


Construction Project Planning... The Sequel!

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What do these have in Common?



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Construction Project Planning... The Sequel

Outline of Presentation

- ❑ Introduction
- ❑ What & Why Planning?
- ❑ Planning Input & Output
- ❑ Roles of Planner(s) / Scheduler
- ❑ Schedule Input & Output
- ❑ Summary & Questions

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AACE Intl. Recommended Practice

***"PROJECT PLANNING - AS APPLIED IN
ENGINEERING AND CONSTRUCTION FOR
CAPITAL PROJECTS"***

- AACE International
RP 39R-06 December 2011

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Project Planning

vs. Schedule Development

- Planning and Scheduling are distinctively different but related processes for capital construction projects.
- Schedule planning and development usually require a different set of skills & knowledge.

What is Planning ?

Project Planning

"the determination of a project's objectives to identify the activities to be performed, the methods & resources to be used to accomplish the tasks, to assign responsibility & accountability, and establish an integrated plan for project completion."

- AACE International
RP 10S-90 Terminology

What is a (CPM) Project Schedule?

A realistic time phased project plan that represents how the project will be built that includes:

- ❑ the entire scope of the project
- ❑ Key milestones and phases
- ❑ specific activities with reasonable durations
- ❑ a logic or sequence of work activities
- ❑ how these various activities interrelate
- ❑ Interfaces: Design & Procurement
(client; other contractors; regulators)

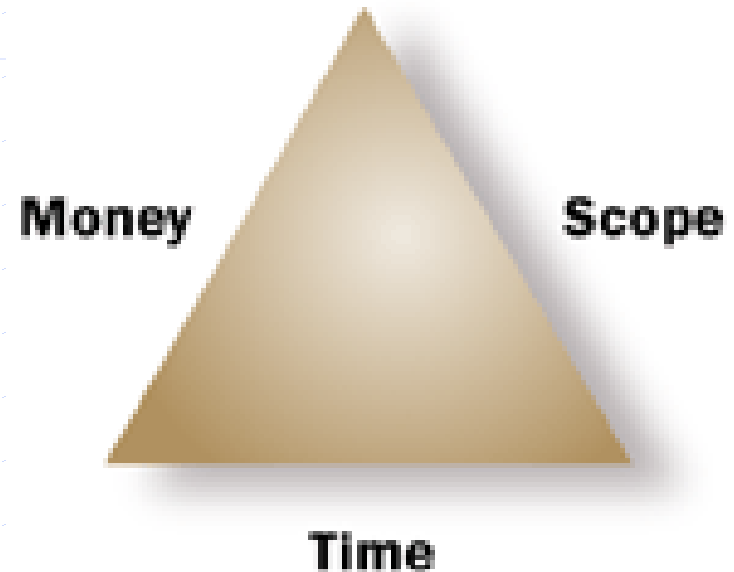
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The Project Triangle

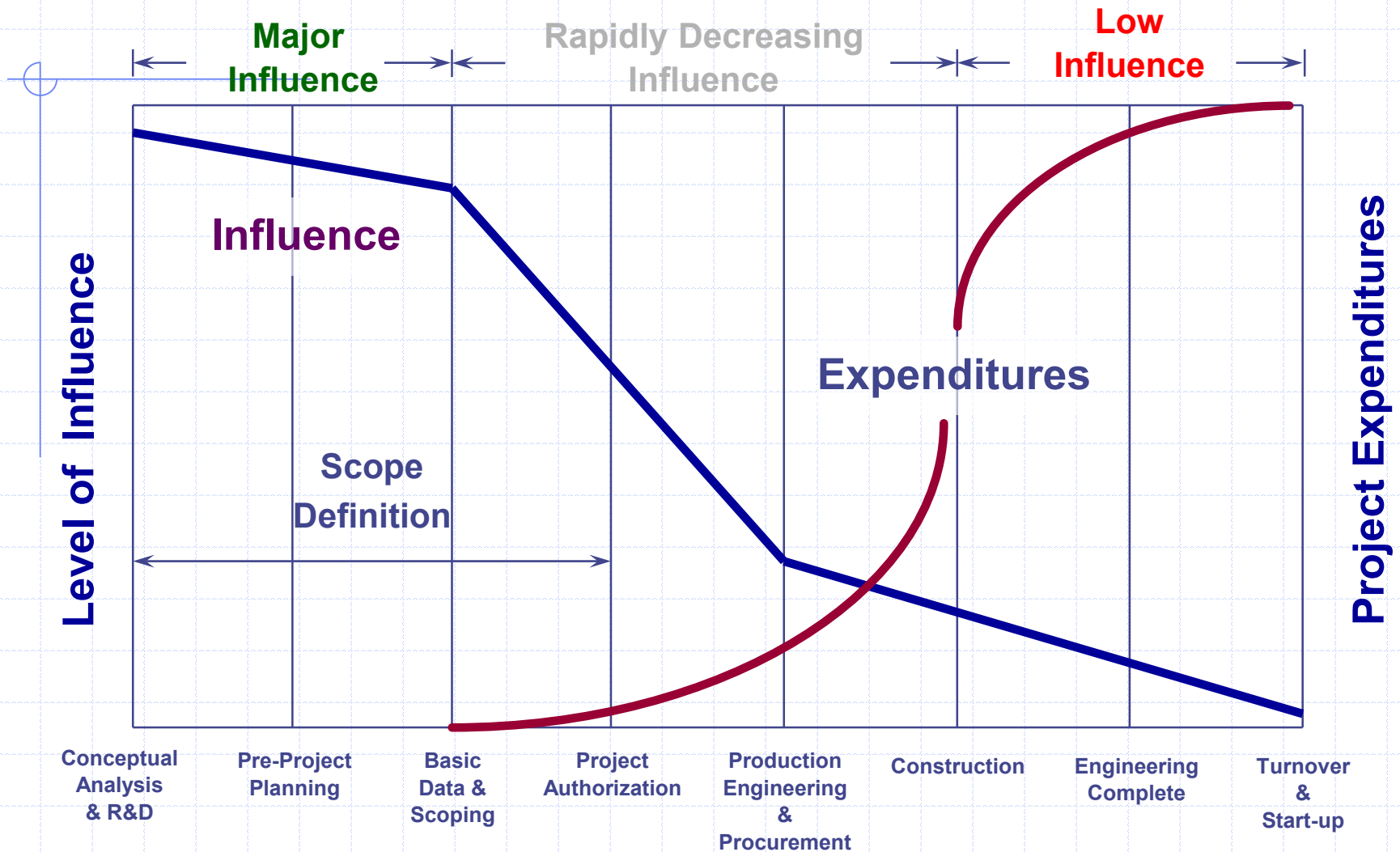
PCTS Relationship

- Performance (Quality)
- Cost/ Resources
- Time
- Scope of Work



“You can pick any three!”

Opportunity for Influence



Project Life Cycle

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Why Project Planning ?

“As the level of Pre-Project Planning increased:

- ✓ *Project cost favorably decreased by as much as 20 percent*
- ✓ *Schedule performance improved by as much as 39 percent*
- ✓ *Plant design capacity & facility utilization improved 15 percent*
- ✓ *Scope changes tended to decrease”*

- Construction Industry Institute - 1994

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What is the Planning Process?

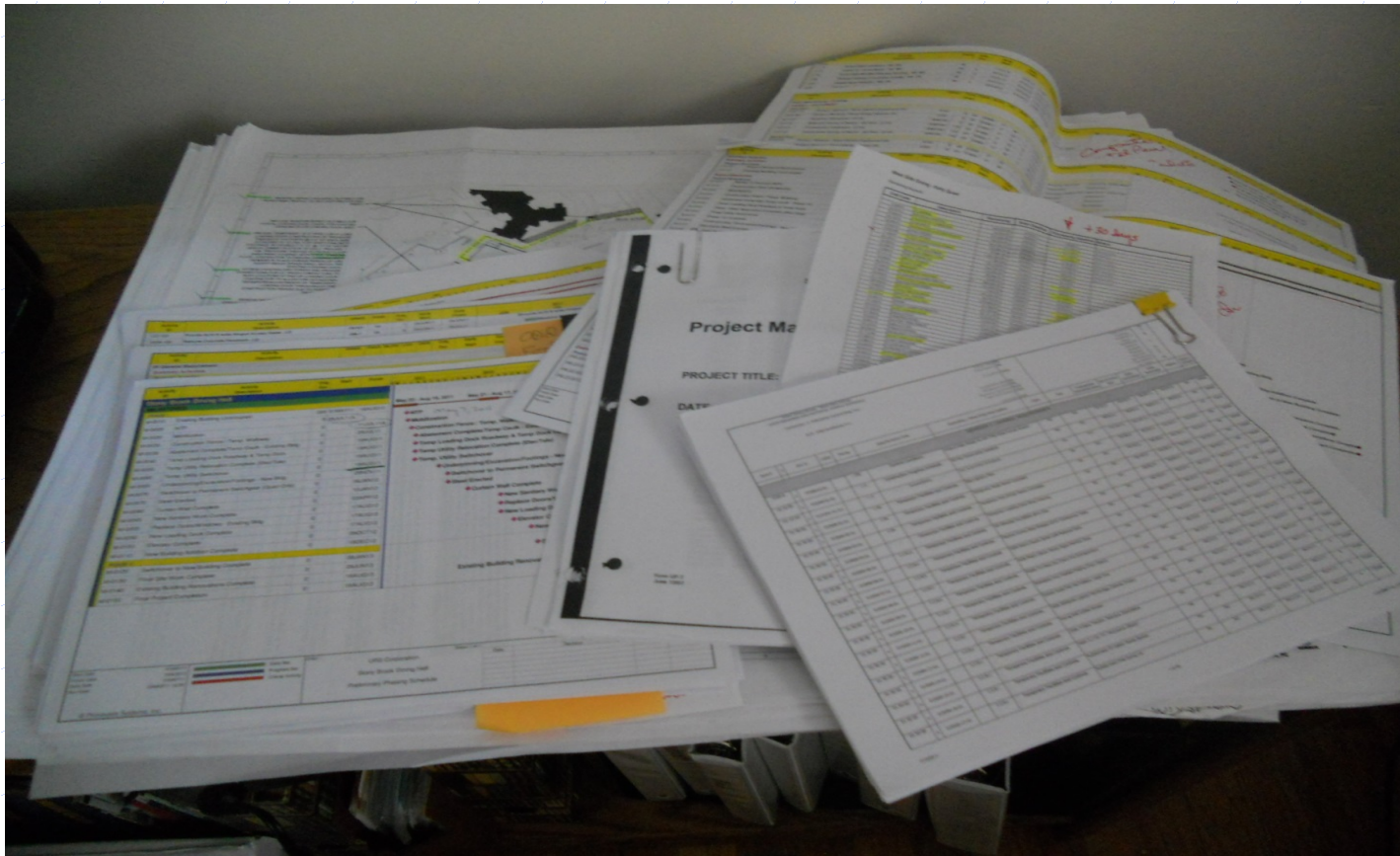
Essential questions to be answered during project planning:

- ❑ **Who?** Stakeholders, resource commitments and organization breakdown structure (OBS).
- ❑ **What?** The physical features and technical objectives (Scope of Work).
- ❑ **Where?** The location where the project work will be performed: Engineering, Procurement and Construction.
- ❑ **How?** Work breakdown structure (WBS) decomposition of the scope into deliverables.
- ❑ **When?** Initial timeline, phases and sequence for the subsequent schedule planning process.
- ❑ **How Much?** Rough order of magnitude (ROM) cost estimate / budget.

Planning Sequence Recommended

- ❑ Define the project scope of work (SOW).
- ❑ Identify the contract requirements, project objectives and project delivery method.
- ❑ Establish the work breakdown structure (WBS) of deliverables.
- ❑ Identify stakeholders.
- ❑ Identify resources availability (people and capital assets).
- ❑ Identify the constraints and variables and their potential impact on the project.
- ❑ Establish the preliminary timeline and sequence of deliverables (phases).
- ❑ Determine the rough order of magnitude (ROM) cost estimate for each component phase, work package, or group of tasks. Include estimated quantities, planned production rates and pricing.

Contract Document Review = Pile Diving



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Contract Table Of Contents (Typical)

Part I - The Schedule

- A. Solicitation/Contract Form*
- B. Supplies or Services and Prices/Costs*
- C. Description/Specs./Work Statement*
- D. Packaging and Marking*
- E. Inspection and Acceptance*
- F. Deliveries or Performance*
- G. Contract Administration Data*
- H. Special Contract Requirements*

Part II - Contract Clauses

Part III - List Of Documents, Exhibits, And Other Attachments

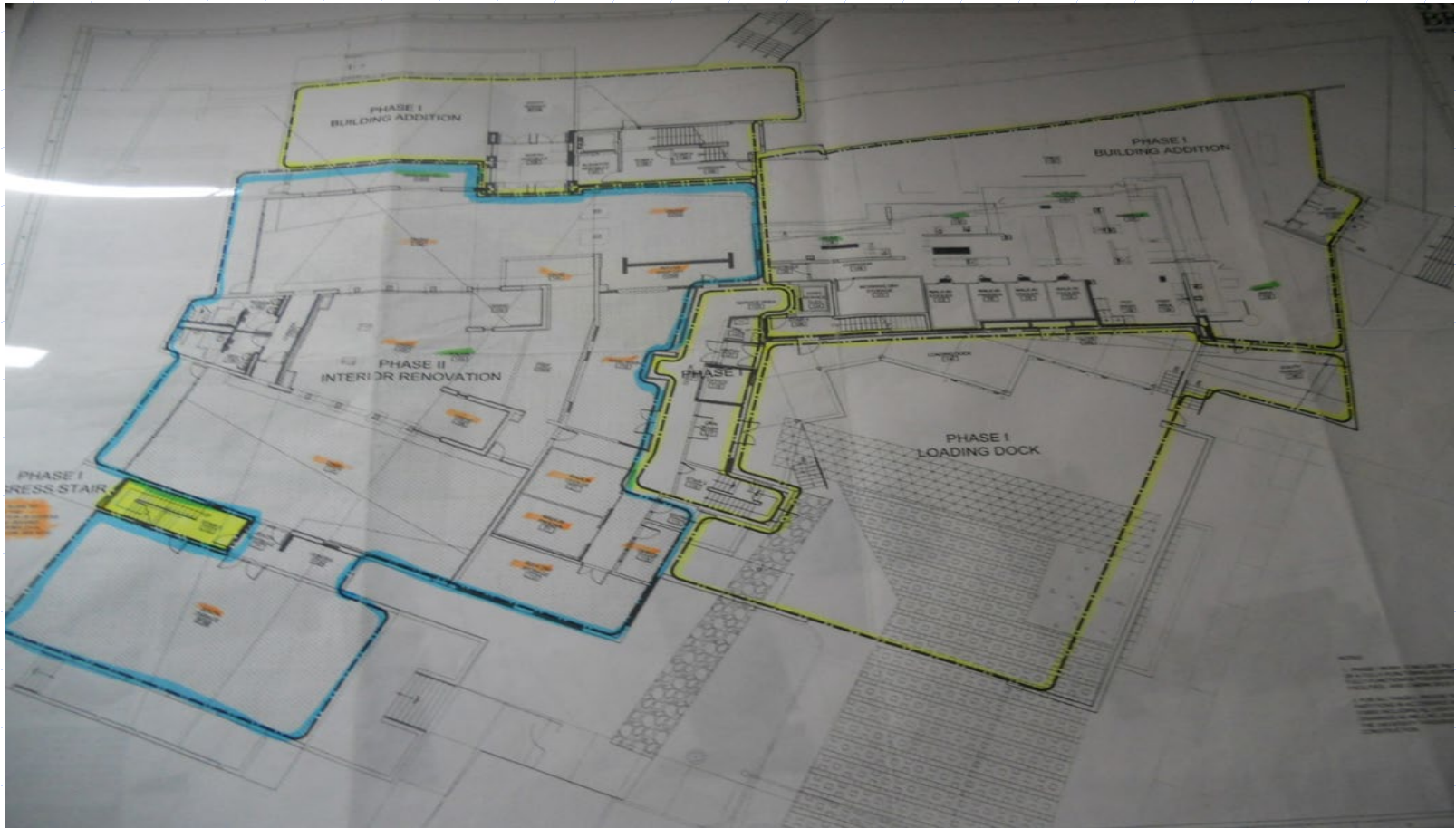
Part IV - Representations And Instructions

- a. Representations, Certifications, and Other Statements of Offerors*
- b. Instructions, Conditions, and Notices to Offerors*
- c. Evaluation Factors for Award*

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Review of Design Drawings



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Contract Assessment

Review the Contract to Identify:

- Scope of Work (inclusions / exclusions)
- Key Milestones & Phases
- Start / Completion/ Period of Performance
- Interface with Agencies and Regulators
- Procurement of Materials & Equipment
- Labor requirements / restrictions
i.e. prevailing wages / hiring requirements
- Site Access and Work Restrictions
- Influence of Weather on the Project

Essential Planning Questions

- *What?* *Technical objectives (Scope)*
- *How?* *Work Breakdown Structure (WBS)*
- *Who?* *Resource Commitment/ (OBS)*
- *When?* *Initial Timeline then Schedule later*
- *How Much?* *Budget Estimate*
- *Where?* *Location of the Work*

The project team must understand the Total Scope of the contract documents.

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Who does the Planning ?

*The Owner, the Contractor(s),
the Project Manager, Project Engineer,
Lead Design Engineers, Process Engineers,
Project Team Members,
Commissioning & Start-up,
Facility Operations & Maintenance Manager*

*Project Participants have distinct roles and
responsibilities for successful project planning.*

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Who does the Planning ?



A bread line for the unemployed in New York City—FORTUNE, February 1940

Key members of the planning effort

the Client / Owner,

the Project Manager,

the Project Scheduling Professional

The project team must be involved early and continuously until the project plan is completed and approved.

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Project Planning Stage

The Project Management Team reviews the Contract including:

- Scope of Work for the Project
- Design drawings, technical specifications and specified construction materials
- Prepares the project cost estimate

While the planning effort is underway the project CPM contract schedule is prepared.

The Project Manager's Role

- ❑ Involve the client (Owner) in defining project goals and key results”
- ❑ Identify key project results and milestones
- ❑ Involve team members in the planning process

Fundamentals of Project Management
- Professor James Lewis

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Project Scheduler's Role

- ❑ Assist the Project Manager to establish realistic and achievable schedule baselines.
- ❑ Provide direct support and expert consulting advice to project personnel regarding planning and scheduling
- ❑ Ensure that required project planning and scheduling controls are appropriately implemented and maintained

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Project Scheduler's Role ?



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Project Scheduler's Role

- ❑ Provides expertise to develop methodologies, techniques and tools for planning and scheduling
- ❑ Supports the development of the project plan
- ❑ Translates the project plan into the project schedule.

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Project Scheduler's Role

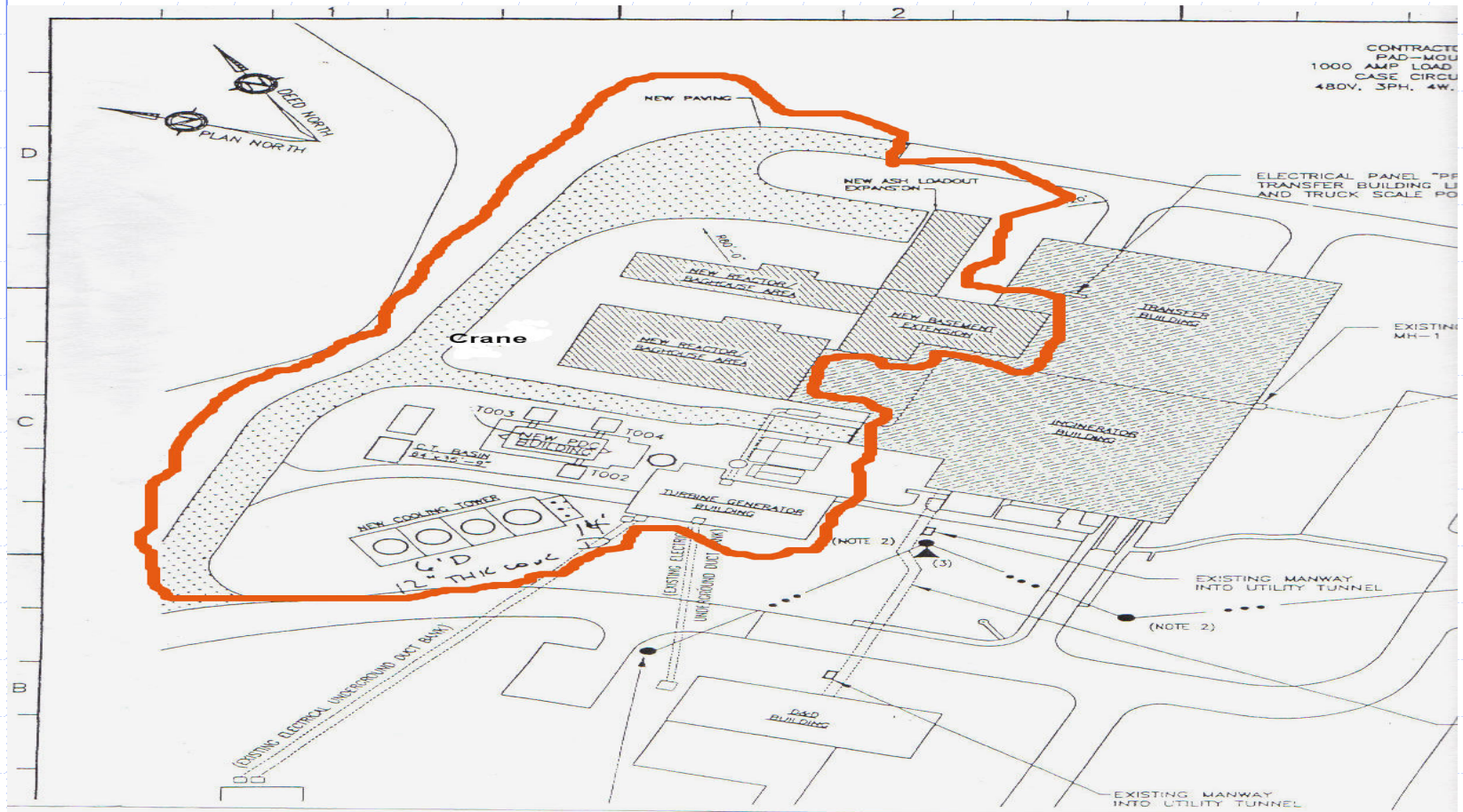
- ❑ Coordinate with the project team for the complete definition of the scope of work
- ❑ Establish the schedule development process
- ❑ Identify major work activities and the preferred sequence
- ❑ Establish an integrated plan to achieve required completion

- **AACEI Recommended Practice No. 14R-90**

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Site Coordination & Restrictions?



Physical Project Site Data (Input)

Examples of relevant physical data include:

- ❑ Geographic and other location factors
- ❑ Geological
- ❑ Terrain
- ❑ Utilities
- ❑ Transportation
- ❑ Environmental
- ❑ Cultural
- ❑ Climate factors

Project Site Planning

- site access and egress
- site drainage
- temporary facilities: buildings; plumbing; power
- staging areas for rigging, pre-assembly & field erection work
- lay-down areas / fabrication shops: avoid double handling
- Environmental, safety and security

Project Site Scheduling

The Project Site will have an influence on the CPM Schedule:

- Remote Site Location = Logistics
- Vendor & Design Support Sources
- Temporary Facilities / Utilities
- Site Access: Badging / Craft Parking
- Work Restrictions: Hours of Work
- Weather / Temperature / Environmental
- Equipment, Materials & Supplies Storage

Planning Output & Deliverables

Planning output and deliverables include:

- ❑ Defined scope of work (SOW)
- ❑ Defined project goals
- ❑ Defined project plan
- ❑ Work breakdown structure (WBS)
- ❑ Organization breakdown structure (OBS)
- ❑ Cost breakdown structure (CBS)
- ❑ Project cost estimate / budget

Planning Output & Deliverables

Planning output and deliverables (continued):

- ❑ Definition of phases
- ❑ Phase sequencing & relationships
- ❑ Established project coding structures
- ❑ Risk & mitigation plans
- ❑ Baseline Schedule Development plan
- ❑ Project team implementation approval
- ❑ Stakeholders reviews and acceptance
- ❑ Periodic forecasts & planning

Planning Product (Output)

Components of the project execution plan include:

- ❑ Executive summary
- ❑ Scope of work
- ❑ Project objectives, goals & strategy
- ❑ Contract requirements
- ❑ Safety, health, environmental & security
- ❑ Quality assurance / quality control
- ❑ Execution approach, work plan

Planning Product (Output)

Components of the project execution plan include:

- ❑ Change control
- ❑ Risk management
- ❑ Internal (project) requirements
- ❑ Public & community relations
- ❑ Organization, roles & responsibilities
- ❑ Communications & reporting
- ❑ Documentation requirements

Planning Assessments / Approval

Value engineering and constructability assessments are important elements of the planning process.

- Constructability reviews focus on the optimal execution of the project plan.
- Value engineering is concerned with the re-design of the project to meet stated performance criteria in a less costly manner than previously envisioned.
- Allocate time for management & stakeholder approval of the project plan.

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Role of the Scheduler



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Role of the Scheduler

To prepare a CPM schedule that meets the Contract requirements and represents the project team proposed plan:

- ❑ Entire scope of work for the project
- ❑ Identify key project milestones
- ❑ Phases / key tasks & deliverables
- ❑ Start Date / Completion Date
- ❑ Contract Period of Performance
- ❑ Important Interfaces: Design & Procurement

Input for CPM Schedule

The Contract General Conditions include:

- Scope of Work (inclusions / exclusions)
- Type of Contract (Fixed price/ T&M/ Other)
- Site Access and Work Restrictions
- Liquidated Damages / No Damage for Delay
- Period of Performance:
Start Date & Major Milestones
- Materials and Key Equipment Requirements
- Regulatory & Agency Permits / Requirements
- Design Completion Status

CPM Schedule Specification

The Contract Scheduling Specification:

- CPM Software Requirement
- Standard Codes / WBS / Activity IDs
- Frequency of Updates & Progress Reporting
- Schedule Baseline & Change Management
- Time Impact Assessment Process
- Schedule Level of Detail
- Resources - Crews / Budget Loading
- On site Scheduler Support
- Scheduler Qualifications / Prior Experience

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CPM Contract Schedule Review

- ✓ Meets Contract scheduling specification
- ✓ Complete scope of project
- ✓ Key Milestones
- ✓ Sequence of work phases
- ✓ Reasonable activity/ phase durations
- ✓ Inter-discipline coordination
- ✓ Delivery of key equipment & materials
- ✓ Impact of weather on project

Level of CPM Schedule Detail



“Good work, but I think we need a little more detail right here.”

Review - Means, Methods, Materials

Construction Means

- Availability of skilled labor force
- Labor intensity of installation (congestion)
- Accessibility to project site

Construction Methods

- Contracting strategy
- "Biddable" & "Buildable"
- Start-up and Commissioning

Construction Materials

- Fabrication requirements & Time
- Availability & Delivery when required

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What might happen if you don't PLAN?
(PS: Read the Full Contract...)



Source: HARD HAT HUMOR – June 2005

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