

51<sup>ST</sup> BRIGADE IRAQI ARMY BARRACKS  
AL HILLAH, IRAQ

**SIGIR PA-06-075**  
**JANUARY 29, 2007**



## SPECIAL INSPECTOR GENERAL FOR IRAQ RECONSTRUCTION

January 29, 2007

MEMORANDUM FOR DIRECTOR, IRAQ RECONSTRUCTION MANAGEMENT OFFICE  
COMMANDING GENERAL, MULTI-NATIONAL SECURITY  
TRANSITION COMMAND – IRAQ  
COMMANDING GENERAL, GULF REGION DIVISION,  
U.S. ARMY CORPS OF ENGINEERS

SUBJECT: Report on 51st Brigade Iraqi Army Barracks, Al Hillah, Iraq  
(Report Number SIGIR PA-06-075)

We are providing this project assessment report for your information and use. We assessed the design and construction work being performed at the 51st Brigade Iraqi Army Barracks, Al Hillah, Iraq to determine its status and whether intended objectives will be achieved. This assessment was made to provide you and other interested parties with real-time information on a relief and reconstruction project underway and in order to enable appropriate action to be taken, if warranted. The assessment team included an engineer/inspector and an auditor/inspector.

The Commanding General, Gulf Region Division of the U.S. Army Corps of Engineers concurred with the conclusions and recommendation contained in a draft of this report and implemented appropriate corrective action. As a result, comments on this final report are not required.

We appreciate the courtesies extended to our staff. If you have any questions please contact Mr. Brian Flynn at [brian.flynn@sigir.mil](mailto:brian.flynn@sigir.mil) or at 914-360-0607. For public or congressional queries concerning this report, please contact SIGIR Congressional and Public Affairs at [publicaffairs@sigir.mil](mailto:publicaffairs@sigir.mil) or at (703) 428-1100.

Stuart W. Bowen, Jr.  
Inspector General

# Special Inspector General for Iraq Reconstruction

SIGIR PA-06-075

January 29, 2007

## 51st Brigade Iraqi Army Barracks, Al Hillah, Iraq

### Synopsis

**Introduction.** This project assessment was initiated as part of our continuing assessments of selected sector reconstruction activities for Facilities and Transportation. The overall objectives were to determine whether selected sector reconstruction contractors were complying with the terms of their contracts or task orders and to evaluate the effectiveness of the monitoring and controls exercised by administrative quality assurance and contract officers. We conducted this project assessment in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team included an engineer/inspector and an auditor/inspector.

The objective of this project was to construct new buildings and facilities, and to upgrade utilities for the 2<sup>nd</sup> (formerly 51st) Brigade Iraqi Army Garrison, located in the City of Hillah, Babil Governorate, Iraq. The project is funded through the Iraq Relief and Reconstruction Fund and administered by the U.S. Army Corps of Engineers, Gulf Region South for the Multinational Security Transition Command-Iraq. Task Order 0007 under Contract W916QW-05-D-0014 for the project was issued on 8 October 2005 in the amount of \$999,298. At the time of our assessment, the project was reported to be 90% complete.

**Project Assessment Objectives.** The objective of this project assessment was to provide real-time relief and reconstruction project information to interested parties in order to enable appropriate action, when warranted. Specifically, we determined whether:

1. Project components were adequately designed prior to construction or installation;
2. Construction or rehabilitation met the standards of the design;
3. The contractor's Quality Control plan and the U.S. Government's Quality Assurance program were adequate;
4. Project sustainability was addressed; and
5. Project results were consistent with original objectives.

**Conclusions.** The assessment determined that:

1. The U.S. Army Corps of Engineers design package was adequate to construct the buildings and most of the facilities included in the contract scope. Specifically, the U.S. Army Corps of Engineers developed a design package that consisted of architectural, mechanical, electrical, civil, and structural drawings. In addition to the design drawings and specifications, the contract Statement of Work provided specific construction requirements and a bill of quantities for the contractor to follow. However, there were some omissions associated with the design. There were no drawings showing locations of the paved street and pad construction. In addition, there were no structural drawings for the motor pool facility.
2. The majority of the construction appeared to meet the standards of the Statement of Work and design. The inspection team did not observe significant deficiencies during its visit to the project site, but did note in the report "punch list" type items

that needed to be corrected by the contractor. In addition, since there were no structural drawings for the motor pool facility, the assessment team could not determine if the concrete and structural steel construction met the design standards. Nonetheless, because of the concerns raised in the report regarding the motor pool construction, the U.S. Army Corps of Engineers-Gulf Region South engineering staff should assess the adequacy of the concrete vehicle ramps and the structural steel frame supporting the roof. The U.S. Army Corps of Engineers-Gulf Region South Babil Resident Office provided adequate oversight to ensure the requirements of the Statement of Work and the design were met.

3. The contractor's Quality Control plan was sufficiently detailed to effectively guide the contractor's Quality Management program. Further, the contractor's daily quality control reports contained required project and work activity information to document construction progress and identify problems and required corrective action.

The U.S. Government's Quality Assurance program was effective in monitoring the contractor's Quality Control program. The U.S. Army Corps of Engineers-Gulf Region South Babil Resident Office Project Engineer and Quality Assurance Representative ensured that all deficiencies cited during quality assurance inspections were corrected. The Quality Assurance Representative also completed daily quality assurance reports that contained project specific information to document construction progress and highlight deficiencies.

4. Sustainability was not adequately addressed in the basic contract and was not mentioned in the task order requirements. The basic contract did not address spare parts lists, major catalog cuts, and certifying warranties in the name of the appropriate Ministry, for all equipment, including any mechanical, electrical and/or electronic devices. Instead, the basic contract made vague references to Operations and Maintenance manuals and training, warranty information, and as-built drawings. In addition, this report identified low quality plumbing fixtures and barracks buildings' doors used by the contractor. The use of these items will present the Iraqi Army with continual maintenance problems.
5. The observed project results appeared consistent with the task order objectives. The report does document concerns with the motor pool requiring follow-up by the U.S. Army Corps of Engineers-Gulf Region South Babil Resident Office. Overall, the project has resulted in the construction of the new buildings and facilities required in the Statement of Work. The completed project work will result in additional facilities for the Iraqi Army soldiers to live and work in.

**Recommendations.** We recommend the Commanding General, Gulf Region Division, U.S. Army Corps of Engineers assess the adequacy of the motor pool facility's concrete vehicle ramps and the structural steel frame supporting the roof.

**Management Comments.** The Commanding General, Gulf Region Division concurred with our draft report and recommendation, commenting that a Gulf Region South lead engineer is currently assessing the adequacy of the motor pool facility's concrete vehicle ramps and the structural steel frame supporting the roof.

**Evaluation of Management Comments.** Management comments addressed the issues raised in our conclusions and on going actions should identify and correct any potential problems. Therefore, no further management comments are required.

# Table of Contents

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<b>Synopsis</b>	i
<b>Introduction</b>	
Objective of the Project Assessment	1
Pre-Site Assessment Background	1
Contract, Task Order and Costs	1
Project Objective	2
Description of Facility (pre-construction)	2
Scope of Work of the Task Order	2
Current Project Design and Specifications	2
<b>Site Assessment</b>	
Work Completed	4
Work in Progress	20
Work Pending	20
<b>Project Quality Management</b>	
Contractor Quality Control Program	20
Government's Quality Assurance Program	21
<b>Project Sustainability</b>	21
<b>Conclusions</b>	22
<b>Recommendations</b>	24
<b>Management Comments</b>	24
<b>Evaluation of Management Comments</b>	24
<b>Appendixes</b>	
A. Scope and Methodology	25
B. Acronyms	26
C. Report Distribution	27
D. Assessment Team Members	29

# Introduction

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## Objective of the Project Assessment

The objective of this project assessment was to provide real-time relief and reconstruction project information to interested parties in order to enable appropriate action, when warranted. Specifically, we determined whether:

1. Project components were adequately designed prior to construction or installation;
2. Construction or rehabilitation met the standards of the design;
3. The contractor's Quality Control (QC) plan and the U.S. Government's Quality Assurance (QA) program were adequate;
4. Project sustainability was addressed; and
5. Project results were consistent with original objectives.

## Pre-Site Assessment Background

### Contract, Task Order and Costs

The 51<sup>st</sup> Brigade Garrison Project is funded through the U.S. Government's appropriated Iraq Relief and Reconstruction Fund (IRRF) and administered by the U.S. Army Corps of Engineers-Gulf Region South (USACE-GRS) Forat Area Office, Babil Resident Office for the Multinational Security Transition Command-Iraq (MNSTC-I). Contract W916QW-05-D-0014, an indefinite delivery/indefinite quantity contract, was awarded on 1 December 2004. There are currently four modifications to the original contract:

- Modification #01, dated 18 March 2005, transferred authority to the USACE GRS.
- Modification #02, dated 23 September 2005, exercised Option 1 in the maximum amount of \$50,000,000.
- Modification #03, dated 6 October 2005, corrected the minimum guaranteed amounts included in Modification P00002 for the base and Option years 1-3.
- Modification #04, dated 24 October 2005, corrected the dates included in Modification P00003 for the base and Option years 1-3.

Task Order (TO) 0007 was issued on 8 October 2005 in the amount of \$999,298 for the construction of new facilities and to upgrade utilities for the 51<sup>st</sup> Brigade Garrison, Iraqi National Guard, in Hillah, Iraq. The work under this TO is identified as Project Number 23025, listed in the Project and Contracting Office (PCO) construction database, dated 14 July 2006.

There were two modifications to the initial TO:

- Modification #01, issued 14 October 2005, changed the agreed-to-award amount from \$999,298 to \$999,208.
- Modification #02, issued 4 November 2005, modified the unit numbering for the Iraqi Army 8<sup>th</sup> Division. The new name of the project is the 2<sup>nd</sup> Brigade, 8<sup>th</sup> Division, Iraqi Army.

## **Project Objective**

The objective of this project was to construct new buildings and facilities, and to upgrade utilities for the 2<sup>nd</sup> (formerly 51st) Brigade Iraqi Army Garrison, located in the City of Hillah, Babil Governorate, Iraq.

## **Description of the Facility (pre-construction)**

The description of the facility (pre-construction) was based on information obtained from the USACE project file, and discussions with the USACE GRS Babil Resident Office Project Engineer (PE). The project site was at the 2<sup>nd</sup> Brigade's compound, located in the City of Hillah along the Hillah-Najaf Highway in the Babil Governorate. The site contained existing buildings and facilities utilized by the 2<sup>nd</sup> Brigade. Local electric and water utilities were available to the compound.

## **Scope of Work of the Task Order**

Based on the TO Statement of Work (SOW), the project included construction of the following buildings and facilities:

- Dining facility for 100 men
- Two 75-man barracks
- Two ablution buildings with 8 water closets, 7 showers, and 8 hand washing stations
- Electrical distribution enhancements, i.e., electrical generators
- Covered parking (i.e., sunshades) for 50 vehicles
- Motor pool ( *a vehicle maintenance facility*)
- Paved street and pads plus aggregate service road
- Force protection improvements (guardhouse and main gate improvements)

The SOW also required a sanitary sewer system to serve the ablution buildings and the dining facility. This system included a septic tank and a mound drainage system (i.e., a drain field). The system also included a dosing chamber with submersible pump for delivering effluent from the septic tank to the mound drain system. The USACE PE informed the assessment team that the mound sanitary drainage system was removed from the scope at the request of officials from the 2<sup>nd</sup> Brigade because of the complexity of the system and added maintenance requirements.

## **Current Project Design and Specifications**

The contract drawings and specifications were part of the contract SOW and were provided to the contractor.

The design package consisted of architectural, civil, electrical, mechanical, and structural drawings for the 2<sup>nd</sup> Brigade buildings and facilities. The architectural drawings contained floor and roof plans, elevations, typical sections, and window and door schedules for the barracks, the dining facility, the ablution buildings, and the guardhouse building. The architectural drawings for the dining facility showed separate rooms for a chill box and frozen box, but did not show any details regarding the chill box and frozen box rooms.

The civil drawings provided location, sizes, and pipe elevation details for the sanitary system, as well as drawings showing septic tank design. The civil drawings did not contain plans showing paved street and pad construction.

Structural drawings included plan and cross sectional views of structural members (footers, columns, beams, and floor and roof slabs). The structural drawings did not

show details of how the masonry walls were tied together or connections made to structural concrete beams or columns using dowels or wall ties. In addition, there were no structural drawings for the motor pool. In the SOW, the following structural drawings were listed for the motor pool:

- S-021 Motor Pool Elevation & Details
- S-022 Motor Pool Side View
- S-023 Motor Pool Ramp Plan

However, the actual drawings (S-021, S-022 and S-023) contained in the design package applied to the construction of the covered parking (sunshades), not the motor pool.

Mechanical drawings included plumbing plans and details for water and sanitary sewer systems, as well as plans and details for individual room heating, ventilation, and air conditioning (HVAC) systems. Electrical drawings contained power generation and distribution system plans, details, electrical panel schedules and system one-line diagrams. The electrical drawings also included lighting plans and details. The civil drawings provided location, sizes, and pipe elevation details for the sanitary system, as well as drawings showing septic tank design.

The SOW lists 42 specification sections applicable to the project; the USACE GRS provided us with the 42 specification sections. The specifications, prepared in Construction Specifications Institute (CSI) format, described the quality requirements for the workmanship including the required standards expected to be achieved.

In addition to the requirements contained in the specifications, the SOW required all works for the garrisons to be “carried out to National Iraqi Standards or equivalent British/American Standards where/as applicable.”

The SOW and bill of quantities also augmented the design by providing the contractor construction requirements pertaining to material quantities and sizing information. For example, the design drawings did not show floor slab thicknesses for any of the buildings. However, the SOW provided the thickness for the barracks and ablution buildings.

For the ablution buildings, the SOW required all plumbing equipment and accessories to be approved by the “GRS site engineer” prior to procurement. Discussions with the USACE GRS Babil Resident Office PE indicated a formal submittal and review process was not used for this project.

In summary, our review of the design package indicated several areas noted above where there were omitted drawings or the drawings lacked sufficient detail. Overall though, the design package appeared adequate to construct most of the buildings and facilities for the 2<sup>nd</sup> Brigade Garrison.

## **Site Assessment**

On 25 August 2006, we performed an on-site assessment of the 2<sup>nd</sup> Brigade Garrison project. At the time of our assessment, the USACE GRS Babil Resident Office PE stated the project was 90% complete, with a scheduled completion date of 1 October 2006. Most of the buildings and facilities constructed for this project were substantially



complete, although the electrical distribution enhancements were not finished. Final inspections by the USACE GRS Babil Resident Office were pending on all facilities.

The on-site assessment included inspections of most of the buildings and facilities listed in the TO SOW. We did not inspect the guard tower or the force protection improvements at the main entrance gate to the 2<sup>nd</sup> Brigade compound. Also, the Iraqi Army had recently moved into the guardhouse adjacent to the entrance gate prior to a final inspection by the USACE GRS Babil Resident Office. Since most of the floor space in the guardhouse was taken up with furniture and stored material, our inspection of this facility was limited to a quick walk-through.

During the site assessment, we were accompanied by the USACE GRS Deputy District Commander, the USACE GRS Babil Resident Engineer (RE) and PE.

### **Work Completed**

The 2<sup>nd</sup> Brigade buildings (barracks, ablution, and dining) constructed for this project were designed structurally as reinforced concrete and masonry buildings. The foundation design for the barracks consisted of a series of pad footings supporting interior and exterior columns, and perimeter wall footings supporting exterior walls. Because of the open floor plan in the two barracks buildings, interior and exterior reinforced concrete columns and beams provided the structural frame for the building to support the roof slab and parapet. The SOW required a 10 centimeter (cm) reinforced concrete floor slab and an 18 cm reinforced concrete roof slab.

Based on the design, the ablution buildings' foundations included a series of wall footings, supporting exterior masonry walls. The SOW required a 10 cm reinforced concrete floor slab and an 18 cm reinforced concrete roof slab in the ablution buildings. The design also called for 200 millimeter (mm) deep reinforced concrete bond beams on all free standing walls that supported the reinforced concrete roof slab and parapet.

The dining facility's structural design consisted of a foundation of continuous strip footings supporting the building's columns and continuous wall footings supporting the exterior walls. The reinforced concrete columns supported the reinforced concrete bond beams, roof slab, and parapet.

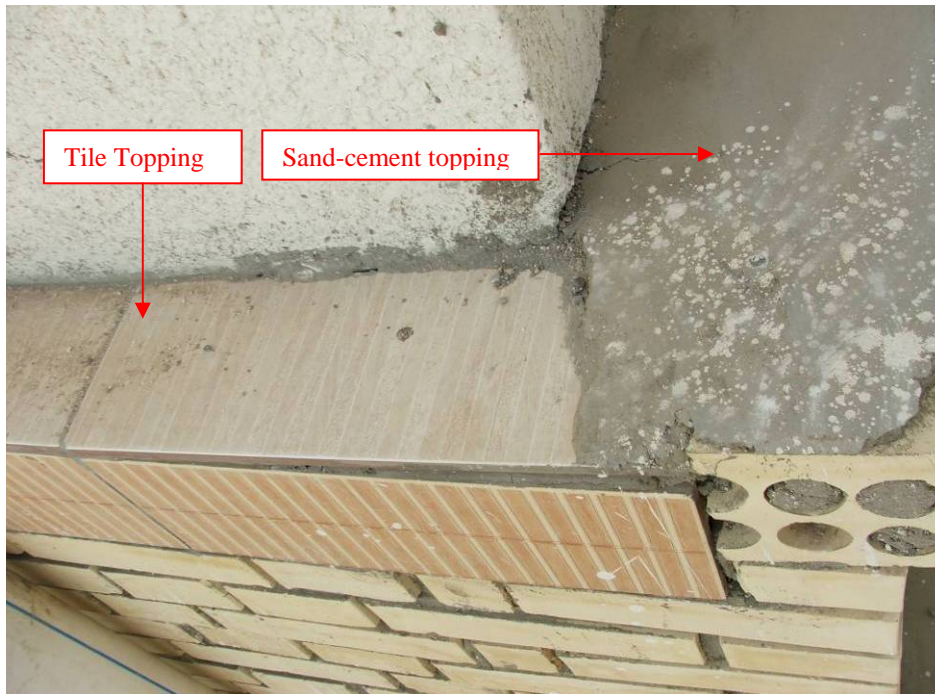
The following summarizes our assessments for each of the completed buildings and facilities we inspected on 25 August 2006.

### **Dining Facility**

The dining facility floor plan included a 100-person dining room, a kitchen, a hand wash room, and three separate food storage rooms (dry storage, a chill box, and a frozen box). The design called for the base of the exterior walls to be covered with brick to a height of about 1 meter (m), and the upper portion of the walls covered with a ceramic type tile matt. Site Photo 1 shows the exterior of the dining facility. The contractor had constructed the brick facing along the bottom 1 m of the exterior; the upper portion of the walls were plastered, textured, and painted. We did not find any significant deficiencies with the exterior construction, except the top of the 1 m brick face on one side of the building. The contractor, on three sides of the building, had placed a ceramic tile cover over the top course of the brick face. However, on the front side of the building, the contractor had only placed a sand-cement topping, as shown in Site Photo 2. The USACE GRS Babil Resident Office PE informed us the contractor would make the necessary corrections.



**Site Photo 1. Dining facility exterior**



**Site Photo 2. Brick face finish**

The door and window schedule for the dining facility required aluminum entrance doors, wood interior doors, and insulated metal doors for the exterior entrances to the food storage rooms, and metal frame windows of various sizes and configurations. We did not find any deficiencies in the window and door installation.

The interior walls of the dining facility were plastered and painted and the flooring included mosaic tiles. Site Photo 3 shows part of the interior finishes in the dining room.

The mechanical and electrical designs required eight, two-ton HVAC units in the dining room and two in the kitchen, which were augmented by ceiling fans. We verified the installation of the HVAC system units in these areas. The chill box design required specific items for the contractor to install, including a 6,000 British Thermal Unit (BTU) cooling unit. The chill box room did not appear complete. The interior walls and ceiling were plastered and painted, but there was no cooling unit in place to provide refrigerated air. We could not determine if the walls were insulated to the standards required by the design.



**Site Photo 3. Dining room interior**

### Barracks

Each one-story barracks building contained a 20 m by 12 m room (sleeping quarters) to house 75 soldiers. The barracks also contained an issue room and an arms room, each approximately 4 m x 3 m in size. The SOW required plastered and painted interior walls ceilings and mosaic tile floors. The mechanical design called for 10, two-ton split system HVAC units, and the electrical design required ceiling fans for added air circulation. We did not observe any noticeable deficiencies with the interior wall, floor, and ceiling construction. We also verified the HVAC and ceiling fan units were in place as designed. Site Photo 4 shows the interior of one of the barracks.



**Site Photo 4. Interior in one of the barracks sleeping quarters**

The SOW also required “good quality” aluminum windows and aluminum doors in the barracks sleeping quarters. In our inspection, we observed two sets of aluminum entry/exit doors in the sleeping quarters, one set of double doors serving as the front entrance, and a single door in the rear of the building. These doors did not appear to be “good quality,” especially considering the high traffic that a 75-man barracks will receive. Site Photo 5 shows the aluminum doors used for the entrance to the barracks sleeping quarters, and Site Photo 6 shows the rear entrance/exit door in one of the two barracks.

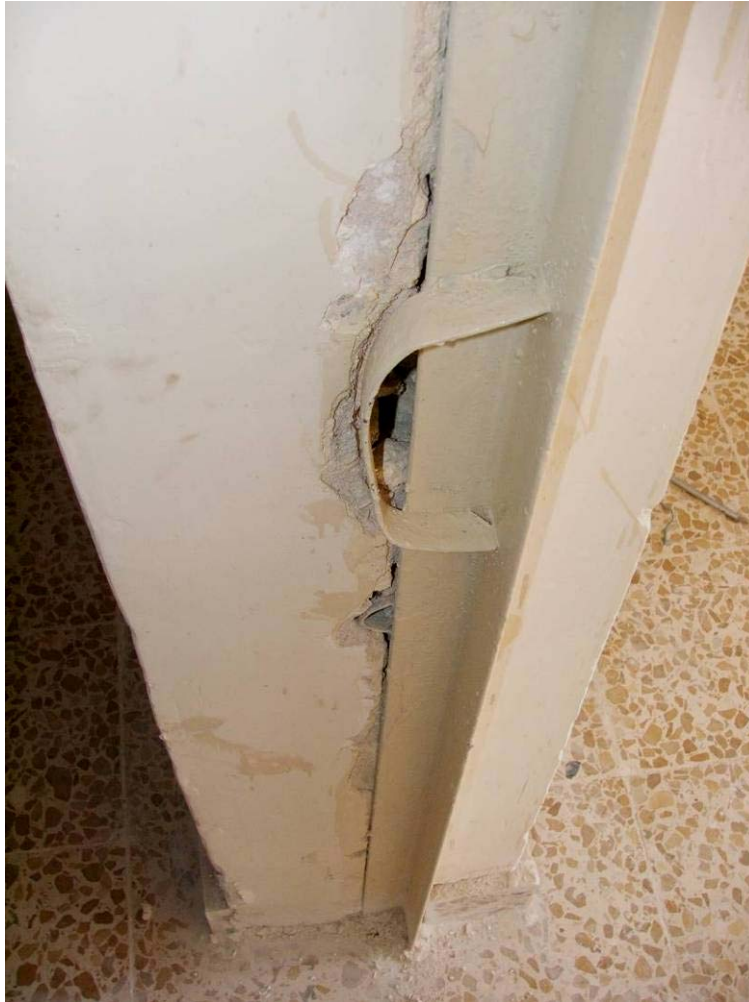


**Site Photo 5. Aluminum doors at front entrance to the barracks sleeping quarters**



**Site Photo 6. Aluminum door at rear entrance to the barracks sleeping quarters**

In the barracks' issue room and arms room, the design required metal doors. These doors appeared to be satisfactory in quality and adequately installed. We did notice on one of the door frames (Site Photo 7), the wall around the frame needed patching and painting.



**Site Photo 7. Arms room wall requiring patching in door frame**

### Ablution Buildings

The SOW included construction of two single story ablution buildings, each one adjacent to one of the new barracks. The design for each 8 x 10 m building included seven individual showers, eight water closets, and a hand washing station with eight faucets, and three electric water heaters. We verified their installation during our inspection.

The SOW required a sand-cement exterior wall finish; while for the interior, the SOW required the contractor to plaster to a smooth finish and paint interior walls and ceilings, and to install mosaic floor tile. During our inspection, we observed plastered and painted ceilings, and mosaic floor tiles. We did not find any noticeable deficiencies associated with the ablution building interior and exterior finishes.

Although the walls and ceiling appeared to be finished properly, we did observe the top of the privacy walls constructed between showers and water closets were not finished in

the same manner as the walls and ceiling. The design contained no information regarding the finish requirements for the top of these walls. Site Photo 8 shows an example of the unfinished portion of the privacy walls. Aside from the ascetics, the rough surface will pose a problem for cleaning, and will trap moisture and dirt.



**Site Photo 8. Top of privacy walls constructed in ablution buildings**

Regarding the plumbing fixtures used in the ablution buildings, we did observe what appeared to be low quality fixtures (shower heads, water supply lines, faucets, drain covers, etc.) installed in the showers, wash stations, and water closets. Site Photos 9 and 10 show the shower fixtures, including the shower head and the thin metallic tubing used to supply water to the shower head. Site Photos 11 and 12 show the type of plumbing materials used in the water closets, which includes flexible water hoses, plastic supply tanks, and thin wall plastic tubing supplying water from the tank to the toilet. Considering the ablution buildings will receive heavy usage, we believe the low quality plumbing fixtures will pose continual maintenance problems for the Iraqi Army.



**Site Photo 9. Shower in ablution buildings**



**Site Photo 10. Shower head in ablution building**



**Site Photo 11. Water closet in ablution building**





**Site Photo 12. Close-up of plastic tubing used in ablution building water closets**

### Covered Parking (sunshades)

The SOW requirements for two covered parking structures (sunshades) for 40 vehicles and 10 vehicles, respectively, included the following:

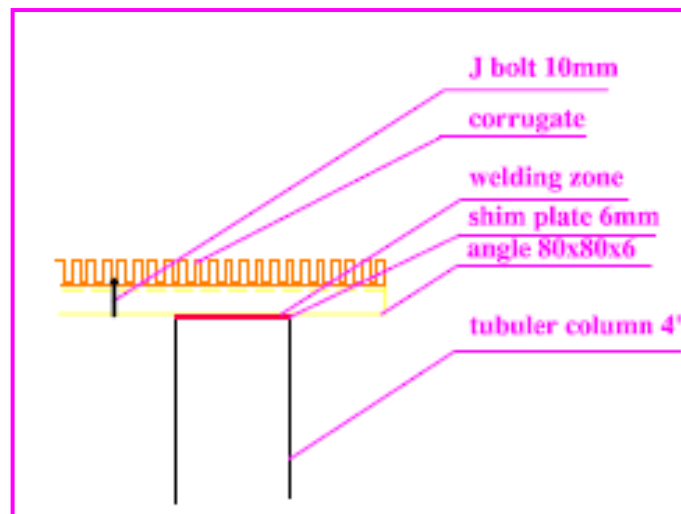
*“Concrete in bases for each of the 4” tubular steel columns using a (1:2:4) mixture. Field weld connections between tubular columns, top plates, and L80x80x4 angles. Attached corrugated sheets to angles with J-hooks, spaced no more than 80 cm apart. Paint all exposed steel surfaces with one coat zinc-rich primer and two coats enamel paint.”*

Site Photo 13 shows one section of the 40 vehicle sunshade. We did note that many of the four inch tubular columns consisted of spliced sections of pipe welded together to form one tubular column. The design did not provide any details as to whether or not welded pipe columns were allowed.



**Site Photo 13. 40- vehicle parking sunshade**

The design detail for the structural frame supporting the corrugated roof sheeting (Figure 1) showed an 80 x 80 x 6 angle supporting the roof sheeting. No units were provided for the angle, although it is assumed the dimensions are in millimeters. Figure 1 also shows the angle welded to a shim plate at the top of the column. There were no details provided on the type or size of weld or the type and thickness of the corrugated roof sheeting. The design also did not show any lateral cross bracing perpendicular to the angle support shown in Figure 1.

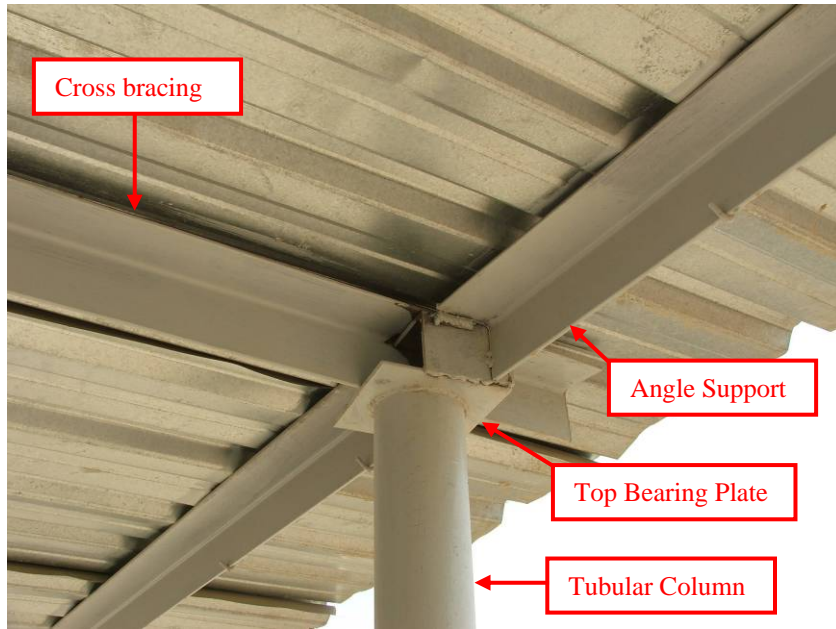


**Figure 1. Design detail for covered parking (sunshade)**

Site Photo 14 shows the actual welded angle connections at the bearing plate (i.e., shim plate) at the top of each tubular column, as well as, the lateral cross bracing. The roof sheeting material appeared to be a thin gage sheet metal, connected to the frame with J-bolts, as depicted in Figure 1.

At one end of the sunshades, a portion of the metal sheeting was torn away at the corner (Site Photo 15). We also observed broken concrete at the base of one of the four inch tubular columns (Site Photo 16). Both of these items should be included in the punch list generated at final inspection.

The assessment team inspected all of the parking sunshades for the 50 vehicles and found no significant deficiencies, based upon the SOW requirements and the design.



**Site Photo 14. Typical column support for covered parking (sunshade)**



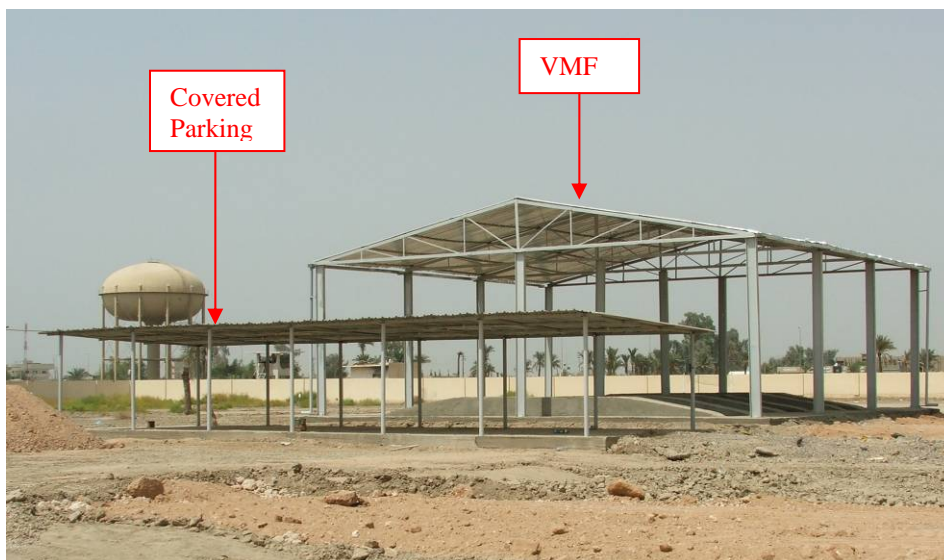
**Site Photo 15. Torn sheeting at one end of the parking sunshade**



**Site Photo 16. Broken concrete at column base in the parking sunshade**

#### Motor Pool (Vehicle Maintenance Facility)

The SOW (page 5) required the contractor to construct a “Motor Pool with 3 vehicle ramps and sunshade” in accordance with the drawings. The motor pool will serve as a vehicle maintenance facility. Except for a power and lighting plan, there were no drawings in the design package pertaining to the motor pool. The motor pool we inspected, located adjacent to one section of the covered vehicle parking areas, was constructed as an open air facility with concrete ramps for three vehicles (Site Photo 17). Each vehicle ramp included a sunken pit in the center to facilitate maintenance of the vehicle from underneath when the vehicle was parked. Site Photo 18 shows one of the three ramps constructed for vehicle maintenance.



**Site Photo 17. Vehicle maintenance facility (VMF) next to a covered parking sunshade**



**Site Photo 18. One of the three vehicle ramps and maintenance pits at the VMF**

We found the following areas of concern regarding the construction of the motor pool:

*Concrete Workmanship on the Ramps*

We observed poor workmanship associated with the concrete stairs accessing the maintenance pits. The stairs did not appear to be aligned properly or uniform or level. In addition, there were also voids in the concrete along the rise of the steps. Site Photo 19 shows one set of steps to illustrate the poor workmanship.

We also found the contractor had patched the ramp surface with a sand-cement mortar. There was no explanation for the need for patching; however, in several areas, the patch was crumbling. Site Photo 20 shows the crumbling material along the top of the ramp.



**Site Photo 19. Concrete steps into the maintenance pit**



**Site Photo 20. Crumbling mortar at the surface of the vehicle ramp**

*Steel H-columns*

The motor pool structure was supported by 12 steel H-columns. Each column was welded to a base plate, which was attached to the concrete floor slab using four anchor

bolts cast in the concrete. On one of the 12 columns, we found on one anchor, the nut connecting the anchor bolt to the base plate resting on the top of the bolt. The nut needed to be tightened down to the base plate.

We also observed one of the H-columns consisted of two sections, butt welded together to form the column (Site Photo 21). In addition, in two of the 12 columns, we observed four bolt holes in the flange section of the column (Site Photo 22).



**Site Photo 21. Spliced steel H-column at the motor pool**



**Site Photo 22. Bolt holes in flange of a steel H-column at the motor pool**

*Steel Roof Truss*

The motor pool's sheet metal roof was supported by four trusses consisting of steel angles. Each truss was supported by three H-columns, one at each end, and one at mid-span. Site Photo 23 shows two of the roof trusses.



**Site Photo 23. Roof truss system supporting the motor pool roof**

It appeared the roof trusses were adequately constructed; although we observed in several locations, the bottom chord of the truss was spliced between the columns. Site Photo 24 illustrates the spliced bottom chord. It appeared in these locations, the contractor welded plates to the bottom and side of the steel angle to stiffen the spliced connection.



**Site Photo 24. Spliced bottom chord on motor pool roof**



Our concerns about the motor pool noted above should be reviewed by a USACE GRS structural engineer, particularly since there were no structural design drawings for the facility.

### **Work in Progress**

#### **Electrical Distribution Enhancements (Electrical Generators)**

The SOW required the contractor to install two, 200 kilo-volt-amps (kVA) diesel generators in a new generator shed. The SOW also required a fuel tank for the generators (no size provided), manual change-over switch, synchronous panel for 2 generators, and 400 ampere switchgear. We found during our inspection the two new 200 kVA generators covered with tarps and resting on a concrete slab. The generator shed was also constructed, but the switchgear, electrical panel, and external fuel tank had not been installed. Site Photo 25 shows the generators in place under the metal shed.



**Site Photo 25. Generator shed and two generators (covered with tarps)**

### **Work Pending**

Pending work included completion of the electrical distribution system enhancements. In addition, work on the new paved streets and pads was pending.

## **Project Quality Management**

### **Contractor's Quality Control Program**

The basic contract required a Quality Control (QC) program, consisting of a contractor QC plan, daily QC reports, deficiency tracking, list of QC testing, and any transferred or installed property.

The contractor submitted a QC plan to the USACE. The plan addresses the QC organization, inspections, and work plans for earthwork, concrete, masonry, metal, wood

and plastics, doors and windows, and mechanical and electrical work. The QC plan consisted of plans and procedures necessary to produce an end product that complies with contractual requirements. However, the QC plan did not contain organization charts, the qualifications of QC personnel, and deficiency logs.

The contractor submitted QC reports on a daily basis, which were reviewed by the USACE GRS Babil Resident Office Quality Assurance Representative (QAR) and PE. These reports contained information such as work accomplished each day at the location, test results, deficiencies and corrective actions, labor distribution, and overall project completion percentage. The contractor also maintained deficiency logs to document problems noted with construction/renovation activities.

### **Government Quality Assurance Program**

The USACE GRS Babil Resident Office QAR maintained daily QA reports that documented any deficiencies noted at the site. Based on our review, we found the QAR's reports to be sufficiently complete, accurate, and timely. In addition to containing project specific information to document construction progress and highlight deficiencies, the QAR also supplemented them with detailed photographs that reinforced the narrative information provided in the reports. The USACE GRS Babil Resident Office QAR did not maintain a QA deficiency log; however, the USACE GRS Babil Resident Office PE and the QAR did ensure that all deficiencies cited during QA inspections were corrected.

The QAR was on site every day in managing this project and the PE made frequent visits to the site to verify the contractor's construction and progress. They spent a significant amount of their time at project sites interacting with the contractor and observing construction activities. Further, they ensured that potential construction deficiencies were detected, evaluated, and properly corrected, in a timely manner.

The Government QA program was effective in monitoring the contractor's QC program for the 2<sup>nd</sup> Brigade Iraqi Army Garrison construction and renovation project. In addition, QA activities were sufficiently and accurately documented. This condition occurred because of the efforts of the PE and QAR during the course of the project.

## **Project Sustainability**

The basic contract required the contractor provide Operations and Maintenance (O&M) documentation and manuals, O&M training, warranty information, and as-built drawings.

The basic contract did not address spare parts lists, major catalog cuts, and certifying warranties in the name of the appropriate Ministry, for all equipment, including any mechanical, electrical and/or electronic devices. TO 7 did not address the issue of warranties of workmanship and equipment, catalog cuts, spare parts, or manuals.

Earlier in this report, we identified potential sustainability issues with the low quality plumbing fixtures in the ablution buildings. For example, the plumbing materials used in the water closets were flexible water hoses, plastic supply tanks, and plastic tubing from the tank to the toilet; while in the showers, the water faucets are susceptible to breaking off and the thin metal water pipe to the shower head is connected to the wall with a one screw clamp (Site Photos 26 and 27). Over time, the clamp will dislodge from the wall and the shower water pipe will dangle. Considering the heavy usage the ablution buildings will receive, the low quality material will pose continual maintenance problems for the Iraqi Army.



**Site Photos 26 and 27. Single screw clamp holding the thin metal water pipe to the wall.**

In addition, we also identified the poor quality aluminum doors in the barracks sleeping quarters. As with the ablution buildings, considering the heavy traffic expected with a 75-man barracks, a higher quality type door was needed. Another concern is that during a strong windstorm, the aluminum doors may fly off.

USACE GRS Babil Resident Office and MNSTC-I staff agreed the plumbing fixtures and aluminum doors used were of poor quality and presented future maintenance problems for the Iraqi Army; however, both stated these are items readily available within Iraq, which should help with quick replacement.

## **Conclusions**

Based upon the results of our site visit, we reached the following conclusions for assessment objectives 1, 2, 3, 4, and 5. Appendix A provides details pertaining to Scope and Methodology.

1. Determine whether project components were adequately designed prior to construction or installation.

The U.S. Army Corps of Engineers' developed design was adequate to construct the buildings and facilities included in the contract statement of work. The U.S. Army Corps of Engineers developed a design package that consisted of architectural, mechanical, electrical, civil, and structural drawings, coupled with the Statement of Work, which provided the contractor with the necessary requirements to construct the project. In addition to the design drawings and specifications, the contract Statement of Work provided a bill of quantities and also construction requirements for the

contractor to follow. However, there were some omissions associated with the design. There were no drawings showing locations of the paved street and pad construction. In addition, there were no structural drawings for the motor pool facility.

2. Determine whether construction met the standards of the design.

The majority of the construction appeared to meet the standards of the Statement of Work and design. The inspection team did not observe significant deficiencies during its visit to the project site, but did note in the report “punch list” type items that need to be corrected by the contractor. In addition, since there were no structural drawings for the motor pool facility, the assessment team could not determine if the concrete and structural steel construction met the design standards. Nonetheless, because of the concerns raised in the report regarding the motor pool construction, the U.S. Army Corps of Engineers Gulf Region South engineering staff should assess the adequacy of the concrete vehicle ramps and the structural steel frame supporting the roof. The U.S. Army Corps of Engineers Gulf Region South Babil Resident Office provided adequate oversight to ensure the requirements of the Statement of Work and the design were met.

3. Determine whether the Contractor’s Quality Control plan and the Government Quality Assurance program were adequate.

The contractor’s Quality Control plan was sufficiently detailed to effectively guide the contractor’s Quality Management program. Further, the contractor’s daily Quality Control reports contained required project and work activity information to document construction progress and identify problems and required corrective action.

The Government Quality Assurance program was effective in monitoring the contractor’s Quality Control program. The U.S. Army Corps of Engineers Gulf Region South Babil Resident Office Project Engineer and Quality Assurance Representative ensured that all deficiencies cited during the quality assurance inspections were corrected. The Quality Assurance Representative also completed daily Quality Assurance reports that contained project specific information to document construction progress and highlight deficiencies.

4. Determine if project sustainability was addressed.

Sustainability was not adequately addressed in the basic contract and was not mentioned in the task order requirements. The basic contract did not address spare parts lists, major catalog cuts, and certifying warranties in the name of the appropriate Ministry, for all equipment, including any mechanical, electrical and/or electronic devices. Instead, the basic contract made vague references to Operations and Maintenance manuals and training, warranty information, and as-built drawings. In addition, this report identified low quality plumbing fixtures and barracks buildings’ doors used by the contractor. The use of these items will present the Iraqi Army with continual maintenance problems.

5. Determine whether project results were consistent with original objectives.

The observed project results appeared consistent with the task order objectives. The report does document concerns with the motor pool requiring follow-up by the U.S. Army Corps of Engineers Gulf Region South Babil Resident Office. Overall, the project has resulted in the construction of the new buildings and facilities required in the Statement of Work. The completed project work will result in additional facilities for the Iraqi Army soldiers to live and work in.

## **Recommendations**

We recommend the Commanding General, Gulf Region Division, U.S. Army Corps of Engineers should assess the adequacy of the motor pool facility's concrete vehicle ramps and the structural steel frame supporting the roof.

## **Management Comments**

The Commanding General, Gulf Region Division concurred with our draft report and recommendation, commenting that a Gulf Region South lead engineer is currently assessing the adequacy of the motor pool facility's concrete vehicle ramps and structural steel frame supporting the roof.

## **Evaluation of Management Comments**

Management comments addressed the issues raised in our conclusions and ongoing actions should identify and correct any potential problems. Therefore, no further management comments are required.

## **Appendix A. Scope and Methodology**

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We performed this project assessment from August through December 2006 in accordance with the Quality Standards for Inspections issued by the President's Council on Integrity and Efficiency. The assessment team included an engineer/inspector and an auditor/inspector.

In performing this Project Assessment we:

- Reviewed contract documentation to include the following: Basic Contract, Task Order, Task Order Modifications, and scope of work;
- Reviewed the design package (drawings and specifications), Quality Control Plan, Contractor's Quality Control Reports, USACE Quality Assurance Reports, Construction Progress Photos, Punch Lists, and Turnover Letters;
- Interviewed the U.S. Army Corps of Engineers Gulf Region South Babil Resident Office Resident Engineer and Project Engineer, and the Multinational Security Transition Command – Iraq J-7 (Engineering Directorate) staff; and
- Conducted an on-site assessment and documented results at the 2<sup>nd</sup> Brigade Iraqi Army Garrison Project in Hillah, Iraq.

## Appendix B. Acronyms

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BTU	British Thermal Unit
cm	Centimeter
CSI	Construction Specifications Institute
GRS	Gulf Region South
HVAC	Heating, Ventilation and Air Conditioning
ID/IQ	Indefinite Delivery/Indefinite Quantity
IRRF	Iraq Relief and Reconstruction Fund
kVA	kilo volt amps
m	Meter
mm	Millimeter
MNSTC-I	Multinational Security Transition Command – Iraq
O&M	Operation and Maintenance
PCO	Project and Contracting Office
PE	Project Engineer
QA	Quality Assurance
QAR	Quality Assurance Representative
QC	Quality Control
RE	Resident Engineer
SOW	Statement of Work
TO	Task Order
USACE	U. S. Army Corps of Engineers

## **Appendix C. Report Distribution**

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### **Department of State**

Secretary of State

Senior Advisor to the Secretary and Coordinator for Iraq

U.S. Ambassador to Iraq

Director, Iraq Reconstruction Management Office

Inspector General, Department of State

### **Department of Defense**

Secretary of Defense

Deputy Secretary of Defense

Director, Defense Reconstruction Support Office

Under Secretary of Defense (Comptroller)/Chief Financial Officer

Deputy Chief Financial Officer

Deputy Comptroller (Program/Budget)

Inspector General, Department of Defense

### **Department of the Army**

Assistant Secretary of the Army for Acquisition, Logistics, and Technology

Principal Deputy to the Assistant Secretary of the Army for Acquisition,

Logistics, and Technology

Deputy Assistant Secretary of the Army (Policy and Procurement)

Assistant Secretary of the Army for Financial Management and Comptroller

Chief of Engineers and Commander, U.S. Army Corps of Engineers

Commanding General, Gulf Region Division

Auditor General of the Army

### **U.S. Central Command**

Commanding General, Multi-National Force – Iraq

Commanding General, Joint Contracting Command – Iraq/Afghanistan

Commanding General, Multi-National Corps – Iraq

Commanding General, Multi-National Security Transition Command – Iraq

Commander, Joint Area Support Group – Central

### **Other Defense Organizations**

Director, Defense Contract Audit Agency



## **Other Federal Government Organizations**

Director, Office of Management and Budget  
Comptroller General of the United States  
Inspector General, Department of the Treasury  
Inspector General, Department of Commerce  
Inspector General, Health and Human Services  
Inspector General, U.S. Agency for International Development  
Mission Director – Iraq, U.S. Agency for International Development

## **Congressional Committees and Subcommittees, Chairman and Ranking Minority Member**

### **U.S. Senate**

Senate Committee on Appropriations  
    Subcommittee on Defense  
    Subcommittee on State, Foreign Operations and Related Programs  
Senate Committee on Armed Services  
Senate Committee on Foreign Relations  
    Subcommittee on International Operations and Terrorism  
    Subcommittee on Near Eastern and South Asian Affairs  
Senate Committee on Homeland Security and Governmental Affairs  
    Subcommittee on Federal Financial Management, Government Information and International Security  
    Subcommittee on Oversight of Government Management, the Federal Workforce, and the District of Columbia

### **U.S. House of Representatives**

House Committee on Appropriations  
    Subcommittee on Defense  
    Subcommittee on Foreign Operations, Export Financing and Related Programs  
    Subcommittee on Science, State, Justice and Commerce and Related Agencies  
House Committee on Armed Services  
House Committee on Government Reform  
    Subcommittee on Management, Finance and Accountability  
    Subcommittee on National Security, Emerging Threats and International Relations  
House Committee on International Relations  
    Subcommittee on Middle East and Central Asia

## **Appendix D. Project Assessment Team Members**

The Office of the Assistant Inspector General for Inspections, Office of the Special Inspector General for Iraq Reconstruction, prepared this report. The principal staff members who contributed to the report were:

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