
113	Do not utilize high ceiling/high roof elements at entrance foyers	P
114	Use zoned occupancy sensors (separate for each dining area and kitchen)	BD
115	Step back ventilation rate during unoccupied periods	BD
116	Rework bottleneck where two serving lines split (N-19) on 2600 DF	P
117	Remove wing walls in direction of movement	P
118	Slide entrance of salad bar further down from end of line from short-order servery in 2600 DF (M-17)	P
119	Consider using PEX tubing in lieu of copper pipe for small diameter runs	P
120	Use foam-filled block	X
121	Use glass block to bring in natural light	X
122	Use polyiso insulation for building insulation	S
123	Use sprayed insulation to fill cavities and provide vapor barrier	P
124	Utilize cut and fill to prevent depressing truck dock below grade, especially in areas subject to freezing	BD
125	Use argon-filled windows to reduce UV	BD
126	Use exterior sunscreens in lieu of film or special glazing	S
127	Confirm that enough wooden doors are being used to count LEED point per spreadsheet	S
128	Indicate on LEED that mechanical equipment on roof jeopardizes point taken for SS.7.2	S
129	Add soffit or screening to prevent bird roosting under canopy	S
130	Use fans under canopies	S
131	Use radiant heating to prevent ice on ramps and in queuing areas	X
132	Use recovered heat from dishwashing and kitchen to prevent ice on ramps and in queuing areas	S
133	Avoid artificial bumps in roof just for daylighting	X

134	Get feedback on lessons learned	BD
135	Remove reference to quarry tile from drawings	S
136	Show more detail on power distribution to kitchen equipment	S
137	Show more exterior lighting	S
138	Show underslab utility layout	S
139	Do not use polyethylene for vapor barrier	S
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SECTION 4 - LEED CHECKLIST

LEED Credit Paragraph	LEED 2.2 Project Checklist for Design and Construction Dining Facility Prototypes	Maximum Points Achievable				Government (Gov) Action Required for Point		
PAR	FEATURE	Req'd	Taken	Maybe	Not taken		Notes, action/descriptions	Additional Remarks
	CATEGORY 1 - SUSTAINABLE SITES							
SSPR1	Construction Activity Pollution Prevention (PREREQUISITE)	R	R					
SS1	Site Selection	1		1		Gov	Government site selections may qualify for point	
SS2	Development Density & Community Connectivity	1		1		Gov	Government site selections may qualify for point	
SS3	Brownfield Redevelopment	1			1			
SS4.1	Alternative Transportation: Public Transportation Access	1		1		Gov	Government must identify bus routes and public transportation near sites.	
SS4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	1	1				Design will include bike racks and showers	
SS4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles	1	1					Site Adapt A/E to note parking signage to achieve this point.
SS4.4	Alternative Transportation: Parking Capacity	1	1			Gov		Site Adapt A/E to note parking signage to achieve this point.
SS5.1	Site Development: Protect or Restore Habitat	1			1			
SS5.2	Site Development: Maximize Open Space	1		1		Gov	Compliance with base master plan and AT/FP stand-off distances may comply with this requirement.	Establish site limits that provide adequate acreage to comply.
SS6.1	Stormwater Design: Quantity Control	1	1					
SS6.2	Stormwater Design: Quality Control	1	1					
SS7.1	Heat Island Effect: Non-Roof	1	1			Gov		Site adapt A/E must develop site plan to achieve this point using appropriate

LEED Credit Paragraph	LEED 2.2 Project Checklist for Design and Construction Dining Facility Prototypes	Maximum Points Achievable				Government (Gov) Action Required for Point		
PAR	FEATURE	Req'd	Taken	Maybe	Not taken		Notes, action/descriptions	Additional Remarks
								paving materials, canopy tree cover, etc.
SS7.2	Heat Island Effect: Roof	1	1					
SS8	Light Pollution Reduction	1	1			Gov		Site adapt A/E should specify full cutoff optics for site lighting.
	CATEGORY 2 – WATER EFFICIENCY							
WE1.1	Water Efficient Landscaping: Reduce by 50%	1	1					
WE1.2	Water Efficient Landscaping: No Potable Water Use or No Irrigation	1	1					
WE2	Innovative Wastewater Technologies	1			1			
WE3.1	Water Use Reduction: 20% Reduction	1	1				Use low flow fixtures and waterless urinals.	
WE3.2	Water Use Reduction: 30% Reduction	1		1			Use low flow fixtures and waterless urinals.	
	CATEGORY 3 – ENERGY AND ATMOSPHERE							
EAPR1	Fundamental Commissioning of the Building Energy Systems (PREREQUISITE)	R	R					
EAPR2	Minimum Energy Performance (PREREQUISITE)	R	R					
EAPR3	Fundamental Refrigerant Management (PREREQUISITE)	R	R					
EA1	Optimize Energy Performance	10	5	2	3		Mechanical and Electrical will coordinate on this point as savings includes lighting design issues.	
EA2.1	On-Site Renewable Energy	1			1			
EA2.2	On-Site Renewable Energy	1			1			

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PAR	FEATURE	Req'd	Taken	Maybe	Not taken		Notes, action/descriptions	Additional Remarks
EA2.3	On-Site Renewable Energy	1			1			
EA3	Enhanced Commissioning	1			1			
EA4	Enhanced Refrigerant Management	1	1					
EA5	Measurement & Verification	1			1			
EA6	Green Power	1			1			
	CATEGORY 4 – MATERIALS AND RESOURCES							
MRPR1	Storage & Collection of Recyclables (PREREQUISITE)	R	R					
MR1.1	Building Reuse: Maintain 75% of Existing Walls, Floors & Roof	1			1			Point is not Applicable for New Construction
MR1.2	Building Reuse: Maintain 95% of Existing Walls, Floors & Roof	1			1			Point is not Applicable for New Construction
MR1.3	Building Reuse: Maintain 50% of Interior Non-Structural Elements	1			1			Point is not Applicable for New Construction
MR2.1	Construction Waste Management: Divert 50% From Disposal	1	1				Specifications will require compliance	
MR2.2	Construction Waste Management: Divert 75% From Disposal	1		1				This will depend on the actual amount and materials resulting from an on-site demolition required
MR3.1	Materials Reuse: 5%	1			1			
MR3.2	Materials Reuse: 10%	1			1			
MR4.1	Recycled Content: 10% (post-consumer + 1/2 pre-consumer)	1	1				Specifications will require compliance	
MR4.2	Recycled Content: 20% (post-consumer + 1/2 pre-consumer)	1	1				Specifications will require compliance	

LEED Credit Paragraph	LEED 2.2 Project Checklist for Design and Construction Dining Facility Prototypes	Maximum Points Achievable				Government (Gov) Action Required for Point		
PAR	FEATURE	Req'd	Taken	Maybe	Not taken		Notes, action/descriptions	Additional Remarks
MR5.1	Regional Materials:10% Extracted, Processed & Manufactured Regionally	1	1				Specifications will require compliance	
MR5.2	Regional Materials:20% Extracted, Processed & Manufactured Regionally	1	1				Specifications will require compliance	
MR6	Rapidly Renewable Materials	1		1		Gov	This will need to be a joint effort since the furniture procurement is not in the project and it is a large portion of this point. To the extent possible Rapidly renewable products will be used.	Government will need to procure furniture meeting this requirement.
MR7	Certified Wood	1	1				Specifications will require compliance	Government will need to allow wood doors for the majority of interior doors
	CATEGORY 5 – INDOOR ENVIRONMENTAL QUALITY							
EQPR1	Minimum IAQ Performance (PREREQUISITE)	R	R					
EQPR2	Environmental Tobacco Smoke (ETS) Control (PREREQUISITE)	R	R					
EQ1	Outdoor Air Delivery Monitoring	1	1				Air Flow measuring across dampers will be required.	
EQ2	Increased Ventilation	1		1			This may be an operational budget issue.	
EQ3.1	Construction IAQ Management Plan: During Construction	1	1				Specifications will require compliance	
EQ3.2	Construction IAQ Management Plan: Before Occupancy	1	1				Specifications will require compliance	
EQ4.1	Low Emitting Materials: Adhesives & Sealants	1	1				Specifications will require compliance	

LEED Credit Paragraph	LEED 2.2 Project Checklist for Design and Construction Dining Facility Prototypes	Maximum Points Achievable				Government (Gov) Action Required for Point		
PAR	FEATURE	Req'd	Taken	Maybe	Not taken		Notes, action/descriptions	Additional Remarks
EQ4.2	Low Emitting Materials: Paints & Coatings	1	1				Specifications will require compliance	
EQ4.3	Low Emitting Materials: Carpet Systems	1	1				Specifications will require compliance	
EQ4.4	Low Emitting Materials: Composite Wood & Agrifiber Products	1	1				To the Extent of their use. Also, must be done with Furniture Package.	
EQ5	Indoor Chemical & Pollutant Source Control	1			1			
EQ6.1	Controllability of Systems: Lighting	1	1					
EQ6.2	Controllability of Systems: Thermal Comfort	1	1					
EQ7.1	Thermal Comfort: Design	1	1				Design will to comply with ASHRAE 55-2004.	
EQ7.2	Thermal Comfort: Verification	1	1			Gov	Occupants must be surveyed during the first year of operations.	Government will need to conduct the survey of personnel
EQ8.1	Daylight & Views: Daylight 75% of Spaces	1		1			May not be achievable due to project design	
EQ8.2	Daylight & Views: Views for 90% of Spaces	1			1		May not be achievable due to project design	
	CATEGORY 6 – FACILITY DELIVERY PROCESS							
IDc1.1	Innovation in Design	1		1				
IDc1.2	Innovation in Design	1	1				Use "Green" Cleaning Materials	
IDc1.3	Innovation in Design	1		1				
IDc1.4	Innovation in Design	1		1				
IDc2	LEED Accredited Professional	1	1				LEED AP: Provided by Clark Nexsen, several designers and PM are LEED AP.	
	TOTAL	69	~~36~~ 26	14	19			

Point Credit Reflected in Prototype drawings.