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DEVELOPMENT OF THE ENGINEERING COMPANIES QUALIFICATION SYSTEM

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DEVELOPMENT OF THE ENGINEERING COMPANIES QUALIFICATION SYSTEM

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EXECUTIVE SUMMARY

This engagement was undertaken to support GTD in developing a new qualification system for A/E Firms in Jordan.

The starting point was the study of the current system, which has been under scrutiny for the past year through a special committee developed by GTD, JEA, EOC and the A/E Business Council. Upon joining the committee, it was evident that the committee's work was supposed to cover three areas:

1. New qualification Criteria such as the number and qualification of offices and their engineers
2. New qualification framework based on a classification structure
3. Legislative development needed to ensure that the new system is applicable

The first point was the ongoing effort and the third was to be discussed upon finishing the work. The second point was the most difficult as it required some form of change which may not necessarily be accepted by all parties. Moreover, the level of the discussion in every session reflected that the mindsets were very different on each minor issue.

Accordingly, this engagement concentrated in supporting the effort of GTD through the committee on points one and three and to independently work on point 2 through consultation with experts and stakeholders in the field of which GTD is part. Unfortunately, it was a tumultuous task as getting information, data and opinions was very difficult due to the fact that the current system has its vehement supporters and those few against. However, it was evident from the study that the classification structure of the current system not only does not conform to any international structure but rather is conducive to rigidity and none development.

As an alternative, numerous systems were evaluated and the United Nations Central product Classification system was found to be the most applicable with some minor modifications that were superficial and that do not affect the core. Moreover, a previous version of the same system was used in a national study to benchmark the current A/E and construction sectors of Jordan within a global view, an activity that would have been far easier if the current JEA and GTD classification systems were based on the globally accepted CPC.

A corrected system to Jordan structure was developed based on the UN CPC and that system was the basis for the development of a Vision for the qualification framework, which was also corrected to take the following into consideration:

1. The effort of the GTD committee so far for the past 2 years
2. The innate Jordanian rejection for change and hence the need for something that was correct, different to an extent and conforms to a gradual variation rather than a drastic shift.

This classification structure, Vision and framework are presented in this document. The criteria for implementation are the output of the partial engagement of this project and are part of the GTD official documents and accordingly could not be included as they are not the sole effort of this engagement but rather more stakeholders.

In conclusion, this work is part of the overall system developed, which will be issued by the end of November 2009 for final approval by the GTD and other government agencies as required by law. It will be applied in 2010 for the qualification cycle of 2011.

INTRODUCTION

This project was a tumultuous one as it presented major difficulties in data and opinion generation. Moreover, immediate evaluation of the current system and initial consultations with members of qualified firms resulted in identifying the need for introducing change but fell short on identifying any road map that could be taken as an indication of development.

Moreover, the Ministry of Public Works and Housing (MPWH), based on the request of the Architectural/Engineering Business Council (A/E BC) established a committee for the development of the qualification system, which upon commencement of the project had already met 30 times in a period of around one year. In tandem the A/E BC established its own technical committee on the matter, as stipulated in the support MOU with the SABEQ Program, which also funded this project, and the committee had met for 4 times upon project commencement.

After identifying the players and after two questionnaires to generate data failed in obtaining measurable feedback, the following was concluded:

1. The Development committee established in MPWH had been active in developing specific qualification criteria that was accepted by the attendees from the following stakeholders:
 - MPWH
 - A/E BC
 - The Jordan engineers Association (JEA)
 - The Engineering Offices Commission (EOC) of the JEA
 - The Government Tenders Department (GTD)

However, the committee was working based on the current system and although some change in the structure of the system automatically had been introduced, this change was not based on any acceptable international Standard that would be identified as globally inclusive to the Jordanian qualification system as being globally acceptable or even recognizable. The main weakness was that the current structure, which is a classification system to which qualification levels are developed for firms to work on Government projects, was totally ad-hoc.

2. The technical committee established by the A/E BC included members of the Council some of whom were also members of the JEA Board and thus could represent the JEA's opinions although tentatively was also busy in meetings but of a different flavor. The committee was still in the discussion phase of the shape of the framework or structure to which qualification criteria should be linked.

This project was connected to both committees, and meetings were attended in both committees to ensure that the effort is congruent rather than disjointed. This fact took some time to organize and finally upon generating enough discussions and input from members of these two committees in their professional status, the following was concluded as necessary to be developed for the success of the development of new system:

1. A Strategic framework that is based on international classification systems to which qualification criteria would be appended was a necessity which would need to be approved by the stakeholders
2. Detailed development of qualification criteria in tandem with the MPWH committee was necessary, accordingly, revision and evaluation of the currently developed criteria was necessary so that a complete system would be developed

STRATEGIC JUSTIFICATION

This engagement is a direct result of realities that have revealed themselves from years of implementation of a Qualification system that was once considered at the forefront of qualitative excellence. Accordingly, it is by no means a straightforward system development engagement due to the fact that there are many stakeholders who are benefitting from the existing system while those who are not marginally believe that they may benefit from any change in the current system. However, the direct basis for the strategic justification stems from the fact that the owner of the projects, namely the Ministry of Public Works and Housing (MPWH) and the Leading Jordanian Private Sector A/E firms are congruent in that MPWH is not getting the best value for its money. To that extent and stemming from that fact alone, the following factors have been articulated as the fundamental strategic justification for changing the current system of A/E firm's qualification:

1. There is a wide variation in the qualification and experience levels of firms in the same grade; this leads to eliminating the qualitative equality that is the basis for qualification on the premise that "equal firms" are competing and that price variation is the only determining factor among equals. The current system has firms that are NOT "Equals" and hence price variation is dramatic and quality becomes sacrificed.
2. Public Sector satisfaction level is low, added to the frustration that the system allows for uneven competition.
3. Some high quality, internationally competitive firms are not qualified because of the current system and hence the Public sector lost their added advantage due to a system that only allows companies with certain academic qualifications to join.
4. The labeling of the qualification specializations are not product oriented in terms of the specifics but rather in terms of the aggregate. Accordingly, bridges and traffic impact assessment are part of the roads qualification although bridges and traffic impact assessments are not related as a single product but rather as three distinct products. The same applies to "Buildings" which requires Architecture and Electrical, Mechanical and Plumbing engineering services. In this case, the sector is globally known as the Architecture and Engineering services Sector and hence Architecture is not in the same product level of the Engineering services. Globally, the best architecture firms deal with the best Electrical, Mechanical and Plumbing engineering services firms to produce a building which is NOT a single supplier product but the result of the supply of architectural and engineering services products. In essence, this has been quoted as a major repressor of the capabilities of the field in Jordan¹.
5. The current classification is not congruent with any international benchmark but rather has been the result of local growth with the adage that "Jordan is different and hence we need something specific". While this could have been true in the past, the current realities of open trade and WTO and the Global-local village are all facts that products are benchmarked and suppliers of these products are globally benchmarked. Accordingly, the current qualification system, which may be viewed as a basis of excellence on less developed Arab countries has become of no qualitative significance on a more advanced level and hence is actually holding back local firms who compete on the global scene.

¹ Meeting with A/E firms, A/E Business Council, March 2009

PART 1: THE STRATEGIC FRAMEWORK AND STRUCTURE

Extensive research was done on identifying qualification frameworks and classification structures for development of the qualification system. Arab systems from Saudi Arabia, Yemen, Dubai, Kuwait, Egypt, UAE were investigated and showed similarities, as in the case of Yemen to the Jordanian system or none whatsoever as in the case with the Gulf Countries who do not have a qualification system but rather project prequalification criteria for most of their work. On the other hand, international best practice applied in the USA by the American Council of Engineering Companies (ACEC) was researched and some European systems were investigated for applicability. In both cases, the US and some European systems apply the Qualification/Quality Based Selection (QBS) methodology developed by the International Federation of Engineering Companies (FIDIC) which is very different from the current Jordanian system since it does not prequalify firms on a periodic basis but rather works on firm selection based on Qualification/Quality Based criteria. To that extent, it is no wonder that the current system was based on the experience of the team that developed it. On the other hand, when products/industries are benchmarked globally, in order to compare “apples” to “apples” the United Nations has developed a strategic framework called the Central Product Classification (CPC) system, which is the basis for global benchmarking of industries and products. A recent work on benchmarking the service industry in Jordan was based on the CPC system and the results were easily benchmarked. Stemming from that framework, it is evident that such a classification system could work as the structure on which qualification criteria would be developed.

The relevance of this classification is that companies that are qualified to do Government work are qualified based on an internationally accepted classification system. Accordingly, companies that get qualified can be internationally benchmarked and hence could compete on international projects. The system also supports the new changes in the current structure introduced by the MPWH committee and hence will benefit from the work done by that committee and reduce implementation time. Accordingly, this strategic framework for firm qualification will ensure the following:

1. Global inclusion and benchmarking ability
2. The support of the development of a more effective, productive, quality oriented and professional engineering services sector in Jordan that can be qualified for producing better work for the Ministry and the Public Sector
3. The possibility of the qualification system becoming a National system that will also be used for qualifying work for the Private Sector and increase the credibility and quality output of Jordanian firms.
4. The increase of local firm competitiveness with foreign firms wanting to work in Jordan on projects through increased local content potential or with foreign firms competing for projects on an international scale.
5. Opening the chance for new engineering services to be created or expanded

THE UNITED NATIONS CLASSIFICATION SYSTEMS

The UN Classification Systems² are based on one of four categories as follows:

1. **Activity Classification** such as the “International Standard Classification of all Economic Activities (ISIC) now at Revision 4”
2. **Product Classification** such as “Central Product Classification (CPC) now at Version 2.0”
3. **Classifications of Expenditures according to Purpose** such as “Classification of the Functions of Government (COFOG), Classification of Individual Consumption According to Purpose (COICOP), Classification of the Purposes of Non-Profit Institutions Serving Households (COPNI) and Classification of the Outlays of Producers According to Purpose (COPP)”
4. **Other Classifications** such as “Time Use Classification (ICATUS)”

From the above 4 systems the Product Classification (CPC version 2.0) was considered the most suitable as it is the one used in detailing the services and products presented from all economic sectors and is the one used in global benchmarking of each individual service provided. The CPC System is clearly located on the UN Website³. It was finished in December 2008 and accordingly is the only active CPC system available. All previous versions should be discarded according to the UN.

The CPC system has a hierarchy broken into 5 levels as follows:

1. Level One: Section denoted by a single digit
2. Level Two: Division denoted by the section digit and one other digit
3. Level Three: Group denoted by the Division double digit and one other digit
4. Level Four: Class denoted by the Group triple digits and one more digit
5. Level Five: Sub-Class denoted by the Class quad digit and one more digit

For the services provided by Architectural and Engineering firms, the following classification hierarchy is applied. However, it has to be mentioned that within Division 83 below more Groups that are not relevant exist such as Group 831 which encompasses “Management consulting and management services; information technology services”.

Section 8 (Business and Production Services)

Division 83 (Other professional, technical and business services)

Group 832 (Architectural services, urban and land planning and landscape architectural services)

833 (Engineering Services)

834 (Scientific and other technical services)

Each Group is further divided into classes and each class is divided into sub-classes. Group 832 above is further divided into the following Classes:

Class 8321 (Architectural services and advisory services)

8322 (Urban and Land planning services)

8323 (Landscape architectural services and advisory services)

² <http://unstats.un.org/unsd/cr/registry/regct.asp?Lq=1>

³ <http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=25>

Moreover, Class 8321 above is further divided into the following sub-classes:

- Sub-Class 83211 (Architectural advisory services)
- 83212 (Architectural services for residential building projects)
- 83213 (Architectural services for non-residential building projects)
- 83214 (Historical restoration architectural services)

The following Map details the structure that is relevant to the Architectural and Engineering Services:

CPC Version 2.0
Division 83
relevant to the A/E Sector

832 Architectural services, urban and land planning and landscape architectural services

— 8321 - Architectural services and advisory services

- 83211 - Architectural advisory services
- 83212 - Architectural services for residential building projects
- 83213 - Architectural services for non-residential building projects
- 83214 - Historical restoration architectural services

— 8322 - Urban and land planning services

- 83221 - Urban planning services
- 83222 - Rural land planning services
- 83223 - Project site master planning services

— 8323 - Landscape architectural services and advisory services

- 83231 - Landscape architectural advisory services
- 83232 - Landscape architectural services

833 Engineering services

— 8331 - Engineering advisory services

- 83310 - Engineering advisory services

— 8332 - Engineering services for specific projects

- 83321 - Engineering services for building projects
- 83322 - Engineering services for industrial and manufacturing projects
- 83323 - Engineering services for transportation projects
- 83324 - Engineering services for power projects
- 83325 - Engineering services for telecommunications and broadcasting projects
- 83326 - Engineering services for waste management projects (hazardous and non-hazardous)
- 83327 - Engineering services for water, sewerage and drainage projects
- 83329 - Engineering services for other projects

— 8333 - Project management services for construction projects

- 83330 - Project management services for construction projects

834 Scientific and other technical services

— 8341 - Geological, geophysical services

- 83411 - Geological and geophysical consulting services
- 83412 - Geophysical services

— 8342 - Surface surveying

- 83421 - Surface surveying services

— 8344 - Technical testing and analysis services

- 83441 - Composition and purity testing and analysis services
- 83442 - Testing and analysis services of physical properties
- 83449 - Other technical testing and analysis services

839 - Other professional, technical and business services n.e.c.

— 8393 - Scientific and technical consulting services n.e.c.

- 83931 - Environmental consulting services

Figure "1": CPC Version 2 Division 83 (Only that is relevant to the A/E Sector)

The above hierarchy is further explained below as follows⁴:

832 Architectural services, urban and land planning and landscape architectural services

8321 Architectural services and advisory services

This class includes:

- advisory and pre-design services
- preparation of designs and construction documents
- Plans, studies and other advisory services related to the design of buildings.

The architectural services may be provided in a bundle covering all stages of a building project, including the advisory, pre-design and design stages, or they may be provided individually.

83211 Architectural advisory services

This subclass includes:

- provision of advice, studies and reports on architectural matters
- expert witness services in the field of architecture consisting in the provision of testimony before a court or administrative body, by a witness who, by virtue of experience, training, skill or knowledge of architecture, is recognized as being qualified to render an informed opinion on matters relating to that field or subject
- This subclass does not include:
- provision of advice, studies and reports on architectural matters done in a bundle with other architectural services for a specific project, cf. according to the type of project in 83212, 83213, 83214

83212 Architectural services for residential building projects

This subclass includes:

- architectural services for:
 - single-family residential projects
 - multi-family residential projects

83213 Architectural services for non-residential building projects

This subclass includes:

- architectural services for:
 - office building projects
 - retail and restaurant projects
 - hotels and convention centers
 - health care projects
 - entertainment, recreational and cultural building projects

⁴ CPC version 2.0 explanatory notes, UN Statistics Division, December 2008

- educational building projects
- industrial building projects
- transportation and distribution facility projects
- other non-residential building projects

83214 Historical restoration architectural services

This subclass includes:

- architectural services that incorporate legal requirements to preserve or restore the historic character of a building

8322 Urban and land planning services

83221 Urban planning services

This subclass includes:

- development of plans concerning land use, site selection, control and utilization, road systems and servicing of land with a view to creating and maintaining systematic, coordinated urban development, such as:
 - comprehensive urban plans
 - community urban plans
 - Element urban plans for specific amenities or objectives such as transportation, utilities, etc.
- feasibility studies
- studies of environmental impact and economic assessments of urban development plans
- urban planning advisory services, such as:
- expert witness, policy and program evaluation

83222 Rural land planning services

This subclass includes:

- development of plans that describe the long-term objectives of rural areas for the development of infrastructure, housing, industry, commercial, recreational and other facilities
- comprehensive plans covering a large geographical area, for a lengthy time period

83223 Project site master planning services

This subclass includes:

- providing plans for a construction site, showing the proposed location of buildings, roads, parking lots and other features, for:

- residential building projects
- non-residential building projects
- recreational and open-space projects

8323 Landscape architectural services and advisory services

This class includes:

- Architectural services concerned with the design of the landscape. Landscape architectural services include the provision of designs and construction documents, plans, studies and other services related to specific landscape projects

83231 Landscape architectural advisory services

This subclass includes:

- provision of advice, studies and reports on landscape architecture matters
- Expert witness services in the field of landscape architecture consisting in the provision of testimony before a court or administrative body, by a witness who, by virtue of experience, training, skill or knowledge of landscape architecture, is recognized as being qualified to render an informed opinion on matters relating to that field or subject.

This subclass does not include:

- provision of advice, studies and reports on landscape architecture matters done in a bundle with other landscape architectural services for a specific project, cf. 83232

83232 Landscape architectural services

This subclass includes:

- landscape architecture services for:
 - residential building projects:
 - single-family residential projects
 - multi-family residential projects
 - residential subdivision projects
 - non-residential building projects:
 - corporate building projects
 - hotels, convention centers, stadiums and arenas
 - educational building projects
 - health care, penal institutions
 - other non-residential building projects
 - recreational and open-space projects:
 - city centers and public squares
 - non-building recreational facilities, parks and natural areas
 - transportation corridors

- resorts
- other recreational and open space projects

This subclass also includes:

- landscape architecture services related to:
 - preparing and modifying terrain such as land clearing and grading plans, drainage designs, erosion and sediment control designs, retaining wall designs, outdoor sprinkler system plans
 - facilitating access to a site such as lighting plans, signage plans, trail and path plans, accessibility designs

833 Engineering services

This group includes:

- Application of physical laws and principles in the design, development, and utilization of machines, materials, instruments, structures, processes, and systems. Services of this type involve the provision of designs, plans, and studies related to engineering projects.

8331 Engineering advisory services

83310 Engineering advisory services

This subclass includes:

- provision of advice to clients concerning engineering principles and methods, when performed independently of an engineering project, including policy analysis, regulatory studies and audits
- provision of testimony by a witness who, by virtue of experience, training, skill or knowledge of engineering, is recognized as being qualified to render an informed opinion on such matters
- engineering investigation of a failed engineered system or structure to determine causal factors

This subclass does not include:

- advice, studies, and reports performed in conjunction with a project, cf. based on the project type under 8332

8332 Engineering services for specific projects

83321 Engineering services for building projects

This subclass includes the application of physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems for building projects.

This subclass includes:

- provision of designs, plans, and studies related to residential building projects, such as:
 - new and existing homes

- Row housing, apartments, etc.
- mixed-use buildings that are predominantly used for residential housing
- provision of designs, plans, and studies related to new and existing commercial, public and institutional building projects, including mixed-use buildings that are predominantly used for commercial, public, or institutional purposes, such as:
 - office buildings
 - shopping centers
 - hotels and restaurants
 - service stations and warehouses
 - bus and truck terminals
 - hospitals, schools, churches
 - prisons, stadiums and arenas
 - libraries and museums

This subclass also includes:

- engineering advisory services that are related to specific residential, commercial, public or
- institutional building projects

This subclass does not include:

- engineering advisory services not related to a specific project, cf. 83310

83322 Engineering services for industrial and manufacturing projects

This subclass includes the application of physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems for industrial and manufacturing projects.

This subclass includes:

- engineering services related to industrial facilities and processes:
 - mining and metallurgical facilities such as mines, smelters, mills, mineral refineries, including integrated facility and process engineering projects
 - mining and metallurgical processes, such as mineral extraction, smelting, refining, metal forming
 - petroleum and petrochemical facilities such as oil and gas platforms, refineries, petrochemical plants, including integrated facility and process engineering projects
 - processes for the production of petroleum and petrochemicals, such as extraction, refining, formulation, mixing
 - microelectronics facilities and processes, such as those that produce microprocessors, silicon chips and wafers, microcircuits, and semiconductors
 - textile and clothing facilities and processes
 - iron and steel facilities and processes

- Other industrial and manufacturing facilities, and processes, n.e.c.
- engineering services related to the design of industrial and manufactured products, such as:
 - industrial machinery such as agricultural, construction, mining, metalworking, commercial and service industry, heating, ventilating and air-conditioning, power transmission machinery
 - electronic equipment such as computers and peripheral equipment, communications equipment, audio and video equipment, semiconductors and other electronic components
 - electrical equipment such as lighting, major and minor appliances and components thereof
 - transportation equipment such as motor vehicles, aircraft, trains, marine vessels, space vehicles
 - industrial and manufactured products not elsewhere classified

This subclass does not include:

- research and development services in engineering, cf. 81129
- industrial design services, cf. 83912

83323 Engineering services for transportation projects

This subclass includes the application of physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems for transportation infrastructure projects.

This subclass includes:

- engineering services (including provision of designs, plans, and studies) related to:
 - highways, roads and streets, including elevated highways used for motor vehicle traffic
 - bridges and tunnels
 - ancillary road transport facilities such as rest stops, weigh stations, toll booths
 - mass transit systems, such as light rail or subway systems
 - railways and related structures
 - railway bridges and tunnels
 - marine and inland ports
 - harbors, locks, canals, and dams primarily used for transportation purposes
 - airports, runways, hangars
 - other aviation facilities
 - space transportation projects
 - oil and gas transportation projects
 - Other transportation projects n.e.c.

83324 Engineering services for power projects

This subclass includes the application of physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems for electricity generation, transmission and distribution projects.

This subclass includes:

- engineering services related to facilities that generate electrical power from:
 - coal and other fossil-fuel energy such as oil and gas
 - nuclear energy
 - the energy in falling water
 - other energy, such as solar power, wind power, geothermal power including cogeneration
 - facilities
- engineering services related to overhead or underground electrical power transmission and distribution lines

83325 Engineering services for telecommunications and broadcasting projects

This subclass includes the application of physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems for telecommunications and broadcasting projects.

This subclass includes:

- engineering services related to systems for the transmission of voice and data between network termination points by copper wire, fiber-optic cable, co-axial cable, and hybrid fiber-coax cable
- engineering services related to systems for the transmission of voice, data and programming between network termination points by short-wave or microwave, such as:
 - wireless telephony systems
 - satellite radio systems
 - direct-broadcast satellite systems
- engineering services related to systems for the transmission of radio and television signals
- engineering services related to systems for the transmission or distribution of voice, data or programming, not elsewhere classified

83326 Engineering services for waste management projects (hazardous and non-hazardous)

This subclass includes the application of physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems for waste management projects.

This subclass includes:

- engineering services related to household garbage collection and disposal systems, such as:
 - recycling facilities
 - composting facilities
 - transfer stations
 - resource recovery facilities
 - landfill sites
- engineering services related to programs for the collection, treatment, recycling, and disposal of industrial air, water and solid wastes, generally to a level such that the remaining waste stream can be safely released to the natural environment or ordinary municipal systems
- engineering services related to programs for hazardous waste remediation, such as:
 - management of nuclear waste
 - chemical agent destruction
 - Brownfield redevelopment
 - ground water modeling
 - contaminated site remediation

This subclass does not include:

- engineering services for water, sewage treatment and drainage projects, cf. 83327

83327 Engineering services for water, sewerage and drainage projects

This subclass includes the application of physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems for water treatment and distribution systems, sewer systems, sewage treatment plants and drainage projects.

This subclass includes:

- engineering services related to systems for the collection, distribution, treatment, and disposal of water such as:
 - drinking water distribution systems, pumping stations, reservoirs, water storage facilities, water transmission and distribution mains including dams used primarily for local drinking water distribution and desalination plants
 - systems for storm water management, drainage and detention systems including dams used primarily for flood control
 - systems for the collection, treatment, and disposal of waste water, except industrial waste water irrigation systems and water pipelines including dams primarily used for irrigation

83329 Engineering services for other projects

This subclass includes the application of physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems for projects not elsewhere classified (n.e.c.)

This subclass includes:

- engineering services related to:
 - outdoor sport and recreation facilities
 - natural gas and steam distribution projects
 - Other utility projects n.e.c.
- engineering services related to systems, processes, facilities or products not elsewhere classified including the provision of designs, plans and studies related to them

8333 Project management services for construction projects

83330 Project management services for construction projects

This subclass includes:

- services of assuming overall responsibility for the successful completion of a construction project on behalf of a client, including organizing the financing and the design, requesting tenders, and performing management and control functions
- project management services provided by engineers or architects

834 Scientific and other technical services

8341 Geological, geophysical and other prospecting services

83411 Geological and geophysical consulting services

This subclass includes:

- provision of advice, guidance and operational assistance concerning the location of mineral deposits, oil and gas fields and groundwater by studying the properties of the earth and rock formations and structures
- provision of advice with regard to exploration and development of mineral, oil and natural gas properties, including:
 - pre-feasibility and feasibility studies
 - project evaluation services
- evaluation of geological, geophysical and geochemical anomalies
- surface geological mapping or surveying

83412 Geophysical services

This subclass includes:

- providing information on subsurface earth formations by different methods:
 - seismographic, gravimetric, magnetometric methods

- other subsurface surveying methods

This subclass does not include:

- test drilling and boring work, cf. 54320

8342 Surface surveying and map-making services

83421 Surface surveying services

This subclass includes:

- gathering of information on the shape, position and/or boundaries of a portion of the earth's surface by different methods, including transit, photogrammetric and hydrographic surveying, for the purpose of preparing maps
- collection of data by satellite
- land surveying services (e.g., marking of property, boundary marking)

8344 Technical testing and analysis services

83441 Composition and purity testing and analysis services

This subclass includes:

- testing and analysis of the chemical and biological properties of materials such as air, water, waste (municipal and industrial), fuels, metal, soil, minerals, food and chemicals
- Testing and analysis in related scientific fields such as microbiology, biochemistry, bacteriology, etc.

83442 Testing and analysis services of physical properties

This subclass includes:

- testing and analysis of physical properties such as strength, ductility, electrical conductivity or radioactivity of materials such as metals, plastics, textiles, woods, glass, concrete and other materials
- tests for tension, hardness, impact resistance, fatigue resistance and high-temperature effects

83449 Other technical testing and analysis services

This subclass includes:

- testing and analysis of a technical or scientific nature that does not alter the object being tested
- Radiographic, Magnetic, and Ultrasonic testing of machine parts and structures in order to identify defects. These tests are often conducted on site.
- Certification of ships, aircraft, dams, etc.
- radiological inspection of welds
- all other technical testing and analysis services not elsewhere classified

839 Other professional, technical and business services n.e.c.

8393 Scientific and technical consulting services n.e.c.

83931 Environmental consulting services

This subclass includes:

- environmental assessments, i.e. objective studies undertaken for any one or more of the following purposes: identify whether or not environmental contamination exists at a particular site, and if so determined, the source, nature, and extent of the contamination; assess the risk to public safety and health from environmental contamination associated with a project that is proposed or in place; evaluate the impact on the ecology or economy of environmental changes resulting from human or natural activities
- environmental audits, i.e. independent assessment of the current status of a party's compliance with applicable environmental requirements or of a party's environmental compliance policies, practices and controls
- site remediation planning services, i.e. preparation of plans for the abatement of environmental contamination, usually at a specific site, that incorporate such technical or other requirements as may be prescribed by law or regulation
- Evaluation of environmental studies, i.e. provision of analysis that explains the strengths or weaknesses of an environmental study and provides the basis for alternative judgments. The evaluation of environmental studies may also include an analysis of future responses to environmental regulators
- natural resource management consulting, i.e. provision of objective information, advice, or guidance concerning the best practices for ecologically sustainable development and use of: land; forests; bodies of water; gas, oil, and mineral deposits; wildlife populations and other natural resources
- waste management consulting, i.e. provision of objective information, advice, or guidance concerning the best practices for the minimization, transport, handling, disposal and/or recycling of waste
- environmental policy development consulting, i.e. advising public or private institutions on the design, development and implementation of environmental statutes, regulations, standards, or practices
- Other environmental consulting services n.e.c.

RELEVANCE OF THE CPC HIERARCHY TO THE JEA CLASSIFICATION

JEA classifies all engineers who want to work in Jordan based on their education. Additionally, the JEA classifies A/E offices/firms into four categories as follows⁵.

Engineer Office

This office is established and owned by a single Jordanian Engineer with not less than three years of experience who has to be fully dedicated to working only in her/his office. S/he is allowed to employ engineers as needed as long as they are specialized in the same field as s/he is.

S/he is allowed to work in only **one** field in the following A/E services

- Architecture (CPC 832)
- Structural Engineering (CPC 83321/83322)
- Bridges engineering (CPC 83323)
- Heating Ventilation and Air Conditioning (HVAC) (CPC 83321/83322)
- Buildings wiring and electrical installation (CPC 83321/83322)
- Electronics (CPC 83323/83324/83325)
- Surveying (CPC 8342)

An Engineer office gets qualified as “A”, “B” or “C” with “A” being the most prominent based on the number of years of experience of the owner engineer with stipulations to the size of the office in square meters to accommodate the anticipated volume and level of work. Furthermore, such an office can cooperate with other offices to complement the services presented as needed by the undertaken projects.

Engineering Office/Firm

Such an office/firm has to be registered with the JEA by at least 2 Jordanian engineers with a minimum of 7 years of individual experience two of which, as a minimum, were spent in design. Both engineers have to be fully dedicated to working full-time in the firm. The firm can work in the following fields:

- CPC 832 – Architectural services, urban and land planning and landscape architectural services
- CPC 833 – Engineering services
- CPC 834 – Scientific and other technical services

These firms are further qualified as “First Grade” and “Second Grade” depending on the level of experience and number of staff. “First Grade” firms have to have at least 2 qualified engineers both with a minimum of 7 years of experience in each field of specialization which means that they have to have at least 4 engineers in the firm. “Second Grade” firms need to

⁵ Articles 16 – 30 of the Engineering Offices Commission (EOC) regulation (JEA)

have at least one engineer with 7 years of experience assisted by another engineer with a minimum of 3 years of experience in the same specialization making the minimum number of employees in the firm 3. Furthermore, such an office/firm can cooperate with other offices/firms to complement the services presented as needed by the undertaken projects.

Finally, the firm has to have sufficient and acceptable offices and utilities with a minimum of 40 square meters for the first 2 engineers and additional 10 square meters for every engineer hired.

Consultant Engineering Office/firm

Such an office/firm has to be registered with the JEA by at least 2 Jordanian engineers with a minimum of 11 years of individual experience four years of which, as a minimum, were spent in design and the firm has to work on two specializations at least. Furthermore, both engineers have to be fully dedicated to working Full-time in the firm. The firm can work in the following fields:

- CPC 832 – Architectural services, urban and land planning and landscape architectural services
- CPC 833 – Engineering services
- CPC 834 – Scientific and other technical services

These firms are further qualified depending on the number of specializations they work in. The table below reflects the number of years and the number of people to enable the firm to work according to the JEA regulation stipulations

Number of specializations	Engineers with 11 years of experience	Engineers with 3 years of experience	Engineers with less years of experience	Total number of engineers
2	2	2	1	5
3	3	2	2	7
4	4	3	2	9
More than 4	Same as 4 above, plus 2 engineers for every specialization one of whom should have 11+ years of experience			

Table "1": Number of engineers relative to number of specializations for the Consultant engineering firm

Furthermore, such an office/firm can cooperate with other offices/firms to complement the services presented as needed by the undertaken projects.

Additionally, the firm has to have sufficient and acceptable offices and utilities with a minimum of 110 square meters for the first 2 specializations and additional 30 square meters for every specialization undertaken. Finally, the firm has to employ at least 2 administration officers and to have a minimum of 3 technical staff including drafters and quantity surveyors and increase 1 technical staff member for every specialization after the first two.

Expert Engineer Office

Such an office has to be manned by an engineer with 15+ years of practical experience after obtaining her/his Bachelor's degree, 8 years of which are in the Expert area applied for or by an engineer with 10 years of practical experience post Master's/PhD degree graduation in a specific area of expertise with not less than 5 years working in that expert field which is applied for to the JEA. The Expert Engineer should have demonstrated a lifetime of achievement and level headedness that will be evaluated by the JEA to ensure acceptability to this high level of acknowledgment by the JEA.

Moreover, this kind of office and expert lends itself to the qualifications necessary in the advisory services such as the following:

- CPC 83211 Architectural advisory services
- CPC 83231 landscape architectural advisory services
- CPC 83310 Engineering advisory services

Additionally such expert engineers could qualify to perform design auditing on behalf of the MPWH in their areas of specialization and can mentor and help develop Public sector staff who work in project evaluation and design services.

One final note that should be taken into consideration is that the proposed CPC hierarchy and map is a **product** classification map and is directly related to the type of product or service that is required by the client who in this case is the MPWH. To that effect, it stands to reason that such a classification is totally not related and not necessarily connected to the classification system that the Jordan Engineers Association (JEA) classifies engineers to, which is based on their education and specialization.

On the other hand, the classification of the type of offices and firms that can be established for working in Jordan as described above works very well within the hierarchy and actually supports the classification of these companies. It also works favorably in benefiting from the company type classification in the development of qualification criteria that would require certain projects to be served by companies and a consortium of individual engineers' offices rather than individual engineers offices alone. This also has a direct effect on the way tenders would be developed in the future.

ADDITIONAL BENEFIT FROM THE CPC CLASSIFICATION IN RELATION TO THE JEA CLASSIFICATION IN NON RELATED AREAS

This section specifically has been added for professional completeness and as a section to be viewed by the Jordan Engineers Association (JEA) for discussion within itself in the way they view their classification system other than engineering offices but rather as the strategic themes that Engineering Offices could work in.

This product classification also identifies areas that hitherto have not been included in the scope of the “Engineering Services” Sector in Jordan and these relates directly to engineering specializations other than Civil Engineering and Architecture. This is exemplified in the Group 833 “Engineering services”, the Class 8332 “Engineering Services for specific Projects and the following subclasses:

- **83322 Engineering services for industrial and manufacturing projects**

This includes the technical design and know-how in relation to the industrial facilities and processes for:

- mining and metallurgical facilities such as mines, smelters, mills, mineral refineries, including integrated facility and process engineering projects
- mining and metallurgical processes, such as mineral extraction, smelting, refining, metal forming
- petroleum and petrochemical facilities such as oil and gas platforms, refineries, petrochemical plants, including integrated facility and process engineering projects
- processes for the production of petroleum and petrochemicals, such as extraction, refining, formulation, mixing
- microelectronics facilities and processes, such as those that produce microprocessors, silicon chips and wafers, microcircuits, and semiconductors
- textile and clothing facilities and processes
- iron and steel facilities and processes
- Other industrial and manufacturing facilities and processes, n.e.c.

It also includes engineering services related to the design of industrial and manufactured products, such as:

- industrial machinery such as agricultural, construction, mining, metalworking, commercial and service industry, heating, ventilating and air-conditioning, power transmission machinery
- electronic equipment such as computers and peripheral equipment, communications equipment, audio and video equipment, semiconductors and other electronic components
- electrical equipment such as lighting, major and minor appliances and components thereof
- transportation equipment such as motor vehicles, aircraft, trains, marine vessels, space vehicles
- industrial and manufactured products not elsewhere classified

- **83324 Engineering services for power projects**

Which includes engineering services related to facilities that generate electrical power from:

- coal and other fossil-fuel energy such as oil and gas
- nuclear energy
- the energy in falling water
- other energy, such as solar power, wind power, geothermal power including cogeneration
- facilities

And engineering services related to overhead or underground electrical power transmission and distribution lines

- **83325 Engineering services for telecommunications and broadcasting projects**

Which includes engineering services related to systems for the transmission of voice and data between network termination points by copper wire, fiber-optic cable, co-axial cable, and hybrid fiber-coax cable

And engineering services related to systems for the transmission of voice, data and programming between network termination points by short-wave or microwave, such as:

- wireless telephony systems
- satellite radio systems
- direct-broadcast satellite systems

And engineering services related to systems for the transmission of radio and television signals

And engineering services related to systems for the transmission or distribution of voice, data or programming, not elsewhere classified

- **83326 Engineering services for waste management projects (hazardous and non-hazardous)**

Which includes engineering services related to household garbage collection and disposal systems, such as:

- recycling facilities
- composting facilities
- transfer stations
- resource recovery facilities
- landfill sites

And engineering services related to programs for the collection, treatment, recycling, and disposal of industrial air, water and solid wastes, generally to a level such that

the remaining waste stream can be safely released to the natural environment or ordinary municipal systems

And engineering services related to programs for hazardous waste remediation, such as:

- management of nuclear waste
- chemical agent destruction
- Brownfield redevelopment
- ground water modeling
- contaminated site remediation

- **83329 Engineering services for other projects**

Which includes engineering services related to:

- outdoor sport and recreation facilities
- natural gas and steam distribution projects
- Other utility projects n.e.c.

And engineering services related to systems, processes, facilities or products not elsewhere classified including the provision of designs, plans and studies related to them

The know-how needed to perform the work for to provide the above services involves all the engineering disciplines such as Mechanical, Electrical, Chemical, Industrial and Computer just to name a few they also require other scientific streams to be involved.

It would be beneficial for the business development of the term Engineering services Companies to include such services and not to be limited to the construction sector.

THE PROPOSED CLASSIFICATION STRUCTURE

The following structure represents the classification structure that is suggested as the basis for a qualification methodology and criteria

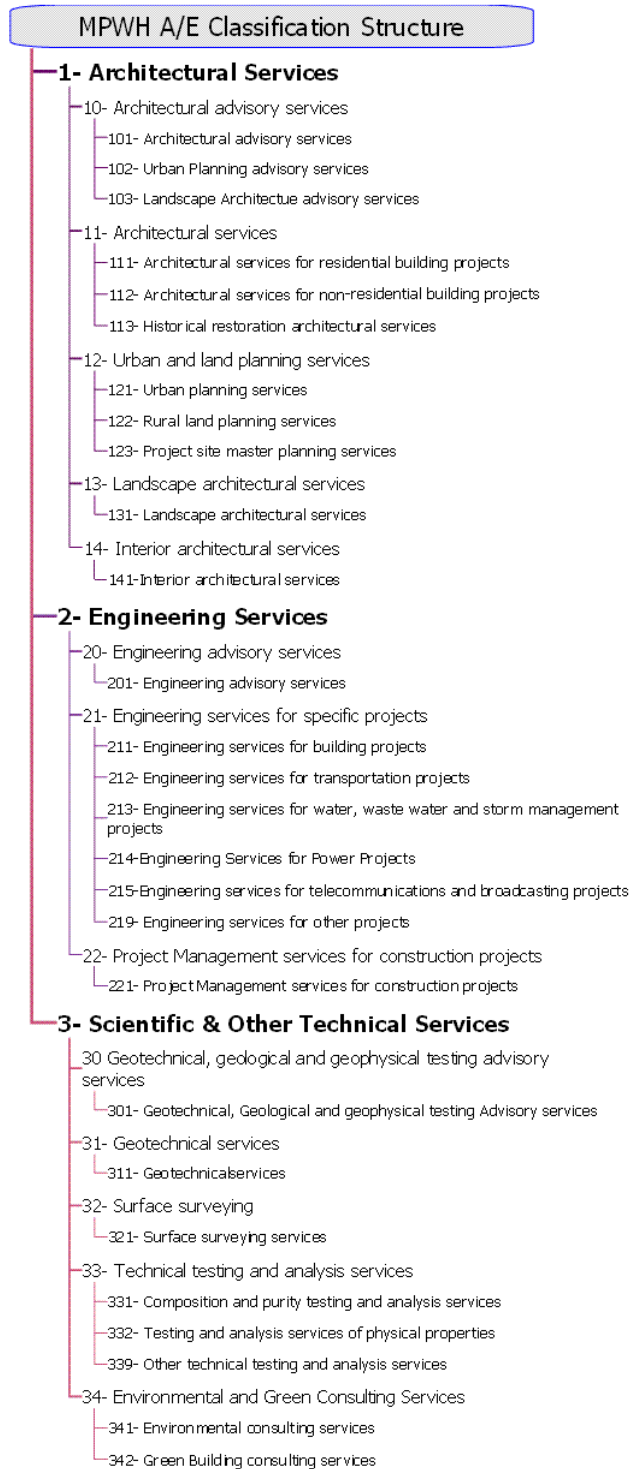


Figure “2” Suggested classification Structure for MPWH Qualification

From the above figure, the structure is clearly broken into four levels as follows:

- Level 1 - Group denoted by a single digit
- Level 2 - Class denoted by the Group single digit and a second digit
- Level 3 - Sub-class denoted by the Class double digits and a third digit
- Level 4 - Specialization denoted by the Sub-class triple digits and a fourth digit

Moreover, in harmonizing with the UN CPC any Class that describes non specific job functions like “Other engineering services” for example will have the number “9” as the last digit. This will leave room for expansion in the development of specialized functions as is covered in the CPC when they become accredited in the National Classification system for MPWH Engineering firm Qualification.

The details of the above structure are found below as follows:

1 Architectural services

10 Architectural advisory services

101 Architectural advisory services

This subclass includes:

- 1011 **Architectural advisory services** includes the provision of advice, studies and reports on architectural matters and expert witness services in the field of architecture consisting in the provision of testimony before a court or administrative body, by a witness who, by virtue of experience, training, skill or knowledge of architecture, is recognized as being qualified to render an informed opinion on matters relating to that field or subject

102 Urban Planning advisory services

This subclass includes:

- 1021 **Urban Planning advisory services** includes the provision of advice, studies and reports on Urban Planning matters and expert witness services in the field of Urban Planning consisting in the provision of testimony before a court or administrative body, by a witness who, by virtue of experience, training, skill or knowledge of Urban Planning, is recognized as being qualified to render an informed opinion on matters relating to that field or subject.

103 Landscape architectural advisory services

This subclass includes:

- 1031 **Landscape architectural advisory services** includes the provision of advice, studies and reports on landscape architecture matters and expert witness services in the field of landscape architecture consisting in the provision of testimony before a court or administrative body, by a witness who, by virtue of experience, training, skill or knowledge of landscape architecture, is recognized as being qualified to render an informed opinion on matters relating to that field or subject.

11 Architectural Services

111 Architectural services for residential building projects

This subclass includes:

1111 architectural services for residential buildings including:

- single-family residential projects
- multi-family residential projects

112 Architectural services for non-residential building projects

This subclass includes:

1121 architectural services for non-residential buildings including:

- office building projects
- High density Mixed use projects
- retail and restaurant projects
- hotels and convention centers
- health care projects
- entertainment, recreational and cultural building projects
- educational building projects
- industrial building projects
- transportation and distribution facility projects
- other non-residential building projects

113 Historical restoration architectural services

This subclass includes:

1131 architectural services that incorporate legal requirements to preserve or restore the historic character of a building

12 Urban and land planning services

121 Urban planning services

This subclass includes:

1211 **Urban planning services** include the development of plans concerning land use, site selection, control and utilization, road systems and servicing of land with a view to creating and maintaining systematic, coordinated urban development, such as:

- comprehensive urban plans
- community urban plans
- Element urban plans for specific amenities or objectives such as transportation, utilities, etc.

It also includes feasibility studies and studies of environmental impact and economic assessments of urban development plans

122 Rural land planning services

This subclass includes:

1221 **Rural land planning services** include the development of plans that describe the long-term objectives of rural areas for the development of infrastructure, housing, industry, commercial, recreational and other facilities

In addition to comprehensive plans covering a large geographical area, for a lengthy time period.

123 Project site master planning services

This subclass includes:

1231 **Project site master planning services** include providing plans for a construction site, showing the proposed location of buildings, roads, parking lots and other features, for:

- residential building projects
- non-residential building projects
- recreational and open-space projects

13 Landscape Architectural Services

131 Landscape architectural services

This subclass includes:

1311 **landscape architecture services** for:

- residential building projects:
- single-family residential projects
- multi-family residential projects
- residential subdivision projects
- non-residential building projects:
- corporate building projects
- hotels, convention centers, stadiums and arenas
- educational building projects
- health care, penal institutions
- other non-residential building projects
- recreational and open-space projects:
- city centers and public squares
- non-building recreational facilities, parks and natural areas

- transportation corridors
- resorts
- other recreational and open space projects

In addition to landscape architecture services related to:

- preparing and modifying terrain such as land clearing and grading plans, drainage designs, erosion and sediment control designs, retaining wall designs, outdoor sprinkler system plans
- facilitating access to a site such as lighting plans, signage plans, trail and path plans, accessibility designs

14 Interior Architectural Services

141 Interior architectural services

This subclass includes:

1411 Interior architecture services for:

- residential building projects:
 - single-family residential projects
 - multi-family residential projects
 - residential subdivision projects
- non-residential building projects:
 - corporate building projects
 - hotels, convention centers, stadiums and arenas
 - educational building projects
 - health care, penal institutions
 - other non-residential building projects
- recreational and open-space projects:
 - city centers and public squares
 - non-building recreational facilities, parks and natural areas
- transportation corridors
- resorts
- other recreational and open space projects

2 Engineering services

20 Engineering advisory services

201 Engineering advisory services

This subclass includes:

2011 **Engineering advisory services** include the provision of advice to clients concerning engineering principles and methods, when performed independently of an engineering project, including policy analysis, regulatory studies and audits. In addition to the provision of testimony by a witness who, by virtue of experience, training, skill or knowledge of engineering, is recognized as being qualified to render an informed opinion on such matters and engineering investigation of a failed engineered system or structure to determine causal factors

21 Engineering services for specific projects

211 Engineering services for building projects

This subclass includes the application of physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems for building projects.

This subclass includes:

2111 provision of engineering structural, electrical, mechanical and plumbing designs, plans, and studies related to residential building projects, such as:

- new and existing homes
- Row housing, apartments, etc.
- mixed-use buildings that are predominantly used for residential housing

2112 provision of engineering structural, electrical, mechanical and plumbing designs, plans, and studies related to new and existing commercial, public and institutional building projects, including mixed-use buildings that are predominantly used for commercial, public, or institutional purposes, such as:

- office buildings
- mixed-use buildings that are predominantly used for non residential housing
- shopping centers
- hotels and restaurants
- service stations and warehouses
- bus and truck terminals
- hospitals, schools, churches
- prisons, stadiums and arenas
- libraries and museums

212 Engineering services for transportation projects

This subclass includes the application of physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems for transportation infrastructure projects.

This subclass includes engineering services (including provision of designs, plans, and studies) related to:

- 2121 highways, roads and streets, including elevated highways used for motor vehicle traffic, ancillary road transport facilities such as rest stops, weigh stations, toll booths
- 2122 bridges, underpasses and tunnels
- 2123 mass transit systems, such as light rail or subway systems, railways and related structures
- 2124 railway bridges and tunnels
- 2125 marine and inland ports, harbors, locks, canals, and dams primarily used for transportation purposes
- 2126 airports, runways, hangars, other aviation facilities and space transportation projects
- 2127 Traffic and transportation studies (including feasibility, planning, modeling and impact studies)
- 2129 other transportation projects n.e.c.

213 Engineering services for water, Waste water and storm management projects

This subclass includes the application of physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems for water treatment and distribution systems, sewer systems, sewage treatment plants and drainage projects.

This subclass includes engineering services related to systems for the collection, distribution, treatment, and disposal of water such as:

2131 Drinking water systems including:

- Water resources studies including reservoirs
- Water networks and storage facilities design
- Water networks rehabilitation
- Water distribution systems and pumping stations
- Operations and maintenance and institutional studies
- Water quality and treatment

2132 Waste Water systems including:

- Wastewater collection, treatment and disposal
- Wastewater networks design
- Wastewater reuse studies
- Lift stations
- Operations and maintenance and institutional studies
- Dams and irrigation studies and systems

2133 Systems for storm water management, drainage and detention systems including dams used primarily for flood control

214 Engineering services for power projects

This subclass includes the application of physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems for electricity generation, transmission and distribution projects.

This subclass includes:

- 2141 engineering services related to facilities that generate electrical power from:
 - Oil and Gas and other fossil-fuel energy such as coal
 - nuclear energy
 - the energy in falling water
 - other energy, such as solar power, wind power, geothermal power including cogeneration
 - facilities
- 2142 engineering services related to overhead or underground electrical power transmission and distribution lines

215 Engineering services for telecommunications and broadcasting projects

This subclass includes the application of physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems for telecommunications and broadcasting projects.

This subclass includes:

- 2151 engineering services related to systems for the transmission of voice and data between network termination points by copper wire, fiber-optic cable, co-axial cable, and hybrid fiber-coax cable
- 2152 engineering services related to systems for the transmission of voice, data and programming between network termination points by short-wave or microwave, such as:
 - wireless telephony systems
 - satellite radio systems
 - direct-broadcast satellite systems
- 2153 engineering services related to systems for the transmission of radio and television signals
- 2154 engineering services related to systems for the transmission or distribution of voice, data or programming, not elsewhere classified

219 Engineering services for other projects

This subclass includes the application of physical laws and principles of engineering in the design, development and utilization of machines, materials, instruments, structures, processes and systems for projects not elsewhere classified (n.e.c.)

This subclass includes engineering services related to systems, processes, facilities or products not elsewhere classified including the provision of designs, plans and studies related to them.

22 Project management services for construction projects

221 Project management services for construction projects

This subclass includes:

2211 **Construction Management services** of assuming overall responsibility for the successful completion of a construction project on behalf of a client, including organizing the financing and the design, requesting tenders, and performing management and control functions

2212 **project management services** provided by engineers or architects

3 Scientific and other technical services

30 Geotechnical, geological and geophysical testing advisory services

301 Geotechnical, geological and geophysical testing advisory services

This subclass includes:

3011 provision of advice, guidance and operational assistance concerning the location of mineral deposits, oil and gas fields and groundwater by studying the properties of the earth and rock formations and structures and evaluation of geological, geophysical and geochemical anomalies and of surface geological mapping or surveying

31 Geotechnical services

311 Geotechnical services

This subclass includes:

3111 providing information on subsurface earth formations by different methods:

- seismographic, gravimetric, magnetometric methods
- test drilling, boring work and core extraction services
- other subsurface surveying methods

32 Surface surveying services

321 Surface surveying services

This subclass includes:

3211 land surveying services (e.g., marking of property, boundary marking)

Also gathering of information on the shape, position and/or boundaries of a portion of the earth's surface by different methods, including transit, photogrammetric and hydrographic surveying, for the purpose of preparing maps

33 Technical testing and analysis services

331 Composition and purity testing and analysis services

This subclass includes:

3311 testing and analysis of the chemical and biological properties of materials such as air, water, waste (municipal and industrial), fuels, metal, soil, minerals, food and chemicals

332 Testing and analysis services of physical properties

This subclass includes:

3321 testing and analysis of physical properties such as strength, ductility, electrical conductivity or radioactivity of materials such as metals, plastics, textiles, woods, glass, concrete and other materials

In addition, tests for tension, hardness, impact resistance, fatigue resistance and high-temperature effects

339 Other technical testing and analysis services

This subclass includes:

3391 testing and analysis of a technical or scientific nature that does not alter the object being tested, radiographic, magnetic, and ultrasonic testing of machine parts and structures in order to identify defects. These tests are often conducted on site, radiological inspection of welds and all other technical testing and analysis services not elsewhere classified

34 Environmental and Green Consulting Services

341 Environmental consulting services

This subclass includes the following services:

3411 Environmental consulting services covering the following:

- environmental assessments, i.e. objective studies undertaken for any one or more of the following purposes: identify whether or not environmental contamination exists at a particular site, and if so determined, the source, nature, and extent of the contamination; assess the risk to public safety and health from environmental contamination associated with a project that is proposed or in place; evaluate the impact on the ecology or economy of environmental changes resulting from human or natural activities
- environmental audits, i.e. independent assessment of the current status of a party's compliance with applicable environmental requirements or of a party's environmental compliance policies, practices and controls
- site remediation planning services, i.e. preparation of plans for the abatement of environmental contamination, usually at a specific site, that incorporate such technical or other requirements as may be prescribed by law or regulation
- Evaluation of environmental studies, i.e. provision of analysis that explains the strengths or weaknesses of an environmental study and provides the basis for alternative judgments. The evaluation of environmental studies may also include an analysis of future responses to environmental regulators

- natural resource management consulting, i.e. provision of objective information, advice, or guidance concerning the best practices for ecologically sustainable development and use of: land; forests; bodies of water; gas, oil, and mineral deposits; wildlife populations and other natural resources
- waste management consulting, i.e. provision of objective information, advice, or guidance concerning the best practices for the minimization, transport, handling, disposal and/or recycling of waste
- environmental policy development consulting, i.e. advising public or private institutions on the design, development and implementation of environmental statutes, regulations, standards, or practices
- Other environmental consulting services n.e.c.

342 Green Building consulting services

This subclass includes the following services:

3421 Green Building Consulting services covering the following:

- Building energy assessments,
- Retrofitting green technology options and feasibility
- Incorporating Green energy into design for new building
- Green certification of building (LEED and others)
- Other green process management and implementation resulting in increasing energy efficiency in buildings and reducing their carbon print

AGREGGATE LIST OF SPECIALIZATIONS

The table below shows the overall aggregate list of specializations that are open for qualifications in the suggested new classification framework:

Number	Description
1011	Architectural Advisory Services
1021	Urban Planning Advisory Services
1031	Landscape Architectural Advisory Services
1111	Architectural Services for residential buildings
1121	Architectural Services for Non-residential buildings
1131	Historical restoration Architectural Services
1211	Urban Planning Services
1221	Rural Land Planning Services
1231	Project Site Master Planning Services
1311	Landscape Architectural Services
1411	Interior Architecture Services
2011	Engineering Advisory Services
2111	Electro-Mechanical Engineering Services related to residential buildings
2112	Electro-Mechanical Engineering Services related to non residential buildings
2121	Highways, roads and streets
2122	Bridges, underpasses and tunnels
2123	Mass transit systems
2124	Railways bridges and tunnels
2125	Marine and Inland ports
2126	airports, runways, hangars, other aviation facilities projects
2127	Traffic and transportation studies
2131	Drinking Water Systems
2132	Waste Water Systems
2133	Storm Water management Systems
2211	Construction Management Services
2212	Project management Services
3011	Geotechnical, geological and geophysical Testing Advisory Services
3111	Geotechnical Services
3211	Surface Surveying Services
3311	Composition and purity Testing and Analysis Services
3321	Testing and Analysis of Physical properties
3411	Environmental Consulting Services
3421	Green Building Consulting Services

Table"2": specializations open to qualification in the suggested classification framework

EQUIVALENCE BETWEEN THE SUGGESTED MPWH CLASSIFICATION STRUCTURE AND CPC VER 2.0

The following Table reflects the congruence and equivalence between the suggested MPWH structure and the CPC version 2.0. This table can be used as a reference for ensuring any development in the future in the MPWH classification is congruent with its equivalent in the CPC in the numbering system that will be used for adding new entries to the classification system.

MPWH Classification Structure	CPC Ver. 2.0
1	832
10	8321/8322/8333 partial
101	83211
102	83221 partial
103	83231
11	8321 partial
111	83212
112	83213
113	83214
12	8322
121	83221 partial
122	83222
123	83223
13	8323
131	83232
14	8321
141	83212, 83213, 83214
2	833
20	8331
201	83310
21	8332
211	83321
212	83323
213	83327
219	83329
22	8333
221	83330
3	834
30	8341 partial
301	83411
31	8341 partial
311	83412
32	8342
321	83421 + 54320
33	8344
331	83441

332	83442
339	83449
34	8393
341, 342	83931

Table "2": MPWH Classification and CPC Ver. 2.0 table of equivalence

The sections with the word "Partial" next to them means that a section of the CPC number was only included and the rest would be in a second section under the MPWH classification so that the summation would represent the whole of the CPC section.

CONGRUENCE BETWEEN THE CURRENT CLASSIFICATION STRUCTURE AND SUGGESTED CLASSIFICATION STRUCTURE

The current system represents a very different view from the suggested hierarchy since it entails the following structure:

1. Buildings
2. Roads
3. Water and waste water
4. Electromechanical
5. Specialized Engineering
6. Materials Testing
7. Site surveying
8. Environment

The limitation of the above classification, in the case of Buildings for example, has the following drawbacks:

1. The office has to be a Consultant Engineering Firm at least as per the JEA classification mentioned earlier
2. In addition the following services have to be available at the office itself
 - a. Electromechanical
 - b. Structural engineering
 - c. Quantity surveyors
 - d. Project Management

To elaborate further the above, the following Table represents the specifics of the current system as per the qualification requirements:

Classification ⁶	JEA specification	Services available in the firm
Buildings	Consultant Engineering Firm	Architectural, Electromechanical, Structural Project Management
Roads	Consultant Engineering Firm	Roads, Bridges, Surveying Project Management
Water and Waste water	Consultant Engineering Firm	Water, Structural, electromechanical, surveyor, Project Management
Electromechanical	Consultant Engineering Firm	Electrical and Mechanical
Specialized engineering	Consultant Engineering Firm	As specified in specialization

⁶ The current committee established under the GTD at MPWH has updated this structure and inserted many modifications that are congruent with the suggested classification structure such as dissecting roads into independent roads, bridges and surveying requirements as opposed to requiring it in one firm. It also added landscaping and interior to the buildings as independent requirements.

Materials testing	Consultant Engineering Firm	Numerous testing abilities
Site surveying	Consultant Engineering Firm	Mainly soil testing
Environment	Consultant Engineering Firm Engineering Firm grade "A" Engineer Office grade "A"	Environmental assessments

Table "3": Requirements of the current MPWH qualification system

The main limitations of the current system are that it requires the establishment of an Engineering Consulting Firm as per JEA classification requirements. This in its own right eliminates all the engineer offices from ever being independently qualified to work for MPWH. However, Engineer offices could establish a collaborative or an affiliation together to present them as a unified consortium to MPWH for qualification. This has never been done as engineer offices find it very complicated and rather not realistic⁷.

The suggested system eliminates the need for establishing the engineering firms that offer all the services and concentrates on providing the best possible service to MPWH from specialized offices or firms

The current Table reflects the current structure with the new classification sections that are needed to form the requirements

Classification	Suggested classification sections
Buildings	1111, 1121, 1311, 1411, 2111, 2112, 2212, 3211, 3421
Roads	2121, 2122, 2212, 3211, 3212, 3213
Water and Waste water	2131, 2212, 3211, 3212, 3213
Electromechanical	2111 partial, 2112 partial
Specialized engineering	219
Materials testing	3111, 3112, 3311, 3321, 3322
Site surveying	3211
Environment	3411, 3421

Table "4": Requirements of the current MPWH qualification system of sections from the suggested classification

⁷ Private Meetings with engineers who have engineer offices and are not qualified, Structure Consulting, April 2009

QUALIFICATION DYNAMIC

The most important question to answer is “from what level will qualification begin?” In this section, we shall suggest the dynamic of qualification so as to maximize the benefit of qualifications to engineering sector. Moreover, the classification of the JEA is taken as the basis from which to define the dynamic.

In a questionnaire that was distributed to the engineering firms that are qualified from which only nine companies responded it was difficult to establish the number of respondents as a representative sample. However, questions to which answers were unanimous do represent some value. The following questions reflected over 80% confidence

- Question on the viability of the current qualification dynamic to which over 80% responded that it was not good and that the main issue is that the requirements for space and number of engineers do not mean that the firm is capable of doing a substantially good job.
- Question on the necessity of having a qualification system in tandem with project prequalification for highly specialized projects to which over 80% responded that it is the preferred way to proceed and last
- The question on the need to change the tendering process to account for more qualified offices to which over 80% indicated that it is necessary to change to tendering process from the way projects are currently tendered.

Based on the above, the main qualification dynamic is that qualification can be done at the specialization and sub-class level with the possibility of getting qualified at the class level if all subclasses are duly qualified. However, it is a function of the ability to transform within the sector that supports the level of qualification. In the following section, the qualification framework shall be developed based on the classification structure and the Qualification system vision.

In that sense, qualification can be opened to the specialization and subclass level which can be offered by all classification levels of the JEA rather than only the highest level of consultant engineering firm as is mostly the case with the current system.

Moreover, there will no longer be a building qualification but rather an architectural services for buildings and engineering services for buildings which can be offered by two separate firms. However, it should be taken into consideration that the classification requirements of the JEA will have to be met which in some cases would mean that the firm is already classified under more than one specialization number in this classification hierarchy. This fact does not pose a problem, as it is not just the classification that is important to MPWH and GTD but rather, the qualification standards that they allow to be used for accepting firms or offices to implement the work offered through tenders by the GTD for the Public Sector.

A NEW VISION FOR MPWH QUALIFICATION OF ARCHITECTURAL / ENGINEERING FIRMS

Based on the above classification system and on the numerous meetings and committee meetings that were held with the stakeholders, it stands to reason that a new vision is developed for the Qualification of Architectural / Engineering Firms by MPWH.

The following issues have been mentioned in this report as fundamental to the benefit of the Public Sector and the Private Sector in unison:

1. MPWH wants to get the best from the sector companies and wants to qualify the best to serve in Public Sector Projects
2. By Best, it is not meant that the option should be opened only a few companies but rather to all the companies that conform to the qualification and quality basis that would constitute the qualification criteria
3. The Private sector is not interested in increasing staff and overheads only to be offered a single or few projects from the Public Sector. Such an increase in overheads will decrease the competitive advantage in this price-sensitive market for smaller offices and companies.
4. Congregating specializations in one office or firm has been proving to be a hurdle for firm excellence and development and most large –scale companies are seriously considering company fragmentation into more specialized independent companies that will become houses of excellence.
5. Some Houses of excellence already exist and have not been able to qualify due to the current system although the Public sector knows that they should be included.
6. Some Private sector companies are not interested in becoming qualified because of their belief that the tendering process favors the big companies. Hence they have not even benefitted from the current system allowance of establishing groups of companies and submitting together to be qualified as a group.

Accordingly, what is needed a more open system that allows smaller and more specialized companies to be qualified and benefit from projects offered by the Public Sector in a manner that does not require an increase in their overheads as a pre-requisite for qualification. The “Bigger is better” mindset should change and conform to current trends that require “Lean, efficient and capable” companies to compete based on their existing structures.

Based on all the above, it is recommended that the new **Vision** of the qualification system should be as follows:

“A system that ensures that Architectural / Engineering offices and firms are able to fairly compete in providing the **Best Value and Quality** for Public Sector projects”

This Vision is exemplified by the following main themes:

1. A/E Firms and Offices should be able to join in all specializations without the need for offices to increase in size and overheads to be qualified.

2. Qualified offices can join hands in projects as opposed to offices joining hands to be qualified. The benefit here is that qualified offices can join groups for specific projects as they please with other qualified offices as opposed to joining a long term relationship which may not be beneficial and then lose their qualification if they dissolved the group.
3. The Public Sector is by no means responsible for offering projects to serve all offices and firms. However, all offices and firms should be able to compete for whatever projects are offered. To that extent, the tendering system has to be developed to cater for the new qualification dynamic.
4. Promotion into higher grades and any benefits in tendering should be based on the quality of the projects executed by each office/firm and the evaluation of the whole experience with the Public Sector. It should not be based on number of years spent in a grade. Accordingly, a “Bonus and Penalty” system should be developed and integrated with the overall qualification and tendering systems.
5. GTD has the right to request only firms and offices of a specific size to enter into the tendering process for specific projects if it believes that is to the benefit of the project.

Accordingly, the proposed classification system should be reflected in a qualification framework that can be used as the basis for the products to which A/E offices and firms are qualified. This is done in the following section.

QUALIFICATION FRAMEWORK BASED ON THE CLASSIFICATION STRUCTURE

The Classification structure provides a wide basis from which GTD will be able to develop qualification frameworks for A/E offices and Firms.

Based on the numerous committee meetings at GTD during the past months and project consultations, it is evident that qualification transformation is not something GTD can or is willing to handle nor are firms and offices in the private sector willing to accommodate. To that effect, the following qualification framework is recommended for this current stage of development of the GTD qualification system. However, it is stressed that the classification system should always be the basis for future development to ensure global inclusion.

Qualification Framework		Classification Structure Reference		
Section	Product	Group	Class	Sub-Class
Advisory Services	Architectural Advisory Services	1	10	101
	Urban Planning Advisory Services	1	10	102
	Landscape Architectural Advisory Services	1	10	103
	Engineering Services Advisory Services ⁸	2	20	201
	Geotechnical, geological, and geophysical testing Advisory Services	3	30	301
Architectural Services	Architectural Services for Buildings	1	11	111
	Urban, Rural land and project site Master planning services	1	12	121/122/123
	Landscape Architectural Services	1	13	131
	Interior Architectural Services	1	14	141
Engineering Services	Engineering Services for Buildings	2	21	211
	Engineering Services for transportation projects ⁹	2	21	212
	Engineering Services for Water, Waste Water and drainage projects	2	21	213
	Engineering Services for Power Projects	2	21	214
	Engineering services for telecommunications and broadcasting projects	2	21	215
	Other specialized Engineering services ¹⁰	2	21	219
	Project Management Services for Construction projects	2	22	221
Scientific and other Technical Services	Geotechnical Services	3	31	311
	Surface Surveying Services	3	32	321
	Technical Testing and Analysis Services	3	33	331
	Environmental Consulting Services	3	34	341
	Green Building Consulting services	3	34	342

⁸ The actual service from the specification should be entered

⁹ The actual service from the specification is should be entered

¹⁰ Developed as needed and the actual specific service should be added at the specification level

CONCLUSION

The above classification system and qualification framework are part of a two year effort that has been undergoing at the Government Tenders Department (GTD). The structure was developed to align with international best practices and trends in classification systems and is based on the United Nations Central product Classification system, version 2.0 which was endorsed by the UN in December 2008 and the latest in a series of systems used in this manner. The CPC system was modified to cater for local peculiarities without losing the main issues that would realize alignment between the two structures.

On the other hand, a major part of this project was based on weekly meetings with the GTD technical committee which worked on the development of qualification criteria for most functions/products in the classification structure. Taking the previous qualification framework and the effort of the committee prior to this engagement in addition to the proposed classification structure, a new qualification framework was developed that would align with all previous efforts of the GTD technical committee and the classification structure. Additionally, the classification structure is very capable and welcoming of any new addition needed within the qualification framework if new products and services are identified and are needed to be added to the framework.

The conclusion is that now GTD has a strong internationally aligned classification structure which can be used within the qualification criteria as part of the overall qualification system to realize the Vision of having a system that “ensures that Architectural / Engineering offices and firms are able to fairly compete in providing the Best Value and Quality for Public Sector projects”.

After approval of this classification structure and qualification framework as the basis for qualification implementation, the overall tendering process needs to be restudied so that this system will be correctly implemented. The new system should take into consideration the facts that rather than offering the project to a single company, the project will be offered to the firms and offices that comply with the qualification level that is based on the classification structure in this document for those specializations that are needed to perform the overall project.

APPENDICES

APPENDIX “1”: CLASSIFICATION STRUCTURE IN ARABIC

APPENDIX “2”: QUALIFICATION FRAMEWORK IN ARABIC

APPENDIX “1”: CLASSIFICATION STRUCTURE IN ARABIC



APPENDIX “2”: QUALIFICATION FRAMEWORK IN ARABIC

إطار التأهيل		مرجعية هيكلية التصنيف		
الفئة	المنتج	المجموعة	الدرجة	البند
خدمات الرأي	خدمات الرأي المعماري	1	10	101
	خدمات الرأي للتخطيط الحضري	1	10	102
	خدمات الرأي لعمارة المواقع	1	10	103
	خدمات الرأي الهندسي ¹¹	2	20	201
	خدمات الرأي الجيوتقني والجيولوجي والفحص الجيوفيزيائي	3	30	301
خدمات العمارة	الخدمات المعمارية للمباني	1	11	111/112
	خدمات التخطيط الحضري وتخطيط الأراضي الريفية والتخطيط الشمولي للمواقع	1	12	121/122/123
	خدمات عمارة المواقع	1	13	131
	خدمات التصميم الداخلي	1	14	141
الخدمات الهندسية	الخدمات الهندسية لمشاريع الأبنية	2	21	211
	الخدمات الهندسية لمشاريع النقل ¹²	2	21	212
	الخدمات الهندسية لمشاريع المياه والصرف الصحي	2	21	213
	الخدمات الهندسية لمشاريع الطاقة	2	21	214
	الخدمات الهندسية لمشاريع الاتصالات والبث الإذاعي	2	21	215
	الخدمات الهندسية الأخرى ¹³	2	21	219
	خدمات إدارة المشاريع الهندسية	2	22	221
الخدمات العلمية والفنية الأخرى	الخدمات الجيوتقنية	3	31	311
	خدمات المساحة	3	32	321
	خدمات الفحص والتحليل الهندسي	3	33	331/332/339
	خدمات الاستشارات البيئية	3	34	341
	خدمات استشارات المباني الخضراء	3	34	342

¹¹ يجب تحديد التخصص

¹² يجب تحديد التخصص

¹³ يتم تطويرها حسب الحاجة بالرجوع إلى هيكل التصنيف ولغاية مستوى التخصص

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