INTERNAL AUDIT DIVISION

REPORT 2022/093

Audit of engineering support services in the United Nations Interim Force in Lebanon

Improvements were needed to ensure engineering support services are provided in an efficient, effective and economical manner

29 December 2022
Assignment No. AP2021-672-03

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EXECUTIVE SUMMARY

The Office of Internal Oversight Services (OIOS) conducted an audit of engineering support services in the United Nations Interim Force in Lebanon (UNIFIL). The objective of the audit was to assess the adequacy and effectiveness of the management of engineering support services to ensure efficient and economical use of resources in providing timely engineering services to support the implementation of the mandate. The audit covered the period from July 2019 to September 2022 and included: (i) asset management and maintenance; (ii) project management; and (iii) procurement of engineering services and materials. The management of engineering projects by military engineering units will be covered in a separate assignment in the future and was therefore excluded from this audit.

UNFIL ensured that Mission sites were adequately powered by generators and solar panels during the audit period. UNIFIL also established standard operating procedures for engineering services and assigned project managers for all construction projects. However, while preventive maintenance activities were planned, they did not cover all areas and were sometimes not done or properly conducted and/or recorded. The Engineering and Facilities Management Section (EFMS), which is responsible for providing engineering support, did not establish key performance indicators for processing engineering service/work requests and did not monitor the time taken to close them. Project documentation was not standardized to ensure project managers use them effectively to plan, execute and monitor projects. Since the Mission was working with a small pool of vendors, it was necessary to analyze and mitigate procurement risks and review the allocation of roles and responsibilities within EFMS to improve the segregation of duties.

OIOS made six recommendations. To address issues identified in the audit, UNIFIL needed to:

- Establish and implement procedures for EFMS to prepare regular preventive maintenance plans and post-inspection reports to record and follow up on maintenance requirements;
- Establish performance indicators and targets for processing engineering service requests and properly plan, track and report on the status of preventive maintenance and service requests in the iNeed system;
- Require EFMS to develop project management templates to be completed by project managers for all stages of the project lifecycle;
- Ensure that project managers comply with the documentation requirements for planning, executing and monitoring engineering projects;
- Ensure EFMS prepare project-related procurement plans, analyze procurement risks including potential fraud schemes, and develop appropriate mitigating measures; and
- Review the allocation of roles and responsibilities between the Construction and Project Units in EFMS to improve the segregation of duties for the various aspects of implementing construction projects.

UNIFIL accepted five recommendations and initiated action to implement them. UNIFIL did not accept the recommendation to review the allocation of roles and responsibilities in EFMS to improve the segregation of duties stating that engineering-related Umoja roles provided for segregation of duties. Also, EFMS had limited staff with unique expertise in specific areas of engineering, who only performed roles in those areas. OIOS notes that while assignment of roles in Umoja provided some segregation of duties, a variety of measures are needed to minimize the risks related to potential procurement fraud schemes, vendor bias and inefficient processes. The Mission can achieve better segregation of duties with existing EFMS personnel

by reviewing the distribution of roles and responsibilities and strengthening their procurement and project management capabilities. OIOS considers that the underlying risk remains relevant. Therefore, the recommendation will be recorded as unaccepted by UNIFIL in the OIOS recommendation monitoring system.

Actions required to close the other recommendations are indicated in Annex I.

CONTENTS

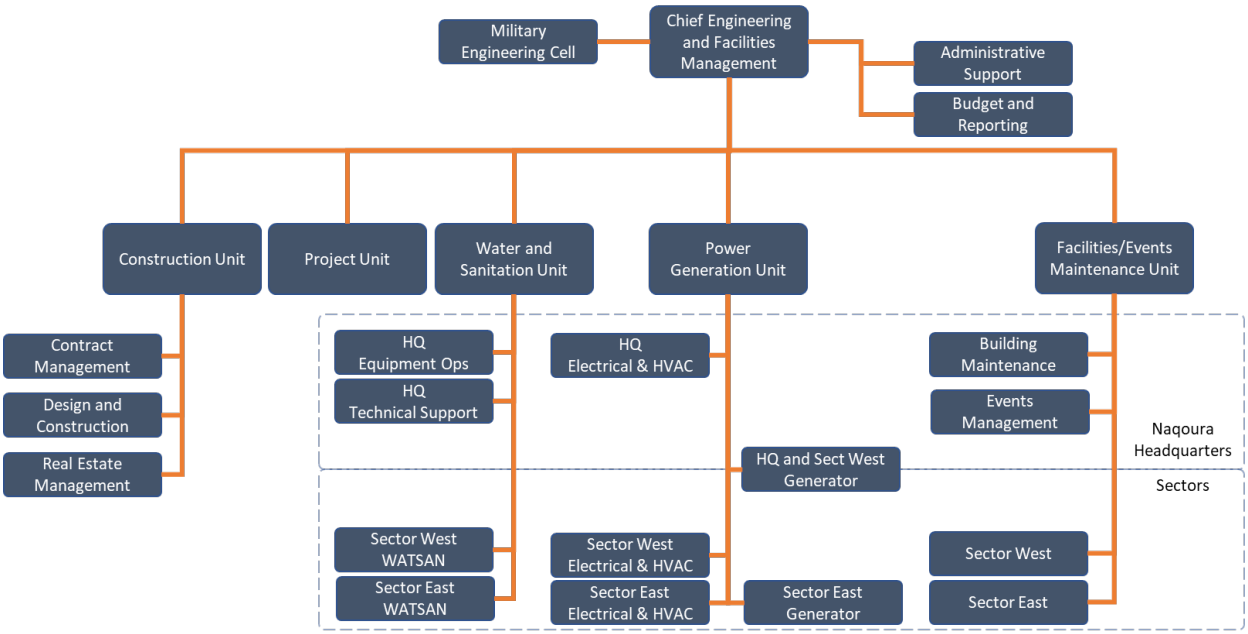
Audit of engineering support services in the United Nations Interim Force in Lebanon

I. BACKGROUND

1. The Office of Internal Oversight Services (OIOS) conducted an audit of engineering support services in the United Nations Interim Force in Lebanon (UNIFIL).

2. Engineering support is provided by the Engineering and Facilities Management Section (EFMS), which is headed by a Chief Engineer at the P-5 level who reports to the Chief of Service Delivery Management. The Section is responsible for construction, renovation and repair and maintenance of facilities, buildings and infrastructure, as well as the operations of water and sanitation equipment and plants. The Section consists of five units namely the Construction Unit, Project Unit, Water and Sanitation Unit, Power Generation Unit and Facility/Events Maintenance Unit. It operates with the following structure:

Figure 1: Organization chart – EFMS



3. The approved operating budgets of EFMS for the financial years 2019/20, 2020/21 and 2021/22 were $18.1 million, $17.7 million and $15.4 million, respectively. The approved staffing level for the Section was 135 posts with 13 international staff and 122 national staff as of the financial year 2021/22. The Section was augmented by three military staff and two engineering units of the military pillar with 200 personnel responsible for force protection works and 20 personnel responsible for demining.

4. Comments provided by UNIFIL are incorporated in italics.

II. AUDIT OBJECTIVE, SCOPE AND METHODOLOGY

5. The objective of the audit was to assess the adequacy and effectiveness of the management of engineering support services in UNIFIL to ensure efficient and economical use of resources in providing timely engineering services to support the implementation of the mandate.

6. This audit was included in the 2021 risk-based work plan of OIOS due to the financial and operational risks in providing engineering support services to support implementation of the UNIFIL mandate.

7. OIOS conducted this audit from August 2021 to September 2022. The audit covered the period from 1 July 2019 to 30 September 2022. Based on an activity-level risk assessment, the audit covered higher and medium risks areas in engineering support services, which included: (i) asset management and maintenance; (ii) project management; and (iii) procurement of engineering services and materials. The management of engineering projects by the military engineering units will be covered in a separate assignment in the future and was therefore excluded from this audit.

8. The audit methodology included: (a) interviews of key personnel; (b) reviews of relevant documentation; (c) analytical reviews of data; and (d) physical inspection of engineering/construction sites and facilities.

9. The audit was conducted in accordance with the International Standards for the Professional Practice of Internal Auditing.

III. AUDIT RESULTS

A. Asset management and maintenance

UNIFIL had yet to implement the asset management module in Umoja

10. Several of UNIFIL assets had exceeded their useful lives but there was inadequate assessment of their full maintenance costs in decisions on whether to continue to use or replace them, as discussed below.

(a) Asset replacement planning

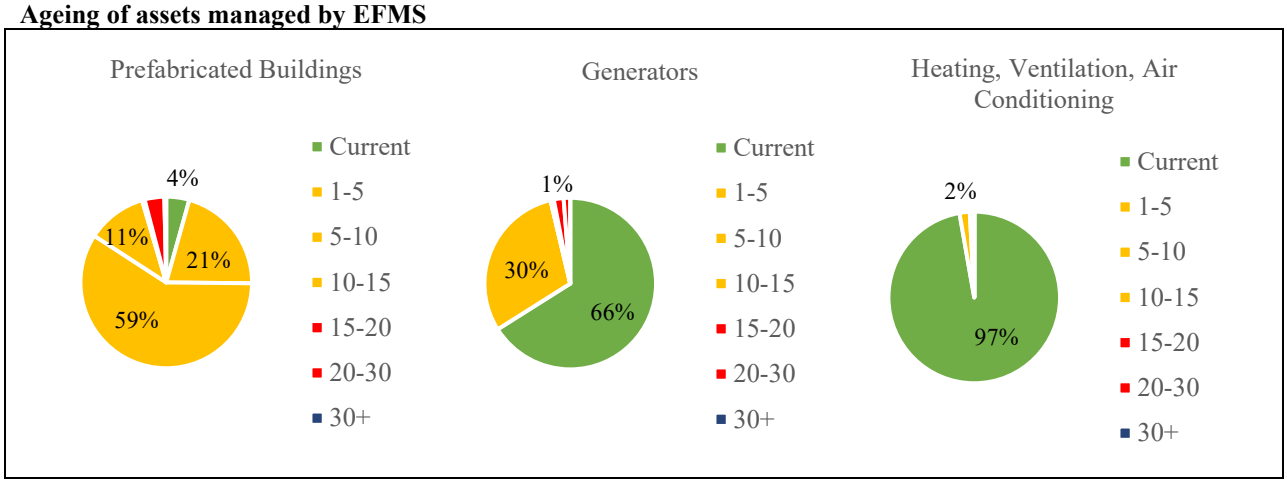
11. As of 30 June 2022, EFMS had assets and equipment with an acquisition value of $36.3 million as shown in Table 1. A total of 3,352 items were within their useful life, while 2,626 items had exceeded their useful life by 1 to more than 30 years, including 96 per cent of prefabricated buildings and 34 per cent of generators.

Table 1
Ageing analysis of UNIFIL buildings and equipment as of 30 June 2022

Details	Within useful life	Exceeded useful life by (years)							Grand Total	Acquisition cost
		1-5	5-10	10-15	15-20	20-30	30+	Total		
Prefabricated buildings	62	297	842	161	7	53	5	1,365	1,427	$ 20,676,830
Generators	93	-	-	57	3	2	-	62	155	$ 5,714,216
HVAC*	2,817	56	24	-	-	-	-	80	2,897	$ 1,919,307
Containers	166	24	468	92	2	8	2	596	762	$ 1,929,814
Other	200	144	309	24	19	21	6	523	723	$ 6,127,712
Total	**3,338**	**521**	**1,643**	**334**	**31**	**84**	**13**	**2,626**	**5,964**	**$ 36,367,879**

* Heating, ventilation, and air conditioning
Source: Umoja Equipment Management

Figure 2
Ageing of assets managed by EFMS



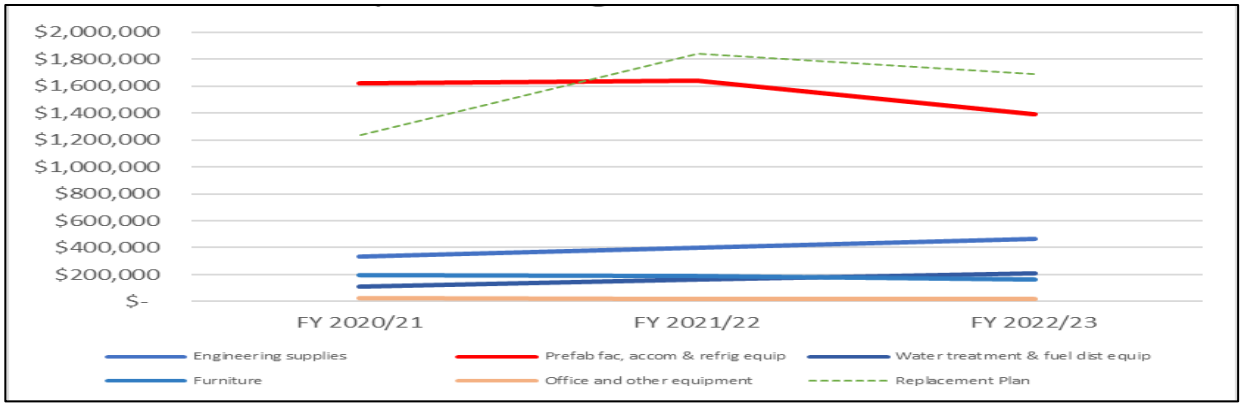
12. In financial year 2019/20, the Mission developed an asset replacement plan covering the five previous financial years as a historical reference and indicative for the five upcoming financial years. By 30 June 2022, the Mission had replaced 2,505 assets and equipment, including 2,347 air conditioners, 75 prefabricated buildings and 7 generators. However, replacement of both prefabricated buildings and generators lagged as funding for prefabricated buildings was not included in the Mission's approved budget for 2016/17 and 2018/19 and was not compensated for in the new replacement plan, and only 8 generators were procured from 2019/20 to 2021/22, against 15 in the plan. EFMS indicated that Mission priorities and operations changed; therefore, the replacement plan was adjusted.

(b) Prefabricated buildings

13. During the audit, the Mission was in the process of replacing 15 prefabricated steel buildings with concrete alternatives at its headquarters in Naqoura. As the Mission's headquarters is located on the Mediterranean Sea, salt water had affected the steel structures. According to the replacement plan, 216 prefabricated buildings still needed to be replaced at a cost of $7.2 million, while there were 1,519 units that had exceeded their useful life as of December 2020.

14. EFMS acquisition budgets were mainly based on the previous years' figures with minor adjustments as illustrated in Figure 3. As the Umoja maintenance module for prefabricated buildings had not yet been implemented, the Mission could not readily estimate maintenance costs and incorporate them into the decision-making on asset replacement. However, during the COVID-19 pandemic when funds became available as expenditures were lower than expected, EFMS proactively and successfully procured an additional number of prefabricated buildings for financial year 2020/21 through redeployment. The Mission stated that it also considered other factors in asset replacement decisions including useful life, budget availability, present condition, and other criteria depending on the type of asset (e.g., new technology, gas emissions).

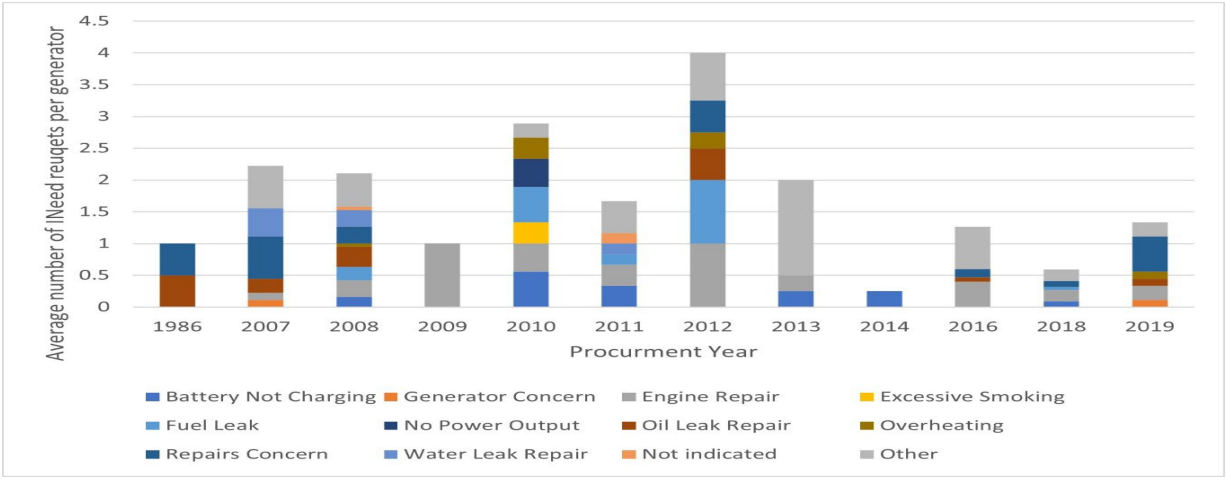
Figure 3
EFMS acquisition budgets for the financial years 2019/20, 2021/21 and 2021/22



(c) Generator sets

15. A review of all iNeed service requests relating to generators during the period January 2019 to June 2021 indicated a high number of corrective maintenance requests for 15 generators procured in 2010 and 4 procured in 2012 as shown in Figure 4. However, the Mission had prioritized replacement of only 5 out of the 15 generators procured in 2010, namely five 1250 KVA power plant generators in Naqoura in 2021/22 and 2022/23 at an estimated cost of $1.28 million (original purchase price $1.23 million). The four generators procured in 2012, with high corrective maintenance costs, were planned for replacement in 2023/24 and 2024/25. The Mission did not prepare a detailed cost-benefit analysis to show why the remaining 10 generators procured in 2010 and 6 in 2011 were not included in the current replacement plan, which ends in financial year 2024/25.

Figure 4
Average number of corrective maintenance requests by year generator was procured (July 2018 - July 2021)



Source: iNeed system

16. The Mission calculated fuel efficiency costs in determining possible replacement of generators but did not consider maintenance costs, so it was unable to determine whether to propose a faster replacement or to continue repairing them. Despite approaching the end of their useful lives in 2020 and 2022, the Mission incurred maintenance cost totalling approximately $150,000 on the five generators as shown in

Table 2. In addition, these generators had over 41,000 running hours and were due for major overhauling at 42,000 running hours at an estimated cost of $170,000, excluding the cost of electrical spare parts (alternator and panels). Moreover, the maintenance history for these generators indicated that they had previously incurred a one-time maintenance activity that had exceeded 30 per cent of their acquisition value and was greater than the depreciated value of $51,903 as of December 2021. The replacement plan indicated that a complete overhaul (QL4) would cost $160,000 per generator in parts and $40,000 in additional training costs. EFMS assessed this as not cost effective and proposed a QL3 overhaul, which amounted to $77,160 and $101,300 respectively for two generators, as shown in Table 2. This resulted in a cost overrun for spare parts for the financial year 2021/22 (budget of $319,100 against expenditures of $520,966).

Table 2
Maintenance costs incurred by five generators between July 2019 and December 2021

Equipment ID	Acquisition date	Original cost	Maintenance costs	QL3 Overhaul
16870236	01.12.2010	$ 245,421	$ 19,659	$ 77,160
16870237	01.12.2010	$ 245,421	$ 37,454	-
16870238	01.12.2010	$ 245,421	$ 57,223	-
16870239	01.12.2010	$ 245,421	$ 15,741	$ 101,300
16870240	01.12.2010	$ 245,421	$ 19,457	-
		$ 1.227.105	**$ 149,534**	**$ 178,460**

Source: Umoja Maintenance Service Orders

17. In addition, five other generators that exceeded their useful life in 2022 had maintenance costs greater than 15 per cent of their purchase value, as shown in Table 3.

Table 3
Generators with end of useful life (EOL) prior to 2022 for which maintenance costs exceeded 15 per cent of their acquisition value in 2021/22

Equipment ID	EOL	Description	Acquisition value	Maintenance cost	%
16870322	2019	Generator set, 250 KVA	$ 35,433	$ 10,315	29%
16870361	2019	Generator set, 50 KVA	$ 12,545	$ 2,246	18%
16870346	2020	Generator set, 40 KVA	$ 16,451	$ 2,788	17%
16870342	2020	Generator set, 40 KVA	$ 16,451	$ 2,688	16%
16870360	2019	Generator set, 50 KVA	$ 12,545	$ 1,866	15%

Source: Umoja Maintenance Service Orders

18. Items that require repairs costing more than a certain percentage of their acquisition cost should be classified as uneconomical to repair rather than extending their use for limited periods at significant cost. However, the Mission had not established a threshold of maintenance cost (spare parts and labour) above which repairs would not be considered cost-effective. Implementation of this would require accurate records on the status of all assets, including their performance. The asset management functionality in Umoja would enable EFMS to capture the associated materials, resources and costs of maintenance activities. However, this functionality had not yet been fully implemented at the Mission. UNIFIL needed to develop a roadmap to fully implement the Umoja asset management functionality to schedule and record maintenance activities, track costs and use the information for budget formulation and other asset management decisions.

19. UNIFIL stated that it could not develop a roadmap without a clear training plan and schedule provided by the United Nations Global Support Centre in Brindisi. Also, this functionality may not be optimal to enable UNIFIL to achieve improvements in maintenance. UNIFIL would utilize alternate means

to improve its planning, execution and recording of maintenance activities. Based on UNIFIL's comments, OIOS did not make a recommendation on this issue at this time.

UNIFIL needed to improve performance and recording of preventive maintenance activities and establish and monitor targets for processing engineering service/work requests

20. The Mission's approved budgets for the financial years 2019/20, 2020/21 and 2021/22 listed preventive maintenance activities for eight types of sites, facilities and equipment operated by EFMS as shown in Table 4. The maintenance activities broadly included to: (i) refurbish solid and prefabricated buildings and fixtures; (ii) service generators, repair faulty transformers and update electrical wirings and fixtures; (iii) service heating and cooling units; and (iv) maintain water wells/bore holes, water treatment plants and wastewater treatment plants, and septic tanks and sewers.

Table 4
Engineering facilities and equipment planned for maintenance for financial years 2019/20, 2020/21 and 2021/22

Fiscal year	Solid buildings	Prefab buildings	Generator sets	Solar farms	Water wells	Water treatment plants	Sewage treatment plants	Septic systems
2019/20	949	1,511	168	15	17	11	22	80
2020/21	963	1,456	150	15	18	11	21	80
2021/22	971	1,435	156	15	16	11	21	80

Source: UNIFIL result-based budgeting documents

(a) Building inspections

21. In December 2021, EFMS developed a schedule of periodic inspection and maintenance for buildings and infrastructures as illustrated in Table 5. EFMS also created a checklist and inspection report template to record the observations and any deficiencies noted during inspection.

Table 5
UNIFIL periodic building inspection schedule

Buildings and Infrastructure	Inspection	Scheduled Maintenance
Solar heater	Half-yearly	
Shelter/bunker	Half-yearly	
Living and office accommodation	Yearly	
Roof sheeting	Yearly	Pre-winter inspection
Rub hall	Yearly	Pre-winter inspection
Workshop/Warehouse	Yearly	Pre-winter inspection
Helipad hanger	Monthly	
International mess/cafeteria	Half-yearly	

Source: EFMS inspection schedules

22. However, OIOS observation of the inspection of office and living accommodation on 11 March 2022 at UNIFIL headquarters indicated that the physical inspection was not done thoroughly. For example, the EFMS inspector did not bring the checklist or make any other notes to record his observations and there was no follow-up or action items to address the deficiencies noted during the inspection. These included: roofs and railings of the accommodation and toilets for staff officers that were corroded and leaking water; the office door for the Military Gender Officer and the emergency exit door for senior officers were broken and needed repair; and toilets and urinals were damaged and not working.

23. Additionally, EFMS inspection reports showed that it had inspected 43 buildings and 71 toilets in 2021, while it was indicated in Umoja that there were 127 and 76 inspections, respectively. The inspection reports also showed 13 assets listed as buildings, but these were pedestrian walkways, asphalt roads or metal protected sheds. In addition, EFMS did not record the condition of buildings and the history of maintenance activities in Umoja. EFMS indicated that the property maintenance module was not yet implemented and that differences between Umoja's terminology and record keeping requirements could lead to misinterpretation. EFMS was therefore aware of the actual situation but could not present it fully and clearly in Umoja.

24. A review of weekly preventive maintenance records for electrical and heating and cooling units during a 24-week period indicated that EFMS did not inspect: (i) the main power distribution panels in 15 weeks; sub-distribution panels in 17 weeks and (iii) transformers in 13 weeks. EFMS also did not maintain records for the preventive maintenance of air conditioners, transmitters, wirings, earth connections, lamps, indicators, functioning of meters, solar panels, and security lights.

(b) Generator sets

25. EFMS was required to service generators every 10 days or after 250 running hours for operating generators, and every six months for standby/backup generators. EFMS had implemented the Umoja Asset Service module for generators only. There was a dedicated staff member responsible for recording repairs and maintenance of generators in Umoja based on service/work order entry sheets prepared by the technicians. However, since July 2021 when EFMS started recording generators running hours in Umoja, the records showed that 24 of 51 preventive maintenance were done late. In eight cases, EFMS allowed the generators to operate for over 500 running hours before completing the required maintenance. The Mission indicated this was mainly due to COVID-19-related production and supply chain delays in spare parts and oil filters.

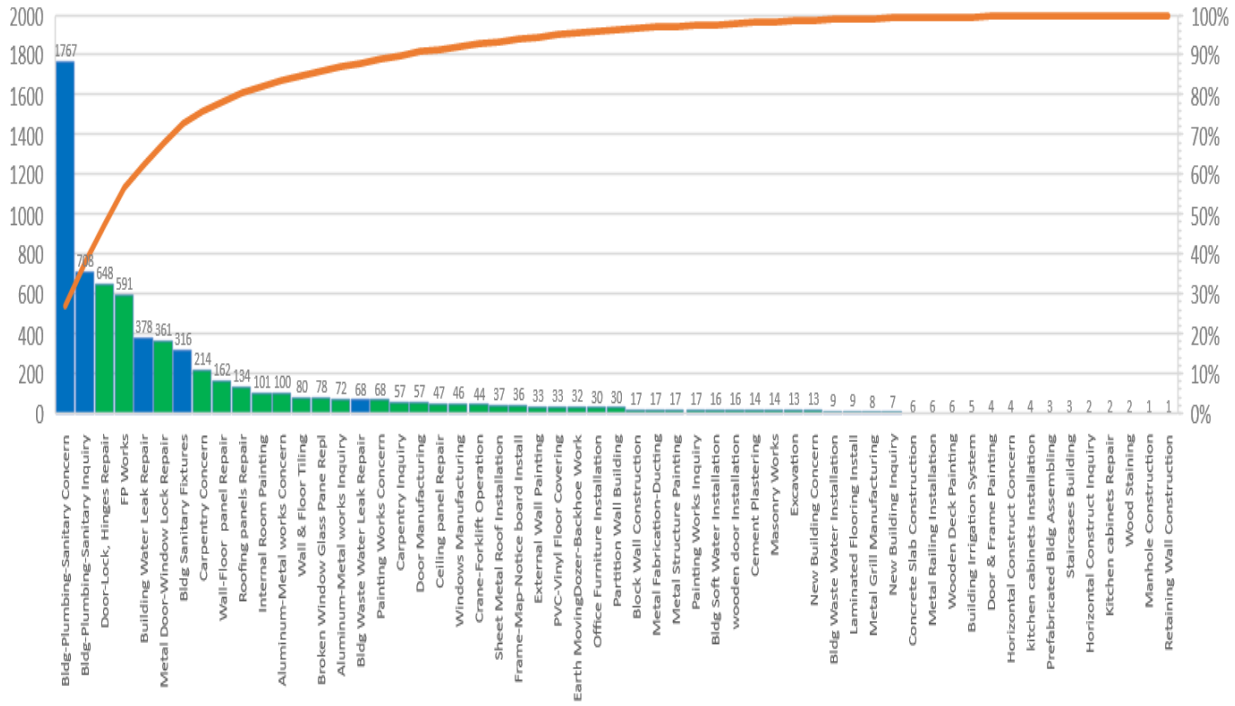
26. In addition, preventive maintenance was not documented as required and supporting documents were not available or not uploaded in Umoja including service entry sheets; spare parts requests, issues and transfer slips; and receipts for materials purchased through petty cash. There were also errors in Umoja as: (i) the standard type of preventive maintenance activity (003 Repair) was selected for all service orders, even though Umoja provided for more specific types of preventive maintenance activity (001 Inspection, 002 Preventive Maintenance and 004 Refurbishment); (ii) service durations were incorrectly recorded (305 hours instead of 3.5 hours) and (iii) wrong cost centres were also recorded (EFMS instead of Transport Section). Although these errors were later corrected, they indicated insufficient controls were in place to prevent incorrect data entry.

(c) Water and sanitation

27. EFMS: (i) conducted weekly inspection of ablutions; (ii) had sufficient water and sustainable water supply, and had synchronized various water points to ensure continued supply of water in the event of a breakdown; (iii) installed readers and alarm systems to monitor the functioning of water pumps and to control water levels; (iv) conducted weekly water chlorination; and (v) properly maintained sewage septic tanks and wastewater recycling processes including aeration, filtration and chlorination. Although EFMS had inspection schedules, it did not have checklists for the inspection and maintenance of water wells, septic tanks and sewers, and drains and vent pipes to guide technicians on the required tasks during site visits.

28. A review of all service requests submitted by end users in iNeed between 1 January 2019 to 30 June 2022 involving building maintenance indicated that 49 per cent (3,237 out of 6,564) were related to concerns about water and sanitation as shown in blue in Figure 5.

Figure 5
iNeed requests 1 January 2019 to 30 June 2022 (building maintenance)



Source: iNeed system

(d) Other building and infrastructure

29. OIOS visits at various Mission locations, including facilities at Sector West and Sector East indicated the following:

i. Two buildings used for living accommodation by contingent personnel at UNP 8-30 and UNP 8-33, had worn floors due to moisture caused by rain. The buildings were not built on bricks/pilings and rested on the ground. EFMS stated that the material to replace the worn floors had already been procured, but no measures had been taken to lift the buildings off the ground to prevent further floor damage.

ii. Retaining walls that were part of the protective measures at the Mission's headquarters had collapsed. Concrete on the seaward side of the retaining walls near the International Mess had completely disappeared, with only the cladding intact. The upper cladding had holes in it, posing a safety risk for falls and possible access for intruders.

Photos: Retaining walls part of perimeter security Naqoura Headquarters (27 April 2022)



EFMS could not provide information on when these walls were originally built. There was no mechanism to assess the condition of these retaining walls periodically and proactively prevent a complete collapse. EFMS initiated procurement of replacements in May 2020 and reported the collapse in late 2021, whereupon EFMS took corrective action in-house. A new contract was awarded in June 2022. Factors outside EFMS caused the significant delay in procurement.

iii. Inspection reports prepared by the Force Headquarters Support Unit (Military Component) on 19 April 2022 indicated that out of 60 shelters, 9 (15 per cent) needed painting and 19 (32 per cent) showed leakage. EFMS had not yet taken action to address the deficiencies noted in the reports.

30. In addition, there were no key performance indicators or targets for processing engineering service/work requests. As EFMS had not established target completion timeframes for service requests, OIOS categorized closed service requests into less than 10 days, between 10 and 30 days and more than 30 days of receipt. A review of all 10,312 recorded and closed requests from 1 July 2020 to 8 June 2022 showed than it took more than 10 days to complete repairs for 5,172 or 34 per cent of service requests, including 1,191 or 8 per cent that took more than 30 days as shown in Table 6. It should be noted that this review period took place during the height of the COVID-19 pandemic and EFMS was able to maintain a corrective maintenance programme despite constraints "on the ground" and increasing challenges in the supply chain. However, EFMS did not have a monitoring mechanism to analyze and determine whether the time taken to close a service request was reasonable.

Table 6
Completion time to close iNeed service requests

EFMS Unit	Closed within 10 days		Closed between 10 and 30 days		Closed after more than 30 days		Unit total	Unit percentage
Generator	1,250	97%	38	3%	2	0%	1,290	8%
Electrical	2,431	68%	859	24%	311	9%	3,601	23%
HVAC	1,932	64%	1,026	34%	53	2%	3,011	19%
Water and Sanitation	310	50%	209	34%	100	16%	619	4%
Facilities and Events	718	68%	292	28%	44	4%	1,054	7%
Building Maintenance	3,604	63%	1,472	26%	638	11%	5,714	37%
Real estate management	67	34%	85	44%	43	22%	195	1%
Total EFMS	**10,312**	**66%**	**3,981**	**26%**	**1,191**	**8%**	**15,484**	**100%**

Source: iNeed system

31. Furthermore, EFMS did not have preventive inspection plans for offices, workshops and air-conditioning units, which were supposed to be inspected annually. For other inspected facilities, post-

inspection reports describing the findings and maintenance work identified were not produced. Instead, EFMS relied on repair requests from occupants to determine maintenance needs, citing staff shortages. In addition, there was no structured monitoring of the prioritization and tasking of incoming requests, and supervisors did not formally inspect repair works after they were completed. Although the Force Headquarters Support Unit inspected shelters and staff officers' accommodation, they appeared to have excess capacity that the Mission could have used for preventive inspections of military offices and workshops.

32. Much effort was devoted to corrective maintenance, where proper preventive maintenance could have significantly reduced the cost and amount of work and prevent defects from occurring. UNIFIL needed to fully implement the Umoja preventive maintenance solution to provide the necessary information and change the maintenance culture in the Mission from reactive maintenance and inspections to proper preventive maintenance. This would result in more efficient use of resources and mitigate risks to health and safety of staff.

(1) UNIFIL should establish and implement procedures for its Engineering and Facilities Management Section to: (i) prepare regular preventive maintenance plans in coordination with the Force Headquarters Support Unit to inspect facilities, offices and workshops to identify maintenance requirements in a timely manner; and (ii) prepare post-inspection reports to record and follow up on maintenance requirements.

UNIFIL accepted recommendation 1 and stated that it was already working with the Force Headquarters Support Unit to inspect facilities, offices and workshops to identify maintenance requirements and execute the required maintenance plan, as maintenance was an area of opportunity for improvement.

(2) UNIFIL should: (i) establish performance indicators and targets for processing engineering service requests; (ii) strengthen the planning, tasking and monitoring of maintenance and repair of facilities and equipment; and (iii) properly record, track and report on the status of preventive maintenance and service requests in the iNeed system.

UNIFL accepted recommendation 2 and stated that it already had performance indicators and target and would work to strengthen planning and performance against targets, including those related to the iNeed system.

B. Project management

The management of engineering projects needed improvement

33. EFMS had 15 projects with a budget of $2.6 million planned for implementation by outside vendors from July 2019 to June 2022. Five were completed, three were under procurement while six were ongoing as shown in Table 7.

Table 7
EFMS projects for the financial years 2019/20, 2020/21 and 2021/22

Project title/description Total: $2,697,135	2019/20 $401,780	2020/21 $1,505,355	2021/22 $790,000	Status 30/06/2022
Painting services for external surfaces of buildings	$ 186,580			Completed
Rental of heavy equipment	$ 60,200	$ 60,200	$ 50,000	Ongoing
Fabrication and installation of steel structures	$ 50,000	$ 36,475	$ 40,000	Ongoing
Construction of reinforced concrete bunker	$ 55,000			Completed
Miscellaneous concrete structures	$ 50,000	$ 48,170	$ 50,000	Ongoing
Construction of sludge disposal system in area of operations		$ 90,710		Completed
Consultancy Service for Structural Analysis Solid Building		$ 19,800		Completed
Complete rehabilitation of old wastewater treatment plant Naqoura HQ		$ 100,000		Completed
Construction of Concrete Modular Building (1,575 m2) Naqoura HQ		$ 900,000		Ongoing
Asphalting general works in Naqoura HQ and area of operations		$ 150,000	$ 110,000	Ongoing
Construction of retaining walls along coastal patrol road Naqoura HQ		$ 100,000		Cancelled[1]
Naqoura HQ Green Hill Gate entrance upgrade			$ 75,000	Procurement
Construction works for the reconfiguration and closure of UN positions			$ 300,000	Procurement
Painting services for external surfaces of building structures			$ 50,000	Procurement
FTS building retrofitting			$ 115,000	Ongoing

Source: UNIFIL EFMS

34. EFMS had assigned a dedicated project manager to each project. However, EFMS did not conduct a needs assessment for two major projects: (i) construction of concrete modular building at Green Hill camp with a budget of $900,000; and (ii) rehabilitation of the old WWTP installed in 2005 at the Mission headquarters in Naqoura at a cost of $100,000. The Mission stated that the needs had been established in the Camp Master Plan, but this was not made available to OIOS, despite several requests. The projects were approved in meetings and a cost analysis was carried out after approval, which meant that the decision was taken without an indication of the costs. Contracts to undertake the projects were awarded for $770,488 and $62,500. While the WWTP was completed under the contract amount, the contract for the modular building was increased to $898,325 due to increased prices caused by the economic situation in Lebanon.

35. There were no standard templates for project documents that included the expected minimum information to be provided and quality standards to be adopted. The following shortcomings were also noted:

a) There was no risk assessment, and no mitigation measures were anticipated.

b) According to the statement of works (SOW), a quality management plan was required for the projects and this was prepared by the vendor. However, there was no evidence that the projects were completed within the required quality standards as per the SOW. For example, for the modular building, there was no documented evidence that materials of the required quality were used. Although the work was inspected by the project manager and concrete tests were performed by an outside entity, the concrete test parameters differed from the SOW. Also, the Mission indicated that "inspection requests" were created, executed and signed during projects, i.e., the supplier indicates that a certain part is ready, asks the project manager for an inspection and the project manager signs for approval. However, these documents were generic, not directly related to SOW requirements and did not include process information such as on timeliness and safety compliance.

[1] Contract was awarded and signed, but the vendor required a price increase after signature. The Mission declined the price increase and cancelled the contract.

c) Weekly and monthly progress reports were in place, but they were drafted by the vendor and signed off by the project manager. None of the reports included the challenges identified during performance meetings with the vendor, including possible additional overruns of time and safety requirements.

d) The Mission held regular performance meetings with vendors. The minutes of the meetings showed action points were identified, but not whether and how these action points were satisfactorily resolved. During site visits, OIOS noted that none of the workers were wearing hard hats or high visibility jackets. EFMS said it had informed the vendor of this and requested corrective action; however, it had not ensured that the proposed corrective actions were implemented.

e) Although the Mission prepared periodic and final vendor performance reports, these were mostly checklists (yes or no answers) on the vendor's compliance with the SOW and they did not include a detailed assessment of the work done following a physical inspection. The performance on the two major projects mentioned above was rated satisfactory, although additional work was required after the projects were completed.

f) There was no documentary evidence of a proper handover of constructed facilities to the receiving unit, mainly the Facilities/Events Maintenance Unit.

36. The above occurred because EFMS had not implemented adequate supervisory and review procedures to ensure that project managers comply with the documentation requirements for the planning, execution, monitoring and closure of projects. OIOS noted four instances of non-compliance by the vendor for the construction of the modular building through meeting minutes and personal observation. As there was no integrated project documentation, it was not possible to assess whether there were other instances. Therefore, there was no assurance that the decision to proceed with the project was made by Mission management with full information on all aspects of the project.

37. EFMS had established a Project Unit with an international staff member to manage projects; however, the management of construction projects was not exclusively assigned to the Unit as each individual project manager maintained their own project administration. In addition, project managers indicated that full project documentation was not required for small sized projects. Therefore, although inspections and progress reviews were done "on site," the results were not always recorded. EFMS had not formally defined what constitutes a small project, and the distinction between construction projects, maintenance projects and other projects was not clear.

38. Inadequate records of project plans, progress and completion reports deprives Mission management of an integrated view of the status of ongoing projects and may limit their ability to assess them holistically and prevent or resolve problems as necessary. This posed a further risk of financial loss and operational inefficiencies.

(3) UNIFIL should establish adequate procedures to improve project documentation and management by requiring the Engineering and Facilities Management Section to develop project management templates to be completed by project managers for all stages of the project lifecycle, including at a minimum, project planning documents to justify the initiation of a project, periodic progress reports, project briefs to management, logs of issues and risks, and project closure and handover documents.

UNIFIL accepted recommendation 3 and stated that it would consider ways to standardize project procedures and documentation, particularly for major projects.

(4) UNIFIL should implement adequate supervisory and review procedures to ensure that project managers comply with the documentation requirements for the planning, execution monitoring and closure of engineering projects.

UNIFIL accepted recommendation 4 and stated that it would strengthen this area within EFMS with available expertise.

C. Procurement of engineering services and materials

Need to analyze and manage procurement risks for construction services

39. The Mission engaged vendors through a competitive solicitation process to perform engineering services for which it did not have in-house capacity. OIOS noted, in its report on an audit of procurement and contract management activities in UNIFIL (2020/061), that the same vendors for engineering services had been repeatedly awarded contracts. Table 8 shows the number of contracts awarded to the top four vendors for construction-related services and materials by not to exceed (NTE) amount as recorded in Umoja.

Table 8
Number of construction-related contracts (services and materials) awarded to the top four vendors by calendar year and total NTE amounts as of 30 June 2022

	Value of all construction	No.	Vendor							
Created	contracts		1110001102	#	1110001462	#	1110001062	#	1110000260	#
2011	$ 6,955,060	8	-		$ 4,583,620	1	$ 655,000	1	$ 217,018	2
2012	$ 5,171,047	15	$ 2,999,934	4	$ 453,000	1			$ 119,897	1
2013	$ 2,081,140	10	$ 1,530,995	3	-				$ 267,736	3
2014	$ 1,531,120	17	$ 299,265	1	$ 482,320	2	$ 181,000	2	$ 184,670	3
2015	$ 1,996,131	10	-		-		$ 120,000	1	$ 149,351	1
2016	$ 1,428,161	17	$ 103,715	2	$ 640,820	1	$ 100,000	1	$ 13,970	1
2017	$ 371,860.5	3	$ 371,861	3	-		-		-	
2018	$ 1,518,745	9	$ 519,263	2	-		$ 191,921	3	-	
2019	$ 678,236	8	$ 348,667	3	$ 29,920	1	-		-	
2020	$ 1,333,834	10	$ 683,493	5	$ 28,150	1	-		-	
2021	$ 1,508,202	12	$ 201,329	3	$ 1,012,213	2	-		-	
2022	$ 399,015	5	$ 283,200	3	-		-		$ 30,268	1
Total	**$ 24,972,552**	**124**	**$ 7,341,721**	**29**	**$ 7,230,043**	**9**	**$ 1,247,921**	**8**	**$ 982,910**	**12**

Source: Umoja BI Contract Analysis Area. Excluding deleted/duplicated contracts, construction services and materials only, year is start validity in calendar year, local contracts only. Total NTE, which could be over multiple years.

40. A review of 18 procurement cases related to construction services indicated that the Mission was not able to attract adequate numbers of bidders. There were five to seven bidders competing for all construction projects. According to feedback received from potential vendors, reasons for not bidding included safety concerns, insufficient profit margin, lack of capacity, other business commitments and individual vendor preferences, such as not operating in a specific location. It was also difficult for potential foreign vendors to obtain business registration licenses, visas and security passes from the host Government, which were mandatory requirements for participation in bidding exercises. Therefore, two bidders won most of the contract awards. Depending on the type of project:

a) Small construction projects, concrete work, metal work and rental of construction equipment were awarded to vendor 1110001102.

b) Asphalting works and larger construction projects (modular buildings) were awarded to vendor 1110001462.

41. These projects were managed by the same project manager, responsible for all aspects of the projects including requirements definition, evaluations of bids as part of the Technical Evaluation Committee along with other colleagues from the same unit, vendor performance management, and reporting.

Table 9
Top two engineering vendors involved in construction projects

Financial year	**2019/20**		**2020/21**		**2021/22**		**Total for 3 years**
Total value and no. of projects:	**$ 401,780**	**5**	**$ 1,505,355**	**9**	**$ 790,000**	**8**	**$ 2,697,135**
Vendor 1110001102	$ 160,200	3	$ 144,845	3	$ 140,000	3	$ 535,755
	40%		9%		18%		20%
Vendor 1110001462	$ -		$ 1,050,000	2	$ 110,000	1	$ 1,160,000
	0%		70%		14%		43%
Combined	**40%**		**80%**		**32%**		**63%**

Source: EFMS Project Portfolio

42. OIOS identified the following risks:

a) Risk of inadequate market research in identifying vendors. From a review of bid submissions and other information, most of the bidders appear to be small, family operated business that are highly dependent on standard "off the shelf" United Nations construction works and hire staff and equipment on an ad hoc basis when required for a project. It was observed that the top four vendors identified in Table 8 did not submit bids for a more complex construction project in UNIFIL, which involved the retrofitting an existing building.

b) Risk of unethical behaviour by vendors who use cheap labour without work permits. The Security Section rejected 11 out of 155 closed verification requests (including for day passes). These included five workers without work permits and six cases of workers with violent or financial convictions.

c) Risk of vendors uniting for common profit and defeating the purpose of competition. OIOS review indicated that bids for construction services were generally submitted by the same vendors. There was a risk that these vendors may work together to fix prices rather than compete against each other.

d) Increased risk of changes after the procurement process has been initiated or the contract signed. In one case (construction of a modular building), the vendor (one of the previously top two vendors mentioned) requested a price increase during the execution of the project, citing rising prices. Since this situation applies to all vendors, integrated risk management should have triggered the Mission to assess the overall risk for all vendors and assess what mitigation actions should be taken.

e) Risk of circumvention of quality standards by vendors. In one case (purchase of asphalting works), a new vendor certified for environment (ISO 9001:2015), occupational health and safety (ISO 18001:2017) and quality management (ISO 9001:2015), all valid until 2022, was found technically compliant but lost the tender to the top two vendors who could not provide evidence of the above quality management systems but instead provided uncertified internal documents. In these cases, all bidders received the same points for compliance, without differentiation according to the quality of the evidence submitted. No assessment of 'best value for money' was made.

43. The Procurement Manual states that a risk assessment should be part of the procurement process. However, for project-related procurements, EFMS did not consistently produce procurement plans in collaboration with the Procurement Section to ensure that potential procurement risks including fraud schemes were identified and effectively managed. In none of the cases reviewed was a risk analysis or risk assessment performed. Only risks that could lead to contractual penalties were indicated in the procurement plans, not those related to the procurement process. Effective risk assessment is required to ensure that the impact of risks on the overall cost, schedule and quality of goods and services delivered are considered and mitigation measures explored.

(5) UNIFIL should establish monitoring mechanisms to ensure that the Engineering and Facilities Management Section prepares project-related procurement plans in collaboration with the Procurement Section and Acquisition Management Section to analyze procurement risks including potential fraud schemes and develop appropriate mitigating measures.

UNIFIL accepted recommendation 5 and stated that it would continue to ensure relevant Supply Chain and Service Delivery sections collaborate for early and effective planning, documentation and mitigation of procurement risks.

Need to review the allocation of roles and responsibilities in EFMS to improve segregation of duties

44. OIOS review of nine technical evaluation files involving the top two engineering vendors indicated that procurement staff and the Technical Evaluation Committee disagreed on the results of five of the technical evaluations, and the evaluations were redone, or additional information was obtained from vendors. This included one case where procurement staff enquired from the Technical Evaluation Committee why a vendor who had been awarded a previous contract for the same services was not declared technically compliant. In another case, the Committee accepted an invoice for the purchase of vehicles as proof of vehicle ownership, while the Procurement Section required the registration of the vehicle. The technical evaluation had to be redone in a third case when the Committee used the wrong version of the SOW in its evaluation.

45. The Procurement Section rejected many shopping carts and requested changes to SOWs that were too broad or too narrowly scoped and may have favoured certain vendors. In the solicitation for the construction of concrete modular building, bidders were required to submit a logical schedule in a Gantt chart format including all required elements of the project listed in the SOW. These requirements were received, evaluated and found to be technically compliant. However, the final Gantt chart submission was only accepted by the project manager after two previous rejections due to insufficient technical content, indicating that either the requirements in the SOW were insufficient or the submissions were not technically compliant. In another case, a question on whether the vendor had recently been involved in an environmental violation was answered with "yes". However, no additional information was given by the vendor or requested by the Mission on the breach.

46. The Technical Evaluation Committee comprised mainly of staff members of the Construction Unit, with one of them serving as the project manager responsible for assessing the performance of the vendor including the quality of materials provided. Out of the nine projects reviewed for the financial year 2021/22, the Committee was composed of the same three staff in five cases and in two cases two of the three staff were part of the Committee. As such, members could be exposed to “proximity bias,” negatively impacting the perceived or actual objectivity of the technical evaluation. Although the Acquisition Management, Procurement and Finance Sections have specific roles in the process, these Sections acted on information provided and tasks performed by the project manager. As such the project manager could exert significant

influence throughout the process. Although OIOS did not uncover evidence of wrongdoing, there was an unmitigated risk that project managers could consciously or unconsciously favour certain vendors.

47. The Procurement Manual does not require separation of functions such as technical requirements development and vendor bid review, but international standards indicate that these functions may be incompatible. For example, the SCOR[2] Framework Best Practices states that employees who have a direct interest in a project should not be involved in the evaluation. The Institute of Internal Auditors' Practice Guide on Government Procurement Auditing also states that the risk of perceived bias in the evaluation and selection of bids can be mitigated by controls in which "the evaluation is conducted by a committee that includes experts who are independent of those developing the criteria."

(6) UNIFIL should review the allocation of roles and responsibilities between the Construction and Project Units in the Engineering and Facilities Management Section to improve the segregation of duties for the various aspects of implementing construction projects, including developing requirements, conducting technical evaluations, managing projects, receiving and inspecting materials and work performed, and evaluating vendor performance.

UNIFIL did not accept recommendation 6 and stated that engineering-related Umoja roles adhered to segregation of duties as defined by the internal control framework. EFMS had limited staff with unique expertise in different areas of engineering, who are involved in preparing statements of requirements, technical evaluation, project management and other aspects of expertise required for different projects. While assignment of roles in Umoja provided some segregation of duties, a variety of measures are needed to minimize the risks related to potential procurement fraud schemes, vendor bias and inefficient processes. The Mission can achieve better segregation of duties with existing EFMS personnel by reviewing the distribution of roles and responsibilities and strengthening their procurement and project management capabilities. OIOS considers that the underlying risk remains relevant. Therefore, the recommendation will be recorded as unaccepted by UNIFIL in the OIOS recommendation monitoring system.

IV. ACKNOWLEDGEMENT

48. OIOS wishes to express its appreciation to the management and staff of UNIFIL for the assistance and cooperation extended to the auditors during this assignment.

Internal Audit Division
Office of Internal Oversight Services

[2] Supply Chain Operations Reference Model

ANNEX I

STATUS OF AUDIT RECOMMENDATIONS

Audit of engineering support services in the United Nations Interim Force in Lebanon

Rec. no.	Recommendation	Critical[3]/ Important[4]	C/ O[5]	Actions needed to close recommendation	Implementation date[6]
1	UNIFIL should establish and implement procedures for its Engineering and Facilities Management Section to: (i) prepare regular preventive maintenance plans in coordination with the Force Headquarters Support Unit to inspect facilities, offices and workshops to identify maintenance requirements in a timely manner; and (ii) prepare post-inspection reports to record and follow up on maintenance requirements.	Important	O	Receipt of the first set of preventive maintenance plans and post-inspection reports	30 September 2023
2	UNIFIL should: (i) establish performance indicators and targets for processing engineering service requests; (ii) strengthen the planning, tasking and monitoring of maintenance and repair of facilities and equipment; and (iii) properly record, track and report on the status of preventive maintenance and service requests in the iNeed system.	Important	O	Receipt of the performance indicators and reports from the iNeed system showing the status of preventive maintenance and service requests	30 June 2023
3	UNIFIL should establish adequate procedures to improve project documentation and management by requiring the Engineering and Facilities Management Section to develop project management templates to be completed by project managers for all stages of the project lifecycle, including at a minimum, project planning documents to justify the initiation of a project, periodic progress reports, project brief to management, logs of issues and risks, and project closure and handover documents.	Important	O	Receipt of guidelines to improve project documentation and management	30 September 2023

[3] Critical recommendations address those risk issues that require immediate management attention. Failure to take action could have a critical or significant adverse impact on the Organization.
[4] Important recommendations address those risk issues that require timely management attention. Failure to take action could have a high or moderate adverse impact on the Organization.
[5] Please note the value C denotes closed recommendations whereas O refers to open recommendations.
[6] Date provided by UNIFIL in response to recommendations.

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STATUS OF AUDIT RECOMMENDATIONS

Audit of engineering support services in the United Nations Interim Force in Lebanon

Rec. no.	Recommendation	Critical[3]/ Important[4]	C/ O[5]	Actions needed to close recommendation	Implementation date[6]
4	UNIFIL should implement adequate supervisory and review procedures to ensure that project managers comply with the documentation requirements for the planning, execution, monitoring and closure of engineering projects.	Important	O	Receipt of evidence of improved supervisory and review procedures introduced for engineering projects	30 June 2023
5	UNIFIL should establish monitoring mechanisms to ensure that the Engineering and Facilities Management Section prepares project-related procurement plans in collaboration with the Procurement Section and Acquisition Management Section to analyze procurement risks including potential fraud schemes and develop appropriate mitigating measures.	Important	O	Receipt of project-related procurement plans with adequate risk assessment	30 September 2023
6	UNIFIL should review the allocation of roles and responsibilities between the Construction and Project Units in the Engineering and Facilities Management Section to improve the segregation of duties for the various aspects of implementing construction projects, including developing requirements, conducting technical evaluations, managing projects, receiving and inspecting materials and work performed, and evaluating vendor performance.	Important	C	UNIFIL accepts the risk of not implementing this recommendation.	

APPENDIX I

Management Response

UNITED NATIONS

INTERIM FORCE IN LEBANON

NATIONS UNIES

FORCE INTERIMAIRE AU LIBAN

Office of the Head of Mission and Force Commander

Date: 20 December 2022
Reference: 1940/UNIFIL/FC 06

To: Ms. Muriette Lawrence-Hume,
Chief New York Audit Service,
Internal Audit Division, OIOS

From: Major General Aroldo Lázaro Sáenz
Head of Mission and Force Commander, UNIFIL

Subject: **Draft Report on an Audit of Engineering Support Services in the United Nations Interim Force in Lebanon (Assignment No. AP2021/672/03)**

1. We refer to your memorandum on the above subject, reference No. OIOS-2022-01895 dated 12 December 2022. Please find attached, UNIFIL's response to the recommendations contained in the subject Draft Audit Report.

2. In following the usual procedure, copies of the supporting documents will only be provided to MERAO based at UNIFIL HQ and will not be transmitted to you with this Mission's response.

Best regards.

cc: Ms. Melva Crouch, UNIFIL
Ms. Campbell Bright, CSDM
Mr. Fayyaz Asghar, CEFMS
Mr. Effendi Syukur, UNIFIL
Mr. Ibrahim Bah, MERAO, OIOS
Mr. Jeffrey Lin, IAD, OIOS

APPENDIX I

Management Response

Audit of engineering support services in the United Nations Interim Force in Lebanon

Rec. no.	Recommendation	Critical[1]/ Important[2]	Accepted? (Yes/No)	Title of responsible individual	Implementation date	Client comments
1	UNIFIL should develop a roadmap to fully implement the Umoja asset management functionality to schedule maintenance and record maintenance activities, track costs and use the information for budget formulation and other asset management decisions.	Important	No	EFMS	Not applicable	UNIFIL does not accept this recommendation, as the requirement for mission to develop a roadmap and to fully implement this complex Umoja functionality for EFMS cannot be completed and timeframe to implement cannot be determined by Mission without a clear training plan and schedule to be provided by UNGSC/Brindisi, nor may Umoja be the optimal functionality for UNIFIL to achieve improvements in maintenance. UNIFIL will utilize alternate means to improve its planning, execution, and recording of maintenance activities.
2	UNIFIL should establish and implement procedures for its Engineering and Facilities Management Section to: (i) prepare regular preventive maintenance plans in coordination with the Force Headquarters Support Unit to inspect facilities, offices and workshops to identify maintenance requirements in a timely manner; and (ii) prepare post-inspection reports to record and follow up on maintenance requirements.	Important	Yes	EFMS	30 September 2023	UNIFIL accepts this recommendation and is already working with the Force Headquarters Support Unit to inspect facilities, offices, and workshops to identify the maintenance requirements and execute the required maintenance plan, as maintenance is an area of opportunity for improvement. Formalization of the relevant forms and schedule is underway.
3	UNIFIL should: (i) establish performance indicators and targets for processing engineering service requests; (ii) strengthen the planning, tasking and	Important	Yes	EFMS	30 June 2023	UNIFIL accepts this recommendation. EFMS already has performance indicators and targets (recommendation i) and will work to strengthen planning and

[1] Critical recommendations address those risk issues that require immediate management attention. Failure to take action could have a critical or significant adverse impact on the Organization.
[2] Important recommendations address those risk issues that require timely management attention. Failure to take action could have a high or moderate adverse impact on the Organization.

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Management Response

Audit of engineering support services in the United Nations Interim Force in Lebanon

Rec. no.	Recommendation	Critical[1]/ Important[2]	Accepted? (Yes/No)	Title of responsible individual	Implementation date	Client comments
	monitoring of maintenance and repair of facilities and equipment; and (iii) properly record, track and report on the status of preventive maintenance and service requests in the iNeed system.					performance against targets - including related to the iNeed system (recommendations ii and iii).
4	UNIFIL should establish adequate procedures to improve project documentation and management by requiring the Engineering and Facilities Management Section to develop project management templates to be completed by project managers for all stages of the project lifecycle, including at a minimum, project planning documents to justify the initiation of a project, periodic progress reports, project brief to management, logs of issues and risks, and project closure and handover documents.	Important	Yes	EFMS	30 September 2023	UNIFIL accepts this recommendation and will consider ways to standardize the procedures and documentation, particularly for major projects.
5	UNIFIL should implement adequate supervisory and review procedures to ensure that project managers comply with the documentation requirements for the planning, execution, monitoring and closure of engineering projects.	Important	Yes	EFMS	30 June 2023	Though UNIFIL has supervisory and review procedures in place, the mission accepts this recommendation and will strengthen this area within EFMS with available expertise.
6	UNIFIL should establish monitoring mechanisms to ensure that the Engineering and Facilities Management Section prepares project-related procurement plans in collaboration with the Procurement Section and Acquisition Management Section to analyze procurement risks including potential fraud schemes and develop appropriate mitigating measures.	Important	Yes	EFMS	30 September 2023	UNIFIL accepts this recommendation and will continue to ensure relevant Supply Chain and Service Delivery sections collaborate for early and effective planning and documentation and mitigation of procurement/fraud risks and mitigations.

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Management Response

Audit of engineering support services in the United Nations Interim Force in Lebanon

Rec. no.	Recommendation	Critical[1]/ Important[2]	Accepted? (Yes/No)	Title of responsible individual	Implementation date	Client comments
7	UNIFIL should review the allocation of roles and responsibilities between the Construction and Project Units in the Engineering and Facilities Management Section to improve the segregation of duties for the various aspects of implementing construction projects, including developing requirements, conducting technical evaluations, managing projects, receiving and inspecting materials and work performed, and evaluating vendor performance.	Important	No	EFMS	Not applicable	UNIFIL does not accept this recommendation because Segregation of Duties, as defined by the Internal Control framework, is adhered to with Engineering-related Umoja roles, as required. The Mission disagrees that further review of roles and responsibilities of EFMS staff is required. The EFMS has limited staff, with unique engineering expertise. Staff from required area(s) of expertise are involved in Statement of Requirements, preparation, technical evaluation, project management, and other aspects for the respective area of expertise required in different projects.