



Everyone's Smart University

Project (Spring 2021)

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Construction of a primary road in industrial city

Construction of road is a heavy civil and infrastructures project. Heavy equipment's are engaged during different constructions phases. Project has scope of work for dry and wet utilities and their tie-ins with other existing services like storm drainage, sanitary, potable water, irrigation service, telecom and power system. So, the major challenges involved to completion of project in respect of safety and quality of works.

As a project manager role in this project, to complete the construction of road within time itself another challenge for the region of desert due to frequent sandstorm and rainfall. During these two season project works will be almost shut-down, which will cause time lapse and move progress behind the schedule.

So, aim of research is look into the aspects that how to construct the road with standard quality, safely within time.

Objective-

To construct a primary road for heavy traffic flow in industrial city to diverts and distribute the load from other heavy traffic congested roads.

To reduce the travel time to the destination.

To distribute the utility loads and surface run off from catchment area towards discharge basin.

To accommodate utility facilities adjacent surroundings.

To full fill the overall aim and purpose of industrial city building.

Construction of a segment of road among overall road networks of industrial city.

Scope of work:

The work of this construct includes the Procurement and Construction of the section Road and utilities between two existing Road in industrial city in accordance with the contract drawings and documents as follows;

The work includes but is not limited to the following:

Roads including aggregates asphalt pavements, base course and subgrade.

Pavements markings-signs, concrete curbstones and pedestrian walkway, landscape and

hardscape.

Storm water and sanitary systems along with manholes and catch-basin.

Potable and fire water system.

Irrigation water system.

Electrical power distribution system and telecom with CCTV surveillance.

Literature Review and conceptual Framework:

PROJECT ORGANIZATION:

Project organization has been established under the supervision of the Project Manager and its representative and to control completion of the project. The Project Manager has full authority to ensure comprehensive proper management and monitoring of the project, which include all associated technical, financial and administrative matters until timely completion, handing over of this project. The Project Manager shall ensure the project completion with the agreed cost and time. The Project Manager shall follow up the objective profit of the company. A team of Managers in the irrespective Field-Engineers, Supervisors, and administration personnel shall assist the Project Manager.

Ensure the Project Procedure Manual is implemented and kept up to date, and ensure all staff is aware of the Project Procedure Plan requirements.

Ensure all staffs understand their responsibilities as outline in the Project Procedure Manual.

Responsibilities and Authorities:

1.On award of the contract

- a. List the overall manpower requirement of the project and define their designation, role and responsibilities.
- b. Record material resources and source them locally.
- c. Estimate budget required monthly for cash flow analysis.
- d. To study the contract documents & all other documents related to the contract.
- e. To decide the necessary arrangements for the site establishment.
- f. To establish the needs of the overall staffs, labor, tools, equipment & to prepare materials schedule.
- g. In liaison with the Construction Manager in charge:
 - To decide the policy on hiring and/or sub-contracting. To

decide the policy on insurance.

To make the Contractor Quality Control Plan.

2. During Execution of the Contract

- a. To programming the works in accordance with the contract requirements
- b. To comply with the specified Quality standards on materials and work
- c. To minimize the cost through proper management & innovation
- d. To execute the works in accordance with the provision of the contract with regards to:

Notice to be served and reports submittals.

Testing (including management of external laboratories),

Measurements

, Record keeping Law

Health and safety regulations

- e. To measure the works, to prepare the request for interim payment.

3. On Completion of the Contract

- a. To prepare and submit the final account.
- b. To arrange for the preparation & submit the specified as built drawing operation and maintenance manual.
- c. To prepare and submit the various reports on technical & commercial issues, productivity, sub-contractors, suppliers, etc. in accordance with the company's Procedures.
- d. To manage to reconciliation the materials.
- e. To demobilize and remove offices, stores, and materials from site.
- f. To serve all appropriate notices to clients, Architect, sub-contractors, issuers, authorities, etc.
- g. To request and obtain the Certificate of Completion.

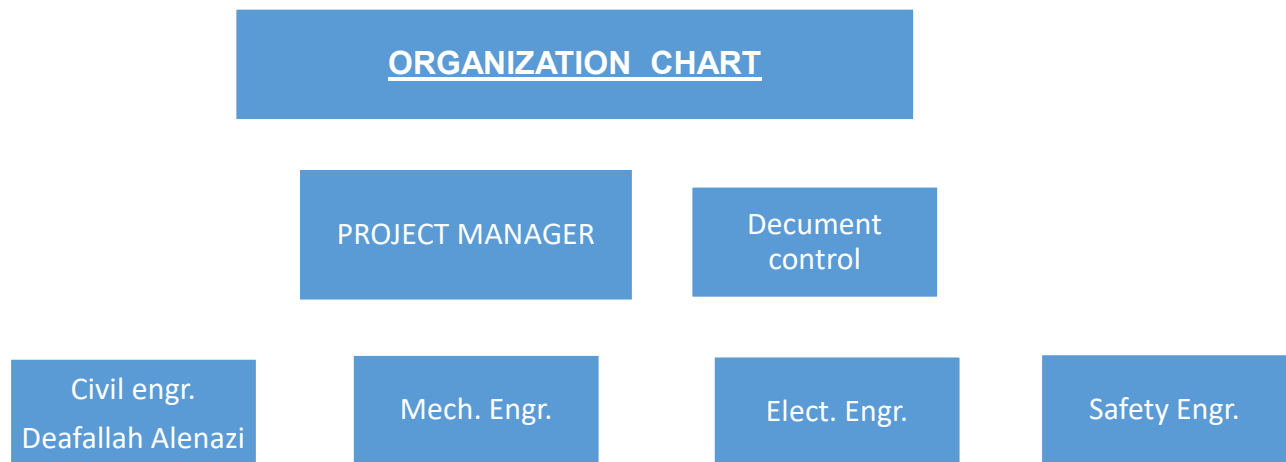
Job Descriptions of Key Personnel & Reporting Channel:

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Responsibility								
WBS		Project Office		Field operation				
Package	Task	Project Manager	Schedule Engineer	Construction Manager	QAQC engineer	Project Engr. (Site)	Safety Engineer	Surveyor
Potable and Fire Water System	Trenching Works	O	□	□	□	□	□	□
	Installation of systems	O	□	□	□	□	□	□
	Backfilling works	O	□	□	□	□	□	□
Street Lighting System		O	□	□	□	□	□	□
Street Lighting and Traffic Light System		O	□	□	□	□	□	□
Roadworks	Sub grading works	O	□	□	□	□	□	□
	Base Course	O	□	□	□	□	□	□
	Asphalt installation	O	□	□	□	□	□	□
Box Culvert C1,2,3	Excavation works	O	□	□	□	□	□	□
	Concreting works	O	□	□	□	□	□	□
Swale 1,2,3,4.	Excavation works and lean concrete finish	O	□	□	□	□	□	□
Landscaping and Hardscape	Concrete works, interlock pavements installation and walk way	O	□	□	□	□	□	□
	Trees and shrubs plantation	O	□	□	□	□	□	□
	Boulders placing and garden works	O	□	□	□	□	□	□
Testing and Commissioning		□	□	□	□		□	
Demobilization and Site Cleanup		□	□	□				

Legend	
□	Responsible
□	Support
□	Notification
O	Approval

Organization Chart:

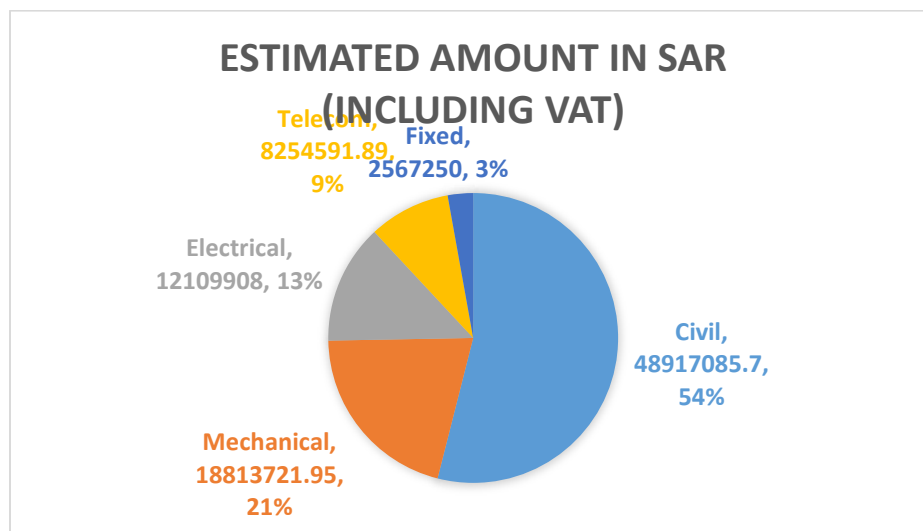


Methodology:

Project value: SR 90,662,557.77

Scope of work as per BOQ:

Discipline	Estimated amount in SAR (including VAT)
Civil	48917085.7
Mechanical	18813721.95
Electrical	12109908
Telecom	8254591.89
Fixed	2567250



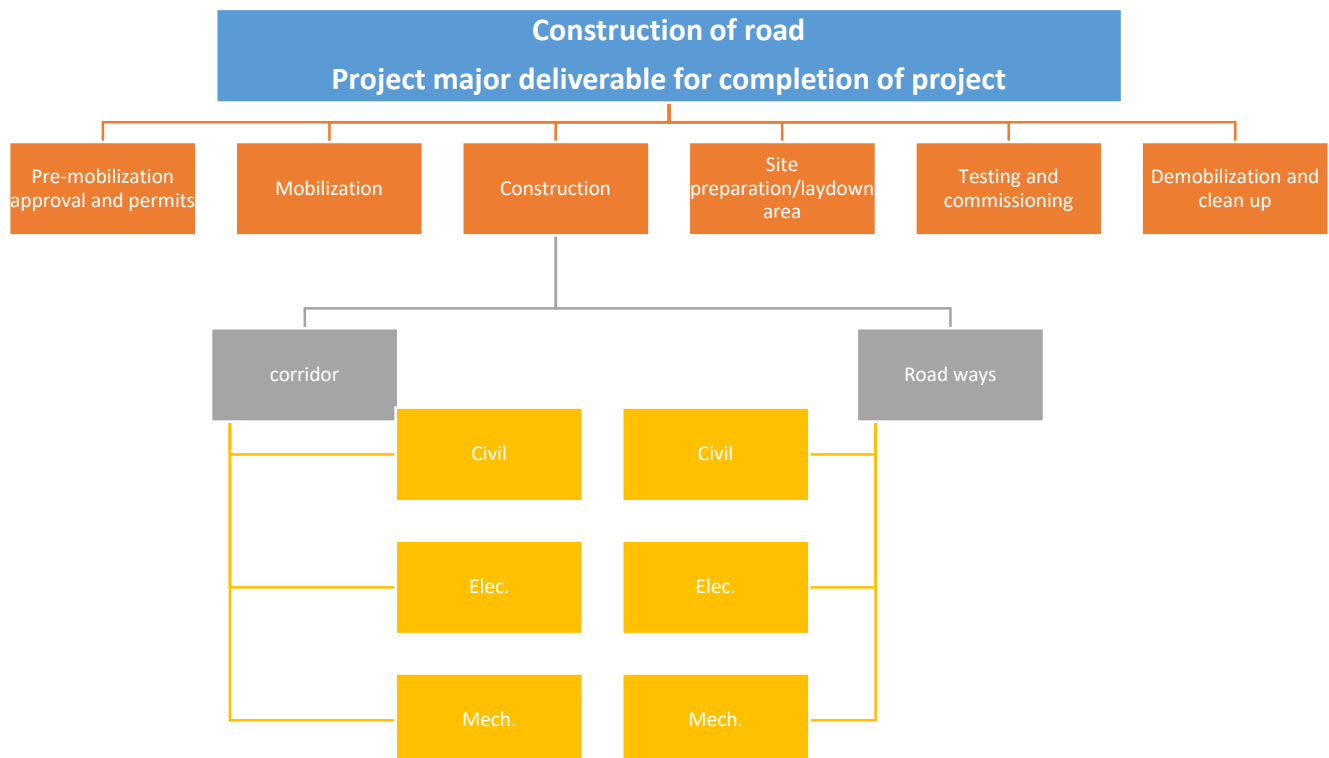
Budget as per top down method:

Activity Name	Budgeted Total Cost
CONSTRUCTION OF ROAD	90,662,557.77
Pre-Construction	
Construction and Installation of Temporary Facilities and Initial Mobilization	718,830.00
Mobilization of Manpower and Equipment's	1,848,420.00
Construction	
Site Clearing and Grubbing	2,242,453.85
Cut and Fill	16,274,917.43
Road Crossing Utilities	8,839,767.35
Irrigation System	3,130,931.38

Storm Drainage System	8,932,438.32
Sanitary Waste Water System	4,301,581.41
Telecommunication System	8,135,215.88
Power Distribution System	15,586,930.54
Potable and Fire Water System	6,182,501.58
Street Lighting System	6,556,931.03
Street Lighting and Traffic Light System	2,204,951.51
Roadworks	1,432,094.45
Box Culvert C1,2,3	1,292,045.51
Swale 1,2,3,4.	469,938.08
Landscaping and Hardscape	1,246,574.45
Testing and Commissioning	752,585.00
Demobilization and Site Cleanup	513,450.00

WBS with major deliverable:

Work break down structures is illustrative only. It is not intended to represent the full project scope of any specific project not to imply that this is the only way to organize a WBS on this type of project. Major works deliverables identified first and further it divided into discipline work packages as below—



After project awarded and got notification to proceed the construction works construction contractor needs to submit performance security and local governance approval for works including Insurance certificate. Contractor have to build their laydown area for offices and primary accommodation and messing for staff. In general, within 30 days of timeframe preliminary and baseline schedule required to submit based on mapping the project timeline, sequence of activities and cost.

Construction works quality will be controlled by project Quality Control Plan, approved IFC drawings, shop drawings. With Quantity take off, cash flow plans the invoices to be released and paid.

Entire project life to be maintain safely according Safety plan and risk assessment of each activity.

Result and discussion:

Output of the study found Challenges to complete the construction works on time. Because during sand storm and hot weather time working man hours reducing which affected the baseline schedule. So, to control the situation tools and techniques to be used

1. **Expert judgement** on technical knowledge on the industry and focused area of the project, legal and procurement, legislation and procurements and organization governance.
2. **Project management information system (PMIS)**-Using latest software systems for design, schedule, automated information and reporting gathering on key performance indicator/index.
3. **Meetings** with stake holders in regular interval such as weekly, bi-weekly, monthly regarding progress and co-ordination to address the critical area.
4. **Corrective action and preventive action** are an intentional activity to realign the performance of the project according to Project Management Plan.

Project **cost account** directly involved with high risk activities like deep excavation for utility networks, lifting operations for installation of pipeline and erection of light poles, work at height for in-situ concrete works, massive volume of materials management,

electro-mechanical works etc. So, proper risk assessment, man machine interference plan and work sequence will save the man-days and help to safely complete the project.

Reference:

Lecture 7 on starting of the project plan: WBS

PMBOK Sixth Edition 4.3.2 ,4.3.3 ,5.4.2.2

Contract JCPDI-R-3004; Construction of road 3 between road 4 to road 12.