ENHANCING SCHOOL MANAGEMENT AND PLANNING (ESMP) PROJECT

GENERAL ASSESSMENT

Submission Date/Version: September 13, 2019, Version 1

Contract Number: 72027819C00002
Project Start Date and End Date: February 15, 2019 - February 14, 2023
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Project Name:	Jordan Enhancing School Management and Planning (ESMP) Project
Project Start Date and End Date:	February 15, 2019 – February 14, 2023
Name of Prime Implementing Partner:	The Kaizen Company, LLC
Contract Number:	72027819C00002
Name of Subcontractors:	Edvise ME; CDM International Inc. (CDM Smith)
Major Counterpart Organizations:	Ministry of Education; Ministry of Public Works and Housing
Geographic Coverage:	Jordan

ACRONYMS AND ABBREVIATIONS

A&E	Architect and Engineering
ASEZA	Aqaba Special Economic Zone Authority
BOQ	Bill of Quantity
B&SE	Basic & Secondary Education
DLS	Department of Lands and Surveys
DOS	Department of Statistics
EMIS	Education Management Information System
ECED	Early Childhood Education and Development
ESMP	USAID's Enhancing School Management and Planning Project
ESP	Education Strategic Plan
FD	Field Directorate
FGD	Focus Group Discussion
FIDIC	Fédération Internationale Des Ingénieurs-Conseils
GAM	Greater Amman Municipality
GBD	General Budget Department
GIS	Geographic Information System
GIZ	German Society for International Cooperation
GOJ	Government of Jordan
GSD	General Supplies Department
GTD	Government Tenders Department
HRDP	Human Resources Development Plan
H&S	Health & Safety
HSE	Health, Safety, and Environment
IEE	Initial Environmental Examination
JEA	Jordan Engineer's Association
JEN	Japan Emergency NGO
JOD	Jordanian Dinar
JONEPS	Jordan Online E-Procurement System
JSP	USAID/Jordan School Project
KFW	German Development Bank
KG	Kindergarten/Preschool
MODEE	Ministry of Digital Economy and Entrepreneurship
MOE	Ministry of Education
MOICT	Ministry of Information and Communications Technology
MOLA	Ministry of Local Administration
MPWH	Ministry of Public Works and Housing
NCHRD	National Center for Human Resource Development
NSHRD	National Strategy for Human Resource Development
O&M	Operations and Maintenance
QRC	Queen Rania Center
SI	School Infrastructure
SDDP	School and Directorate Development Program
SDG	Sustainable Development Goal
SKEP	USAID/Schools for a Knowledge Economy Project
STC	Special Tenders Committee
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNICEF	United Nations Children's Fund
UNOPS	United Nations Office for Project Services
USAID	United States Agency for International Development
VO	Variation Order

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I EXECUTIVE SUMMARY

The primary objective of the USAID Enhancing School Management and Planning (ESMP) Project is to work collaboratively with the Ministry of Education (MOE) and the Ministry of Public Works and Housing (MPWH) in Jordan to implement improved systems, policies, procedures, and tools to address gaps and challenges in the school infrastructure (SI) process. These improvements have the goal of increasing quality and reducing time and associated costs of school construction, operations, and maintenance, thus improving the learning environment for students in Jordan.

The project focuses on areas that impact SI projects, specifically:

1. School planning process
2. Data for decision making
3. School design standards, requirements, design review and approval
4. Procurement of Architect and Engineer (A&E) and construction services
5. Construction management and supervision
6. School maintenance, operation, and utilization

This document serves to fulfill the following contractual requirement:

Component 1. Assessments, Result 1A General Assessment: Baseline data collection conducted and maps of current MOE and MPWH infrastructure process participants, processes, systems, and procedures.

This general assessment serves to collect baseline data and evaluate the situations of schools in Jordan across the different stages of development. School data, provided by the MOE, was disaggregated by a range of factors. Prior SI assessments and reports were reviewed. Existing laws, bylaws, procedures, and systems were reviewed. Issues of curative versus preventive maintenance were explored, as well as the information and process prerequisites for proper facility maintenance. The risk factors and negative effects of poor design and construction supervision were identified, leading to corrective contract changes, variation orders (VOs), time delays, and higher costs.

During the course of reviewing prior reports, MOE data, and speaking with 67 stakeholders in the process, some ideas emerged.

At the school project planning stage, it appeared that greater awareness and understanding of the national education strategy at the governorate level could help to better align local education project plans with national needs. Also, interviewees called for a pre-feasibility screening for land ownership and building permit compliance. This measure would help governorates to better target capital funds by focusing on projects that are ready for action, while also eliminating a significant source of delay.

At the design stage, developing and enforcing a uniform set of design standards was very important. Interviewees also pointed to land and permit issues, unclear employer requirements, and the lack of adherence to design program schedules as sources of significant delays. Substandard design and inattentive review oversight were also seen as a lead contributor to project change requests, or VOs. It was also noted that the use of inexpensive and poor-quality materials at design leads to higher maintenance and repair costs later.

At the tender stage, building contractor performance automatically into the bid process was viewed as a major improvement, and would reduce chronic poor performance. The Jordan Online E-Procurement System (JONEPS) and the new Procurement Law were viewed as offering opportunities for significant system improvement, if fully implemented.

At the construction stage, improved oversight and reporting were seen as vital. On site quality control improves the final product and reporting and, if linked to a simple tracking system, would provide key project management information for the ministry.

At the maintenance, operations, and utilization stage, interviewees noted that ingredients for improvement include regularly updated school-level physical information and improved facility maintenance planning and management at the national, governorate, and school levels.

A major cross-cutting theme that was seen to impact the entire process is information sharing and improved communication. As the Government of Jordan (GOJ) moves to e-government, it has developed strong information systems to serve specific tasks. Linking these information centers and sharing data electronically instead of arcane official letters can greatly reduce delays.

The GOJ is working hard to be a regional economic leader, and an educated workforce is a vital contributor to success. The ESMP Project, focused on SI aspects of education, aims to play a supportive role collaborating with partners in the MOE, MPWH, and the various stakeholders in the school building and maintenance process. **Annex 1** provides a Glossary of Terms.

2 INTRODUCTION

USAID's investment in Jordan's education sector began in 2003. Over the past 16 years, USAID has prioritized partnering with the MOE to assist children and youth to acquire the skills necessary to be productive citizens.

Current GOJ education priorities are guided by two documents; *Education for Prosperity: Delivering Results - A National Strategy for Human Resource Development 2016-2025*, and the *MOE's Education Strategic Plan (ESP) 2018-2022*. Both reports describe the need for updating and expanding SI to offer a conducive learning environment, by addressing school overcrowding, rented school buildings, and double-shifted schools. Both reports also outline the need for better school maintenance, and describe planning, funding, and training gaps.

The ESMP Project was designed to support the GOJ in achieving its goals, by working collaboratively to improve SI systems and policies, and build ministerial capacity to provide and maintain quality schools in Jordan.

Public school construction is implemented through the MOE and MPWH. The MOE is responsible for providing initial data of schools, including the nomination of schools for renovation, expansion, or construction; providing the essential data to initiate the A&E services design process. The MPWH manages the school design and construction process by hiring specialized A&E and construction firms. After construction is completed, the MPWH and MOE form a committee to review and approve the final work before officially transferring responsibility for the school over to the MOE. Typically, there is a defects liability period of one to two years during which the construction contractor is responsible for repairing any faults in the construction.

This report offers a general assessment evaluating the SI process in Jordan across the different stages of implementation and utilization. The report attempts to identify policy, system, and capacity gaps for each stage in the SI process, in order to build an evidence base to support ESMP activities and long-term sustainability of results.

The report focuses on key areas that impact the SI process including:

1. School planning
2. School design
3. GOJ procurement of A&E and construction services
4. Construction management and supervision
5. School operation and maintenance
6. Data for decision making

For each impact area, the ESMP team reviewed previous relevant assessment reports, reviewed current ministry processes and procedures, held discussions with ministry officials and other key stakeholders, and offered key findings and recommendations.

The report reviews data from different geographical areas in Jordan to identify patterns that are specific to neighborhoods of governorates. The assessment includes a review of maintenance issues, and to the extent possible within data limitations, discusses the advantages of preventive versus curative maintenance. The report outlines the impact of qualifications of local engineering and construction firms, and compliance with time, quality, and safety standards on school construction.

The assessment also includes a review of existing laws, bylaws, procedures, and systems that govern or impact SI implementation and utilization.

2.1 ASSESSMENT REPORT LIMITATIONS

The preparation of this General Assessment Report was limited due to delays in official engagement with the MOE and MPWH. While the project kickoff meeting occurred in March 2019, critical personnel recruitment and replacement was not completed until July 2019. The project had the ability to initiate official meetings with the GOJ starting July 9, 2019. With Eid holidays in early June and mid-August and report writing deadlines, the project had approximately one month to conduct official meetings.

It should be noted that during the months of March – July 2019, the project was able to hold many unofficial meetings, access some ministry data, and review prior assessments. However, this report has notable limitations:

- For USAID submission, the report lacks the time to create a joint ministry assessment team, as originally envisioned. Additionally, at the time of submission, the report has not been developed collaboratively with ministry officials, as originally envisioned.

- While ESMP obtained access to MOE school statistical data contained in the Education Management Information System (EMIS), the project was unable to obtain official access to key financial and project data that would have allowed for full analysis of root causes for VO delays, cost analysis to assess preventive versus curative maintenance, and the cost effects of poor construction.

- Additionally, the delayed recognition by the ministries of prevented school-level access to key stakeholders prior to summer vacation.

Going forward, ESMP views this General Assessment Report as a first step in its collaboration with the MOE and MPWH. After USAID review, the project expects to review and revise the findings and recommendations in collaboration with ministerial partners, and to jointly develop a final version of this report that forms the foundation of future project work.

In the following pages, the report will examine the key steps in the SI process, review past findings, examine current processes, and make recommendations to the SI PI process.

2.2 ESMP PROJECT BACKGROUND

The Enhancing School Management and Planning (ESMP) Project is designed to improve the Jordanian school management and planning process, as well as the quality of the school environments in Jordan by enhancing the planning, oversight, operation, and maintenance capabilities of the MOE and the MPWH.

The goal of the ESMP Project is to provide assessment expertise, technical assistance, capacity building, and training to the MOE, MPWH, targeted stakeholders, and other counterparts to improve existing management systems and procedures used by the GOJ for the planning, implementation, and utilization of public schools in Jordan.

To achieve this goal, ESMP staff will work in close coordination with multiple governmental and non-governmental actors. Within the MPWH, the ESMP team will coordinate with the Government Tendering Directorate, Studies Department, and Supervision Department. Within the MOE, ESMP will partner with the Planning Directorate, Building and Maintenance Directorate, Development Coordination Unit, Procurement Unit, Field Directorates (FDs), and public schools. Engagement with the private sector is critical to the construction and procurement side of the project, and ESMP will coordinate with A&E firms, construction firms, and local professional Jordanian Engineers Associations. Critical to the integration of MOE and MPWH policies and their long-term cooperation is the inclusion of local communities and parent stakeholders involved in the education process.

2.3 SCOPE OF WORK

The overall scope of work of this assessment report is to identify assets and gaps for capacity development at each stage of the SI process (i.e., planning, design, tendering, construction supervision, closeout and acceptance, operation and utilization, maintenance) and build an evidence base to support all ESMP activities and lead to longer-term sustainability of results.

2.4 APPROACH AND METHODOLOGY

Primary and secondary data were collected from a combination of data sources. The study implemented a methodology that is based on a qualitative approach during different phases. The qualitative approach was based on three data collection methods: (1) prior assessments, bylaws, and regulations review, (2) semi-structured interviews, and (3) a stakeholder workshop. The approach then utilizes a content analysis method to analyze the data.

Semi-Structured Interviews: The interview structure was organized into two parts. The first part was comprised of general questions related to the respondents' respective roles and responsibilities. The second part of the interview was designed to reveal respondents' insights into the prior assessment of key findings and the current practices. **Annexes 2 and 3** provide a list of all ESMP and Edvise ME interviewees.

Stakeholder Workshop: ESMP hosted a one-day stakeholder workshop at the Sheraton Hotel in Amman on July 29, 2019 to gather qualitative input from invited participants, specifically owners and/or directors of established Jordanian contracting and design firms with experience in SI. Challenges and opportunities were identified as participants openly discussed issues related to school construction, and a list of suggestions was developed.

3 SCHOOL PLANNING PHASE – NEEDS ASSESSMENTS AND SITE SELECTION

3.1 BACKGROUND

Responsibility for the planning phase of SI rests with the MOE. However, to strategically target resources and ensure preliminary project feasibility, effective planning requires: 1) good data, and 2) a complex exchange of information with donors, additional ministries, municipalities, and governorate-level decision makers. Important financial coordination and budget planning is also necessary to ensure that resources are available when needed.

ESMP observed important information gaps that made coordinated information gathering difficult. In many cases, the issue was not the lack of information systems, but rather the lack of bridges between existing data systems or restrictive information sharing protocols.

Also, communication gaps were observed between the central ministry and governorates. As the GOJ moves forward with a nascent decentralization process and has partially devolved capital spending decision-making to governorates, the central ministry has not actively worked to educate governorate councils, executive councils, local councils, and citizens on national strategic objectives and their rationale. On the other hand, there is a great deal of work to be done in the governorates, so that capital funds targeted for education are not used inefficiently because of poor planning.
ESMP believes that with better data, stronger data coordination, and intergovernmental coordination, combined with improved planning capacity building, significant improvements are possible.

According to *MOE Statistics Report (2017–2018)*, there are a total of 3,835 public schools in Jordan educating 1,378,840 students by 86,627 teachers with 1,399 employees at the MOE Center.

MOE schools are segregated by:

1. Type: all-male, all-female and mixed gender (KG – grade 4) schools
2. Level: preschool (KG), basic (grades 1–10), and secondary - academic or vocational - (grades 11–12)
3. Shift: one shift and double shift schools
4. Ownership: MOE owned and rented schools
5. Location: Urban and rural schools
6. Overcrowded and underutilized schools

There are no major differences of percentages between the last two school years (2016–2017) and (2017–2018) in terms of school distribution. **Tables 1 – 5** show percentage distribution of schools by type, while **Tables 6 and 7** show percentage distribution of students by gender at MOE.

Table1. Percentage distribution of schools, students and teachers by school type

School Type	Schools	Students	Teachers
All-Male	36%	35%	37%
All-Female	12%	17%	15%
Mixed-Gender	52%	48%	48%

Table 2. Percentage distribution of schools, students and teachers by education level

Level of Education	Schools	Students	Teachers
KG	0.05%	0.01%	0.01%
Basic	66.32%	58.07%	55.84%
Secondary	33.63%	41.92%	44.15%

Table 3. Percentage distribution of schools, students and teachers by school shift

School Shift	Schools	Students	Teachers
One-Shift	81%	73%	78%
Double-Shift	19%	27%	22%

Table 4. Percentage distribution of schools, students and teachers by school ownership

School Ownership	Schools	Students	Teachers
MOE Owned	80%	91%	89%
MOE Rented	20%	9%	11%

Table 5. Percentage distribution of schools, students, and teachers by school location

School Location	Schools	Students	Teachers
Urban	46%	65%	57%
Rural	54%	35%	43%

Education enrollment and drop out ratios are shown in Tables 6 and 7.

Table 6. Enrollment ratio of students by age and gender of MOE schools

Student Age	Male Students	Female Students
KG (4 – 5)	37.1%	36.0%
Basic (6 – 15)	94.5%	94.9%
Secondary (16 – 17)	64.8%	77.9%

Table 7. Dropout ratio of students by grade and gender at MOE

Student Grade	Male Students	Female Students
Grade 1 – 4	0.62	0.57
Grade 5 – 10	3.17	3.52
Grade 11 – 12	Optional	

3.2 MOE CURRENT EDUCATION STRATEGY

In recent years, the MOE aligned its strategic plan with the objectives of the *National Strategy for Human Resource Development (2016-2025)* (see **Table 8**), Jordan Vision 2025, and the 2030 Agenda for Sustainable Development. An emphasis was placed on promoting the quality of education delivered at public schools. Subsequently, the ministry partners, managing directorates, field directorates, and various stakeholders conducted several studies and launched a corresponding initiative to achieve their goal. Nonetheless, the importance of having a systematic, practical, and integrated methodology to deal with the current challenges that hinder the progress of development became vital.

Table 8. Project objectives based on National Strategy for Human Resource Development (NSHRD)

Project	Objective
Basic & Secondary Education (B&SE)1.1: Open new schools strategically	Increase the number of classrooms through school expansions and building new schools by buildings 60 schools annually for ten years to meet the expected increase in the number of students by 25,000 new students
B&SE1.2: Rationalize poor performing small schools	Remove small schools that are inefficient and deliver low teaching quality

The Education Strategic Plan (ESP) Report 2018-2022 started with a situation analysis which presents key challenges and solutions for improvement as summarized in **Table 9** below**.**

Table 9. Education Strategic Plan 2018-2022 – Challenges and Opportunities

MOE Challenges		
1. Limited availability of kindergartens in densely populated areas. 2. Schools are overcrowded. 3. Too many schools are rented or working on a double shift.	5. A large number of schools have urgent maintenance needs. 6. A large number of schools do not receive preventive maintenance due to the lack	7. The needs of people with disabilities have to be taken into account with the establishment of ramps and other facilities.

4. Refugee students need to be accommodated.	of a special program for this purpose.	8. Lack of an attractive, stimulating, and safe educational environment. 9. Lack of air conditioning systems in all schools in the Kingdom.
MOE Solutions		
Establish 300 new, accessible male and female school buildings for Jordanian, refugee and special needs students over the next five years.	Improve the school environment by carrying out the necessary maintenance work, and the activation of the preventive maintenance program in the public schools.	Renovate 420 schools (210 girls' schools and 210 boys' schools) to improve school environment and to make them accessible to children with disabilities.

Accordingly, ESP 2018-2022 includes several strategic objectives that require building new schools as shown in **Table 10**.

Table 10. Strategic Domains and Objectives Requiring New School Construction.

Strategy Domain	Objective	Related Activities to Buildings	Indicator	Baseline (2016/17)	Target (2022/23)
Domain 1: Early Childhood Education and Development (ECED)	Increase enrolment rate at KG2 from 59% to 80% in 2022 to be achieved through several activities.	Develop/ construct and equip new KG2 classrooms at MOE schools.	Number of new classrooms established and equipped at MOE schools	1,459 classrooms renovated and equipped	• 210 newly renovated • 500 newly constructed
Domain 2: Access and Equity	Establish 300 new, accessible male and female schools for Jordanian, refugee, and special needs students over the next five years.	Establish 60 new schools per year (300 total) or expand existing schools to reduce overcrowding and the number of rented and double shift schools. These schools will accommodate Jordanians and provide increased access for	Percentage of rented school buildings	22%	17%

		Syrian and other refugees.			
			Percentage of double shift schools	19%	10%
		• Use GIS to identify needed sites for new schools. • Acquire additional land in identified sites in different governorates.	Number of land parcels acquired	100 parcels	300 parcels
		Continuous integration of small schools (less than 100 students) into bigger schools.	Number of schools with less than 100 students	618	0

Many of today's planning challenges find their roots in prior assessment reports summarized in the next section

3.3 FINDINGS FROM PREVIOUS ASSESSMENTS AND STUDIES

ESMP completed an exhaustive review of relevant prior assessments. The following are the findings that were related to the SI planning process.

USAID JORDAN SCHOOL CONSTRUCTION STAKEHOLDER ASSESSMENT REPORT (APRIL 2015)

- Serious lag time between the planning and implementation stages can take up to four years. Within that time, demographic shifts can render the plans inappropriate.
- The vast majority of stakeholders described USAID financing as rigid, with the majority of funding being allocated for school construction with little remaining for operation and maintenance, both of which require substantial resources.
- Collaboration often lacking among stakeholders, slowing the early stages of school construction.

- Obtaining licenses and permits; some stakeholders mentioned that delays occur when MOE does not follow-up on issuing permits. This was emphasized by Aqaba Special Economic Zone Authority (ASEZA).

- According to some stakeholders, MOE's responsibility in this phase should not be limited to planning but should also include location readiness: securing permits and licensing, identifying land borders, and solving issues prior to proceeding to the next level.

- Most stakeholders reported that MOE's planning and management capacity is limited and non-participatory, resulting in a lack of strategic, long-term plans, weak management of the multiple funding sources and duplication of work, and poor selection of school locations.

- Most stakeholders also mentioned the lack of a database or system that provides up-to-date information on demographics and school populations, status of construction projects, and projected needs, resulting in flaws in planning, particularly in duplication of effort.

- Stakeholders also commented that planning decisions are sometimes based on favoritism and factors beyond the need for educational facilities.

- Some stakeholders stated that MOE frequently does not have information necessary for good planning.
    - For example, the engineering/construction associations said that soil testing is not available when needed.
    - The ASEZA reported that social studies and traffic flow studies are not always available during the planning phase.
    - Architecture and engineering firms stated that "As-Built" diagrams that show wiring and plumbing are not available when needed, particularly for older schools.

- Long duration of the planning renders original plans irrelevant by the time of implementation. The MOE highlighted changes in demographic characteristics at the local level that affected relevance of plans. The situation has been exacerbated by the influx of refugees, placing additional demands on school services.

- Another issue mentioned by some stakeholders is the continuous changing of plans, which causes delays in implementation and increases costs.

- Finding land for schools is difficult; the MOE mentioned that land parcels in highly populated urban areas such as Amman and Zarqa are frequently unavailable and if they are available, the price is very high.

- The MPWH highlighted the high cost incurred when fixing/preparing locations that are not ready, and the significant time needed to solve land issues, particularly those owned by multiple parties.

- Local community members, parents, and school staff feel that the selection of school locations is poor and is not proportional to real needs.

- Utilities and service delivery companies similarly voiced dissatisfaction with the selection of school locations.

USAID JORDAN SKEP PLANNING AND DESIGN GUIDELINES REPORT (OCTOBER 2015)

- Updated and non-technical planning and design guidelines could serve as a reference for those involved in the process of planning, designing, building, and renovating schools.

- If students have a long commute to school, they may encounter difficulty attending classes, which are easily accessible for local students. Long commutes to school for children could have an impact on access to education and also have an impact on the lives of the families financially and socially.

- Female students have a higher tendency to use school buses or private cars, probably for reasons of safety and cultural and social norms rather than a long distance to school.

USAID JORDAN JSP: A TRANSFORMATIONAL CHANGE – EVALUATION OF THE JORDAN SCHOOL CONSTRUCTION AND REHABILITATION PROJECT REPORT (MAY 2013)

- A community-based site selection process was effective and showed high levels of sensitivity to the project's main goals, in which the overcrowding, double-shifting, and rented schools topped the list.

- Improvements and adjustments on the design and the planning of the project can contribute to reducing the cost of construction and increasing its effectiveness.

USAID JORDAN EDUCATION ASSESSMENT: SCHOOL CONSTRUCTION AND SCHOOL EXPANSION REPORT (SEPTEMBER 2018)

**Based on a sample of 25 schools across Jordan*

- Urban schools tended to have higher teacher-student ratios compared with rural schools. This was comparable across expansion schools as well as newly constructed schools within urban and rural localities.

- There appears to be no difference in average numbers of students per classroom in first or second shifts, when compared across new or expansion schools.

- As enrollment continues to increase, the issue of school size and students per classroom become critical to improving student performance.

JEN AND UNICEF JORDAN NATIONWIDE ASSESSMENT IN PUBLIC SCHOOLS FOR STRATEGIC PLANNING REPORT (2015 - 2016)

- MOE defines 1.3m^2 per child as a requirement for learning space in classrooms of MOE-owned schools.

- USAID Jordan has built classrooms targeting 1.4m^2 per child.

- Less than 0.8m^2 is considered to be severely crowded by the National Center for Human Resource Development (NCHRD).

- The average number of students per school showed clear differences by three characteristic features. According to population density, the average school size was bigger in urban areas. Rented schools were smaller on the scale of student population than MOE-owned schools due to space restrictions.

- Noticeably, the average number of students per female school is 1.5 times that per male school, which reflects the fact that there are more male schools than female schools.

- Only 45% of the classrooms met the standard while 55% of the total number of classrooms had less than 1.3 m^2 per child. This indicates that 861,575 students have been forced to learn in overcrowded classrooms.

- Overcrowding in classrooms is prominent in schools in urban areas. However, overcrowded rural schools may be more damaging. If the nearest school denies enrollment to a child, usually the child would not attend school at all rather than go to an assigned school far from home.

- Schools in urban areas had a high proportion (33%) of classrooms with space greater than 1.0 m² but less than 1.3 m² per child. Concerning severely crowded classrooms with space less than 1.0 m², there is little distinction in schools according to geographical areas. This indicates that schools in urban areas are crowded. However, there is still enough space to accommodate additional children if a standard as low as 1.0 m² per child is accepted. Relatively crowded classrooms in schools in urban areas, however, are rather difficult to solve in practice. Classroom education is divided by grade level and therefore, the number of students and their grade levels should be considered when classrooms are required to accept the students.

Table 11. Challenges related to school planning process across relevant reports

Challenges	MOE Education Strategic Plan 2018-2022	The Jordan Country Development Cooperation Strategy 2013 – 2017	The Education Assessment for School construction and School Expansion in 2018	Jordan Nationwide Assessment in Public Schools Report 2012-2016	The Situation Analysis of Children in Jordan issued in 2017	USAID Planning and Design Guidelines (2015)
Schools are overcrowded	*	*	*	*	*	*
Rented school	*			*	*	
Double shifts	*			*	*	
Refugees need to be accommodated	*	*		*	*	
Early childhood and children with disabilities education need to be well-planned	*					
Lack of attractive and safe educational environment	*		*			
School location needs to be examined carefully to avoid school overcrowding and underutilization		*			*	*
Educational digital data and spatial maps need to be applied on a fast pace to support decision makers	*	*			*	*

MOE limited operations and maintenance budget and financial difficulties	*	*	*	*		*
School management centralization			*		*	
Lack of long-term planning		*			*	

In summary, prior assessments highlighted overcrowded conditions necessitating school expansion and construction. While overcrowding was more prevalent in urban areas, there were serious effects with rural overcrowding as well. Planning new and expanded schools exposed serious planning deficiencies. Pre-feasibility information such as land ownership, site obstacles, topography, and local permits were not obtained prior to initiating a project, often causing serious delays. Lack of access to data, lack of collaboration, and staff capacity gaps were identified as serious contributors to poor planning. Finally, the handoff period from planning to design caused serious issues as the underlying justification for the project may have changed.

3.4 MOE – PLANNING PROCESS, ROLES, AND RESPONSIBILITIES

Responsibility for the planning phase primarily lies with the MOE. MOE receives funding from multiple donors, assesses the needs for school capacity and buildings, and determines physical requirements for educational facilities. The main entities involved in school planning within the MOE are the Planning and Educational Research Managing Directorate and the Buildings and International Projects Managing Directorate. The Governorate Executive Council and the Governorates Council, with input from MOE's field directorates, also participate in school planning in the context of determining capital projects.

3.4.1 ORGANIZATIONAL STRUCTURE AND STAFF RESPONSIBILITIES

Figures 1 and 2 below illustrate the organizational charts for the MOE's Planning and Educational Research Managing Directorate and the Buildings and International Projects Managing Directorate.

Figure 1: Planning and Educational Research Managing Directorate Organizational Chart

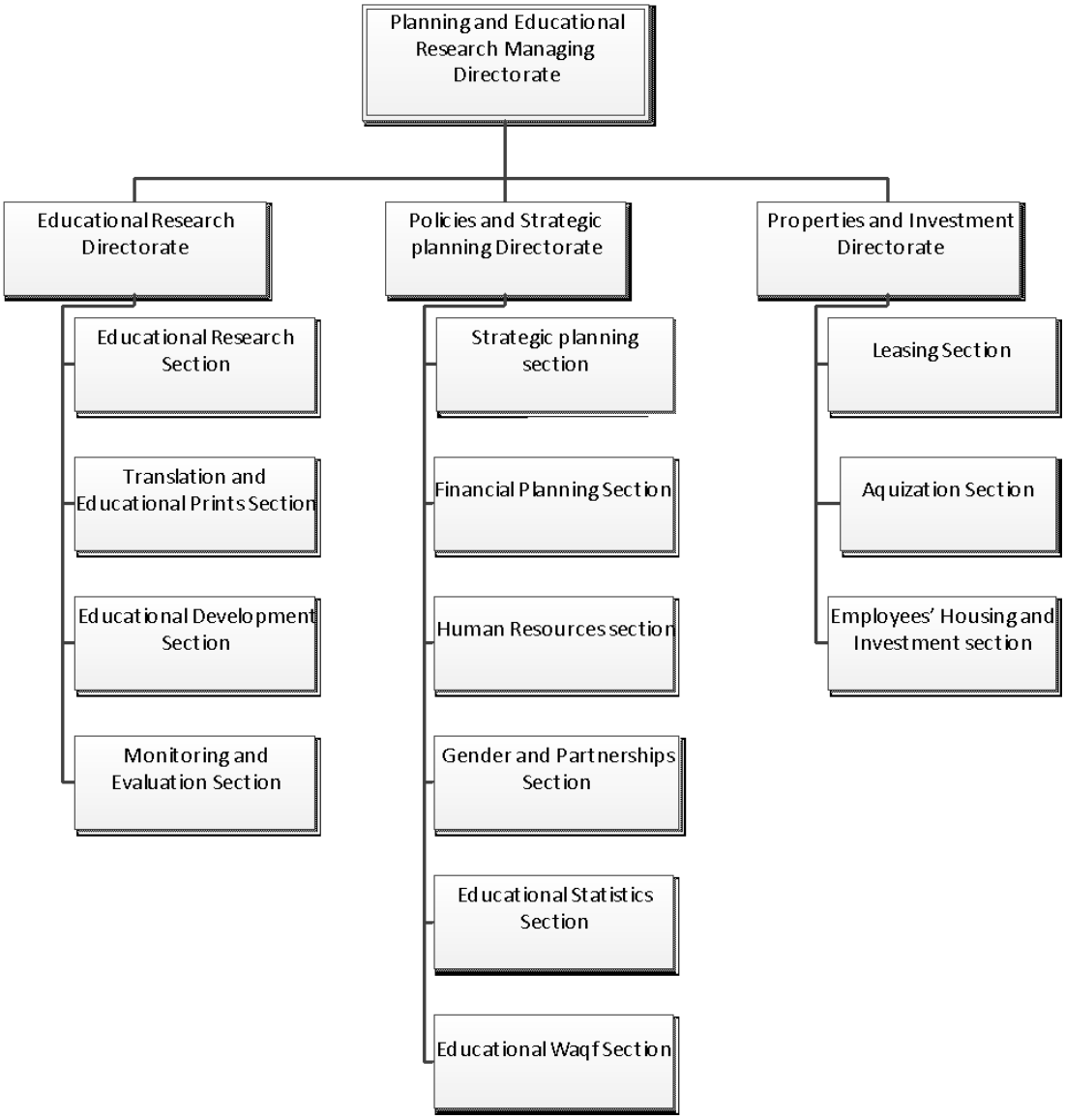
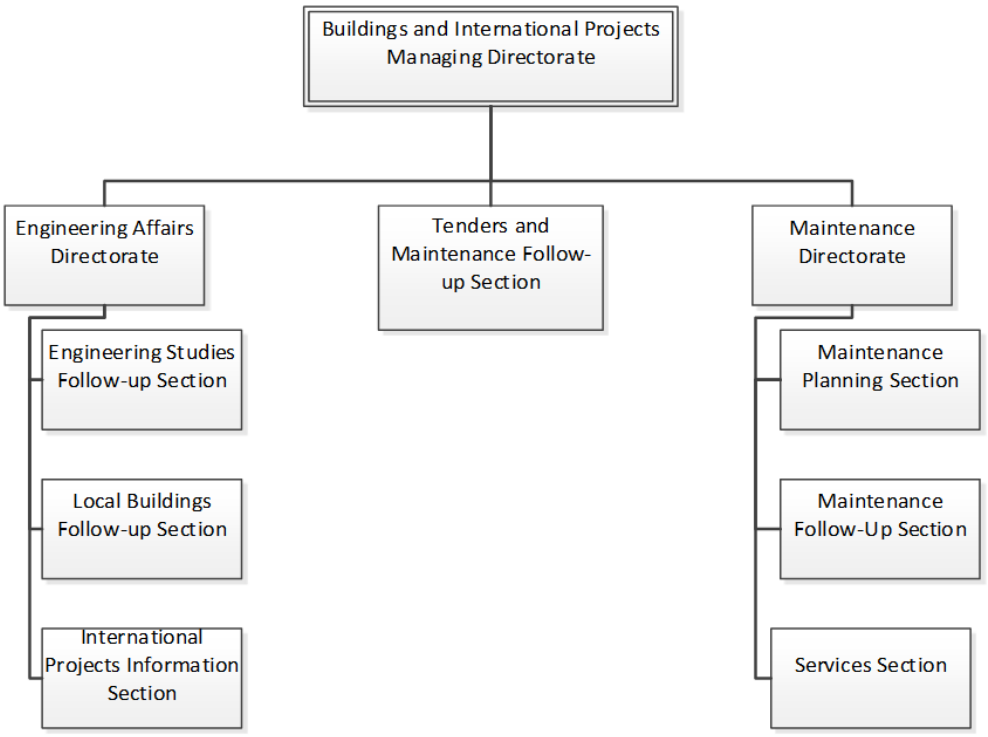


Figure 2: Buildings and International Projects Managing Directorate Organizational Chart



The following are the key directorates and sections that are responsible for SI planning:

- Planning and Educational Research Managing Directorate

- Policies and Strategic Planning Directorate
    - Strategic Planning Section - Translates field directorates' needs of school buildings into plans for execution.
    - School Mapping Section - Uses WebGIS to provide data needed for taking decisions regarding school planning. Data source used come from OpenEMIS these Data provided covers population demographics, school location, type, status, capacity etc.
    - Financial Planning Section - Allocates estimated cost of school buildings within MOE budget according to related programs.
    - Human Resources Planning Section - Once the school is officially handed over, the staffing process starts according to the approved school staff allocation instructions.

- Properties and Investment Directorate
    - Acquisition Section - Acquires lands for school buildings and obtains necessary legal documents.

- Buildings and International Projects Managing Directorate

- Engineering Affairs Directorate / Engineering Studies - Conducts cost estimation for new school buildings under consideration, and after securing the required fund, develops the design and tender documents.

3.5 MOE SCHOOL PLANNING PROCESS

The school planning process starts at the MOE FD Planning Sections, who identify needs for both new schools and school expansions. Site selection is based on the following ministry guidelines.

3.5.1 MOE SITE SELECTION CRITREIA

The MOE sets forth basic standards for site selection. They include:

- The availability of land owned by MOE.
- The availability of financial allocation.
- Availability of students - at least 50 students for the classes (1-4) in rural area and the distance five kilometers from adjacent village / catchment area.
- Availability of students - at least 200 and above in the subdistrict (city) or inside municipality bounder or village with population 5000 or more.

The MOE also offers rules for special circumstances:

- A school may be established if within three kilometers there is no basic school or within five kilometers there is no secondary school, and there are more than 200 available students.
- A school may be established if located in an urban renaissance area. Anticipating future expansion in this region, and if there is no alternative private school, MOE may establish a central school if the number of available students is more than 200.
- A school may be established in case of replacing a rented school, using regular catchment areas.
- A school may be established in case of addressing a double-shifted school, using regular catchment areas.
- MOE supports school rehabilitation / adding annex if the school is overcrowded, and if there is available area for school horizontal expansion or ability to do vertical expansion.
- MOE supports establishing a KG room (annex) for an existing or new school if there are 15 children or more, and if there is available area for school expansion.
- MOE supports building or adding an annex, KG room, or education facility, or other school facilities, if donated by the local community or any organization according to above rules.
- MOE supports building central schools in rural areas when the total number of students in each village is less than 50 students and the distance between the villages is five kilometers or less, and the total number of students exceeds 200. If the total number of students is less than 200, a transportation service will be provided by MOE.
- MOE supports building a small girls' school when the number of students (girls) in basic school exceed 50, and the distance to the nearest school is between three to five kilometers. An annex (room) will be added for a girls' school if the number of students (girls) equals or exceeds 10 in the secondary school in the villages, and if the distance to the nearest school is five kilometers or more (catchment area).

After sites are evaluated, Directorates will inform the central ministry of potential sites for international donor projects. For projects utilizing governorate capital spending funds, usually for school expansion or renovation, the MOE FDs, who are represented in the Governorate Executive Councils at each governorate, play a widely varying role in identifying school construction needs. Depending on directorate leadership, FDs may play an active or passive role.

Along with other sectors, capital project needs lists are presented to the Executive Council, chaired by the Governor, who filters the list and prepares a draft budget for Governorate Council approval.

Next, the Ministry of Finance General Budget Department (GBD) reviews estimated project costs for budgeted fund sufficiency in order to be included in the Ministry's budget.

At this point, the list of potential projects is reviewed. The Policies and Strategic Planning Directorate incorporates the needs identified by the Governorate Council while referring to the:

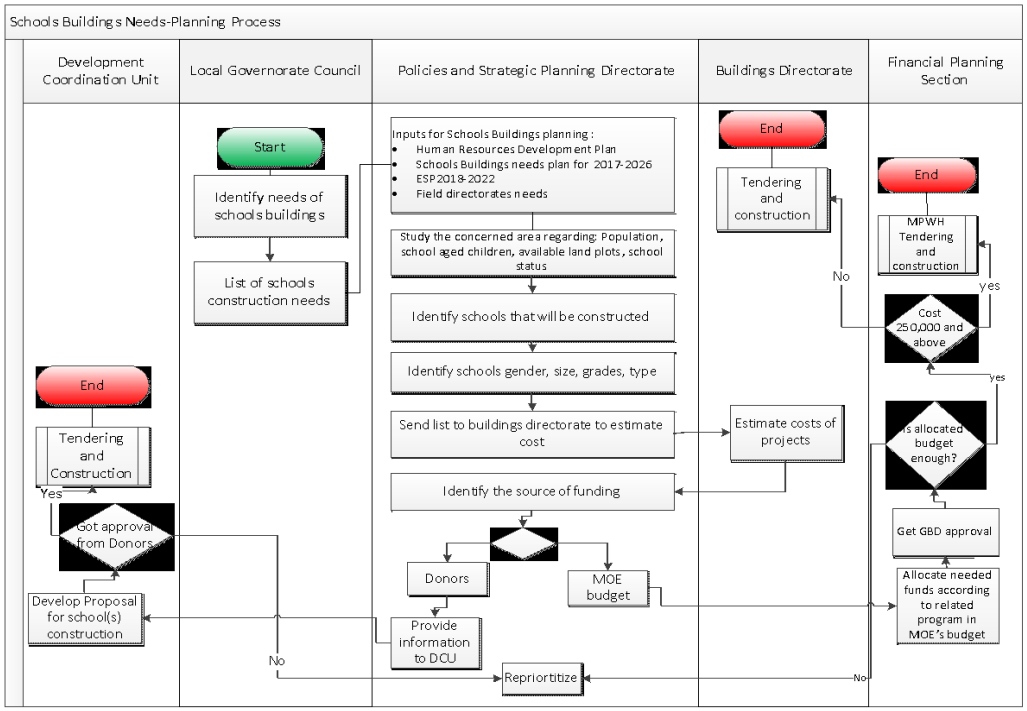
- National Educational Strategies, mainly the *Human Resources Development Plan (HRDP)*
- *Educational Strategic Plan 2018-2022 (ESP)*
- *Schools Building Needs Plan 2017-2026*

Both the School Mapping Section and Strategic Planning Section, under the Policies and Strategic Planning Directorate, participate in carrying out the necessary analysis based on criteria that includes the following: population:

- School type (all-male, all-female, or mixed gender)
- Level (preschool (KG), basic (grades 1–10), secondary, academic or vocational (grades 11–12))
- Shift (one shift or double shift)
- Ownership (MOE owned or rented)
- Location (urban or rural)
- Availability of land plots
- School status (overcrowded or underutilized)

Figure 3 below maps the school planning process:

Figure 3: School Planning Process Map



3.6 MAJOR CHALLENGES IDENTIFIED BY ESMP

The following table (**Table 12**) shows important challenges according to key organizational elements (strategy, system/policy, behavior and skills) for each planning challenge area:

Table 12. Major Challenges and Correlation to System, Policy, and Skill Gaps

Major Planning Challenge	Description	System /Policy Gap	Skill Gaps
Strategic Planning Implementation	National education plans often overlap. Implementation challenges may relate to their non-binding nature, lack of localized goals and targets, and lack of information to assess progress against goals.	Strategic plan implementation falls short. Operational planning lacking, especially at the FD level. Monitoring data gaps.	Planning skills Project management skills. Data use for managers.
Needs Assessment / Site Selection	Long duration of the planning renders original plans irrelevant by the time of implementation. Incomplete information supplants	Lag time between planning and implementation. Lack of a pre-feasibility assessment increases delay risks. Poor data sharing between inter-	MOE planning & project management capacity is limited. Understanding of building information sharing systems and effective manager-level data use.

	data-based decision making. MOE does not have a land utilization plan.	governmental authorities.	
Financial Planning	The MOE relies on donors to fund the construction of new schools.	GBD does not approve the needed budget which forces the MOE to re-prioritize its school construction projects and request donors to cover for the shortage.	MOE Center, MOE FDs, the Executive Council and Governorate Council lack knowledge and experience.
Decentralization	School planning does not refer to HRDP, ESP at governorate level.	Weak procedures evolving.	The Executive Council and Governorate Council lack knowledge and experience in planning and budgeting.
Data	Quality planning data is partially available. MOE does not have a plan on how it will assure accurate data and its verification.	No process is being followed for having accurate data and verification.	Lack of needed skills to conduct data accuracy verification.

3.6.1 STRATEGIC PLANNING IMPLEMENTATION

As a general rule, it is difficult to successfully implement government strategic plans. Often, successful implementation is linked to establishing sub targets and geographic targets, the targets are broadly communicated and understood, goals are linked to data necessary to assess progress, and employee performance is linked to achieving goals. In the Jordan context, it is not known if sub-goals are established, there is little evidence that targets are communicated broadly, there are data gaps and there do not appear to be key personnel whose performance is assessed based on achieving key goals. Interviewees share stories that offer different anecdotal information

COMMENTS FROM INTERVIEWS WITH MOE AND FDS

- It is difficult to develop strategic plans to cover the needs of areas with a fast population growth such as Tabarbour area, which has reached a growth rate of 400% in the last 7 years with no future plans to accommodate this rapid growth as MOE tends to take action only once a problem emerges. Moreover, there are data gaps to acquire information on fast growing populations.

- Project implementation planning sometimes falls short as in the case of Thu Al Nourein School under the Marka FD. The school needed demolishing so as to build 24 classrooms to replace 12 old classrooms. However, there was no consideration as to what to do with the students during construction. The FD is still looking for a place to host them in coordination with Strategic Planning at MOE.

- Lack of coordination among the MOE, FDs, and the donors regarding educational requirements. For example, two female schools (Al Khansa' and Al Andalus under Marka Field Directorate) were built

from a Gulf fund, whereas the need was for male schools. In another case, an expansion was requested for Arwa Bint Abdul Muttalib school where the classrooms needed were built but in addition to labs and an auditorium which prohibited adding new classrooms to solve the double shift problem.

- MOE did not translate NSHRD 2016-2025 and ESP 2018-2022 objectives and projects into executive plans that include detailed activities and a timeline for execution over the whole period of its own strategic plan and on yearly basis to facilitate follow-up. These executive plans would also serve as reference for measuring progress.

- Although MOE has developed its Needs for School Buildings (2017-2026) Plan**,** there was no follow-up on its implementation in order to check for progress or challenges that hinder achieving targets.

- Some planning issues relate to municipalities and urban planning in terms of assigning plots for schools.

3.6.2 NEEDS ASSESSMENT/SITE SELECTION

While MOE Guidelines provide needs assessment/site selection guidance, because key data like land ownership and building permits, financial allocation, and demographic data are generally not available locally, projects are often initiated prematurely. Additionally, in the face of lack of information, quantitative factors are often replaced by community feelings and political influence.

COMMENTS FROM INTERVIEWS WITH MOE AND FDS

- Lack of coordination among the MOE, FDs, and the donors regarding educational requirements. For example, two female schools (Al Khansa' and Al Andalus under Marka Field Directorate) were built from a Gulf fund, whereas the need was for male schools. In another case, an expansion was requested for Arwa Bint Abdul Muttalib school, where the classrooms needed were built but in addition to labs and an auditorium which prohibited adding new classrooms to solve the double shift problem.

- In some areas with overcrowded schools, no land plots are available. If such plots are available, they may be:
    - High prices
    - Owned by a government entity other than the MOE; does not wish to sell to MOE
    - Owned by the MOE but its size is not suitable

- Land plots owned by the MOE have outdated legal documents. This may cause problems similar to those in Rweished where the school design was based on land dimensions according to the land scheme provided by MOE, whereas in reality the land boundaries were different because the neighboring land took 11 meters of MOE's land which forced the consultant to redo the school design.

3.6.3 FINANCIAL PLANNING

SI financing comes from multiple sources making planning difficult. International donor funding is more reliable, and capital spending is intended to be available, but multiple steps in the project approval seeking availability of funds means that budget planning is challenging.

COMMENTS FROM INTERVIEWS WITH MOE AND FDS

- MOE lacks the capacity to prepare financial estimates for school construction as cost estimates are not accurate, and usually underestimated.

- After estimating the needed cost, the Planning Section will add these to MOE budget and get approval from GBD by discussing with them the rationale behind the needed funds, but usually GBD does not approve the needed budget which forces the MOE to re-prioritize its school construction projects and request donors to cover the shortage.

- MOE's budget for school construction is not enough to build new schools; it can cover some expansions to current schools. Accordingly, the MOE relies on donors to fund the construction of new schools.

3.6.4 DECENTRALIZATION AND SCHOOL PLANNING

The governorate-level decision-making process used to select capital projects plays an important part in SI planning, as significant funds are channeled through a partially decentralized process. This partial decentralization is new and evolving, processes are forming, and major knowledge and skill gaps exist at all levels.

COMMENTS FROM INTERVIEWS WITH MOE AND FDS

- There is little discussion of national and regional priorities between MOE, the Governorate Council, and the Executive Council.

- FD staff do not have the capacity to increase local awareness of national priorities, governorate targets, and/or school needs identification criteria and their use.

- Lack of planning and budget knowledge at the governorate level results in substantial percentages of funds allocated to SI lapsing at the end of a budget year.

- Governorate revenue sharing allocations are generally insufficient for new large schools. Instead projects focus on expansions and/or building small schools (cellular school). Often, the projects contradict the MOE strategy to close schools with less than 100 students.

- The Governorate Council and the Executive Council lack knowledge and experience in technical and financial planning, and FDs lack the skill to educate citizens on national education priorities.

3.6.5 PLANNING DATA

OpenEMIS and WebGIS are the primary data sources for school planning. While the systems have a great deal of data, and the department is committed to continued expansion, there are data gaps and opportunities for improvement.

COMMENTS FROM INTERVIEWS WITH MOE

- The single source of MOE data is OpenEMIS, this data is used for planning (site selection) through utilizing WebGIS tool to show and present OpenEMIS data in a proper way that will support the decision makers.

- OpenEMIS reports needed for planning purposes are constructed each time they are needed. This makes it difficult for EMIS to be used as a decision-making tool.

- EMIS access is very limited.

- There is no "data ownership" resulting in data that might not be collected, accurate or up to date in the system.

- Current physical assessment data is insufficient.
- EMIS data is generally not available to governorate decision makers who are developing capital budgets.

3.7 ESMP RECOMMENDATIONS

Based on the review of prior assessments and studies, and ESMP's discussions with relevant officials and other stakeholders, several recommendations for SI planning have been developed. **Table 13** below summarizes these recommendations and links them to type of intervention by process, policy, and system as well as capacity building opportunities.

Table 13. ESMP Recommendations for Planning

Planning Recommendations	Process	Policy	System	Capacity Building
Strategic Planning Implementation ● Align School Construction Plan with the MOE plan and other national plans related to education such as the Education Strategic Plan ● Build capacity of MOE Center, MOE FDs, the Executive Council and Governorate Council staff on SI Cycle, strategic planning, budgeting, etc. ● Make timelier decisions to initiate school construction after assessments and plans are completed to ensure validity of plans, particularly given the rapidly changing demographics and population. If this is not possible, make sure to update the relevant information and assessments as needed before start of construction	√ √ √	√	√	● Planning operations training ● Communications strategic goals ● Project management
Need Assessment/Site Selection ● Develop a plan for land acquisition ● Build the MOE staff capacity to understand and undertake its responsibility in settling land ownership and rights issues. MOE should give MPWH and A/E firms documentation of ownership prior to implementation or at provide timely responses on these issues ● Consider factors such as accessibility by roads and availability of basic services such as utilities prior to location selection	√ √ √	√ √ √	√	Land ownership, licenses and basic service resources and processes training

● Obtain required construction licenses from local authorities prior to the bidding stage of the project	√	√		
Financial Planning ● MOE enhance collaboration with governorate and municipal stakeholders, particularly in the planning phase, to ensure optimum selection of school locations. ● Build governorate awareness of budget process and typical project timelines to reduced lapsed funds due to poor planning.	√ √	√	√	Effective intergovernmental communication tools and methods
Decentralization ● MOE provide Governorates annual updates on National Strategy along with governorate level targets necessary to meet the goals, so that citizens and communities are more fully aware of national priorities and their rationale. ● Ensure that schools' educational facility requirements are clear among all parties involved at project initiation. This early communication at the planning phase will have an impact on implementation quality.	√ √	√ √	√ √	● Report preparation ● Decentralization law training ● Effective communications
Data ● Strengthen existing EMIS database/ management information system with *current* information on demographics, school population. ● Update MOE-owned land plots' legal documents on a yearly basis in terms of: o Registration certificate (ownership) o Local certificates o Land scheme that shows lands boundaries o Zoning	√ √	√	√	● Data sharing technology ● Data for mangers training

4 SCHOOL DESIGN PHASE – DESIGN STANDARDS, REQUIREMENTS, REVIEWS, AND APPROVAL PROCESS

4.1 BACKGROUND

There is common understanding that the physical quality of learning environments has an impact on student learning and behavior. MOE has made considerable progress during the past decade in addressing both the need for more classrooms and the need to improve the delivery of education in Jordan's schools.

Ideally, for all school projects, the role of MOE is to direct other stakeholders (MPWH and A&E firms) to design the educational spaces in accordance with MOE policy and serve the learning needs of students. While MOE has increased the number of classrooms for students, the push has stretched the capacity of A&E firms and government officials to maintain the highest design requirements. At the same time, there is no unified standard for school design. MOE applies different standards for school constructions funded by MOE to meet the low allocated budget. While design standards are set at a higher level when school construction is funded by donors. Yet, there is a need for outlining unified standards for school design.

MOE is responsible for preparing a list of educational requirements to be considered by designers for each school, yet in some instances design requirement specifications are not clear. The MPWH, through the Buildings and Studies Directorate, has the responsibility to prepare the tender invitation for selection of an A&E firm through the Government Tenders Department (GTD) and Special Tenders Committee (STC). MPWH and MOE are both responsible for follow up on the progress of the design phase by reviewing design submittals.

The design phase is a critical part of the SI process which, if implemented poorly, has negative downstream impacts on construction tendering, building, and maintenance. There are key risk factors related to poor design quality, including:

- Inadequate design review and poor design decisions can lead to unplanned added costs, by needing to compensate for unplanned or errors in design.

- Poor communication and collaboration, which can lead to failure in capturing customer requests, may lead to increased project change orders or VOs.

- Time delays present a design risk. During the ESMP workshop on July 29, 2019, the participants noted that lengthy time gaps between design submittal and the actual start of construction increases the risk that site conditions have substantially changed.

- Poor design quality increases financial risks, as the chance for major project changes / cost overruns increases.

- Inadequate initial site review, as part of the design process, leads to delays and cost overruns. Examples include:
    - Unplanned delays related to trees movement recently in Salt (AlFarooq School).
    - Unplanned existing structural columns when meeting new horizontal expansion in Hamza Bin Abdel Mutaleb school in Petra.
    - Unplanned street patterns caused major changes for new school building, causing problems with perimeter walls which needed to be changed to retaining walls in two girls' schools in Amman, Byader Wadee Aseer and AlYarmook School.

- Unaccounted for addition of a new underground water tank in Al Yarmook School in Amman to replace the old tank that need to be demolished to allow for new school horizontal expansion.

- Unaccounted for over 50 air conditioning units located on top of roof where vertical expansion had been planned in schools in Aqaba, such as Althamneh School.

- Lack of attention to details and design standards when designing surface water drainage causing problems for new school horizontal expansion at Zahoom Girls School in Madaba, Maeen Kindergarten, and Alfarooq School extension

Other key factors when discussing design phase system gaps include design review, land permit / building license issues, lack of adherence to design schedule timelines, unclear employer requirements, multiple design standards, and multiple issues around communication and collaboration.

4.2 FINDINGS FROM PREVIOUS ASSESSMENTS AND STUDIES

After a thorough review of prior assessments, ESMP found the following regarding the design phase:

USAID JORDAN SKEP PLANNING AND DESIGN GUIDELINES REPORT (OCTOBER 2015)

- Updated and non-technical planning and design guidelines could serve as a reference for those involved in the process of planning, designing, building, and renovating schools.

- If students have a long commute to school, they may encounter difficulty attending classes, which are easily accessible for local students. Long commutes to school for children could have an impact on access to education and also have an impact on the lives of the families financially and socially.

- Female students have a higher tendency to use school buses or private cars, probably for reasons of safety and cultural and social norms rather than a long distance to school.

THE EDUCATION ASSESSMENT – SCHOOL CONSTRUCTION AND SCHOOL EXPANSION REPORT (2018)

- Both new and rehabilitated schools offered improved physical spaces, layout, and equipment that were suitable for more modern teaching pedagogy.

- Newly constructed USAID-funded schools have larger classroom sizes than MOE schools. However, they also have different student seating arrangements such as larger tables which also take up room and may not be as conducive to meeting classroom capacity nor the movement of both teachers and students.

- Limited spaces to accommodate the entire student body during recess, morning assemblies, and entering/exiting the school.

- Canteens tend to be extremely loud and not large enough to ensure all students were comfortable as all students, except for those in the higher grades (11th and 12th) took recess at the same time.

- The outdoor spaces were not large enough to ensure that all students are able to gather together during the morning assembly when the full student population is expected to be present.

- In some schools, the entrance ways were noted to be too small to appropriately accommodate students when they are entering the school in the morning and leaving school in the afternoon. Due to the constricted entries, it takes more time to enter and leave during these particular times.

JEN AND UNICEF JORDAN NATIONWIDE ASSESSMENT IN PUBLIC SCHOOLS FOR STRATEGIC PLANNING REPORT (2015 - 2016)

- Main challenges hindering education environment in schools: 1) overcrowding, 2) number of shifts, 3) poor physical infrastructure and maintenance, and 4) school ownership.

- MOE defines 1.3 m² per child as a requirement for learning space in classrooms of MOE-owned schools. Only 45% of the classrooms met the standard while 55% of the total number of classrooms had less than 1.3 m² per child. This indicates overcrowding in classrooms is prominent in schools. Solutions for schools with many overcrowded classrooms may include construction of larger-scale classrooms. Construction of a new school could also be considered.

- Among the 746 schools where there are children with special needs, only 15% and 18% of them have latrines and water points, respectively, designed for those children. To help improve access to latrines for children with special needs, upgrading one cubicle to a western latrine seat was suggested. The assessment also revealed that 71% of the schools have no sanitary disposal bins, and 48% of the schools have no waste disposal containers. To improve solid waste management in schools, disposal containers should be supplied to these schools.

- The number of schools that are connected to public waste water networks is very low; 68% of the schools are not connected and the condition of these schools' internal sewage system tends to be poor. To improve the sewage system in schools, it was suggested to connect schools to sewage networks.

- Furthermore, the assessment revealed that the public water supply is not delivered daily and the frequency of water delivery differs by area. Therefore, schools need to have the capacity for storing an adequate amount until the next water delivery. To ensure access to a sufficient quantity of water for students, installation of additional water tanks is recommended.

- The Jordanian minimum student-to-latrine compartment ratio differs by gender: 45 students per seat in girls' schools, 75 students per seat in a boys' schools and 60 students per seat in a mixed school. 35% of the assessed schools, fail to meet these standards. In those schools, the expansion of existing latrines or construction of new latrine blocks is required. Furthermore, the assessment recommended installation of partitions in unsegregated latrines to improve girls' access to segregated latrines in mixed schools.

- The assessment clarified that the unavailability of a playground/yard has two different causes, lack of space and lack of pavement. For those schools where lack of pavement was the cause, the assessment team recommended to construct new playgrounds to improve the school environment. Finally, the assessment team recommended the installation of protection/perimeter walls to improve the security in schools.

USAID JORDAN SKEP PLANNING AND DESIGN GUIDELINES REPORT (OCTOBER 2015)

The purpose of the *SKEP Report* was to facilitate an understanding of the educational spaces required in MOE schools as well as the factors affecting their design and the quality of the environment within and around the buildings.

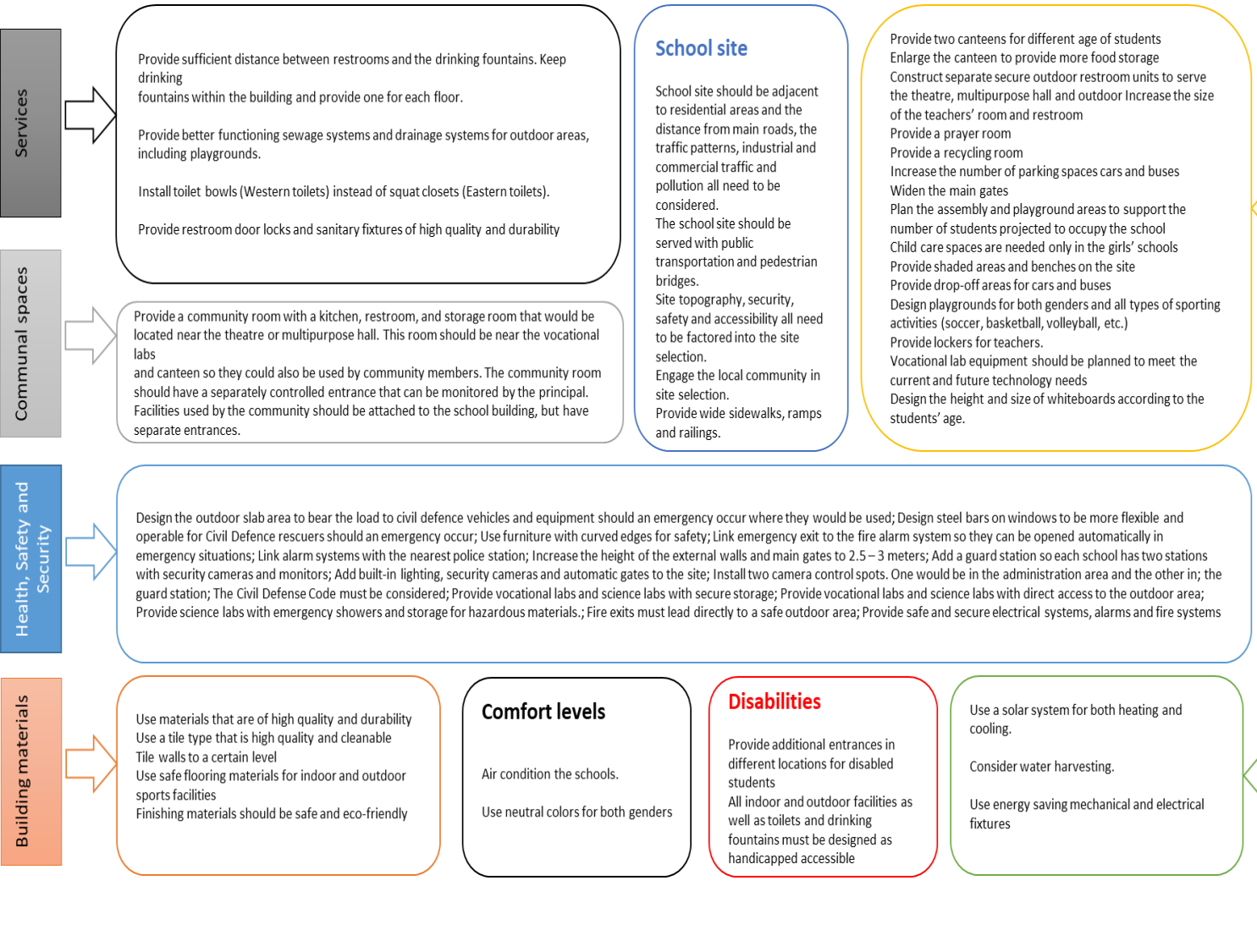
- Proposed updated designs and recommended materials and systems to address the issue of low costs of operations and maintenance (O&M).

- Developed planning and design guidelines for existing school renovations and expansions to facilitate an understanding of the educational environment required in MOE schools as well as the factors affecting the quality of the environment within and around the buildings.

- The proposed guidelines covered: 1) site/facility planning, 2) spaces index, 3) bubble diagrams, 4) space adjacencies, 5) space descriptions, 6) space program table, 7) space data sheets, 8) unitized designs, 9) site hardscapes, 10) exterior walls, 11) interior walls, 12) acoustics, 13) ADA accessibility, and 14) materials and systems.

Stakeholder workshop recommendations were included in the report's guidelines. Some of the most important recommendations are summarized in **Figure 4.**

Figure 4: SKEP Assessment Recommendations to Improve Schools' Design



MADRASATI INITIATIVE FINAL REPORT (2011)

- The Madrasati Initiative sought to pilot a green schools project in one area in order to develop a model for future eco-friendly initiatives.

- To achieve this, they sought simple, cost effective green solutions that were tailored for the specific needs of each school and that cater to the culture of the community.

- These solutions were designed based on the technical assessment which was conducted by Terra Vertis in each selected school. The Madrasati initiative final report (2011) outlines the pilot implementation plan at the three participating public schools in Madaba, Sahaab and Ajloun. **Table 14** shows the overall proposed solutions.

Table 14. Madrasati Initiative Proposed Solutions

Standard	Recommendation
Water Demand	Building a well to act as a reservoir and to harvest rainwater. This system consists of reservoir well that will be used to defer water shortage problems in the school and to collect the rainwater and utilize it for useful purposes. Installation of a grey-water utilization system. This system will consist of a collection scheme that takes the tap water, and water used in cleaning the campus grounds to be used in flushing toilets and irrigating plants. Fixing any leakages in faucets and bathroom on campus.
Energy and Electricity	Suitable renewable energy options were explored and installed for hot water and some heating usages. Energy efficient light bulbs replaced the existing light bulbs in the schools. Use curtains, blinds and thin film on windows to minimize overheating due to sunlight in the summer, and heat loss during winter. Maximize the use of day lighting to decrease the schools' dependence on electric lighting.
Improving Comfort Levels	Installing pergolas in playgrounds to act as a protection from sunlight and rain. Implement drought tolerant and low maintenance landscaping that improve air quality in the school area, improve the schools' visual appearance, and add to the campus' sustainability through programs like grey water utilization, and farm to school. Install fans for ventilation and cooling to improve the air quality in the classrooms and keep the rooms at a healthier temperature during the summer time, and will discharge toxic gases from conventional kerosene heaters like Carbon monoxide from the classrooms. Acoustics; this is a simple cost-effective system that enhances acoustics in small classrooms with many students. It consists of long curved strips of gypsum board to be mounted along the edges of the ceiling. Plant trees in larger hallways.
Behavioral Schemes and Recycling	Recycling schemes to be implemented in the schools based on the 4R's principle: Reduction, Reuse, Recycling and Recovery. These to be enforced for different recyclable materials like water, paper, pens, bottles and cans, organic material…etc. Elect a "Hero of the Environment" from the teachers and the students to enforce such practices.

However, it was reported that:

- Design development of the rainwater harvesting system and the gray water harvesting system was delayed due to the unavailability of site plans for the selected schools.

- The municipality did not offer a recycling program that would support the management of the segregated waste.

- To deal with the organic waste, the Terra Vertis team included a composting program within the social component of the project, allowing the school to manage organic waste on site, and utilize it for fertilization of its own 'Green Zone'.

USAID JORDAN SCHOOLS CONSTRUCTION & REHABILITATION PROGRAM ENVIRONMENTAL REPORTS (AQABA SCHOOLS NOVEMBER 2007, MIDDLE GOVERNORATE SCHOOLS 2007, AND SOUTHERN GOVERNORATE SCHOOLS 2008)

- Recommended a school design environmental plan that includes standard cover design phase at multiple levels.

- Recommended additions to the pre-construction / design planning phase to include in its bidding document some key standards including: 1) health and safety plans that conform with Jordanian Code No. 22 for Public Safety, 2) workers' sanitation, 3) traffic disruption, 4) noise, 5) dust and air pollution, 6) waste generation, 7) water demand, 8) soil and water pollution, 9) water stagnation, and 10) archeological resources.

Moreover, these reports suggested other measures that should be considered during design as shown in **Table 15**.

Table 15. Proposed measures to be considered during design for environmental consideration

Environmental Impact	Proposed Measures
Interaction Between Students	● Design separate facilities for different age groups.
Student Psyche Inside Classroom	● Select stimulating colors for the classroom walls. ● Provide ventilation in the classroom design (such as fans) by utilizing the Jordanian Code No.16 for Natural Ventilation and Jordanian Code No. 30 for Mechanical Ventilation giving preference to natural ventilation whenever possible taking into consideration that windows should be wide enough to allow sunlight to enter but not enough to allow too much heat during the summer. ● Using thermal isolation materials. ● Designing wide windows. ● Include air conditioning wherever possible. ● Provide natural lighting whenever possible in accordance with Jordanian Code No. 17. ● Design trees outside classroom windows whenever possible.
Monitor Student Behavior	● Design supervising staff offices to overlook students' main activity areas.

Traffic During Operation	● Design proper entrances, exists, and parking areas to avoid traffic congestion during picking up and dropping off hours.
Communicable Disease Prevention	● Include a medical examination room in the school design.
Sanitary Facilities	▪ Provide 1 toilet facility for every 40 students, (According to the Nationwide Assessment in Public Schools for Strategic Planning report, MOE standards require minimum 1 toilet facility for every 45 students per seat in girls' schools, 75 students per seat in a boys' schools and 60 students per seat in a mixed school). ● Provide ventilation in toilets in accordance with the Jordanian Code No. 16 for Natural Ventilation and Jordanian Code No. 30 for Mechanical Ventilation. ● Provide Eastern-style toilets which are more easily cleaned and maintained except for kindergartens. ● Adhere to the Jordanian Code No. 19 for Building Sanitation.
Indoor and Outdoor Safety	● Provide naturally shaded areas in the courtyard. ● Design railings along the stairs and edges. ● Whenever applicable prepare the designs for alarm system, fire protection system, and emergency exits using: o Civil Defense conditions for standalone extensions which does not apply in this school. o Jordanian Code No. 15 for Fire Protection o Jordanian Code No. 27 for Fire Alarm Systems o US National Fire Protection Agency (NFPA) 72 National Fire Alarm Code 2007 Edition and o NFPA 101 Life Safety Code 2006 Edition as guidelines
Injury from Car Accidents	● Avoid designing entrances/exits on main roads.
Safety in Workshops and Laboratories	● All electrical installations in the workshop should be designed in accordance with Section 3 on Protection for Safety of the Jordanian Code No. 24 for Electrical Installations if applicable to school scope of work. ● All labs should be located in the ground floor, and provided with an exit to outside, or it will be located near entrances and escape routes for easy evacuation in case of emergency. ● Be located as near to first aid as possible or to the medical examination room. ● Include sinks for students for cleanup and flush in case of exposure to chemicals. ● Poster to demonstrate the meaning of warning signs. ● Be equipped with exhaust fans, smoke detectors, and fire alarms. ● Should have a heavy-duty entrance door for security and safety.

	● The floor finish should be of non-slip material. ● The storage area should have good ventilation to mitigate odors and fumes, and be equipped with fume hood to handle odors and fumes. ● The gas cylinders' closet should be vented and located exterior of the building for safety. ● Have secure and safe storage closets for materials and tools.
Protection from Intruders	● Provide fencing for the school. ● Design a guardhouse at the school entrance. ● Provide surveillance cameras at school entrance.
Provisions for Physically Challenged Students	● Design the facilities in accordance with the Jordanian Code No. 32 for Construction Requirements for the Physically Challenged. ● Provide an elevator-designated place for future MOE consideration.
Earthquake Protection	● Design the facilities in accordance with the Jordanian Code No. 3 for Loads and Forces (Section 4 on Earthquakes).
Utilization of Water for Landscaping	● Select trees that are indigenous to the area and do not require large amounts of water for irrigation.
Water Conservation	● Including a treatment plant. ● Usage of grey water after treatment. ● Collection of rainwater.

For the purpose of summarizing the key challenges of this theme, all the challenges addressed in the reviewed assessments' reports have been examined thoroughly and summarized in **Table 16**.

Table 16. Challenges Related to School Construction Design Standards, Requirements, Design Review, and Approval Process

Code	Challenges	*School Construction and School Expansion 2018*	*USAID SKEP - Planning and Design Guidelines 2015*	*Nationwide Assessment in Public Schools for Strategic Planning 2015-2016*	*Situation Analysis of Children In Jordan 2017*	*Madrasati*	*GOJ Human Resources Development Strategy 2016-2025*
A1	Classroom size and students per classroom	*	*	*	*		*
A2	Classroom seating layout	*	*				

A3	Acoustics especially in public areas such as Canteen	*	*			*	
A4	School entrance size	*	*		*		
A5	Windowless spaces and oddly placed windows	*					
A6	Old building infrastructures			*	*		*
A7	Lack of clean drinking water	*	*		*	*	
A8	Lack of playground				*	*	
A9	Inadequate classroom lighting		*		*	*	
A10	School furniture		*				
A11	Limited spaces to accommodate students during recess, morning assemblies, and entering/exiting the school		*				
A12	Lack of proper sanitary facilities in terms of capacity and number of latrines	*	*	*	*	*	*
A13	School's internal sewage capacity system is weak		*		*	*	
A14	Lack of solid waste management					*	
A15	Lack of consideration of renewable energy and ecosystems		*			*	
A16	Low comfort levels		*			*	
A17	Lack of capacity for storing an adequate amount of water		*	*	*	*	
A18	Lack of security measurers		*			*	
A19	Lack of accessibility of disabilities		*				
A20	Absence of health and safety considerations		*				
A21	Lack of consideration of materials that are of high quality and durability with low operational costs		*				

An indication of importance or priority has been developed by identifying the frequency of specific challenges from the reviewed assessments and reports. Figure 5 illustrates challenges ranking statistics.

Figure 5: Statistical Ranking of Challenges

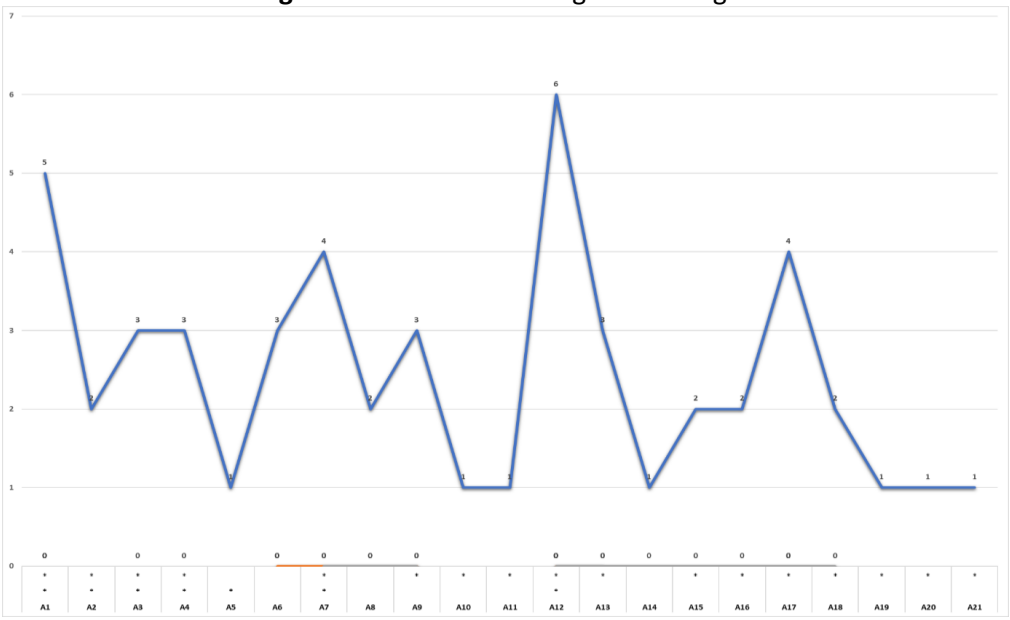


Figure 5 above shows that the top challenges related to school construction design are: 1) lack of proper sanitary facilities in terms of capacity and number of latrines, 2) classroom size and students per classroom, 3) Lack of capacity for storing an adequate amount of water, and 4) lack of clean drinking water.

4.3 CURRENT MPWH DESIGN PROCESS

The following is a typical design review and approval process schedule that illustrates design activities between the MPWH (employer) and the consulting engineer (**Table 17**). The actual number of days to complete each step may differ based size and complexity of project.

Table 17. Stages of the Typical School Design Process (also further detailed in **Annex 4**)

Stage	Description	Illustrative Days
One	● Starts from instruction to start date and lasts till completion of all stage one requirements. ● Review and evaluation of stage one works by the MPWH.	5 2

Two	● Starts from written approval of MPWH on stage one works and includes carrying out revisions and alterations instructed by MPWH on stage one works and the completion of stage two works. ● Review and evaluation of stage two works by the MPWH. ● Starts from date of MPWH's written approval on stage two works and includes carrying out revisions and alterations instructed by MPWH on stage two works and the submittal of two copies of draft final documents. ● Review and evaluation of draft final documents by MPWH.	30 2 10 3
Three	● Presentation of all works design documents by the designer with number of copies as per the particular contract being designed.	3
Summary	● Total Design Period for the Design Firm.	48
	● Review and evaluation of documents by the Employer (MPWH).	7
	● Total agreement duration including MPWH reviews.	55

It should also be noted that:

- At 30% of the MPWH approval of the design, the soil testing is completed so that the structural engineer can begin the design.
- At 60% of the preliminary design, the mechanical and electrical engineers have begun their work. Civil Defense and GAM approval is essential in this stage.
- At 90% of design process completion, the Jordan Engineers Association (JEA) approves the design for seismic and load carrying requirements.

4.4 MAJOR CHALLENGES IDENTIFIED BY ESMP

Based on its review of prior assessments and engagement with relevant local officials and other stakeholders, ESMP has identified major design challenges and linked them to system, policy, and skill gaps as summarized in **Table 18** below.

Table 18. ESMP-Identified Design Challenges

Major Design Challenge	Explanation	System/Policy Gap	Skill Gaps
Design Quality Control	High quality firms assigning junior engineers for design. Design review at MPWH inadequate. Both are a symptom of high demand and adequate staffing.	● Inadequate implementation of policies/ standards. ● Design quality toolbox checklists. ● Staffing shortage at MPWH.	MPWH training on design review. MOE participation.

Land Ownership and Building Permits	• Designer responsibility to gather government information. • Should be a pre-feasibility test by government prior to design.	• Inter-governmental information sharing. • Misaligned responsibilities.	Develop ministry skills to support, facilitate or assume responsibility for intergovernmental documentation requirements.
Lack of Adherence to Design Program and Schedule	• Standard design timelines are often not adhered to. • Primary reason delayed reviews/approvals by MPWH.	Lack of workflow/project management to track design program compliance.	Project management.
Unclear Employer Requirements	Unclear design goals.	Lack of communication collaboration between MOE and MPWH on design goals.	Joint training on employer's requirements.
Multiple Design Standards	International donors v National standards.	Complex systems.	Training on design standards if updated.
Collaboration and Communication	• MOE-MPWH • MOE - Local Communities • Results in disconnect between.	Lack of community/school interaction in the design process.	Communications training on modern communications tools.

4.4.1 DESIGN QUALITY CONTROL

Design quality control is important, as design errors have negative spillover effects on tendering and construction, and poor design and material selection can negatively affect longer term maintenance and operations. Interviewees offered a nuanced view of design quality control. As the GOJ is pushing hard to build classrooms, the organizational capacity of firms and government are stretched. More junior engineers are assuming design duties above their capacity, and government officials responsible for design review are stretched thin.

Interviewees offered possible solutions such as strengthening review standards, developing review checklists and other tools. Interviewees believed joint design review training with MPWH and MOE would be useful.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- Interviewees from the MPWH reported that the local A&E firms' technical capabilities vary within the same category which indicates a deficiency in the current A&E firms' qualification system done by the MPWH.

- Interviewees from the MPWH highlighted the lack of staff to manage the design review and approval process which cause delays and extend the design review process to a month in which it doesn't need more than two weeks.

- Interviewees from the MPWH stated that there is a delay in receiving design submissions. Interviewees cited that the STC frequently submits design submissions for review with little time for the Directorate of Building Studies to conduct a proper review within the assigned period.

- Interviewees from A&E firms highlighted the lack of clear client requirements and the continuous changes during the design phase.

4.4.2 LAND OWNERSHIP AND PERMITS

Clearing land legal issues is a major impediment to the SI process. Interestingly, responsibility for gathering what are, for the most part, government records, falls to A&E firms as part of the design process. Rather than a central government to government contact, various firms employ staff whose primary job is to travel from office to office, seeking to secure records around land ownership and municipal licenses/permits for the school building.

Interviewees offered criticism of the current system. There was also criticism that land and building documentation could put projects on hold indefinitely, at a cost to the firm, and should be sorted out prior to initiating design.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- Check with the competent authorities to obtain registration deeds, land plans, organizational charts, change data and coordinates for plots and ensure that any recent changes or regulatory changes occur on the plots and make sure that the registration deed on behalf of the MOE.

- Check with regulators regarding the modification of the status of use and recoil or unify the plots of land.

- The contract of services transferred responsibility to the consultant to remove the problems of the land during the design phase and not the implementation, but the problem of delay in the implementation of agreements arose because of the delay in obtaining approvals and the duration of reviews, and the problem of ownership of land to the MOE.

- The engineering services contract confirmed some conditions and responsibilities that the engineering offices should work in the design stage such as fixing the land boundaries, obtaining the initial approvals from the municipality concerned on the preliminary plans for the purpose of ratifying the plans and proceeding with the licensing procedures later.

- Interviewees from the MPWH highlighted the lack of MOE involvement in solving issues related to land acquisition and land unification.

- Interviewees from the MPWH highlighted that they issue a formal letter to be used by A&E firms and presented to different governmental bodies to facilitate design process in terms of issuing an updated land deed.

4.4.3 LACK OF ADHERENCE TO THE DESIGN PROGRAM – DEVIATION FROM STANDARD DESIGN TIMELINES

The MPWH offers standard timelines for design work completion, based on size and complexity of the project. In addition to land and permitting issues that bring a design project to a halt, a range of other contributory factors were offered during interviews. Vague initial requirements and subsequent redesign issues were described. There also appeared to be a lack of basic design project management tracking capacity within the MPWH, so that delays were often hard to track and resolve, even as a design plan worked its way through multiple review layers.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- Interviewees from A&E firms highlighted the delay in offering the specific school contract for tendering, this delay is cited as taking up to a few years between the initial study and design, leading to another round of design.

- Interviewees from A&E firms highlighted the lack of clear client requirements and the continuous changes during the design phase, causing delay.

- Interviewees from the MPWH asserted that there are no written processes or instructions for the Directorate of Buildings Studies to follow. The existing process in inherited from former employees' experiences and new manager efforts to enhance the existing process, providing inconsistent processes.

4.4.4 UNCLEAR EMPLOYER (MPWH) REQUIREMENTS

The issue of unclear design requirements was considered a major factor in design delay and contributing to project changes during construction. Considering the path of a school expansion project originating in a governorate, it is easy to understand the challenge. There is no mechanism for a local community to raise concerns about additional school resource needs to the MOE through capital project lists, and the MOE, in turn, may not be clear in their request to MPWH. On a systems level, the lack of uniform design standards complicates the issue further.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- Interviewees from the MOE highlighted the problem of ad-hoc changes to the school type such as changing the school form a girl's school to a boy's school, requiring significant infrastructural changes.

- Interviewees from the MPWH highlighted the lack of clear client requirements that should be prepared by the MOE. In many cases the Directorate of Buildings Studies takes the responsibility of preparing educational requirements based on their experience while it should be customized and tailored by the MOE based on school needs and MOE most current educational needs.

- Interviewees from A&E firms highlighted the lack of clear client requirements and the continuous changes during the design phase.

4.4.5 MULTIPLE DESIGN STANDARDS

The lack of uniform design standards was noted as an important challenge. Interviewees noted that there is considerable variation between projects funded by the GOJ and those funded by international

donors. Moreover, it was noted that there are often country specific design requirements among international donors. While some international standards require more durable materials which facilitate cost-effective operations and maintenance, assessments and interviews also noted that international standards may impose complicated and hard to maintain systems. But design standard variation appears not to be limited to internationally funded projects. Interviewees noted unclear design standards impacting GOJ funded projects as well.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- Interviewees from the MPWH highlighted a difference between school designs that are funded by the MOE and those funded by external donors. Schools funded by the MOE are usually designed to meet the smaller budgets which negatively impacts the school environment quality.

- Interviewees from the MPWH stated that the Directorate of Building Studies is trying to enhance the design process by introducing different codes related to special needs and green buildings. However, the existing team needs training courses to improve their skills to be capable to review designs submitted by A&E firms.

- Interviewees from A&E firms highlighted the failure to adhere to agreed design standards by the employer, and the lack of laws that legally binds all involved parties to do so.

- Interviewees from A&E firms highlighted the lack of information on existing MOE buildings especially when designing extensions.

- Interviewees from A&E firms highlighted the delay in offering the specific school contract for tendering, this delay may amount in up to a few years after the initial study and design, which may require a revisit of the design.

4.4.6 COMMUNICATIONS/COLLABORATION

Communication challenges were frequently cited during interviews. It was noted a source of frustration and delay by nearly every group. Interviewees noted widespread refusal among ministries to use email and electronic documents as a form of official government communication, while most firms rely on email and computer aided design. There is a widespread practice to hold information rather than share between departments or ministries. Interviewees noted that there doesn't appear to anyone in the ministries who is responsible for the overall design process, who has the authority to bring parties together, and require information sharing.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- Interviewees from the MPWH stated that there is a delay in receiving design submittals. Usually the designs are submitted to the STC and are not sent to the Directorate of Buildings Studies until close to the deadline for the period of review. This delay doesn't give the Directorate of Buildings Studies enough time to do a proper design review.

- Interviewees from the MPWH highlighted the lack of communication between different stakeholders. For example, donor design requirements are usually handed over to A&E firms without sending a copy to the Directorate of Buildings Studies to check and verify the inclusion of these requirements during the design review process.

- Interviewees from the MPWH highlighted the lack of communication between the MPWH departments. For example, the National Building Council do not share the new updates regarding

design with concerned departments. The implementation and supervision team don't share VO design related with Directorate of Buildings Studies and doesn't share any feedback on A&E firms' performance.

- Interviewees from the MPWH indicated the lack of communication and coordination between stakeholders. An example is Al-Nahda school which has been designed by the MPWH Directorate of Buildings Studies and kept on shelf due to funding issues. Then it has been designed once again when funds are secured by KFW because there was not sufficient coordination with the Directorate of Buildings Studies.

- Interviewees from the MPWH highlighted that the MOE does not share with the committee the review of the design even though the service contract requires their participation.

- Interviewees from the MPWH highlighted the absence of a focal point and contact person to facilitate urgent issues at the MOE.

- Interviewees from the MPWH clarified that the Directorate of Buildings Studies sends the design review comments by email to the concerned parties and after by letter to expedite the process. A hard copy of these comments is usually kept in their files for records.

4.5 ESMP RECOMMENDATIONS

Table 19 below summarizes ESMP process, policy, and system recommendations, as well as related capacity building options, to the design challenges highlighted.

Table 19. ESMP Design Recommendations

Design Recommendations	Process	Policy	System	Capacity Building
Design Quality Control ● Develop and implement design review policies/standards ● Provide design review toolkit, manual, guidelines, check lists	√ √	√ √	√	Joint MOE / MPWH Training on Design Review
Land Ownership and Building Permits ● GOJ assume greater responsibility for acquiring government permits or provide ministry focal point liaison to link with government counterparts. ● Where possible, develop live data links to developed e-government systems like DLS and GAM	√ √	√ √	√	● Liaison /focal point training ● Data system training
Lack of Adherence to Design Program / Schedule ● Review design process workflow to identify bottlenecks / causes ● Develop a project tracking system to better manage workflow, and identify delays more quickly	√ √	√	√ √	Project management training

Unclear Employers Requirements ● Create a design specification document, to be completed at project inception (MOE or Governorate) that identifies key features/ specifications requested. ● Contractually mandate communication with project initiator (MOE/Governorate) to assure design complies with local preferences and GOJ design requirements.	√	√ √	√	Design requirements training
Collaboration / Communication ● Recognize electronic documents and communications as official form of communication, in compliance with GOJ law and regulation, and set guidelines when official paper letters/documents are required. ● Set policies to require open data sharing between departments and ministries, when they would speed the design process. ● Set policies requiring communication with SI project initiator during the design phase, reducing demand for VOs during construction.		√ √ √	√	Communications training email, document management in the context of Jordanian law

5 SCHOOL PROCUREMENT PHASE – TENDERING PROCESS

5.1 BACKGROUND

The MPWH GTD plays a major role ensuring qualified firms are hired to design, construct, and maintain GOJ schools. The GTD works within the legal framework of Government's Works Regulation No. (71)/1986. GTD is headed by a Director General appointed by the Cabinet and administratively connected directly with the Minister of Public Works and Housing. The Department is a central department and does not have other branches in the Kingdom, employing approximately 80 employees.

A parallel tendering structure exists for USAID projects, called the STC. It is intended to provide more rapid decision making, and it follows similar but not identical procedures. With a focus on long term sustainability, ESMP believes that important lessons can be derived from the STC process, but the project focus should be on standardizing systems and processes followed by GTD.

Tendering is a key step in the SI process. Decisions made on what firms will design and build schools has important follow on effects related to cost, timeliness, and quality, and will impact construction and future utilization.

5.2 GTD

The GTD calls itself an early adopter of electronic management, starting in 1996. Through its e-government program, GTD states that it works to simplify and develop its procedures and expedites the services provided for all partners including the contractors, consultants, government and semi-government institutions, and private institutions. GTD also provides its services through its website (www.gtd.gov.jo) in Arabic and English.

GTD practices the tasks and authorities entrusted to it according to the provisions of the Government's Works Regulation No. (71) for the year 1986 and its amendments, including:

1. Classify contractors and consultants and qualify them to bid on projects in accordance with instructions issued by the Minister.

2. Check and analyze the government work and technical services tenders, compile, store and analyze this information.

3. Administratively support the central tender committees and the Supreme Committee for the Organization of the Construction Sector and any committees and bodies formed for the purpose of organizing this sector.

4. Standardize general and specific conditions for carrying out a contract and technical service agreements, terms of reference, tender procedures, and develop these conditions and procedures according to current laws, regulations and instructions.

5. Publish periodic circulars on the construction sector, prices of construction materials and work items.

5.3 FINDINGS FROM PREVIOUS ASSESSMENTS AND STUDIES

ESMP's review of prior assessments resulted in the following findings with regarding to SI procurement.

USAID HOST COUNTRY CONTRACTING ASSESSMENT REPORT (2018)

This report evaluated the capacity of the MPWH to carry out the different phases of procurement in accordance with the rules set out by the Government Works by-laws and other related regulations for both the GTD and STC. The assessment covered the organizational aspects, staff capability, quality and adequacy of supporting and control systems, and suitability of the laws, rules and regulations applicable to the Ministry.

The assessment concluded that efficient controls and guidelines for GTD activities are designed and in place. Key suggestions for improvement were

1. Strengthening the procurement and payment processes

2. Improving the archive system

The assessment identified opportunities for improvements and recommendations and rated them according to their importance. These recommendations can be classified in four categories, as displayed in **Figure 6** below.

Figure 6: Opportunities for Improvements for GTD and STC

5.4 CURRENT MINISTRY TENDERING PROCESS

5.4.1 GTD ORGANIZATIONAL STRUCTURE

The following are key GTD departments that are particularly relevant to the SI process:

A complete list of departments reporting to the Director General are as are as follows;

- Deputy Director General
- Bidding directorate
- Classification and qualification directorate
- Finance and administration affair directorate
- Electronic management and IT directorate
- VOs and prices alteration directorate

- Engineering contracts
- Central tender committees' secretarial unit
- Legal affairs unit
- Government purchases and international relations unit
- Director general office
- Public relations and media unit

5.4.2 KEY DEPARTMENTS

Key departments related to the SI process include:

- **The Bidding Directorate**
  - Receives the request for the submission of central tenders. Conducts procedures of bidding, i.e. reviewing bidding documents, announcements, issuing the addendums, receiving the bidding guarantee, maintain bid files.

- **The Directorate of the Secretary of the Central Tending Committee**
  - Receives bids of (contractors and consultants) and arranges their offers on time in the tender box.
  - Keeps bids and guarantees of tenderers and handing them over to the technical committee and receiving them after studying and keeping them until the tender is submitted.
  - Prepares a number of correspondence or coordinates meetings with the bidders to request clarifications or commitments in accordance with the decisions of the Central Committee.
  - Prepares the decisions of the assignment, the decisions of re-offering of the tender, decisions of cancellation or correspondence to the Minister.

- **The Government Procurement and International Relations Unit**
  - This unit is established to implement the electronic bidding system, the JONEPS. The unit has provided training to governmental entities to use JONEPS. The JONEPS system will be used in parallel with off-line bidding during a phase in period.
  - Internal control unit, reporting to HE Minister of Public Works and Housing.

- **The Contractor Classification Section**
  - This section is responsible for the contractor classification. Contractors are classified according to a set of criteria so that contractors that allowed to bid on projects have skills that align with the project needs. The section manages the classification process, receiving information from contractors, reviewing information, preparing information for and participating on the classification committee.

- **The Consultant Qualification Section**
  - This section is responsible for the qualification of the consultant firms. Only qualified firms are allowed to bid on government projects.
  - In Jordan there are roughly 1227 consultant firms (for all specialties). Only 58 firms are qualified to bid on tenders issued the GTD.

- **The Engineering Contract Directorate**

- Consolidation of public and private contracts for contracting, technical services agreements, terms of reference and procedures.
- Tender and develop terms and conditions in accordance with applicable laws, regulations, and instructions.
- Development of new contracts commensurate with the required works of design, execution, and delivery of the key.
- Cooperation and coordination of local, Arab, and international bodies in the fields of modernization of construction contracts and contracts.

- **The STC**
  - Formed in 2018 under the Government Works Regulation No. 71 of 1986, and by the request of the donor (USAID or other international donors), although the STC is not a part of the GTD but it takes part in the procurement process for USAID projects, and following the same laws and by-laws as the GTD.

  - The committee members are:
    - The General Secretary the chairman
    - Director of the implementation and maintenance of the buildings of the educational sector
    - Head of Legal Affairs
    - The USAID representative
    - A representative of GTD
    - A representative of MOE
    - A representative of the Audit Bureau

  - The decision of the Committee shall be taken by a majority.
    The USAID procurement is for both local and international bidders, and the international bidder should apply a tender security bid bond, with the Bid Guarantee, but the local bidder should apply only the Bid Guarantee.

  - All the USAID tendering demands pre-qualification for the bidder of the construction contract, and for the A&E firms a technical and financial proposal should apply, and the lowest price does not necessarily win.

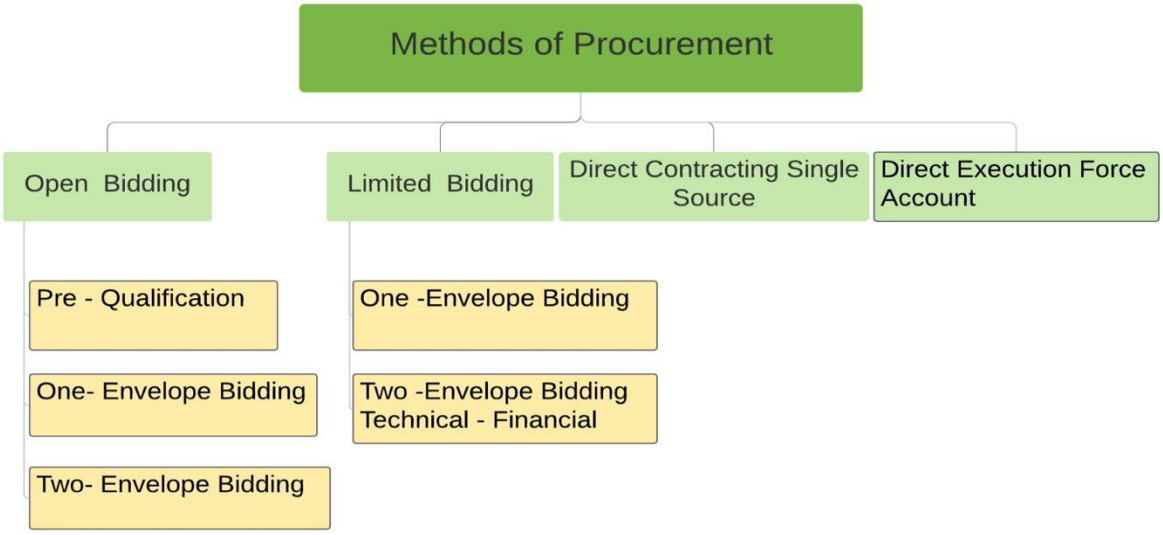
  - For the pre-qualification, an announcement is made in all official newspapers. The pre-qualification process takes about 7-21 days for proposal and about 7-14 days for the committee to study the offers and announce the shortlist for the qualified contractors to submit their financial offers.

  - The contract used for the USAID funded projects is the FIDIC 1987 version, (although there is a newer version 1999 for the international bidding).

5.4.3 OVERVIEW OF THE PROCUREMENT PROCESS

Figure 7 below outlines the several methods of procurement used by GTD. **Annex 5** provides 13 flow charts relating to the procurement cycle and **Annex 6** provides insights into the GTD tendering cycle.

Figure 7: Procurement Methods at GTD



The GTD may deploy one of several procurement processes.

- Open bidding is the most common method of bidding, meaning all contractors and A&E firms, may submit bids. Some tenders require certain qualifications and terms of reference prepared by the GTD. Pre-qualification depends on the kind of bid and the specifications of the project.

- Generally, the Bidding Directorate ensures that bids are advertised in newspapers and the GTD website.

- As per the Government Tenders Instructions of 1986, there should be an adequate period between the announcement of the tender and the time for submitting offers which should be sufficient for the study and preparation of bids, provided that the period of distribution of tender copies shall not be less than seven days. Furthermore, a minimum of seven days should be allowed between the closing date of sale of tender copies and the time for depositing of offers.

- This seven-day period between closing date and depositing offers is also sufficient for clarifying any inquiries by potential bidders. Law requires both the opening of bids and the awarding decision to be made available to the public; this is practiced by GTD and STC where bidder representatives are present during the opening of bids.

- Next, a Technical Committee, consisting of members with expertise in the subject of tender is formed, the Central Tendering Committee, to evaluate technical bids and issue a Technical Report. The Technical Report provided by the Technical Committee contains all information on the evaluation and the reasons behind recommendations made.

- After assessing the technical reports, an awarding decision is made by GTD and endorsed by the Minister then sent to the fund provider for approval (if it is funded by the donors). The timeline for awarding contractors may vary and depends on the scope and complexity of the project.

- Upon receiving all approvals, the contract is signed by both parties in the presence of a witness. For GTD, all documents related to the tendering process, starting with the acquisition request to the awarding decision sent to the Employer, are kept as hard copies in folders and scanned to be kept as soft copies on Oracle.

5.4.4 MOE TENDERING

MOE manages school construction and rehabilitation projects with total estimated cost below JOD 250,00 through the Tender Department in the Directorate of Buildings and International projects.

5.4.5 MOE AND SCHOOL FURNITURE

The MOE is responsible for the procurement of the furniture and equipment for the schools under the supply management law No. 32 – 1993. When school construction progress is between 40% - 65%, the department starts immediately preparing for the procurement of school furniture and equipment.

1. The Tendering Coordinator in the DCU starts the coordination with the Directorate of Planning to identify and determine the estimated number of students and teachers for each school to start preparing for school furnishing procurement.

2. Next, the Studies Section prepares the bill of quantities and specifications for school furniture and equipment. The documents are then reviewed and approved by the Tendering Coordinator.

3. The International Bidding Department then prepares tender documents and announces the tender invitation.

However, when school furniture procurement exceeds JOD 250,000, responsibility is transferred to the General Supplies Department.

5.4.6 PROCUREMENT AND DECENTRALIZATION

Official policy pronouncements allow governorates to directly procure products and services with a value of up to JOD 2 million. However, governorates lack the systems, processes, and financial authorities to implement financial aspects of decentralization. Training has begun in governorates to enable them to fulfill their role in the future.

5.4.7 PROCUREMENT LAW

The new Government Procurement Law No. 28 for the year 2019, was published in the formal newspaper in February. The provisions of this Law shall come into full force at the beginning of November 2019. The law oversees governmental procurements of Goods, Consultant Services, Works, Technical Services, Medical Equipment, and pharmaceuticals.

Key features of the new legislation that will impact SI tendering include:

- Each government entity is obliged to prepare a procurement plan that includes its future needs for a period of not less than one year.

- Some new procurement techniques have been introduced within the new system, such as the use of Reverse Auction method for procurement procedures, with measurable evaluation criteria set in the procurement documents and for those currently in the process of preparing instructions.

- Establishment of a framework agreement of not more than two years under one of the following two contracts:
    - Closed - restricted to pre-qualified firms, with no new contractors allowed to join.

- Opened - Not limited to contractors who have been contracted and allows the joining of a new contractor to submit offers to the procuring entity in accordance with the requirements of procurement documents in any period during the validity of the contract. (Currently in the process of preparing guidance.)

- Use pre-qualification for major, specialized or high-value projects prior to the call for the request of proposals, to determine the shortlist of bidders.

- Establishment of a Ministerial Committee (Procurement Policy Committee) with the following functions:
  - Setting the general policy for procurement and the means of its implementation.
  - Adoption of model documents for tender conditions, general conditions and others.
  - Evaluating the performance of the procuring entities and their compliance with the provisions of this Law.
  - Develop and build human resource capacities in the field of public procurement through the preparation and implementation of targeted strategies and programs.
  - Manage and collect data on procurement processes, analyze and study them, and extract recommendations to improve performance and enable public access to the database.
  - Adopt policies, standards and guidelines for the application of modern ICT procurement entities in procurement processes.

- Increase the financial powers of the procurement committees.

- Except for the Chairmen of the Central Purchasing Committees and the Chairmen of the Special Procurement Committees, the term of membership of any procurement committee under this system shall be two years, renewable for another year.

5.4.8. MAJOR CHALLENGES IDENTIFIED BY ESMP

Based on its review of prior assessments and engagement with relevant local officials and other stakeholders, ESMP has identified major tendering challenges and linked them to system, policy, and skill gaps as summarized in **Table 20** below.

Table 20. ESMP-Identified Tendering Challenges

Tendering Challenges	Description	System /Policy Gap	Skill Gaps
No prior performance built into the Tender System.	A&E and Construction firm performance should be factored into future tendering decisions. Process is reliant on performance review standards, reports, and points scale into process.	Modify selection process to factor in past performance on every tender rather than reacting to poor performance on special case basis. Build contractor performance database.	MPWH training on design review. MOE participation.
Within the Contractor Classification System, there is wide quality variation. The lowest priced bids do not produce the overall highest value but are frequently selected.	The Contractor Classification System assumes comparable quality between firms, yet considerable variation has evolved within classes. So lowest cost decision may not produce best value.	Time pressure limits use of pre-qualified bidders in GTD. Contractor classification system is a poor substitute. Lowest cost bidding does not ensure highest value school construction.	Knowledge of tendering alternatives. Knowledge of options to improve/revise Contractor Classification System.
JONEPS electronic procurement system and new Procurement Law implementation.	These new reforms offer opportunity for substantial improvements if fully implemented by both MPWH and MOE. Korean Government and World Bank currently providing support. Gaps exist in training.	Electronic procurement will close many system gaps. Uniform implementation is critical.	JONEPS skill gaps in MPWH / MOE and with contractors.
Transition to decentralized procurement in Governorates.	Government pronouncements for decentralized procurement and budget implementation need systems support to succeed – important to more responsive school operations/maintenance system.	Major knowledge / system / implementation /authority-responsibility gaps need to be closed before policy aligns with the capacity to implement.	Procurement capacity at governorate level is low.

PAST PERFORMANCE BUILT INTO THE TENDERING SYSTEM

Currently there is no system that collects A&E and construction firm past performance data and does not consider this information for future tenders. There is a little use of a special procedure to remove contractors with unusual performance issues, but neither excellent nor poor performance is a determining factor in the selection process. Interviewees noted this issue with concern, because if cost is the primary factor of evaluation and selection, low quality materials and substandard workmanship is usually cheaper – and therefore more likely to win.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- The classification of the contractors does not consider past performance of the contractors.
- There is a lack of feedback loops between the project's implementation and supervision department, buildings engineering and GTD to inform contractor/consultant performance for future consideration during the tender evaluation process.
- GTD Manager identified as a major priority.

WITHIN CONTRACTOR CLASSIFICATION SYSTEM THERE IS WIDE QUALITY VARIATION

The contractor classification system was noted as an area of concern. Originally seen as a means to increase quality assurance and align contractor skills to project sophistication, many believe that standards have become looser and quality within a classification much more variable. With firm classification used as a proxy for assured quality, most bids defer to lowest cost as the deciding evaluation factor. However, given wide quality variation, lowest cost may not represent best value. And in fact, selection of lesser quality contractors likely increases potential for error in design and construction, leading to higher add-on costs and considerable time delays.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- Interviewees from GTD advised that contractor's capabilities and performance vary dramatically under the same classification. This means that the existing classification system of contractors focus on financial requirements more than technical requirements. However, interviewees from the classification section advised that new instructions for both contractors' classification and consultants' qualification are under review according to the new Government Procurement law.
- Interviewees from GTD advised that there are no criteria for selecting technical committees to evaluate tenders. There is a wide variation in technical ability of the technical committees to judge quality and instead focus primarily on price.
- Usually, the selection of furniture and equipment supplier is based on the lowest price which affects the quality.
- GTD Manager identified as a major priority.

JONEPS ELECTRONIC PROCUREMETN SYSTEM AND NEW PROCUREMENT LAW IMPLEMENTATION

The new Procurement Law, soon to be implemented, and the JONEPS e-procurement system, represent policy and system reforms that offer considerable benefits. As with many reforms, full implementation is critical. The Korean Government and World Bank have led efforts in this regard. The General Supplies Department (GSD) started training the employees of the MOE to use JONEPS for furniture purchases.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- GTD Manager identified as a major priority
- GSD Manager identified as a major priority

DECENTRALIZED PROCUREMETN TO GOVERNORATES

The decentralization process is evolving in Jordan. As capital project allocation decisions move to governorates, the governorates want to be in control of the movement of funds. If Jordan wishes to move forward with decentralization, administrative skills and systems need to be established. Uniform tendering laws, policies, procedures and systems should apply at all levels, including tendering for school related projects, products, and services.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- Interviewees from GTD informed that the decentralization process is new and an unfamiliar process and requires time and effort to empower and train governorate councils to properly manage tenders.

5.4.9. ESMP RECOMMENDATIONS

Table 21 below summarizes ESMP process, policy, and system recommendations, as well as related capacity building options, to address the tendering challenges highlighted.

Table 21. ESMP Tendering Recommendations

Tendering Recommendations	Process	Policy	System	Capacity Building
Build prior performance ratings into tendering system to assure quality ● Revise scoring process as new procurement law is being implemented. ● Develop contractor review system and develop database.	√ √	√ √	√	● Tender review training (generally). ● Training on rating system.
Review and Revise the Contractor Classification System ● Review factors determining classification scoring. ● Review process to ensure classification accuracy. ● Use performance data for recertification.	√ √ √	√ √ √	√ √	● Liaison /focal point training. ● Data system training.

JONEPS and Procurement Law Implementation ● Work with GOJ to identify implementation gaps in SI sphere. ● Deliver targeted JONEPS training to identified stakeholder groups. ● Work with Engineers and Contractor Associations to deliver workshops on new Procurement Law.	√ √ √	√	√ √	JONEPS and Procurement Law training.
Procurement in Governorates ● Work with GOJ to extend JONEPS / Procurement Law training to governorates, as deemed appropriate.	√	√	√	Joint training with MOE MPWH FD.

6 SCHOOL CONSTRUCTION PHASE – MANAGEMENT, SUPERVISION, AND HANDOVER

6.1. BACKGROUND

The actual building process is the result of good planning, accurate tendering, and accurate design. Construction management, supervision, and handover are the responsibility of the MPWH's Implementation and Maintenance of the Buildings of the Educational Sector Directorate. MPWH will select a contractor and supervising engineer who together are responsible for delivering a final project that meets contractual design requirements and complies with health, safety, and environmental standards.

During the school construction stage, major challenges are quality assurance, VOs, site related issues, and timely approvals and payments. Each of these issues represent possible delays and added costs.

6.2. FINDINGS FROM PREVIOUS ASSESSMENTS AND STUDIES

There are very few prior assessments that focus on the evaluation of the construction management and supervision of school constructions in Jordan. One of the few assessments is the Education Assessment - School Construction and School Expansion issued in 2018 that stressed the MOE role in supervising construction/expansion activities and instituting regular reporting requirements from each field directorate in order to compile updates and lessons learned on construction/expansion activities.

USAID Jordan Schools Construction & Rehabilitation Program Environmental Assessment Reports (Aqaba Schools November 2007, Middle Governorates Schools 2007, and Southern Governorates Schools 2008) reports have suggested recommendations to be considered during the construction, expansion, and renovation phase as shown in **Table 22**.

Table 22. Recommendations to Be Considered During Construction Phase

Environmental Impact/Issue	Measures
Health and Safety	Prepare and abide by a Health & Safety Plan that includes the relevant measures described in Jordanian Code No. 22 for Public Safety during Construction. ● Proper signage in accordance with Section 1. ● Provision of firefighting measures in accordance with Section 2/5. ● Provide temporary electrical connections in accordance with Section 2/12; all openings and edges should be provided with guard rails and toe boards in accordance with Section 2/13. ● Proper storage of materials in accordance with Section 3/3. ● Safety measures during demolition works in accordance with Section 4/7. ● Safety measures according to type of equipment in accordance with Section 5. ● Personal safety during work in accordance with Section 6. ● Provide medical services in accordance with Section 2/4 of the Code which includes medical examination for all workers, first aid kit and personnel, and keeping logs of all medical records. ● Appoint accident prevention officer at the site (Item 34 of the FIDIC 1987). ● Train all construction staff on Health & Safety Plan. Provide fencing around the construction site at all times.
Workers' Sanitation	Provide on-site: ● One sanitary facility (1 toilet with shower, 1 washing basin, 1 urinal) per 25 workers in accordance with Section 2/2 of Code No. 22. ● Sanitary facilities to be covered, easily accessible, ventilated, well lit, maintained, and sanitized. Safe drinking water in accordance with Jordanian specifications distributed by pipes that are at least 2 meters away from any contaminated water source in accordance with Section 2/3 of Code No. 22.
Traffic Disruption	● Limit the use of vehicles to the site and avoid unnecessary trips. Set up and abide by a time schedule for transporting material with the purpose of avoiding traffic congestion.
Noise	● Abide by the time and noise limits specified in the Instructions for Controlling and Preventing Noise for 2003. ● Abide by noise limits for workers set out in Section 2/9 of Code No. 22, including providing workers with protection equipment whenever necessary.
Dust and Air Pollution	● Provide ventilation in accordance with Section 2/8 of Code No. 22. ● Abide by safety measures during painting works in accordance with Section 4/9 of Code No. 22 (4/9/2 for Lead-based paint, 4/9/3 for unsaturated polyesters, 4/9/4 for spray painting, and 4/9/5 for airless spray paints). ● Avoid use of lead-based paint. ● Water the ground when extremely windy.

	● Mix material in an enclosed space. ● Cover material when transporting in accordance with 3/2 of Code No. 22. ● Prohibit open burning.
Water Demand	Commit to minimizing the use of water during construction works.
Soil and Water Pollution	● Minimize soil exposure time during construction. Minimize the use of chemicals such as lubricants, solvents, and petroleum products.
Water Stagnation	● Ensure that the construction site is well kept and avoid water spillage.
Waste Generation	● Prepare a waste management plan. Dispose of solid and liquid waste regularly and in accordance with the Solid Waste Management Bylaw (No. 27 for 2005) and Jordanian Code No. 21 for Solid Waste.
Archaeological Resources	Any suspected archaeological findings during construction, Supervision Consultant, Client and the Department of Antiquities should be immediately informed (Item 27.1 in the FIDIC 1987).

The assessment of school construction management throughout the previously conducted assessments was too limited as the majority of the previous assessments were conducted during the operation and maintenance phase. Therefore, both MOE and MPWH shall work collectively on preparing an administrator guide to school construction projects wherein MOE and MPWH roles are clearly activated and identified from the very early stage of construction.

The level and nature of supervision required should be determined as an outcome of the MOE's management arrangements for the project and from the risk assessments carried out by contractors and others. It is not sufficient to stipulate that "supervision will be provided" without specifying the detail of that provision. The MOE's arrangements for managing the project and the risk assessments for the project should stipulate the level and nature of the supervision required. Questions such as who will supervise, how supervision will take place, how much is required and when need to be considered.

Findings from interviews analysis highlighted key issues that can be summarized as follows:

1. Significant delays during the construction implementation which affects the scheduled handover date and the start date of school operation which creates complications that MOE must deal with to find ad-hoc solutions.

2. Lack of clear written agreed construction progress. Current procedure is what MPWH are used to although it sometimes clashes with clear FIDIC and contract documents.

3. Lack of proper project controlling measures in term of controlling time, cost and quality.

4. Lack of capacity and capability to manage school construction close-out and handover process.

5. Lack of capacity and capability to manage interim payments, valuations, VOs, and claims.

6.3. SCHOOL CONSTRUCTION PROCESS, ROLES, AND RESPONSIBILITIES

6.3.1 GENERAL ROLES AND RESPONSIBILITIES

MPWH

The Implementation and Maintenance of the Buildings of the Educational Sector Directorate is responsible for supervision of the implementation of the school construction, and its responsibilities are:

- Appointing the designer, contractor and the supervising engineer, through the tendering process.
- Acting as the Employer on behalf of the MOE (Owner).
- Generally supervising the construction project throughout its cycle from start to end, with clearly defined roles and responsibilities as defined in FIDIC, and special contract conditions.
- Overall approval of payment requests of financial project matters.
- Liaising between the contractor/supervising engineer and the MOE with regards any MOE related issues, including; land issues, VOs, handover, financial or management requests by MOE during construction phase.
- Issuing progress reports to MOE.
- Nominate MPWH members for the final handover committee and serve on the committee.
- Handing over the finished project (Keys to school etc.) to MOE.

MOE

- Receives progress reports and liaises with MPWH on any operational issues that are beyond the scope of MPWH, and that are missed in planning, design or tender stages, such as land issues.
- Participate in the VO process under certain conditions.
- Payment of utilities supply like electricity, which were not allowed for in contract documents at tender stages and resolving any associated major issues.
- Participating with final handover committee.

The Contractor

- Employ efficient and competent construction team and construction operatives to ensure good quality project completion on time and within the contract requirements.
- Manage day to day issues of construction, including; programing, materials purchases, gaining consultant engineers approval, quality control, health, safety and environmental issues, etc.
- Maintain legal and contractual control of project site within the defined site boundaries.
- Fulfill of all contractual obligations as stipulated in FIDIC and special contract documents.

The Supervising Engineer Firm – generally A&E firms

- Responsible for ensuring implementation / compliance of contractors' quality, health, safety and environmental policies and procedures.

- Approve the contractor's baseline, insurance policies etc.
- Supervise and check the contractor's valuations/bills ensuring they are compatible with Bill of Quantity (BOQ) and other contract documents.
- Approve contractor workshop drawings, materials submittals, request for inspection (foundations, building skeleton, finishes, mechanical and electrical installations etc. and carrying out physical inspection of same prior to approving work for implementation.
- Monitor and evaluate the contractor site progress through detailed mark up of contractor's base line program and regular site meetings.
- Respond to contractors' requests for VOs; ensuring need, quality control, compliance with contract documents, costs analysis, and an engineering recommendation is advised to MPWH accordingly.
- Respond to MPWH VOs requests in a timely manner.
- Instruct contractor in writing of all VOs approved by MPWH.
- Respond to contractors' delay letters and advise MPWH of details (no approval of any delays and costs without prior written agreement of MPWH) as per Contract Documents.
- Issue official letter to employer with regards to VOs recommendations or otherwise.
- Issue periodic reports on quality, site progress and other items as stipulated in the contract conditions to MPWH and respond to its requests and instructions accordingly.
- Participate in hand over procedure and committee as required by contract documents.
- Issue practical completion certificate to contractor upon successful project completion.

The Designer

- Resolve any major issues during construction phase; like faulty design, missing details, comments on late soil report and changing design to suit, if required.
- Provide supervising engineer and employer with background design information as and when required.
- Assist in forming a decision when major VOs is needed by the project nature or later requested by the MOE.

6.3.2 CURRENT CONSTRUCTION PROCESS

The MPWH construction process (**Figure 8** and detailed further in **Annex 7**) follows an industry recognized set of contract implementation standards for the construction and engineering industry set by the international federation of consulting engineers, Fédération Internationale Des Ingénieurs-Conseils (FIDIC). The FIDIC standard is used in more than 60 countries.

With FIDIC, a standard MPWH contract may include project specific additions or deletions. Generally, however, the school construction project process is as follows:

- The contractor is officially handed over the project site by the appointed Engineer (Supervising).
- The contractor is given written instruction to start on site, within two weeks signing the contract (FIDIC), by the appointed Engineer (FIDIC), or the MPWH in special contract additional documents (current practice).
- The contractor is issued signed and stamped official contract drawings and documents by the employer (the MPWH).
- The contractor starts on site supervised by the external supervision team or direct supervision from MPWH engineers.
- The contractor ensures that the existing ground topography is verified and recorded by the Engineer and the MPWH prior to any excavation.
- The contract documents, specifications and BOQ detail all items requiring special tests and approval during different construction phases.
- The contractor issues the proposed lab testing firm for approval by the Engineer who seeks MPWH approval prior to providing confirmation to the contractor.
- The contractor forwards a list of his proposed staffing for approval by the Engineer, who seeks MPWH approval prior to providing confirmation to the contractor.
- The contractor issues base line (work program), and a quality and H, S &E (Health, Safety and Environment) Plan for approval, by the Engineer.
- The contractor issues insurance proposals as requested by contract documents for approval by the Engineer, who seeks MPWH approval prior to providing confirmation to the Engineer
- After project start, the contractor marks up the approved base line, showing actual progress periodically. TheEngineers check and verifies any issues with its periodic report to MPWH.
- The contractor seeks information required from the Engineer as and when they arise.
- The contractor issues workshop drawings for the Engineer's approval, within the specified contract agreement period.
- The contractor issues materials submittal for engineer's approval as per contract documents, within the specified contract agreement period.
- The contractor is to timely respond to Engineers' requests / instructions.
- The contractor is to provide timely advise to the Engineer with regards to costs and technical proposals for any possible VOs. The Engineer is to notify the MPWH and seek approval, as per current contract documents and the responsibility and authority delegated to the Engineer.
- The contractor is to notify the Engineer with any possible delays or financial claims as and when they arise in accordance with contract documents. The Engineer must notify the MPWH accordingly (and

confirm MPWH's detailed recommendation, as the Engineer does not have authority to approve the same).

The contractor is to submit valuation for payment for the Engineer's verification and approval, with values equal or higher than the minimum required by the contract documents. The MPWH then carries out final detailed checks on quantities and valuation requirements

- The contractor then issues an official letter to the Engineer advising of substantial completion. After doing a site visit and conducting a detailed inspection, the Engineer provides a detailed snagging list of issues and provides a recommendation to the MPWH.

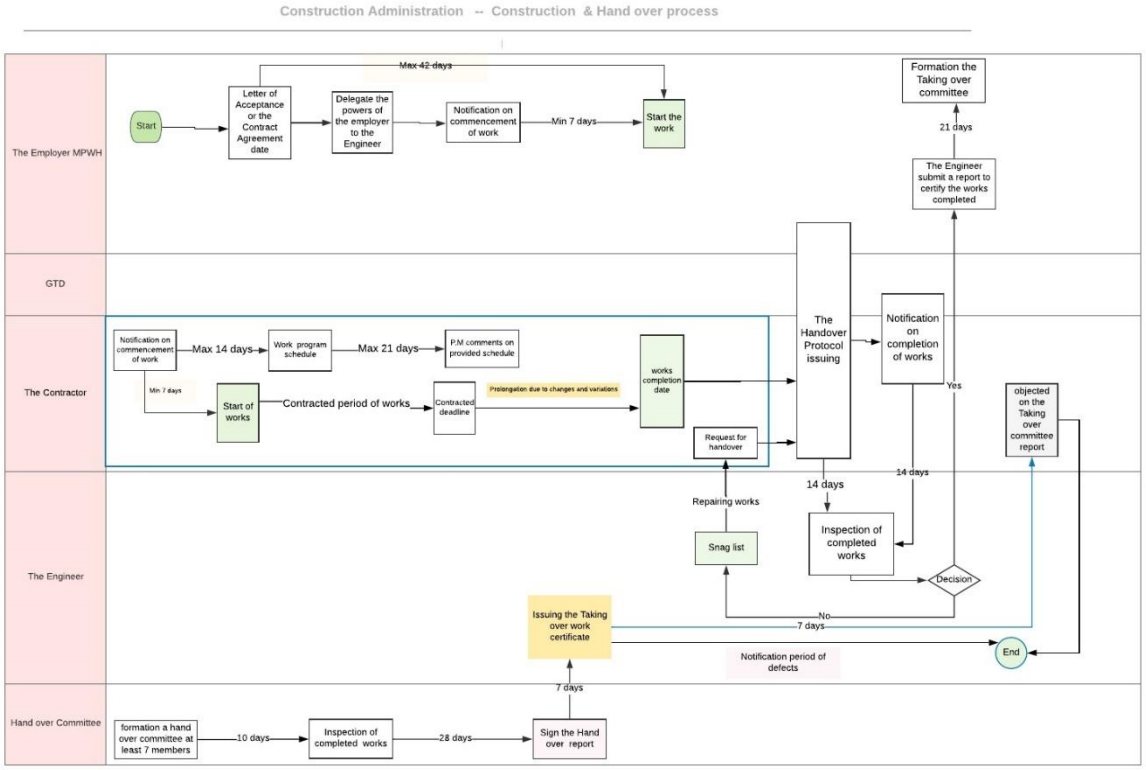
- The Supervising Engineer participates in a hand over committee usually named by the Minister of the MPWH.

- The duration of this hand over process is usually in accordance with FIDIC guidelines but may be affected by special conditions.

- Upon completion of the hand over procedure, the Engineer issues a hand over certificate to the contractor.

The contractor then issues as-built drawings at the end of the contract, which the Engineer checks. After review, the Engineer provides approval documents to the MPWH.

Figure 8: Construction and Handover Process



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6.4. MAJOR CHALLENGES IDENTIFIED BY ESMP

Based on its review of prior assessments and engagement with relevant local officials and other stakeholders, ESMP has identified major construction management challenges and linked them to system, policy, and skill gaps as summarized in the table below (**Table 23**).

Table 23. ESMP-Identified Construction Management Challenges

Major Challenge Construction Management	Description	System/Policy Gap	Skill Gaps
Inadequate Building Standards Enforcement / Quality Control	A&E and Construction firm performance should be factored into future tendering decisions. Process is reliant on performance review standards, reports, and points scale into process.	Inadequate implementation of policies/ standards. Design quality toolbox checklists. Staffing shortage at MPWH.	MPWH training on design review. MOE participation.
Improved project management system to track implementation	The Contractor Classification System assumes comparable quality between firms,	Inter-governmental information sharing. Misaligned responsibilities.	Develop ministry skills to support, facilitate or assume responsibility for intergovernmental

progress among all SI projects. Enforce and report project "Baseline" implementation timeline.	yet considerable variation has evolved within classes. So the lowest cost decision may not produce best value.		documentation requirements.
The handover process is not organized or streamlined and is a source of major delays.	The process from committee request, Minister approval, committee formation and meeting/approval can take several months. FIDIC (34 day) time limit standard not enforced.	Lack of communication and collaboration between the MOE and the MPWH on design goals.	Joint training on employer's requirements.
VOs a major source of time delay.	The approval process for making changes in a project is burdensome and slow.	Unclear tracking. Policy changes to bundle VOs may exacerbate issues.	Process / workflow improvements. VO tracking system. Troubleshooting authority.
Government Payments/ Arrears.	Government payment delays lead to work slowdowns. Interviewees describe how GOJ project time/ payment risks result in higher cost bids.	Improved cashflow planning to compensate for MOF disbursement delays.	Better financial planning.

6.4.1 BUILDING STANDARDS ENFORCEMENT/QUALITY CONTROL

In discussions with key stakeholders across all sectors, the need for better on-site quality control and reporting was a consistent theme. Monitoring and oversight are critical to addressing problems early and creating a compliance culture, yet unfortunately, staff and budget shortages lead to spotty oversight. Poor quality control can lead to corrective delays or reduced building life, hidden costs that come due later in the school life cycle. Quality control and contractor quality assessments are key factors to incorporate into past performance assessments for future tendering.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- Consistent and continuous site supervision during construction works are needed.
- Higher level presence (e.g. field engineer/supervisor) during construction of critical elements, e.g. foundation, structural, etc.
- On and off-site testing of materials to confirm compliance with specifications, etc.
- Daily reporting on construction, confirming adherence to scope and specs, etc.

- Interviewees from the MPWH - directorate of the implementation and maintenance of the buildings of the educational sector claimed that the shortage of current staff is not allowing them to plan for regular field visits to follow up on the implementation of school constructions. Field visits are usually conducted based on the availability of the staff.

- There is a lack of proper evaluation for the Engineer/Contractors' performance.

6.4.2 PROJECT MANAGEMENT

The GOJ is undertaking an aggressive campaign to build and maintain a modern education infrastructure. Staff and budgetary resources to achieve this goal are stretched thin. Data and systems are critical to effective management. The GOJ has many systems in place: mature financial systems track payments and a projected implementation timeline contained in contracts, called the baseline. Although these systems exist, enforcement and overall use are not consistent. By combining regular progress with financial data, stronger project management oversight can be developed. Contractors and government officials generally welcome such a system.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- Daily reporting on construction, confirming adherence to scope and specs, etc.

- The need to deploy a comprehensive electronic enterprise resource planning and document management system for proposed effective monitoring routines linked to executive dashboards, to alert about delays in project process, risk in budget allocation, risks of information documentation, and delays in providing response to pending issues.

- There is a lack of proper documentation/information management system (knowledge management system) that tracks documents and resolves pending issues up. This has also been commented on and raised as major concern for contractors, A&E and designers as cause for delays in decision on behalf of MPWH.

- The local A&E firms and MPWH lack these required project management technical skills which affects the whole construction management process and cause delays.

6.4.3 HANDOVER PROCESS: SOURCE OF MAJOR DELAYS

The handover process is the stage where the contractor and the MPWH hand the completed project over to the MOE. The handover implies that except for items identified at handover, the project is completed and ready for occupancy. The notification, ministerial approval for and nomination of a committee, and organizing the handover meeting unfortunately can take several months.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- The handover process can take several months and multiple site visits by supervising firm.

- Slow handover negatively affects the warranty period and weakens the MOE's ability to control contractor defects.

- During the project close-out and handover process, forming committees can take a long time between the MPWH and the MOE. Following up on the implementation of the defects detected during the first inspection of the handover process also extends this process. In the most current

practice, the MPWH agreed with USAID - due to lack of resources- to be involved in the first inspection of the handover. Subsequent follow up will be the responsibility of the A&E firm until the certificate of practical completion is issued

- The seven-person committee, combining central government and local stakeholders, is often very difficult to collectively organize, especially far from Amman. This often leads to substantial delays in handing the school over to the MOE for use.

6.4.4 VOS ARE A MAJOR SOURCE OF TIME DELAY

The VO process can be the result of several factors: design errors, customer/donor requests, inadequate communication during design, unexpected conditions, etc. The approval process is multi-layered and often slow.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- Reduce the number of VOs by applying better oversight techniques of design changes during construction due to continuous client/donor changes.

- Assign a time span to reduce the late responses to claims, VOs, RFIs, etc.

- In an effort to address the frequency of VOs per project, a recent practice is to bundle all VOs for one project and issue an approval for all requests at one time. Interviews provided feedback that this change increases total VO processing time and adds to delay.

- Justified VOs are allowed, as per Section 7 Articles 22-a of Law No. (71) of 1986 the Law of Governmental Works, such that, Articles 22-b to 22-d give the authority for the Client to approve VOs as deemed necessary.

6.4.5 DELAYED PAYMENTS/DECISION MAKING

While many aspects of SI improvement are focused on A&E and construction firms, contractors maintained a constant theme of slow government decision-making and payment. Informally, contractors noted that they had grown to expect time and payment delays, that shift costs onto the contractor. To manage the risk, contractors build a government cost premium, meaning bids for government work are higher than comparable private sector projects, to cover anticipated delays and late payments.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, A&E, AND CONSTRUCTION FIRMS

- Reduce the time of late payments due to budget misallocation procedures or bureaucracy.

- Slow response of engineer and supervision to claims, variations, payments and other requests by contractors.

6.5. ESMP RECOMMENDATIONS

Table 24 summarizes ESMP process, policy, and system recommendations, as well as related capacity building options, to address the school construction challenges highlighted.

Table 24. ESMP School Construction Recommendations

Construction Management Recommendations	Process	Policy	System	Capacity Building
Building Standards Enforcement / Quality Control ● Continuous site supervision during construction, with higher level presence during critical elements, i.e. foundation, structural. ● On and off-site testing of materials to confirm compliance with specifications. ● Daily reporting on construction to confirm adherence to scope, specs, baseline. ● Contractor evaluation at handover.	√ √ √ √	√ √ √ √	√ √ √	● Quality training. ● Site supervision training. ● Reporting skills.
Project Management ● Enforce contractor "baseline" plan of project implementation and use as the foundation of weekly progress reports to MPWH. ● Develop a low-cost option to track projects as a project management prototype, linked to the payment system. ● Explore other project management systems used within GOJ through MOICT and explore transferability, and/or other donor project management efforts for support.	√ √	√ √ √	√ √	● Project management training. ● Data management and document management training.
Handover ● Review design handover workflow with the MPWH/MOE to identify bottlenecks / causes. ● Develop an improved process for Ministry approval / implementation.	√ √	√	√ √	● Project scheduling training. ● Any technology adopted (e.g., Google Calendar).
VOS ● Review AND design variation workflow with the MPWH to identify bottlenecks/causes, and work with the MPWH on recent proposed changes.	√	√	√	VO change training.
Payments / Decision Making ● Develop a key stakeholder team to identify reasons for late payments including documentation issues, approval workflows, coordination with MOF, etc., to time savings and increased payment timeliness		√	√	TBD

7 SCHOOL OPERATION AND MAINTENANCE PHASE

7.1. BACKGROUND

Physical facilities are vital in the learning process of educational institutions. Governments as well as other stakeholders invest heavily in them. It is therefore necessary that there is proper maintenance of these facilities to reduce reoccurring costs in education which remain a hindrance to learners' participation. There are three main approaches to provide proper maintenance:

- Day-to-day: providing ongoing maintenance to ensure that schools operate as intended and support the continued delivery of education.
- Annual preventive maintenance plan: managing and delivering the maintenance works and improvements that have been highlighted in the long-term plan.
- Long term maintenance planning: considering future maintenance needs and budgeting priorities for schools.

For the MOE, planning for school maintenance has been considered a key challenge for several years. This is partly due to lack of data needed to develop informed maintenance plans, and due to increased utilization of infrastructure caused by the population growth.

In 2018, the students in public schools reached about 1.38 million, taught by approximately 87,000 teachers in 3,835 schools; 373 double shift schools were operated, of which 204 were targeted for around 130,000 Syrian students.

The ministries commissioned several new schools to reduce the number of double shift schools, keep up with enrollment and decrease the number of rented schools, which amounts to 21% of the public schools. However, wear and tear began to show on these schools because they were used beyond their designed capacity.

Accordingly, the MOE need to proactively develop and implement a plan for school facilities maintenance. Such aplan would help to ensure that school facilities are, and will be, cared for appropriately.

7.2. FINDINGS FROM PREVIOUS ASSESSMENTS AND STUDIES

According to the *Education Assessment for School Construction and School Expansion in 2018,* the causes of maintenance issues varied across all schools, however, the two most commonly cited issues affecting equipment and facilities were the misuse or quality of construction and the quality of the materials used.

The *MOE - Education Strategic Plan (ESP) 2018-2022,* issued in 2018, emphasized the urgent maintenance that many schools need. The report underscored the belief that improving the school environment is feasible so long as necessary comprehensive and corrective maintenance actions are taken. This will require activating the role of school maintenance committees, comprised of students and community members in the schools where preventive maintenance programs are implemented. The report also stressed the MOE's intention to address the heating problems identified inside the classrooms by installing air conditioning systems and heating solar systems in schools throughout the country.

The USAID Report on Education Assessment: School Construction and School Expansion (2018) concluded that the poor construction quality or quality of materials causes maintenance issues, e.g. window glass falling on its own, marble finishes/trimming on windows or staircases failing, door handles falling off with the slightest touch and toilets breaking after a few uses through no fault of user.

Situation Analysis of Children in Jordan Report (2017) correlated underutilization and the lack of proper facilities and building maintenance. Several underutilized schools seem to have limited financial resources for adequate school maintenance, learning resources, and materials to ensure good teaching and learning outcomes.

Findings and Observations of the Improving Learning Environments in Jordanian Public Schools' Report (2017) reported 27% of schools had poor infrastructure (i.e. lack of basic toilet facilities, running water, heating/cooling facilities, library, lab, etc.). In addition, most assessment reports emphasized the poor quality of the infrastructure inside the school buildings: broken, soiled, windows and faded walls; dirty and unusable toilets, etc. The connected issue of cleanliness in the classrooms was repeatedly highlighted in different assessment reports, emphasizing the insufficient number of cleaners operating in schools.

The JEN Jordan School Physical Assessment - Nationwide Assessment in Public Schools for Strategic Planning (2015-2016) identified the main elements of rehabilitation work as follows: replacement/maintenance of eastern-style latrine seats, tiles, lights, doors, water tanks, wastewater network and wall painting. The report further noted that:

- Over 929 schools, 25% surveyed, were classified as falling below the minimum standards and have maintenance issues including possible unusable/broken/damaged latrine.

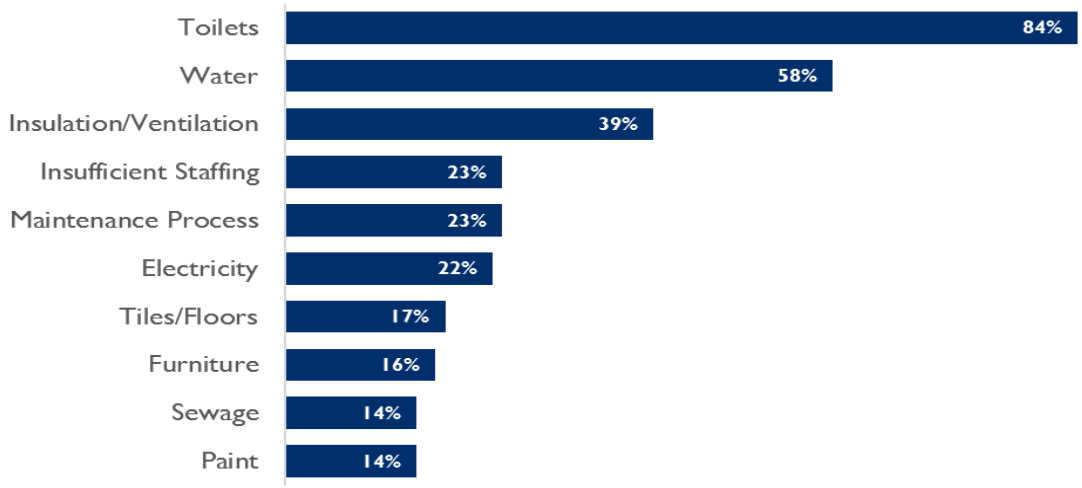
- There were several cases of schools where water taps were in poor condition or not available. The report also correlated the availability of security measures and the conditions of school facilities. When correlating school latrine conditions and security measures, fewer schools without a guard and a fence maintain latrines in good condition. Enhancing school security could also contribute to the maintenance of school facilities.

- There is a need for increasing hygiene awareness to lower the maintenance cost of school facilities. The assessment revealed that the inadequacy of latrine seats in public schools is caused not only by the shortage of latrine seats but also by a large number of damaged latrine seats. The cost to rehabilitate one seat is around one fifth of the cost of constructinga new latrine; therefore, maintenance should be conducted periodically in public schools to avoid more costly replacement. Moreover, the assessment revealed that some schools claimed that they had no budgets for purchasing soap which indicates that a schools' facility operational budget should be considered.

The Jordan STEM Education Landscape (2017), a report for the British Council, highlighted the importance of operation and maintenance budget allocation for vocational training and education centers. Infrastructure (physical and educational) for students needs to be upgraded and maintained.

The *Education Assessment: School Construction and School Expansion (2018)* ranked the top maintenance issues as shown in **Figure 9** and discussed below:

Figure 9: Top Maintenance Issues, as Ranked by the *Education Assessment: School Construction and School Expansion (2018)*



Toilets: issues with toilets include misuse by students due to unfamiliarity with equipment, clogged pipes due to backed up sewage, lack of water to clean or wash afterwards, improper location of toilets (e.g. toilets are located in areas where wind carries smells throughout the school).

Water: water was often cited as not available for washing away waste or hands after toilet use, filtered drinking water is not available and students often have to bring their own drinking water from home or buy bottled water from the store. Other issues include water leakage in bathrooms from various sourced, included but not limited to water fountains, electrical sockets, and through the floors.

Insulation/Ventilation: schools tend to be too cold in the winter or too hot in the summer. Most schools use gas heaters during the winter to keep warm which they note is a health/safety risk. Teachers and students both note that while these are causes of concern, they would rather be warm. During the summer months, classrooms tend to be too hot with little ventilation, something that is not mitigated by opening the windows or keeping fans in the room. Schools that have been equipped with air conditioners often find them broken or needing frequent maintenance. There is very little capacity to fix them, or the air conditioners themselves are insufficient in cooling the rooms due to the over occupied classrooms. Schools that have been equipped with fans also face similar dilemmas. The fans need constant maintenance and are often insufficient in classrooms that are overcrowded.

Insufficient Cleaning Staff: the lack of maintenance is often a result of an insufficient number of cleaning staff.

Maintenance Process: the process if often delayed due to the lack of a timely response from officials in addressing maintenance requests that have been submitted.

Electricity: electrical issues such as misaligned cords impact the equipment's working condition and safety.

Difficult to Clean Tiles/Floors: the floor tiles in place are difficult to clean and look dirty even after they've been cleaned.

Furniture: furniture, including desks and chairs, often break due to their poor quality and lack of comfort and light plastic chairs with small metal frames often break under the weight of the students. The desks and chairs are not stable and move from side to side which can cause disturbances while in the classroom. The desks and chairs also do not have storage space for students and as a result, students have to carry their belongings everywhere they go.

Plumbing or Sewage System: schools often face issues with sewage systems such as waste blockage, waste overflow, smell, and insufficient water drainage. Common issues that respondents from schools spoke about related to toilets and sewage issues.

Paint: the paint used in schools gets dirty very easily and walls often need to be repainted. In addition, there is a risk that paint will fall on students due to humidity.

The strategic report that has been prepared by GIZ for school facilities management in 2019 reported the following key challenges:

- **Increasing Demand on Education**: increased by 15.7% between 2011 and 2017 (from 1.15 M to 1.34 M students) mainly because of normal population growth, students transferring from private schools and the enrollment of Syrian students. The MOE had to implement the temporary action of renting private buildings (2016-2017: 139,802 students are in rented school buildings and 1,196,565 students in MOE owned buildings) and introducing night shift schools so that schools operated on double shifts (in 2018, 373 double shift schools).

- **Aging Infrastructure**: Almost half of the public schools were built before 1990 and around 7% reached the end of their lifespan, which is a typical case where school buildings are used far longer than their original design intended, and often at greater capacity.

- **Regulation**: Law 49 for the year 2015 gave the governorates' executive councils the authority to plan their capital budget. This included the governorate capital budget for educational systems as part of the decentralization process in Jordan, and included a maintenance budget for public schools. The decentralization process began in 2018 and still requires time and effort to develop. The MOE is facing challenges as they transition from a central maintenance process to a decentralized one.

- **Limited Budge**t: The MOE responded to the rise in student enrollment by commissioning new schools. The Education Strategy Plan for 2018 to 2022 described a plan to build 300 new schools but due to time and budgetary constraints, the MOE had to temporarily rent private buildings and introduce night shift schools to accommodate greater numbers of student enrollment

Both actions have a serious impact; rented buildings are an added cost to the MOE budget and double shift schools intensify wear and tear on buildings, contributing to higher maintenance demands and the shortening of the building lifespan. Wear and tear begins to show earlier in newer schools when used beyond their designed capacity. However, maintenance efforts and plans directed toward older schools are primarily aimed at keeping the schools operational and safe.

Finally, The German Development Bank (KfW) and the United Nations Office for Project Services (UNOPS) financed a project that aims at supporting access to quality education and generating livelihood opportunities in Jordan. Under this project, 10 million Euros of grant financing will be made available for labor-intensive school maintenance. The project focuses on cleaning and providing maintenance of schools located in communities that host the highest number of refugees, while also striving to improve livelihoods through cash for work opportunities for both vulnerable Jordanian citizens as well as the Syrian refugees living in host communities. Other reports recommended various solutions to solve maintenance issues and can be summarized as follows:

- Provide ongoing mentorship to school principals on school maintenance and include related modules in training for new principals (given the critical role of school leadership in ensuring schools are well maintained, that the quality of education is strong, and that student wellbeing is looked after).

- Conduct regular follow up visits to schools to ensure spaces are being utilized as intended and to understand and address newly developed concerns.

- Continue to support schools in their maintenance efforts which could mean working with the MOE and the MPWH to ensure appropriate allocation of staff and school maintenance budgets. This would also ential reducing the bureaucracy that comes with the two-year warranty or working with other donors and implementers on different maintenance solutions.

- Develop the preventive maintenance program. This will include activating the role of school maintenance committees, which would be comprisedof students & community members in the schools where preventive maintenance programs are implemented.

- USAID/Jordan, the MOE, and the MPWH (through the Donor Coordination Working Group) should identify clear roles, responsibilities and expectations for both preventative and ongoing school maintenance activities. Budget availability should be communicated clearly between all parties to facilitate collaboration.

- Supervise construction/expansion activities and institute regular reporting requirements from each field directorate in order to compile updates and lessons learned on construction/expansion activities.

- Replace all faucets (sinks and drinking stations) with spring loaded push mechanisms for automatic shutoff, and aerator units to throttle flow rate.

- Install AC, Fans as well as solar energy systems.

- Increase the allocation of cleaning staff, as required to maintain a certain standard of cleanliness, as agreed upon by all relevant stakeholders.

- Replace existing lighting with low energy alternatives as it offers the advantage of a reduction in energy consumption and lower lifetime operational costs.

- Where appropriate, decentralize funding decisions to the school level so that more funding is invested in maintaining and improving facilities.

- Increase support for school construction activities and capacity building for soft skills (e.g. teacher training) and ensure coordination between the different stakeholders.

- Integrate activities among the various donors and implementers so that gaps are addressed in providing support as needed.

Based on the review of prior assessments and interviews conducted with various stakeholders, there are opportunities to improve the school maintenance process by assisting the MOE, Directorates, and public schools through pragmatic solutions. Some opportunities as discussed during the interviews are:

1. Utilize available resources to increase the effectiveness and efficiency of the delivery of school maintenance requests.

2. Develop a strategy for the preventive maintenance and corrective maintenance strategies of schools. It would be vital for the MOE to acknowledge the importance of these strategies, integrate

them into its policies and planning processes and release instructions to the Directorate and school levels.

3. Develop a follow up strategy to oversee and manage school maintenance that requires quarterly reports from Directorates outlining the quarterly planned preventive maintenance audits and duties completed, as well as the associated costs incurred. The report should also identify any outstanding issues that have not been resolved.

4. Develop policies for school operation and maintenance that consider Health & Safety (H&S), Hygiene, Environment for adoption throughout the MOE at all levels.

5. Develop a clear process and time frame for solving maintenance issues to avoid bureaucracy and elongated processes.

6. Develop guidelines that identify operations and maintenance requirements to be considered within the early stages of school design.

7. Create a platform to develop vocational skills nationwide and for the benefit of the maintenance of schools.

8. Conduct initial condition surveys for all existing schools to be completed, listing all current defects to act as a 'to do' list of maintenance needs that need to be addressed. Updated annual, this would be a useful tool for strategic planning be a catalogue of outstanding maintenance tasks.

9. All Directorates should set up and run a hot line solution to accept and record calls/emails from schools requesting any maintenance related work or issues.

10. Train school caretakers to carry out clearly defined and planned preventative maintenance duties and to deliver cleaning duties to maintain a hygienic environment inside schools.

11. Enhance the current process by automating the approval processes (business process management).

12. Enhance and develop school maintenance modules to cover maintenance requirements in a single database source. This could be linked with real-time operation that management and MOE specialists could access via dashboard. These requirements could be linked with financial systems to speed up the workflow.

13. Create a general awareness on the importance of school maintenance directed at the school community including teachers, parents and students.

14. Create a general awareness on the importance of a sense of ownership by involving the MOE and strengthening existing structures at the MOE.

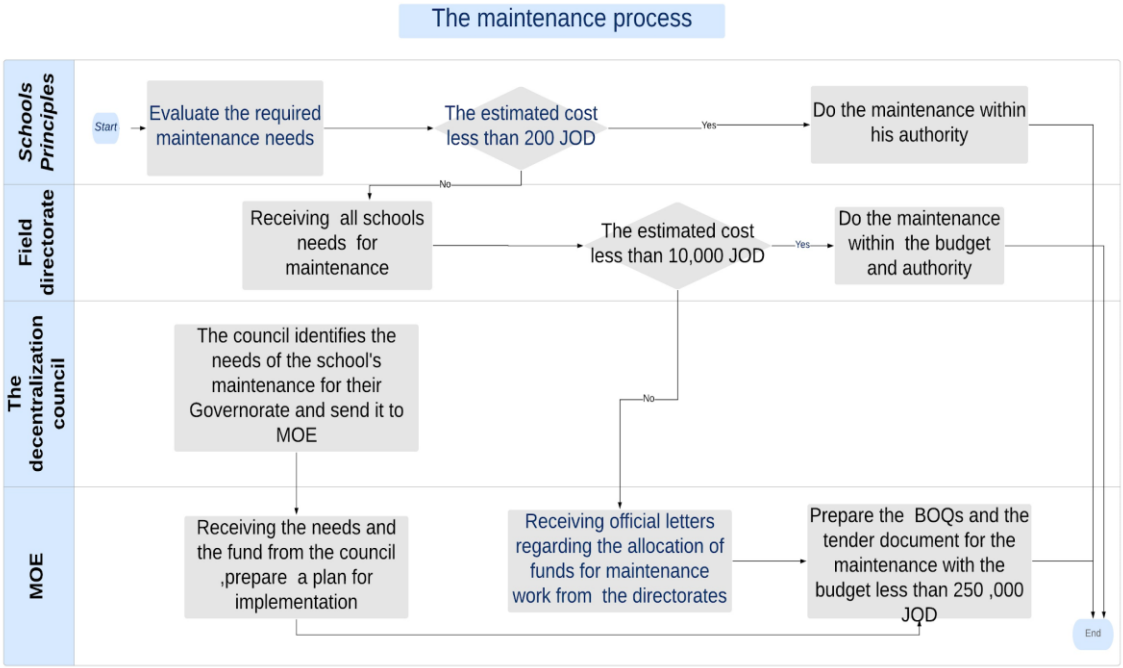
15. Reward and enhance good cleaning and maintenance examples.

7.3. CURRENT MAINTENANCE PROCESS

There are mechanisms that currently exist to assist schools in addressing maintenance needs. These include allocating school maintenance based on the student population size, and the two-year warranty provided for all newly constructed schools as shown in **Figure 10**, led by the MOE. The school budget allocated for repair varies between JD 200-2,000 per year and is usually used for corrective maintenance. Corrective maintenance is currently being carried out by private companies/contractors directly commissioned through the school principal and paid via the amount allocated for repairs.

The thresholds are different for each school – it can reach to up to JOD 200 per repair for secondary schools and up to JOD 150 per repair for elementary schools. If the repair costs exceed the allocated limit, the school principal must make an official request to the FD. The FD then estimates the cost of the requested repair. If the estimated cost exceeds JOD 10,000, the repair is managed by the central MOE.

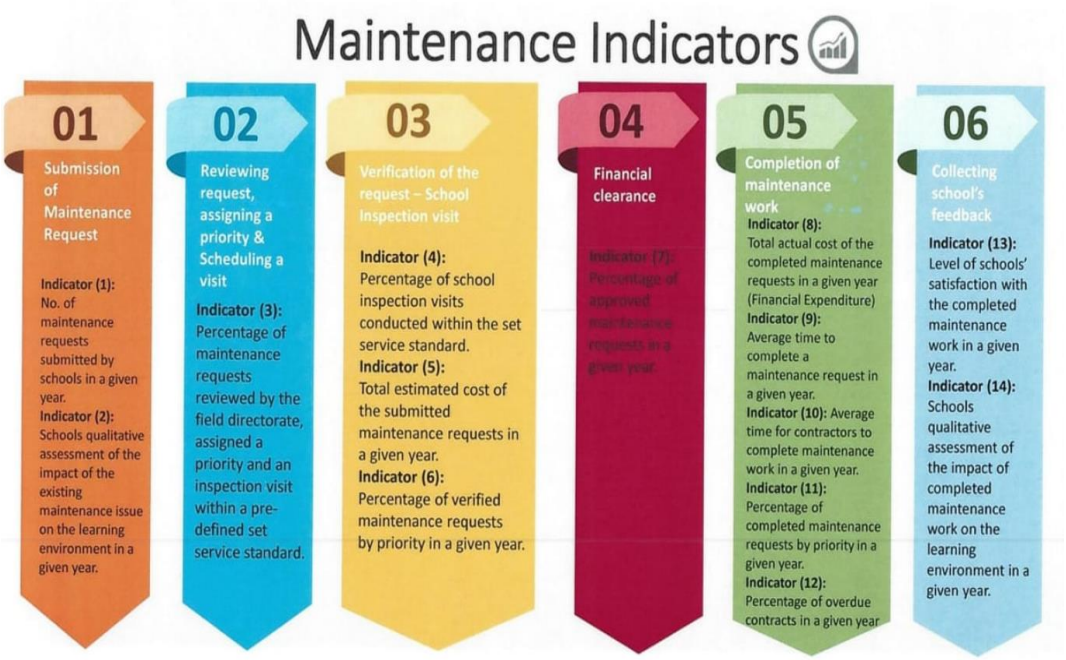
Figure 10: The Current School Maintenance Process



On the other hand, all newly constructed schools have a two-year warranty period during which the contractor is responsible for providing maintenance oversight and repairs. The process starts when schools make requests for maintenance support through their FDs. The requests are then to be sent to the central level MOE, which are then sent to the MPWH. The MPWH works with the construction contractor to assess the maintenance issues at the schools. Contractors are contractually obligated to provide maintenance support during the warranty period if the issue is related to construction, otherwise they risk losing funds. If the issue is related to vandalism, then the contractors are not under contractual obligation to address the issue. In addition to this lengthy process, some school repairs are caused by misuse. If misuse is the cause, the school must submit a request to the FD only if the cost of the repair exceeds the school's allocated budget.

MOE is working with GIZ on developing a facility maintenance workflow that can lead to improved systems and outcomes. **Figure 11** below illustrates the plan. In addition, the MOE, GIZ, UNESCO and others are working together to develop school maintenance processes to enhance the current form, and develop indicators related to business data.

Figure 11: MOE-GIZ Facility Maintenance Indicators and Workflow Plan



PHYSICAL ASSESSMENT OF JORDAN SCHOOLS AS A STEP TO FACILITY MAINTENANCE PLANNING

As a major step forward to gather baseline information from schools that could be used for 1) facility maintenance planning, 2) capital project allocations and 3) donor / MOE targeting, GIZ and UNESCO developed a school assessment survey and developed a module in Open EMIS.

The survey was sent to all public schools in March-April 2019. 1802 schools responded, 1519 were MOE-owned and 275 were rented schools. The survey received a response rate of 15%.

While the initial effort was laudable, the results were disappointing for planning purposes.

In a companion assessment, ESMP is working with the MOE and international donors in Jordan to physically assess all schools, using junior engineers, and to provide a high-quality data set for MOE use. Going forward, the project hopes to play a role in ongoing training of governorate MOE engineers and school maintenance staff, so that the process of maintaining school physical plant data is sustained.

EXAMPLES OF CONSEQUENCES OF LACK OF PREVENTATIVE MAINTENANCE

Proactive and systematic maintenance is proven to prevent larger, complicated and expensive tasks. To illustrate this point, the following are some examples of the consequences of a lack of preventative maintenance:

- In Aqaba, underground water pump failure that fed rooftop tanks that serve school toilets, kitchens, canteen etc. led to school disruption with high repair costs due to the lack of periodic checks and minor repairs.

- Lack of proper periodic cleaning of toilets and supplying of basic rubbish bins in toilets have caused the toilets to flood causing more damage to floor tiling, dampness to lower floors, and even electricity rooms. This forced head teachers to lock the flooded toilet units, forcing the pupils to use far away alternative toilets, sometimes on a different floor level. This was evident in many schools, like the Eighth School in Aqaba (boys' school), UmQusair and Muqablain School in Amman (boys' school). In the Eighth School in Aqaba, there is video documentation taken by the contractor who completed the refurbishment to said toilets.

- The simple task of not cleaning falling tree leaves caused blockage and surface water problems in schools in Algoor (Mothallath Alardah) girls' school, and a recent USAID-built school in Petra, Hamza Bin Abdel Mutaleb (boys' School).

- Delayed repair of damaged rainwater pipes caused external dampness on building fabric at theWadi Aseer School in Amman.

- Delayed repair of a simple water leak in a roof of the Madaba Girls School caused additional costs for repair of roof and dampness on the staircase below.

- Delayed repair of damaged solar panels on a school roof resulted in the solar panels being discarded.

7.4. MAJOR CHALLENGES IDENTIFIED BY ESMP

Based on its review of prior assessments and engagement with relevant local officials and other stakeholders, ESMP has identified major operation and maintenance challenges and linked them to system, policy, and skill gaps as summarized in **Table 25** below.

Table 25. ESMP-Identified Operation and Maintenance Challenges

Issue	Description	System /Policy Gap	Capacity Gaps
Facility Maintenance Strategy at MOE for both preventive and corrective maintenance.	The GOJ is making major investment in SI. A clear strategy to maintain schools is an important first step.	• Clear policy with measurable goals and objectives. • Governorate/district level goals. • Timeline and feedback.	• Data analysis and reporting. • Implementation tracking and reporting.
Facility Maintenance Plan at School / Directorate Level.	Individual school facility maintenance plans help to set the framework for improved maintenance. Capital inventory, preventive maintenance, and lifecycle replacement scheduling would improve planning,	• Plan on assessing capital inventory and conditions. • Plan on preventive maintenance. • Plan on lifecycle replacement.	• Physical assessment training on tools, methods and technical aspects with district engineers and/or facility maintenance supervisor. • Preventative maintenance planning, implementation and reporting for school

	reduce unplanned major repairs, and open opportunities to access capital funds in the governorates.		principal and facility maintenance supervisor. ● Lifecycle planning with key personnel. ● School maintenance best practices.
On-going physical assessment of schools.	Quality baseline and updated data is vital to facility maintenance planning and overall MOE knowledge of school needs.	● Review current assessment tools. ● Allocate assessment responsibility with required expertise. ● Schedule assessment sections based on need / purpose.	Project management. Asset management, (inventory) best practices, procedures, tools, checklists.
Coordinate major school purchases with Capital Spending Process.	Decentralized capital spending decisions offer greater opportunity.	● Understanding of capital project cycle, planning and budgeting. ● Communications gap with citizens, municipal, and governorate decision makers.	Joint training on employer's requirements.
Community ownership and vandalism.	Reports show positive trends between community ownership and reduced damage and vandalism.	Understanding of transferable best practices to support community ownership of schools.	Identifying best practices. Developing process, procedure, materials, and support to replicate best practices.

7.4.1 FACILITY MAINTENANCE STRATEGY AT MOE

Several reports and ESMP interviews noted that the lack of strategy impeded a national collection of schools to follow a clear path.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, AND KEY STAKEHOLDERS

- Public schools in Jordan are now in constant need of repair and refurbishment and effective programs to ensure that they are pro-actively taken care of with regards to cleaning & maintenance.
- Due to the increased volume of student enrollment, prioritize considerations of other pro-active measures such as waste management and pest control regimes designed to prevent potential hazardous situations.
- The security measures in place are not protecting the buildings from malicious damage, the community does not feel a sense of ownership and does little to protect them or utilize them outside of educational needs. Even when new schools are built or existing schools are refurbished, they very quickly degrade due to a lack of ownership.

- Maintenance is constantly referred to at all levels in the education system, but the reality is that often these repairs could have been prevented with regular maintenance oversight and therefore become reactive and more costly repairs.

- The MOE currently employs people in the roles of guards and housekeepers with basic job role definitions but no clear purpose or strategy to preserve the integrity of the school buildings.

- The maintenance budget was found to be the core challenge facing the MOE. Although the Maintenance Planning Section at the MOE allocates money to schools, participants indicated that the budgeted amount was not sufficient to do simple repairs.

7.4.2 FACILITY MAINTENANCE PLAN AT SCHOOL AND DIRECTORATE LEVEL

While national strategy is imperative, equally important are school based plans. Initial facility maintenance planning is reportedly underway, but quality of plans and actual implementation are areas for improvement.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, AND KEY STAKEHOLDERS

- Lack of knowledge and experience to develop pro-active systems and processes to alleviate reactive work repairs.
- The process of requesting maintenance for those new schools under the two-year warranty is difficult to implement and is a protracted process requiring the MPWH to contact and coordinate with the contractors to make school repairs.
- The lack of follow up with contractors who perform repairs during the two-year maintenance warranties.

7.4.3 ONGOING PHYSICAL ASSESSMENT OF SCHOOLS

Facility planning requires data and physical assessments of schools should be a prerequisite. EMIS/GIZ initiated this type of effort. ESMP hopes to follow up with EMIS/GIZ to use their baseline data. Regularly updated assessment information is very important for planning and budgeting.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, AND KEY STAKEHOLDERS

- The lack of a database negatively impacts school maintenance. The current paper system has proven inefficient and ineffective as records taken and reports submitted are not systematically captured or readily available to reflect the real time status of any school.

7.4.4 COORDINATE MAJOR SCHOOL PURCHASES WITH THE CAPITAL SPENDING PROCESS

The decentralization process is evolving. However, observers of the process conclude that the current practice results in millions of unspent Jordanian dinars that are earmarked for schools. While governorate officials gain experience in planning and budgeting processes, schools and FDs need to better advocate for the effective use of funds, including corrective maintenance and major repairs.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, AND KEY STAKEHOLDERS

- Budget sizes allocated to school maintenance vary between JOD 200 to JOD 2,000 annually, which is based on the number of students enrolled at the school. For maintenance needs that exceed this budget, schools must make official requests to the MOE FDs. Some interviewees expressed their frustration at the lack of timely responsiveness or follow through by the MOE FDS.

- Directorates have the financial capacity to manage maintenance projects that cost JOD 10,000 or less. If the maintenance needs are above JOD 10,000, then the project becomes the responsibility of the central MOE to manage. Interviewees believe that this process added an additional layer of frustration. They claimed that their maintenance requests have not been addressed at all and were ignored for an extended period of time.

7.4.5 COMMUNITY OWNERSHIP AND VANDALISM

Prior assessments offer anecdotes of schools that were strengthened by community engagement; by students and families playing a role in cleaning and in the repair of their schools. These anecdotes reveal that local community engagement and ownership of schools lead to positive results.

COMMENTS FROM INTERVIEWS WITH MOE, MPWH, AND KEY STAKEHOLDERS

- Good examples of clean and well-maintained schools should be promoted (i.e., the AlKaramah School for Girls in Aqaba).

- Vandalism is a major issue and needs to be tackled.

7.5. ESMP RECOMMENDATIONS

Table 26 summarizes ESMP process, policy, and system recommendations, as well as related capacity building options, to address the operation and maintenance challenges highlighted.

Table 26. ESMP School Maintenance Recommendations

School Maintenance Recommendations	Process	Policy	System	Capacity Building
MOE Facility Maintenance Strategy ● Form a facility maintenance strategy team, through the MOE Maintenance Committee and/or SDDP, to devise strategic recommendations for MOE consideration. ● In lieu of a formal plan, use recommendations to devise key principles, goals and objectives for various school maintenance efforts, i.e. GIZ, Canadian government, Swiss government, USAID, KfW, etc.	√ √	√ √	√	● Quality training. ● Site supervision training. ● Reporting skills.

● Reporting framework to share information with MOE and with program implementers/donors.	√			
School Facility Maintenance Plan ● Work with MOE and international partners to review existing efforts and identify where ESMP can provide added value. ● For USAID schools, use the facilities to prototype best practices, materials, etc.	√ √	√ √	√ √	Facility maintenance plan development – best practice v. appropriate scale.
Ongoing Physical Assessment of Schools ● Prepare baseline data set for MOE through ESMP Physical Assessment #3. ● Provide ongoing training and support for MOE governorate engineers on tools and technical aspects. ● Provide ongoing training and support for MOE school facility managers on tools and technical aspects.	√ √	 √	√ √	● Project scheduling training. ● Adopt new technology e.g., Google Calendar.
Coordinate Major School Purchases with Capital Spending Process ● Develop reporting with MOE to create governorate level reports that can be used to quantify school capital needs. ● Work with MOE on preparing FD leaders to communicate needs within the capital project decision cycle and provide costing and timing information to budget makers.	√ √	 √	√ √	● Report making. ● Data use for decision making. ● Communications .
Improve Community Ownership and Reduce Vandalism ● Accumulate baseline data and best practices. ● Identify a pilot community to prototype methods and approaches. ● Work in collaboration with other partners.	√ √ √	 √	√ √ √	● Sustainable data gathering techniques. ● Best practices, methods, and approaches.

8 DATA FOR DECISION MAKING

8.1. BACKGROUND

The MOE uses OpenEMIS as the foundation for school information management. The OpenEMIS system is designed as a school information management platform to assist with school operations and ministry information links. The UNESCO-designed, open-source platform is used in countries around the world to collect student, teacher, and institutional data, and to link educational data into sustainable development goals (SDG4). OpenEMIS is used in 15 countries around the world. In Jordan, OpenEMIS is managed under the direction of the Queen Rania Center (QRC) for Education and Information Technology within the MOE.

The MOE links OpenEMIS to a Web GIS system. Geographic information systems allow users to look at the relationship of data to location. GIS systems utilize data linked to geographic coordinates, such as school location, student population, number of classrooms, gender, and ownership. Data is combined with geospatial layers, such as administrative boundaries, roads, topography, satellite imagery, etc. By combining data with location, GIS provides planners and decision makers with an enhanced set of tools for decision making.

There are relatively clear roles and responsibilities between Open EMIS and Web GIS. Open EMIS is the data warehouse. Data is transferred to Web GIS, which combines GIS spatial layers, and data is analyzed graphically using mapping imagery.

Beyond Open EMIS and Web GIS, there are several other data sources that are useful for SI planning. Land registry data is stored electronically at the Department of Lands and Surveys. Municipal permit data is stored in municipal offices. In some municipalities, such as GAM, the data is stored electronically. Contracts and “as built” drawings are stored at the MPWH. Population and other demographic factors are stored at the Department of Statistics. Topography and navigational road data are stored at the Royal Jordanian Geographic Center.

Electronically available private sector data also influences the SI process. For example, data for electric, water, and sewage systems and account information are held in a combination of public and private companies.

School construction and expansion requires data from multiple sources, often contained on sophisticated electronic data islands, where they serve their primary business purpose. Building bridges between these islands, both governmental and private sector, can unleash significant improvements in the planning and SI processes.

8.2. FINDINGS FROM PREVIOUS ASSESSMENTS AND STUDIES

ESMP reviewed the 2017 evaluation report listed below in relation to its assessment of data for decision making.

END OF PROJECT EVALUATION OF THE EUROPEAN UNION-FUNDED TECHNIACL ASSISTANCE TO ENHANCE ACCESSIBILITY AND USE OF THE JORDANIAN MOE EMIS FOR EVIDENCE-BASED POLICY FORMULATION REPORT (2017)

The evaluation identified the following key findings:

- The design of the project underestimated the magnitude of implementing OpenEMIS in a country of Jordan's size and the corresponding capacity building needs of MOE.

- A disconnect between UNESCO/MOE's initial conception of OpenEMIS and the subsequent vision of other key MOE stakeholders for the system's purpose and functionality delayed and complicated OpenEMIS implementation.

- A lack of clearly defined roles and responsibilities within MOE in relation to the EMIS negatively impacted project implementation and sustainability.

- The project adapted well to unanticipated external developments, but these had an unavoidable negative impact on project implementation.

- Top-level MOE engagement and support is crucial for the successful implementation and sustainability of a large-scale technical assistance project such as OpenEMIS.

The report made the following recommendations:

- Continue building QRC's capacity to maintain and manage the core IT aspects of the OpenEMIS platform but identify a more suitable MOE counterpart for strengthening the link between EMIS data and its utilization for evidence-based policy formulation.

- Incorporate broader institutional support for building a culture of evidence-based policy making in MOE.

- Conduct a comprehensive stakeholder consultation to ensure cross-MOE consensus on the primary features and functionalities of the OpenEMIS platform and clarify institutional roles and responsibilities in relation to the EMIS.

- Incorporate change management, communications, and stakeholder management workstreams into the core project management component.

- Ensure the project is coordinated and aligned with other donor support to MOE relating to planning, monitoring and evaluation (M&E), research, and evidence-based policy making.

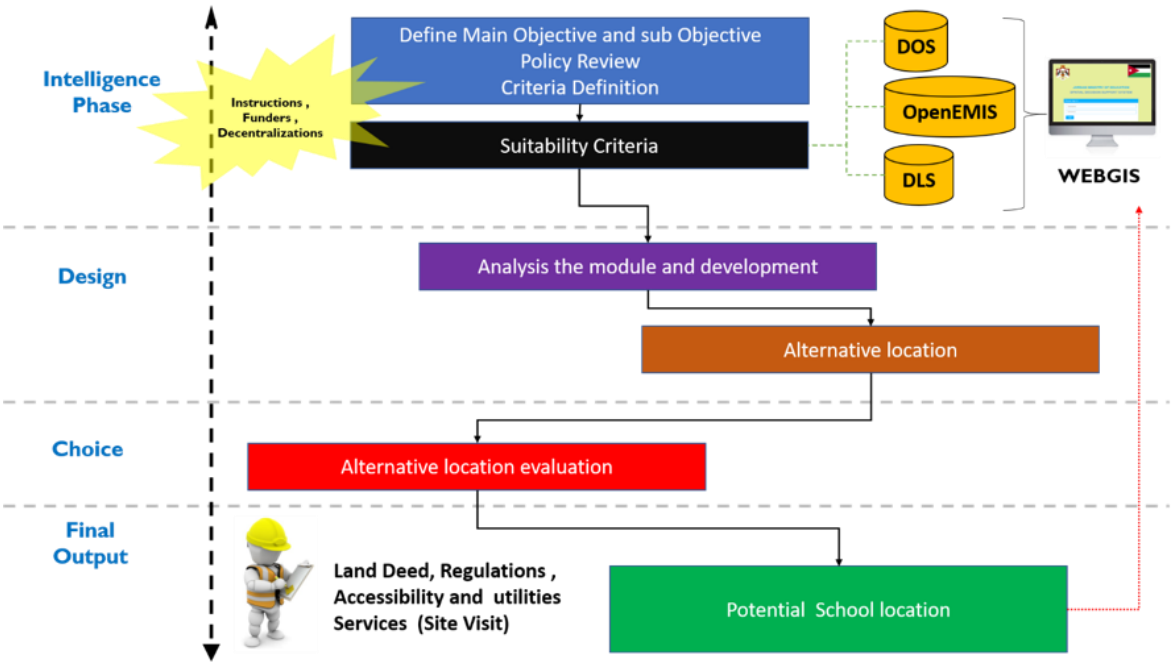
8.3. CURRENT USE OF DATA FOR SITE SELECTION

Schools which are in a strategic and safe area play an important role in improving students' performance and excellence. To ensure both success and long-term sustainability of the SI process, identifying suitable sites during the planning phase is key, yet this presents many challenges. This report focuses on a high level of the current site selection process for the construction of a new public school (**Figure 12)**. It was carried out by utilizing WebGIS and a multi-criteria evaluation model. A set of criteria was used to define a number of potential sites using a spatial analysis model, the final safety model outputs were compared with the field verification data and found to be reliable.

8.3.1 MOE CURRENT DATA USED FOR SITE SELECTION MODULE

1. Overcrowded MOE school locations
2. Overcrowded rented school locations
3. Double-shift school locations
4. MOE cadastral, Government cadastral
5. Population Area, per age, Catchment area

Figure 12: Data Use in Site Selection Process

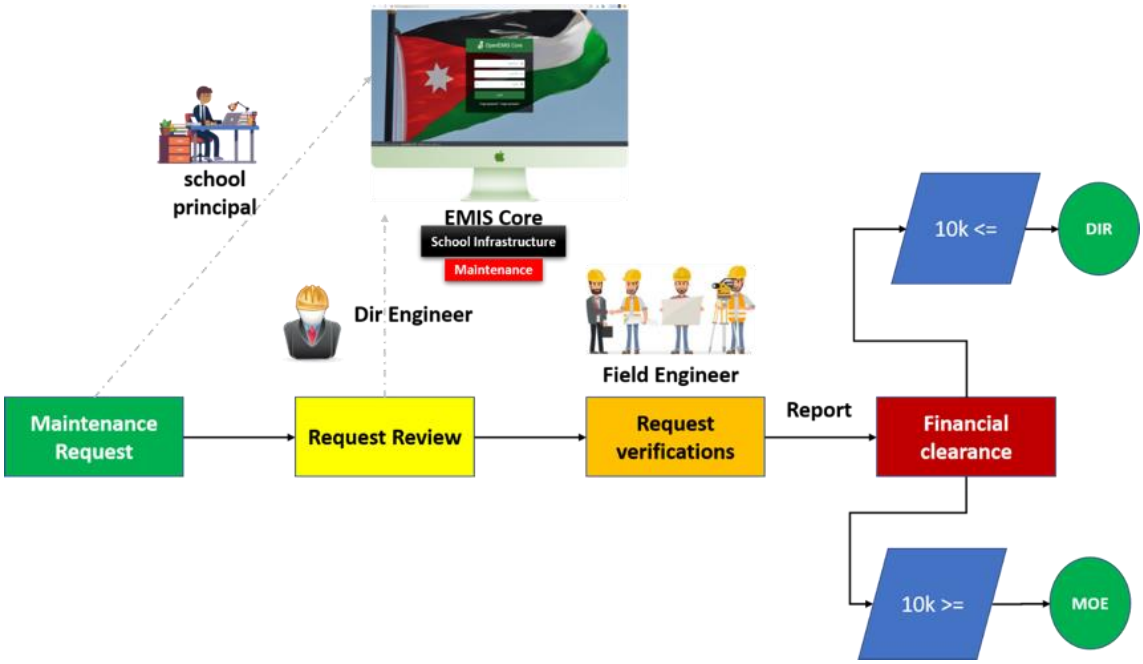


The module can also be used to study other factors related to the school location once the proposed site has been identified. Each site needs to be studied on a case by case basis since a number of factors will influence the decision-making process such as road access and distance, topography, municipal regulations, and land area. Once a potential site has been deemed appropriate and actually selected, necessary documentation is gathered and submitted to MPWH. MPWH will then begin the verification process and design phase.

Site Selection for school expansions is the same as for new schools in the case of horizontal school expansions. If the additional land necessary is available and owned by the MOE, the site can be used for the expansion. If the adjacent land is not owned by the MOE, MOE will begin negotiations with the owner in order to purchase the land.

OpenEMIS can be used to track and record school maintenance activities (**Figure 13)**. OpenEMIS should house information about each school's infrastructure model and the data should be kept up to date. There are many data fields that should be populated, including building address, age and type of building, number of students, and maintenance status (physical assessment). MOE owns 2,785 school buildings, including double shift schools. The data for SI is not being entered into the system – many fields are left unpopulated – thus creating a gap in data necessary for informed decision making. Ensuring that all data is entered in the SI module and then linking it to a school maintenance workflow will support sustainable schools.

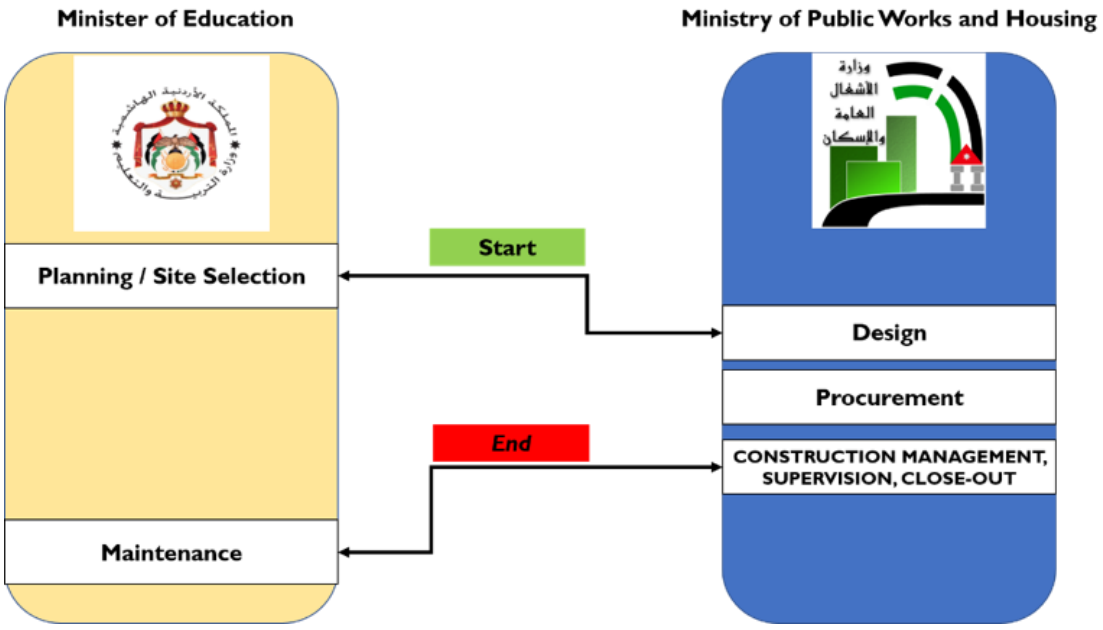
Figure 13: Data Use in School Maintenance Process



8.4. MOE AND MPWH DATA-DRIVEN DECISION MAKING

Information on data collected from various sources such as EMIS, Department of Land Surveys (DLS), Department of Statistics (DOS), and MOE analysis, along with relevant legal documents (land deed, land accessibility, municipal land regulations, etc.), is sent to MPWH to initiate the design process. A technical committee from the MPWH will inspect the selected site based on a checklist of criteria, such as accessibility, topography, and utilities. If the site meets all the checklist criteria, MPWH begins to design the new school.

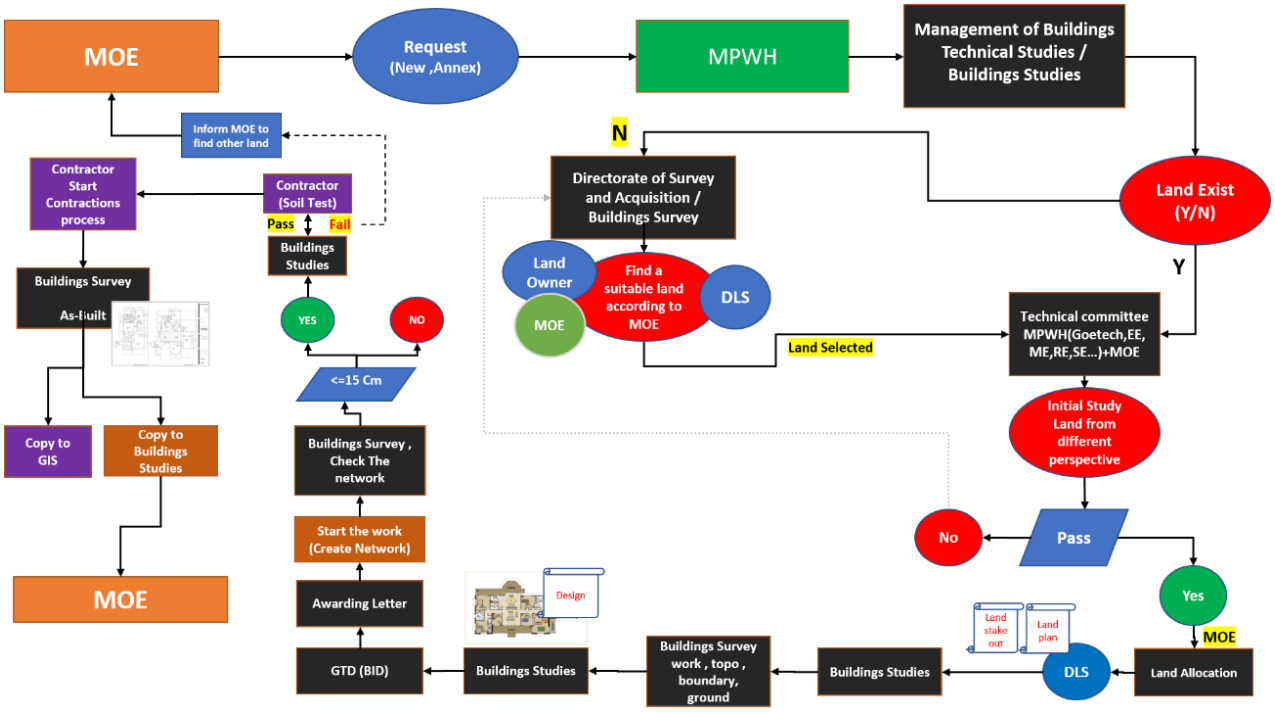
Figure 14: MOE-MPWH Relationship for School Construction



MPWH Data Hub:

- Procurement system database.
- As-Built drawing
- Road data – MPWH road
- Building data
- Geotechnical data - Soil data test.
- Topography inspections

Figure 15: MPWH Data Roles and Responsibilities for School Construction



The availability of accurate and timely data will support the MOE and the MPWH to better manage the school construction process, saving time, effort, and scarce funds. Data is the backbone of the work of and between these two ministries. Defining a central trusted data source in each ministry will support the decision-making process. Establishing an electronic link between the two ministries should be considered a priority to facilitate the entire school construction process, from planning to handover.

8.5. MAJOR CHALLENGES IDENTIFIED BY ESMP

Based on its review of prior assessments and engagement with relevant local officials and other stakeholders, ESMP has identified major data management challenges and linked them to system, policy, and skill gaps as summarized in **Table 27** below.

Table 27. ESMP-Identified Data Challenges

Major Challenge Data for Decision Making	Description	System/policy Gaps	Skill Gaps
MOE/MPWH land ownership and municipal license data is often electronic but not linked.	Land ownership is prerequisite for school building or expansion. EMIS database is not fully accurate and does not contain future land coordinates. DLS system is electronic. With real time access, MOE could resolve land issues immediately.	• Intergovernmental agreement to use live data generally, and not on a case by case basis that require slow official letters. • Better enforcement of GOJ laws on the legal uses of electronic	

		communication and e-permission.	
MPWH - Archive System does not meet the multiple data needs of decision makers and managers. Project data, including "as- built drawings" are archived and stored on CD-ROM but not linked to other sources or easily searchable.	Based on interviews, ESMPESMP believes the MPWH archive system can be improved so more easily access key project documents, many of which are scanned.	● It appears that the document management system is poor and data not easily searchable. ● Also, the data – particularly "as built drawings" is not easily linked to schools.	
MPWH - Contractor project baseline and financial data exists but is not merged to form a data supported project management system.	MPWH has clear financial systems in place. Contracts have implementation guides and baseline – project specific timelines. Progress reports against benchmarks against financial reports will create a strong project tracker system	● Irregular contractor performance reporting ● No integrated system to receive the data ● No baseline data in electronic form	
MOE - EMIS and GIS data quality and system enhancements are widely supported, reporting needs to be more robust, and data access needs to be expanded.	While Open EMIS has made rapid progress, data improvement is ongoing, A new facility management module is new. Reporting is generally customized through outside vendor, challenging program flexibility.	● Improved data ownership/maintenance protocols. ● Improved Open EMIS – Web GIS sharing to allow live data exchange.	
MOE - School physical condition data needs to be improved and maintained.	An early 2019 school assessment was partially successful, but data gathered was inadequate for decision making.	● Information gaps to develop baseline data ● System gap to maintain data.	● Technical physical assessment training. ● Ongoing facility assessment capacity building.

Cross cutting - Data links between the MOE and the MPWH, as well as DLS / DOS / GAM / MOMA and utilities need strengthening.	Schools need data from multiple sources during the SI process. As information moves from ledgers to hard drives, opportunities for live data links emerge, connections that can save time and money.	● Information sharing policies. ● Inter-system understanding. ● Technology deficit in GOJ. ● Shift problem to A/E firms.	● Improved understanding of information sharing power and lower cost technology options. ● Data collection system training for MOE and MPWH.
Cross Cutting - Weak reporting tools and inadequate manager training on using data for decision making.	As the GOJ improves its data systems, the next step is to improve manager understanding of how to use data for better decisions.	● Reporting is limited and inflexible. ● Specific reports take too long. ● Manager understanding of possible data sources and the problems that could be solved.	● Technical training on report writing. ● Manager training on using data.

Major challenges identified by ESMP include:

- MOE/MPWH – Land ownership and municipal license data is often electronic, but not linked. This issue is raised in the design section of the assessment as a major challenge.

- MPWH - Archive System does not meet the multiple data needs of decision makers and managers. Project data, including “as built drawings” are archived and stored on CD-ROM but not linked to other sources or easily searchable. This issue is raised in design and construction management sections of the assessment as a major challenge.

- MPWH - Contractor project baseline and financial data exists, but not merged to form a data supported project management system. This was listed in the construction management section of the report as a major challenge.

- MOE - EMIS and GIS data needs, reporting needs to be more robust, and data access needs to be expanded.

- MOE - School physical condition data is imprecise and a system to maintain data is being developed. ESMP working with MOE and partners to provide baseline data and train key personnel on data maintenance.

- Cross-cutting - Data links between MOE and MPWH, as well as DLS / DOS / GAM / MOMA and utilities need strengthening. ESMP has received broad interest in working together to address some of these issues.

- Cross-cutting - Weak reporting tools and inadequate manager training on using data for decision making. ESMP received feedback from multiple interviews on the importance of better data reporting and utilization.

8.6. ESMP RECOMMENDATIONS

Table 28 summarizes ESMP process, policy, and system recommendations, as well as related capacity building options, to address the data management challenges highlighted.

Table 28. ESMP Recommendations for Addressing Data Challenges

Data for Decision Making Recommendations	Process	Policy	System	Capacity Building
MOE / MPWH / DLS Group Formed ● Devise plan on Land Ownership Issues	√	√	√	Data training
MPWH Archive System Improvement ● Work with MPWH / MOE to devise Archive strategy. ● Work with MOICT to identify GOJ approved document management systems. ● Devise and implement a plan to transfer documents into a searchable system. ● Provide training to use and maintain the system.	√ √ √ √	√ √	√ √ √	Document management system training
Project Management Data ● Develop system to receive regular site reports. Link progress against baseline timelines. Develop project management reporting tools.	√ √ √	√	√ √	Project management reporting.
Open EMIS/WebGIS ● Support data cleanup through physical assessment. ● Collaborate with ongoing efforts by UNESCO / GIZ. ● Improve reporting tools in collaboration with Ministry managers.	√ √	√	√ √	● Data QA/QC. ● Reporting technical assistance
Cross cutting - Data links ● Work with partners to develop a team to explore data linkages. ● Raise awareness among managers regarding the power of shared data. ● Support development of a plan to build data bridges.	√ √ √	√	√ √	● Data sharing technology ● Data for mangers training

9 DATA FOR DECISION MAKING

In addition to a baseline assessment, a key purpose of the report is to develop a roadmap for future GOJ collaboration. The report provided valuable coordination information as well, as there are multiple donors and implementing organizations that are providing MOE support. As ESMP looks forward to identifying key areas of collaboration, the list below represents possible areas of partnership.

MPWH

- Developing effective quality assurance criteria for design reviews.
- Creating a past performance database used for GTD.
- Developing an improved construction contractor grading system.
- Establishing a Contractor / A/E performance evaluation tool.
- Reviewing construction incentives and penalties linking to performance.
- Improving construction management supervision guidelines.
- Creating a searchable “As built” drawings database maintained by MPWH.
- Supporting implementation of JONEPS and new procurement laws.

MOE

- Developing a national school maintenance strategy.
- Implementing a baseline physical assessment of all government schools, maintained by MOE.
- Developing improved school maintenance plans and supporting implementation, including a system of requirements to perform school maintenance and a list of pre-qualified vendors with certified and trained staff.
- Supporting implementation of JONEPS and new procurement laws.

CROSS-CUTTING

- Strengthening MOE and MPWH joint data sharing, to improve project tracking and implementation progress, including EMIS and GIS programs in MPWH and MOE.
- Working jointly with MOE and MPWH to improve planning and budgeting of governorate capital spending for SI.

10 ANNEXES

• ANNEX 1: GLOSSARY OF TERMS

As-Built	Detailed drawings showing exact types, locations, and sizes of all elements in a unit of structure, such as foundations, main electricity board, water pipes as installed
Cadastral survey	Survey that establishes property boundaries, primarily used for legal purposes to accurately establish land ownership boundaries and usage. It is an important component of the legal creation of properties.
Contractor's Baseline	Detailed work schedule that shows intended time duration of all elements of work in the construction project from start to hand over, including the intended sequence of works
ESRI	An international supplier of geographic information system software, web GIS and geodatabase management applications. The company is headquartered in Redlands, California. The company was founded as the Environmental Systems Research Institute in 1969 as a land-use consulting firm.
FIDIC	Acronym for French term that translates to: International Federation of Consulting Engineers and refers to standards for Conditions of Contract for Works of Civil Engineering Construction
Geotechnical Engineering	Engineering that utilizes the disciplines of rock and soil mechanics to investigate subsurface and geologic conditions. These investigations are used to design and build foundations, earth structures, and pavement sub-grades.
GIS	A framework for gathering, managing, and analyzing data. Rooted in the science of geography, GIS integrates many types of data. It analyzes spatial location and organizes layers of information into visualizations using maps and 3D scenes.
Land Surveying	The detailed study or inspection, as by gathering information through observations, measurements in the field, questionnaires, or research of legal instruments, and data analysis in the support of planning, designing, and establishing of property boundaries.
Loadbearing Capacity	Strength of existing soil at proposed foundation level to support structure
Map Layer	A GIS database containing groups of point, line, or area (polygon) features representing a particular class or type of real-world entities such as customers, streets, or postal codes. A layer contains both the visual representation of each feature and a link from the feature to its database attributes. Maps in a GIS are made by combining multiple layers.
Open-Source Software	A type of computer software in which source code is released under a license in which the copyright holder grants users the rights to study,

	change, and distribute the software to anyone and for any purpose. Open-source software may be developed in a collaborative public manner.
Retaining Wall	A structural wall that supports and holds back earth
Snag	Item with poor quality of works
Topography	A broad term used to describe the detailed study of the earth's surface. This includes changes in the surface such as mountains and valleys as well as features such as rivers and roads. It can also include the surface of other planets, the moon, asteroids and meteors. Topography is closely linked to the practice of surveying, which is the practice of determining and recording the position of points in relation to one another.
Underpinning	Laying a structural foundation below an existing structure to add support

• ANNEX 2: LIST OF INTERVIEWEES

Interviews Conducted by ESMP Capacity Building/Behavioral Change Team

	Interviewee Name	Job Title	Department	Entity	Date of Interview[1]
1	Eng. Samar Bahous	SKEP Chief of Party	Management	Engicon Consultants	May 5
2	Ibrahim Mahfouth	IT Manager	IT	Engicon Consultants	May 5
3	Eng. Nemer Bitar	General Manager	Management	Al Bitar Consultants	May 6
4	Eng. Jumana Hassani	Team Lead	Design Department	Al Bitar Consultants	May 6 & July 31
5	Eng. Laila Ghanim	Manager	Proposals and Contracts	Al Bitar Consultants	May 6
6	Eng. Hashim Al Faqih	Engineer	Project Management and Planning	Al Bitar Consultants	May 6
7	Mr. Abdullah Hassouneh	Policies and Strategic Planning Directorate	Planning and Educational Research Managing Directorate	MOE	May 27
8	Mr. Mohammed Abu Hajileh	Managing Director	Supplies Managing Directorate	MOE	May 27
9	Eng. Laila Alhousna	International Tenders Section Head	Supplies Managing Directorate	MOE	May 27 & July 28
10	Mr. Mohammad Al Manasser	Financial Affairs Managing Director	Finance	MOE	May 27
11	Dr. Haifa Jayousi	Team Leader	Education Quality and Accountability Unit (EQAU)	MOE	May 28 & July 28
12	Dr. Balsam Maittah	Managing Director	Internal Controls Unit	MOE	May 28
13	Eng. Rana Al Rai	Maintenance Section Head	Buildings and International Project Directorate	MOE	May 28
14	Mr. Khaldoun Shkokani	Team Leader at MOE	Audit Bureau	Audit Bureau	May 28

[1] All interviews were conducted in 2019.

15	Mr. Mohammad Hmeidat	Auditor at MOE	Audit Bureau	Audit Bureau	May 28
16	Eng. Azmi Hmeidi	International Tenders Coordinator	Development Coordination Unit (DCU)	MOE	May 29
17	Mr. Marwan Turman	Education Technology Manager	Queen Rania Center for Education and Information Technology (QRC)	MOE	May 29
18	Mr. Abdulnasser Hishmeh	School and Directorate Development Section Head	School and Directorate Development Program (SDDP)	MOE	May 29 & July 28
19	Mr. Ghazi Johar	Educational Supervisor	School and Directorate Development Program (SDDP)	MOE	May 29 & July 28
20	Eng. Safa'a Beiruti	School Mapping Section Head	Planning and Educational Research Managing Directorate	MOE	May 30 & July 28
21	Mr. Abdullah Hassonah	Policies and Strategic planning Directorate Manager	Planning and Educational Research Managing Directorate	MOE	May 30 & July 28
22	Eng. Maher Toamah	Land Acquisition Section Head	Planning and Educational Research Managing Directorate	MOE	May 30
23	Eng. Samar Qaqeesh	Managing Director	Properties and International Projects Managing Directorate	MOE	June 2
24	Eng. Osama Yousef	Services Section Head	Properties and International Projects Managing Directorate	MOE	June 2 & July 28
25	Mr. Hisham Abu Khashabah	Financial Planning Section Head	Policies and Strategic Planning Directorate	MOE	June 2
26	Mr. Tamer Alazem	HR Planning Section Head	Policies and Strategic Planning Directorate	MOE	June 2
27	Eng. Areej Nmair	Buildings Tenders and Maintenance Section Head and Acting Engineering Studies Section	Properties and International Projects Managing Directorate	MOE	June 2 & July 28
28	Eng. Wijdan Nazzal	Strategic Planning Section Head	Planning and Educational Research Managing Directorate	MOE	July 4 & July 28
29	Dr. Raba'a Abdullah	Managing Director	Marka Field Directorate	MOE	July 15

30	Mr. Attallah Maqablah	Planning Section Head	Marka Field Directorate	MOE	July 15
31	Eng. Yasser Al Khaldi	Properties Section Head	Marka Field Directorate	MOE	July 15
32	Abeer Al Ali	Planning Officer	Marka Field Directorate	MOE	July 15
33	Dr. Shaker Al Alaween	Managing Director	Al Qweismeh Field Directorate	MOE	July 16
34	Dr. Nizar Al-Duquss	Technical and Educational Affairs Department Head	Al Qweismeh Field Directorate	MOE	July 16
35	Dr. Hisham Al Qawasmi	Admin Department Head	Al Qweismeh Field Directorate	MOE	July 16
36	Eng. Khalil Al-Maraeah	Properties Section Head	Al Qweismeh Field Directorate	MOE	July 16
37	Eng. Enaam Lahham	Head of Maintenance Planning	Maintenance Department	MOE	July 28
38	Eng. Nadia Al Ahmad	Director of Buildings Department	Buildings Department	MPWH	July 29
39	Eng. Jumana Shihadeh	Buildings Department	Buildings Department	MPWH	July 29
40	Eng. Suhair Burgan	Head of Studies Unit	Buildings Department	MPWH	July 29
44	Eng. Jihad Suilem	Head of Execution and Maintenance of Schools Department	Execution and Maintenance of Schools Department	MPWH	July 29
45	Eng. Basemah Shihan	Engineer	Execution and Maintenance of Schools Department	MPWH	July 29
46	Eng. Doa Othman	Engineer	Execution and Maintenance of Schools Department	MPWH	July 29

Interviews Conducted by ESMP Procurement Team

	Interviewee Name	Job Title	Department	Entity	Date of Interview[2]
1	Eng. Arig Namair	Head of Follow-up of building tenders Section	Directorate of Engineering Affairs	MOE	May 5

[2] All interviews conducted in 2019.

2	Eng. Layla Al Hasani	Head of Section	International Tendering Department	MOE	May 27 & July 21
3	Azmi Hamedi	Tendering coordinator	DCU	MOE	May 23
4	Khelaf Alarud	Head of the Decentralizatio n section	Directorate of Engineering Affairs	MOE	May 27 & July 21
5	Muhamed Qteshat	Head of the Local Procurement Department	Procurement	MPWH	July 21
6	Muhamed Al-Edwan	The Procurement Director	Procurement	MPWH	July 21
7	Dr Jamal Qteshat	Secretary General of the National Construction Council	The National Construction Council	MPWH	July 14
8	Eng.Ettaf Abu Hamedah	The Bidding Director	The Bidding Directorate	GTD	July 16
9	Eng. Demah Hajer	Head of the Contractors Classification Section	Directorate of classification and qualification	GTD	July 16
10	E Maram Ayuob	Head of projects planning section/ STC secretary	projects planning department	MPWH	July 16 & July 25
11	Rema Klaldah	Head of the Consultants Qualification Section	Directorate of Classification and Qualification	GTD	July 18
12	Eng. Reda Gumaah	Engineer at Consultants Qualification Section	Consultants Qualification Section	GTD	July 18
13	Eng. Suheer Burqan	Studies Director	Directorate of the Technical Affair	MPWH	July 18
14	Eng Nadai Al-Ahmed	Director of Technical Affairs	Directorate of Technical Affairs	MPWH	July 18
14	Eng. Jehad Suelm	Director of Implementing and	Directorate of Implementing and Maintaining the	MPWH	July 18

		Maintaining the Buildings of Educational Sector	Buildings of Educational Sector		
15	Eng. Doaʿa Authman	USAID Projects Coordinator	Directorate of Implementing and Maintaining the Buildings of Educational Sector	MPWH	July 18
16	Eng. Bahsama Shehan	Engineer	Directorate of Implementing and Maintaining the Buildings of Educational Sector	MPWH	July 18

Interviews Conducted by ESMP Data and Information Management Team

	Interviewee Name	Job Title	Department	Entity	Date of Interview[3]
1	Eng. Safaa Albieruti	Head of GIS Section	Planning and Educational Research Department	MOE	July 7 & July 23
2	Khelaf Alarud	Head of the Decentralization section	Management of Buildings and Projects	MOE	July 21
3	Muhamed Qteshat	Head of the Local Procurement Department	Management Supplies and Equipment	MOE	July 21
4	Muhamed Al-Edwan	The Procurement Director	Management Supplies and Equipment	MOE	July 21
5	Eng. Layla Al Hasani	Head Section of International tendering	Planning and Educational Research Department	MOE	July 21
6	Maher Teamah	Head of Land Acquisitions Section	Planning and Educational Research Department	MOE	July 21
7	Abdallah Hassunah	Director of Strategic Planning	Planning and Educational Research Department	MOE	July 21
8	Dr. Ahmad A'aen	EMIS Team	Queen Rania Center for Education and Information Technology	QRC	July 7

[3] All interviews conducted in 2019.

9	Eng. Ruba Al Omari	Managing Director of the Queen Rania Center for Education and Information Technology	Queen Rania Center for Education and Information Technology	QRC	July 7
10	Ahmed M. Al-Sleiti	Coordinator for Data User Programs, Programmer	Department of Management Information System (MIS)	QRC	July 7
11	Eng. Ahmad Al-Durgham	Head of Buildings Survey	MPWH – Directorate of Survey and Acquisition / Buildings Survey	MPWH	July 7
12	Engr.Lana Maqtash	GIS Unit Manager	GIS Unit	MPWH	July 7

Interviews Conducted by ESMP School Design and Construction Team

	Interviewee Name	Job Title	Department	Entity	Date of Interview[4]
1	Sami Issa Al-Salaita	Secretary General for Administrative and Financial Affairs	Administrative and Financial Affairs	MOE	July 11
2	Christian Ritchter	Head of Division Employment and Education - Middle East	Employment and Education-Middle East	KFW	July 11
3	Christian Ritchter	Head of Division Employment and Education - Middle East	Employment and Education-Middle East	KFW	July 12
4	Eng. Mahmoud H. Khliefat	General Manager of GTD	Tender Department	MPWH	July 14
5	Costanza Farina	UNESCO Representative to Jordan	Country Rep Basic Education and Youth	UNESCO	July 18
6	Courtney Babcock	Deputy Office Director		USAID	July 18
7	Eng. Nehayah Burqawee	Head of Maintenance Follow Up Section	Maintenance Department	ME	July 22
8	Eng. Mahmoud H. Khliefat	General Manager of GTD	Tender Department	MPWH	July 22

[4] All interviews conducted in 2019.

• ANNEX 3: EDVISE ME FGD ATTENDANCE SHEET

East Amman - Focus Group (Parents)

Name	# of Children	School Type
Amal Mujarat	3	Public
Jumana Aburado	4	Public
Noor Hamad	3	Public & Private
Zuhair al Affa	4	Public
Zain Mohammad	3	Public
Lina Mustafa	2	UNRWA
Maya Abu Abdo	2	Public
Lama Al Kaydi	3	UNRWA
Amal Al Namouti	3	Private & UNRWA
Sarah	7	Public, Private & UNRWA
Lama Ahmad Saraybeh	2	Public & Private
Maysoon Ajaleen	3	Public
12	**39**	

Jerash - Focus Group (Parents)

Name	# of Children	School Type
Khulud Saleh Al Shaykhah	3	Public
Fadwa Jansiz	2	Public
Zainab Abu Khalil	5	Public & Private
Mariam Jabr Nabat	3	Public
Alia Mohammad Momani	4	Public
Ghadeer Azmi Alhawamdeh	2	Private
Samira Jihad Alkayed	1	Private
Muna Fathi Mustafa Taha	2	Public
Hanan Yousef Mughrabi	4	Public
Wajd Ziad Aawan	4	Private
Layla Abdellatif Juneidi	2	Public & Private
Rawan Muhideen Oqdah	2	Public
May Fayez Ahmad	3	Public & Private
Sabah Mahmoud Abu Kushk	4	Public
14	**41**	

ANNEX 4: DESIGN PROCESS

Timetable for Design Studies Stages and Allocated Durations for Their Completion

(Source: MPWH Arabic Adaptation of the Engineering Services Contract as Presented by FIDIC)

**Translated to English by ESMP*

Stage	Description	Days
1	● Starts from instruction to start date and lasts until completion of all stage one requirements. ● Review and evaluate of stage one works by the employer.	5 2
2	● Starts from written approval of employer on stage one works and includes carrying out revisions and alterations instructed by employer on stage one works and the completion of stage two works ● Review and evaluation of stage two works by the employer. ● Starts from date of employers written approval on stage two works and includes carrying out revisions and alterations instructed by employer on stage two works and the submittal of two copies of draft final documents. Review and evaluation of draft final documents by employer.	30 2 10 3
3	● Presentation of all works design documents by the designer with number of copies as per the particular contract being designed.	3
	● Design period for the design firm . ● Review and evaluation of documents by the employer. ● Total agreement duration including employer reviews. ● Agreement duration for all projects.	48 7 55 55

Designers Duties During Various Stages of Design and Studies

The consultant must prepare studies and design drawings and offer relating engineering services, in all design stages as follows:

STAGE 1:
Description of works at this stage are defined in special conditions of the agreement and must include the following:

- The study of the project requirements as prepared by the employer, and fully studying all project requirements and commenting on it and deciding on the concept to be used one employer approval has been obtained.

- Preparation of visual report (3) copies, that includes full comprehensive program which should include all project elements services, including the followings:

- A brief description of the project nature, its elements and it inter serving relations.
- Establishing areas required for each project element and the total area.
- Concept drawings identifying major project components and main zoning (two copies).
- Prepare and present skeleton drawing identifying the various project elements.
- Prepare and present topographical drawing for the project site using maximum 50cm grid, including the identification and physical installation of project corners using fixed concrete block. Also, the establishment of surrounding roads level.
- Prepare and present 5m grid topography drawings for site plan.
- Study adjacent buildings and offer as built drawings for same (for use in rehabilitation, works permits, expansion etc.)
- Prepare and present three copies (200:1 scale) of architectural drawings for the project buildings.
- The study of existing building's electro-mechanics services for the purpose of designing its connection to new building.
- Presenting a description of structural and electromechanical elements that will be detailed at later stages complete with materials to be used.
- Presenting a description of substructure elements; like water distribution, sewer drainage system, surface water dispersion system, electricity and communication system and any other system that may be needed.
- Setting up a testing system for soil and structural integrity, and carrying out the same.
- Presenting stage report including estimated costs. (three copies).
- Presenting photographs for all existing project elements: trees, lamp posts, septic tanks, perimeter walls, existing buildings, culverts, drainage channel, etc.
- Environmental study of the site.

Note: If circumstances require additional special specifications/tasks that are not included within this list of duties, the employer should, in consultation with the owner, identify these requirements and the consultant's additional duties, which need to be added accordingly.

STAGE 2A:

- Carrying out the required changes and alterations as requested by the employer on Stage 1 works.

- Preparation and presentation of architectural drawings for the buildings (site plan with suitable scale, plans, sections, architectural details for main sections, all architectural details required for the project) and all internal design, and furniture layout in a scale of 1/100 (3 copies).

- Presenting all structural and electromechanical drawings and details and for all elements of works in 1/100 scale (two copies).

- Preparation and presentation of all detailed drawings relating to infrastructure elements, such as water distribution, sewer system, surface water drainage, any other related elements.

- The consultant engineer is to present two copies of electromechanical and architectural drawings (site plan, plans, sections, elevations, architectural details, and all required details) to civil defense authority in order to gain their initial approval for licensing.

- The consultant engineer is to apply and follow up on proposed building license application with Amman Municipality or local council.

- Prepare and present all drawings and studies including Bills of Quantities, required contract documents, as detailed later in this document and presenting the works of this stage to allow for the employer review. (3 copies)

STAGE 2B:

- Carrying out alterations on drawings in line with employer instructions for stage two.
- Presenting three copies of final draft.
- The employer will check and review the final draft drawings within a maximum period of three days from the date of receipt then informs the consultant in writing of any related comments.

STAGE 3:

This is the stage when all contract final documents are to be handed over with the final report for all the project with copies of drawings as follows:

- 10 copies of conditions, specifications and Bills of Quantities.
- 10 copies of all drawings including architectural details in normal size.
- 5 copies of architectural details in A3 size.
- The original translucent copy of drawings framed.
- Priced document of Bill of Quantities.
- The final report for this stage including the final areas for the project and estimated construction cost.
- Presenting 5 CD`s of all drawings, specifications, special conditions etc., which are compatible with the employer's electronic system and offering it on USB flash.
- Isometric drawings with suitable scale for two locations at most, to be agreed with the coordination engineer.
- 5 copies stamped and approved by Jordan Engineers Association, Civil Defense and any other related authority.
- 5 copies of soil test report stamped by Jordan Engineers Association.
- The consultant engineer responsibility to include obtaining initial approval from licensing authorities as per current planning regulations. It is also his responsibility to alter any drawings etc. to suit their requirements at his own expense, when the employer completes the licensing requirements.

General Considerations When Preparing Designs and Studies

- The consultant engineer must show any possibilities of vertical and horizontal expansions of any of the project elements.

- The consultant engineer is to prepare the designs in such a way that it reflects local traditions and environment and takes in consideration economical future maintenance.

- The consultant engineer is to have consideration for beauty and economy and ensure approval of related legislative bodies when designing the project.

- The consultant engineer must ensure that suggested areas are suitable for the required purpose use and taking care that all suggested areas are in line with clear design standards.

- The consultant engineer is to ensure that suggested areas are suitable for fixed and removable furniture.

- Design codes to be in line with the Hashemite kingdom of Jordan codes, except in special cases when employer prior agreement must be sought.

- The consultant engineer is to arrange the Bill of Quantity items with the following agreed categories, as guided by MPWH standard format as a minimum.

- Details for each project as follows:
    - Preparation works (demolition, removal of obstacles, etc.)
    - All works under floor tiles
    - All works over floor tiles
    - Plastering works
    - Floor slabs and floor tiles
    - Roof sealants, expansion joints and surface water drainage
    - Woodwork finishes
    - Metal works
    - Laboratories (if needed)
    - Painting works
    - Sanitary works
    - Electrical works
    - Air conditioning and mechanical works

- External Works:
    - Preparation works
    - Walls and retaining walls
    - Playgrounds and playing fields
    - External drainage and mechanical works
    - Septic tanks
    - Electrical works and external lighting
    - Main entrance and exit works

- The consultant engineer is to present all studies and calculations related to the project design in connection with Architectural, Civil, Electrical, Mechanical, Drainage etc.

- The consultant engineer is to prepare and present specifications and designs of external yards, external lighting, landscaping, yards circulation, including any arrangements with third parties/entities that may be required.

- The consultant engineer, if requested by the employer, participates in the study and evaluation of contractor's related tenders.

- Metric system to be adopted in the design and studies.

- The consultant engineer is to include for a provisional sum of 5% of estimated total project cost for the purpose of connection of services or any additional requirements that may be needed. The consultant engineer is to quantify the services connections costs and reflect that in the provisional sum.

- It is the consultant engineer's responsibility to prepare Bill of Quantities and specifications and checking both for compatibility with final design and soil test reports.

- In case the increase of final quantities, following the design drawings, and the increase is higher than 10% of the quantities stated in the contract and without justifiable reason, especially for quantities under floor tiling/floor slab, this will reflect badly on the consultant engineer`s classifications at the GTD. The consultant engineer will be charged with additional costs due to resulting VOs.

- It is the consulting engineer`s responsibility to carry out structural integrity tests for all structural elements for the existing building, if the project entails vertical expansion. Thus, ensuring its safety and capability of supporting additional floors and presenting technical report and structural drawings which clarifies the followings.
- Capacity of existing building to carry additional floors, including number of, complete with methods of any additional structural support for structural elements that may be required. This to include the presentation of all related design drawings and details.

- Structural system and direction of loading in existing building.

- Supplying 3 offers from specialist structural testing firms so that structural testing steps can be studied and approved by the employer.
- The consultant engineer must define priorities of the construction project elements in coordination with the employer and prepare a time scale program for project implementation and adherence to.

- The consultant engineer is to be guided by codes, specifications and guidance notes as issued by MPWH, country building council and Jordan Standards and Metrology department in the preparation of all studies, designs including the new codes (solar energy code), (energy saving buildings code), and other codes and specifications relating to building projects.

Details of Required Drawings

The consultant engineer is to allow for all requirements set out in instructions issued by Jordan Engineers Association in relation to Architectural, Structural, Electrical, Sanitary and air conditioning and heating including the followings:

- **Architectural Works:**
  - General Site Plan scale 1/200, and if site is large a further general site plan 1/500 or whatever is suitable to be presented.
  - Architectural Plans 1/100 scale.
  - Architectural Elevations 1/100 scale.
  - Architectural sections 1/100 scale.
  - Architectural details 1/5, 1/10, 1/20 and 1/50 scale.
  - Furniture and fixed furniture plan and details of fixed furniture.
  - Finishes schedule.
  - Detailed drawings for landscaping, external yards and planted areas.
  - Prepare and present chart drawings showing all technical symbols.
  - Any other drawings or details that may be necessary.
  - Prepare and present sound isolation drawings if required.
  - Topography drawings for general site 1:200 scale.
  - Grid level survey for general site plan 1:100 scale.

- **Structural Works:**
  - The supervision of soil tests and site investigations and structural integrity test if required, which are usually assigned to specialist firm by the consultant engineer. Then the study and evaluation of the related technical report.
  - Foundations design to be based on recommendations and test results of the soil report, also to be designed on various soil strengths (1, 1.5, 2, 2.5, 3) kg/cm2. Columns and its structural details with CD copy as approved during design and within structural memo, adhering to agreed design standards, ensuring adherence to approved MPWH design codes and Jordan Engineers Association instructions relating to earthquakes.
  - All floors roof slabs, beams, stairs, expansion joints and related structural details.
  - External works structural drawings and details (retaining walls, walls, tanks, etc.)
  - Chart Drawings showing all technical symbols.
  - Preparing and presenting technical reports, structural drawings and structural details relating to structural integrity tests of existing building.
  - Any other drawings or details that may be required.

- **Electrical Works:**
  - Drawings for lighting and extract fans (if existing), complete with numbering of electrical circuits.
  - Drawings for power and fans, complete with separate numbering of electrical circuits.
  - Drawings for bells push buttons, IT sockets, phone sockets, TV sockets, PA and data show sockets.
  - Main Distribution board drawings, detailing all breakers and related power capacity that feeds floors. Also, main breaker including details.
  - Earthing system drawings for all boards, including generator earthing, if applicable.
  - Drawings showing main power feed system, including cables and wires, pipes used, its paths, start and end points.
  - Drawings for fire alarm system and lightning protection.

- Drawings showing power loading distribution on sub mains boards showing the various electrical circuits, areas of wires sections for every individual circuit and the breaker strength estimated in Ampere.
- External works plan showing external electrical works, external lighting points and its related paths.
- Drawings for IT and telephone systems, fire alarm system, sound alarm, observation, sound system, and visual systems (if applicable) and others.
- Drawings showing symbol chart.
- Any other drawings that may be required.
- Calculation Memo.
- Drawings showing electrical loadings requirements for mechanical equipment.

- **Mechanical Works:**
  - General site layout showing, water distribution network, drainage system starts and end points, also distribution of main mechanical systems feed if applicable; like (central Heating, firefighting system, gases, air conditioning, steam, irrigation system, …etc.)
  - Drawings showing vertical installation for mechanical systems.
  - Drawings showing horizontal installation for mechanical systems.
  - Detailed drawings showing locations, sizes and types of mechanical systems scale 1/20.
  - Drawings showing symbol chart.
  - Detailed drawings showing relationship between various electrical and mechanical systems and others to avoid clash between these systems.
  - Any other drawings that may be required.
  - Calculation memo.
  - General Comments:
    - The original copy of drawing must be framed.
    - Consultant Engineer is to produce drawings and contract documents within the agreed time.

Checking Out and Evaluation Committee Responsibilities

In case a committee was formed with responsibility of checking all design stages in liaison with the owner representative, their responsibility would be restricted to the followings:

- Discussion of the main project requirements (electrical system, mechanical system, finishes, details, and furniture) with the concerned entity and identification of the main requirements.
- Discussion with the consultant engineer regarding the identified concepts for design bases, various studies, and project nature.
- Follow up of design engineer throughout the design stages and various studies.
- Recommendation of approval of various design stages, thus allowing the move to following stage.
- Discussion of initial estimate of financial report.

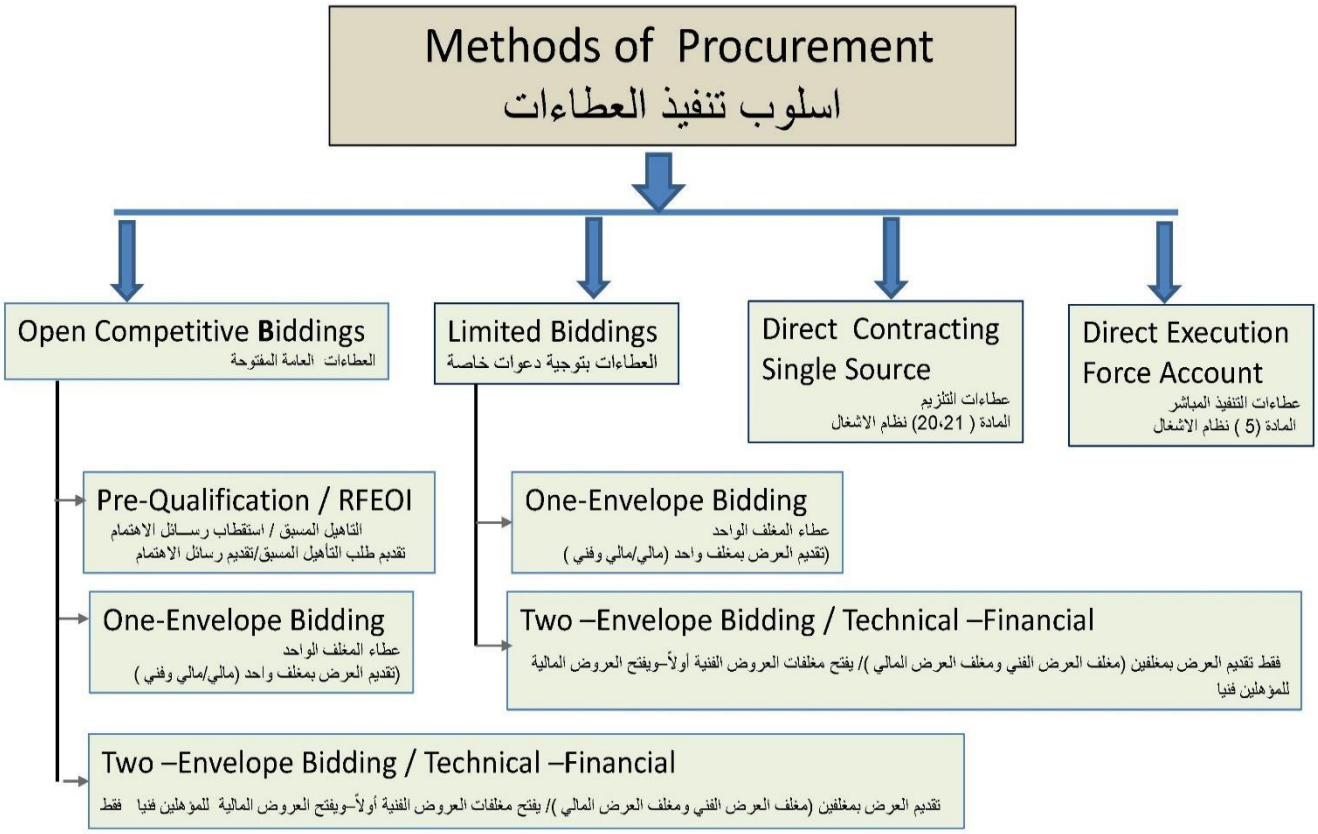
Other Requirements for the Consultant Engineer to Follow When Designing the Projects:

- Uncovered car parks compatible with building area.
- Passageways for less abled persons.
- External playing areas, lining (assembly) areas separated from car parks+ suitable canopy.
- External perimeter walls and entrance and exist gates.
- External drinking fountains with canopies, ensuring heights are suitable for end users.
- Building shafts suitable for electrical, mechanical and communication installation.

- Lift and machines rooms (if applicable)
- Generator Rooms (if applicable).
- Transformers locations (if applicable) to be identified.
- Ensuring approval is sought on all items description and agreement on all systems.
- Any other requirements the employer may find necessary.

- **ANNEX 5: PROCUREMENT FLOW CHARTS**

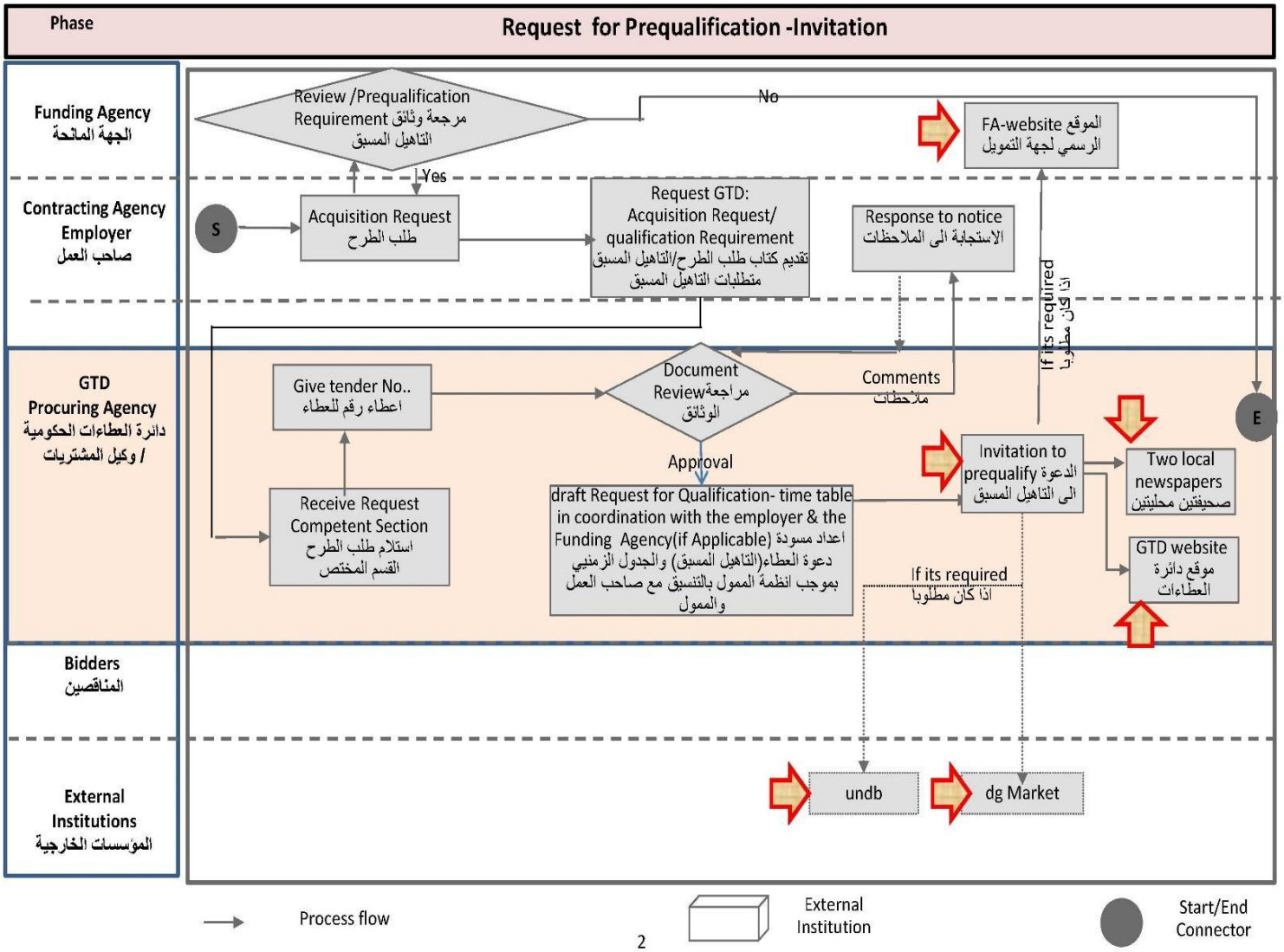
(Source: *GTD Annual Report 2018*)



Methods of procurement according to Article no. 5 of Government Works by Law ----1986 أسلوب تنفيذ العطاءات استنادا الى المادة رقم 5 من نظام الاشغال الحكومية رقم 71 لسنة

1

Bidding Process (Open Competitive Biddings) **التاهيل المسـبق - Prequalification**



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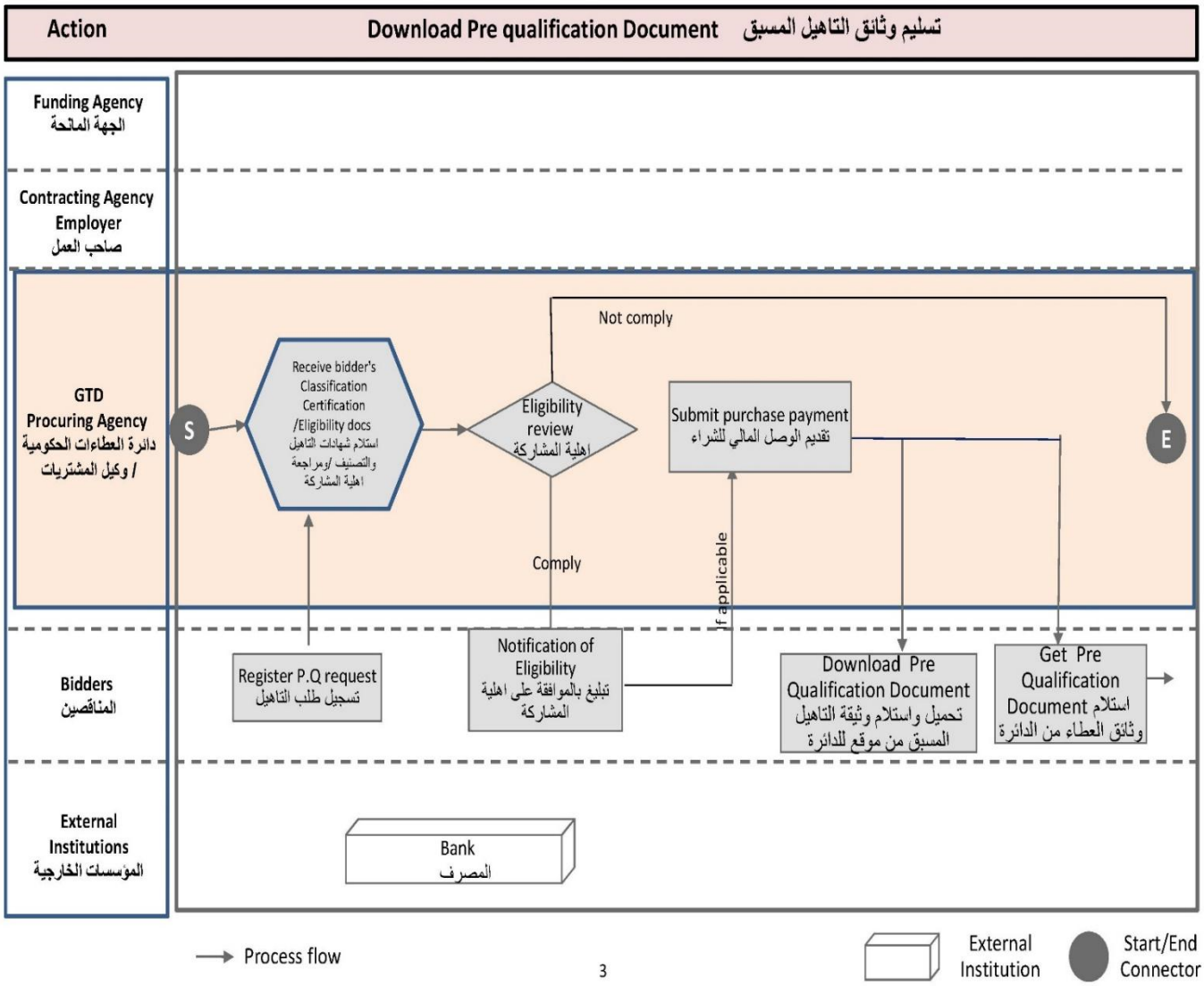
Bidding Process (Open Competitive Biddings- Pre Qualification) عمليات الطرح (التاهيل المسبق –المناقصات المفتوحة)



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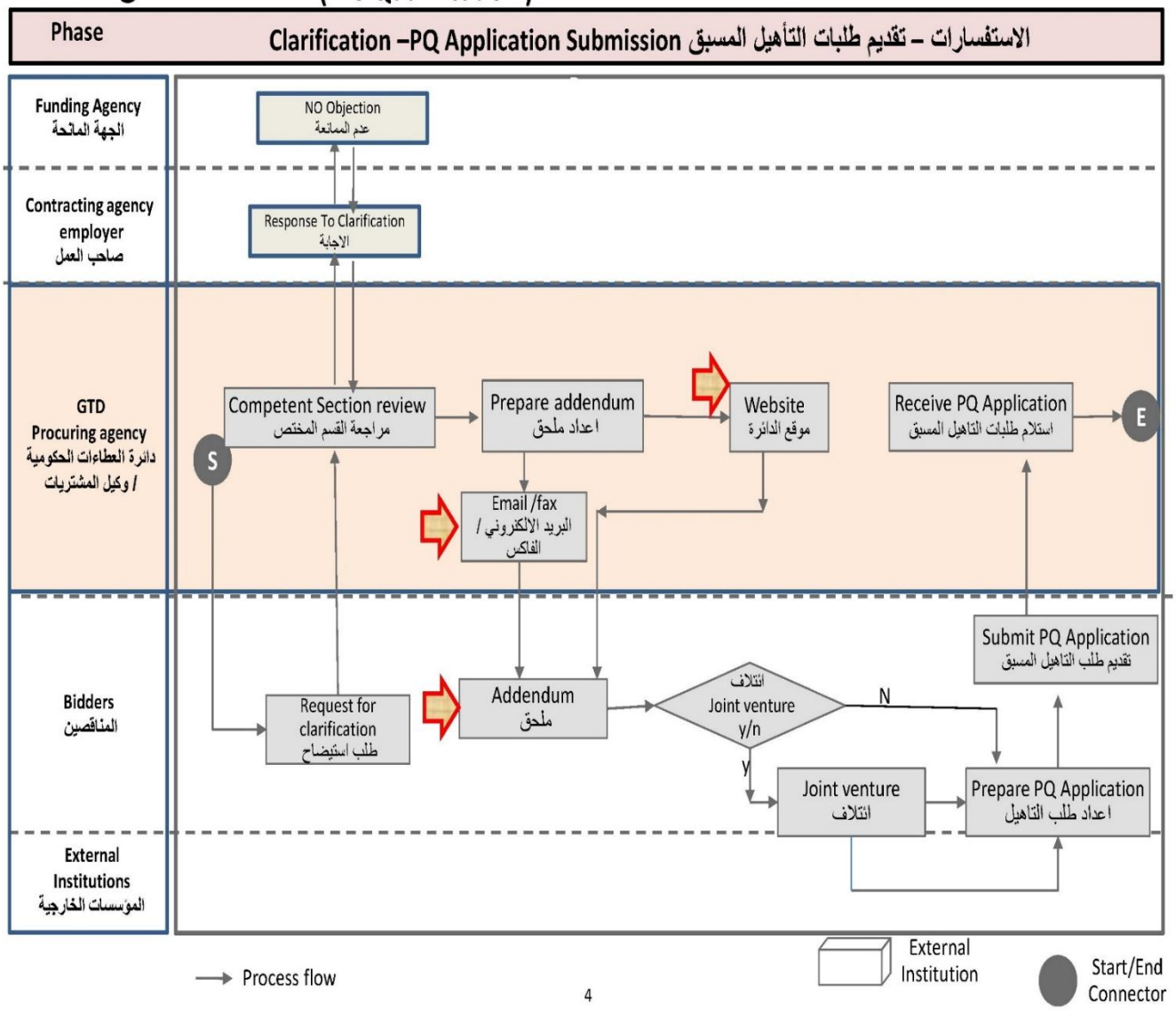
Bidding Process - (Pre Qualification)



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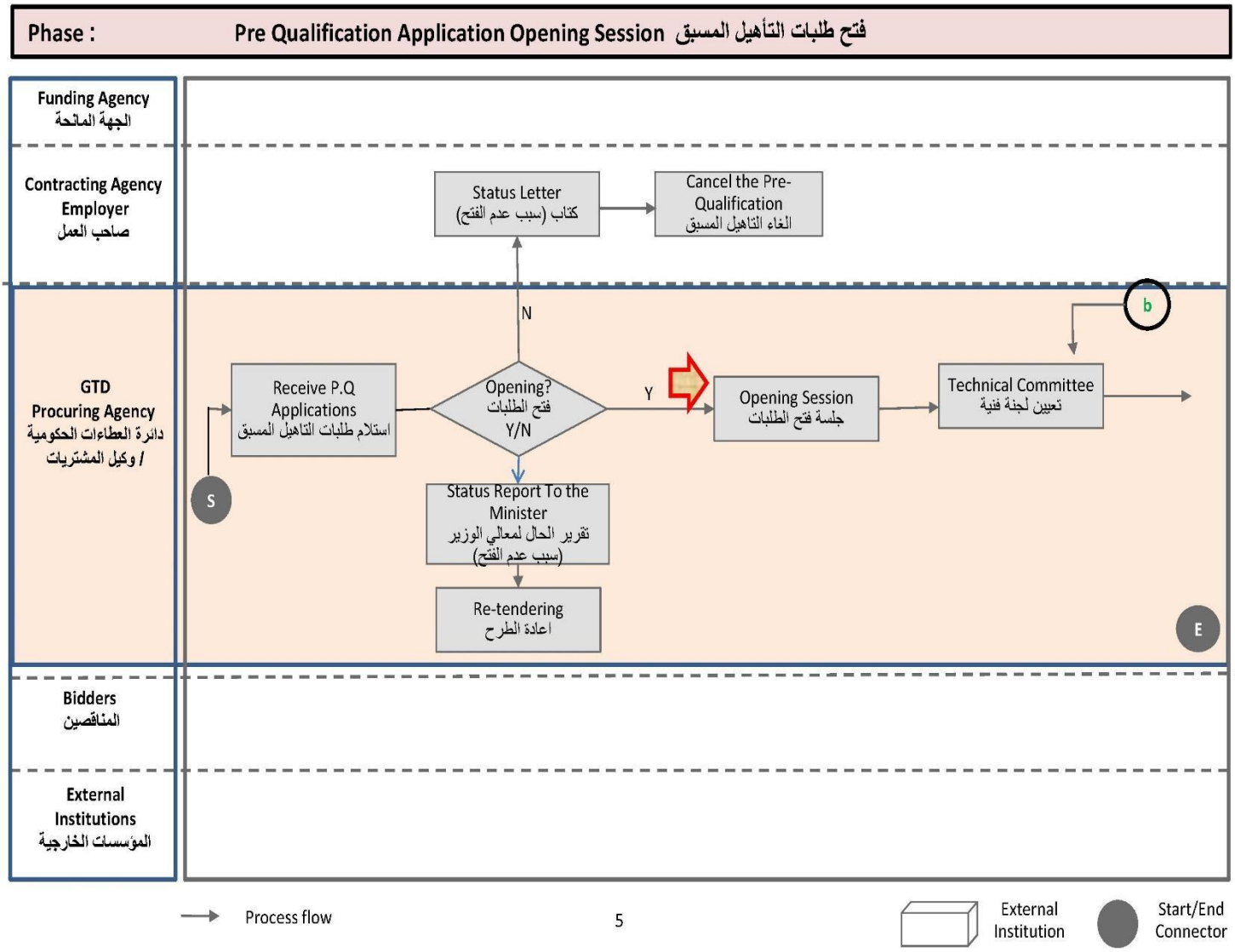
Bidding Process /Pre-Qualification



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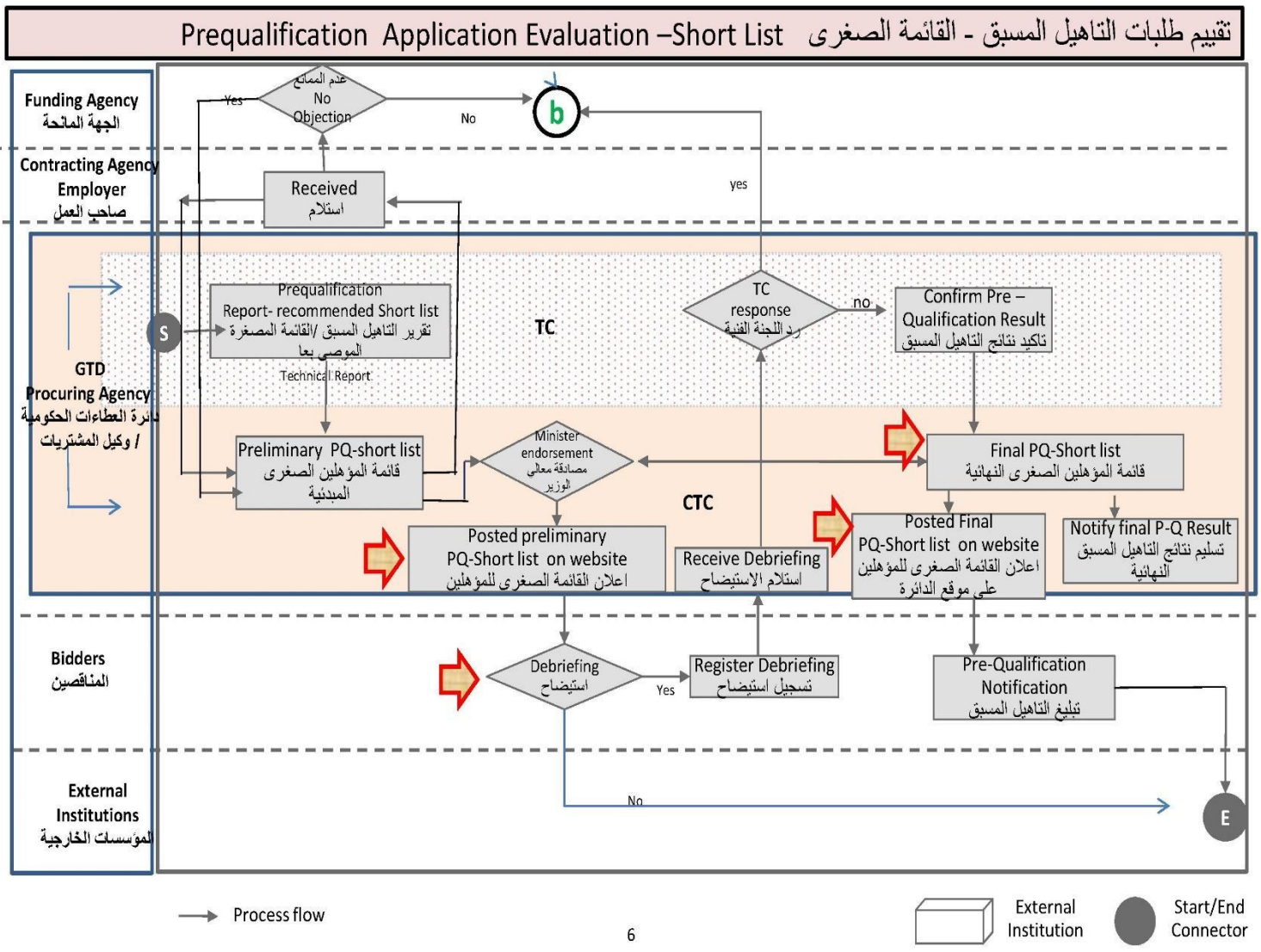
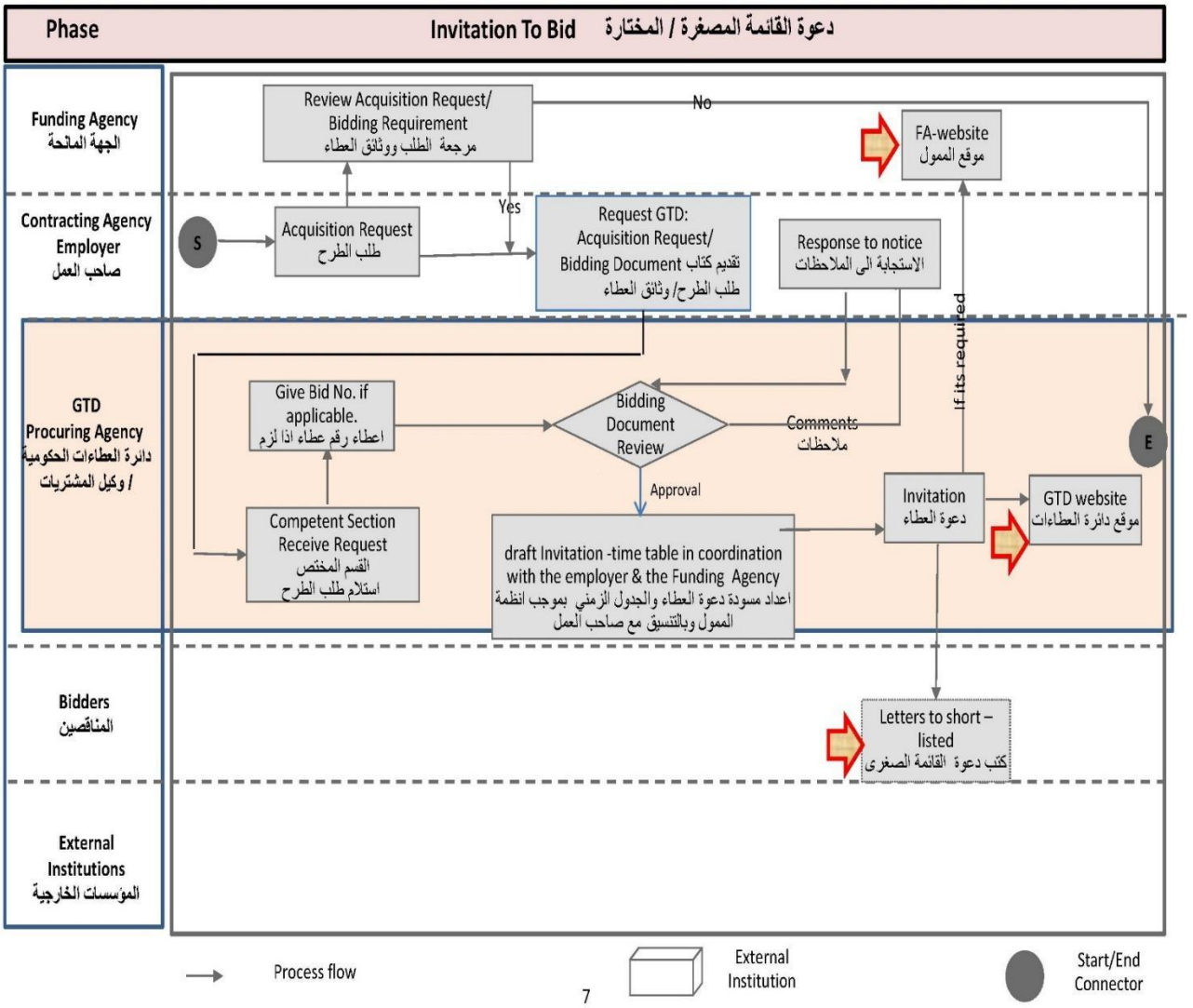
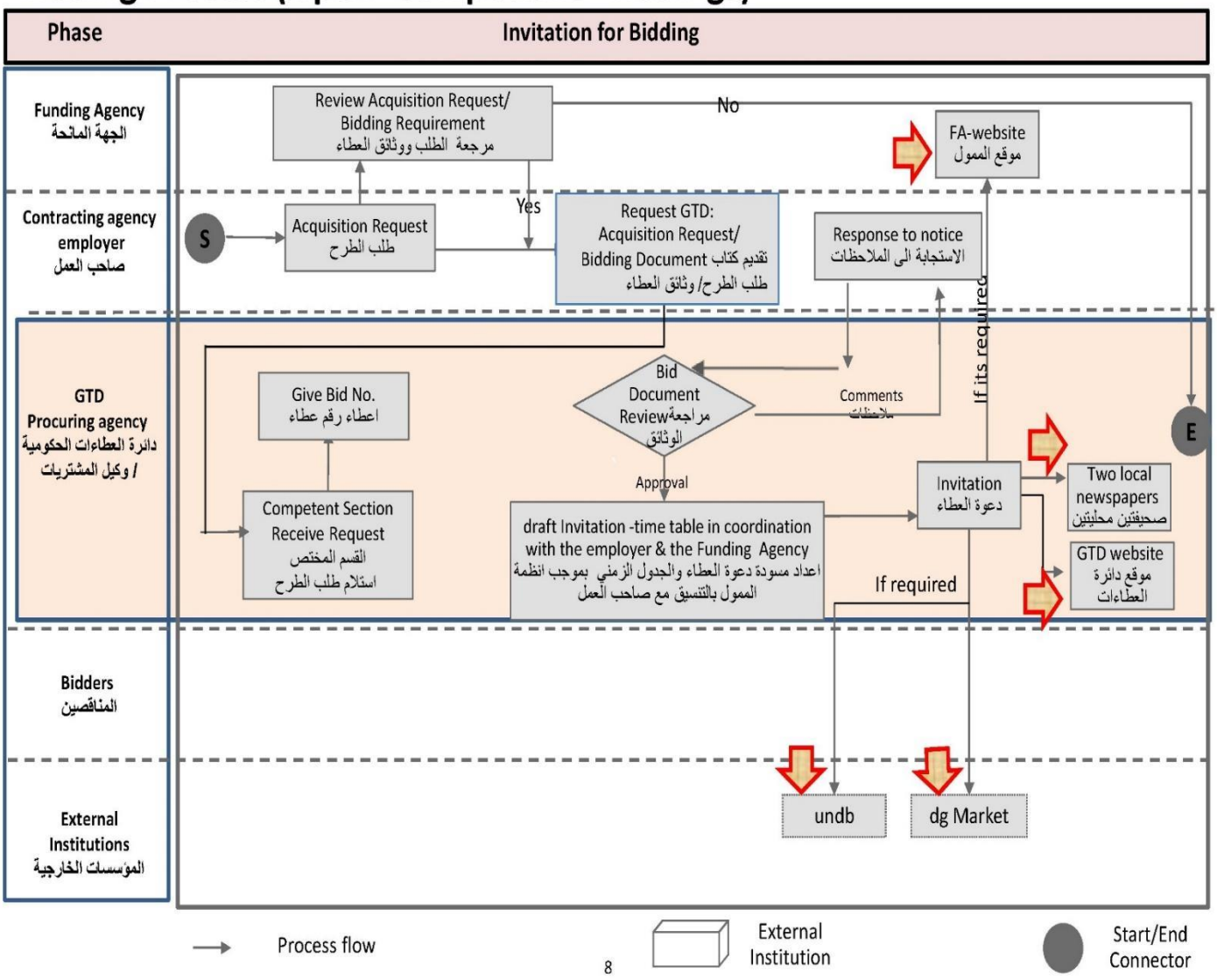
Bidding Process (Prequalification)



Bidding Process : Limited Biddings /Pre Qualified Short Listed

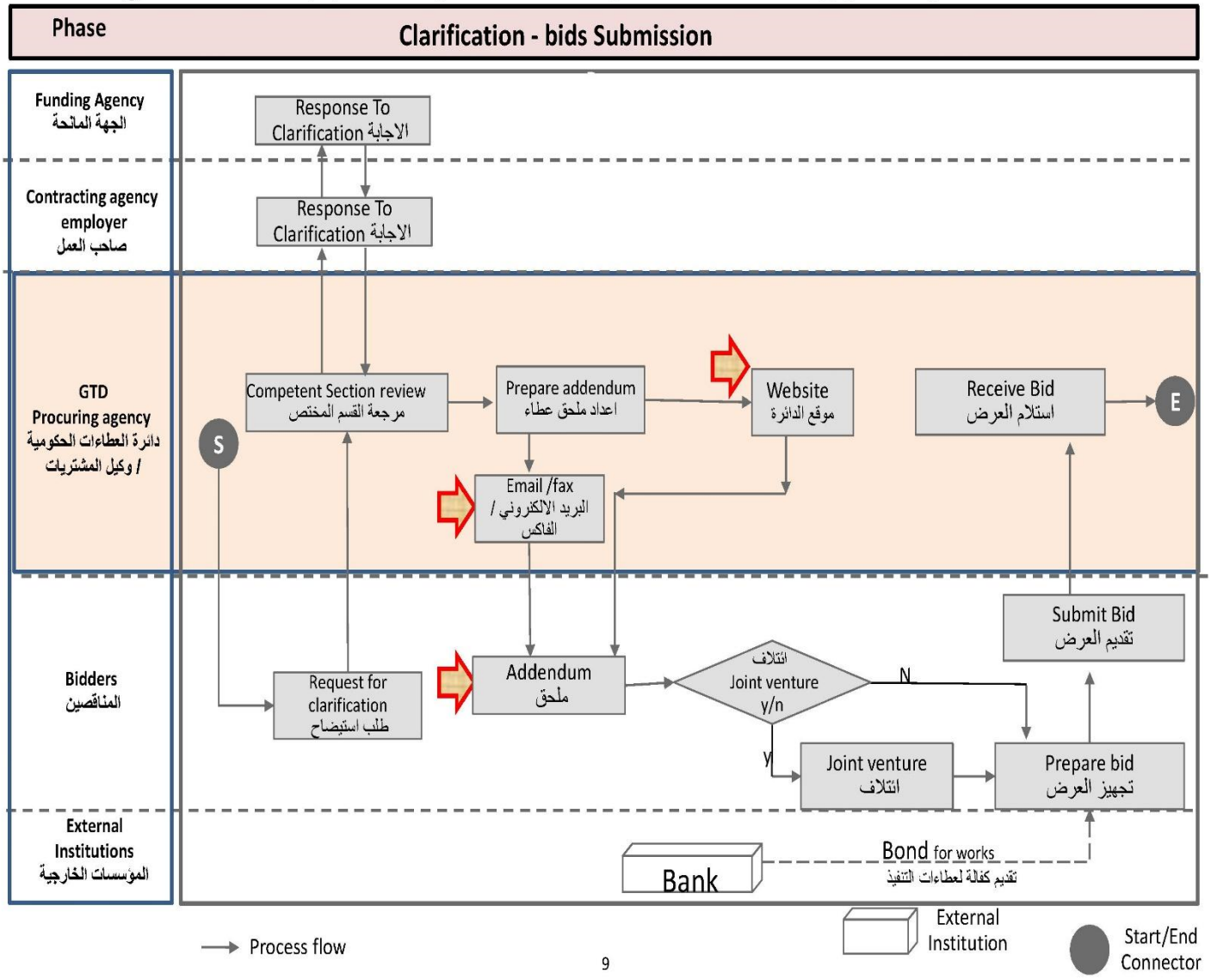


Bidding Process (Open Competitive Biddings)

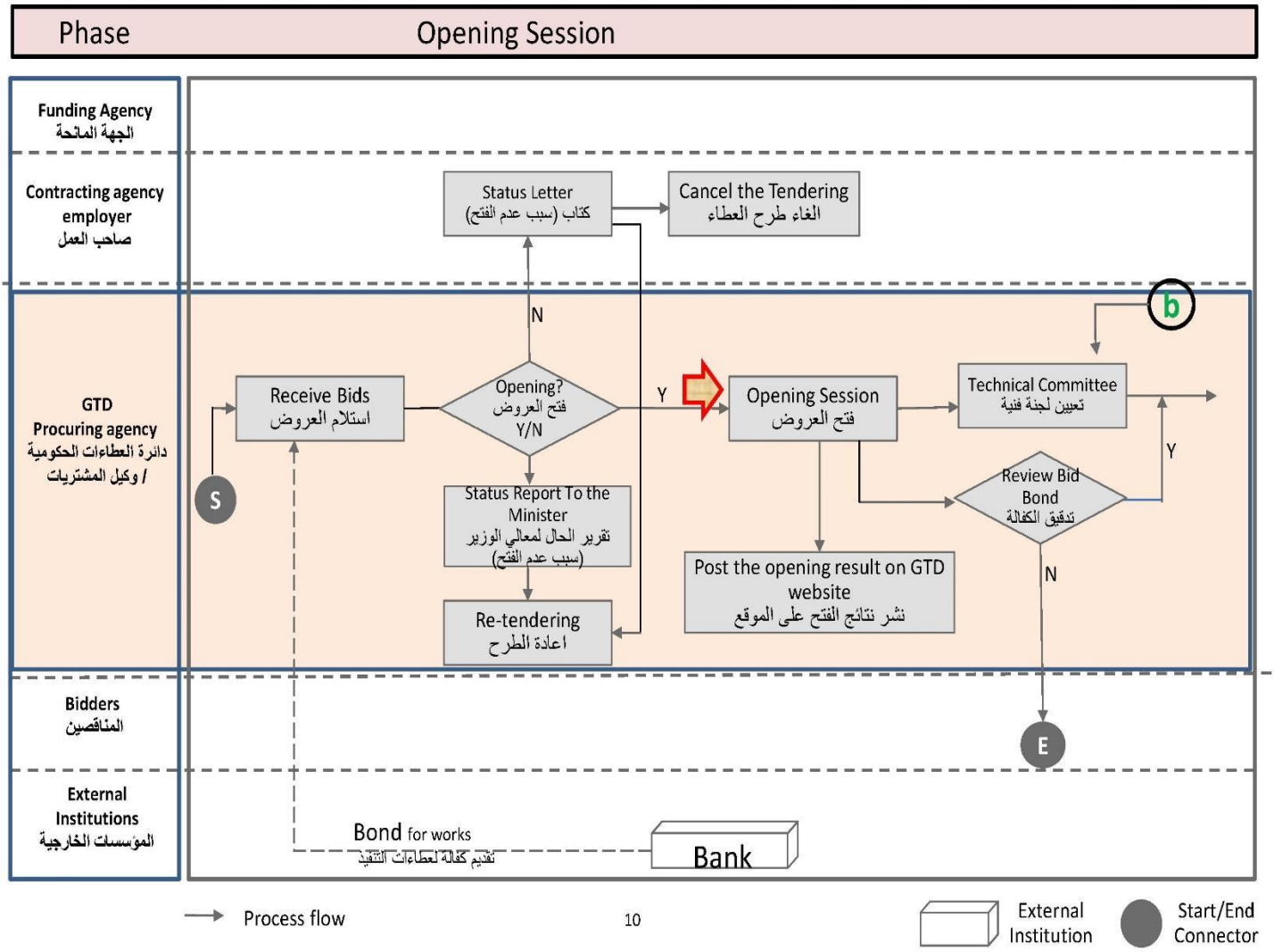


8

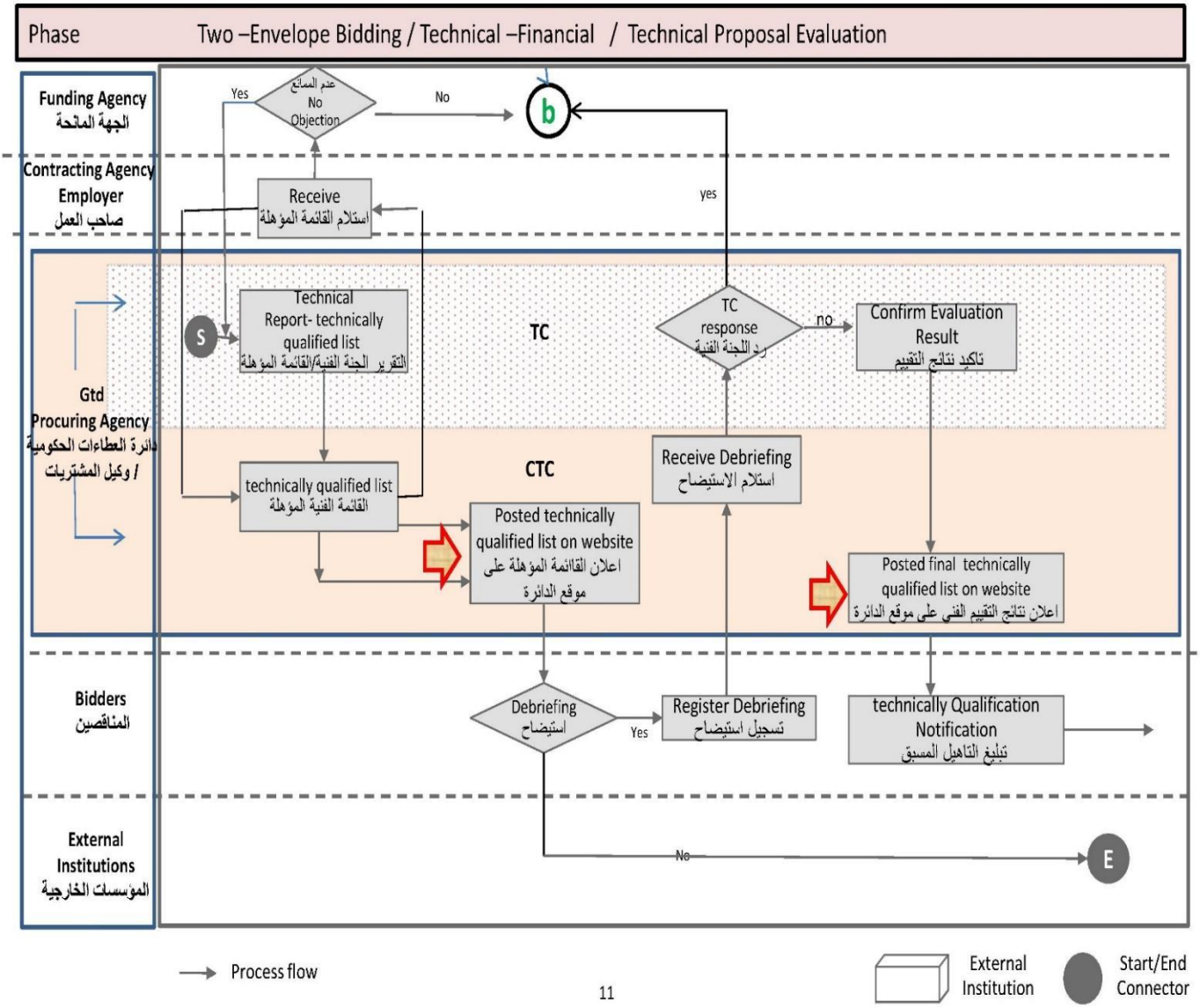
Bidding Process - (Open Competitive biddings /Limited Biddings) – Prequalified short Listed



Bidding Process: Open /Limited Biddings/ Pre-Qualification Short Listed

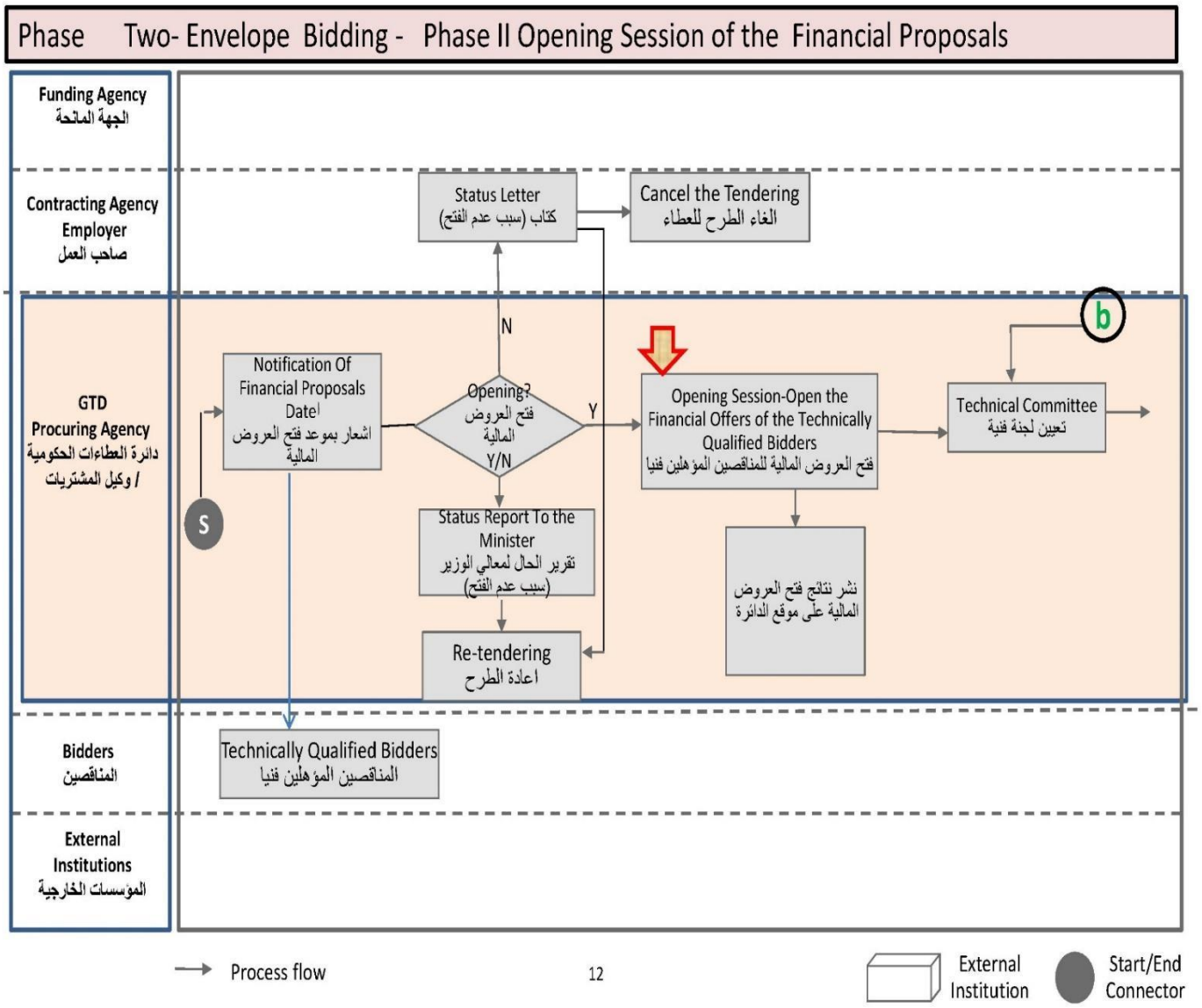


Bidding Process:Open /limited Biddings/ Pre-qualified Short listed

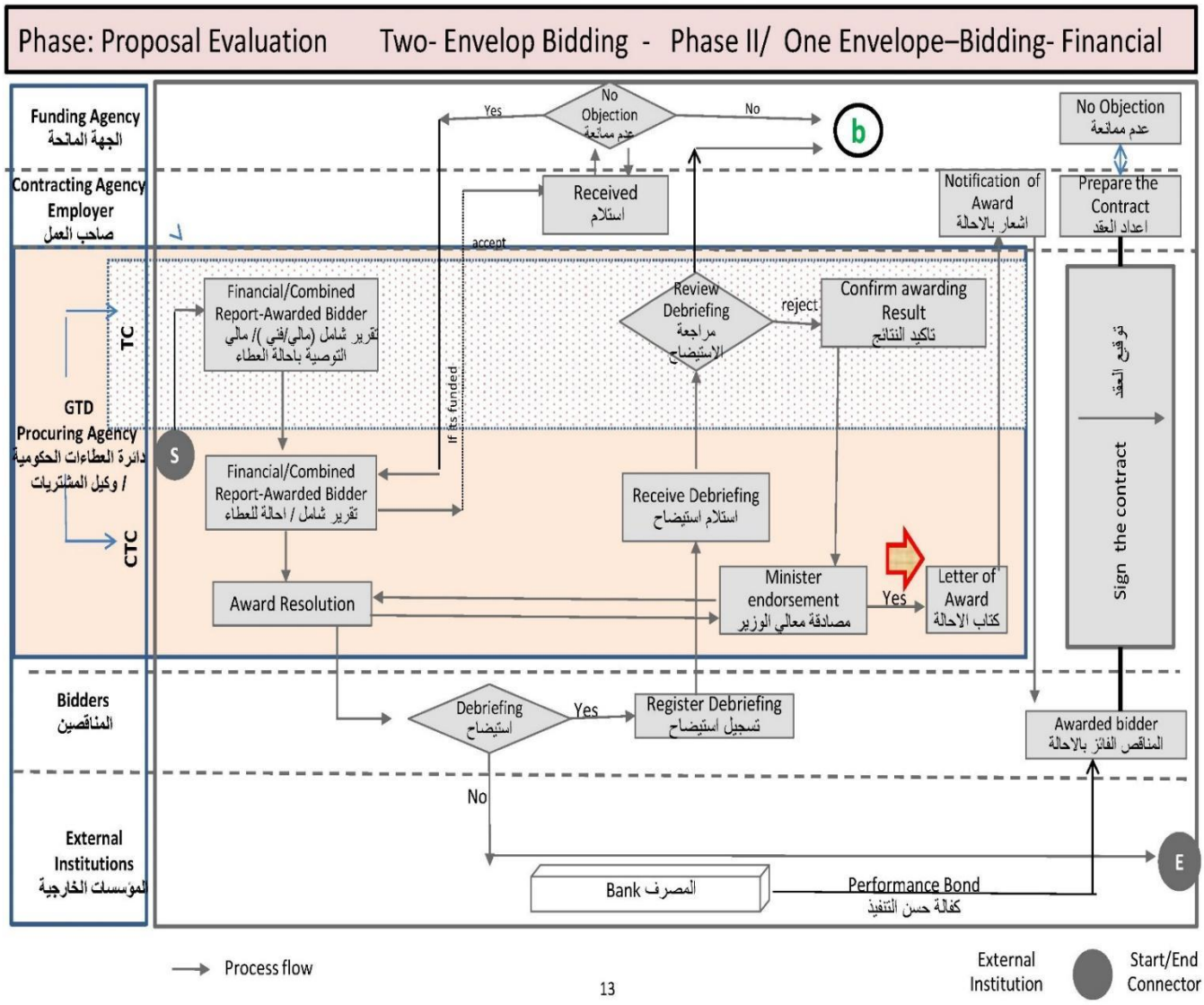


11

Bidding Process Open /Limited Biddings- Pre-Qualification Short Listed



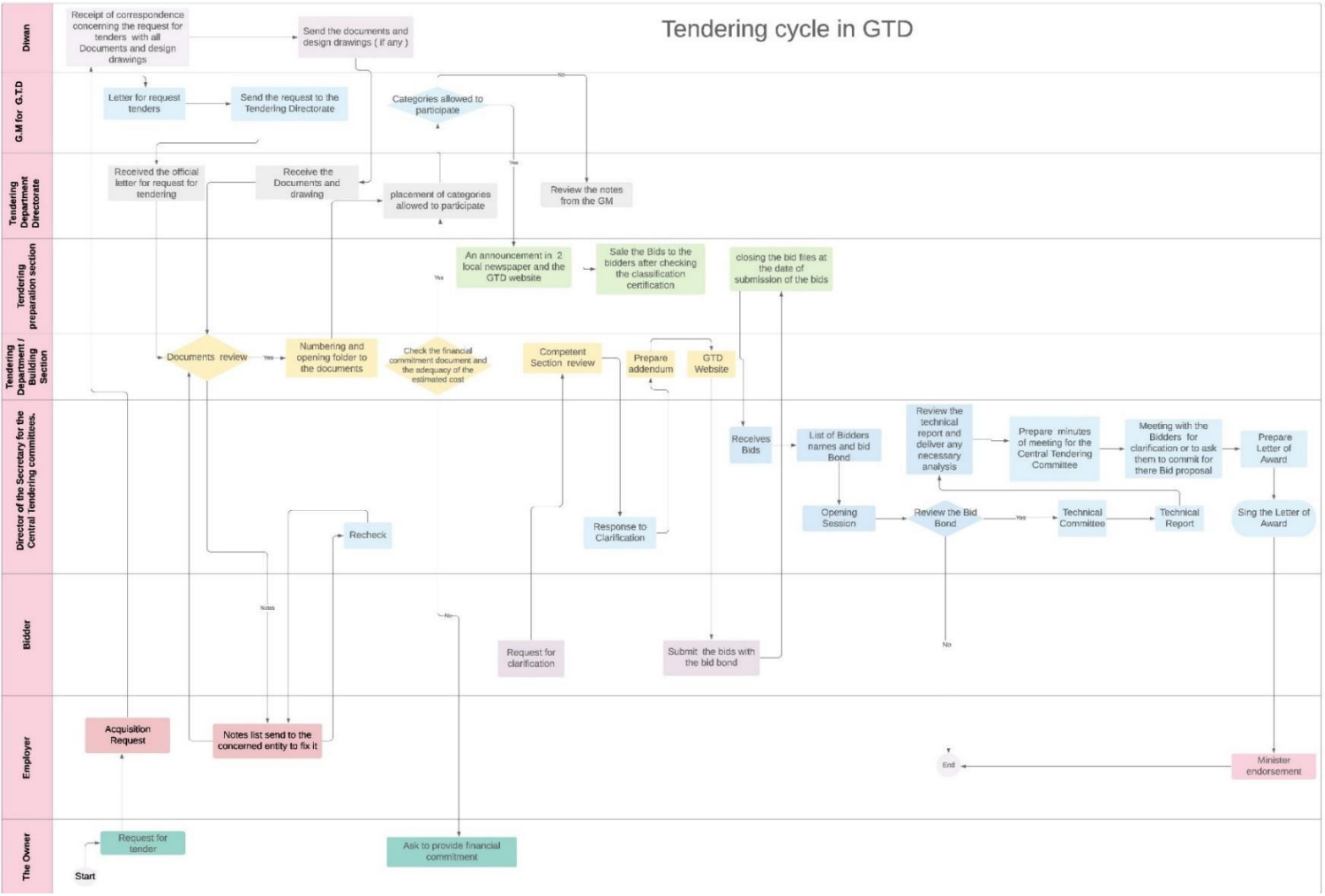
Bidding Process(Open /limited Biddings)/ Pre-qualified Short listed



13

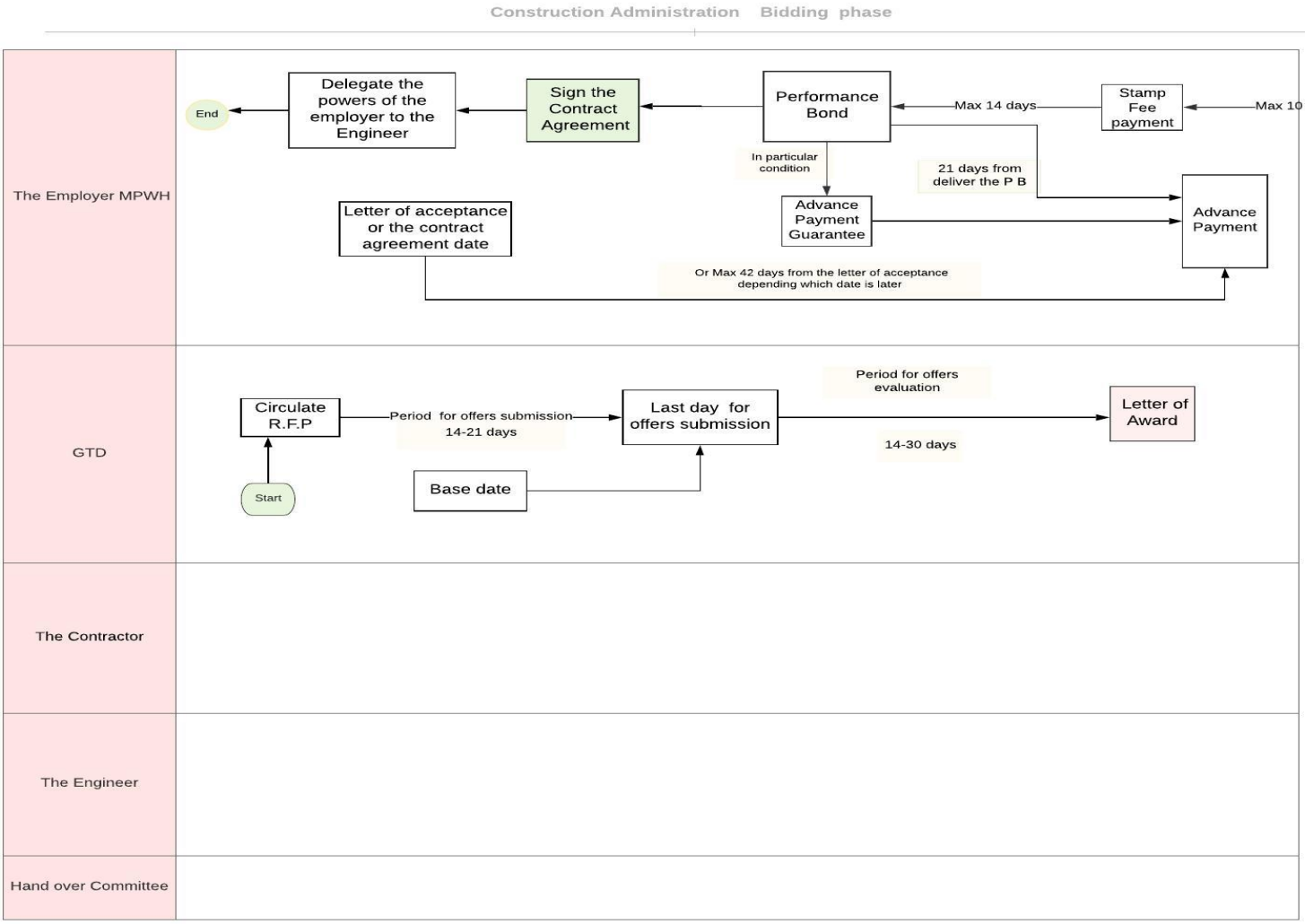
- **ANNEX 6: GTD TENDERING CYCLE**

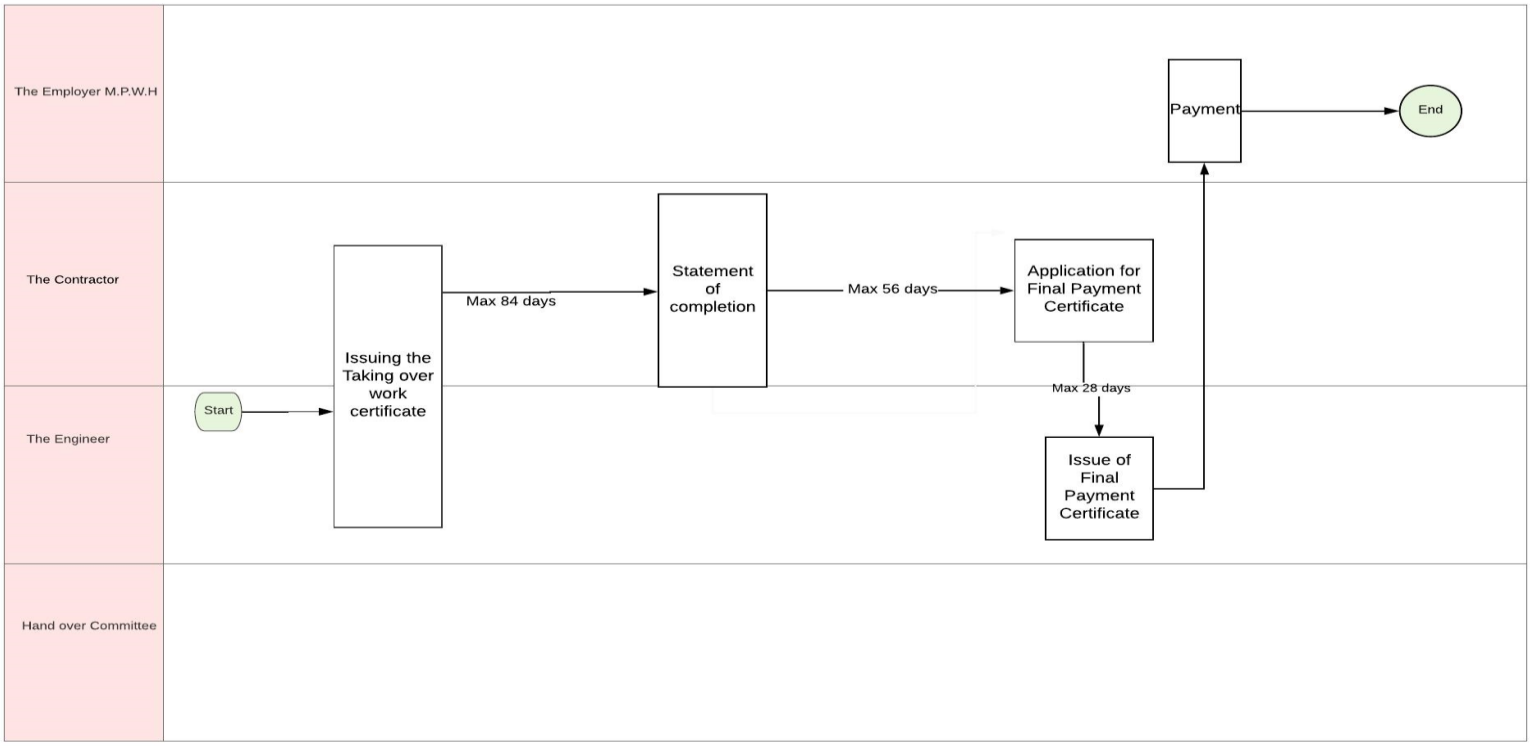
(Source: Adapted from: www.gtd.gov.jo)



• ANNEX 7: CONSTRUCTION PROCESS

(*Source: MPWH Adaptation of FIDIC Guidelines)*




The Employer M.P.W.H
The Contractor
The Engineer
Hand over Committee
Start
Issuing the Taking over work certificate
Max 84 days
Statement of completion
Max 56 days
Application for Final Payment Certificate
Max 28 days
Issue of Final Payment Certificate
Payment
End

ANNEX 8: REFERENCES

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