

# FUNCTION ANALYSIS CONCEPT DEVELOPMENT REPORT

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FY-2000 MCON Project P-568

## MAINTENANCE AND OPERATIONS FACILITY

*Owner*

**UNITED STATES MARINE CORPS  
SECOND RECONNAISSANCE BATTALION**

Marine Corps Base, Camp Lejeune  
Jacksonville, North Carolina



*Design Agency*

**Atlantic Division  
Naval Facilities Engineering Command  
Norfolk, Virginia**

*Design Consultants*

**HBA Architects  
Virginia Beach, Virginia**

**Miller-Stephenson & Associates, P.C.  
Virginia Beach, Virginia**

**Pace Collaborative  
Virginia Beach, Virginia**

**Land Planning & Design Associates, Inc.  
Charlottesville, North Carolina**

*Function Analysis Concept Development/Value Engineering Consultants*

**Lewis & Zimmerman Associates, Inc.  
Rockville, Maryland and Atlanta, Georgia  
*Taking the Chance Out of Change***

January 26 - February 4, 1999

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**ENDORSEMENTS**

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2nd Reconnaissance Battalion Maintenance and Operations Facilities  
Marine Corps Base, Camp Lejeune, Jacksonville, North Carolina

<u>APPROVED BY</u>	<u>REPRESENTING</u>	<u>DATE</u>
<u>2nd Lt. Nelson P.</u>	<u>Supply</u>	<u>990204</u>
<u>C. J. Dunston Major USMC</u>	<u>XO, 2d Recon Bn</u>	<u>990204</u>
<u>J. P. Lopez LTCOL USMC</u>	<u>2d MARDINEWARD</u>	<u>990204</u>
<u>A. J. [unclear] 1STLT USMC</u>	<u>S-4, 2d Recon Bn</u>	<u>990204</u>
<u>Robert J. Hudson MSGT USMC</u>	<u>2d RECONNAISSANCE BATTALION</u>	<u>990204</u>
<u>[unclear] 1STLT NGAV</u>	<u>MOTOR TRANSPORT, 2d Recon Bn.</u>	<u>990204</u>
<u>John J. [unclear] MSGT</u>	<u>motor transport chief</u>	<u>990204</u>

**SECTION 1  
ENDORSEMENTS**

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**2nd Reconnaissance Battalion Maintenance and Operations Facilities  
Marine Corps Base, Camp Lejeune, Jacksonville, North Carolina**

APPROVED BY

REPRESENTING

DATE

William Bryant

AC/S FACILITIES, FAC Mgmt DIR.

4 Feb 99

J. Elliott

Public Works Mech Branch

4 Feb 99

Sgt. J. Stalls

April 150 Public Works

1 Feb 99

Al Samuff

ARCH BRG PUBLIC WKS

4 FEB 99

REG

PUBLIC WORKS ELEC BRANCH

4 FEB 99

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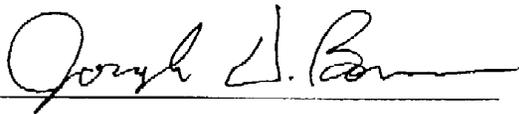
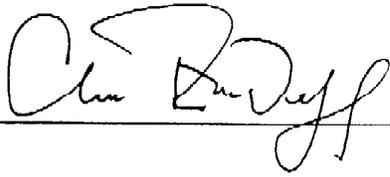
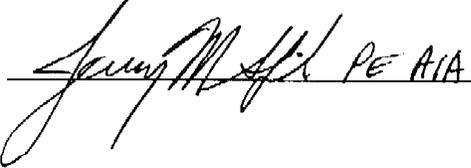
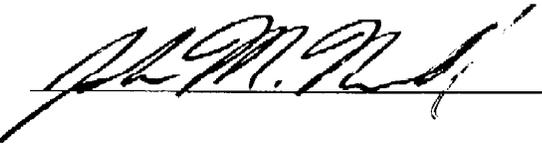
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**SECTION 1**  
**ENDORSEMENTS**

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**2nd Reconnaissance Battalion Maintenance and Operations Facilities**  
**Marine Corps Base, Camp Lejeune, Jacksonville, North Carolina**

<u>APPROVED BY</u>	<u>REPRESENTING</u>	<u>DATE</u>
	HBA ARCHITECT.	2-4-99
	HBA ARCHITECTS	2-4-99
	LEWIS & ZIMMERMAN	2-4-99
	PACE COLLABORATIVE, P.C.	2-4-99
	HBA ARCHITECTURE	2-4-99
	PACE COLLABORATIVE, P.C.	2-4-99
	ASIA LAND PLANNING & DESIGN ASSOC.	2-4-99

**SECTION 1**  
**ENDORSEMENTS**

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**2nd Reconnaissance Battalion Maintenance and Operations Facilities**  
**Marine Corps Base, Camp Lejeune, Jacksonville, North Carolina**

APPROVED BY

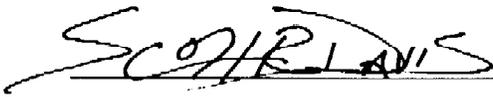
REPRESENTING

DATE



Miller-Stephenson Assoc

2/4/99



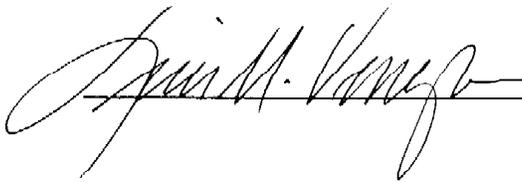
MILLER-STEPHENSON ASSOC

2/4/99



HEA ARCHITECTURE

2/4/99



LEWIS & ZIMMERMAN ASSOC.

2/4/99

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**SECTION 1**  
**ENDORSEMENTS**

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2nd Reconnaissance Battalion Maintenance and Operations Facilities  
Marine Corps Base, Camp Lejeune, Jacksonville, North Carolina

APPROVED BY

REPRESENTING

DATE

Dolbie Bryant LANTDIV Project Manager 2/4/99

R. Dale Harris, PA LANTDIV ARCHITECT (AC) 2/4/99

LAB LANTDIV VALUE ENGR 2/4/99

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## SECTION 2

### EXECUTIVE SUMMARY

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#### Introduction

Function Analysis Concept Development (FACD) is a cooperative effort by the consultant architect-engineer (A-E) design team, user/customer representatives, Atlantic Division, Naval Facilities Engineering Command (LANTNAVFACENGCOM) personnel and other interested parties. A FACD typically includes on-site development of a conceptual design in response to functional, aesthetic, environmental, base planning, site, budgetary and other requirements. Consideration should also be given to life cycle cost consequences of alternative design solutions. The purposes of the FACD effort include: (1) confirmation of project scope and budget; (2) expedition of the design; (3) exposing design issues early in the process and setting the stage for resolution of these issues; and (4) improved understanding between participants and facilitation of their “buy-in” to the project concept. In summary, FACDs are intended to improve design quality and execution of the finished project.

A FACD workshop was conducted for MILCON P-568, United States Marine Corps (USMC), 2nd Reconnaissance (Recon) Battalion Maintenance and Operations Facility project between January 26 - February 4, 1999, in Jacksonville, North Carolina. Participants included representatives from: the 2nd Recon Battalion; the Marine Corps Base (MCB) Camp Lejeune Facilities, Base Land Planning and Design; the Marine Corps Engineering School; the HBA Architects’ design team (the consultant A-E design team); Lewis & Zimmerman Associates, Inc. (the FACD facilitators), and LANTNAVFACENGCOM. The participants are listed on the attendance sheets for the various sessions - see Section 4 of this report entitled *FACD Process*.

During the FACD workshop kickoff meeting, LANTDIV’s value engineer again reviewed FACD concepts for the benefit of those individuals who were unable to attend the FACD pre-study meeting in Virginia Beach, Virginia office of the design team - HBA Architects. The FACD facilitator then explained the FACD process and reviewed the planned agenda. Emphasis was placed on user participation throughout the process and the documentation required for substantiation of the final design concept.

#### User Presentation

Master Sergeant Robert J. Hudson and Gunnery Sergeant Mark Clark of the 2nd Recon Battalion made an excellent presentation concerning the mission of the provisional unit, their heavy training emphasis and outlined their functional requirements as far as the new facilities were concerned. These representatives were asked about what they do on a day-to-day basis, people and units that they interface with, security requirements, maintenance, and equipment storage needs.

User functional requirements are shown in Section 4 of this report. As noted in the Function Logic Diagram, the higher order requirement for this project is to Support the Mission. The basic functions are identified as *Consolidate Personnel & Equipment* and *Facilitate Deployments*. The first basic function is necessary because several years ago, the 2nd Recon Battalion was scattered to various buildings as a hurricane destroyed their original facilities. The existing operational accommodations are in poor condition and do not fulfill the requirements of the unit. The 2nd Recon Battalion has a very challenging mission. This requires them to be instantly deployable in a multitude of potential

weather and action environments. The new facilities will greatly enhance their ability to be responsive to such emergency conditions.

Additional functions that the new facilities will fulfill include helping to *Retain Marines* and *Improve Morale*. The training and provisioning of the personnel in the 2nd Recon Battalion is an extremely expensive undertaking. Reenlistment of such talent is pivotal to the success of the unit. Hence, it is expected of the new facilities that personnel will be able to take pride in their new work spaces and feel fully supported as they are deployed into difficult situations. Such support includes the presence of new, modern medical care rooms and equipment. Also, dependents will find assistance available when their spouses are in need, from the family care office in the building.

## **Design Evolution**

From the initial kickoff meeting/Concept #1 presentation on January 25, 1999, the floor plans, perspectives, site plans, along with the electrical, mechanical, civil engineering and landscape architectural concepts were polished and revised in a reiterative fashion. This was done through a series of close discussions with end users, base technical representatives, and the LANTDIV project management team. These reiterative efforts were reflected in Concepts #1 - #4 and ultimately refined into that form which is presented in Section 3 of the report entitled *Final Conceptual Design Description*. The following is a brief recounting of the reiterative processes that made up the work of the FACD workshop:

### **Concept #1**

As previously noted, Concept #1 was presented at the kickoff meeting on January 26, 1999 and delineated an Operations/Administration Building that contained 44,298 square feet (SF), a Vehicle Maintenance Building having 11,760 SF, and accessory buildings totaling 4,320 SF. The two main buildings totaled 56,058 SF — approximately 3,000 SF over the allowable programmed space. There was some debate about the contribution of the accessory structures' square footage to the problem with the program space. It was decided that the Boat Shelter would have to be counted for half its square footage since it was an open, covered space. Additionally, the Hazardous Materials (HAZMAT) Storage Shed was considered an additional building and its entire 1,320 SF was counted as programmed space. This resulted in a square footage overage of approximately 5,300 SF.

Similarly, the cost estimate summary for Concept #1 indicated that the project was about \$1,000,000 over the target budget amount for this level of development.

The occurrence that Concept #1 was over on square footage and cost is not unusual. In fact, this is the expected point of entry into the FACD process, and is one of the reasons for having a FACD workshop. This type of workshop provides the opportunity for the designers, end users and NAVFAC management to work together to resolve these and other design issues.

### **Concept #2**

Concept #2 evolved from the initial concept after an extensive effort to reduce the construction cost and building square footage to required programmed levels. This was done through a brainstorming session that yielded nearly seventy ideas for change. After evaluating these ideas, it was found that

there were significant areas of previously unknown program requirements which drove the construction costs for the project upward dramatically.

The second concept managed to bring the combine square footage to 53,273 square feet (SF) - acceptably below program requirements. However, because of the previously noted addition of the unexpected requirements, the project's construction cost climbed to \$8,627,000 which was approximately \$1,300,000 above the required budget level.

### **Concept #3**

As a result of the budget problems identified within Concept #2, another brainstorming session was conducted - intended to identify the more drastic actions needed to bring the construction costs below the needed \$7,300,000 level. Since there was such a spread between the estimate on Concept #2 and the budget, it was decided to carry out almost all of the cost reduction ideas. Working closely with the representatives of the 2nd Reconnaissance Battalion and Camp Lejeune, the FACD/Design team developed Concept #3. This concept brought the composite square footage to 50,129 SF - over 3,000 SF below the programmed limit. The estimated construction cost was brought down to \$7,140,000 - just below the \$7,300,000 requirement.

Key changes that made this cost transition possible included:

- The building square footage was reduced by approximately 3,000 SF;
- Substituting metal siding for much of the original brick siding;
- Steel framing was designated to replace the concrete masonry unit (CMU), load bearing, backup walls originally used with the brick veneer;
- The curvilinear wall section on the backside of the building was straightened out;
- The site plan was very dramatically changed to not only help reduce costs, but also to avoid potentially costly wetlands; and
- Mechanical costs were reduced by minimizing redundancy and reducing the capacity to reflect the reduced size of the building.

### **Concept #4 (Final Concept)**

The final concept is detailed under Section 3 of this report.

### **Final Presentation**

The final presentation of the Conceptual Design was made on Thursday morning, February 4, 1999. The entire project was presented with all disciplines being discussed. Comments received at this meeting, or by Thursday afternoon, were responded to in writing by the FACD team and are included in the final report distribution. Sign-off on the report occurred that afternoon. Last minute comments were expected to be addressed in the 35% design submittal.

### **Outstanding Issues**

As the concept design evolved during the FACD workshop, several key issues were identified. Most of the issues were resolved through design changes or memos of understanding with those persons making the comments. There are two issues remaining which need follow-on action:

1. Americans with Disabilities Act (ADA) Access - Camp Lejeune Base Facilities is to provide a letter which establishes a waiver on ADA requirements as the buildings are to be occupied and operated by active duty, physically able Marines.
2. Communications - Base Facilities is to finish ironing out the remaining details which will provide for Base Telephone to run the fiber optic and paired telephone cables to the new site. Base Facilities is expected to provide another letter to confirm Base Telephone's willingness and capacity to accomplish the installation of these cables - resulting in significant cost savings to MILCON Project P-568.
3. Environmental Assessment (EA) - At the time of the FACD workshop, the EA study had not been commissioned. It is essential this effort be undertaken immediately to make sure that environmental issues will not interfere with the use of this site.

# FACD PARTICIPANTS



<b>PROJECT: USMC 2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>		<b>DATE:</b> January 26, 1999 - February 4, 1999	
<b>NAME</b> (Please Print)	<b>ORGANIZATION/TITLE</b>	<b>PHONE/FAX</b>	
Charles R. McDuff, PE, CVS, CCE mcduffcr@aol.com	Lewis & Zimmerman Associates, Inc. FACD Facilitator	ph 770-992-3032 fx 770-992-0228	
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Jerry M. Spiker, PE, AIA michael@hbaonline.com	HBA, Architects Structural Engineer and Architect	ph 757-490-9048 fx 757-490-7081	
Richard S. Corner, AIA richard@hbaonline.com	HBA, Architects Architect	ph 757-490-9048 fx 757-490-7081	
J. Michael Newell, EIT pace2@norfolk.infi.net	PACE Collaborative Mechanical Engineer	ph 757-499-7223 fx 757-671-8712	
Jim S. Bedois, EIT jim@pace-pmc.com	PACE Collaborative Electrical Engineer	ph 757-499-7223 fx 757-671-8712	
Doug M. Will, PE dwill@masonline.com	Miller Stephenson & Associates (MSA) Civil Engineer	ph 757-490-9264 fx 757-490-0634	
Scott R. Davis, EIT, VCN sdavis@msaonline.com	Miller Stephenson & Associates (MSA) Civil Engineer	ph 757-490-9264 fx 757-490-0634	
Bill R. Mechnick, ASLA, CLA landplanning@mindspring.com	Land Planning & Design Associates, Inc. (LPDA) Landscape Architect	ph 804-296-2108 fx 804-296-2109	
MSGT Robert J. Hudson	2nd Recon Battalion 2nd Force Recon Company	ph 910-451-1350 fx 910-451-3748 (Call First)	
MSGT John J. Zeh	2nd Recon Battalion Motor Transportation	ph 910-451-2 711 fx Not Provided	
GySGT Mark Clark	2nd Recon Battalion	ph 910-451-2225 fx Not Provided	
Capt Alikea Ferriera	Marine Corps Engineering School (MCES) S-4, Logistics	ph 910-450-7275 fx Not Provided	

# FACD PARTICIPANTS



<b>PROJECT: USMC 2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>		<b>DATE:</b> January 26, 1999 - February 4, 1999	
<b>NAME</b> (Please Print)	<b>ORGANIZATION/TITLE</b>	<b>PHONE/FAX</b>	
John M. Caston	MCB, Camp Lejeune, Public Works, Planning	ph 910-451-1833 fx 910-451-2927	
Fred W. Estes, Jr.	MCB, Camp Lejeune, Public Works, Planning Branch Manager	ph 910-451-1833 fx 910-451-2927	
CWO5 Steve A. Loconto	MCB, Camp Lejeune Facilities	ph 910-451-3034 fx 910-451-3300	
Debbie L. Bryant, PE	LANTNAVFACENGC Project Management	ph 757-322-8344 fx 757-322-8362	
R. Dale Harris, RA	LANTNAVFACENGC LANTDIV Review Team Liaison	ph 757-322-4373 fx 757-322-4415	
HMCS Dennis M. Downey	2nd Recon Battalion Medical Representative	ph 910-451-5277 fx N/A	
GM <sup>C</sup> /SW(DV) John Nicholson	2nd Recon Battalion Dive Locker	ph 910-451-2180 fx N/A	
SGT Jeff Eyl	2nd Recon Battalion 2nd Recon Battalion Paraloft Rigger	ph 910-451-1342 fx 910-451-2180	
William A. Bogue, Jr., PE, CVS	LANTNAVFACENGC Value Engineer	ph 757-322-4442 fx 757-322-4415	
James Elliott, PE	MCB Camp Lejeune, Public Works Mechanical Engineer	ph 910-451-3658 fx 910-451-2927	
Larry Stallings	MCB Camp Lejeune, Public Works Architectural	ph 910-451-3238 fx 910-451-2927	
Andrew Young	MCB Camp Lejeune Public Works Electrical	ph 910-451-3658 fx 910-451-2927	
Robert Capps	LANTNAVFACENGC ROICC Camp Lejeune	ph 910-451-5817 fx 910-451-5899	
Al Samuel	MCB Camp Lejeune Public Works Architect	ph 910-451-3238 fx 910-451-2927	
Vann Marshburn	LANTNAVFACENGC ROICC Camp Lejeune	ph 910-451-2583 fx 910-451-5899	
Greg Shoemaker	MCB Camp Lejeune, Base Maintenance Inspection/Contracts	ph 910-451-5794 fx 910-451-5765	



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# FACD WORKSHOP AGENDA

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## 2nd Recon Battalion Maintenance and Operation Facilities

### Courthouse Bay, Marine Corps Base (MCB)

Camp Lejeune, North Carolina  
 FIS Project No.: P-568  
 A&E Contract No. N62470-98D-8029  
 Construction Contract No.: N62470-98-C-8024

**Dates:** 26 January - 4 February 1999

**Location:** Quality Inn & Suites  
 701 N. Marine Boulevard  
 Jacksonville, NC 28540  
 Phone: 910-347-6111  
 Fax: 910-347-2801

**Facilitator:** Charles R. McDuff, PE, CVS, CCE (Cell Phone 443-421-0323)  
 Luis M. Venegas, PE, CVS (Cell Phone 443-421-0324)  
 Lewis & Zimmerman Associates, Inc.

DATE/TIME	ACTIVITY	LEAD BY
<b>Monday 25 January</b> 1300 and after  2000 Hours	FACD Team may set up equipment, etc. in the meeting room  FACD Team Leadership Meeting	  Bogue, McDuff and Bovee
<b>Tuesday 26 January</b> 0800  0900	Project Development Team (PDT) Group Meetings  <b>Kick-off meeting</b> Introductions  Opening Comments on FACD Process Bogue, NAVFAC McDuff, FACD Facilitator  User group opening comments concerning their functions (what they do, how they do it, etc.), and expectations of the FACD process  Comments on Functions of Facility  <b>Concept #1 Presentation</b> Each discipline makes presentation of their initial concept for the project. As the Design Team present their aspect of the project concept, they should include comments on how they expect the facilities to function, based on their current understanding of the Users' operations.	  Bovee  Bogue and McDuff   McDuff  McDuff  Bovee

DATE/TIME	ACTIVITY	LEAD BY
<p><b>Tuesday 26 January</b> (continued)</p>	<p>Creative Phase: The Project Development Team is open to receive comments on the concept design. The team will brainstorm ways in which to address these comments and ways in which to improve the design in order to respond to functional requirements, to reduce life cycle costs and to resolve emerging issues.</p> <p>Preliminary Evaluation Phase: The Project Development Team evaluates the ideas brought out in the Creative Phase to determine which will be carried forward.</p> <p>Task Assignments: Based on the work of this day, PDT members will receive assignments required to be incorporated into the next Concept Presentation.</p>	<p>McDuff</p> <p>McDuff</p> <p>Bovee</p>
<p><b>Wednesday 27 January</b> 0800</p> <p>1700</p>	<p>Group Meetings: PDT members meet with base and user counterparts during the day to resolve issues and obtain additional information.</p> <p><b>Executive In-Brief</b> (If Required)</p> <p>The PDT works on the development of Concept #2 based on information received the previous day.</p> <p>Team meeting to assess progress. Each discipline reports on progress to date.</p>	<p>Bovee</p> <p>Bovee and McDuff</p> <p>Bovee and McDuff</p> <p>Bovee and McDuff</p>
<p><b>Thursday 28 January</b> 0800</p>	<p>Continue design and investigation work. Prepare for Concept #2 Presentation</p>	<p>Bovee</p>
<p><b>Friday 29 January</b> 0800</p> <p>0900</p>	<p>PDT assembles and prepares for presentation.</p> <p><b>Concept #2 Presentation</b> Each discipline will make a presentation of their findings and recommendations. Presentation should include key sketches and hand-outs as required to inform participants and to invite their comments.</p> <p>Creative Phase: The team will brainstorm ways in which to address these comments and ways in which to improve the design in order to respond to functional requirements, to reduce life cycle costs and to resolve emerging issues.</p> <p>Evaluation Phase: The Project Development Team evaluates the ideas brought out in the Creative Phase to determine which will be carried forward.</p>	<p>Bovee</p> <p>Bovee</p> <p>McDuff</p> <p>McDuff</p>

DATE/TIME	ACTIVITY	LEAD BY
<p><b>Friday 29 January</b> (continued)</p>	<p>Task Assignments: Based on the work of this day, PDT members will receive assignments required to be incorporated into the next Concept Presentation. Work begins on developing Concept #3.</p>	<p>Bovee  Bovee</p>
<p><b>Monday 1 February</b> 0800  1700</p>	<p>The PDT continues work on the development of Concept #3 and preparations for the presentation of this concept.  Team meeting to review progress and to prepare for Concept #3 Presentation tomorrow morning.</p>	<p>Bovee  Bovee</p>
<p><b>Tuesday 2 February</b> 0800  0900</p>	<p>Team meeting to prepare room for presentation of Concept #3.</p> <p><b>Concept #3 Presentation</b> Each discipline will make a presentation of their findings and recommendations. Presentation should include key sketches and hand-outs as required to inform participants and to invite their comments.</p> <p>Creative Phase: The team will brainstorm ways in which to address these comments and ways in which to improve the design in order to respond to functional requirements, to reduce life cycle costs and to resolve emerging issues.</p> <p>Evaluation Phase: The Project Development Team evaluates the ideas brought out in the Creative Phase to determine which will be carried forward.</p> <p>Task Assignments: Based on the work of this day, PDT members will receive assignments required to be incorporated into the Concept #4 Presentation.</p> <p>Work begins on developing Concept #4.</p>	<p>Bovee  Bovee  McDuff  McDuff  Bovee  Bovee</p>
<p><b>Wednesday 3 February</b> 0800</p>	<p>Team members work on final presentation and report contributions. Selected task group detailed to meet with ROICC for constructibility input to report. Review list of invitees for the Concept #4 (Final) Presentation for tomorrow and reconfirm attendees.</p> <p>PDT members work on final presentation and final input to report. Floor plans, Mechanical and Electrical layouts, site plan and important building sections are finalized. Refine cost estimate and develop a bid additive list if required. Identify construction methods, phasing and schedule for the project (if applicable).</p> <p>Complete FACD Report</p>	<p>Bovee  Bovee and McDuff  Bovee and McDuff</p>

DATE/TIME	ACTIVITY	LEAD BY
<b>Wednesday 3 February</b> (continued) 1700	Review progress and prepare for tomorrow's Concept #4 Presentation	Bovee
<b>Thursday 4 February</b> 0800	PDT meeting to prepare for presentation	Bovee
0900	<b>Concept #4 Presentation</b> formal presentation of final concept. All disciplines make brief but comprehensive presentations. The PDT will identify the status of remaining issues and plans for their resolution. The attendees will be presented copies of the FACD report and will be invited to submit their final comments in writing. The Team members will make copies of comment and response sheets for circulation.	Bovee
1300	<b>SIGN-OFF MEETING:</b> All participants sign-off on the final FACD report.	Bovee and McDuff
1400	<b>Executive Out-Brief</b> (If required)	Bovee and McDuff

SP. 002

1. Component NAVY	<b>FY 2000 MILITARY CONSTRUCTION PROGRAM</b>			2. Date 9/15/98
3. Installation and Location/UIC: M67001 MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA		4. Project Title MAINTENANCE AND OPERATIONS FACILITY		
5. Program Element 0206496M	6. Category Code 214.51	7. Project Number P-568	8. Project Cost (\$000) Auth: 8,550 Appr: 8,070	
<b>9. COST ESTIMATES</b>				
Item	U/M	Quantity	Unit Cost	Cost (\$000)
MAINTENANCE AND OPERATIONS FACILITY	M2	4,954	-	5,790
AUTOMOTIVE VEHICLE MAINTENANCE SHOP	M2	781	1,394.00	(1,090)
ELECTRONICS/COMMUNICATION MAINTENANCE SHOP	M2	453	1,241.00	(560)
OPERATIONS STORAGE FACILITY	M2	3,720	1,071.00	(3,980)
TECHNICAL OPERATING MANUALS	LS	-	-	(60)
INFORMATION SYSTEMS	LS	-	-	(70)
BUILT IN EQUIPMENT	LS	-	-	(30)
SUPPORTING FACILITIES	-	-	-	1,900
SPECIAL CONSTRUCTION FEATURES	LS	-	-	(160)
ELECTRICAL UTILITIES	LS	-	-	(320)
MECHANICAL UTILITIES	LS	-	-	(140)
PAVING AND SITE IMPROVEMENTS	LS	-	-	(1,280)
SUBTOTAL	-	-	-	7,690
CONTINGENCY (5.0%)	-	-	-	380
TOTAL CONTRACT COST	-	-	-	8,070
SUPERVISION, INSPECTION, & OVERHEAD (6.0%)	-	-	-	480
TOTAL	-	-	-	8,550
*SIOH FUNDING	-	-	-	(480)
TOTAL REQUEST	-	-	-	8,070
EQUIPMENT FROM OTHER APPROPRIATIONS	-	-	(NON-ADD)	(0)
10. Description of Proposed Construction				
<p>*SIOH will be funded out of BA 3, BLI 500 in this and future year appropriations. Two single story buildings with pile foundations, slab-on-grade floors, brick veneer / structural steel framing / concrete block cavity walls, and standing seam metal roofs; vehicle lifts, lubrication system, overhead monorail hoist, tire changer, climate controlled dive equipment storage room, decompression chamber room, armory, and compressed air system; two single story buildings with shallow foundations, slab-on-grade floors, brick veneer / concrete block cavity walls, and standing seam metal roofs; washrack, high pressure wash pumps and hot water tank; support facilities include flexible parking, vehicle wash racks and aprons, security fencing and lighting, a wastewater lift station, vehicle refueling island with a diesel and gasoline storage tank, waste oil storage tank, oil water separator, stormwater detention pond, fire protection system, and utilities.</p>				
11. Requirement: <u>4,954 M2</u> Adequate: <u>0 M2</u> Substandard: <u>(0) M2</u>				
PROJECT:				

(Continued On DD 1391C...)

1. Component NAVY	<b>FY 2000 MILITARY CONSTRUCTION PROGRAM</b>	2. Date 9/15/98														
3. Installation and Location/UIC: M67001 MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA																
4. Project Title MAINTENANCE AND OPERATIONS FACILITY		7. Project Number P-568														
<p>(...continued)</p> <p>Provides specialized operations, maintenance, and storage facilities for the 2nd Marine Division Reconnaissance Battalion at MCB Camp Lejeune. (Current Mission.)</p> <p>REQUIREMENT:</p> <p>Adequate maintenance facility for the Reconnaissance Battalion Communications Section to perform electronics maintenance and the Motor Transport Section to perform required maintenance on forty-seven vehicles that are organic to the Reconnaissance Battalion. Adequate operations/storage facilities for Reconnaissance Battalion special operations equipment including inflatable boats and associated motors and trailers, diving gear, parachutes, and small arms.</p> <p>CURRENT SITUATION:</p> <p>The Reconnaissance Battalion was located in facilities on Onslow Beach until Hurricane Fran destroyed the buildings. The Battalion was temporarily relocated to the French Creek area and is currently occupying shared spaces in several scattered shops. Vehicle maintenance is performed in a substandard metal building constructed in 1952 which lacks necessary ceiling height and doors and support equipment such as vehicle lifts, overhead hoists, lubrication equipment, compressed air, oil/water separators, and adequate lighting. Diving gear and other special equipment maintenance is being performed in a prefabricated building constructed in 1943 which also lacks components necessary for proper maintenance. The Communications Section and Armory are temporarily housed in military vans.</p> <p>IMPACT IF NOT PROVIDED:</p> <p>Work will continue in scattered inadequate facilities resulting in prolonged maintenance efforts, increased deadline equipment, and impaired combat readiness.</p>																
<p>12. Supplemental Data:</p> <p>A. Estimated Design Data: (Parametric estimates have been used to develop project costs. Project design conforms to Part II of Military Handbook 1190, Facility Planning and Design guide)</p> <p>(1) Status:</p> <table border="0"> <tr> <td>(A) Date Design Started.....</td> <td>12/97</td> </tr> <tr> <td>(B) Date Design 35% Complete.....</td> <td>01/99</td> </tr> <tr> <td>(C) Date Design Complete.....</td> <td>07/99</td> </tr> <tr> <td>(D) Percent Complete As Of September 1998.....</td> <td>15%</td> </tr> <tr> <td>(E) Percent Complete As Of January 1999.....</td> <td>35%</td> </tr> <tr> <td>(F) Parametric estimate used to develop project cost..</td> <td>YES</td> </tr> <tr> <td>(G) Energy study/life-cycle analysis performed.....</td> <td>YES</td> </tr> </table> <p>Installation POC: Larry Brant, Phone: (910) 451-1833</p>			(A) Date Design Started.....	12/97	(B) Date Design 35% Complete.....	01/99	(C) Date Design Complete.....	07/99	(D) Percent Complete As Of September 1998.....	15%	(E) Percent Complete As Of January 1999.....	35%	(F) Parametric estimate used to develop project cost..	YES	(G) Energy study/life-cycle analysis performed.....	YES
(A) Date Design Started.....	12/97															
(B) Date Design 35% Complete.....	01/99															
(C) Date Design Complete.....	07/99															
(D) Percent Complete As Of September 1998.....	15%															
(E) Percent Complete As Of January 1999.....	35%															
(F) Parametric estimate used to develop project cost..	YES															
(G) Energy study/life-cycle analysis performed.....	YES															

1. Component NAVY	<b>FY 2000 MILITARY CONSTRUCTION PROGRAM</b>	2. Date 9/15/98										
3. Installation and Location/UIC: M67001 MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA												
4. Project Title MAINTENANCE AND OPERATIONS FACILITY	7. Project Number P-568											
<p>(...continued)</p> <p>(2) Basis:</p> <p>(A) Standard or Definitive Design: NO</p> <p>(B) Where Design Was Most Recently Used:</p> <p>(3) Total Cost (C) = (A) + (B) Or (D) + (E):</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">(A) Production of Plans and Specifications.....</td> <td style="text-align: right;">(510)</td> </tr> <tr> <td>(B) All Other Design Costs.....</td> <td style="text-align: right;">(260)</td> </tr> <tr> <td>(C) Total.....</td> <td style="text-align: right;">770</td> </tr> <tr> <td>(D) Contract.....</td> <td style="text-align: right;">(680)</td> </tr> <tr> <td>(E) In-House.....</td> <td style="text-align: right;">(90)</td> </tr> </table> <p>(4) Construction Start..... 10/99 (4)</p> <p>Construction Completion..... 03/01</p> <p>B. Equipment associated with this project which will be provided from other appropriations: NONE.</p>			(A) Production of Plans and Specifications.....	(510)	(B) All Other Design Costs.....	(260)	(C) Total.....	770	(D) Contract.....	(680)	(E) In-House.....	(90)
(A) Production of Plans and Specifications.....	(510)											
(B) All Other Design Costs.....	(260)											
(C) Total.....	770											
(D) Contract.....	(680)											
(E) In-House.....	(90)											
Installation POC: Larry Brant, Phone: (910) 451-1833												



## PROJECT DESCRIPTION

### **P-568, Maintenance and Operations Facility for the 2<sup>nd</sup> Marine Division Reconnaissance Battalion, MCB Camp Lejeune, NC**

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**This project consists of** maintenance, storage, staging, training and administrative space for the 2<sup>nd</sup> Marine Division Reconnaissance Battalion, located at the Marine Corps Base Camp Lejeune, NC. The facilities are to be arranged in two buildings on a site of approximately 10 acres at the Courthouse Bay Boat Basin.

**The Operations/Administration Building** is a two-story structure totaling 39,677 square feet. The first floor houses the following functions: Supply, Communications, Armory, Battalion Aid Station, Dive Locker, Paraloft and includes a Quarterdeck and mechanical/electrical support spaces. The second floor houses the Battalion Command and Administration functions.

**The Vehicle Maintenance Building** is a single-story structure totaling 10,592 square feet. It houses the Motor Transport and Boat Repair functions.

**Both buildings shall be constructed** of timber pile-supported concrete foundations, concrete floor slabs on fill, and a post-and-beam/steel joist-framed roof structure. Second floor construction at the Operations/Administration Building shall consist of metal deck/concrete floor supported by steel joists bearing upon load-bearing masonry and steel post-and-beam supports. Exterior wall construction of both buildings shall consist of CMU cavity wall with brick veneer up to eight feet above the first floor. Upper wall construction above the eight feet elevation shall consist of metal siding over structural steel girts with interior metal studs. All walls and roof areas will be insulated, and limited window areas shall receive insulating glass. Roofing shall consist of metal standing seam over the second floor of the Operations/Administration Building, and modified bituminous membrane over all other areas. All roof surfaces shall be sloped to drain. The Operations/Administration Building includes a 75 feet tall loft for parachute maintenance, which is constructed of load-bearing cast-in-place concrete walls and roof.

**Primary mechanical systems** for the Operations/Administration Building include central plant hot and chilled water systems, composed of air-cooled chillers and oil-fired boilers serving a variable air volume HVAC system. The Vehicle Maintenance Building includes independent heating and cooling systems as well as vehicular ventilation and lubrication systems. Both buildings shall be equipped with centralized domestic hot and cold water plumbing systems utilizing flush valve fixtures. The Operations/Administration Building shall be equipped with wet pipe fire suppression sprinklers throughout; and the Vehicle Maintenance Building shall have limited area sprinklers off of domestic water supply.

**Primary electrical systems** include power distribution, interior and exterior lighting, telephone and data distribution, and fire detection and alarm systems for both buildings. Additional systems in the Operations/Administration Building include lightning protection and grounding, emergency power generation, CCTV, and cable television distribution.

**Site features** include paved areas for vehicle parking, deployment staging and secure outdoor storage. A fueling station, vehicle wash and hazardous material containment area are located outside the Vehicle Maintenance Building. A large area to the rear of the Operations/Administration Building encompassing the Vehicle Maintenance Building is surrounded by a security fence. A turfed area within the secure compound outside the Paraloft shall be used for personnel training. A Best Management Practice retention pond lying outside the secure compound is included for stormwater runoff treatment. The buildings and paved areas are carefully laid out to avoid disturbing adjacent wetlands. Site utilities shall include domestic water, fire protection, sanitary sewage, electrical power and communication systems distribution. Landscaping at the Operations/ Administration Building shall include planting at building façade and a paved entry forecourt with relocated existing monuments.

**MAINTENANCE & OPERATIONS FACILITY FOR  
THE 2nd MARINE DIVISION RECON BATTALION,  
COURTHOUSE BAY, CAMP LEJEUNE, NORTH CAROLINA**



**FRONT ELEVATION**



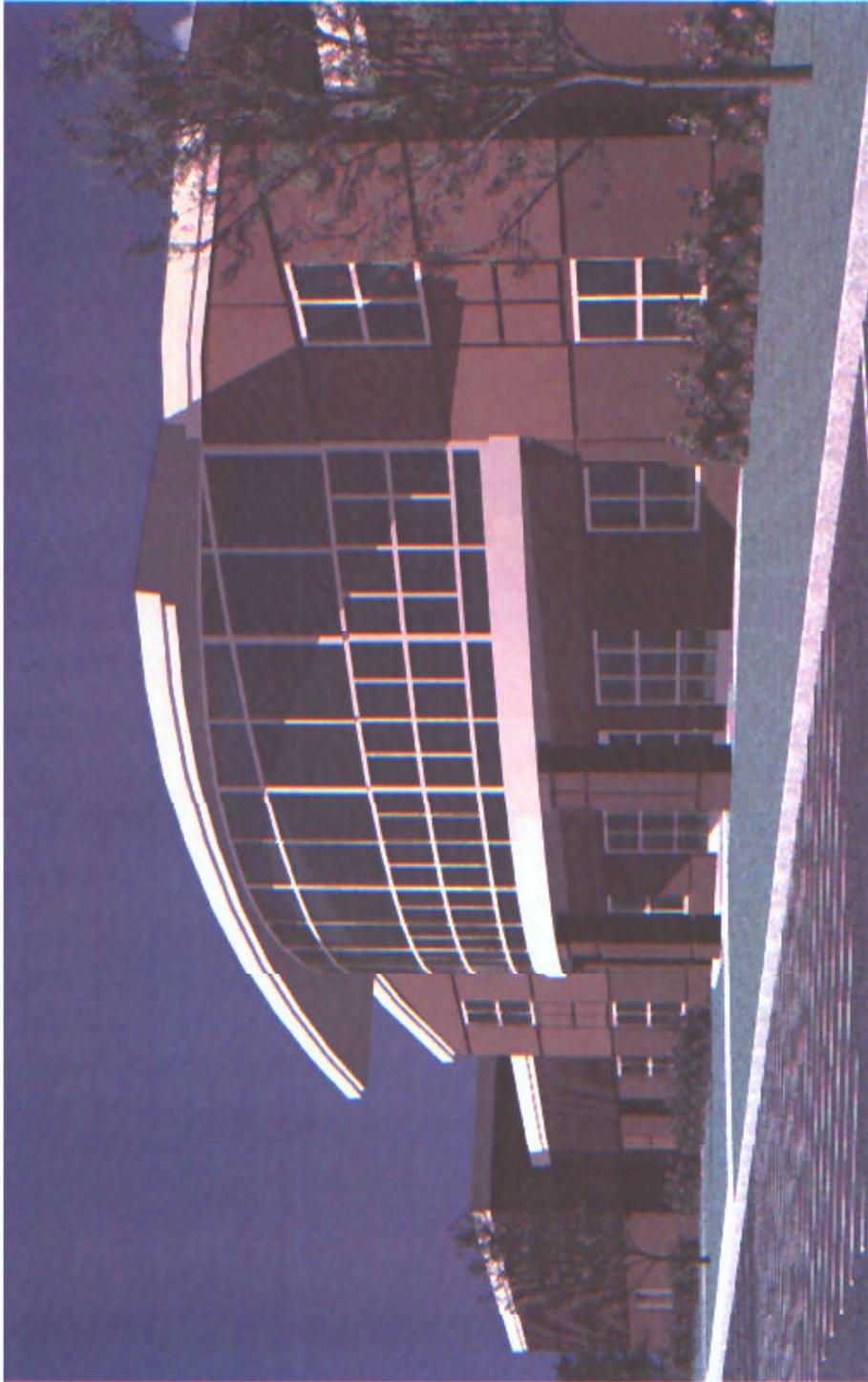
MAINTENANCE & OPERATIONS FACILITY FOR  
THE 2nd MARINE DIVISION RECON BATTALION,  
COURTHOUSE BAY, CAMP LEJEUNE, NORTH CAROLINA



BIRDSEYE

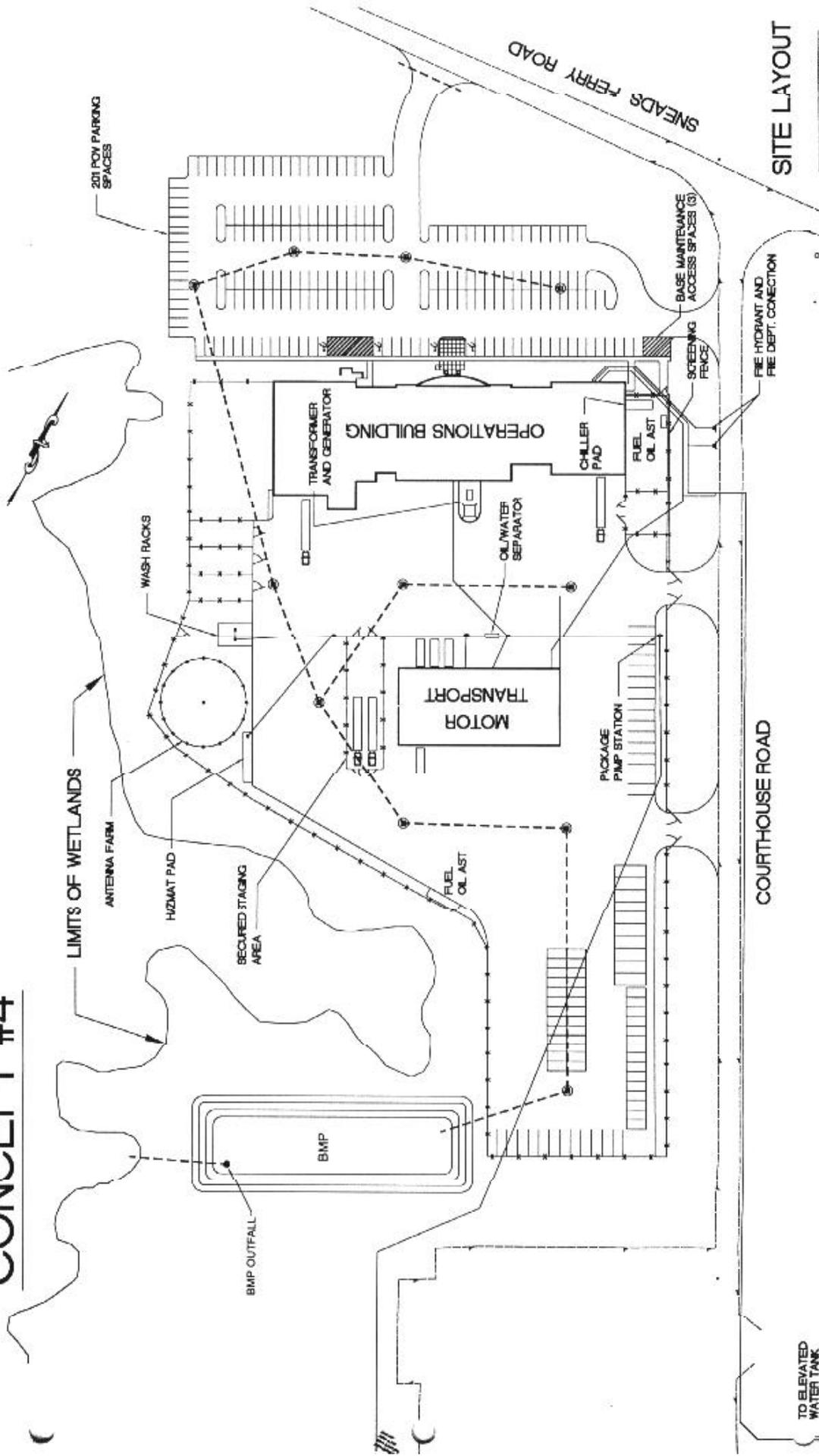


**MAINTENANCE & OPERATIONS FACILITY FOR  
THE 2nd MARINE DIVISION RECON BATTALION,  
COURTHOUSE BAY, CAMP LEJEUNE, NORTH CAROLINA**



**PERSPECTIVE**

# CONCEPT #4



SITE LAYOUT



COURTHOUSE ROAD

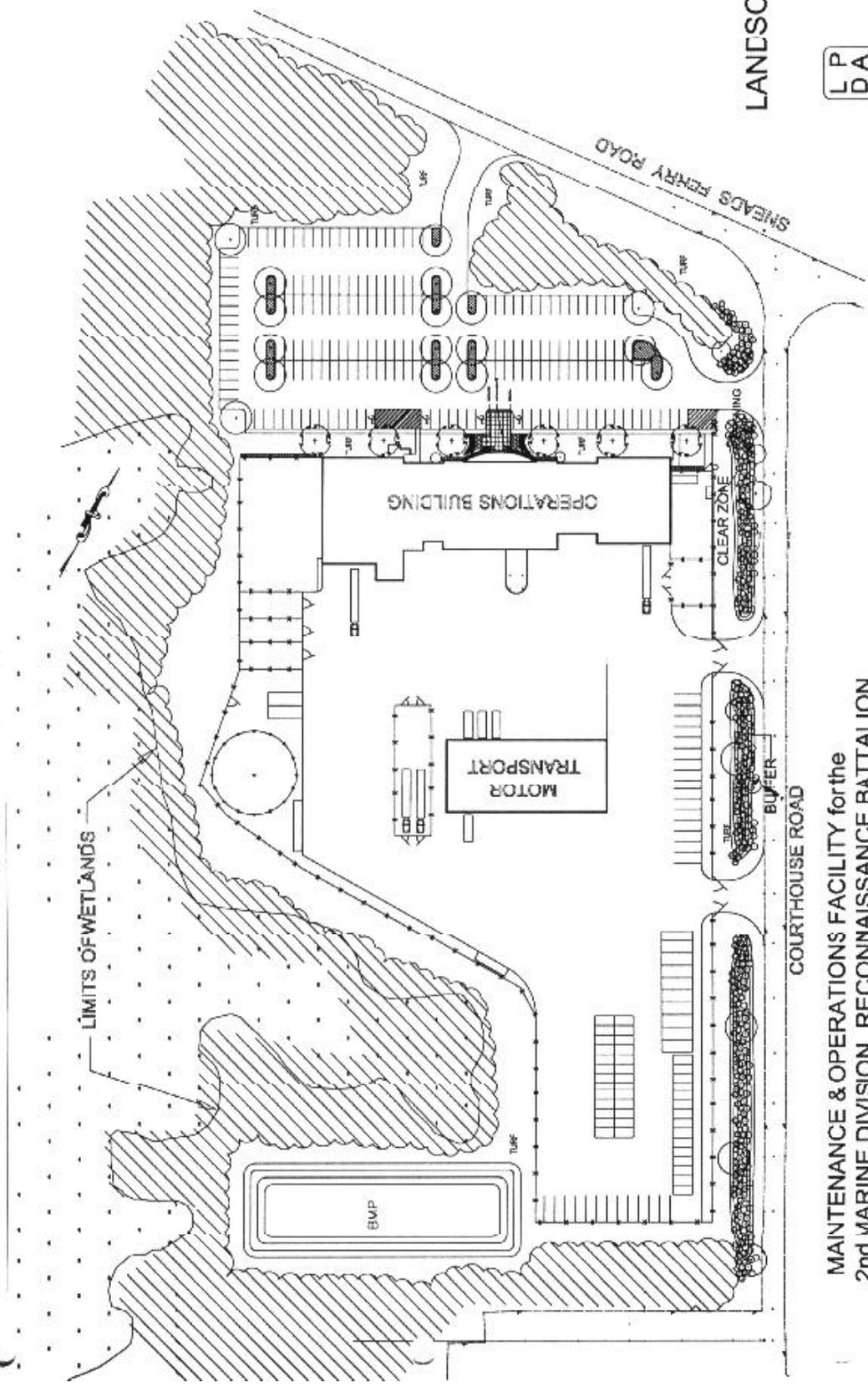
SNEADS FERRY ROAD

TO ELEVATED WATER TANK

MAINTENANCE AND OPERATIONS FACILITY for the  
2nd MARINE DIVISION, RECONNAISSANCE BATTALION  
COURTHOUSE BAY, CAMP LEJEUNE, NORTH CAROLINA

# CONCEPT #4

- KEY
- LARGE & SMALL SHADE TREE
  - LIVE OAK
  - RED MAPLE
  - SKY PINE
  - SAWTOOTH OAK
  - BROADLEAF EVERGREEN
  - AMERICAN HOLLY
  - SOUTHERN MAGNOLIA
  - RED BAY
  - FLOUNDER TREE
  - DOGWOOD
  - REDWOOD
  - WAX EVERGREEN TREE
  - LOW LIME PINE
  - LORDBURY PINE
  - EVERGREEN UNDERSTORY
  - SOUTHERN MAHOGANY
  - POINT PINE
  - CAROLINA CHERRYLAUREL
  - AMERICAN HOLLY
  - FLOWERING UNDERSTORY SHRUBS
  - MEXICAN BEAUTY BUSH
  - SKY PINE
  - LOW SPUR MASS / PINE
  - AMERICAN HOLLY
  - LORDBURY PINE
  - AMERICAN HOLLY
  - ROSE HAZEL
  - SMOOTH CORYMBUS
  - SKY PINE
  - LIVE OAK
  - BANGOR PEGANOLA



## LANDSCAPE PLAN



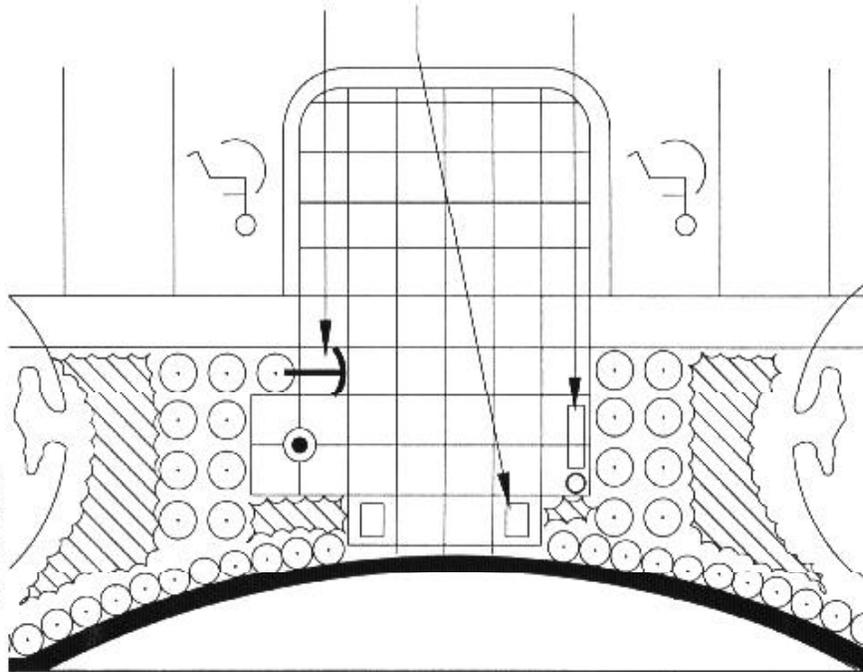
LP  
DA

LINC PLANNING & DESIGN ASSOCIATES, INC.  
LANDSCAPE ARCHITECTS AND ENGINEERS  
CHARLOTTEVILLE, VA

MAINTENANCE & OPERATIONS FACILITY for the  
2nd MARINE DIVISION, RECONNAISSANCE BATTALION  
COURTHOUSE BAY, CAMP LEJEUNE, NORTH CAROLINA

# CONCEPT #4

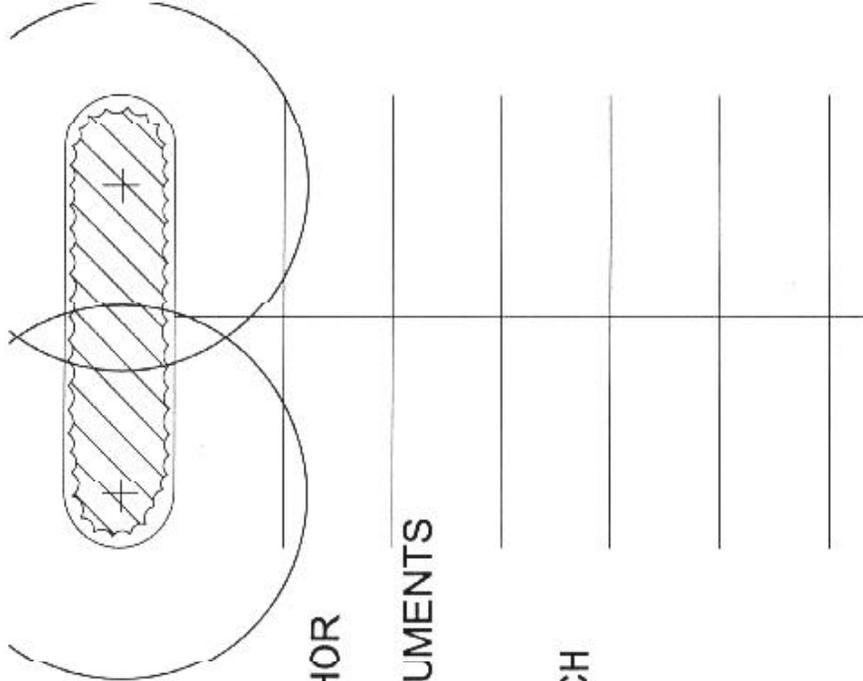
SCALE NTS



ANCHOR

MONUMENTS

BENCH



ENTRY AREA

MAINTENANCE & OPERATIONS FACILITY for the  
2nd MARINE DIVISION, RECONNAISSANCE BATTALION  
COURTHOUSE BAY, CAMP LEJEUNE, NORTH CAROLINA



# CONCEPT #4

SCALE 3/64" = 1'-0"



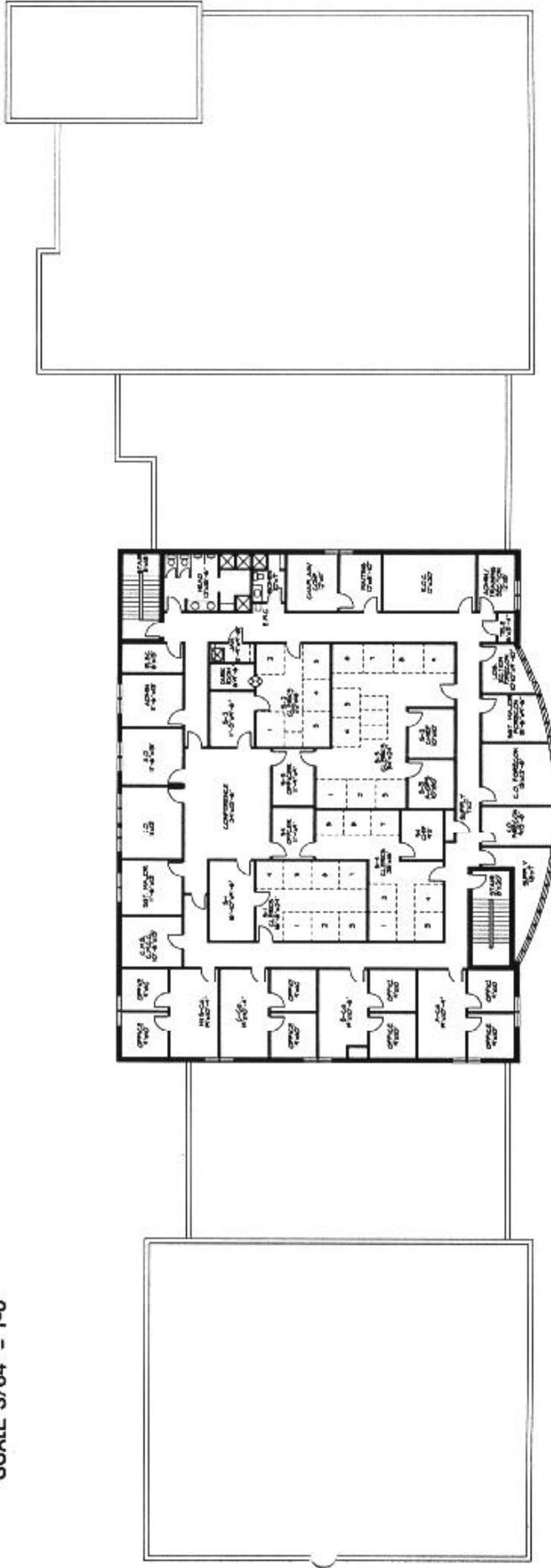
## OPERATIONS / ADMINISTRATION BUILDING



MAINTENANCE & OPERATIONS FACILITY for the  
2nd MARINE DIVISION, RECONNAISSANCE BATTALION  
COURTHOUSE BAY, CAMP LEJEUNE, NORTH CAROLINA

# CONCEPT #4

SCALE 3/64" = 1'-0"



OPERATIONS /  
ADMINISTRATION  
BUILDING  
SECOND FLOOR



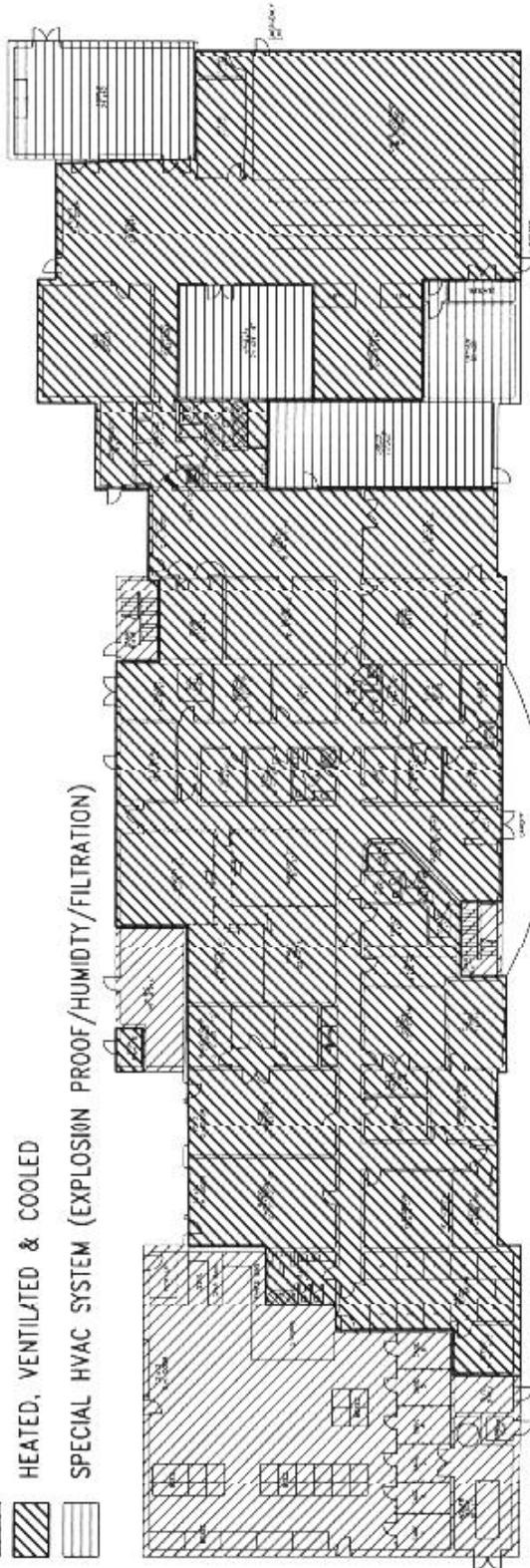
MAINTENANCE & OPERATIONS FACILITY for the  
2nd MARINE DIVISION, RECONNAISSANCE BATTALION  
COURTHOUSE BAY, CAMP LEJEUNE, NORTH CAROLINA



# CONCEPT #4

SCALE: NONE

-  HEATED & VENTILATED
-  HEATED, VENTILATED & COOLED
-  SPECIAL HVAC SYSTEM (EXPLOSION PROOF/HUMIDITY/FILTRATION)



SUPPLY

COMMUNICATIONS

ARMORY

BATTALION AID

DIVE LOCKERS

ESCALATOR

MECHANICAL SPACE  
CONDITIONING  
ALLOCATION

FIRST FLOOR OPERATIONS/ADMINISTRATION BUILDING

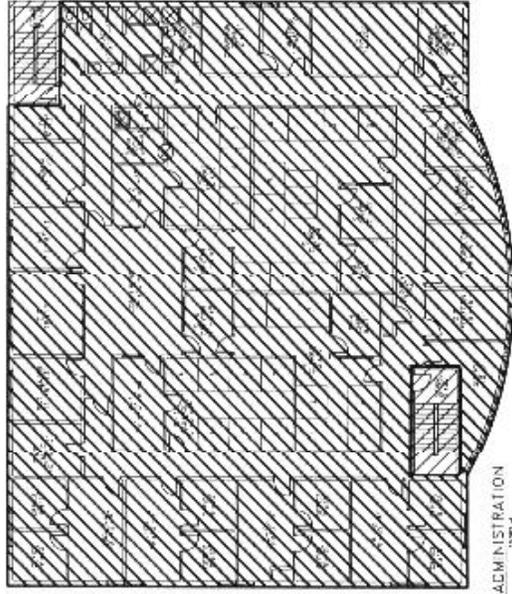
**MAINTENANCE & OPERATIONS FACILITY for the  
2nd MARINE DIVISION, RECONNAISSANCE BATTALION  
COURTHOUSE BAY, CAMP LEJEUNE, NORTH CAROLINA**



# CONCEPT #4

SCALE NONE

-  HEATED & VENTILATED
-  HEATED, VENTILATED & COOLED
-  SPECIAL HVAC SYSTEM (EXPLOSION PROOF/HUMIDITY/FILTRATION)



MECHANICAL SPACE  
CONDITIONING  
ALLOCATION

SECOND FLOOR OPERATIONS/ADMINISTRATION BUILDING

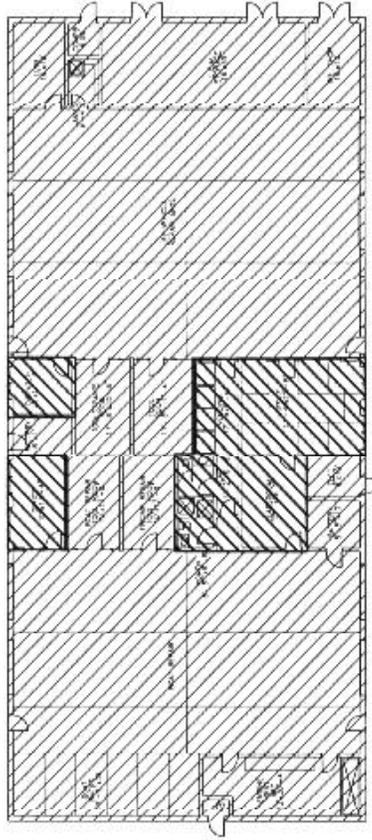
**MAINTENANCE & OPERATIONS FACILITY for the  
2nd MARINE DIVISION, RECONNAISSANCE BATTALION  
COURTHOUSE BAY, CAMP LEJEUNE, NORTH CAROLINA**



# CONCEPT #4

SCALE: NONE

-  HEATED & VENTILATED
-  HEATED, VENTILATED & COOLED
-  SPECIAL HVAC SYSTEM (EXPLOSION PROOF/HUMIDITY/FILTRATION)



BOAT REPAIR  
10' x 10'

ACTOR TRANSPOST  
10' x 10'

VEHICLE MAINTENANCE BUILDING

MECHANICAL SPACE  
CONDITIONING  
ALLOCATION

**MAINTENANCE & OPERATIONS FACILITY for the  
2nd MARINE DIVISION, RECONNAISSANCE BATTALION  
COURTHOUSE BAY, CAMP LEJEUNE, NORTH CAROLINA**







**COST ESTIMATE MASTER SUMMARY**

FACD FINAL CONCEPT PRESENTATION

February 4, 1999

MCON PROJECT P-568, MAINTENANCE AND OPERATIONS FACILITY FOR THE  
 2ND MARINE DIVISION RECONNAISSANCE BATTALION  
 MCB CAMP LEJEUNE, NORTH CAROLINA

CODE ITEM	OPERATIONS/ADMIN. BUILDING		VEHICLE MAINT. BUILDING		TOTAL COST FINAL CONCEPT 50,269 S.F.
	39,597 S.F.	S.F.	10,592 S.F.	S.F.	
<b>PRIMARY FACILITIES</b>					
01	01	01	01	01	01
01	01	01	01	01	01
02	02	02	02	02	02
03	03	03	03	03	03
04	04	04	04	04	04
05	05	05	05	05	05
06	06	06	06	06	06
08	08	08	08	08	08
09	09	09	09	09	09
10	10	10	10	10	10
11	11	11	11	11	11
12	12	12	12	12	12
13	13	13	13	13	13
14	14	14	14	14	14
SUB-TOTAL, PRIMARY FACILITIES					
DISTRIBUTED COSTS, PRIMARY FACILITIES					
TOTAL, PRIMARY FACILITIES					
<b>SUPPORTING FACILITIES</b>					
17	17	17	17	17	17
18	18	18	18	18	18
19	19	19	19	19	19
20	20	20	20	20	20
21	21	21	21	21	21
SUB-TOTAL, SUPPORTING FACILITIES					
DISTRIBUTED COSTS, SUPPORTING FACILITIES					
TOTAL, SUPPORTING FACILITIES					
TOTAL ESTIMATED COST OF CONSTRUCTION (E.C.C.), BASE BID					
TOTAL ESTIMATED COST OF CONSTRUCTION (E.C.C.), BASE BID, ROUNDED					
<b>ADDITIVE BID ITEMS</b>					
ADDITIVE BID ITEM #1	VEHICLE LIFT				
ADDITIVE BID ITEM #2	ANTENNA FARM / MULTI-LEVEL LIGHTING				
ADDITIVE BID ITEM #3	PARACHUTE BRIEFING / RAPELLING PLATFORM				
ADDITIVE BID ITEM #4	BOAT SHELTER				
ADDITIVE BID ITEM #5	ADDITIONAL LANDSCAPING				
TOTAL ESTIMATED COST OF CONSTRUCTION (E.C.C.), INCLUDING ADDITIVES, ROUNDED					

## **SECTION 4**

### **FACD PROCESS**

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#### **Team Configuration**

The Atlantic Division (LANTDIV) of the Naval Facilities Engineering Command (LANTNAVFAC-ENGCOR), awarded the design of the Second (2nd) Reconnaissance (Recon) Battalion Maintenance and Operations Facilities project to the design team headed by HBA Architects of Virginia Beach, Virginia. The assigned task included conducting a Function Analysis Concept Development (FACD) workshop as part of the design process.

The primary FACD team included personnel from the architect-engineer (A-E) design team; LANTDIV design, project management and planning; United States Marine Corps (USMC) 2nd Recon Battalion; Marine Corps Base Camp Lejeune facilities, planning and public works; and the FACD facilitators from Lewis & Zimmerman Associates, Inc.

#### **Activities and Schedule**

The basic FACD approach was to utilize function analysis techniques and the job plan associated with Value Engineering, to identify the users' functional operating and facility needs and to translate them into a set of scope/criteria documents that would allow the project design to progress to the 35% design stage in a very short period of time. As the FACD workshop progressed, costs were evaluated to validate authorized budget limitations.

The Value Engineering Job Plan was followed as a guide to establish work activities and the general schedule. The Job Plan consists of six phases including: Information Gathering; Function Analysis; Creative Phase; Evaluation of Potential Alternatives; Development of Surviving Alternatives; and Presentation Phase. In the setting of the FACD effort, Value Engineering is one of the tools employed to help attain the goals of the FACD effort. The various phases of the Job Plan are practiced as needed and not necessarily in the normal, rigid fashion as they are in a Value Engineering Study.

The FACD team began investigating project requirements and obtaining available information prior to the start of the study. The design team made site visits and worked extensively with representatives of the 2nd Recon Battalion in preparation for the FACD. It is difficult to overstate the importance of the assistance provided by the Battalion in helping the designers become fully aware of the functioning and needs of the unit for the completed project. In particular, Master Sergeant Robert J. Hudson was an enthusiastic advocate of the project and presented well prepared, graphically accurate sketches and information as required to formulate the design.

The FACD kickoff meeting was conducted at HBA Architects' office on January 13, 1999. This was done to introduce the FACD Process to the various participants, present the agenda and discuss the events that would occur during the workshop in Jacksonville, North Carolina. The meeting was presided over by Mr. William R. Bogue, PE, CVS, the Value Engineer for LANTDIV from Norfolk, Virginia. Mr. Bogue emphasized the need for the FACD team to come to the workshop prepared with drawings, cost estimate and other information required to present their initial project concept. Mr. Charles R. McDuff, PE, CVS, CCE, the FACD facilitator, reviewed the agenda for the workshop and

noted that the agenda was to be used as a flexible guideline. The initial agenda is enclosed in this section of this report.

The main thrust of the FACD workshop was to develop a project that could be constructed within budget, remain within the stated DD1391 area requirements, and still provide the users with facilities that would meet their needs. Pertinent meeting agendas, meeting minutes and telephone conversation records are listed in chronological order and are included as attachments at the end of this section.

The first information phase document prepared was a cost summary sheet indicating where costs are incurred in the project. The costs shown were based on the preliminary design documents prepared by the design A-E. Going into the FACD, the project was approximately \$1,000,000 and 5,000 square feet over budget. This is not unusual as the designers are charged to prepare a preliminary concept design based on the stated needs of the end users, and not to limit the preliminary design by cost. It is one of the key functions of the FACD effort to refine the design to meet the design budget in terms of cost and square footage, while at the same time fulfilling the functional requirements of the end users.

Based on the DD1391 requirements, user interviews and site visits, the FACD team initiated function analysis studies. The participants at the on-site kickoff meeting/Concept #1 presentation were asked to identify the key functions to be accomplished by the new facilities. These functions were summarized in the enclosed *Random Function Analysis* worksheets. Additionally, these functions were refined into a *Function Logic Diagram* which is also enclosed and portrays the flow of functions within the finished project. These documents are helpful to the decision making process, when FACD team members are called on to make difficult choices necessary to bring the project into cost and square footage budgets.

The FACD team was led by the team facilitator through several brainstorming sessions following the presentation of each Concept Design, after which the ideas were evaluated for usefulness to the project in terms of:

- contributing to controlling the final project cost
- reducing life cycle costs
- better meeting the needs of the end users
- making the project more durable and maintainable
- extending the useful life of the finished project

The creative ideas which were generated during various brainstorming sessions and their evaluations are presented later in this section.

From the initial kickoff meeting/Concept #1 presentation on January 25, 1999, the floor plans, perspectives, site plans, along with electrical, mechanical, and civil engineering and landscape architectural concepts were polished and revised in a reiterative fashion. This was done through a series of close discussions with end users, base technical representatives, and the LANTDIV project management team. These reiterative efforts were reflected in Concepts #1 - #4 and were ultimately refined into that form which is presented in Section 3, entitled *Final Conceptual Design Description* of this report.

The FACD team refined this Report and began the process of obtaining formal acceptance signatures from all appropriate representatives. This was accomplished by February 4, 1999, and a copy of the Endorsements is included in Section 1 of this report.

### **Other Criteria and Documentation**

The following is a generic outline of the information obtained and used during the development of this study:

- Existing utility drawings and other information were obtained by the civil, and electrical project team members to a sufficient extent that utility services were established and verified.
- Current information about the flood elevation requirements necessary to protect the new buildings and facilities.
- Existing topographic information

### **Cost Data**

Generally, R. S. Means Cost Data guides were used as the main source of unit cost data for this effort. In addition, local supplier quotes and designers' in-house databases were used as needed.

The cost model immediately following this narrative depicts the cost distribution for Concept #1 and was used by the FACD team to help focus their attention on key cost concerns.

**CONSTRUCTION COST/PARETO CHART**  
**MAINTENANCE AND OPERATIONS FACILITIES**

2nd Division Reconnaissance Battalion  
 Marine Corps Base, Camp Lejeune, North Carolina

<b>SUMMARY OF CONSTRUCTION COSTS - By Facilities</b>			
Primary Facilities	5,529,082	73.43%	29
Supporting Facilities	2,000,178	26.57%	10.4909209159857
SUBTOTAL	\$7,529,260	100.00%	
Quality Control	150,585	2.00%	
Subtotal	7,679,845		
Bond Cost	76,798	1.00%	
Subtotal	7,756,644		
Escalation	193,916	2.50%	
Subtotal	7,950,560		
Design Contingency	397,528	5.00%	
GRAND TOTAL	\$8,348,088	10.88%	Composite Mark-Up

<b>Summary Costs - Primary Facility</b>			
Exterior Closure	1,441,426	26.07%	29
Interior Construction	834,944	15.10%	16.7982095508198
HVAC	771,735	13.96%	15.5265098589869
Substructure	538,471	9.74%	10.833479484899
Interior Finishes	448,384	8.11%	9.02102223770072
Superstructure	411,755	7.45%	8.28408464950681
Roofing	347,553	6.29%	6.99240682490811
Electrical Power and Lighting	235,980	4.27%	4.7476734844522
Communications, Security and Alarm	174,920	3.16%	3.51920944953123
Equipment	118,365	2.14%	2.38138135429776
Fire Protection Systems	116,851	2.11%	2.35092124049379
Plumbing	81,580	1.48%	1.64130520748204
Furnishings	7,118	0.13%	0.143206796602809
SUBTOTAL	\$5,529,082	100.00%	

<b>Summary Costs - Supporting Facilities</b>			
Site Improvements	714,112	35.70%	29
Site Electrical Utilities	612,500	30.62%	24.8735492471769
Site Preparation	365,138	18.26%	14.8282090204338
Site Civil/Mechanical Utilities	180,628	9.03%	7.33528074027603
Accessory Structures	127,800	6.39%	5.18994219394157
SUBTOTAL	\$2,000,178	100.00%	

# RANDOM FUNCTION ANALYSIS



PROJECT: <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	SHEET NO. 1 of 3	
DESCRIPTION <b>OVERALL PROJECT</b>	FUNCTION	
	VERB	NOUN
	Administer	Operation
	Train	Recon Marines
	Administer	Training
	Maintain	Vehicles
	Maintain	Communication Equipment
	Maintain	Weapons
	Maintain	Boats
Medical	Maintain	Bodies
	Communicate	Information
	Consolidate	Operations
	Store	Materials
	Store	Weapons
	Store	Gear
	Store	Records
	Replace	Inadequate Facilities
	Stage	Deployment
Architectural	Make	Statement
	Secure	Facilities
	Control	Access
	Control	HAZMAT
	Monitor	Health

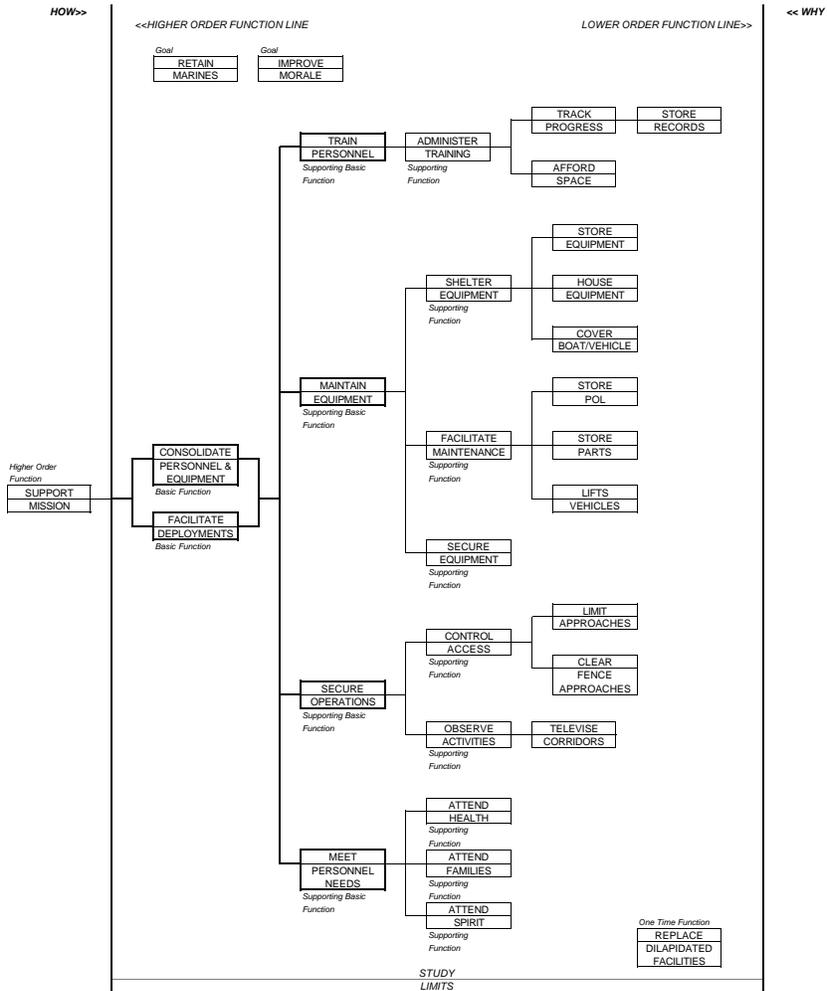
# RANDOM FUNCTION ANALYSIS



PROJECT: <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>		SHEET NO. 2 of 3	
DESCRIPTION	FUNCTION		
	VERB	NOUN	
	Treat	Casualties	
	Protect	Environment	
	Ready	Equipment	
	Provide	Hurricane Protection	
	Receive	Goods	
	Access	Utilities	
	Secure	Operations	
	Facilitate	Traffic Flow	
	Dispense	Equipment	
	Facilitate	Communication	
	Support	Boat Operations	
	Support	Dive Operations	
	Support	Parachute Operations	
	Store	Deployment Containers	
	Provide	Helicopter Rope Suspension Training (HRST)	
	Process	Parachutes	
	Store/Secure	Classified Material	
	Energize	Equipment	
Foundations	Support	Loads	
	Illuminate	Work Spaces	



FUNCTION LOGIC DIAGRAM  
**MAINTENANCE AND OPERATIONS FACILITIES**  
 2nd Reconnaissance Battalion  
 Marine Corps Base, Camp Lejeune, North Carolina



# CONCEPT #1 CREATIVE IDEA LISTING



<b>PROJECT:</b> 2nd Recon Battalion, Maintenance & Operations Facilities <i>Function Analysis Concept Development (FACD)</i>		<b>LOCATION:</b> Camp Lejeune, NC
<b>ELEMENT/DISCIPLINE:</b> SITEWORK (SW)		SHEET NO. 1 of 2
<b>ALT. NO.</b>	<b>IDEA DESCRIPTION</b>	<b>RESPONSIBILITY</b>
SW-1	Contact Public Works to verify location of flood plain	(✓) MSA and Public Works
SW-2	Confirm location, availability, quality and schedule of fiber optic cabling	(✓) PACE, Fred Estes and Rich Roamer @ 451-2100
SW-3	Confirm location, availability, quality and schedule of other communication cabling	(✓) PACE, Fred Estes and Rich Roamer @ 451-2100
SW-4	Confirm status of on-going study for archeology, endangered species, wetlands, etc.	(✓) Land Planning & Design, MSA and Fred Estes
SW-5	Verify antenna farm layout and assure distance from building is adequate for line losses	(✓) PACE and M/SGT Hudson
SW-6	Verify requirements for site security clear zones	(✓) HBA, MSA, PMO, and M/SGT Hudson
SW-7	Clarify bulk oxygen (O <sub>2</sub> ) and accessibility (paving?)	(✓) HBA
SW-8	Clarify location of exterior transformers	(✓) PACE; See Alternative No. B-11
SW-9	Review adequacy of site space - consider deployment containers	(✓) HBA and M/SGT Hudson
SW-10	Confirm fire water pressure	(✓) MSA
SW-11	Confirm the need for a depressed loading dock	(✓) HBA
SW-12	Verify capacity of existing sewer lines and need for a lift station	(✓) MSA
SW-13	Verify accessibility of exterior equipment: chillers, oil separator/storage, transformers, etc. for maintenance and Public Works	(✓) See Alternative No. B-11
<b>Rating:</b> ✓ = To Be Investigated/Incorporated;      X = Not To Be Investigated/Incorporated; ∅ = To Be Used Only As A Cost Cutting Effort      ABD = Already Being Done		



# CONCEPT #1 CREATIVE IDEA LISTING



PROJECT: <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>		LOCATION: Camp Lejeune, NC
ELEMENT/DISCIPLINE: <b>BUILDING (B)</b>		SHEET NO. 1 of 3
ALT. NO.	IDEA DESCRIPTION	RESPONSIBILITY
B-1	Reduce square footage by Team work: A - Eliminate Covered Boat Storage/Shelter; B - Confirm Square Foot Allocation; C - Eliminate HAZMAT Storage; D - Reduce Space Across The Board By 10%	(✓) HBA, 2nd RECON and Camp Lejeune Teams
B-2	Confirm size of Paraloft	(✓) HBA and SGT Eyl
B-3	Use oven dryer(s) for parachute drying	(X)
B-4	Confirm extent of close circuit television (CCTV) use	(✓) PACE and PMO
B-5	Determine location and type of soundproofing	(✓) HBA, HMCS Downey and GM <sup>C</sup> /SW(DV) Nicholson
B-6	Confirm structural slab-on-grade loading distribution	(✓) HBA, M/SGT Hudson and Public Works
B-7	Maximize building use flexibility	ABD
B-8	Review Americans with Disabilities Act (ADA) accessibility	(✓) HBA and Dale Harris
B-9	Confirm size and need for emergency generator	(✓) PACE, M/SGT Hudson and HMCS Downey
B-10	Use temporary emergency generator hook-up	(X)
B-11	Provide exterior access for utility maintenance by Public Works	(✓) HBA to resolve issue with Public Works and Base Maintenance
B-12	Move Armory to building's exterior	(X)
B-13	Provide alternative access to Armory for weapons dispensing/recovery	(✓) HBA

Rating: ✓ = To Be Investigated/Incorporated; X = Not To Be Investigated/Incorporated;  
 ∅ = To Be Used Only As A Cost Cutting Effort ABD = Already Being Done

# CONCEPT #1 CREATIVE IDEA LISTING



<b>PROJECT:</b> 2nd Recon Battalion, Maintenance & Operations Facilities <i>Function Analysis Concept Development (FACD)</i>		<b>LOCATION:</b> Camp Lejeune, NC
<b>ELEMENT/DISCIPLINE:</b> BUILDING (B) (Continued)		SHEET NO. 2 of 3
ALT. NO.	IDEA DESCRIPTION	RESPONSIBILITY
B-14	Incorporate seventeen Public Works comments	(✓) HBA
B-15	Capture waste heat	(✓) PACE
B-16	Reduce height of building	(✓) HBA
B-17	Open exterior Medical doors to the exterior	(✓) HBA
B-18	Provide repelling/climbing training wall	(✓) HBA
B-19	Add more conference rooms	(X)
B-20	Increase lounge/vending areas	(X)
B-21	Add female toilet facilities on first floor	(✓) HBA
B-22	Add public telephone area on first floor	(✓) HBA
B-23	Determine number and location of exterior water and electrical outlets	(✓) PACE and HBA
B-24	Camp Lejeune to provide "Able Bodied" only letter for either the entire building or only the second floor	(✓) See Alternative No. B-8
B-25	Verify cable television (CATV) system for facility	(✓) PACE and M/SGT Hudson
B-26	Verify need for a "dish" antenna to provide adequate support, i.e. structural, electrical, etc. (SATCOM)	(✓) PACE and M/SGT Hudson
B-27	Verify need of a computer local area network (LAN)	(✓) PACE and M/SGT Hudson
B-28	Verify type and extent of grounding grid	(✓) PACE
B-29	Verify need for a building lightning protection system	(✓) PACE
B-30	Provide for a secure Quarterdeck	(X)
B-31	Determine location of fire pump	(✓) HBA and PACE
<b>Rating:</b> ✓ = To Be Investigated/Incorporated;      X = Not To Be Investigated/Incorporated; ∅ = To Be Used Only As A Cost Cutting Effort      ABD = Already Being Done		



# CONCEPT #1 CREATIVE IDEA LISTING



PROJECT: <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>		LOCATION: Camp Lejeune, NC
ELEMENT/DISCIPLINE: <b>VEHICLE MAINTENANCE BUILDING (M)</b>		SHEET NO. 1 of 1
ALT. NO.	IDEA DESCRIPTION	RESPONSIBILITY
M-1	Use female head in main building	(X)
M-2	Reduce building's height	(✓) HBA
M-3	Use a unisex toilet facility	(X)
M-4	Use an exterior brick wainscot with metal panel system above wainscot	(∅)
M-5	Use exterior brick facade on presented faces only	(∅)
M-6	Eliminate two Boat Repair Bays	(X)
M-7	Eliminate two Vehicle Repair Bays	(X)
M-8	Reduce the building's footprint	(✓) HBA
M-9	Eliminate a lift	(∅)
M-10	Use classroom in main building	(X)
M-11	Add more boat storage	(X)
M-12	Add more motor storage	(X)
M-13	Reduce the size of the classroom	(✓) See Alternative No. M-8
M-14	Stack the administration areas	(X)
M-15	Stack motor storage	ABD
M-16	Redistribute head space	(✓) HBA

**Rating:** ✓ = To Be Investigated/Incorporated; X = Not To Be Investigated/Incorporated;  
 ∅ = To Be Used Only As A Cost Cutting Effort ABD = Already Being Done



# CONCEPT #2 CREATIVE IDEA LISTING



<b>PROJECT:</b> 2nd Recon Battalion, Maintenance & Operations Facilities <i>Function Analysis Concept Development (FACD)</i>		<b>LOCATION:</b> Camp Lejeune, NC
<b>ELEMENT/DISCIPLINE:</b> OVERALL FACILITY		<b>SHEET NO.</b> 1 of 2
<b>ALT. NO.</b>	<b>IDEA DESCRIPTION</b>	<b>RESPONSIBILITY/RATING</b>
1	Pay MCB, Camp Lejeune communication contractor to run communications	(✓)
2	Eliminate ductbank	(✓)
3	Use base wide infrastructure improvement program for communications	(✓)
4	Use half-height metal panel exterior enclosure (metal structure?)	(✓)
5	Reduce administration area	(✓)
6	Use a two pipe heating, air conditioning and ventilation (HVAC) system	(∅)
7	Use additive bid items: (a) eliminate flag pole; (b) reduce privately owned vehicle (POV) parking spaces; (c) reduce landscaping; (d) eliminate repelling facility; (e) eliminate antenna farm poles - keep conduit	(✓)
8	Reduce HVAC redundancy	(✓)
9	Review finishes	(✓)
10	Use combination ceilings	(∅)
11	Use task lighting in medical area	(✓)
12	Eliminate closed circuit television (CCTV) for site	(✓)
13	Eliminate Armory CCTV	(✓)
14	Straighten walls on second deck	(✓)
15	Selectively use gypsum wallboard (GWB) partitions on first deck	(✓)
16	Eliminate paging system	(✓)
17	Reduce number of cable television (CATV) outlets	(✓)
18	Eliminate multi-level exterior lighting	(✓)
19	Eliminate or reduce landscaping	(✓)
<b>Rating:</b> ✓ = To Be Investigated/Incorporated;      X = Not To Be Investigated/Incorporated; ∅ = To Be Used Only As A Cost Cutting Effort      ABD = Already Being Done		

# CONCEPT #2 CREATIVE IDEA LISTING



<b>PROJECT:</b> 2nd Recon Battalion, Maintenance & Operations Facilities <i>Function Analysis Concept Development (FACD)</i>		<b>LOCATION:</b> Camp Lejeune, NC
<b>ELEMENT/DISCIPLINE:</b> OVERALL FACILITY		<b>SHEET NO.</b> 2 of 2
<b>ALT. NO.</b>	<b>IDEA DESCRIPTION</b>	<b>RESPONSIBILITY/RATING</b>
20	Eliminate flag pole	(✓)
21	Eliminate antenna arm	(X)
22	Use exterior insulated finishing system (EIFS) for tower (i.e., Dryvit)	(X)
23	Eliminate sidewalks	(✓)
24	Eliminate power pull-down reels in Vehicle Maintenance Building and Paraloft	(✓)
25	Use gravel for POV parking	(✓)
26	Reduce the number of access points on rear of building	(X)
27	Use electronic HVAC controls - eliminate direct digital controls (DDCs)	(✓)
28	Use single zone units instead of variable air volume (VAV)	(✓)
29	Eliminate some overhead drops at Vehicle Maintenance, e.g. grease, anti-freeze	(✓)
30	Use above ground splices instead of manholes	(✓)
31	Use a stand alone HVAC system at Vehicle Maintenance Building	(✓)
32	Use a stand alone Paraloft dehumidification system	(✓)
33	Use intermediate columns in Vehicle Maintenance Building	(✓)
34	Use schedule 10 piping for sprinkler system	(✓)
35	Use cable trays for building communications runs	(∅)
36	Accommodate a lift in Vehicle Maintenance Building	(✓)
37	Use pre-engineered buildings	(X)
<b>Rating:</b> ✓ = To Be Investigated/Incorporated;      X = Not To Be Investigated/Incorporated; ∅ = To Be Used Only As A Cost Cutting Effort      ABD = Already Being Done		

# IDENTIFIED ISSUES DISPOSITION SHEET



<b>PROJECT: 2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>		Sheet No. 1 of 2
DESCRIPTION	RESULT	COMMENTS
<b>(SW) SITEWORK</b>		
Flood Plain	✓	Building not in flood plain
Fiber Optics/Communications Cables	NFA	Open issue, coordination in progress
Environmental Assessment	NFA	Open issue; not yet started
Location of Antenna Farm	✓	Confirmed
Security Clear Zones	✓	Coordinated
Building Screening	✓	No plantings within perimeter
Location of Oxygen Bulk Storage	✓	Will stay in current location
Transformer Location	✓	Resolved
West and Northwest Property Lines	✓	Will stay as is
Fire Water Pressure	✓	Booster needed
Outward Security Lighting	✓	Will be provided
Exterior lighting	✓	Will be provided
Mobilization Lighting	✓	Will be provided if budget permits
Site Security/Gates	✓	Will be provided if budget permits
Loading Dock Drainage	✓/X	Dock eliminated
Sewage Lift Station Capacity	✓	No upgrade required
Chillers/Oil Storage Location	✓	Not a stand alone issued
Number of Privately Owned Vehicle (POV) Parking Spaces	✓	Coordinated
Deployment Container Storage	✓	More pavement being added
Cost	✓	Concept #4 in budget
✓ = Addressed; NFA - Needs Further Action; X = No Longer an Issue		

# IDENTIFIED ISSUES DISPOSITION SHEET



PROJECT: <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>		Sheet No. 2 of 2
DESCRIPTION	RESULT	COMMENTS
<b>(B) BUILDING</b>		
Budget	✓	Concept #4 in budget
Closed Circuit Television (CCTV)	✓	Coordinated with end users
Square Foot Computation/Limitation	✓	Done
Soundproofing	✓	Coordinated with the activity
Oxygen Storage Location	✓	Will stay in current location and be secured
Structural Floor Loading	✓	Determined
Potential Future Reorganization	✓	Outside the design scope of work
Americans with Disabilities Act (ADA) Requirements	✓	Documentation in progress
Total Personnel Count	✓	Information confirmed
Provost Marshal's Office (PMO) Concerns	✓	Coordinated
Size/Need for Emergency Generator	✓	Need is determined; design in progress
Exterior Access for Utilities' Maintenance (oil storage, chillers, transformers, etc.)	✓	Will not be provided per L. Brant
Armory Design/Location/Access	✓	Worked out with end user. Design guidelines in hand. Intrusion Detection System (IDS) coordinated
<b>(M) VEHICLE MAINTENANCE BUILDING</b>		
Fire Sprinkler Requirement	✓	Will be as designed in Concept #1
Female Head	✓	Will be provided
Cost	✓	Concept #4 in budget
Square Footage	✓	Done
✓ = Addressed; NFA - Needs Further Action; X = No Longer an Issue		

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 27, 1999  
TIME: 8:40 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Paraloft Maintenance Units

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Jerry M. Spiker	Structural Engineer	HBA
SGT Jeff Eyl	2nd Recon Bn Paraloft	2nd Recon Battalion

ITEMS DISCUSSED:

- Rotisserie units in Paraloft Maintenance Area  
9-feet x 5-feet  
9- to 10-feet high
- Weight is unknown but is very heavy.
- Electrical requirement: standard plug-in

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 27, 1999  
TIME: 10:00 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Fence Location and Buffering

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
<u>MSGT Robert J. Hudson</u>	<u>2nd Force Recon Company</u>	<u>2nd Recon Battalion</u>
<u>Bill R. Mechnick</u>	<u>Landscape Architect</u>	<u>LPDA</u>
<u>Doug M. Will</u>	<u>Civil Engineer</u>	<u>MSA</u>
<u>Scott R. Davis</u>	<u>Civil Engineer</u>	<u>MSA</u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>

ITEMS DISCUSSED:

- MSGT Hudson stated the clear zone requirement for perimeter fence was 20-feet inside and 30-feet outside.
- MSGT Hudson stated he needed all areas clear inside the perimeter fence. No landscaping will take place within the fenced area or clear zones, and no effort will be made to save existing tree by moving the fence, etc.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: 27 January 1999  
TIME: 10:00 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Motor Transport Operations

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
MSGT John J. Zeh	Motor Transport (MT)	2nd Recon Battalion
Scott R. Davis	Civil Engineer	MSA

ITEMS DISCUSSED:

- Ramped wash racks must be sized for both HMVs and five-ton trucks. Ramped areas to allow the washing of the underside of vehicles is what is desired. On the average, MT washes 5 - 6 vehicles per day with 10 - 12 being a real peak rate plus or minus 1 time/month.
- The dumpster is currently outside of his compound. Storage container dimensions will be obtained and provided prior to Friday.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 27, 1999  
TIME: 10:15 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Dive Locker

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Jerry M. Spiker	Structural Engineer	HBA
GM <sup>C</sup> /SW(DV) John Nicholson	Dive Locker	2nd Recon Battalion

ITEMS DISCUSSED:

- Both compressors for Dive Locker will be in the Compressor Room.
- Compressor will require louvers to outside.
- Hoist in Dive Locker is two-ton.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 27, 1999  
TIME: 11:00 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Various issues

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
MSGT Robert J. Hudson	2nd Force Recon Company	2nd Recon Battalion
Jim S. Bedois	Electrical Engineer	PACE Collaborative

ITEMS DISCUSSED:

1. Laid out cable television (CATV) outlets - see attached annotated plans. As a cost cutting measure, all outlets *except* those in S2, ROC, 2nd Floor Conference Room and the Duty Desk may go.
2. Laid out exterior power outlets - Annotated plans provided to the design team.
3. Discussed site lighting - Annotated plans provided to the design team.
4. Discussed local area network (LAN) - Annotated plans provided to the design team.
5. Discussed general requirements in various spaces - Annotated plans provided to the design team.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 27, 1999  
TIME: 1:50 p.m.  
LOCATION: (if meeting) In car  
RE: Grounding

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Andy Young	Electrical Engineer	PW, Camp Lejeune
Jim S. Bedois	Electrical Engineer	PACE Collaborative

ITEMS DISCUSSED:

1. We will use a grounding girdle for the Operations/Administration Building.
2. We will use a single terminal lightning protection system for the Operations/Administration Building. Andy Young will provide a specification and manufacturers' information
3. No special grounding (no girdle, no lightning protection) for the Vehicle Maintenance Building.
4. No grounding required at antenna farm - Marines do everything required themselves.

# FACD WORKSHOP MEETING MINUTES/TELEPHONE CONVERSATION RECORD

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DATE: January 27, 1999  
 TIME: 2:00 p.m.  
 LOCATION: (if meeting) At proposed site  
 RE: Electrical

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Andy Young	Electrical Engineer	PW, Camp Lejeune
Jim S. Bedois	Electrical Engineers	PACE Collaborative
J. Mike Newell	Mechanical Engineer	PACE Collaborative

ITEMS DISCUSSED:

1. Lightning protection - ERICO system only, i.e. Erico Red: contact Martin McIntyre at 864-268-5331. 20-foot rod on top of tower is okay.
2. Jim Richmond at LANTDIV can address if existing circuits can handle load.
3. Use the existing #4 neutral as the ground
4. Connect transformer  $\Delta$  to Y.
5. Cross the street with overhead service at \$15.00/linear foot.
6. Cable TV on existing overhead; bring in the same way.
7. Fiber optic cable found buried along existing overhead.
8. Mr. Young mentioned telephone and communication on fiber install below grade  $\cong$  54-inches (Andy Young not sure about depth, but must be in non-metallic flexible conduit).
9. Use two new poles to bring in overhead service.
10. Existing Guard Shack has power. Will need to remove one pole and overhead across street.
11. Existing ITT telephone panel in Guard Shack. Contact ITT and tell them to relocate. Need to contact Moral, Welfare and Recreation (MWR).
12. No project for electrical utilities are known that will affect this project by June 2001.

13. Perform field work to upgrade primary circuit if required.
14. Andy would prefer to minimize number of conduits installed in floor slabs to facilitate ease of reworking.
15. Discussed idea of possibly using a trench between Operations Building and antenna farm in lieu of conduit and pull boxes.
16. Obtained Camp Lejeune Design guide.
17. Obtained Camp Lejeune specifications on disk.
18. Obtained telephone drawings (risers) and lightning protection drawings.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 27, 1999  
TIME: 3:00 p.m.  
LOCATION: (if meeting) Public Works (PW) (Architecture), Camp Lejeune  
RE: Base Exterior Architecture Plan (BEAP) landscaping standards

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Albert Samuel, Jr.	Architect	PW, Camp Lejeune
Larry Stallings	Architect	PW, Camp Lejeune
Bill R. Mechnick	Landscape Architect	LPDA

ITEMS DISCUSSED:

- Bill R. Mechnick was instructed to follow the landscape guidelines in the BEAP. Although the site area is not covered by the BEAP, it is to be followed as an example anyway.

# FACD WORKSHOP

## MEETING MINUTES/TELEPHONE CONVERSATION RECORD

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DATE: January 27, 1999  
 TIME: 3:00 p.m.  
 LOCATION: (if meeting) Dive Lock/Paraloft  
 RE: Layout and Needs

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
GM <sup>C</sup> /SW(DV) John Nicholson	Dive Locker	2nd Recon Battalion
SGT Jeff Eyl	2nd Recon Bn Paraloft	2d Recon Battalion
Jim S. Bedois	Electrical Engineer	PACE Collaborative
J. Mike Newell	Mechanical Engineer	PACE Collaborative

ITEMS DISCUSSED:

1. Performed field work at Dive Locker :
  - a. Battery charger has a standard plug connection for lighting.
  - b. Chamber itself had no power connection.
  - c. 60 amperes (A) , three-pole (3P), non-fused (NF) disconnect for compressor for chamber which is 15 horsepower (HP), 208 volts (V), three-phase (3Ø), three-wire (3W), 39 full loaded amperes (FLA).
  - d. 60A, 3P, NF disconnect for compressor for oxygen charging which is 15HP, 208V, 3Ø, 3P, 3W, 39 FLA.
  - e. No emergency lighting required in area LAR-V.
  - f. Emergency lighting required for hyperbaric area and for oxygen jamming.
  - g. Oxygen Analyzer has a standard, hospital grade plug connection in the LAR-V area
2. Performed field work at Paraloft and discussed layout with SGT Eyl - Annotated plans provided to the design team.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: 27 January 1999  
TIME: 3:15 p.m.  
LOCATION: (if meeting) Building 58 Environmental Department  
RE: Environmental Assessment for P-568

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Brent Ashton	Environmental Department	MCB Camp Lejeune
LaRae Mishler	Environmental Department	MCB Camp Lejeune
Doug M. Will	Civil Engineer	MSA
Scott R. Davis	Civil Engineer	MSA
Bill R. Mechnick	Landscape Architect	LPDA

ITEMS DISCUSSED:

- An Environmental Assessment has not been started for this project. There is awareness that one must be conducted, but it has not been contracted at this time. It was suggested that contact be made with Coastal Management (COMA); point of contact: Terry Barrett at 252-808-2808.
- All projects within 75-feet of a body of water must be reviewed by Coastal Management. Should not affect this site - we are well outside of 75-foot from water.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 27, 1999  
 TIME: 3:30 p.m.  
 LOCATION: (if meeting) Building 58, Camp Lejeune  
 RE: Wetland Definition and Environmental Analysis

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Capt Eric Davis	Environmental Department	MCB Camp Lejeune
Doug M. Will	Civil Engineer	MSA
Scott R. Davis	Civil Engineer	MSA
Bill R. Mechnick	Landscape Architect	LPDA

ITEMS DISCUSSED:

- We were shown wetlands delineation. The proposed site does not impact the wetlands. An Army Corps of Engineers permit is required. Capt Davis did not know if an individual or nationwide permit would be required. Capt Davis would handle obtaining the permit (± six months) once he was requested to do so. Capt Davis does not consider this a major issue based upon how much we are impacting; however, mitigation is probable.
- From Capt Davis' prior research, he does not expect any endangered species to be found on site.
- An archeological study will be required because of the proximity to existing archeological finds.
- Capt Davis suggested we contact Coastal Management (COMA) at 252-808-2808 to check if we are within their jurisdiction.
- Capt Davis gave us Tom Morris with Installation Restoration Division as the contact for the existing monitoring wells being relocated or removed. Mr. Morris was in the field and will be available January 28, 1999. Mr. Morris' telephone number is 910-451-9612.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: 27 January 1999  
TIME: 3:45 p.m.  
LOCATION: (if meeting) Building 58 Environmental Department  
RE: Geographical Information System (GIS) for Site

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Frances B. Railey	Environmental Department	MCB Camp Lejeune
Scott R. Davis	Civil Engineer	MSA
Doug M. Will	Civil Engineer	MSA
Bill R. Mechnick	Landscape Architect	LPDA
Capt Eric Davis	Environmental Department	MCB Camp Lejeune

ITEMS DISCUSSED:

- A shape file for ARCVIEW should be provided for ease of evaluation by all environmental personnel. This can be generated from our AutoCADD files. GIS presently has no defined flood elevations. They base their flood elevations on USGS flood zone maps.

# FACD WORKSHOP

## MEETING MINUTES/TELEPHONE CONVERSATION RECORD

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DATE: January 27, 1999  
 TIME: 3:50 p.m.  
 LOCATION: (if meeting) Dive Locker/Paraloft TRCS Quad  
 RE: Electrical and mechanical requirements

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Jim S. Bedois	Electrical Engineer	PACE Collaborative
J. Mike Newell	Mechanical Engineer	PACE Collaborative
GM <sup>C</sup> /SW(DV) John Nicholson	Dive Locker	2nd Recon Battalion

ITEMS DISCUSSED:

1. Existing Bauer compressor to be relocated to new Compressor Room off the Dive Locker - two each. Compressor to pack air tanks serving TRCS Unit. Bauer M# K15-E3, S# 24415, 5000psig, 20.4CFM, CHC-Rate, 1250RPM, 230/3Ø connected at 208, 39A, 15HP, built 10/94, capacity 17CFM. Compair 704-374-0600. Discharge is flexhose "Parflex 520N-3, SAE100R8, 3/16" W.P. US 55 Series Fittings - 135154." TRCS will require an oxygen whip. Also one pack, six DOT oxygen bottles 631±16 in<sup>3</sup> (ea).
2. Chief Nicholson mentioned LAR-V air handling unit (AHU) should be on high efficiency particulate air (HEPA) filtration. Is high efficiency cartridge OK?
3. LAR-V packing bench currently cooled by a 95CFM fan for ventilation.
4. TRCS quad housing TRC and both compressors currently cooled by a 3 ton packaged air conditioning unit and a 1.5 ton thru-wall air conditioner.
5. Guide specifications: SSS21-AA-MAN-010 (TRC) or (SCUBA); NSTM Chapter 550; NSTM Chapter 505; MIL-STD-1330D (the "D" is important); FED-STD-209; MIL-HNDBK-1622; US Navy Diving Manual, Vol 1 & 2, Rev 3 & 4-Interim Revisions (0994-LP-001-9010; BUPERS\NAVY\NAVSEA00C Diving and Salvage.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 27, 1999  
TIME: 4:00 p.m.  
LOCATION: (if meeting) At the Site  
RE: Existing tree buffer along Courthouse Road

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Bill R. Mechnick	Landscape Architect	LPDA
Doug M. Will	Civil Engineer	MSA
Scott R. Davis	Civil Engineer	MSA

ITEMS DISCUSSED:

- Parking lot setback (proposed) was measured from existing road's edge. It was determined that only a few trees could be saved in the site development process. Some of the trees are damaged and stressed and me lost anyway. In all probability, it will not be possible nor practical to save trees in this area.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 27, 1999  
TIME: 6:30 p.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Exterior hose bibbs

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
<u>MSGT Robert J. Hudson</u>	<u>2nd Force Recon Company</u>	<u>2nd Recon Battalion</u>
<u>J. Mike Newell</u>	<u>Mechanical Engineer</u>	<u>PACE Collaborative</u>
<u> </u>	<u> </u>	<u> </u>
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<u> </u>	<u> </u>	<u> </u>

ITEMS DISCUSSED:

- Location of exterior hose bibbs for the Operations/Administration Building:
  - four on rear of building
  - two on front of building
  - one on each end of building.
- Location of exterior hose bibbs for the Vehicle Maintenance Building (end-center-end):
  - three on rear of building
  - three on front of building

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 28, 1999  
TIME: 9:00 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Telecommunications

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Jim S. Bedois	Electrical Engineer	PACE Collaborative
Mike Babnor	Telecommunications	PW, Camp Lejeune
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

ITEMS DISCUSSED:

1. Will need copper and fiber cables to the building.
2. Will meet with Mike Babnor and Ernest Young in the FACD Conference Room at 1:00 p.m. today.
3. Falcon Cable has contract with MCB, Camp Lejeune for cable television (CATV) - look up in telephone book.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 28, 1999  
 TIME: 10:50 a.m.  
 LOCATION: (if meeting) FACD Conference Room  
 RE: Intrusion Detection System (IDS)

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
SGT Ake	PMO	PMO
Jim S. Bedois	Electrical Engineer	PACE Collaborative

ITEMS DISCUSSED:

1. There is a communication relay link for the IDS tie-in in the area of the site - it connects to a relay antenna.
2. Mike Burkart with SPAWAR Systems does off the site engineering and is the site engineer for the base. Mike is currently in his Charleston, SC office. Contact at 843-974-4104, e-mail at burkart@spawar.navy.mil.
3. SPAWAR also does all of the installation - they may use TRACOR as a subcontractor.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 28, 1999  
TIME: 10:55 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Cable TV

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Jim S. Bedois	Electrical Engineer	PACE Collaborative
?	Secretary	Falcon Cable TV
?	Secretary	Charter Communications

ITEMS DISCUSSED:

1. Contacted Falcon Cable TV at 800-682-7814 and was referred to Charter Communications at 910-353-8677.
2. Contacted Charter Communications and was told that William Deel is the chief technician that I need to talk to. Hew was out and I left a message.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 28, 1999  
TIME: 11:00 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Water pressure and pump station upgrade

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Alex Wood	Civil Engineering	PW, Camp Lejeune
Doug M. Will	Civil Engineer	PACE Collaborative

ITEMS DISCUSSED:

1. Water pressure at the elevated water tank is  $\pm 100$  pounds/square inch (psi). Based on distance to site and flow requirements, a booster pump will be required. Alex Wood has no problem with pump being outside of building, just make sure we provide drainage.
2. The existing pump station will not require any upgrades based on the additional flow of  $\pm 50$  gallons per minute (gpm) from proposed site.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 28, 1999  
TIME: 11:25 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Operations/Vehicle Maintenance sprinkler and fire pump requirements

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
J. Mike Newell	Mechanical Engineer	PACE Collaborative
Jim Hogenson (757-322-4408)	Fire Protection	LANTDIV

ITEMS DISCUSSED:

1. NFPA-88A&B guides the Vehicle Maintenance Building. Check Uniform Building Code (UBC)
2. Per Mr. Hogenson, since the Vehicle Maintenance Building is under 15,000 square feet, it does not require full sprinkler.
3. Fire pump or tower distribution is OK as long as we meet pressure and flow rates.
4. Electrical fire pump on backup generator with jockey pump is OK.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 28, 1999  
 TIME: 1:15 p.m.  
 LOCATION: (if meeting) FACD Conference Room  
 RE: Telephone/Data - Exterior

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Jim S. Bedois	Electrical Engineer	PACE Collaborative
Mike Babnor	Assistant Telephone Office	MCB, Camp Lejeune
Ernest Gray	Outside Plant Supervisor	MCB, Camp Lejeune
Bill A. Bogue	Value Engineer	LANTDIV
Bill H. Hargrove	Architect/Principal-in-Charge	HBA

ITEMS DISCUSSED:

1. Information System Management Operation (ISMO) will be remotely managed by 2001; thus 2nd Recon Battalion function will go away.
2. Need to add another closet on right side of Operations Building.
3. Single mode fiber plus copper to southeast - outside plant.
4. Separate conduits for fiber and copper cables.
5. Must use Siemens jacks and terminals:
  - a. Siemens jacks only - two or four port only.
  - b. Siemens patch panel.
  - c. Siecor all fiber products.
  - d. Siecor Altos fiber for outside plant.
6. No 110 block allowed.
7. Sole source justification must come from Base Telephone through LANTDIV.
8. Multimode fiber within the building - inside the plant.
9. Both fibers (inside) fusion splice connected only - no mechanical connection allowed.
10. 175 pair to Operations Building required.
11. 25 pair to Vehicle Maintenance.

12. 12 strands of single mode fiber to both buildings.
13. There is duct space available to the exchange which is about 1-1/2 miles away.
  - a. Option 1) This project bears expense.
  - b. Option 2) Facility identifies another project to perform upgrade.
14. Spare duct are 4-inches in diameter.
15. Run a 900 pair in existing spare.
16. Shirley Bowe is a point of contact at LANTDIV at 757-322-4324.
17. All instruments, switches, cross-connections, etc. to be ground faulted/ground interrupt (GFGI)
18. Annotated plans provided to the design team.

# **FACD WORKSHOP MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 28, 1999  
TIME: 2:00 - 4:00 p.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Sprinkler requirements - Vehicle Maintenance Building

## ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
J. Mike Newell	Mechanical Engineer	PACE Collaborative
Bill H. Hargrove	Architect/Principal-in-Charge	HBA
R. Dale Harris	Design Team Liaison	LANTDIV
MSGT Robert J. Hudson	2nd Force Recon Company	2nd Recon Battalion
Jim Hogenson	Fire Protection	LANTDIV

## ITEMS DISCUSSED:

1. Need to sprinkle boat racks, boat repair and engine maintenance in the Vehicle Maintenance Building. MSGT Hudson stated these areas do not store mission critical equipment and that fire possibility is from fuel fire. Carbon dioxide (CO<sub>2</sub>) would be better than a water system to fight this type of fire.
2. All in the telephone conversation and meeting concurred. Knowledge that boats and outboard engines will be placed in these areas was relayed to all involved. Result: these areas will not be sprinkled.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: January 28, 1999  
 TIME: 2:35 p.m.  
 LOCATION: (if meeting) FACD Conference Room  
 RE: Cable Television (CATV)

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Jim S. Bedois	Electrical Engineer	PACE Collaborative
William Deel	Technical Manager	Charter Communications
Robbie Johnston	Systems Manager	Charter Communications

ITEMS DISCUSSED:

1. Charter Communications has the current contract with MCB to provide service through 2001. They will most likely renew the contract. It was decided to proceed with design as discussed with Charter, due to the fact that any other local CATV company would handle things in a similar manner.
2. RG-6 - Charter Communications will provide interior cable and contractor will install.
3. Cable company wants interior runs less than 200-feet.
4. Cable company will provide cable into building and between closets.
5. 2-inch conduit between closets.
6. Cable company to provide jacks.
7. We just do wire and conduit.
8. 3/4"-inch conduit - one-foot slack at outlets; six-foot slack at closets.
9. Allow a 36-inch x 36-inch wall area for CATV.

# FACD WORKSHOP

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## MEETING MINUTES/PHONE CONVERSATION RECORD

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DATE: February 1, 1999  
TIME: 8:00 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Landscape Material Prices

### ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Jim Jackson	Nurseryman	Jackson's Nursery 910-347-2309
Bill R. Mechnick	Landscape Architect	LPDA

### ITEMS DISCUSSED:

- Confirmed availability and prices of plant materials.
- It was determined that all materials were available and prices used in the FACD estimating process were appropriate.
- Mr. Jackson would be able to furnish and install all plant materials associated with this project.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: February 1, 1999  
 TIME: 9:00 a.m.  
 LOCATION: (if meeting) FACD Conference Room  
 RE: Provost Marshal's Office (PMO) meeting

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
SGT Ake	PMO	MCB, Camp Lejeune
SGT Behrend	PMO	MCB, Camp Lejeune
MSGT Robert J. Hudson	2nd Force Recon Company	2nd Recon Bn
Bill H. Hargrove	Architect and Principal-in-Charge	HBA
Jim S. Bedois	Electrical Engineer	PACE Collaborative

ITEMS DISCUSSED:

- Need a fiber optic connection to Base alarm. Closest point is on the other side of Bay near barracks - large dollars.
- If there is a 24-hour armed guard, no Intrusion Detection System (IDS) is required. Criteria requires constant surveillance of entrance via either line of sight, mirrors or closed circuit television (CCTV).
- Cost for fixed, weatherproof cameras/camera for outside cameras to be an additive bid item.
- \*DECISION: Use a single camera CCTV system with camera inside Armory surveying door; include occupant sensor lights.
- Perimeter security lighting at fence line is required if it is a restricted area.
- Because this is NOT a posted "Restricted Area", i.e. the complex itself, the perimeter security is NOT required.
- IDS can be requested to be installed by Headquarters (HQ) Marine Corps dollars in lieu of Military Construction, Navy (MILCON) dollars at another date.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: February 1, 1999  
 TIME: 9:30 a.m.  
 LOCATION: (if meeting) FACD Conference Room  
 RE: HVAC Systems

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
George Dahl	Mechanical Reviewer	LANTDIV
J. Mike Newell	Mechanical Engineer	PACE Collaborative

ITEMS DISCUSSED:

1. Building has to have DDC control. Does not require central station.
2. Duct Air Leakage Testing (DALT) is mandatory
3. Any HVAC unit must have maintenance access. Three-feet around on a mezzanine or in a closet; includes Vehicle Maintenance Building.
4. Okay with suspended units in a grid for Oxygen; and LAR-V is okay.
5. Will have to provide positive exhaust for ventilation.
6. Use single fuel burner on boiler, consider propane. Informed Mr. Dahl that #2 fuel oil is our primary option.
7. Independent systems in Vehicle Maintenance Building okay. Package Through-Wall Heat Pump (PTHP), gas radiant tubes, split heat pumps discussed.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: February 1, 1999  
TIME: 11:10 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Intrusion Detection System (IDS) tie-in to Base system

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Jay Walker 843-974-5472		SPAWAR
Jim S. Bedois	Electrical Engineer	PACE Collaborative

ITEMS DISCUSSED:

- Tie in does not have to be fiber.
- Needs two lines - primary and backup.
- Can use copper telephone lines from what we are running in already.
- We just dedicate lines and the interconnection can be made by Base telephone at the trunk line.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: February 1, 1999  
 TIME: 11:15 a.m.  
 LOCATION: (if meeting) FACD Conference Room  
 RE: Fire Protection

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Jim Hogenson 757-322-4342	Fire Protection	LANTDIV
Jim S. Bedois	Electrical Engineer	PACE Collaborative

ITEMS DISCUSSED:

1. Use heat detectors, either fixed temperature or rate compensated - not rate of rise in Vehicle Maintenance and Boat Maintenance Bays.
2. Smoke detectors throughout Administration/Operations Building not required; just near the Fire Alarm Control Panel (FACP); maybe in Electrical and Communication Rooms or other mission critical spaces.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: February 1, 1999  
TIME: 11:20 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Telephone conversation with Andy Young

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Andy Young	Electrical Engineer	PW, Camp Lejeune
Jim S. Bedois	Electrical Engineer	PACE Collaborative

ITEMS DISCUSSED:

1. There are no primary meters in the area of the site. No existing load data is available.
2. Andy Young said that the circuit currently serves only a 500 kilo Volt Amperes (kVA) transformer.
3. The existing #4 copper circuit is good for approximately 129 amperes.
4. We will upgrade the #1/0 circuit up to our tap point. Future project will extend the #1/0 circuit from this point forward.
5. Overhead conductors shall be AAAC hard drawn aluminum.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: February 1, 1999  
TIME: 11:30 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: Sprinkler system

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Jim Hogenson	Fire Protection	LANTDIV
J. Mike Newell	Mechanical Engineer	PACE Collaborative

ITEMS DISCUSSED:

1. Discussed go ahead to use a schedule 10, mechanical coupled sprinkler system for sprinkler pipe greater than 2-inches in Administration/Operations Building. This is Camp Lejeune Public Works' standard. Mr. Hogenson gave his blessing.
2. Mentioned limited area system in Vehicle Maintenance Building is off domestic service. Mr. Hogenson had no objections.

**FACD WORKSHOP  
MEETING MINUTES/TELEPHONE CONVERSATION RECORD**

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DATE: February 1, 1999  
TIME: 11:30 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE:

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Jim Hogenson	Fire Protection	LANTDIV
Joe D. Bovee	Architect and Project Manager	HBA

ITEMS DISCUSSED:

- The 2nd Stair is not enclosed, Jim Hogenson stated to look at Chapter 6 of Life Safety Code and perform analysis.
- Jim reminded us not to forget to perform the Uniform Building Code (UBC) Analysis. He also said he did not have any concerns about the facility as it is a Type 2A Construction.
- Jim said the 2nd Floor access look okay.
- He understands we are at 10% design and have not done standard analysis yet - he was only looking for any large or obvious problems.

# **FACD WORKSHOP**

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## MEETING MINUTES/PHONE CONVERSATION RECORD

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DATE: February 2, 1999  
TIME: 2:00 p.m.  
LOCATION: (if meeting) 2nd Recon Bn Supply  
RE: Forklifts

### ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
2LT Patrick Nelson	Supply Officer	2nd Recon Battalion
Jim S. Bedois	Electrical Engineer	PACE Collaborative

### ITEMS DISCUSSED:

- No battery operated forklifts; they run off diesel.

# FACD WORKSHOP

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## MEETING MINUTES/PHONE CONVERSATION RECORD

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DATE: February 2, 1999  
TIME: 2:45 p.m.  
LOCATION: (if meeting) 2nd Recon Bn Boat Shop  
RE: Equipment layout

### ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
SGT Allmond	Supply NCO	2nd Recon Battalion
Jim S. Bedois	Electrical Engineer	PACE Collaborative

### ITEMS DISCUSSED:

- Annotated plans provided to the design team.

# FACD WORKSHOP

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## MEETING MINUTES/PHONE CONVERSATION RECORD

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DATE: February 2, 1999  
TIME: 3:30 p.m.  
LOCATION: (if meeting) MCB, Camp Lejeune Public Works  
RE: Discussion with Andy Young

### ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Andy Young	Electrical Engineer	PW Camp Lejeune
Jim S. Bedois	Electrical Engineer	PACE Collaborative

### ITEMS DISCUSSED:

- No XLP; they want EPR for underground medium voltage cable insulation.
- Underground telephone to be jelly filled.
- AAAC or copper for overhead cables.
- Use direct buried concrete light poles.
- Wooden armless construction for poles, steel cross arms.
- Andy will e-mail overhead details.
- Camp Lejeune Public Works will issue a letter to LANTDIV to belay the use of manholes for power distribution.

# FACD WORKSHOP

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## MEETING MINUTES/PHONE CONVERSATION RECORD

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DATE: February 2, 1999  
TIME: 4:00 p.m.  
LOCATION: (if meeting) 2nd Recon Bn Medical  
RE: Medical equipment issues/layout

### ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
LT Erdman	Medical Officer	2nd Recon Battalion
Jim S. Bedois	Electrical Engineer	PACE Collaborative

### ITEMS DISCUSSED:

- They would like some power outlets on walls for examination equipment (collateral equipment) such as odoscope/opthalmoscope, etc. The equipment itself would be provided by users.
- Annotated plans provided to the design team.

# FACD WORKSHOP

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## MEETING MINUTES/PHONE CONVERSATION RECORD

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DATE: February 3, 1999  
TIME: 10:00 a.m.  
LOCATION: (if meeting) FACD Conference Room  
RE: LANTDIV Review Comments

### ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Sonny Harrison	Civil Engineer, Plan Review	LANTDIV
Scott R. Davis	Civil Engineer	MSA

### ITEMS DISCUSSED:

- Domestic sewer needs to connect downstream of oil and water separator.
- Try to eliminate or minimize left turning movements from the privately owned vehicles (POV) parking entrance on Courthouse Road.
- Fix POV parking traffic circulation.

# **FACD WORKSHOP**

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## **MEETING MINUTES/PHONE CONVERSATION RECORD**

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DATE: February 3, 1999  
TIME: 1:30 p.m.  
LOCATION: (if meeting) 2nd Recon Battalion Armory  
RE: Layouts

### ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
1LT A. J. Mallar	2nd Recon Bn, S-4	2nd Recon Battalion
Jim S. Bedois	Electrical Engineer	PACE Collaborative

### ITEMS DISCUSSED:

- Meeting was conducted to finalize location of security equipment and exterior wall receptacles.
- Annotated plans provided to the design team.

# FACD WORKSHOP

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## MEETING MINUTES/PHONE CONVERSATION RECORD

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DATE: February 3, 1999  
TIME: 3:00 p.m.  
LOCATION: (if meeting) Building 13  
RE: Meeting with Mike Babner

### ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Mike Babner	Base Telephone Officer	MCB, Camp Lejeune
Jim S. Bedois	Electrical Engineer	PACE Collaborative

### ITEMS DISCUSSED:

- Communications to be installed by contractor through Base Telephone. Still funded under our project.
- We will get the money for all outdoor runs up to the Operations Building and the run between buildings.
- May also be able to contract out interior communications wiring through Base communications at a lower price. They will get exactly what they want - benefit.
- \$260,000 total cost by Base Telephone contract - safe number; should be lower.
- Point-of-contact is Ernie Gray at 910-451-9432.

# FACD WORKSHOP

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## MEETING MINUTES/PHONE CONVERSATION RECORD

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DATE:

TIME:

LOCATION: (if meeting)

RE:

ATTENDEES/PARTICIPANTS:

<u>Name</u>	<u>Function</u>	<u>Organization</u>
_____	_____	_____
_____	_____	_____
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ITEMS DISCUSSED:























# COMMENTS ON CONCEPT #3



<b>PROJECT: 2nd Division Reconnaissance Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>		
Comments By: Dale Harris		Date: February 2, 1999
Please use <b>BLACK INK</b> or dark pencil to complete form		
ITEM NO.	COMMENT	PROJECT DEVELOPMENT TEAM RESPONSE
1	Research using a horizontally oriented metal panel to accent the horizontal nature of brick.	Will research.
2	Are overhead doors to radio work rooms large enough for future (wider) vehicles?	Will confirm activity needs.
3	Curved roof over administration area highly lends itself to standing seam metal. Modified bitumen may not be appropriate on a roof with a slope this great.	Identified in meeting of February 2, 1999 and agreed with concern.
4	Fence near antenna farm and wetlands should be configured to be less jagged. Investigate curve around antenna farm.	Will circle fence at antenna farm.
5	Put security bars (or other solutions) at end of drain pipe at BMP to impede covert penetration of compound.	Will review and respond to security issues.
6	Use shatter proof, explosion film, or other terrorist resistant design on all glass on front of building.	Will research cost and review with Mr. Harris and PMO for 35% submission.
7	If it does not create a life safety hazard, remove rear wall in second deck administration telephone room as it is wasted space beyond anyway.	Will comply.
8	Add windows to second deck administration rear of building at least on C.O.'s and X.O.'s spaces.	Figured in cost estimate - will develop with 35% submission.
9	Use clerestory lighting at each side of administration second deck above winged low slope roofs. This would provide some natural light without providing sight of roofs.	Is budgeted at this time - will provide.
10	For safety reasons, are there any issues created when placing the wash station so close to the antenna farm. Electricity vs water.	Will investigate relationship and relocate as necessary.



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <b>A-1</b>
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<b>DESCRIPTION:</b> <b>ELIMINATE HAZMAT STORAGE BUILDING</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The original design calls for the construction of a 1,320 square foot (SF) Hazardous Materials (HAZMAT) Storage Building.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

Eliminate the as-designed HAZMAT Storage Building and relocate the 2nd Reconnaissance Battalion's existing HAZMAT lockers. Provide a slab-on-grade for the existing lockers on-site.

**ADVANTAGES:**

- Initial cost savings
- Alleviates site congestion which could help avoid wetlands
- Reduces construction time
- Helps reduce existing square footage overage
- In keeping with anticipated small quantities of materials

**DISADVANTAGES:**

- End user must relocate existing HAZMAT lockers to site at their expense (already planned)
- Aesthetics of existing lockers versus new structure

**DISCUSSION:**

Representatives of the 2nd Reconnaissance Battalion noted that the current HAZMAT lockers are sufficient for their HAZMAT storage needs provided current battery recycling and used oil recovery programs are continued.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
<b>ORIGINAL DESIGN</b>	<b>\$59,400</b>		<b>\$59,400</b>
<b>ALTERNATIVE</b>	<b>\$11,250</b>		<b>\$11,250</b>
<b>SAVINGS</b>	<b>\$48,150</b>		<b>\$48,150</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <b>A-2</b>
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<b>DESCRIPTION:</b> <b>USE AN INSULATED METAL PANEL EXTERIOR WALL SYSTEM ON STEEL GIRTS</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The original design calls for the exterior enclosure to be a double wythe wall system comprised of concrete masonry unit (CMU) structural load bearing system with an exterior brick veneer finish. The interior side of the CMU wall is to be finished with a high performance epoxy paint system.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

Use a combination: (a) CMU load bearing wall system, and (b) a ribbed, insulated, metal panel exterior wall system supported on steel girts. The interior of metal panel wall system is to be painted, gypsum wallboard (GWB) on steel studs.

**ADVANTAGES:**

- Lightens structural loads thus reducing foundation and piling size
- Faster to erect
- Reduces construction time
- Reduces initial cost
- In keeping with the Base Exterior Architectural Plan (BEAP)

**DISADVANTAGES:**

- Changes the appearance of the facility
- Aesthetics
- Easier to damage exterior metal skin

**DISCUSSION:**

The noted cost savings takes into account the overall square foot reduction of the entire Operations Building. See Recommendation No. S-1 that addresses additional structural cost savings associated with the use of this type of exterior wall system.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
<b>ORIGINAL DESIGN</b>	<b>\$1,142,000</b>		<b>\$1,142,000</b>
<b>ALTERNATIVE</b>	<b>\$757,000</b>		<b>\$757,000</b>
<b>SAVINGS</b>	<b>\$385,000</b>		<b>\$385,000</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <b>A-3</b>
<b>DESCRIPTION:</b> <b>USE A SILICATE FLOOR FINISH IN LIEU OF AN EPOXY FINISH</b>	<b>SHEET NO.</b> 1 of 2

**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)  
 The original design calls for the use of an epoxy sealer/floor hardener for the first floor finish of both the Operations and Vehicle Maintenance Buildings.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)  
 Use a silicate sealer/hardener for the first floor finish in the Operations and Vehicle Maintenance Buildings in lieu of the high performance epoxy finish.

- ADVANTAGES:**
- Reduces initial cost
  - Easier to re-apply
  - Shorter curing time
  - Minimal, if no, harmful vapors during application, refinishing, re-application
  - Still hardens exposed slab-on-grade

- DISADVANTAGES:**
- Not as durable as the epoxy finish
  - Increases O&M costs associated with shortened life due to more frequent re-application

**DISCUSSION:**  
 This recommendation is merely addressed as a cost reduction effort. Although the silicate finish will perform in a like manner initially, it does not have the longevity of a high performance epoxy system. More frequent re-applications are most likely to occur; depending on the amount of traffic these floor surfaces receive.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	<b>\$20,500</b>		<b>\$20,500</b>
ALTERNATIVE	<b>\$13,285</b>		<b>\$13,285</b>
SAVINGS	<b>\$7,215</b>		<b>\$7,215</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <b>A-4</b>
<b>DESCRIPTION:</b> <b>RELOCATE/CONSOLIDATE THE NUMBER OF TOILET/  SHOWER FACILITIES</b>	<b>SHEET NO.</b> 1 of 2

**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The original floor plans indicate several toilet and shower facilities distributed throughout the first floor of the Operations and Vehicle Maintenance Buildings.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

Relocate, combine and centralize a number of the existing toilet/shower facilities for shared use by different “tenants” within the two buildings.

**ADVANTAGES:**

- Reduces the number of toilet and shower plumbing fixtures
- Better utilization of space
- Centralizes needed functions
- Reduces initial and operations/maintenance costs
- Reduces the use of water, a scarce, natural resource

**DISADVANTAGES:**

- May require longer walking distances for some “tenants”
- Potential loss of amenity
- “Shared” facilities

**DISCUSSION:**

A natural consolidation was achieved by relocating the toilet and shower facilities in such a manner to allow for centralization, improving the potential for shared facilities. Not only does this layout improve space utilization, but potentially reduces the amount of water usage. Although not calculated, O&M costs are further reduced due to lower HVAC loads with lessened volume and air extraction requirements.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
<b>ORIGINAL DESIGN</b>	<b>\$30,000</b>		<b>\$30,000</b>
<b>ALTERNATIVE</b>	<b>\$0</b>		<b>\$0</b>
<b>SAVINGS</b>	<b>\$30,000</b>		<b>\$30,000</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <b>A-5</b>
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<b>DESCRIPTION:</b> <b>ELIMINATE THE LOADING DOCK</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The original drawings delineated a full loading dock at the rear of the Operations Building servicing the supply functional area of the building.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

Eliminate the loading dock in its entirety.

**ADVANTAGES:**

- Eliminates the need to provide a sump pump and associated piping/connections to storm water system
- Eliminates all docking equipment
- Reduces construction time
- Facilitates site preparation
- Initial as well as O&M costs savings

**DISADVANTAGES:**

- Loss of an amenity

**DISCUSSION:**

During several meetings with owners, end users, Base Public Works and LANTDIV personnel, it was noted that the loading dock was not a necessity. In fact, it became apparent that the dock would only aggravate an already protracted budget problem. Additionally, the use of the loading dock would require additional structural and equipment expenses to provide monorail lifting system for ingress/egress of the portable hyperbaric chambers. See Recommendation No. S-2 for related savings associated with the monorail system.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	<b>\$30,600</b>		<b>\$30,600</b>
ALTERNATIVE	<b>\$0</b>		<b>\$0</b>
SAVINGS	<b>\$30,600</b>		<b>\$30,600</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <span style="font-size: 1.2em;"><b>A-6</b></span>
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<b>DESCRIPTION:</b> <b>REDUCE THE HEIGHT, SIZE AND STRUCTURAL SYSTEM OF THE PARALOFT</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The original design documents call for the Paraloft to be a 90-foot tall tower structurally composed of reinforced concrete masonry units (CMU). The roof is a standing seam metal, curvilinear shaped roof emulating the roof over the administration portion of the Operations Building.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

In addition to reducing the Paraloft's square footage, reduce the height of the tower to 75-feet. Furthermore, change the structural system to cast-in-place (CIP) concrete thus eliminating the need for brick and CMU. Change to a flat roof with modified bitumen roofing.

**ADVANTAGES:**

- Stronger structurally
- Reduces initial cost
- Eliminates two materials and a construction trade - masons - as brick and CMU are no longer needed
- Shorter tower - less of an eyesore for surrounding neighbors

**DISADVANTAGES:**

- Slightly longer to erect
- Loss of amenities - brick facade and curved roof
- Aesthetics - changes the appearance of the building

**DISCUSSION:**

During the course of the FACD, it was discovered that the Paraloft tower could be reduced by 15-feet. In addition, the curved roof, although aesthetically more in keeping with the rest of the facility, would not have been appreciated due to the extreme height above the ground; thus its site/architectural enhancement potential was greatly reduced. Although not specifically anticipated as a problem, the shorter tower lessens the potential as an aircraft operations hazard. The flatter roof will also make it possible to stage repelling activities from the tower.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
<b>ORIGINAL DESIGN</b>	<b>\$242,000</b>		<b>\$242,000</b>
<b>ALTERNATIVE</b>	<b>\$200,000</b>		<b>\$200,000</b>
<b>SAVINGS</b>	<b>\$42,000</b>		<b>\$42,000</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <b>A-7</b>
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<b>DESCRIPTION:</b> <b>MAXIMIZE USE OF DRYWALL PARTITIONS ON STUD WALLS ON FIRST FLOOR OF OPERATIONS BUILDING</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The current design indicates that all of the Operations Building's first floor interior partition walls are to be constructed of concrete masonry units (CMU). The initial concept is in keeping with the building's CMU load bearing wall structural system.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

Maximize the use of gypsum wallboard (GWB) on steel studs in lieu of CMU interior partitions. This applies to office type occupancies. CMU interior partitions are to be retained on those walls anticipated to receive abusive treatment due to the functional requirements.

**ADVANTAGES:**

- Common practice
- Reduces initial cost
- Easier/faster to construct
- Easy to repair
- Easier to finish, i.e., paint

**DISADVANTAGES:**

- Lessens durability
- Easier to damage
- Could potentially increase O&M costs

**DISCUSSION:**

The use of GWB on metal stud interior partitions is common practice; even in industrial complexes and applications. However, its use is normally limited to office type areas; such is the case for this recommendation. Therefore, in those areas deemed a harsh environment where the potential exists for abusive wall treatment, e.g. supply warehouse, dive locker, etc., CMU walls will be retained.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
<b>ORIGINAL DESIGN</b>	<b>\$555,800</b>		<b>\$555,800</b>
<b>ALTERNATIVE</b>	<b>\$439,100</b>		<b>\$439,100</b>
<b>SAVINGS</b>	<b>\$116,700</b>		<b>\$116,700</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <span style="font-size: 1.5em;"><b>A-8</b></span>
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<b>DESCRIPTION:</b> <b>USE MODIFIED BITUMEN ROOFING IN LIEU OF STANDING SEAM METAL ROOF</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The present design calls for the a curvilinear, metal standing seam roof over administration portion of the Operations Building.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

Retain the curvilinear shaped roof but change the roofing system to modified bitumen.

**ADVANTAGES:**

- Initial cost savings
- In keeping with Base Public Works preferred roofing system
- Availability of local contractors to apply bitumen roofing

**DISADVANTAGES:**

- Loss of an architectural statement
- Aesthetics
- Loss of an amenity
- Lessens durability; could lead to increased O&M costs
- More susceptible to leaks

**DISCUSSION:**

Numerous times during the FACD, Base Public Works representatives reiterated that the preferred roofing system at Camp Lejeune is modified bitumen. Changing the roofing is merely being accomplished as a minor cost reduction effort and to appease local desires for this type of roofing system. The savings does take into account the overall square foot reduction of the Operations Building.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	<b>\$275,800</b>		<b>\$275,800</b>
ALTERNATIVE	<b>\$225,800</b>		<b>\$225,800</b>
SAVINGS	<b>\$50,000</b>		<b>\$50,000</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <span style="font-size: 1.5em;"><b>S-1</b></span>
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<b>DESCRIPTION:</b> <b>CHANGE THE CONCRETE MASONRY UNIT LOAD BEARING STRUCTURAL WALL SYSTEM</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The original design calls for the exterior enclosure to be a double wythe wall system comprised of concrete masonry unit (CMU) structural load bearing system with an exterior brick veneer finish.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

Use a combination CMU load bearing wall system with a ribbed, insulated, metal panel exterior wall system supported on steel girts.

**ADVANTAGES:**

- Lightens structural loads thus reducing foundation and piling size
- Faster to erect
- Reduces construction time
- Reduces initial cost

**DISADVANTAGES:**

- Changes the appearance of the facility
- Aesthetics

**DISCUSSION:**

The noted cost savings take into account the overall square foot reduction of the entire Operations Building. Also included, although difficult to isolate, are the structural cost savings associated with the load reductions and subsequent foundation and piling costs. See Recommendation No. A-2 for the architectural cost savings associated with this recommendation.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
<b>ORIGINAL DESIGN</b>	<b>\$493,000</b>		<b>\$493,000</b>
<b>ALTERNATIVE</b>	<b>\$416,000</b>		<b>\$416,000</b>
<b>SAVINGS</b>	<b>\$77,150</b>		<b>\$77,150</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <span style="font-size: 1.5em;"><b>S-2</b></span>
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<b>DESCRIPTION:</b> <b>ELIMINATE HOIST AND MONORAIL SYSTEM</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The present design calls for the a monorail materials lifting system to assist with the ingress/egress of heavy equipment; particularly the portable hyperbaric chambers.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

Eliminate the monorail system and its associated lifting equipment.

**ADVANTAGES:**

- Initial cost savings
- Not needed
- Lessens O&M costs associated with lifting devices and appurtenances
- Less likely to create personnel injuries

**DISADVANTAGES:**

- Loss of amenity
- Slightly more difficult to move hyperbaric chambers and other heavy loads

**DISCUSSION:**

It became evident that once the loading dock was eliminated from the project, see Recombination No A-5, the monorail and hoist were no longer warranted. The savings includes additional structural strengthening to the adjacent columns, foundations and pile caps.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
<b>ORIGINAL DESIGN</b>	<b>\$25,300</b>		<b>\$25,300</b>
<b>ALTERNATIVE</b>	<b>\$0</b>		<b>\$0</b>
<b>SAVINGS</b>	<b>\$25,300</b>		<b>\$25,300</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <b>S-3</b>
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<b>DESCRIPTION:</b> <b>REDUCE THE JOIST SPANS IN THE VEHICLE MAINTENANCE BUILDING</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The initial design called for 70-foot clear spans in the Vehicle Maintenance Building.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

Add intermediate columns in the Vehicle Maintenance Building and decrease the clear spans from 70 to 35-feet.

**ADVANTAGES:**

- Lightens structural loads
- Easier to erect
- Reduces initial cost
- Better availability of shorter joists

**DISADVANTAGES:**

- Adds columns within spaces
- Potential damage to exposed columns

**DISCUSSION:**

By spanning the Vehicle Maintenance Building in the opposite direction than originally designed and adding interim columns, a shorter clear span was achieved. Although bollards or other column protective devices will be needed, the structural cost differences are sufficient to warrant incorporation of this recommendation.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	<b>\$68,800</b>		<b>\$68,800</b>
ALTERNATIVE	<b>\$54,200</b>		<b>\$54,200</b>
SAVINGS	<b>\$14,600</b>		<b>\$14,600</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <b>M-1</b>
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<b>DESCRIPTION:</b> <b>FINE TUNE THE HVAC DESIGN</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The original design included a Direct Digital Control (DDC) variable air volume (VAV) HVAC system. There was to be a central boiler for hot water and chillers for chilled water as part of this system.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

The FACD process permitted the mechanical designers to affect cost savings by: (a) fine tuning the specific needs of specific spaces, (b) reducing capacities, and (c) run lengths associated with a reduction in building sizes. In addition, redundancy for the chillers and boilers was reduced from two to one of each.

**ADVANTAGES:**

- Reduces operations and maintenance costs
- Initial cost savings
- Lessens the equipment count
- Improves systems' efficiencies

**DISADVANTAGES:**

- Minimal life cycle cost increase due to a reduction in chiller redundancy

**DISCUSSION:**

The cost savings associated with this recombination permitted the designers to continue to include a four-pipe, VAV, HVAC system with terminal reheat and DDC - essential for life cycle cost containment and to provide high quality space conditioning. Numerous alternatives were considered along the route to the final mechanical concept design including single zone systems and alternative control methods.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	<b>\$1,066,534</b>		<b>\$1,066,534</b>
ALTERNATIVE	<b>\$876,662</b>		<b>\$876,662</b>
SAVINGS	<b>\$189,872</b>		<b>\$189,872</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <b>E-1</b>
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<b>DESCRIPTION:</b> <b>REDUCE CLOSED CIRCUIT TELEVISION SYSTEM</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The design provides for a closed circuit television (CCTV) system for the buildings' interior and exterior. The exterior cameras are pan-tilt-zoom, weatherproof, remote control, heated type cameras.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

Eliminate the exterior cameras and reduce the number of interior cameras to one.

**ADVANTAGES:**

- Reduces equipment count
- Reduces initial cost
- Reduces O&M costs
- Minimizes potential for vandalism of equipment

**DISADVANTAGES:**

- Reduced site security

**DISCUSSION:**

General design guidelines do not require the use of CCTV for general site observation. One interior camera was retained to help observe the entrance to the Armory.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	<b>\$33,750</b>		<b>\$33,750</b>
ALTERNATIVE	<b>\$2,250</b>		<b>\$2,250</b>
SAVINGS	<b>\$31,500</b>		<b>\$31,500</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <b>E-2</b>
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<b>DESCRIPTION:</b> <b>REDUCE CLOSED CIRCUIT TELEVISION SYSTEM</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The proposed communications cables were to run in ductbanks and manholes from the point of connection to Base services to the new building.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

The ductbank and manholes will be eliminated and cables will be either direct buried or placed in conduit.

**ADVANTAGES:**

- Reduces initial cost
- Reduces construction time
- Minimizes ground disturbance

**DISADVANTAGES:**

- Cables are not as well protected

**DISCUSSION:**

Base Telephone personnel indicated this is an acceptable practice at Camp Lejeune.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	<b>\$118,125</b>		<b>\$118,125</b>
ALTERNATIVE	<b>\$47,250</b>		<b>\$47,250</b>
SAVINGS	<b>\$70,875</b>		<b>\$70,875</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <span style="font-size: 1.5em;"><b>E-3</b></span>
<b>DESCRIPTION:</b> <b>BASE TELEPHONE TO RUN FIBER OPTIC AND PAIRED COPPER CABLES TO SITE</b>	<b>SHEET NO.</b> 1 of 2

**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The estimate provided for a subcontractor on this project to run the fiber optic and paired copper cable services to the site from the Telephone Exchange at Building 69; a distance of about two miles.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

Base Telephone will run these services to the site and MILCON Project P-568 will reimburse them for the associated cost.

**ADVANTAGES:**

- Reduces initial cost
- Work can be performed prior to commencing construction of P-568
- One less contractor to deal with

**DISADVANTAGES:**

- Requires additional coordination
- Could result in a construction change order if services not provided at the time required by P-568
- Shared responsibility/liability

**DISCUSSION:**

An important advantage to this approach, is that the Base can place and pull cables sized to serve future projects in the general area of the site. It is expected that the cost savings will be considerably higher when final negotiations are completed with Base Telephone.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
<b>ORIGINAL DESIGN</b>	<b>\$337,500</b>		<b>\$337,500</b>
<b>ALTERNATIVE</b>	<b>\$303,750</b>		<b>\$303,750</b>
<b>SAVINGS</b>	<b>\$33,750</b>		<b>\$33,750</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <b>C-1</b>
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<b>DESCRIPTION:</b> <b>CHANGE LENGTH AND TYPE OF FENCING</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The design called for 2,900 linear feet (LF) of 8-foot tall, chain link fence topped with three strands of barbed wire at 45° turned outward.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

Reduce the length of the barbed wire chain link fence to 1,900 LF and provide privacy slats at key locations.

**ADVANTAGES:**

- Privacy slats help maintain scurry in appropriate areas
- Slightly faster to construct fence
- Reduces initial cost
- Easy to replace slats if damaged

**DISADVANTAGES:**

- Slats could become damaged over time leaving an unsightly fence line

**DISCUSSION:**

As part of the overall need to reduce construction cost, fencing was pulled in tighter on site thereby reducing its length and quantities of materials.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	<b>\$137,025</b>		<b>\$137,025</b>
ALTERNATIVE	<b>\$100,125</b>		<b>\$100,125</b>
SAVINGS	<b>\$36,900</b>		<b>\$36,900</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <b>C-2</b>
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<b>DESCRIPTION:</b> <b>REDUCE PAVEMENT SECTION AT THE PRIVATELY OWNED VEHICLE PARKING LOT</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The design called for all paved areas of the site to be constructed of a heavy pavement section in order to handle eighteen-wheeled rigs at any point on site.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

Use a lighter paving section for the Privately Owner Vehicle (POV) parking lot along the north side of the site.

**ADVANTAGES:**

- Initial cost savings
- Pavement designed for the service required
- In keeping with industry standards

**DISADVANTAGES:**

- Occasional, unexpected heavy wheel load could cause limited damage

**DISCUSSION:**

The design has been changed to isolate POV parking from heavy equipment loads. This makes it possible to specify lower capacity pavement for the POV parking lot while maintaining a heavier pavement section for the remainder of the site.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
<b>ORIGINAL DESIGN</b>	<b>\$520,875</b>		<b>\$520,875</b>
<b>ALTERNATIVE</b>	<b>\$455,308</b>		<b>\$455,308</b>
<b>SAVINGS</b>	<b>\$65,567</b>		<b>\$65,567</b>



# FACD RECOMMENDATION



<b>PROJECT:</b> <b>2nd Recon Battalion, Maintenance &amp; Operations Facilities</b> <i>Function Analysis Concept Development (FACD)</i>	<b>ALTERNATIVE NO.</b> <b>L-1</b>
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<b>DESCRIPTION:</b> <b>REDUCE LANDSCAPING COSTS</b>	<b>SHEET NO.</b> 1 of 2
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**ORIGINAL DESIGN:** (Sketch attached \_\_\_\_\_)

The design for landscaping the site was minimal; requiring screening plants, hydro-seeding, mulching and a flagpole.

**ALTERNATIVE:** (Sketch attached \_\_\_\_\_)

Limit savings were made possible by reducing the areas to be mulched, reducing plant specimen sizes and by eliminating the flagpole.

**ADVANTAGES:**

- Reduces initial cost

**DISADVANTAGES:**

- Initial aesthetics - takes longer for plants to mature
- Loss of amenity

**DISCUSSION:**

Landscaping cost reductions were seen as having minimal effect on the site appearance, while helping to meet the budget constraints.

COST SUMMARY	INITIAL COST	RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	<b>\$82,412</b>		<b>\$82,412</b>
ALTERNATIVE	<b>\$73,221</b>		<b>\$73,221</b>
SAVINGS	<b>\$14,191</b>		<b>\$14,191</b>





## ABBREVIATED BASIS OF DESIGN

### P-568, Maintenance and Operations Facility for the 2<sup>nd</sup> Marine Division Reconnaissance Battalion, MCB Camp Lejeune, NC

#### CIVIL DESIGN

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- A. Site Layout: Approximately 10ac will be used for this facility. Paved storage and staging areas are required behind the facility. Provide access and maneuvering capabilities for military vehicles with the largest typical vehicle being a five-ton truck. Asphalt pavement will be heavy duty for staging areas. Approximately 200 POV spaces will be provided in front of facility, which consists of light duty, asphalt pavement. Soil borings have not been performed for site, therefore pavement sections have been assumed based on soil information from existing surrounding sites. Layout of site was partially based on not disturbing any wetlands adjacent to site.
- B. Utilities: Domestic water, fire protection, and sanitary sewage are being provided for both buildings. Waterline sizing is based on water pressures and information provided by Base PWC-Civil and building demands. Sanitary sewage is based on information provided by Base PWC-Civil. An onsite package sewage pump station is required to connect to existing gravity sewer lines
- C. Drainage: Underground storm drainage system will intercept all impervious areas. Piping will be designed for a ten-year storm. A Best Management Practice (BMP) is required for both water quality and water quantity. All storm piping will outfall into the BMP. Design will be based on Stormwater Best Management Practices of the N.C Dept. of Environment and Natural Resources Division of Water Quality, July 1998.
- D. Fencing: Eight-foot chain link fence with three-strand barbed wire is required around the perimeter of the paved storage and staging areas. Clear zones of twenty feet outside of fence and thirty feet inside of fence are required.
- E. Misc. Structures: Vehicle fueling areas: 5,000 and 10,000 gallon above ground, double wall fuel dispensing storage tanks with self-containment capabilities.
- Vehicle washing facility: High pressure washing capabilities with ramps to spray under vehicles. Provide area for two vehicles. Runoff from facilities will be treated with an oil and water separator connected to the sanitary sewer.
- Hazmat area: Concrete pad with self-containment. Drainage of pad is required which outfalls to sanitary sewage. Valve is required to prevent spills from entering sanitary sewage system.
- Antennae farm: Provide wood poles as per users needs; under Additive Bid Item.

F. Design Guidelines:

Stormwater Pollution Prevention Plans for Stormwater Runoff at Industrial Activities of the N.C. Division of Environmental Management, Water Quality Section Permits and Engineering Unit, February 1994.

Construction Erosion Control Devices, N.C. Dept. Natural Resources and Community Development, Division of Land Resources.

Sedimentation Control, N.C. Administration Code Title 15 A, Department of Environment and Natural Resources Chapter 4, October 1 1995.

Civil Engineering Design Requirements, LANTDIV February 1998.

Design of Stormwater Control Facilities, N.C. Division of Environmental Management and the Professional Engineers of North Carolina, May 4 1988.

Stormwater Best Management Practices, N.C. Dept of Environment and Natural Resources Division of Water Quality, July 1998.

## **LANDSCAPE ARCHITECTURAL DESIGN**

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### **I. Existing Conditions**

The site for the maintenance and operations facility is presently wooded with predominantly Loblolly pine species with a small representation of Longleaf pine. The under story consists of predominantly Wax myrtle, Sweet bay magnolia, Red bay, Yaupon holly, American holly and some species of Oak. The ground layer is dominated by various grasses and vines. This existing forest community is beneficial to the security component of this facility. By saving existing trees and under story outside the security clear zones an evergreen buffer can be maintained. This is especially important along Sneads ferry road. The rear of the site will be maintained for buffering and training area.

### **II. Compliance With Marine Corps Base Criteria**

The landscape design will comply with the intent of the MCB Lejeune Base Exterior Architecture Plan (BEAP). The landscape around the Maintenance and Operations Facility will soften hard building lines, blend the building into the natural surrounding. The landscape around the building and outside the perimeter fence will be designed to maintain sight lines to all areas. Shrubs and groundcovers will be species, which will not attain or can be maintained to an ultimate mature height of 24 inches. Large shrubs or small trees will be open in character to allow for sight through and around the canopy. Large trees in front of the building will be spaced uniformly and placed to allow space between the mature canopy and the building face. As a deterrent, low growing thorny hedges may be planted at key locations outside the fence to discourage close proximity to the fence. A buffer will be planted between Courthouse road and the facilities parking lot. The buffer will include 234 small native pines and some under story shrubs placed on a 3 foot height berm. The buffer will be opaque. Trees and groundcovers will be planted in all parking lot islands.

### **III. Special Design Considerations**

Both military personnel and non-military persons will use the main building entrance to the facility. The presentation of this entry will prove important to the 2<sup>nd</sup> Recon Battalion. A plaza will be provided at the building entry, which will provide a sense of place to this facility. Monuments and landscaping will be placed in this space. The existing monolithic granite monuments represent the 17 marines of the 2<sup>nd</sup> Reconnaissance Battalion who gave their lives for their country in Operation Desert Storm and in Beirut. 17 evergreen accent shrubs will be planted in a grid around the plaza to further commemorate these Marines. Additional space for a monument or flagpole will be placed to the side of the plaza.

### **IV. Sustainable design**

Xeriscape principles will be followed for all landscape design. All trees, under story plants, shrubs and ground covers will be native or drought tolerant species. Species will be selected from the BEAP and the Camp LeJeune Long Range Multiple Use Natural Resource Management Plan. The remaining buffers and landscape will require little to no maintenance and will compliment the serious mission and practicality of the base and this facility.

## ARCHITECTURAL DESIGN

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### I. Area Analysis:

#### A. Operations/Administration Building:

• Supply:	5,245 s.f.	
• Communications:	4,148 s.f.	
• Battalion Aid Station	2,097 s.f.	
• Armory/NBC	2,163 s.f.	
• Administration/Qtrdeck	11,846 s.f.	
• Dive Locker	4,753 s.f.	
• Paraloft	8,534 s.f.	
• Covered Area/Mech./Elec.	<u>891 s.f.</u>	
<b>Sub-total:</b>		<b>39,677 s.f.</b>

#### B. Vehicle Maintenance Building:

• Boat Repair:	4,865 s.f.	
• Motor Transport:	<u>5,727 s.f.</u>	
<b>Sub-total</b>		<b><u>10,592 s.f.</u></b>
<b>Total Area, Primary Facilities:</b>		<b>50,269 s.f.</b>

**DD1391 Area Limit = 53,309 s.f. - 3,040 s.f.**

### II. Category Code(s), Publication P-80:

A. <u>Primary Facility Category Code:</u>	214.51 Automotive Organizational Shop (from DD1391)
B. <u>Supplementary Category Codes:</u>	214.20 Automotive Vehicle Maintenance Shop
	214.55 Vehicle Wash Platform
	214.56 Grease Rack (Lift)
	217.10 Electronics/Communications Maintenance Shop
	441.12 Storage of Air or Ground Organic Units for Marine Corps
	610.10 Administrative Office

### III. Applicable Criteria:

A. <u>Scope/Budget Criteria:</u>	DD1391, dated July 1, 1998, FY2000 MCON Project P-568
B. <u>Design Criteria:</u>	MIL-HBK-1190 Facility Planning and Design Guide
	MCB Camp Lejeune Base Exterior Architecture Plan (BEAP), March 1997
	MIL-HBK-1008C Fire Protection for Facilities Engineering, Design and Construction, June 1997
	NFPA 101 Life Safety Code, 1997 Edition
	Uniform Building Code (UBC), 1997 Edition
	Uniform Federal Accessibility Standards (UFAS), Jan. 1992
	OPNAVINST 5530.14B Physical Security for Facilities, Dec. 1988
	NAVFACENCOM Planning & Design Policy, Jan. 1998

#### IV. Compliance With Marine Corps Base Criteria

Exterior design shall comply with the MCB Camp Lejeune Base Exterior Architecture Plan (BEAP), dated March 1997. The proposed facility is located in the Courthouse Bay District. Design elements preferred by the BEAP criteria include:

- Use of brick veneer and metal panels throughout exterior wall surfaces
- Use of sloped standing seam metal roofing
- Adherence to historic proportions
- Local symmetry around primary building entrance
- Use of punched opening windows
- Use of Facility Identification Signage Prototype

#### V. Special Design Considerations

- A. Handicapped Accessibility: The proposed facilities will house the 2<sup>nd</sup> Marine Division Reconnaissance Battalion, composed exclusively of able-bodied, active-duty military personnel. Access to most facility areas is limited to authorized staff personnel. There are no civilian support personnel employed by the RECON Battalion, and there is infrequent contact with civilian visitors. One restroom near the Ops/Admin. Building's primary entrance will be made handicapped accessible. A letter documenting the able-bodied personnel stipulation will be furnished to NAVFACENCOM by the Activity through MCB Camp Lejeune Base Facilities.
- B. Female Restroom Facilities: Currently, all RECON Battalion personnel are ground-combat qualified, and no female personnel are currently assigned to the Unit. It is not anticipated that female Marines will be assigned to the Unit in the near future; however, some accommodation for female visitors and, in the long-range, female personnel should be made. A unisex restroom will be included in both the Ops/Admin. Second Floor And Vehicle Maintenance Buildings which may be designated for female use on special occasions, and on a permanent basis as needed in the future.

#### VI. Building Code Analysis

- A. Use Group: **B**, Business (UBC Section 304.1).
- B. Allowable Floor Area: Twice (double) the area permitted by UBC Table 5-B (UBC Section 504.2)  
Increase for Separation on all sides: 100% (UBC Section 505.1.3)  
Increase for Sprinklers Throughout: Doubled; may be compounded with increase permitted by Section 5.1.3 (UBC Section 505.3)
- C. Type of Construction: Type IIN or IIIN, Non-combustible, minimum. Permissible Area: 96,000 s.f. for a two-story, fully-sprinkled building separated on all four sides.
- D. Fire Resistive Requirements:
  - 1. UBC Table 5-A:

Type <b>IIN</b>	Exterior Walls, Bearing	Not rated, N/C if >20 feet separation
	Exterior Walls, Non-bearing	Not rated, N/C if >20 feet separation
	Exterior Wall Openings	Rating or protection not required if >20 feet
  - UBC Table 5-A:

Type <b>IIIN</b>	Exterior Walls, Bearing	Two-hour, Non-combustible (N/C)
	Exterior Walls, Non-bearing	Not rated, N/C if >40 feet separation
	Exterior Wall Openings	Rating or protection not required if >20 feet

2. <u>UBC Table 6-A:</u>	Bearing Walls, Interior Structural Frame Permanent Partitions Shaft enclosures Floors and Floor-ceilings Roofs and Roof-ceilings Stairway Construction	Not rated, non-combustible Not rated, non-combustible Not rated, non-combustible 1-hour, non-combustible Not rated, non-combustible Not rated, non-combustible Non-combustible
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Conclusion: **It is advantageous to construct to Type IIN construction in order to avoid rating the exterior wall construction, even though it is not necessary to protect the exterior wall openings under Type IIIN.**

E. Life Safety:

1. Design will comply with NFPA 101 and additional requirements of MIL-HBK-1008C for:
  - Occupant load calculations.
  - Unit egress widths.
  - Stair widths and construction details.
  - Number, arrangement, identification and illumination of exits.
2. Dead end corridors shall be limited in length to 20 feet or less in accordance with UBC Section 1005.3.4.6.
3. Emergency lighting systems will be supported by the emergency generator in the event of loss of building power.
4. HVAC systems will be interlocked with smoke detection and fire alarm.
5. Secure locks will be egress compliant at all required exits.

**VII. Fire Protection**

Both buildings are classified under NFPA as Ordinary Hazard facilities. The Ops/Admin. Building will be fully sprinkled throughout as required under this contract. The Vehicle Maintenance Building will have limited area sprinklers at storage rooms only, which can be extended off of the domestic plumbing. Both buildings will be equipped with fire extinguisher cabinets; fire extinguishers must be provided outside the construction contract by the Activity or Public Works as collateral equipment. For smoke detection, fire alarm, notification, and additional features of fire protection, refer to Mechanical and Electrical portions of this report. Electrical power for Fire Protection systems will be supported by the emergency generator in the event of loss of building power.

**VIII. Environmental Issues**

An Environmental Assessment (EA) Study for the Courthouse Bay District is currently underway. The site has been aerially surveyed for wetlands; wetlands are found on the site designated for this facility. The building footprints and disturbed areas for paving and other site features will be located outside the delineated wetland limits. No endangered species are found at the site, and no other environmental issues appear to affect the project at this time. Customary environmental protection specifications will be included in the project’s construction documents. For additional features of environmental protection and list of required permits, refer to the Civil portion of this report.

**IX. Energy Conservation / Sustainable Design**

A. Energy Conservation: Features include:

1. Thermal Insulation:
  - Perimeter insulation at edge of slabs on grade: R-8
  - Rigid and batt-type insulation throughout exterior walls: R-10

- Rigid roof insulation: R-30

2. Solar Gain/Shading: High-performance insulating glass will be specified at vision units with the following characteristics:

- Thermal insulation: R-2.5
- Shading coefficient: 0.35
- Low outdoor reflectance value
- 'Low-E' reflective coating at #3 surface of clear inboard lite

B. Sustainable Design: Features include:

- Avoiding wetlands to minimize environmental impacts.
- Use of Best Management Practices (BMP) to provide water quality and water quantity control for stormwater runoff.
- Use of oil and water separator to minimize pollutants from entering sanitary and storm sewage.
- Specification of self-containment measures to eliminate spills from above ground fuel tanks and hazardous material storage pad.
- Extending water main for fire protection which eliminated fire pump and future pump maintenance.
- Use of "low-energy" materials such as concrete, concrete masonry, brick and steel.
- Limited use of high energy-demand materials such as aluminum.
- Use of recyclable materials such as steel studs.
- Use of materials with recycled content: insulation, carpet, ceiling panels.
- Specification of finish materials which can be reclaimed by manufacturer at end of useful life: carpet, ceiling panels.
- Inclusion of high performance glazing and window shades to reduce interior glare and solar gain.
- Use of finish materials with little or no off-gassing of chemicals.
- Use of low- or no-V.O.C. content paints.
- Practice of energy-conservation throughout design.
- Ease of access for changing of air filters in order to maintain air quality.
- Prohibition of hazardous compounds such as lead, asbestos, mercury, formaldehyde.
- Use of variable air volume HVAC systems for energy efficiency and indoor air quality concerns.
- Use of a direct digital control system for energy efficiency, reduced maintenance costs.
- Provision of DDC contacts for tie-in to a future base-wide energy management control system.
- Use of high efficiency gas fired tube heaters in maintenance areas.
- Provision of local overhead vehicular maintenance fluid drops for personnel efficiency.
- Provision of natural and mechanical ventilation systems in accordance with current ASHRAE and LANTDIV standards for indoor air quality concerns.
- Provision of a dual-fuel boiler to permit future changeover to a cleaner, more easily maintained natural gas fuel source when available.
- Reclaiming and reprocessing of parachute drying tower conditioned air for energy efficiency and life cycle cost.
- Use of independent HVAC systems for the Vehicle Maintenance Building to reduce up-front cost by avoiding costly underground HVAC piping distribution.
- Provision of vehicle and fume exhaust systems with convenient access and control for indoor air quality concerns and personnel efficiency.
- Convenient placement of central plant HVAC equipment for ease of maintenance access, and reduced pumping costs.
- Provision of overhead medical gas system drops and pedal operated scrub sink for medical personnel ergonomics.

- Provision of easily accessible maintenance space around HVAC equipment for personnel efficiency and ease of future renovations.
- Use of non-CFC refrigerants in air-conditioning equipment.
- Use of high energy-efficient lighting fixture ballasts and lamps.
- Provision of alternative light circuiting and switching, permitting low-energy use modes.
- Use of low-water demand plumbing fixtures, including water closets and shower heads.
- Inclusion of natural daylighting where possible and practical.
- Use of drought-tolerant, low-water demand turf and plants at exterior landscaping.

## **X. Security**

Features of physical and electronic security include the following systems and measures:

- Provision of 8 feet high perimeter site security fence with privacy slats and clear zone at rear staging/vehicle maintenance areas with lockable personnel and vehicle gates at entry points.
- Provision of site lighting permitting nighttime surveillance of secure areas and rooftop.
- Provision of a CCTV system monitoring the Armory from Duty Officer Quarterdeck.
- Provision of a SCIF at Ops/Admin. Building first floor (CMS Vault); will comply with DIAM 50.1 for features of construction (does not include EMF, HEMP or RF shielding).
- Inclusion of cipher locks at the ROC, SCIF day gate, and other locations as directed by RECON.
- Curvature of building curtainwall envelope to reduce glass areas susceptible to electronic eavesdropping from the non-secured area in front of the Ops/Admin. Building.
- Security Grade 1 door locksets at designated locations within the facility.
- Quarterdeck layout will permit rapid response by staff to unauthorized entry.
- Armory perimeter walls and second floor above to be constructed in accordance with OPNAVINST 5530.14B, and shall be reviewed by the MCB Camp Lejeune Provost Marshall for compliance with criteria.
- Armory can be secured within the Ops/Admin. Building, inaccessible from the building exterior or other non-secure spaces.

## **XI. Features of Architectural Design**

- A. Exterior Walls: 4-inch brick veneer with 2-inch cavity and rigid insulation over non-load-bearing, reinforced concrete masonry unit wall, 8 inches in width, up to eight (8) feet above first floor. From top of masonry at El. +8'-0" to top of walls, deep-rib corrugated metal siding over batt insulation on horizontal steel girt-braced metal studs. Two colors of brick will be used. Soldier course accent band at top of masonry beneath metal panels. Metal panels shall be PVDF-coated (Kynar finish) over G-90 galvanized steel in sufficient gauge to resist lateral loads.
- B. Windows: Tinted, low-reflectance vision and opacified spandrel glass in thermally-broken aluminum frames. Frames to be PVDF-coated (Kynar finish).
- C. Doors: Heavy-duty aluminum storefront doors and frame at primary entrance to Ops/Admin. Building. All other exterior personnel doors shall be extra-heavy-duty, insulated hollow metal doors in 14 gauge steel frames, painted. Overhead doors shall consist of vertically-coiling heavy-duty insulated steel slats with motor operators, weatherseals and safety edge strips.
- D. Roofing: Barrel-vaulted roof at Ops/Admin. Building shall be standing seam metal over nailable base, mechanically-fastened through rigid perlite and polyiso insulation to substrate metal decking. All other low-slope roofing shall be pitched at 1/2-inch per foot slope, consisting of granule-impregnated APP

modified bituminous membrane, torch applied over rigid perlite, mechanically-fastened through polyiso insulation to substrate metal decking. Roof edges and counterflashing shall be formed from stainless steel sheet.

- E. Miscellaneous: Exterior vehicle entry points shall have opening jambs protected by painted, concrete-filled steel pipe bollards. Exterior louvers shall be PVDF-coated (Kynar finish) aluminum. Exit stairs shall be concrete-filled formed metal pan type on steel channel stringers.
- F. Paraloft Tower: Shell to be constructed of reinforced cast-in-place concrete, 12 inches thick. Finish surface shall receive one coat of latex block filler plus one coat application of a textured, water-based, resinous acrylic paint.

## **XII. Interior Design**

- A. Interior Partitions: At the first floor of the Ops/Admin. Building and throughout the Vehicle Maintenance, interior partitions throughout high-bay areas shall be constructed from concrete masonry for sake of durability. Interior partitions throughout first and second floor office areas of Ops/Admin. Building shall be constructed from gypsum wallboard over metal studs for ease of power, communication and LAN distribution, as well as for ease of future reconfiguration.
- B. Interior Finishes: Shall be of durable quality as follows:
- Flooring: Thinset terrazzo tile at Quarterdeck.  
Vinyl composition tile at ground floor offices, classrooms.  
Sheet vinyl at medical exam and treatment areas.  
Ceramic tile and base at toilets and showers.  
Epoxy coating at shops, staging and storage areas.  
Carpet at parachute folding and throughout upper floor office areas.  
Vinyl wall base at terrazzo tile, VCT and carpet floors.  
Integral coved vinyl wall base at medical exam/treatment.  
Resilient rubber tread covers at stairs.
  - Walls: Paint throughout - acrylic "eggshell" latex enamel or low-VOC alkyd enamel.  
Epoxy paint at medical exam/treatment and toilets.  
Ceramic tile at wet walls in toilets and showers.
  - Ceilings: Painted exposed roof structure at all high-bay shops.  
Paint on gypsum wallboard over suspended metal furring at toilets and showers.  
Suspended acoustical panel ceiling at Quarterdeck and all offices, classrooms, and medical exam/treatment areas.
- C. Miscellaneous Interior Items: Shall be as follows:
- Doors: Painted hollow metal in steel frames, heavy duty.
  - Storefront: Tempered/safety glazing in painted hollow metal frames.
  - Vaults: Class 5 vault doors at SCIF and Armory.

- Casework: Plastic laminate covered cabinets at Quarterdeck and Supply.

D. Interior Specialties: Shall be as follows:

- Toilet Partitions: 1-inch thick phenolic resin compartment and urinal screen panels.
- Lockers: Steel double tier, 12 inches wide x 15 inches deep x 36 inches high.
- Signage: Plastic door signs with embedded graphics.
- Fire Ext. Cabs: Located per NFPA 10; semi-recessed. Fire extinguishers supplied by the Activity as collateral equipment.
- Projection Screen: Electric operating; one at Classroom in Communications area.
- Markerboards: One per Activity subgroup, 4'H x 8'W. One at each Classroom, 4'H x 12'W.
- Bulletin Boards: One per shop location, 4'H x 8'W.

E. Built-in Equipment: None under the Base Bid; one above-floor vehicle lift will be specified at the Vehicle Maintenance Building under Additive Bid Item #1.

## STRUCTURAL DESIGN

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### A. Foundations:

A geo-technical report for this project will be completed after the site plan is finalized at the FACD. The preliminary foundation design was based on the geotechnical report for the Amphibious Vehicle Maintenance Shop, which is located on Courthouse Road near the project site. Based on this report, a pile foundation system has been assumed. The piles were assumed to be 45-feet long, 20-ton timber piles. All columns and load-bearing walls will be supported on a series of concrete pile caps and grade beams.

### B. Floor Slabs:

The first floor will consist of a concrete slab-on-grade over a vapor barrier over 4-inch porous fill. The slab thickness will be determined by the design live load. Typical office loads and other loads up to 100 PSF will have a 4-inch thick slab. Heavier loads, up to 200 PSF, will have a 6-inch thick slab.

### C. Structural System:

The structural system selected for this project consists a combination of structural steel columns and beams, and load-bearing reinforced concrete masonry walls supporting standard open web bar joists with a 1-1/2 inch metal roof deck. Because concrete masonry walls were recommended by the User for their durability, masonry walls were used wherever possible as bearing walls. At the exterior walls, the masonry extends to 8 feet above the floor slab to provide durability, with non-structural infill walls above for economy, and a structural steel frame to support the roof. The floor construction at the second floor and the mezzanine areas will be cast-in-place concrete slabs with welded wire mesh reinforcing on steel form deck, supported by open web bar joists.

The roof of the two-story area metal roof deck on pre-fabricated light-gage metal roof trusses to provide the desired roof profile. The metal trusses will be supported on a series of structural steel columns and beams. In this area where masonry walls are not required for durability, this steel frame structural system will be more economical, as well as provide flexibility for future changes.

Lateral loads in both the north-south and east-west directions will be resisted by a combination of structural steel X-bracing at the exterior walls and the masonry shear walls. The steel roof deck and the second floor slab construction will act as horizontal diaphragms to transmit lateral forces to the shear walls.

### D. Design Loads:

Supply Area:	200 PSF
Radio Area - Offices	100 PSF
Radio Area - Work Rooms	200 PSF
Armory	200 PSF
Medical	100 PSF
Dive Area	200 PSF
Parachute - Folding areas	100 PSF
Parachute - All other areas	200 PSF
Tower Floor	200 PSF
Mezzanines	125 PSF
Second Floor	

Offices	50 PSF + 20 PSF Partition Allowance
Corridors	80 PSF
File Room	125 PSF
Roof	20 PSF
Wind Loads	100 MPH, Exposure C
Seismic Loads	Zone 1

**E. Structural Materials:**

Concrete	
All Concrete	$f'c = 3,000$ PSI
Reinforcing Steel	ASTM A615, Grade 60
Masonry	
Concrete Masonry	$f'm = 1,500$ PSI
Concrete Masonry Units	ASTM C-90 (lightweight)
Grout	ASTM C-476
Mortar	ASTM C-270, Type 'S'
Reinforcing Steel	ASTM A615, Grade 60
Structural Steel	
Steel Tube Members	ASTM A501, Grade B $Fy = 46,000$ PSI
Steel Pipe Members	ASTM A53 $Fy = 36,000$ PSI
All other Steel Members	ASTM A36 $Fy = 36,000$ PSI
Bolts	ASTM A325
Welding Electrodes	E-70-XX
Steel Bar Joists	IAW SJI Specifications
Steel Deck	
Form Deck	ASTM A611                9/16", 28 Gage
Roof Deck	ASTM A611                1-1/2", 22 Gage

## MECHANICAL DESIGN

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### I. System Design:

#### A. General:

The project consists of providing heating, ventilating, humidity control, dive operation compressed air distribution, maintenance compressed air system, maintenance fluid distribution and storage, and vehicle maintenance systems for the new site location for the Marine Second Recon Battalion.

#### B. Design Conditions:

- i. Summer:
  - Outdoor: 90°F dry bulb, 79°F wet bulb (2 ½ %)
  - Indoor: 75° F dry bulb, 50% rh
- ii. Winter:
  - Outdoor: 23° F dry bulb (97 ½%)
  - Indoor: 68° F dry bulb
  - Unmanned Spaces: 52° F dry bulb

#### C. Ventilation:

Ventilation air shall be removed from the buildings by a central exhaust system.

- Heads - 75cfm/fixture
- Offices- 20cfm/person
- Conference Areas- 10cfm/person
- Warehouse & Corridors- 0.05cfm/sf
- Utility Spaces (Summer Ventilation)- 2cfm/sf
- Paraloft Tower- 6ac/hr

#### D. Controls:

Direct digital controls shall be utilized for central plant and four-pipe air handler control. Electronic controls shall be utilized for heated only areas as well as fume exhaust systems and summer ventilation fan systems.

### II. Operations/Administration Building:

#### A. General:

The building shall be supplied by a four-pipe hot water/chilled water distribution system with a central boiler and chiller. Areas requiring standard heating and cooling shall utilize a fan powered VAV system with hot water reheat. Areas requiring heating only shall be provided with suspended hot water propeller unit heaters, hot water convectors for stairwells. Specialized areas of the structure include the Oxygen and LAR-V rooms, which require explosion proof equipment with high levels of particulate filtration, the parachute storage room, and the paraloft tower, which requires dehumidification control. The LAR-V, parachute storage, and Oxygen rooms shall be conditioned by ceiling mounted four-pipe systems. A four-pipe modular air handler shall condition the parachute tower. Dive operation compressed air and oxygen distribution tubing shall be provided from the new compressor room to the TRCS, LAR-V, and Oxygen rooms.

## **B. Central Plant Cooling:**

Central Plant cooling shall be provided by a chilled water distribution system utilizing one air cooled rotary chiller sized for the total cooling load capacity for the total average cooling load, and one constant volume centrifugal chilled water pump. Approximate cooling load is 135 Tons.

## **C. Central Plant Heating:**

Heating shall be provided by a hot water distribution system consisting of one oil/propane fired boiler sized for the total average heating load and one constant volume centrifugal water pump. Approximate heating load is 1980 MBH.

## **D. Explosion-Proof Areas:**

The LAR-V and Oxygen rooms shall be provided with mechanical equipment to suit an explosion-proof area due to the presence of oxygen packing systems.

## **E. Humidity Control:**

The LAR-V oxygen, and Oxygen rooms shall be provided with humidity control to prevent condensation on oxygen compression equipment. The Chute Storage room shall be provided with humidity control to protect valuable equipment. The branch ductwork serving the parachute packing area shall be provided with a standalone steam humidifier system to prevent static electricity.

## **F. Dehumidification Control**

The parachute-drying tower shall be provided with a four pipe air handler utilizing minimal outside air and dehumidification control across the chilled water coil with hot water reheat for use during parachute drying operations. This system will be capable of operating on minimal outside air requirements when parachute-drying operations are not required.

# **III. Vehicle Maintenance Building:**

## **A. Heating and Cooling:**

The office areas of the building shall be conditioned by a split system heatpump. The Dispatch office shall be conditioned by a packaged through wall heat pump. Heating shall be provided by propane fired infrared tube heaters in the repair bays and by small (1.5 KW and less) electric wall mounted heaters in small areas requiring freeze protection. The Boat Repair Bay shall be capable of maintaining 83 degrees F in the winter for maintenance operations.

## **B. Summer Ventilation:**

Summer heat relief shall be provided by centrifugal rooftop exhaust fans with fan switch control. Open bay doors shall be used as the means for make-up air.

## **C. Vehicle Exhaust:**

The boat repair/storage bays shall be provided with a fume collection hood over the outboard motor testing tank for removal of the products of combustion. The vehicle repair bays shall

be provided with a vehicle exhaust system with overhead drops to be attached to vehicle exhaust pipes.

**D. Vehicle Maintenance Equipment:**

The vehicle repair bays shall be provided with overhead retractable water, air, transmission fluid, and 30-weight oil drops, which shall be fed from a centralized 55-gallon drum storage location. Hydrocarbon systems shall be pressurized by compressed air. Antifreeze shall be provided in a 55-gallon storage drum as a collateral item and be pumped by means of an existing, to be relocated hand pump. Water drops shall be pressurized by service pressure.

**E. Compressed Air:**

The vehicle maintenance building shall be provided with a compressed air system for use of pneumatic tools in standard repair operations. The compressed air system shall also be utilized as the drive system for the vehicle overhead fuel drops. Four Compressed air drops shall be provided for Motor Transport as well as Boat Maintenance.

**PLUMBING DESIGN**

**I. General:**

Project consists of the provision of standard fixtures for lavatories, water closets, urinals, and showers for the head and locker areas of new facilities; janitor's sinks for the janitorial storage areas of this facility; deep sink fixtures in the washroom of the paraloft facility and darkroom, a full wet-pipe sprinkler system for the Operations/Administration Building, and limited area sprinkler systems for the Vehicle Maintenance Building. Hose bibs shall be provided around the perimeter of the Operations/Administration Building and the Vehicle Maintenance Building as required.

**II. Operations/Administration Building:**

**A. Plumbing:**

The plumbing system shall consist of a central electric hot water storage tank, cold, hot, and hot water recirculation distribution system, flush valve water closets and urinals, showers, cabinet top lavatories, and wall mounted water coolers. Handicapped fixtures shall be utilized where required. A scrub sink with foot pedal operation shall be provided in the Trauma room. Standard wall mounted lavatories shall be provided in the exam rooms of the Medical Area. Floor mounted service sinks shall be utilized in the janitors closets. A deep sink shall be provided for the darkroom. Fill spigots shall be provided for the parachute wash basins. Potable water shall be copper and routed concealed overhead where possible. Waste piping shall be cast iron and routed underslab.

**B. Medical Oxygen and Suction:**

An oxygen and suction distribution system shall be provided in the medical area of the building. This system shall consist of two central oxygen storage bottles with distribution to two overhead drop locations (one in the trauma room and one in the sick room).

**C. Sprinkler:**

The building shall be protected by a full wet pipe sprinkler system utilizing Schedule 10 steel piping with mechanical couplings for piping greater than 2" and Schedule 40 steel screwed end

pipng for piping 2” and less. The building shall be provided with a standpipe with external flow test connection. The building is primarily classified as ordinary hazard with the exception of the LAR-V and Oxygen rooms which shall be classified extra hazard.

### **III. Vehicle Maintenance Building:**

#### **A. Plumbing:**

The plumbing system shall consist of a central electric hot water storage tank, cold and hot water distribution systems, flush valve water closets and urinals, showers, cabinet top lavatories, and wall mounted water coolers. One wall-mounted sink shall be utilized in each repair bay. Potable water shall be copper and routed concealed overhead where possible. Waste piping shall be cast iron and routed underslab.

#### **B. High Pressure Booster System:**

A domestic water booster pump and pressure reserve tank shall be provided to feed the site vehicle high-pressure wash wand.

#### **C. Sprinkler:**

The building shall be classified as ordinary hazard and is less than 15,000 square feet. A limited area sprinkler system shall be utilized to protect the OEM storage room. Equipment in this area has been labeled non-mission critical by the activity.

## ELECTRICAL DESIGN

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### I. Interior Distribution Systems:

- A. The electrical characteristics for this project are 277/480V, 3 Phase, 4 Wire. The electrical utilization system (120/208V, 3 Phase, 4 Wire) will be provided by use of step-down dry type transformers. The electrical service equipment will be specified as a Main Distribution Panelboard (MDP) in the Vehicle Maintenance Building and a Main Switchboard in the Operations / Administration Building.
1. An emergency electrical power generator will be utilized for this project. It will serve critical loads in the medical area, the sewage lift station, and selected night/emergency lighting loads. The final size will be determined on the final loads to be connected to it.
  2. No uninterruptible power supply (UPS) systems are anticipated for this project.

- B. The estimated **connected** electrical load was calculated based on a watts per square foot basis, and is summarized as follows:

Operations/Administration Building (Includes lift station and some site lighting)	574.8 kW
Vehicle Maintenance Building (Includes fuel station and some site lighting)	221.5 kW
<hr/> Total	<hr/> 796.3 kW

Appropriate demand factors will be applied to the final load calculations.

- C. All wiring shall be run in conduit. Conduit shall be electrical metallic tubing, galvanized rigid steel conduit, or intermediate metal conduit. Polyvinyl chloride (PVC) conduit will be allowed where properly protected within concrete floor slabs, where installed in concrete encased ductbank, and where direct buried for underground electrical branch circuits and underground communications circuits. Electrical metallic tubing will be allowed in dry locations only. Electrical metallic tubing shall not be installed in concrete.
- D. Conductors shall be thermoplastic insulated with type THWN, THW or XHHW insulations. All conductors shall be specified as copper. Aluminum conductors will not be allowed.
- E. The pertinent standards of design used for this project will include compliance with the current edition of the National Electrical Code, LANTDIV's A&E Guide Manual, the Camp Lejeune Design Guide, and requirements defined in the applicable DOD Design Manuals. Specific pertinent design standards shall be as follows:
- F. Voltage drop will be kept to less than 2.5% between the panelboard and the last outlet on that circuit.
- G. Lighting intensities will be as specified in the current edition of the Illuminating Engineers Society handbook and MIL-HDBK 1190: "Facility Planning and Design Guide".
- H. Lighting fixture calculation will be run by computer program utilizing criteria from the LANTDIV plates. See Design Backup for lighting calculations.
- I. The following lighting intensities will be provided:

Offices	50 FC
Conference Rooms	30 FC

Computer/Comm. Rooms	50 FC
Classrooms	50 FC
Mechanical Rooms	15 FC
Electrical Rooms	15 FC
Lobbies	25 FC
Storage Rooms	10 FC
Toilets	20 FC
Stairways	20 FC
Corridors	10 FC
Shop Areas	40 FC

- J. Lighting fixtures will be based on the LANTDIV plates wherever possible. Some specialty fixtures will be detailed individually. All fixture plates will be shown on the drawings. It has been expressed that Holophane “Vector” lighting fixtures be utilized for exterior area and site lighting.
- K. Hazardous locations will be identified on the drawings and will utilize rigid conduit with seal-offs in accordance with the National Electrical Code. The project includes oxygen storage and work areas that will be specified as hazardous areas. The project includes battery storage rooms that **will not** be specified as hazardous areas.
- L. Motors shall be provided with motor disconnect switches. Motor control features will be coordinated with the mechanical system design.
- M. Receptacles will be 15 amp, 125 V grounding type except for circuits with a single receptacle will be fully rated 20A. Ground fault interrupter (GFI) type receptacles will be provided at all sink locations. Special type receptacles will be required for specialized equipment as identified by the Activity. Weatherproof GFI receptacles will be strategically located around the exterior of the buildings.
- N. A short circuit analysis will be prepared and included in the Electrical Design Calculations. The AIC ratings of all panelboards and circuit breakers will be determined by the final short circuit analysis.
- O. The project requires special consideration for the following communications systems:
  1. This project requires a fire alarm system. The control panel will be the addressable style utilizing solid state, modular design features. The fire alarm system will include manual pull stations, audio/visual alarm devices, smoke detectors, heat detectors, and connections to the sprinkler system. Smoke detectors will be provided in the Operations/Administration Building in communications, electrical, and other mission critical spaces, and at the control panel as required by the NFPA. Fixed temperature heat detectors will be utilized in the vehicle maintenance and boat shop areas.
  2. The telephone and data system for this project will include a complete Category 5 premise cabling system including service termination blocks with surge protection; intermediate termination blocks; 4 pair, #24 solid copper, UTP telephone cable; and 8 pin, modular style telephone and data outlets. Telephone/data outlets will be quadruplex style (two data ports and two telephone voice ports). A secure phone line will also be required. It is understood that this line requires no special built-in filters and that the necessary scrambling and/or encrypting is accomplished via user provided equipment. All telephone controllers, switches, cross-connects and instruments will be Government-Furnished, Government-Installed (GFGI).
  3. A SCIF room will be required, but it will not require shielding or any other special electrical requirements.
  4. This project will not include a paging system.

5. A cable television distribution system is required for this project. This will be distributed to selected rooms in the Ops/Admin. Building. Empty conduit will be provided for the service entrance and backbone cables. The service and backbone cables will be provided and installed by the local cable television service company which currently has a contract with the base to provide service. The contractor will install conduit, outlet boxes, and cabling for individual branch outlets. The local cable television service company will provide the branch cabling to the contractor for installation.
  6. This project requires a (CCTV) system. Monitoring of the system will be at the duty NCO area. CCTV will monitor only the armory.
  7. This project does not require an intrusion detection system (IDS). The IDS is not a requirement due to the fact that the facility will have a 24 hour armed guard stationed there. A conduit and outlet box rough-in system will be provided for future IDS installation if required.
  8. This project does not require a nurse call or any other type of special communication system.
- P. The Operations/Administration Building will require a ground grid system. Ground bars will be required in selected areas of the building, such as the Radio Shops. A lightning protection system will also be provided for the Operations/Administration Building.

## **II. Exterior Distribution Systems**

- A. Existing base utility drawings indicate that the existing electrical primary system in this area is rated 12.47 kV, three phase, four wires. The existing system will be intercepted at an overhead location.
- B. The existing primary circuit running along Courthouse Road will be upgraded from #4 to #1/0 to the point of tap. This will be done to accommodate both the additional load on the circuit to be added by this project, as well as anticipated future projects.
- C. The electrical characteristics of the existing electrical primary system are 12.47 kV, 3 phase, 4 wire. The system's available short circuit capacity has been defined as 10,000A.
- D. The total estimated connected load for this project is 796.3 kVA.
- E. The primary and secondary distribution voltage has been selected based on the existing available primary system and the most economical secondary system.
- F. Conductors for the overhead portion of this project will be either bare aluminum, AAAC, or bare copper, hard-drawn. Conductors for the underground portion of this project will be 1/C copper with shielded EPR insulation, and rated 15 kV.
- G. The pertinent standards of design for the exterior distribution system are as follows:
  1. Voltage drop will be kept to less than 1% between the service transformer and the building's electrical service equipment.
  2. The project will require tapping the existing overhead primary circuit at an existing pole. The circuit will be extended to a new pole with an underground terminal assembly. The buildings' service transformer(s) will be pad-mounted style. The overhead distribution system will be based on the Base's overhead construction plates, utilizing armless construction, with steel cross-arms where required.

3. The underground primary circuit will be extended by underground ductbanks to pad mounted transformers. The pad-mounted transformers will be isolated from each other utilizing a four-position switch located in the first transformer in the primary feeder circuit from the tap point. The secondary circuits from the transformers will be run underground in concrete encased ductbanks.
- H. Lighting fixtures will be a combination of building mounted and pole mounted styles. The general area and site pole mounted style fixtures will be direct-buried concrete poles with Holophane "Vector" style fixtures. The lamp source will be High-Pressure Sodium (HPS). A second level of exterior lighting may be provided as an additive bid item to accommodate night staging and deployment activities. This system will include additional lighting fixtures and poles and will be manually controlled with an automatic shut-off override for energy conservation.

Perimeter security lighting fixtures will not be required since the complex is not defined as a "Restricted Area." Circuiting for the outdoor lighting system will utilize direct buried PVC conduit with type "USE" copper conductors.

- I. The existing communications systems will be extended to the buildings as follows:
  1. The existing exterior telephone and data system cabling in the vicinity of the proposed complex has been defined to be inadequate to support this project. New copper telephone cable and fiber optic cable will be extended from the existing exchange facility BB69 to the project site. The intention is to have Base Telephone perform the installation of the copper and fiber optic cables from the exchange to an buildings. All costs for this will be borne by this project, however, Base Telephone can perform this work at a lower cost than a construction contractor. Furthermore, additional capacity will be required in the area in the future to serve other planned facilities.

A 200 pair 24 AWG paired copper cable and a 24-strand single-mode fiber will be utilized to serve both the Operations / Administration Building and the Vehicle Maintenance Building. The extension to the facilities will be accomplished using direct buried cable along Courthouse Road, and non-encased conduit sleeves below paved areas to and between the buildings. The conduit sleeves will be provided under the construction contract. Any splices required will be made above ground.

2. The exterior fire alarm system connection will be made utilizing Base standard radio frequency signals. The specifications for this radio transmitter system have been supplied by PWC.
3. The sewage lift station to be constructed to serve this facility will be connected to the appropriate base monitoring facility via radio frequency signal. The specifications for this radio transmitter system have been supplied by PWC.

**-- End of Abbreviated Basis of Design --**