



EXPRO National Manual for Projects Management

Volume 6, chapter 3

Technical Standardization Plan



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Technical Standardization Plan

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1.0 PURPOSE

The purpose of this document is to present the EXPRO Plan for the identification, development, review, approval and publishing of the National Standard Specifications, Standard Design Criteria and Typical Construction Detail Drawings (TCDD), collectively referred to as the National Technical Standards, based on sector/ disciplines to cover the full spectrum of infrastructure projects across the Kingdom. The Plan covers the following major infrastructure elements which constitute the bulk of government spending on Infrastructure Projects across the Kingdom:

- Healthcare
- Education Facilities
- Water
- Municipality & Rural works
- Housing & Community buildings
- Roads

Refer to Attachment 1 – Indicative Types of Infrastructure Projects covering above element of Infrastructure.

Engineering Templates, Procedures and Discipline Design Guidelines provided in the Volume 6, Engineering, of EXPRO Projects White Book shall be used in the development of all National Technical Standards. National Technical Standards shall be developed and owned by respective Entities responsible for the development of related Infrastructure projects.

2.0 BACKGROUND

EXPRO's interaction thus far with the government Entities has revealed that majority do not have an approved and controlled set of Technical Standards available for use in the design of their Projects across the Kingdom of Saudi Arabia. Also, these Entities do not have an Electronic Content Management Systems (ECMS) to host their respective Technical Standards or other design documents. The consequence of this is that similar infrastructure projects are designed and constructed to different requirements leading to unpredictable outcomes and inconsistent quality.

The Specifications, Design Criteria, and Standard Details form the basis of design for any infrastructure projects. Standardizing these three types of documents, to the extent feasible, will lead to the uniformity of design/material, improved safety standards, reduced engineering efforts, improved construction quality/productivity, simplified change control process, certainty of outcome, etc. It would be most advantageous for the Entities to have the same standard specifications, Design Criteria, and Standard Details wherever possible. Over time, use of these standards may lead to increased local content of material/ equipment.

3.0 SCOPE

This document describes the EXPRO Plan for the identification, development, approval and use of National Technical Standards in the design of government Infrastructure projects across the Kingdom. The elements of Infrastructure listed in section 1.0 above are mainly undertaken by the following six major Entities:

- A. Ministry of Health
- B. Ministry of Education
- C. Ministry of Environment, Water & Agriculture (MEWA)



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- D. Ministry of Municipality and Rural Affairs (MOMRA)
- E. Ministry of Housing
- F. Ministry of Transport (MOT)

The Scope of Work of Project Management Consultant's (PMC) for each of above Entities shall include the identification, development and approval of Technical Standards to be developed by the A/E's (Architect/Engineers) having previous experience in the development of such standards. Each PMC shall develop the A/E's Scope of Work for the development of Technical Standards relevant to the types of Infrastructure elements appropriate to their respective Entity.

Technical Standards shall be reviewed and approved by the PMC and published as National Technical Standards on the Entity's portal which can be accessed by all other Government Entities for use on their Projects.

4.0 DEFINITIONS

Term	Definition
A/E	Architect/ Engineer
BIM	Building Information Management
CAD	Computer Aided Design
CSI	Construction Specification Institute
ECMS	Enterprise Content Management System
Entity	A Saudi Government Organization which is responsible for the delivery of government funded infrastructure construction projects.
EPC	Engineering, Procurement, and Construction
EPMO	Entity Project Management Organization
NWC	National Water Company
O&M	Operation and Maintenance
PMC	Project Management Consultant
QA/QC	Quality Assurance / Quality Control
RFP	Request For Proposal (also called ITT – Invitation to Tender)
SASO	Saudi Standards, Metrology and Quality Organization
SEC	Saudi Electricity Company
TCDD	Typical Construction Detail Drawing, also referred as Standard Details
Technical Standards	Collective term used for Standard Specifications, Design Criteria and Standard Construction Details

5.0 REFERENCES

1. Document No: EPM-KE0-TP-000009: Technical Specification Template
2. Document No: EPM-KE0-PR-000008: CAD Standards Procedure
3. Document No: EPM-KE0-GL-000018: Standard Drawing Template Guide
4. Document No: EPM-KE0-GL-000017: Building Information Modeling Guideline
5. Document No: EPM-KE0-GL-000016: General Design Guideline
6. Document No: EPM-KE0-PR-000002: Design Review Procedure



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6.0 RESPONSIBILITIES

EXPRO shall own, maintain and control this plan including any future revisions. EXPRO shall monitor the implementation of the requirements of this plan.

PMC will review the Entity's available existing Technical Standards and will work with EXPRO and the Entity in the finalization of lists of Technical Standards to be developed by an A/E for each Entity.

The responsibilities of EXPRO, PMC, A/E and Construction Contractors in the identification, development, approval, publishing and use of Technical Standards is listed in the Table 6-1 below:

Table 6-1 – Division of Responsibilities

SN	Task	EXPRO	Entity	PMC	A/E	Construction
1	Assess Entity's Existing Technical Standards and produce report	R	S	P		
2	Finalize the list of Technical Standards to be developed for the Entity	R	S	P		
3	Define the Scope for Technical Standardization work in the RFP for A/E services	-	S	P	-	-
4	Develop Technical Standards as defined in the Contract	-	S	R	P	-
5	Review and approve Technical Standards	-	S	P	-	-
6	Publish Technical Standards on Entity's Portal, provide link on EXPRO Portal	S	S	P	-	-
7	Ensure that the applicable Technical Standards are used on Entity's projects	-	-	P	-	-
8	Propose, if needed, the project specific revisions of Technical Standards	-	-	S	P	-
9	Approve Technical Standard revisions	-	S	P	-	-
10	Use the defined Technical Standards in the design/ construction	-	-	S	P	P
11	Monitor the implementation of this Plan on the Projects (on going)	P	S	S	-	S

Legend: P - Primary Responsibility, S – Support, R-Review



7.0 PROCESS

This section describes the work processes for the identification, development, approval, publishing, revision and use of Technical Standards:

7.1 Identification of Technical Standards

The PMC shall identify the lists of Technical Standards needed for the Entity's typical projects. In developing the lists of Technical Standards the PMC shall undertake an assessment of the existing Technical Standards available with the Entity and produce a report and obtain Entity's agreement to the lists of Technical Standards to be developed. EXPRO shall review the assessment report and work with the Entity in the review of technical standard lists to provide input on any similar standards being developed by other entities so that duplicate engineering efforts is avoided.

Based on the agreed lists above, the PMC shall develop the estimate of the job-hours, scope of services and RFP for an A/E to develop the identified Technical Standards. The PMC shall identify codes and standards to be followed by the A/E in the development of Technical Standards. Development of additional Technical Standards may be required after commencement of the standardization work, as directed by the Entity.

7.2 Development of Technical Standards

The PMC shall perform the Technical Evaluation of bids from A/E's for the development of Technical Standards, provide the recommendation and manage the A/E during the development of Technical Standards.

The A/E shall develop the plan for the development of Technical Standards to suit the Entity's overall requirement of projects schedules. The A/E shall begin the development of Technical Standards using the templates, checklists, Computer Aided Design (CAD) procedures, etc. provided in the Volume 6, Engineering, of EXPRO Projects White Book.

There are many elements of Technical Standards which are site/ project specific such as ground conditions, environmental requirements, surface coating, wind load, weather data, local code compliance, etc. Such project specific elements shall be clearly identified and defined in the Standards so that the future users (usually A/E or (Engineering, Procurement, and Construction) EPC Contractors) can tailor the requirements for specific projects and convert National Standards into Project specific documents. Revisions to National Standards to suit specific Projects will be subject to PMC's approval.

Regular interaction and engagement between the A/E and the PMC will be required during the development phase to ensure that the Technical Standards are being developed in line with locally available material, current design practices and are flexible for use on Entity projects across the nation and that project specific elements are clearly identified.

All the Technical Standards including the Entity's Existing Standards identified to be converted into Technical Standards shall meet the following requirements:

7.2.1 Standard Technical Specifications

The specifications shall not be linked to any specific vendor or supplier. These shall be developed in CSI format. Refer to the Specification Template provided in Volume 6, Engineering, of the EXPRO Projects White Book for guidance.



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The Specifications shall be developed in a form and content that shall support their import and linking to the Revit/BIM model, using a compatible software such as e-SPEC or similar.

7.2.2 Design Criteria

Refer to the Design Criteria templates and the Discipline Design Guidelines (Chapter 7, Design Guidelines, of Volume 6, Engineering, of EXPRO Projects White Book) for the development of Design Criteria. Separate design criteria shall be developed for every applicable engineering discipline such as Civil, Structural, Mechanical, Electrical, etc. Design criteria shall cover all types of work typically undertaken by the Entity.

7.2.3 Typical Construction Detail Drawings (TCDD)

TCDD's, also referred to as Standard Details in Scope of Work documents, shall be developed in a CAD format using the set-up defined in the Volume 6, Engineering, of EXPRO Projects White Book which also provides the drawing templates and a library of symbols for use. One standard detail may contain more than one detail of the same discipline if it does not cause cluttering and the drawings are clear and un-ambiguous. Refer to sample TCDD's provided in the Volume 6, Engineering, for guidance.

7.3 Review & Approval of Technical Standards

All Technical Standards/ Standard Design Manuals shall undergo A/E's internal QA/QC (Quality Assurance/Quality Control) processes and as defined in the A/E's Contract before these are approved by the PMC and issued for use on Entity's projects. PMC shall ensure that the A/E's scope includes all required coordination and approval of Technical Standards by third parties such as SASO (Saudi Standards, Metrology and Quality Organization), SEC (Saudi Electric Company), NWC (National Water Company), Entity's O&M (Operation and Maintenance) teams, etc.

On approval, the Technical Standards/ Standard Design Manuals shall be published on the Entities Web portal for use on its nationwide infrastructure projects.

7.4 Publishing of Technical Standards

All approved current versions of the Technical Standards/ Design Manuals shall be made available electronically to end users (usually A/E and EPC Contractors) via the Entity's Web Portal.

In addition to access through Entity's Web Portal, the Technical Standards/ Design Manuals shall also be made accessible from the EXPRO Website through hyperlinks to the Entity's Web Portal. Whether the Technical Standards are accessed through the Entity's or EXPRO Websites, the PMC will establish and manage the access control i.e. create the user account/passwords as required to control the access.

7.5 Use of Technical Standards

The PMC shall identify and include the list of applicable approved Technical Standards/ Design Manual for use on the Entity's projects.

The Technical Standards/ Design Manual may be amended for specific project requirements subject to agreement and approval by the PMC.



7.6 Revision of Technical Standards

To keep up with Code requirements, technological advancement, project feedback, lessons learnt, industry practices and market conditions, the Technical Standards/ Design Manuals should be periodically reviewed and updated as needed. The review/approval of revisions shall follow the same process as in the development of original Technical Standards/Design Manuals. In general, all the published Technical Standards/Design Manuals shall be reviewed by the originating Entity at least once every five years to see if any changes are warranted.

7.7 Monitoring the Use of Technical Standards/ Design Manuals

EXPRO will work with Entities and PMC's to ensure that the applicable approved Technical Standards/ Design Manuals are invoked for use in the design and construction of the Entity's projects and that due process is followed in the project specific revisions.

7.8 Potential Future Opportunities

This plan requires each of the major Entities to develop their own Technical Standards and to publish them for use on its Projects across the Kingdom. Potential use of standard specifications and designs by government multi-entities can become National Standards and provide an incentive to the Saudi entrepreneurs to manufacture material/ equipment locally, thus promoting the local content and reducing imports.

8.0 ATTACHMENTS

1. Indicative Types of Infrastructure Projects



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Attachment 1 - Indicative Types of Infrastructure Projects

Healthcare	Education	Water	Municipal/ Rural	Housing	Roads
(Ministry of Health)	(Ministry of Education)	MEWA	MOMRA	Ministry of Housing	Ministry of Transport
- Hospitals - Clinics - Specialized Equipment	- Schools - University/ Colleges - Sporting facilities	-Desalination - Potable/ Waste Water Treatment - Potable / Waste Water distribution - Water Storage - Dams/ Wells	- Misc. Buildings - Storm Water (city/ towns) - Landscape - Traffic Control - City/ Town streets	- Housing - Community Buildings	- Major Roads/ Bridges - Storm Water (main roads) - Utility Crossings