

Scheduling Basics

Critique & Create

Training
12/16/09

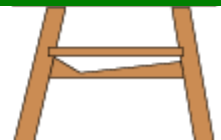


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Goals of this Training:

This is not an in depth training on scheduling; rather it is intended to show how to critique a schedule as the program manager for a project and to understand enough of the dynamics of scheduling to communicate knowledgeably to other members of the team. In order to achieve the last objective listed above, you must know some of the basics on how to create a schedule and then how to input it in a scheduling software. For this reason, the training is divided into three chapters:

Chapter 1: How to Critique A Schedule

Chapter 2: How to Create A Schedule

Chapter 3: How to Input A Schedule Into Microsoft Project

Definition of an Effective Schedule:

The project plan must include all aspects of project delivery to be effective. This is generally associated with:

- o Establishment of a Work Breakdown Structure (WBS) or Activity Coding Structure.
- o Development of a procurement strategy (bid package strategy [BPS])
- o Development of budget structure (GMP format for GMP projects) which reflect the manner in which the project will be constructed and establishes the format for progress payments as the work proceeds.
- o Identifying in a detailed manner all activities necessary to complete the work and development of the relationships among those activities, which dictate their required sequencing in a logical manner with appropriate presumed durations for each activity. **A critical path must be identified. Upon review and acceptance, a baseline will be established for tracking the schedule with future activities.**

Scheduling Terminology:

Critical Path: Longest Path To Complete The Project

Baseline Plan: Original Schedule

Milestone: A Significant Point In A Project Which Has No Duration

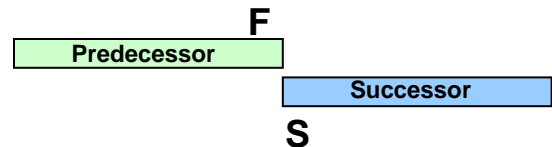
Lag Time: Planned Delay Between Tasks

Predecessor: A Task That Comes Before Another Task And Its Completion Is Dependent Upon The Following Tasks Start.

Successor: A Task that comes after another Task.

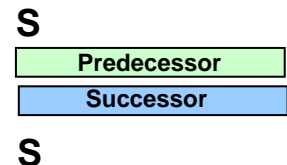
Lead Time: Overlap In Two Tasks Which Are Dependent. One Task Starting Prior To Its Predecessors Completion. Lead Time relationships are shown below:

Finish to Start (FS): Upon Finish of the Predecessor, the Successor can start



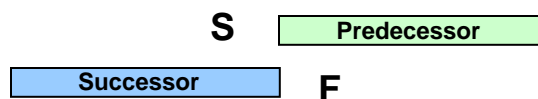
Start to Start (SS): Upon start of the Predecessor, the

Successor can start



Start to Finish (SF): Upon start of the Predecessor, the

Successor must finish



Finish to Finish (FF): Upon finish of the Predecessor, the Successor must finish



Progress Bar: Actual Completion Of A Task. Usually Displayed Adjacent To The Baseline Of The Same Task.

Resource Calendar: A Calendar Which Indicates The Working Days Of A Specific Resource.

Summary Task: A Single Line Task Which Summarizes All The Tasks Indicated Below It. Usually Shown To Indicate The Total Duration Of A Phase.

Slack: The Time A Task Can Be Delayed Without Affecting The Interdependent Tasks Dates.

Slippage: The Duration Of Time That A Task Varies From The Original Baseline Plan. As A General Rule It Indicates A Delay From The Original Baseline Start Date.

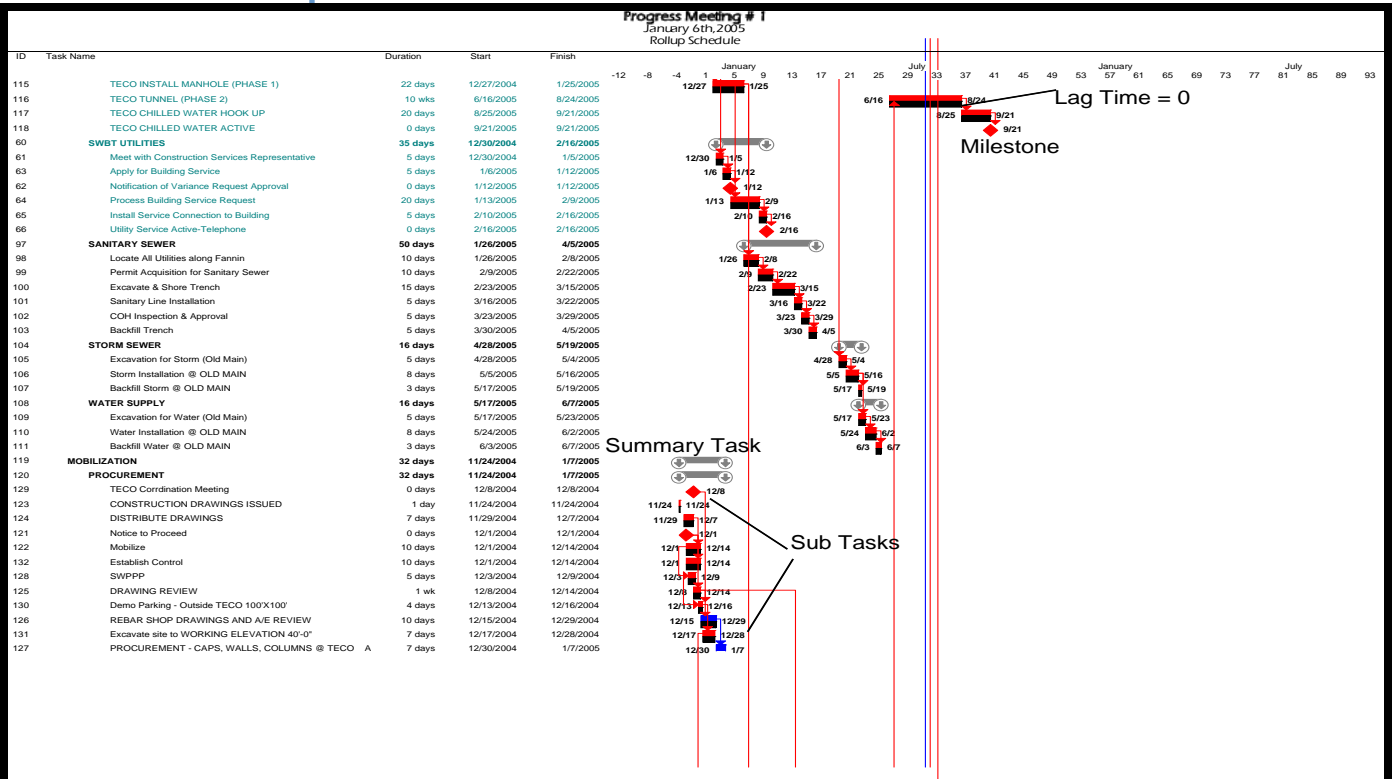
Subtask: A More Detailed Task Which In Outline Format Comes Under The Heading Of A Summary Task.

Variance: The Measure Of Change In A Task Duration Or Resource Allocation Either In A Positive Or Negative Connotation.

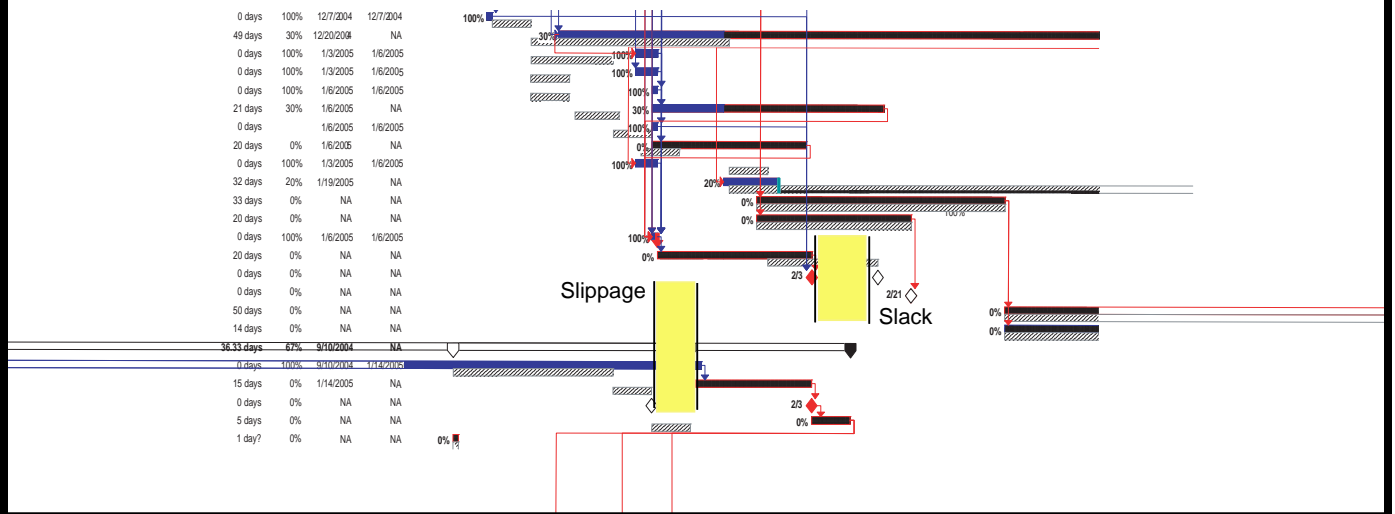
Work Breakdown Structure: A Coding Structure To Allow Reporting For Specific Areas Or Trades

Float: The amount of time that a task can slip before it impacts the start of the successor task or the critical path.

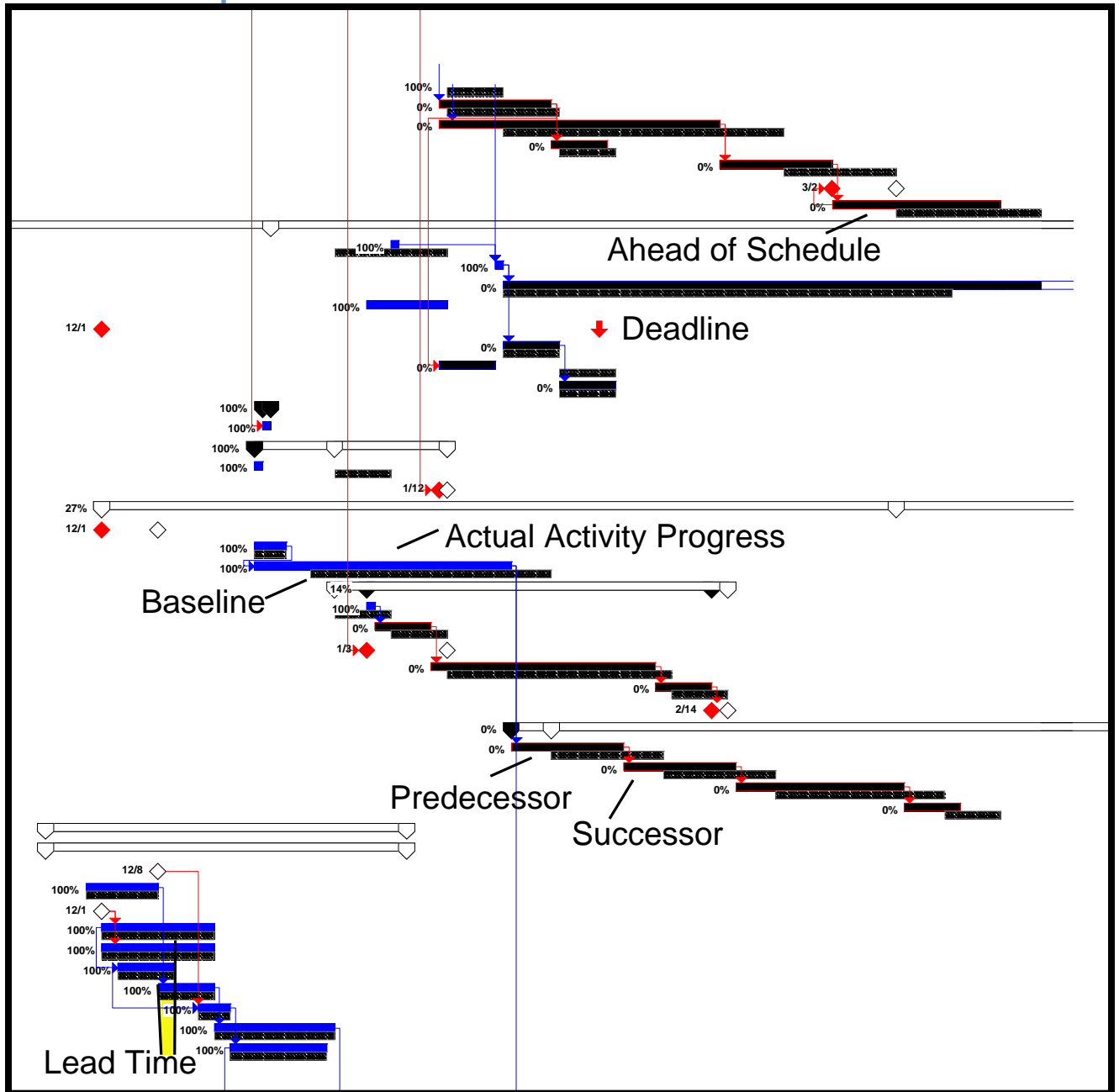
Scheduling Terminology



Graphic Representation of Scheduling Terms



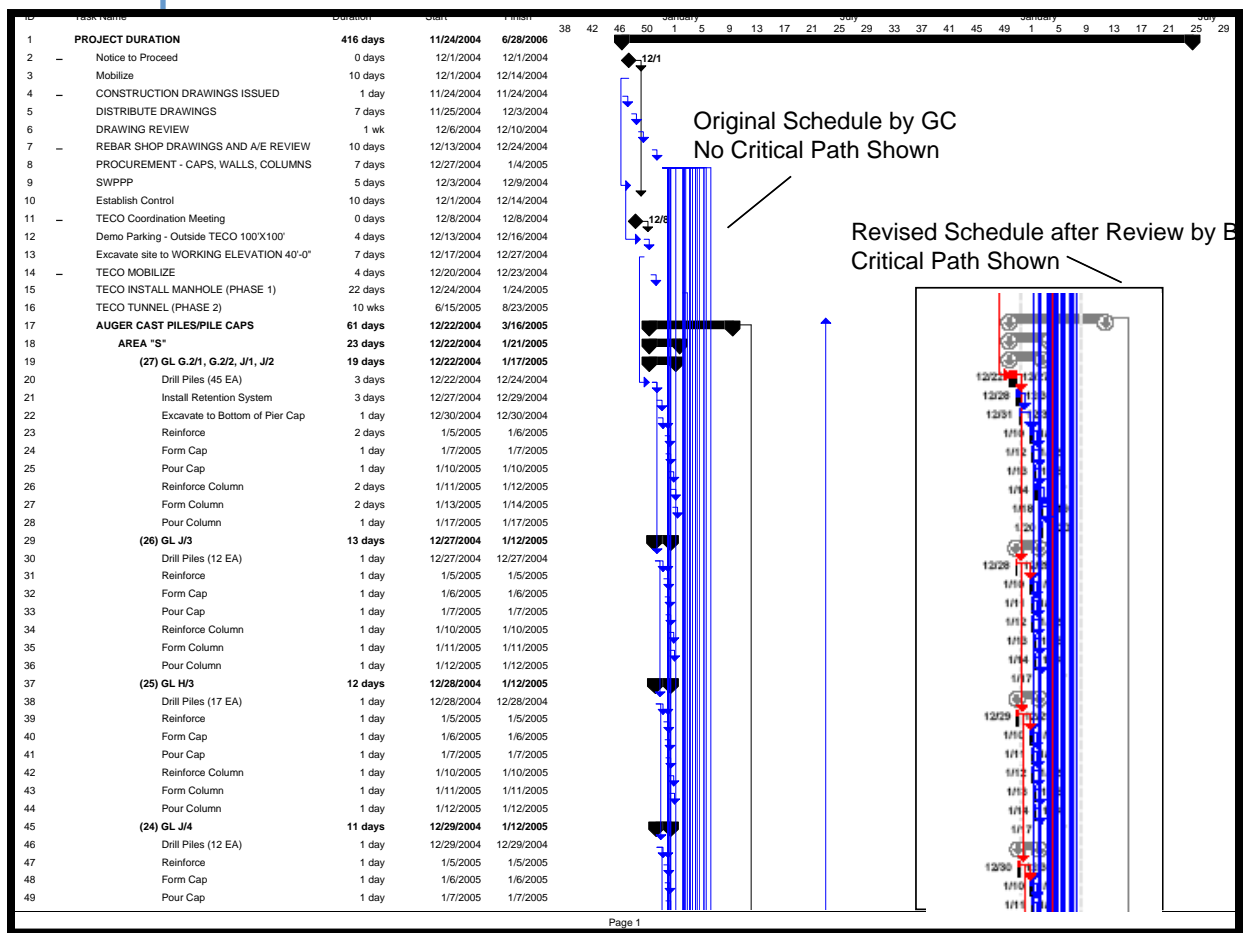
Scheduling Terminology



Chapter 1-How to Critique A Schedule

Critical Path & Float:

1. The 1st thing you should look for is the critical path for the project. This is usually illustrated graphically as activities that are "red". The connecting relationship lines will also appear "red".
2. Another way to determine the critical path is to review the options of the schedule for float. Most programs allow the scheduler to establish the number of days of float as the critical path. (I.e. 0 days of activity float is usually the critical path, but 1 or 2 days of float per activity can also be set as the critical path.)
3. Scheduling programs also typically allow you to select if you want to view multiple critical paths. Whether or not you chose this option depends upon the complexity of the project. Typically the more complex a project is, then it would be appropriate to display more than one critical path. However, caution is needed when showing more than one critical path. It can become easy to distract the attention away from the real focus of the project.



Chapter 1-How to Critique A Schedule

Float Evaluation:

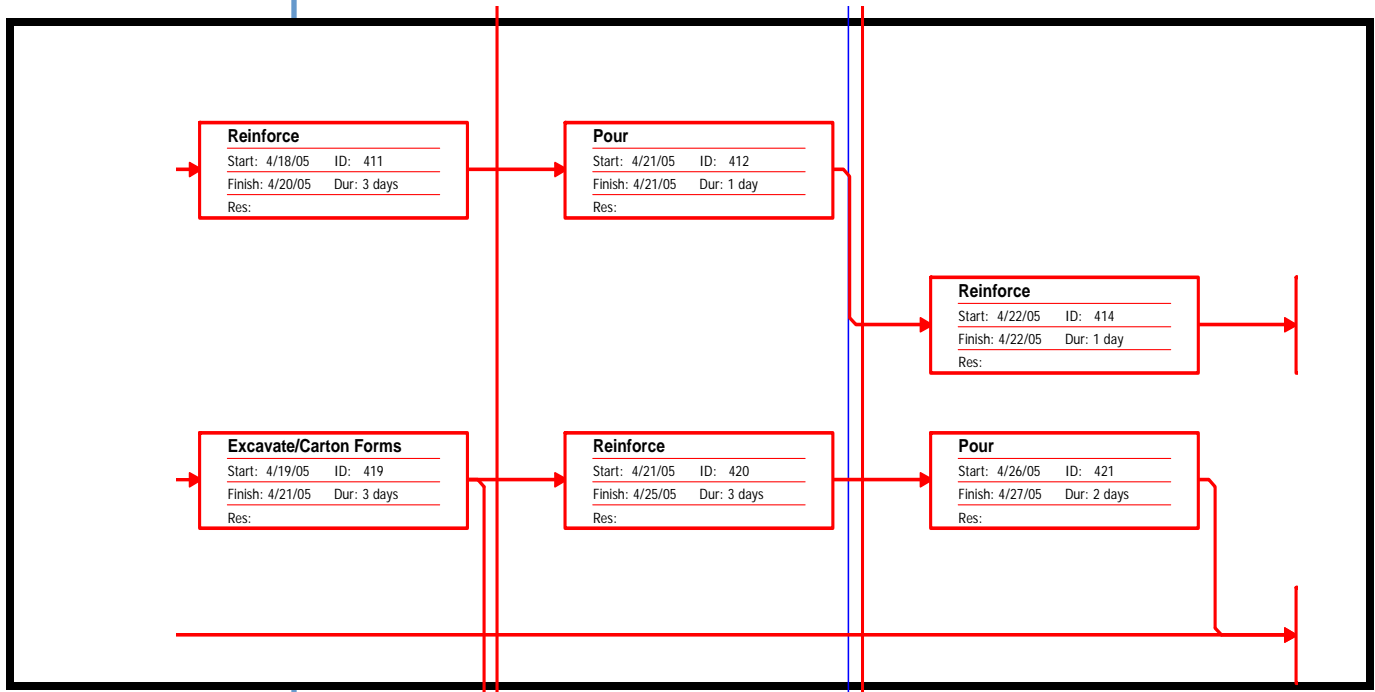
1. A quick way to determine if the critical path has been properly calculated would be to run a float report.
2. In the example shown below, the total float (days), is far greater than it should be. This would indicate that the dependency of the tasks have not been properly linked.

Location	ACT ID	Activity Description	OD	RD	ES	EF	TF	Predecessors	Successors
CW	A0502	MEP ROUGH BELOW SLAB 1ST FLOOR	7	0	04NOV04	29NOV04		AC0202.A0500	A0504
CW	A0500	DRILL PIERS	7	0	29SEP04	18OCT04		AC0201	A0502
CONC - CONCRETE FOR SUSPENDED STRUCTURAL SLABS									
CONC	A0500.2	STRIP & RESHORE DECK ROOF EAST	1	1	15FEB05	15FEB05	112d	AC0400.4E, A0A0500.2E	
CONC	A0500.1	POUR SLAB & BEAMS ROOF EAST	1	1	11FEB05	11FEB05	112d	AC0500.1E	A0A0500.3E
CONC	A0500.4	REBAR SLAB & BEAMS ROOF EAST	2	2	09FEB05	10FEB05	112d	AC0500E	A0A0500.2E
CONC	A0400.4	STRIP & RESHORE DECK 4TH FLOOR	1	1	08FEB05	08FEB05	116d	AC0300.4E, A0A0400.2E	A0A0500.3E
CONC	JA0500I	FORM DECK & BEAMS @ ROOF EAST	3	3	07FEB05	09FEB05	112d	AC0400.3E	A0A0500.1E
CONC	A0400.2	COLUMNS BETWEEN 4TH FLOOR &	2	2	04FEB05	07FEB05	112d	AC0400.2E	A0A0500E
CONC	A0400.2	POUR SLAB & BEAMS 4TH FLOOR	1	1	03FEB05	03FEB05	112d	AC0400.1E	A0A0400.3E, A0A0400.4E
CONC	A0400.4	STRIP & RESHORE DECK @ ROOF	3	3	02FEB05	04FEB05	119d	AC0300.4W, A0A0400.2W	
CONC	A0400.1	REBAR SLAB & BEAMS 4TH FLOOR	3	3	31JAN05	02FEB05	112d	AC0400E	A0A0400.2E
CONC	A0400.2	POUR SLAB & BEAMS ROOF WEST	1	1	28JAN05	28JAN05	119d	AC0400.1W	A0A0400.4W
CONC	A0300.2	COLUMNS BETWEEN 3RD & 4TH	2	2	26JAN05	27JAN05	112d	AC0300.2E	A0A0400E
CONC	A0300.4	STRIP & RESHORE DECK 3RD FLOOR	4	4	26JAN05	31JAN05	121d	AC0200.4E, A0A0300.2E	A0A0400.4E
CONC	A0400.1	REBAR SLAB & BEAMS ROOF WEST	2	2	26JAN05	27JAN05	119d	AC0400W	A0A0400.2W
CONC	JA0400I	FORM DECK 4TH FLOOR EAST BLDG	4	4	26JAN05	31JAN05	112d	AC0300.3E	A0A0400.1E
CONC	A0300.2	POUR SLAB & BEAMS 3RD FLOOR	1	1	25JAN05	25JAN05	112d	AC0300.1E	A0A0300.3E, A0A0300.4E
CONC	JA0400V	FORM DECK & BEAMS @ ROOF WEST	4	4	24JAN05	27JAN05	119d	AC0200.4W, A0A0300.3W, A0A0300W	A0A0400.1W
CONC	A0300.4	STRIP & RESHORE DECK 3RD FLOOR	4	4	21JAN05	26JAN05	123d	AC0300.2W	A0A0400.4W
CONC	A0300.1	REBAR SLAB & BEAMS 3RD FLOOR	3	3	20JAN05	24JAN05	112d	AC0300E	A0A0300.2E
CONC	A0300.3	COLUMNS BETWEEN 3RD FLOOR &	3	3	20JAN05	24JAN05	119d	AC0300.2W	A0A0400W
CONC	A0300.2	POUR SLAB & BEAMS 3RD FLOOR	1	1	19JAN05	19JAN05	119d	AC0300.1W	A0A0300.3W, A0A0300.4W
CONC	A0200.4	STRIP & RESHORE DECK 2ND FLOOR	4	4	18JAN05	21JAN05	123d	AC0200.2E	A0A0300.4E
CONC	A0300.1	REBAR SLAB & BEAMS 3RD FLOOR	2	2	17JAN05	18JAN05	119d	AC0300W	A0A0300.2W
CONC	JA0300I	FORM DECK 3RD FLOOR EAST BLDG	4	4	17JAN05	20JAN05	112d	AC0200.3E	A0A0300.1E
CONC	A0200.2	COLUMNS BETWEEN 2ND & 3RD	2	2	14JAN05	17JAN05	112d	AC0200.2E	A0A0300E
CONC	A0200.2	POUR SLAB & BEAMS 2ND FLOOR	1	1	13JAN05	13JAN05	112d	AC0200.1E	A0A0200.3E, A0A0200.4E
CONC	JA0300V	FORM DECK 3RD FLOOR WEST BLDG	4	4	12JAN05	17JAN05	119d	AC0200.3W	A0A0300.1W, A0A0400W
CONC	A0200.4	STRIP & RESHORE DECK 2ND FLOOR	4	4	11JAN05	14JAN05	124d	AC0200.2W	A0A0400W
CONC	A0200.1	REBAR SLAB & BEAMS 2ND FLOOR	3	3	10JAN05	12JAN05	112d	AC0200E	A0A0200.2E
CONC	A0200.3	COLUMNS BETWEEN 2ND & 3RD	3	3	10JAN05	12JAN05	119d	AC0200.2W	A0A0300W
CONC	A0200.2	POUR SLAB & BEAMS 2ND FLOOR	1	0	08JAN05	08JAN05		AC0200.1W	A0A0200.3W, A0A0200.4W
CONC	JA0200I	FORM DECK 2ND FLOOR EAST BLDG	4	1	04JAN05	07JAN05	112d	AC0100.1E, A0A0200W	A0A0200.1E
CONC	A0200.1	REBAR SLAB & BEAMS 2ND FLOOR	2	0	31DEC04	06JAN05		AC0200W	A0A0200.2W
CONC	A0100.1	COLUMNS BETWEEN 1ST & 2ND	3	0	30DEC04	03JAN05		AC0100.1W	A0A0200E
CONC	JA0200V	FORM DECK 2ND FLOOR WEST BLDG	4	0	20DEC04	06JAN05		AC0100, A0A0100.1W	A0A0200.1W, A0A0200E
CONC	QA010C	MOBILIZE	5	0	15DEC04	21DEC04		AC0100.1W	A0A0200W
CONC	A0100.1	COLUMNS BETWEEN 1ST & 2ND	12	0	15DEC04	27DEC04		AC0104	A0A0100, A0A0100.1E, A0A0200W

3. It is also helpful to review whether a **predecessor and successor has been assigned to each activity**. There should only be a minimum of activities that don't have both a predecessor and successor.

Activities (Level of Detail):

1. Again, the level of detail is dependent upon the complexity of the project. Generally speaking, the activities or processes which are **un-usual or complicated**, would require a more detailed listing. Remember the key to any schedule is the ability of it's end users to understand it's content. Therefore, clarity is of the utmost importance. Therefore, if detail of a complex process will enable the persons using the schedule to understand the process, then detail is warranted.
2. Another point to remember when deciding on the level of detail in your identification of tasks, is the **amount of work which will be required to update the schedule**. In order for a schedule to be useful, it must be updated regularly. Therefore, if a \$200,000 project had 3,000 activities, and this would require 2 days to update, then it would be prudent to reconsider the level of activity details.



Logic In Sequencing of Activities:

1. The next step in reviewing a schedule is to examine the accuracy in the sequencing of activities. This can sometimes best be done by reviewing the PERT view of the schedule.

Chapter 1-How to Critique A Schedule

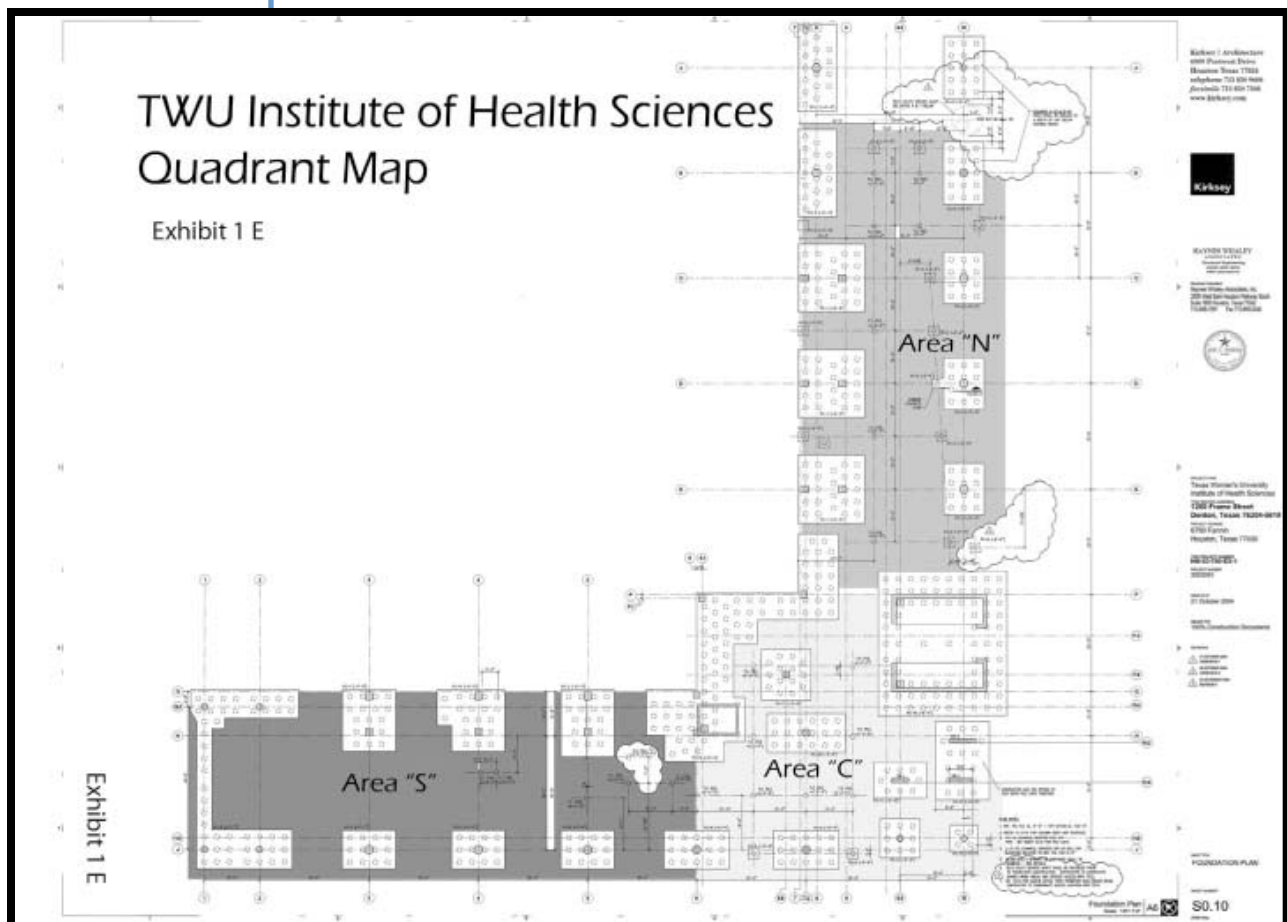
Major Issues & Obstacles for the Project:

1. The objective of any schedule is to accurately represent the major issues and obstacles that may interfere with the project completion by the designated deadline. Therefore, the most important part of a schedule, other than the critical path, is that the major issues be included, regardless if they are under your control or not.
2. In the example below, one of the major project constraints is that the team will have to close one of the major streets in order to complete the necessary utility work.
3. Major issues of the project shown below is all of the utility work that is located adjacent to the property. The contractor failed to include it in the original schedule because they were not responsible for the scope of work, yet it has a big impact on when their work can commence.

ID	Task Name	Baseline Start	Baseline Finish	Projected Start	Projected Finish	Remaining Duration	% Complete	Actual Start
61	TWU Approve Estimate for Underground Ser	12/30/2004	1/12/2005	1/6/2005	1/6/2005	0 days	100%	1/6/2005
62	Deposit Check to CPE from TWU	1/13/2005	1/19/2005	1/12/2005	1/12/2005	0 days	100%	1/12/2005
63	Revise TNC Agreement by CPE	1/13/2005	1/26/2005	1/12/2005	1/25/2005	10 days	0%	1/12/2005
64	CPE Public Plan & Profile Plans	1/20/2005	2/23/2005	1/12/2005	2/15/2005	25 days	0%	1/12/2005
65	TWU Execute TNC Agreement	1/27/2005	2/2/2005	1/26/2005	2/1/2005	5 days	0%	NA
66	COH Permit for Public Plan & Profile Plans	2/24/2005	3/9/2005	2/16/2005	3/1/2005	10 days	0%	NA
68	Close Old Main Street	3/10/2005	3/10/2005	3/2/2005	3/2/2005	0 days	0%	NA
69	CPE Construct Public Underground Duct Ba	3/10/2005	3/30/2005	3/2/2005	3/22/2005	15 days	0%	NA
72	Vault Service	12/22/2004	9/28/2005	11/19/2004	11/1/2005	237.5 days	4%	11/19/2004
74	TWU Approve Estimate of Vault Service	12/30/2004	1/12/2005	1/6/2005	1/6/2005	0 days	100%	1/6/2005
75	Order Transformer Equipment	1/19/2005	1/19/2005	1/19/2005	1/19/2005	0 days	100%	1/19/2005
76	Transformer Fabrication	1/20/2005	3/16/2005	1/20/2005	8/3/2005	140 days	0%	1/20/2005
77	NA Revised Vault Plan	NA	NA	1/3/2005	1/12/2005	0 days	100%	1/3/2005
78	Revised Stub Locations From CPE	NA	NA	12/1/2004	12/1/2004	0 days	0%	NA
79	Apply for Building Service	1/20/2005	1/26/2005	1/20/2005	1/26/2005	5 days	0%	NA
80	TWU Execute TNC Agreement	1/27/2005	2/2/2005	1/12/2005	1/18/2005	5 days	0%	1/12/2005
81	Process Building Service Request	1/27/2005	2/2/2005	1/27/2005	2/2/2005	5 days	0%	NA
87	Fannin Existing Duct Bank	1/12/2005	1/12/2005	12/21/2004	12/21/2004	0 days	100%	12/21/2004
88	Notification of Variance Request Approval	1/12/2005	1/12/2005	12/21/2004	12/21/2004	0 days	100%	12/21/2004
89	ENTEX UTILITIES	12/30/2004	1/12/2005	12/20/2004	1/12/2005	0 days	100%	12/20/2004
90	Meet with Construction Services Representative	12/30/2004	1/5/2005	12/20/2004	12/20/2004	0 days	100%	12/20/2004
91	Notification of Variance Request Approval	1/12/2005	1/12/2005	1/12/2005	1/12/2005	0 days	100%	1/12/2005
92	TECO UTILITIES	12/1/2004	3/9/2005	12/1/2004	9/21/2005	153.13 days	27%	12/1/2004
93	TECO Coordination Meeting	12/8/2004	12/8/2004	12/1/2004	12/1/2004	0 days	100%	12/1/2004
94	TECO MOBILIZE	12/20/2004	12/23/2004	12/20/2004	12/23/2004	0 days	100%	12/20/2004
95	TECO INSTALL MANHOLE (PHASE 1)	12/27/2004	1/25/2005	12/20/2004	1/20/2005	0 days	100%	12/20/2004
99	SWBT UTILITIES	12/30/2004	2/16/2005	1/3/2005	2/14/2005	26.57 days	14%	1/3/2005
100	Meet with Construction Services Representative	12/30/2004	1/5/2005	1/3/2005	1/3/2005	0 days	100%	1/3/2005
101	Apply for Building Service	1/6/2005	1/12/2005	1/4/2005	1/10/2005	5 days	0%	NA
102	Notification of Variance Request Approval	1/12/2005	1/12/2005	1/3/2005	1/3/2005	0 days	100%	1/3/2005
103	Process Building Service Request	1/13/2005	2/9/2005	1/11/2005	2/7/2005	20 days	0%	NA
104	Install Service Connection to Building	2/10/2005	2/16/2005	2/8/2005	2/14/2005	5 days	0%	NA
105	Utility Service Active-Telephone	2/16/2005	2/16/2005	2/14/2005	2/14/2005	0 days	0%	NA
106	SANITARY SEWER	1/26/2005	4/5/2005	1/21/2005	3/31/2005	50 days	0%	NA
107	Locate All Utilities along Fannin	1/26/2005	2/8/2005	1/21/2005	2/3/2005	10 days	0%	NA
108	Permit Acquisition for Sanitary Sewer	2/9/2005	2/22/2005	2/4/2005	2/17/2005	10 days	0%	NA
109	Excavate & Shore Trench	2/23/2005	3/15/2005	2/18/2005	3/10/2005	15 days	0%	NA
110	Sanitary Line Installation	3/16/2005	3/22/2005	3/11/2005	3/17/2005	5 days	0%	NA
121	MOBILIZATION	11/24/2004	1/7/2005	11/24/2004	1/7/2005	0 days	100%	11/24/2004
122	PROCUREMENT	11/24/2004	1/7/2005	11/24/2004	1/7/2005	0 days	100%	11/24/2004
123	TECO Coordination Meeting	12/8/2004	12/8/2004	12/8/2004	12/8/2004	0 days	100%	12/8/2004
125	DISTRIBUTE DRAWINGS	11/29/2004	12/7/2004	11/29/2004	12/7/2004	0 days	100%	11/29/2004
126	Notice to Proceed	12/1/2004	12/1/2004	12/1/2004	12/1/2004	0 days	100%	12/1/2004
127	Mobilize	12/1/2004	12/14/2004	12/1/2004	12/14/2004	0 days	100%	12/1/2004
128	Establish Control	12/1/2004	12/14/2004	12/1/2004	12/14/2004	0 days	100%	12/1/2004

Project Language (Organization of Tasks In Groups Which Emphasize Areas of the Project):

1. Projects are generally complicated enough on their own, so the intent should be to simplify the process as much as possible. For that reason, it is important to create a simplistic language that all parties working on the job can relate to during meetings and planning sessions. This simplistic nomenclature is what is referred to as the **Project Language**. As you can see in the example below, the project has been broken down into 3 sections:
 - Area "N" = North Zone
 - Area "C" = Central Zone
 - Area "S" = South Zone
2. This language will be used in all meetings and throughout the schedule to identify tasks within these areas.

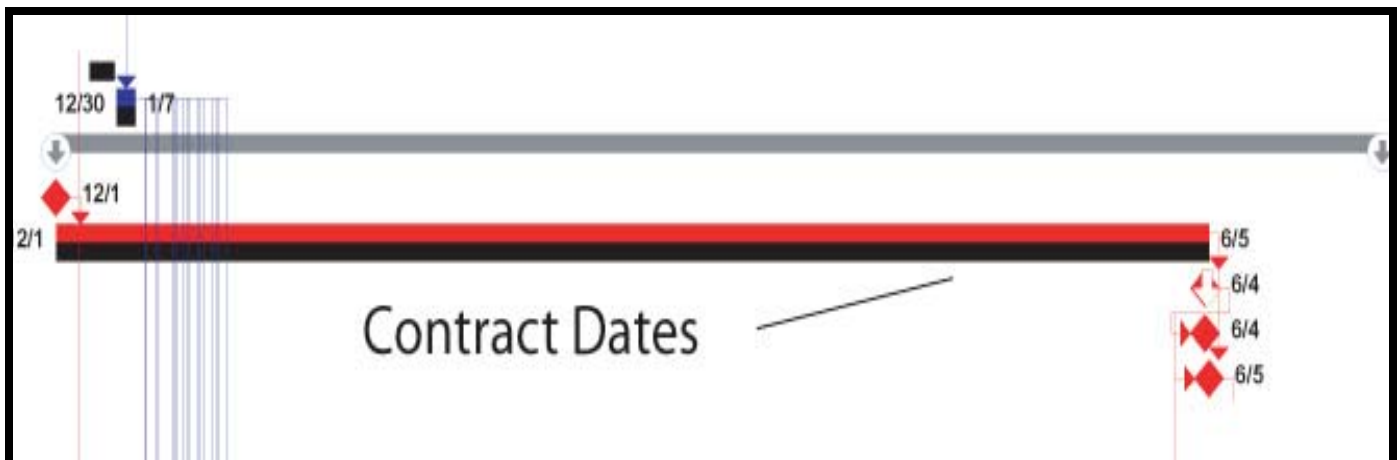


Chapter 1-How to Critique A Schedule

Contract Data:

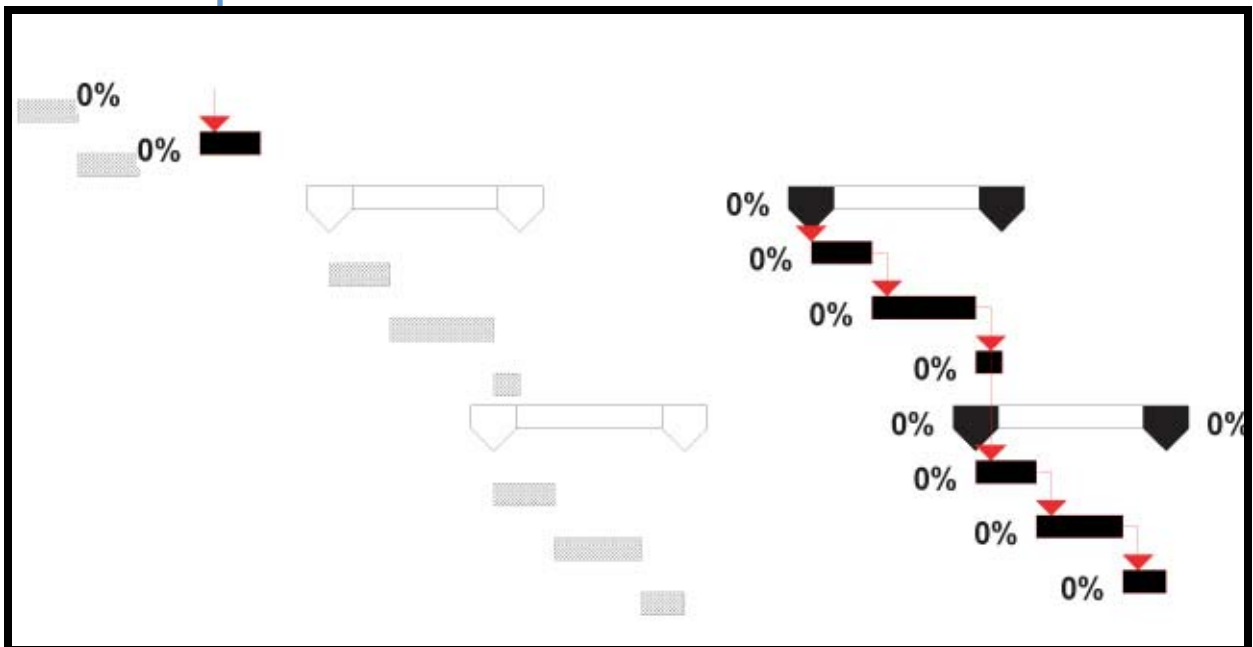
1. As with all schedules, the objective is to make a specific deadline date per the contract. Therefore, it only makes sense to include line items in the schedule that represent what the actual time line goal is.
2. In the example below, activities 275-276 represent the original contract agreement.
3. Activity 279 represent the delay days claimed by the contractor.
4. Activity 278 represents the delay days that are approved by the Owner of the project. Once days are approved in this line item, activity 277 will be extended to represent the new substantial completion date. (In order for this to occur, activity 278 must be a predecessor to activity 277).
5. Not shown in the example below is an additional activity which is called "**Actual Projected Completion by Contractor**". The predecessor to this activity would be the last activity by the contractor to complete the construction portion of the contract. This enables a quick reference on the schedule to the required completion date as well as the contractors projected ability to meet that completion date.

274	CONTRACT DATES	452 days	12/1/2004	8/28/2006
275	*Contract Start Date	0 days	12/1/2004	12/1/2004
276	*Contract Duration Base Bid & Alternates	393 days	12/1/2004	6/5/2006
277	*Contract Completion Date (Liquidated Damages)-Substa	0 days	6/4/2006	6/4/2006
279	Contract Delay Claimed by Vaughn	0 days	6/4/2006	6/4/2006
278	Contract Delay Awarded by TWU	0 days	6/5/2006	6/5/2006



Baseline:

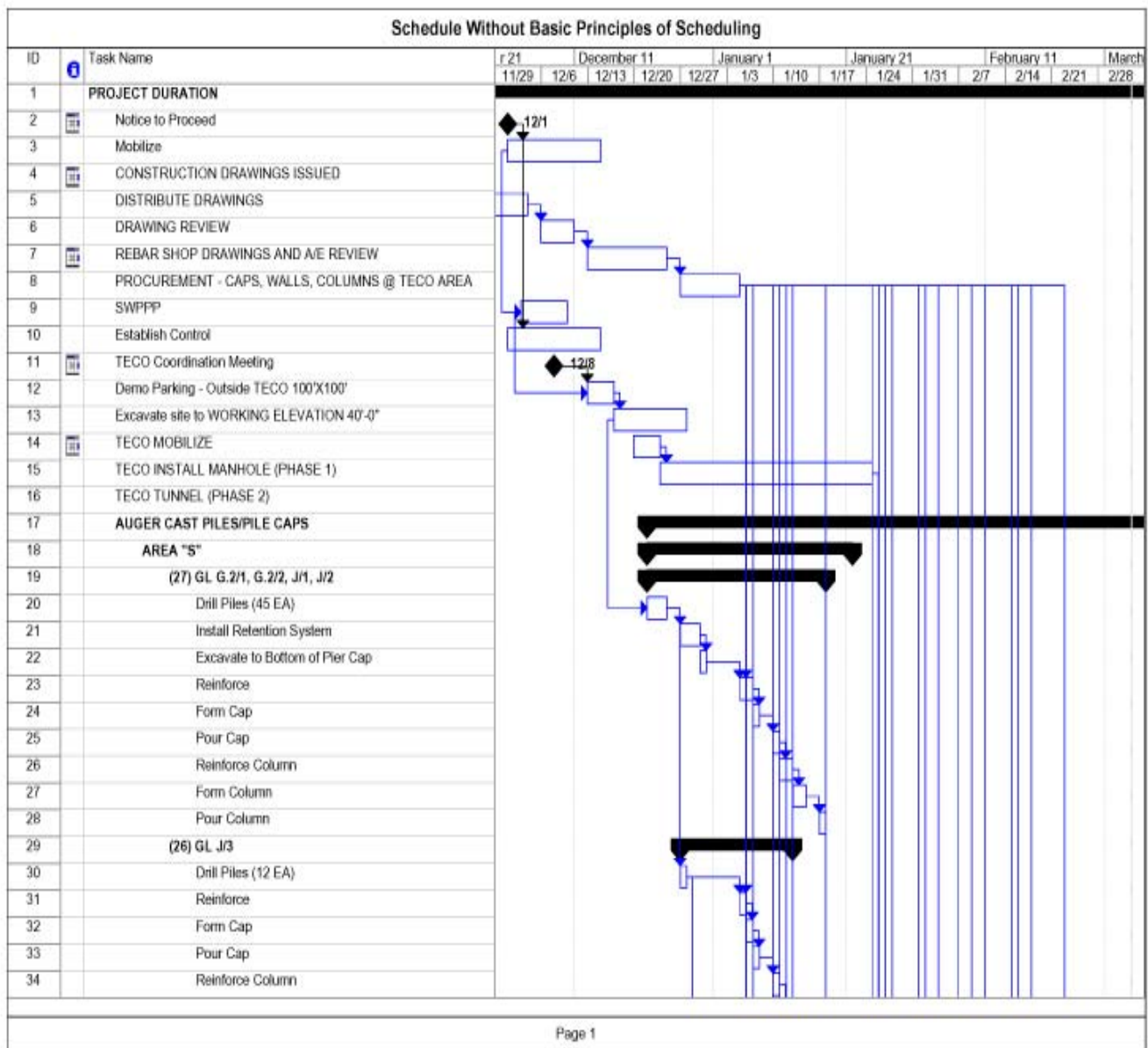
1. **Every project should have a baseline established prior to updating it with any progress dates.** Besides being able to track progress against the baseline (reference point), the other reason for establishing this, is to create buy in by all participants that the plan established is the best to accomplish the project goal. Without buy in by the Owner of the project, it becomes almost impossible to extend the schedule due to any weather or change in scope delays.
2. As the example is shown below, it enables a quick analysis of whether the schedule is ahead or behind. With this assessment, the planner can then make adjustments for the remaining unfinished activities. As with all projects, the sooner these adjustments are made the better chance you have of making the original deadline.



Chapter 1-How to Critique A Schedule

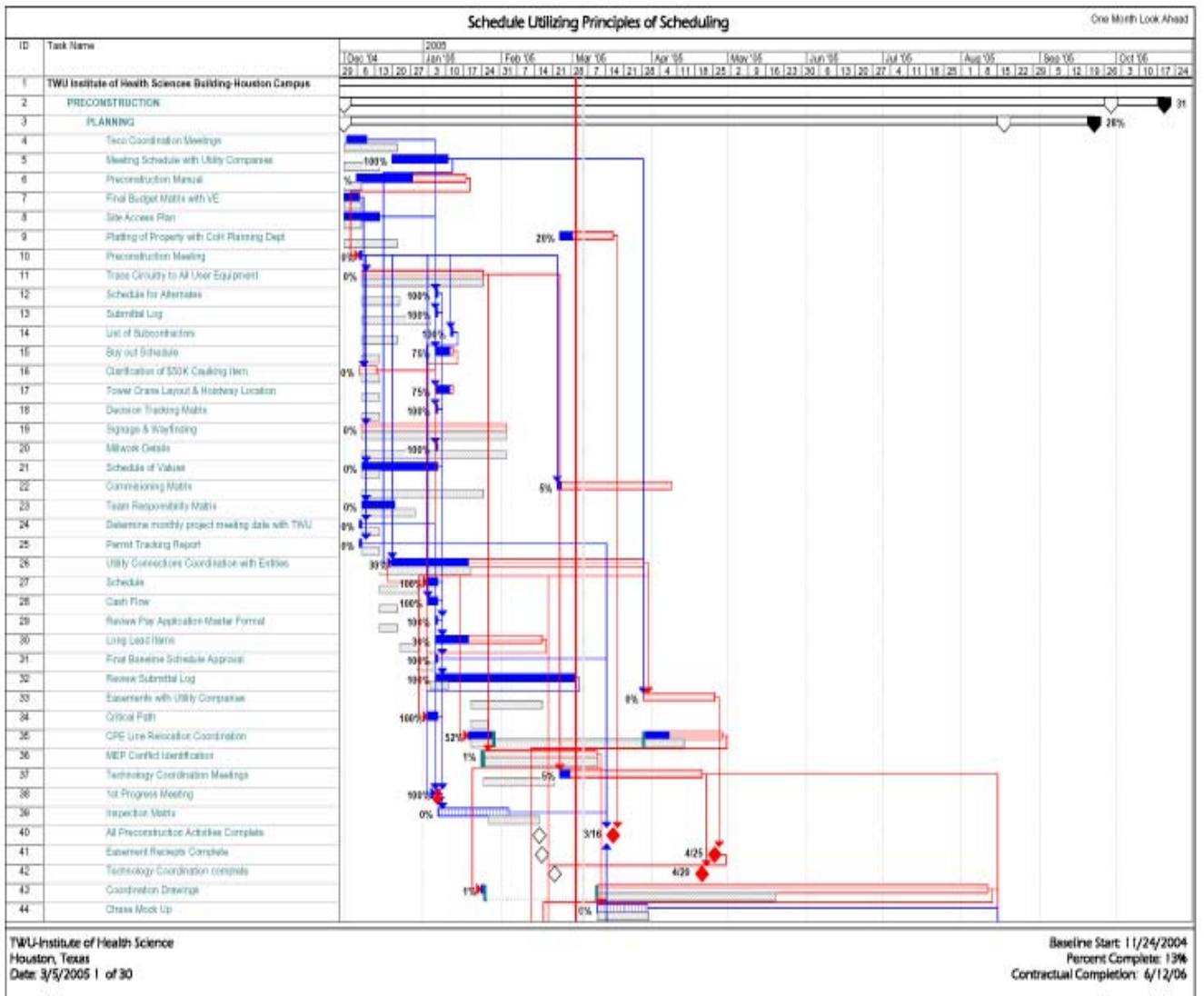
CLASS COMPARISON EXERCISE

CPM Not Utilizing Principles of Scheduling:



Chapter 1-How to Critique A Schedule

CPM Utilizing Principles of Scheduling:



Chapter 1-How to Critique A Schedule

Review Schedules for Technique & Content:

1. Refer to “Wheeler Housing Project” as a sample report.

Project Facts

<p>General Contractor</p> <p>Hardin Construction Company, LLC</p> <p>3101 Bee Caves Road, Suite 270</p> <p>Austin, Texas 78746</p> <p>512.320.9170</p> <p>www.hardinconstruction.com</p>	<p>Documentation Provided by U of H Facilities Planning and Construction</p> <p>101309 Near Term – Actual and Proj.mpp</p> <p>U of H 102209 – Expanded Schedule.mpp</p> <p>Utility Tunnel Schedule.mpp</p> <p>A=101 Revised Architectural Site Plan</p> <p>Building Elevation.jpg</p> <p>UHDmodel-Carla-rvt—644124.jpg</p> <p>Img-Yo2160832-0001.pdf</p>
<p>Project Delivery Method</p> <p>Design Build</p>	<p>University of Houston Project Manager</p> <p>Mei Chang</p> <p>Architect/ Sr. Project Manager</p> <p>UH-FP&C/ 713-743-5729</p> <p>http://www.uh.edu/plantops/fpc.html</p>
<p>Scheduling Software Utilized by General Contractor</p> <p>Microsoft Project</p>	<p>Project Scope</p> <p>7 Story Housing Facility, 292KSF, 1172 Beds</p> <p>Retail and Public Amenity Spaces on 1st Floor</p> <p>Exterior Skin: Precast and Punched Windows</p>
<p>Completion Progress of Work Reflected in Schedule</p> <p>Start 6/17/2009 – Finish 8/16/2010</p> <p>Overall Schedule Completion 6%</p> <p>Site work Completion 37%</p> <p>Structure Completion 69%</p>	<p>Project Location</p> <p>Wheeler Housing East</p> <p>4385 Wheeler Street</p> <p>Houston, Texas 77004</p>

Scheduling Method Technical Analysis

1. Predecessor/Successor Designations (Logic Sequencing):
 - a. Activity 251 and 252, Building Dry In Area 1 and 2, are currently shown to complete on 1/12/10 and 2/4/10 respectively. These activities don't show a successor activity and related drywall installations in Area 1, Floors 1 through 6 are shown to start before the Building Dry In of Area 1. There is not a temporary dry-in date to facilitate this early start to drywall therefore, putting the drywall material at risk for damage due to weather, moisture, etc. (Please refer to attached Exhibit D). The only conclusion that can be reached is either the logic is incorrectly stated or there is a temporary dry in that hasn't been illustrated in the schedule.
 - b. Predecessors: There are 6 activities that do not have a predecessor assigned. Refer to Exhibit P to this report for a listing of those items.
 - c. Successors: There are 133 activities that do not have a successor assigned. Refer to Exhibit S to this report for a listing of those items.
2. Total Float:
 - a. While the overall critical path shows activities of zero total float, there are several activities which show 2 or 6 days of float. Please refer to Exhibit C – Critical Path Analysis and view the clouded activities. Most of these activities are summary activities which suggest that there may be a few activities which are not linked properly.
3. Critical Path Activities:
 - a. Upon review of the critical path, refer to Exhibit C – Critical Path Analysis and look for the yellow highlighted items, there are several activities which are questionable as to whether or not they should be included in the critical path. Those are;
 - i. Stairwell Construction, items 148-172
 - ii. Ceiling Grinding, items 209-225
4. Baseline Visibility:
 - a. There is no baseline identified in the Gantt bar schedule. Proper scheduling technique requires the use of a baseline in order that slippage and slack can be easily identified during monthly schedule reviews.

Schedule Content Analysis

1. Building Key Map Designations to match Schedule nomenclature:
 - a. There is no building designation diagram which illustrates Area 1 & 2 as they are described in the schedule. It is difficult to determine if the sequencing of activities is at their optimum without this information.
2. Milestone Designations:
 - a. Activity #'s 251 and 252, Building Dry In Area 1 and 2, appear to be incomplete in their definition as they show in parenthesis (roofing? windows?).
 - b. There are several key milestone dates omitted from the current schedule. Please refer to section below for recommended milestones to be added to the schedule.
3. Omitted Activities:
 - a. Floor Finishes for the Suites on all floor levels appears to have been omitted from the schedule. Upon review of the concrete floor and carpet activities for the public areas, it is unclear if these activities include the floors in the Suite Areas.
4. Task Level of Detail:
 - a. Exterior Skin Finishes are precast and windows and are currently listed only by floor. In the event that acceleration of the schedule becomes a requirement, due to delays, it is imperative that the schedule is broken down by elevations as well as floors. This allows greater flexibility in drying in portions of the building which would further expedite the start of interior finishes.

- b. Start Up & Commissioning (item 1746) is currently a single line item in the schedule. Commissioning will typically be conducted by floor and requires the work to start generally 4 months prior to project completion and somewhere between the installation of the major mechanical equipment and Test and Balance. The current schedule shows this activity starting 20 days prior to Overall Substantial Completion. Accuracy would require that the predecessor to this activity be revised to start after the installation of major mechanical and electrical equipment and before the test and balance activity. Start Up and Commissioning activities should also be designated by floor.
 - c. FF&E Installation is currently indicated as a milestone activity only and doesn't indicate when it will be installed by floor. Since this activity has a bearing on when the facility will be operational for student housing, it is critical that this be enumerated in the schedule.
 - d. The activity Available for Move-in doesn't clearly reflect if it concerns FF&E or Student Occupancy.
5. Major Procurement Activities:
- a. Currently, there are no activities associated with major procurement items in the schedule. Based upon the scope of work, there are several areas which should have the procurement monitored in the schedule; precast, windows, electrical and mechanical gear associated with the tunnel connection to the central plant and associated systems within the building.
6. Major Issue Activities:
- a. Utility Tunnel Activities in the Expanded Schedule were limited to one item. As this tunnel provides the MEP connections to the new building, it is considered to be a major issue and should include more than one activity in the overall schedule. While a separate schedule was sent for the Utility Tunnel, it should be noted that only the structure was included and of the 38 activities, none of them had predecessor or successor designations.

Recommendations

1. Utility Tunnel Activities:
- a. A complete set of activities, including MEP, should be added to the U of H 102209 – Expanded Schedule and proper logic sequencing should be included with the designation of predecessors and successors.
 - b. These activities should also include the shutdowns required at the main central plant required to facilitate the connectivity of the new MEP raceway system. This may require coordination with U of H Facilities/Maintenance personnel.
 - c. Activities should also be inclusive of the milestone completions of the utility systems and connected to the milestone activities of Conditioned Air and Permanent Electrical Service Start Up for the entire building.
2. Baseline:
- a. A baseline should be set through the tracking function of Microsoft Project and should be configured where it is visible in the Gantt Bar portion of the schedule.
 - b. The Baseline should be submitted by the Contractor no later than 1 month after commencement of the project and should be approved by the Owner. Any further variations to the baseline schedule would then be approved by the Owner.
 - c. Monthly report updates should visibly show the baseline and the progress line for each activity so that slack and slippage per task is easily identifiable.
3. Building Key Map Designations to match Schedule nomenclature:
- a. Provide a key map diagram of the building layout plan (1st floor level) which illustrates Area 1 & 2 as well as Exterior Faces of the building based upon North, South, East and West.
4. Activity Breakdown:
- a. Exterior Skin Precast and Window Activities should be broken down by elevation and floor. This will aid in the production of the materials as well as the ability to dry-in areas of the project sooner.
 - b. Start Up and Commissioning activities should also be designated by floor. Accuracy would require that the predecessor to this activity be revised to start after the installation of major mechanical and electrical equipment and before the test and balance activity.
 - c. FF&E determines when the facility will be operational for student housing, therefore, it is critical that this activity be enumerated by floor in the schedule. This may require coordination with U of H Facilities if they are responsible for procurement.
5. Additional Activities:
- a. Floor Finishes for the Suites on all floor levels should be added to the schedule.

6. Major Procurement Activities:
 - a. Based upon the scope of work, there are several areas which should have the procurement monitored in the schedule; pre-cast, windows, electrical and mechanical gear associated with the tunnel connection to the central plant and associated systems within the building.

7. Milestone Designations: (The following activities should be added to the scope of the schedule)
 - a. The activity Available for Move-in doesn't clearly reflect if it concerns FF&E or Student Occupancy. It is recommended that the following milestones be identified:
 - i. FF&E Installation Start by floor and overall
 - ii. FF&E Installation Complete by floor and overall
 - iii. Student Occupancy Date
 - b. Activity #'s 251 and 252, Building Dry In Area 1 and 2, need to be clearly defined and connected to the appropriate predecessor. Currently, they indicate they are for dry in for both roofing and windows, yet the only predecessor is roofing. The CPM should also be reviewed to determine if dry in by sub areas within Area 1 and 2 would be beneficial to create more slack in the overall schedule.
 - c. There should be a section in the beginning of the schedule which tracks the following information:
 - i. Contract Start Date
 - ii. Contract Duration Base Bid & Alternates
 - iii. Contract Completion Date (Liquidated Damages)-Substantial Completion
 - iv. Contract Delay Claimed by Contractor
 - v. Contract Delay Awarded by U of H
 - vi. Current Contract Completion Date by U of H
 - vii. Current Projected Completion Date by Contractor (This activity would be connected to the actual construction completion in the contractors schedule below)
 - viii. Student Occupancy for Fall Semester Commencement
 - d. Major Planning Issues should be included in the schedule;
 - i. Coordination Drawings for MEP Systems and crash detection coordinated with the structure.
 - ii. Any Mock Ups required by U of H
 - e. All Major Utilities should be included in the schedule;
 - i. Sanitary Sewer Connection
 - ii. Storm Sewer Connection
 - iii. Chilled Water Connection to Central Plant
 - iv. Chilled Water Operational
 - v. Chilled Water Testing
 - vi. Conditioned Air
 - vii. Electrical Service Connection to Central Plant
 - viii. Electrical Service "HOT"
 - ix. Any activities associated with Power Provider work that must occur before Electrical Service can be activated (if applicable)
 - x. Cable Service Operational and any related Provider work that must occur before service is activated.
 - xi. Phone Service Operational and any related Provider work that must occur before service is activated.
 - xii. Water Service Connection
 - xiii. In addition to the Utility Tunnel Construction activities and the related MEP work defined, there should be Milestone dates of the following;
 1. Central Plant Shutdown for connection to tunnel services for each utility scope item being serviced from the central plant.
 2. Building Activation of all services itemized in item 1. above at the building side of the utility tunnel.
 3. Electrical and Conditioned Air "HOT" by floor.
 - f. Project Closeout Activities should be included in the schedule;
 - i. Life Safety Signage and Wayfinding Start and Completion by Floor
 - ii. Commissioning Commencement and Completion by Floor
 - iii. Testing of the Life Safety Systems and Backup Systems
 - iv. Fire Marshall Inspection from COH
 - v. Substantial Completion Inspection by U of H
 - vi. Final Completion Inspection by U of H
 - vii. Final Acceptance by U of H
 - viii. Closeout Documentation Delivered to U of H

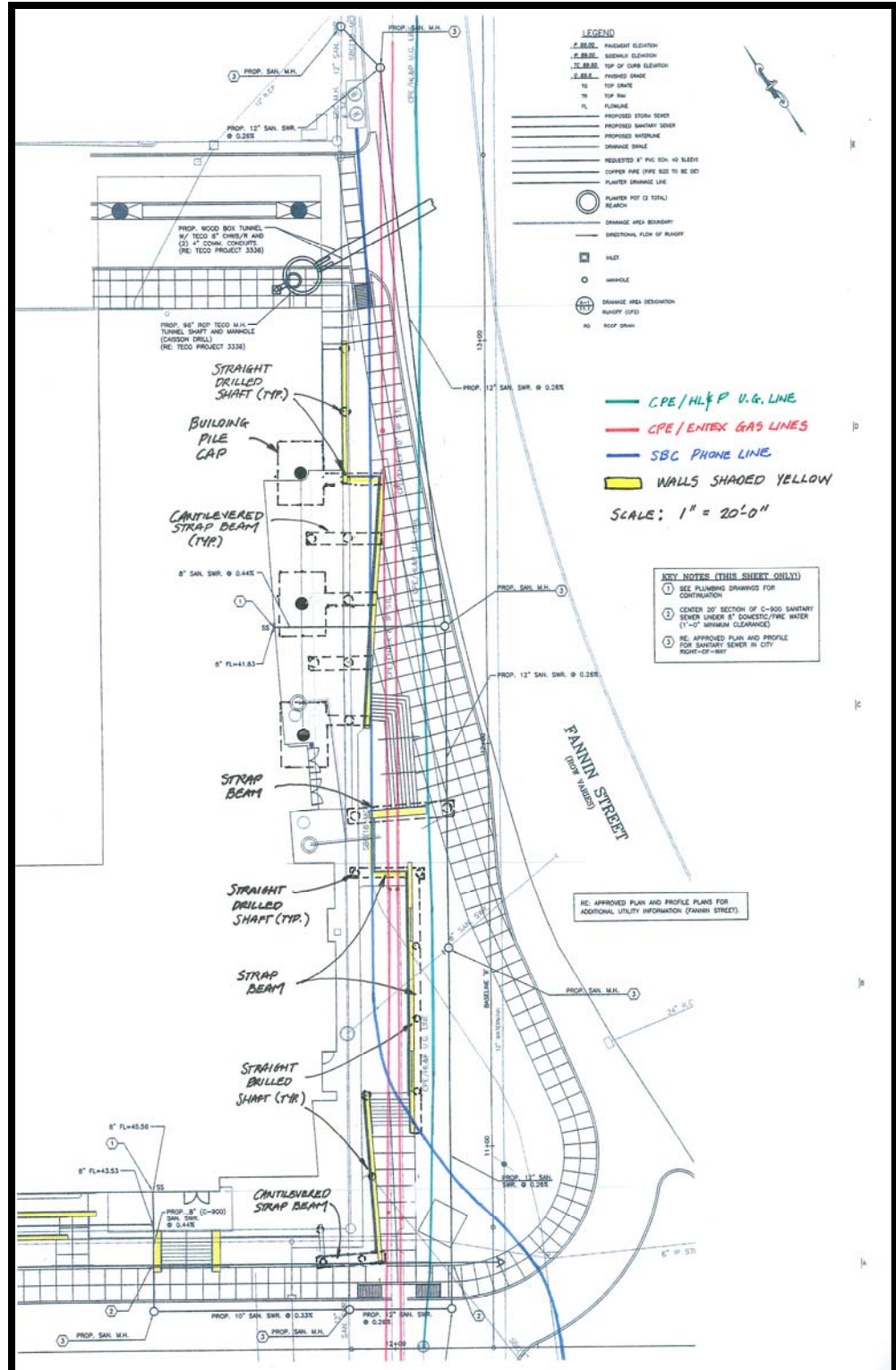
8. Critical Path Content and Total Float:
 - a. Review the linking to activities involving the stairwells and ceiling grinding to confirm that they belong on the critical path.
 - b. Review the activities identified in Exhibit C – Critical Path, which are clouded, as to why they are on the critical path with greater total float values of zero days. All activities on the critical path should be consistent with zero days of float.

9. Predecessor/Successor Designations (Logic Sequencing):
 - a. Activity 251 and 252, Building Dry In Area 1 and 2, are currently shown to complete on 1/12/10 and 2/4/10 respectively. These activities don't show a successor activity and related drywall installations in Area 1, Floors 1 through 6 are shown to start before the Building Dry In of Area 1. There is not a temporary dry-in date to facilitate this early start to drywall therefore, putting the drywall material at risk for damage due to weather, moisture, etc. (Please refer to attached Exhibit D). Either install a temporary dry in activity and set it as a predecessor to the related drywall activities or correct the logic sequence to reflect proper building sequencing.

10. Overall Duration of Schedule:
 - a. The schedule currently allows for 25 weeks to complete interior build out from the time of Building Dry In Area 1 (292,000 SF). Based upon previous experience for a 200,000 SF facility with less compartmentalized build out, and a very aggressive schedule, the work required 30 weeks to complete. Therefore, it's the opinion of B&A that this is a very aggressive schedule and either float should be built into the envelope of the building or overtime may be required during interiors production to meet the required deadline. Refer to Exhibit O - Summary Duration Comparisons by Floor Exhibit.
 - b. The items associated with starting the interiors before the Building Dry In items should have an identifier item which reflects temporary dry in conditions or statement of the fact that the contractor is taking the risk of replacing sheetrock if damaged prior to building dryin.

11. Meeting with Contractor to Discuss Schedule:
 - a. As a best practice when conducting schedule reviews, Broaddus & Associates recommends a meeting with the contractor to discuss these issues to clarify any issues identified above and work with the contractor to make the recommended changes.

CLASS EXERCISE: Plaza Re-Design



1

Activity Codes

Identify Phases:

1. Construction Documents
2. Permitting
3. Procurement
4. Construction
5. Project Close-Out
6. Move In

Activity Code Values

2

Identify Areas within the Phases:

1. Area "N"-Fannin Street
2. Area "C"-Fannin Street

3

Identify Components within Areas:

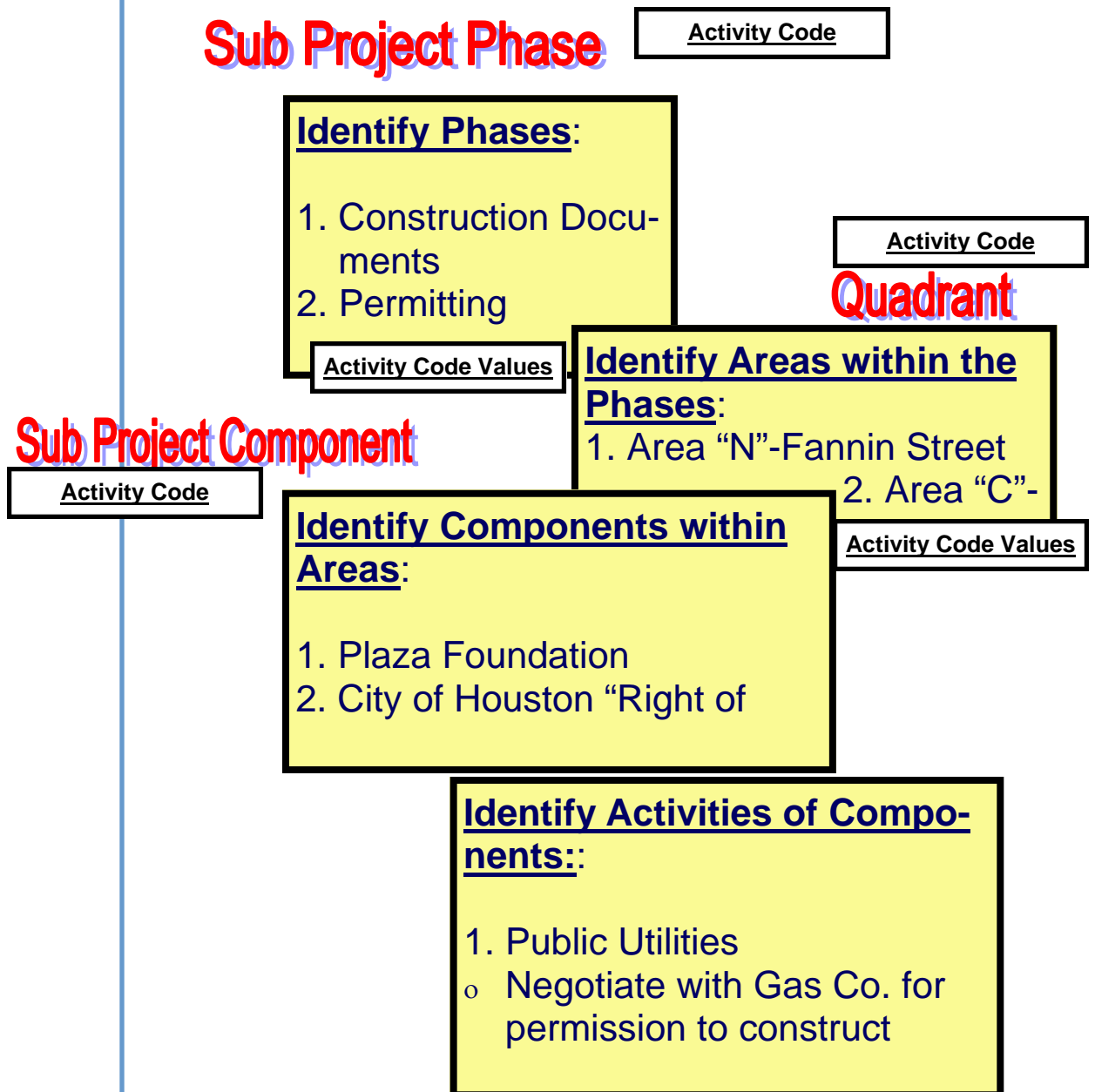
1. Plaza Foundation
2. City of Houston "Right of Way" Variance
3. Public Utilities
4. Private Utilities
5. Plaza Finishes
6. Plaza Furnishings

4

Identify Activities of Components:

1. Public Utilities
 - o Negotiate with Gas Co. for permission to construct plaza
 - o Negotiate with Telephone Co. for permission to construct plaza
 - o Construct Sanitary Sewer Line
 - o COH Inspection of Sanitary Sewer Line

4. The Matrix shows what the purpose of each code is and which issues each code deals with.
5. In the case of this example the codes which best suit the project's needs are shown below:



Each Activity Would Then Be Assigned The Appropriate Value for Each Activity Code

6 Identify Project Constraints:

1. Closing of Fannin Street **NOT ALLOWED**
2. Utility Companies must be present during excavation around existing lines.
3. City of Houston Variance must be obtained before construction can commence.

7 Know Project Materials & Methods:

1. Depth of Public Sanitary Sewer Line requires extra area for “Step Back” Excavation.
2. Approval process of Public Sanitary Sewer requires additional time past normal construction.

8 Know Contract Restraints:

1. Know required Substantial Completion Date as well as Owner Occupancy of Building.
2. Know status of any open legal activities which may impact actual construction work.

9 Interview Team Members:

1. Before completing the schedule, it is very important to get buy in from all those persons who will be responsible for doing the work represented in the schedule.

10

Determine Best Delivery Method:

1. Once all the data has been collected regarding the project and the schedule, an evaluation should be made relative to the best delivery method.
 - o Fast Track Scheduling
 - o Conventional Scheduling
 - o Phased Scheduling

11

Determine Best Schedule Presentation:

1. Based upon the needs of different team members, the following schedules can be produced:
 - o Executive Level
 - o Roll Up
 - o Filtered by Sub Trade Only
2. It should be noted that with the use of Activity Codes and Filters and type of report can be generated.

Class Review of Schedule Preparation Worksheet:

Target Schedule	Activity	Direction from Project	Date
JOB FACTS:			
	Approximate \$ Amount of Project:		-
	Estimated duration of project:	days Calendar days or working	-
	Project Location: Address		-
	City, State		-
	Actual Project Start:	-	
	Required Project Completion:	-	
	Sublist: (Please submit with this form)		-
	Long Lead Delivery Items: (Please check all that apply)		-
	Key Subcontractors: (Please list those of special concern where time or scope of work is concerned)		-
	Buy out Log: (Please submit with this form)		-
	Plans & Specifications: (Please submit with this form)		-
	Submittal Log: (Please submit with this form)		-
	Design Scope: (Please check all that apply)	Schematic Design Design Development Architectural Construction Documents Civil Construction Documents MEP Construction Documents Landscaping Construction Documents Demolition Construction Documents FF & E Construction Documents	
	Permit Scope: (Please check all that apply)	Foundation Permit Building Shell Permit Interior Finishes Permit Building Permit (All in one Package) Site Permit Public Utility Permit Demolition Permit Environmental Remediation Permit	
	Site Scope Description: (Please check all that apply)	HL&P Duct bank Public Utilities Storm Sewer Water Service Sanitary Service Utility Abandonment	-

Chapter 2-How to Create A Schedule

	Site Scope Description: (Please check all that apply)	HL&P Duct bank Public Utilities Storm Sewer Water Service Sanitary Service Utility Abandonment	-
	Environmental Scope Description: (Please check all that apply)	Asbestos Abatement Phase I Assessment Underground Storage Tank Remediation	-
	Demolition Scope Description: (Please check all that apply)	Structure Interior Walls Only Entire Building Multiple Buildings	-
	Renovation Scope Description: (Please check all that apply)	Structure Interior Finishes MEP Systems Entire Building Multiple Buildings	-
	New Construction Scope Description: (Please check all that apply)	Structure Interior Finishes MEP Systems Entire Building Multiple Buildings	-
	Type of Construction:	Steel Structure Poured in Place Tilt Wall Precast Skin Pilings Matt Footings	-
	Type of Building:	Higher Education K-12 Education POB Hospital Church Retail Parking Garage	-
STAFFING:			
	Project Manager:		-
	Superintendent:		-

Chapter 2-How to Create A Schedule

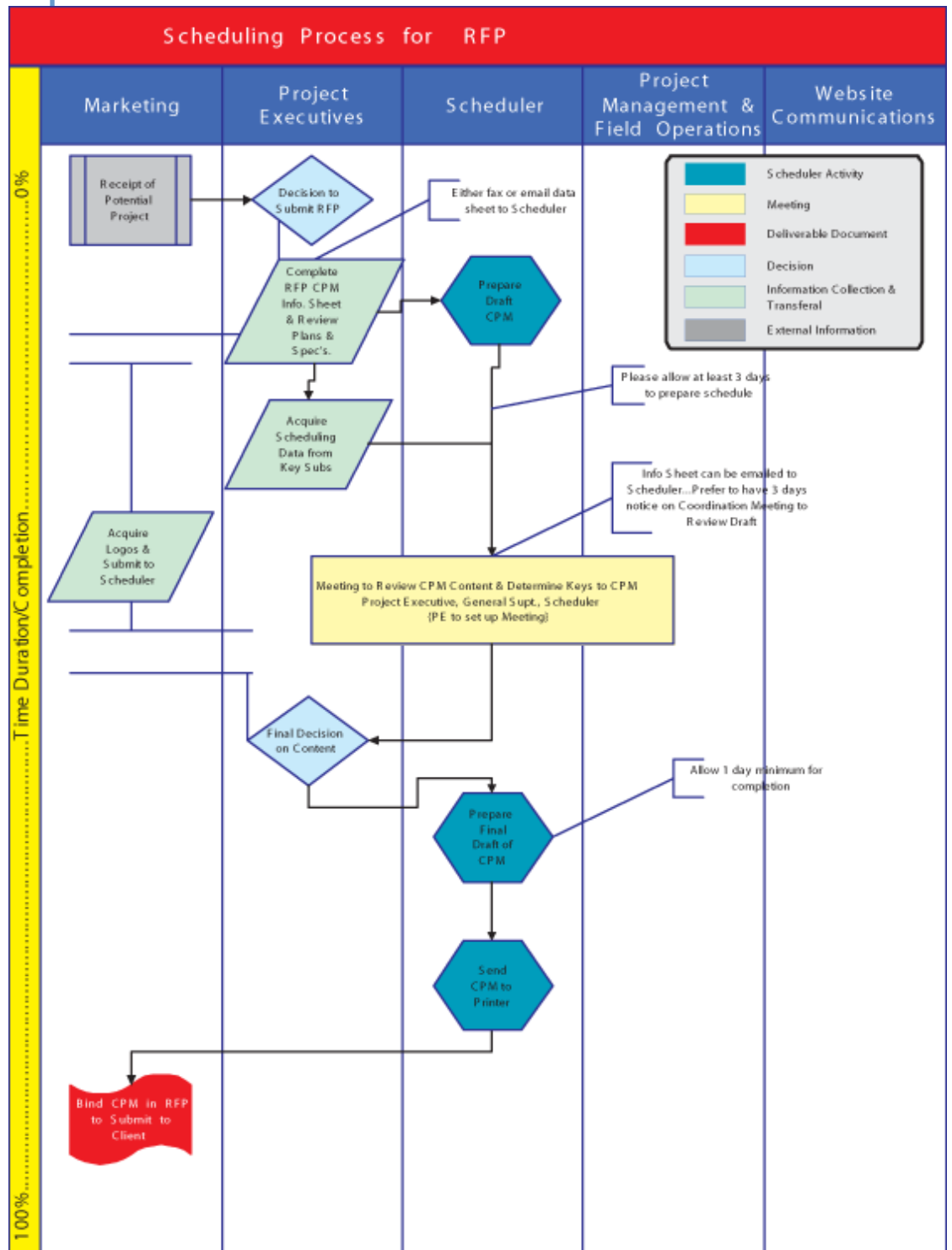


	Superintendent:		-
CPM PRESENTATION:			
	Level of Detail Required for schedule:	1.....2.....3.....4.....5.....6.....7.....8.....9.....10	-
		1 = Less Detail 10 = More Detail	-
	Approximate Number of Activities:		-
	Logo's Required on CPM: (Please list)		-
	Due Date to Submit CPM to Owner:	-	
	Final Product Sizing to Client:	11" x 17" 24" x 36" Wall Board	-
	Final Product Sizing to Supt:	11" x 17" 24" x 36" Wall Board	-
	Final Product Sizing to Project Manager:	11" x 17" 24" x 36" Wall Board	-
	Final Product Sizing to Sub-contractors:	11" x 17" 24" x 36" Wall Board	-
	Project Breakdown Categories: (Please check all that apply)	Site work Foundations Building # Floor # Exterior Skin N Elevation Exterior Skin S Elevation Exterior Skin E Elevation Exterior Skin W Elevation Exterior Skin All Elevations Parking Garage #	-
REPORTING REQUIREMENTS			
	Look Ahead Schedule:	1 Week 2 Weeks 3 Weeks 1 Month	
	Submittal Date to PM:	Every 2 Weeks Every 4 Weeks Every Owner's Meeting	
	Date of Recurring Owner's Meeting:	Every 1 Week Every 2 Weeks Every 3 Weeks Every 4 Weeks Monday Tuesday Wednesday Thursday Friday	

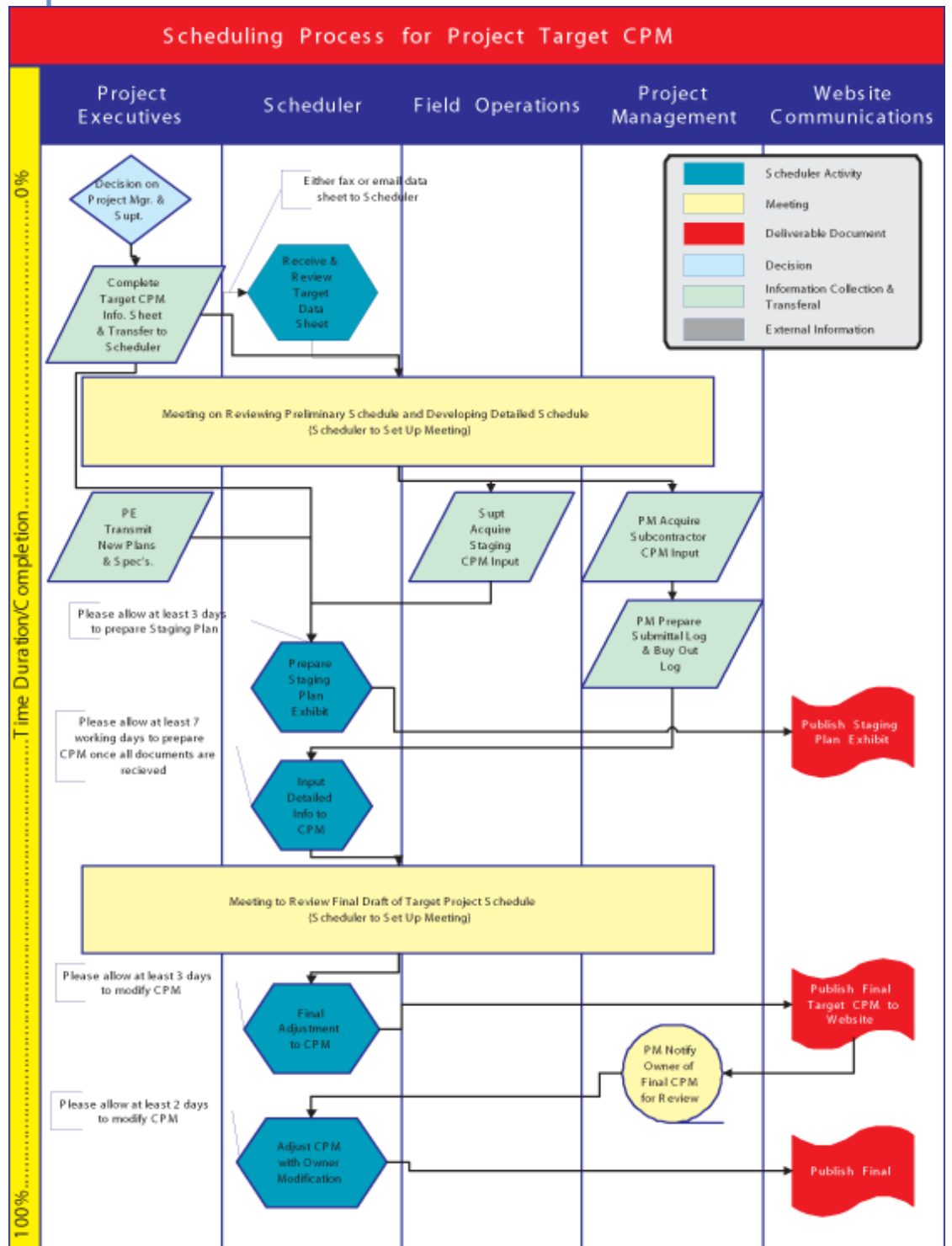
Chapter 2-How to Create A Schedule

	Recurring Date of Subcontractor's Meeting:	Every 1 Week Every 2 Weeks Every 3 Weeks Every 4 Weeks Monday Tuesday Wednesday Thursday Friday	
	Specific Sub trades Requiring Schedule for Their scope of work:	Electrical HVAC Plumbing Structural Steel Concrete Glass Curtain wall Elevators	-
	Show Target Baseline on Schedule?	Yes No	-
SPECIAL INSTRUCTIONS TO SCHED-			

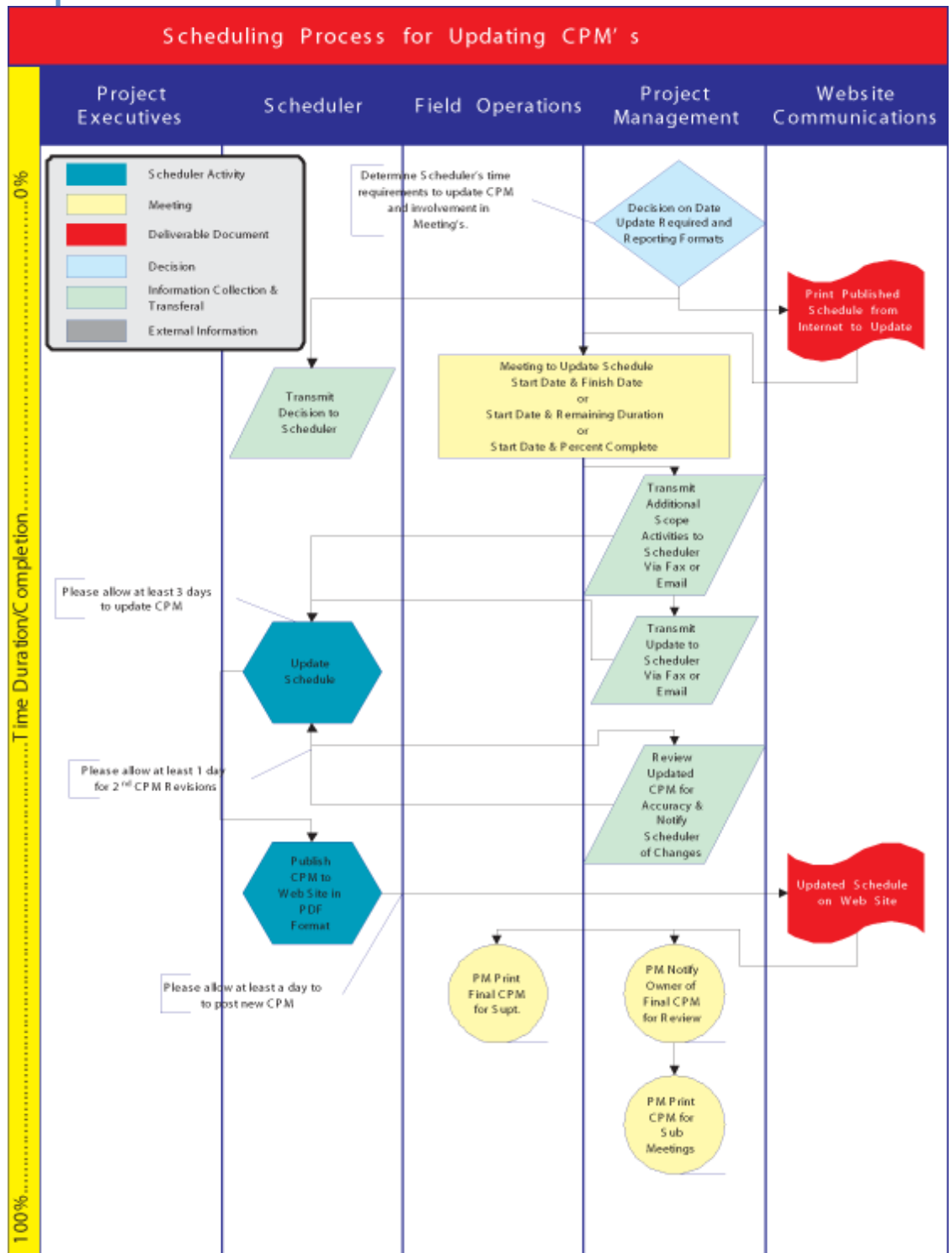
Process Flow Chart : Preparation of Schedule for RFP



Process Flow Chart : Preparation of Schedule for Baseline Tracking

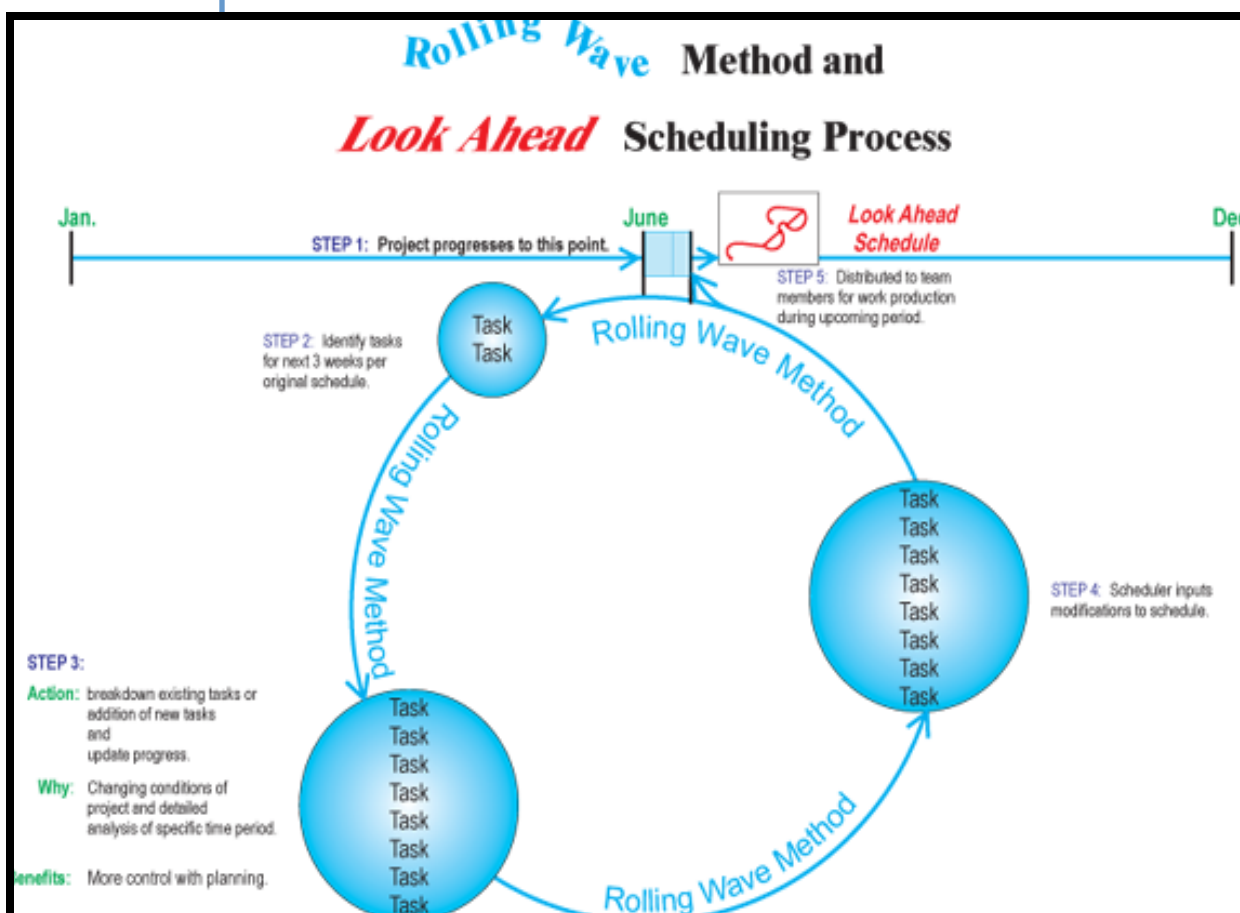


Process Flow Chart : Preparation of Schedule for Updating



Look Ahead Scheduling Process:

1. Look Ahead Schedules are prepared by using a filter to select only those activities which fall within a specified time period from the data update date.



The most important thing to remember about a schedule is that it is ORGANIC!
It changes frequently just like a living Organism. It is only valuable if you update it at regular intervals.

Key to Data Input-Consistency in Process

When scheduling a project, it is **critical that a process/sequence of events** is followed.

Handling so many details can be difficult at best. The only way to assure that you can easily find errors during the input process is to follow a process with consistency.

The list shown in the box

Represents the **process that has proven to be most effective when inputting data into any scheduling program.**

Refer to page 40 of this manual for important set up information before inputting tasks.

Data Input

- Tools/Options Settings
- Project Information
 - Phase Headers within Project
 - Area Headers within Phases
 - Tasks within Phases
 - Durations of Tasks
 - Assign Activity Codes
 - Assign Dependencies
- Calculate Schedule

Evaluate

- Critical Path
- Dependency Assignments
- Completion vs. Contract Requirements

Adjust

- Float Requirements for Critical Path
- Lag between Predecessors/Successors
- Predecessors/Successors Modifications
- Data View – Filters

Format

- Baseline
- Bar Design and Data
- Tracking Fields

Update

- Always Save the Original & the Update
- Actual Start & Finish Columns
- Remaining Duration vs. % Complete



Data Input Into Microsoft Project-Project Information & Phase Header

1. Go to **Start/Programs**
2. Select **Microsoft Project**
3. Select **File/New** (start a new project) or **File/Open** (Open an existing project)
4. Select **Project** in the tool bar, then **Project Information**
5. The Pop up screen shown below will appear.
6. Input the **Start Date** for the project.
7. Input the **Current Date** and **Status Date** (the date which the program will calculate from)..
8. Select the **calendar** that you will use for all tasks. (Note: you may create your own calendar by selecting **Tools/Change Working Time**.)

3 File

4 Project

6 Start date: 12/1/2004

7 Current date: 3/4/2005

8 Calendar: Standard

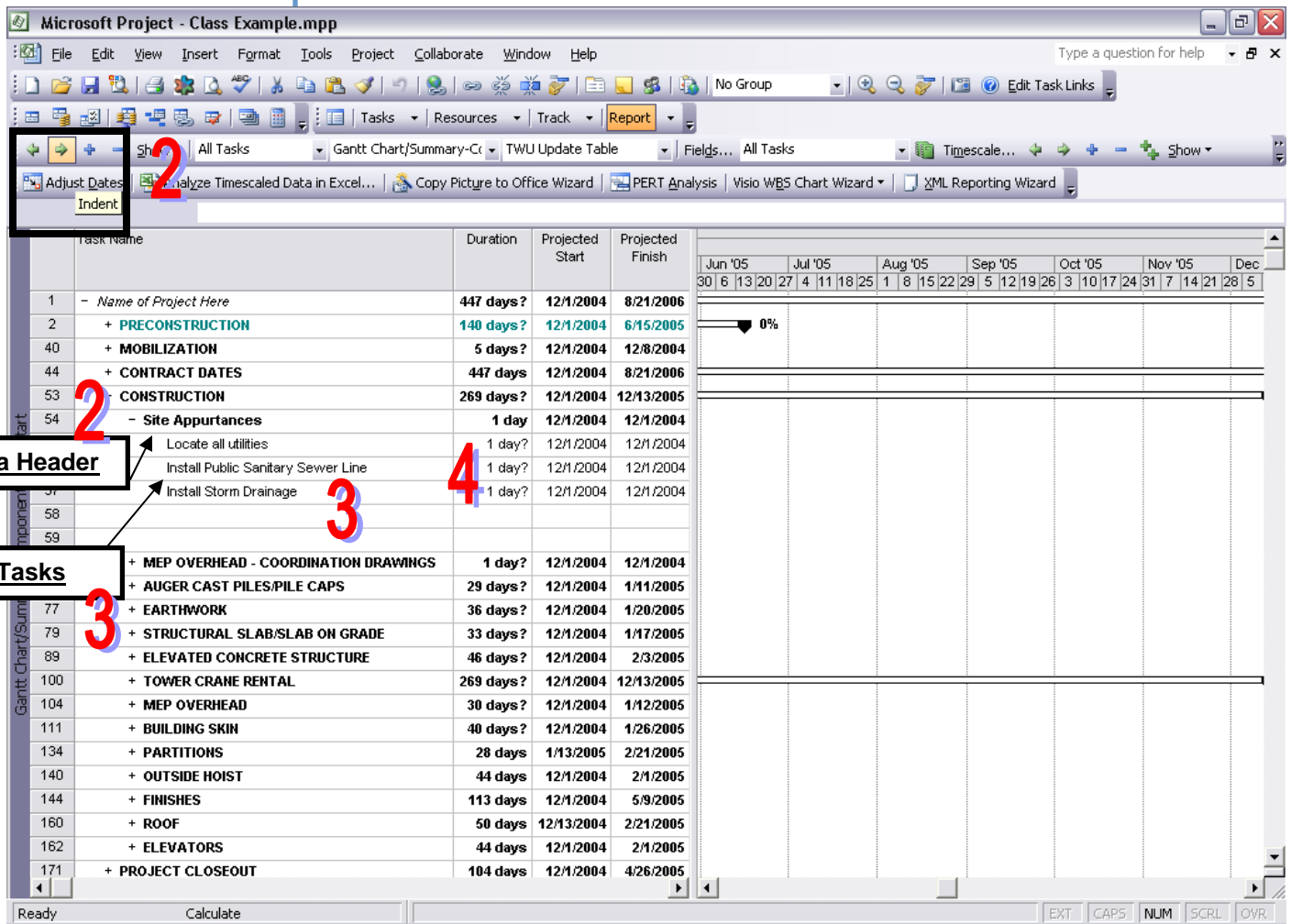
9 OK

10 Row 54

Task Name	Duration	Projected Start	Projected Finish	% Complete
Phase Header	447 days?	12/1/2004	8/21/2006	0%
CONSTRUCTION	140 days?	12/1/2004	6/15/2005	0%
MODIFICATION	5 days?	12/1/2004	12/8/2004	0%
CONTRACT DATES	447 days?	12/1/2004	8/21/2006	0%
CONSTRUCTION	269 days?	12/1/2004	12/13/2005	0%
MEP OVERHEAD - COORDINATION	1 day?	12/1/2004	12/1/2004	0%
AUGER CAST PILES/PILE CAPS	29 days?	12/1/2004	1/11/2005	0%
EARTHWORK	36 days?	12/1/2004	1/20/2005	0%
STRUCTURAL SLAB/SLAB	33 days?	12/1/2004	1/17/2005	0%
ELEVATED CONCRETE STRUCTURE	46 days?	12/1/2004	2/3/2005	0%
TOWER CRANE RENTAL	269 days?	12/1/2004	12/13/2005	0%
MEP OVERHEAD	30 days?	12/1/2004	1/12/2005	0%
BUILDING SKIN				
PARTITIONS				
OUTSIDE HOIST				
FINISHES				
ROOF				
ELEVATORS				
PROJECT CLOSEOUT				
PROJECT OCCUPANCY				

Data Input Into Microsoft Project-Area Header & Tasks

1. Once enough blank spaces have been created, under the phase header, then input the **area header**.
2. Upon typing in the **area header**, it will align itself with the **phase header** above. In order to create the proper outline spacing, click on the **indent button** in the tool bar while your cursor is located on the **area header**.
3. Once the **Area Header** is complete, then list a **single task activity** beneath it. You will then repeat the process illustrated in item 2 except it will be for the task this time. Upon completion of this process, any **task** that you input beneath this first task will automatically be indented to align with the task before it.



4. At this point, all **tasks** must be listed in the program. Do not be concerned yet with listing the durations or the dependencies between activities. **Focus only on getting the right activities listed in order to complete this area of work.** The durations will automatically list the default unit that is located in the programs Options. (in this case 1 day is the standard default duration)

Data Input Into Microsoft Project-Durations

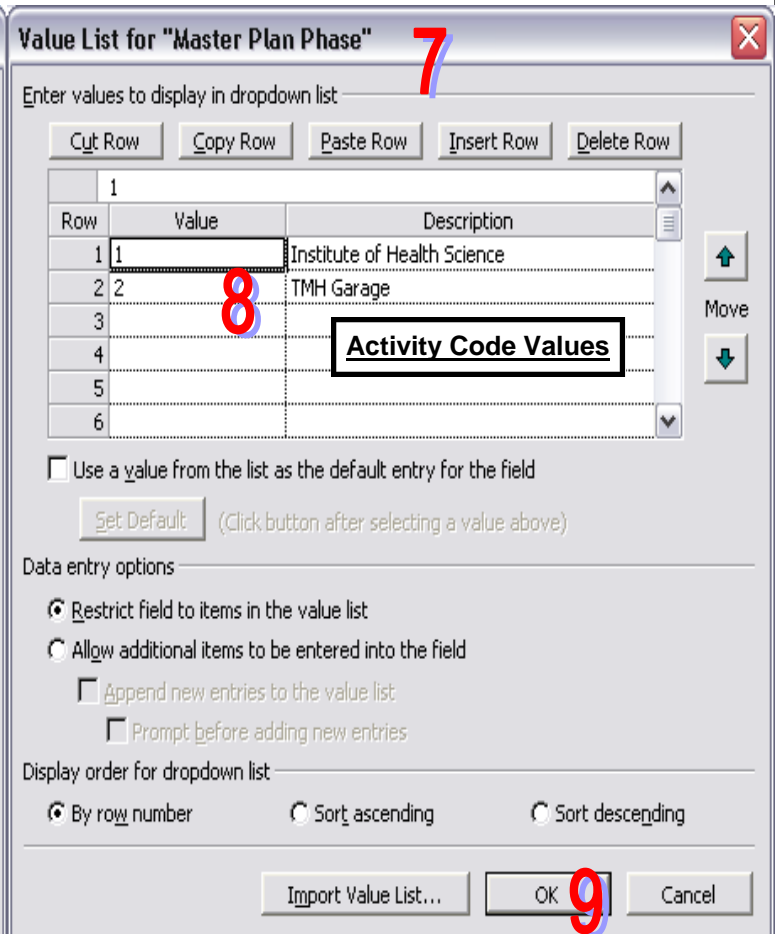
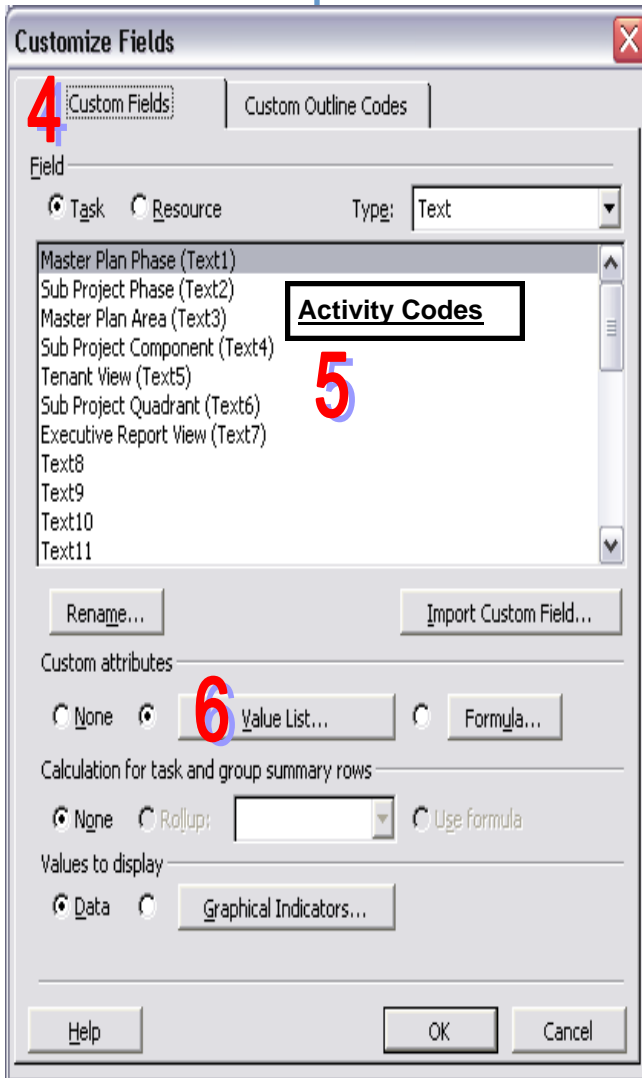
1. Once you have listed all of the tasks that you think are required, you are ready to list the durations.
2. Simply tab down the activities, in the **duration** column and indicate how many days you think it will take to complete each task.

The screenshot shows the Microsoft Project interface for a file named 'Class Example.mpp'. The task list on the left includes various construction tasks with their durations and dates. The Gantt chart on the right shows the project schedule from late 2004 to mid-2005. A red '2' is placed over the 'Duration' column header in the task list, and a red box highlights the 'Durations' text in the same column.

Task Name	Duration	Projected Start	Projected Finish
1 - Name of Project Here	447 days?	12/1/2004	8/21/2006
2 + PRECONSTRUCTION	140 days?	12/1/2004	6/15/2005
40 + MOBILIZATION	5 days?	12/1/2004	12/8/2004
44 + CONTRACT DATES	447 days?	12/1/2004	8/21/2006
53 - CONSTRUCTION	269 days?	12/1/2004	12/13/2005
54 - Site Appurtances	45 days	12/1/2004	2/2/2005
55 Locate all utilities	5 days	12/1/2004	12/7/2004
56 Install Public Sanitary Sewer Line	30 days	12/8/2004	1/19/2005
57 Install Storm Drain	10 days	1/20/2005	2/2/2005
58			
59			
60 + MEP OVERHEAD - COORDINATION DRAWINGS	1 day?	12/1/2004	12/1/2004
64 + AUGER CAST PILES/PILE CAPS	29 days?	12/1/2004	1/11/2005
77 + EARTHWORK	33 days	12/6/2004	1/20/2005
79 + STRUCTURAL SLAB/SLAB ON GRADE	10 days	1/4/2005	1/17/2005
89 + ELEVATED CONCRETE STRUCTURE	13 days	1/18/2005	2/3/2005
100 + TOWER CRANE RENTAL	236 days	1/18/2005	12/13/2005
104 + MEP OVERHEAD	30 days	12/1/2004	1/12/2005
111 + BUILDING SKIN	40 days	12/1/2004	1/26/2005
134 + PARTITIONS	28 days	1/13/2005	2/21/2005
140 + OUTSIDE HOIST	44 days	12/1/2004	2/1/2005
144 + FINISHES	113 days	12/1/2004	5/9/2005
160 + ROOF	50 days	12/13/2004	2/21/2005
162 + ELEVATORS	44 days	12/1/2004	2/1/2005
171 + PROJECT CLOSEOUT	104 days	12/1/2004	4/26/2005

Data Input Into Microsoft Project-Activity Codes

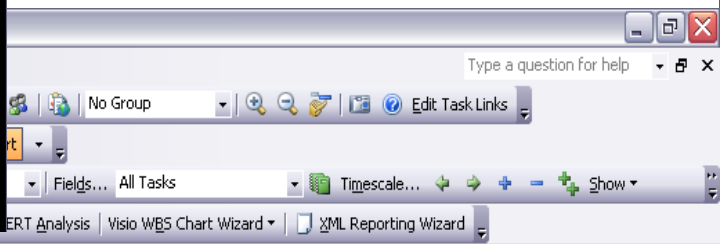
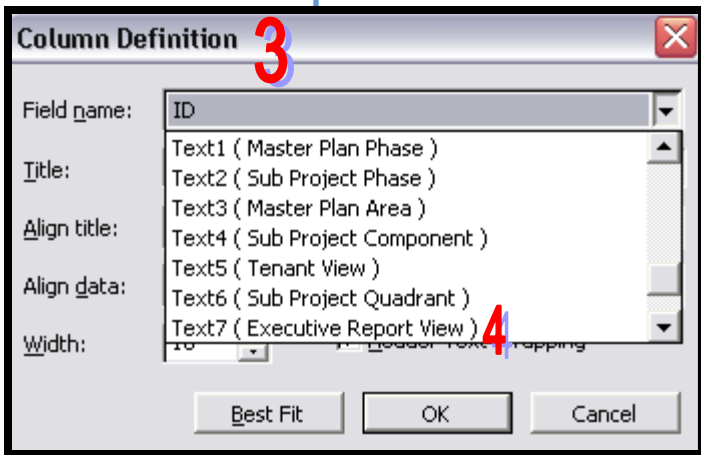
1. **Activity Codes** are the way you organize a schedule into the components that are representative of your specific project.
2. **Activity Codes** enable precise reporting on specific areas of the project, so that "what if" analysis is facilitated easier, as well as, they give the ability to create reports for specific users with just the specific data those users are interested in.
3. Refer to page 20 & 21 for the philosophy and definition of these codes.
4. In order to access the area of Microsoft Project to customize these codes, click on **Tools**, then **Customize**, then **Fields**. The pop up window shown below will appear. Within this pop up menu, select the **Custom Fields** Tab.



5. The activity codes shown in the window above, represent the activity codes that were selected for this particular project.
6. In order to input the values for each code, click on the Value List button.
7. The pop up window to the right will then appear.
8. You may now input the values that apply to this code for your specific project.
9. Once you have completed inputting what values apply to this code, click the OK button and return to you Gantt View in Microsoft Project.

Data Input Into Microsoft Project-Activity Codes

1. The fastest way to input the values for each activity are to create the columns for each code as shown below. **5**
2. This is accomplished by right clicking on the **column header**, then selecting **Insert Column**. **2**
3. The pop up menu will appear as shown below. **3**
4. Scroll down to the **Text** fields, and select the **Text7 (Executive Report View)**. **4**
5. This column will now appear in your Gantt **5**
6. Now all you have to do, is place your cursor in the column, you wish to **select the activity code** for the task, and hit the **drop down button**, and all the value options will appear. Place your cursor over the value you want to select and left click on it. **6**
6. The value will now appear in the column. **6**
7. Note: once you select a value, according to the operating systems of Microsoft, you can either continue to select individual values, or you can copy and paste within that column or choose the fill down option. **6**



Task Name	redecessor:	Successors	Exec	Master Plan Area	Sub Proj Phase	Sub Proj Component	Quadrant
1 - Name of Project Here			1				
2 + PRECONSTRUCTION			1		Preconstruction		
40 + MOBILIZATION			1	00	Mobilization	s0	0
44 + CONTRACT DATES			1	00	Dates		0
53 - CONSTRUCTION			1	01	Construction	b0	
54 - Site Appurtenances							
55 Locate all utilities		56					
56 Install Public Sanitary Sewer Line	55	57					
57 Install Storm Drainage	56						
60 + MEP OVERHEAD - COORDINATION I			1	01	Preconstruction	b0	
64 + AUGER CAST PILES/PILE CAPS	3FF+7 days		1	01	Construction	b0	
77 + EARTHWORK			1	01	Construction	b0	
79 + STRUCTURAL SLAB/SLAB ON GRA	101		1	01	Construction	b0	
89 + ELEVATED CONCRETE STRUCTURE			1	01	Construction	b2	
100 + TOWER CRANE RENTAL			1	01	Construction	s0	0
104 + MEP OVERHEAD			1		Construction	b0	
111 + BUILDING SKIN	147,103		1	01	Construction	b1	
134 + PARTITIONS			1	01	Construction	b1	
140 + OUTSIDE HOIST			1	01	Construction	s0	0
144 + FINISHES			1	01	Construction	b1	
160 + ROOF			1	01	Construction	R	
162 + ELEVATORS			1	01	Construction	b1	
171 + PROJECT CLOSEOUT			1	00	Closeout	b0	0

The Key to Assigning Dependencies

Unless you are absolutely certain that a **lag** will occur between tasks, it is highly recommended that on the **first pass**, of inputting the data, that you leave the relationship between tasks as a **FINISH to START** relationship.

The reason for this is it gives the scheduler a worst case basis for the project.

It is always better to forecast a longer schedule and come in under the time allowed, rather than the opposite scenario.

After all data has been input, and the scheduler recognizes that there is not sufficient time to complete the project on schedule, then go back through all the activities and create a **lag** condition between the activities relationships.



Data Input Into Microsoft Project-Assign Dependencies

- Once the durations are input, then you can link the **tasks together** by placing your cursor over the bar of the predecessor task, holding down the left click button, then drag the cursor to the beginning of the successor activity.
- This should result in the **relationship lines** as shown below.
- The other means to assign dependencies is to open the task information box, click on the Predecessor Tab as shown below, and then input
 - a** Predecessor,
 - b** Relationship and
 - c** Lag.

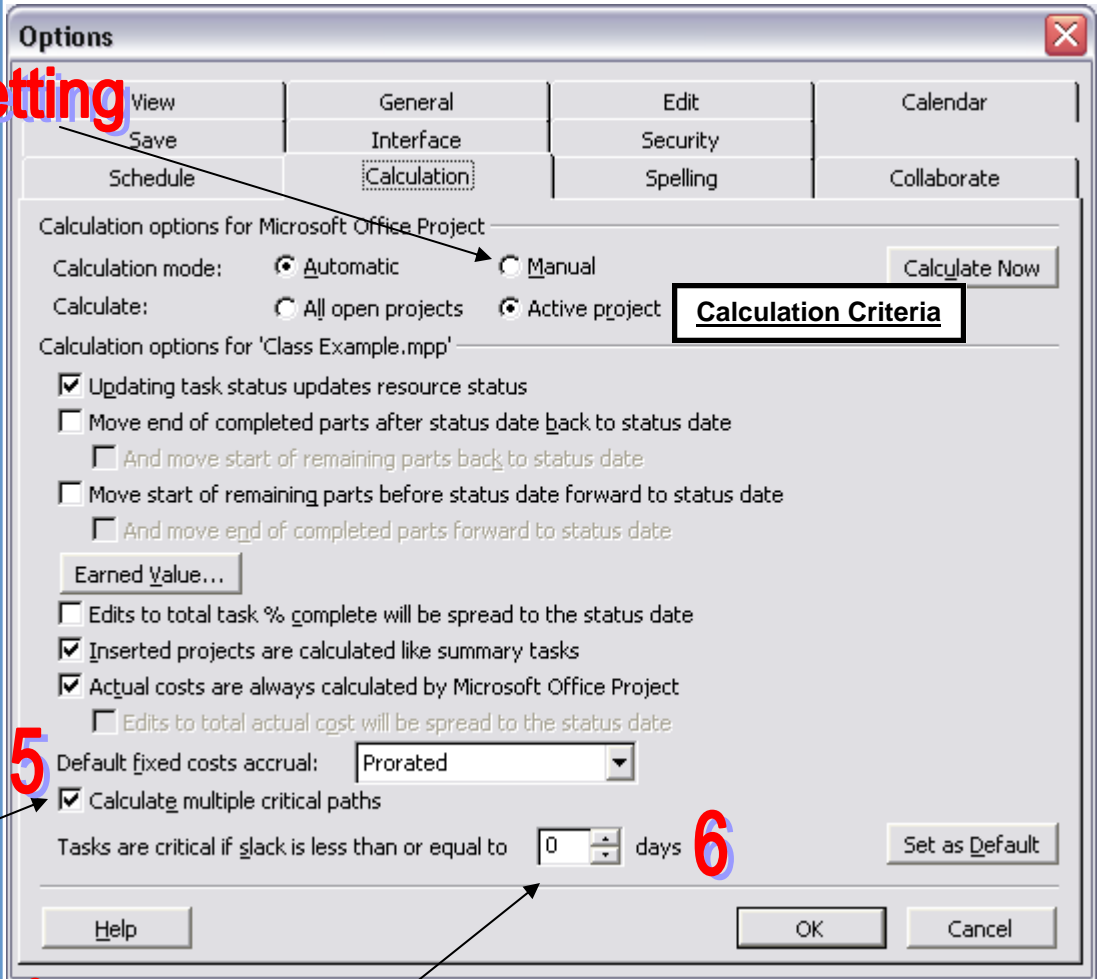
Task Name	Predecessor	Successors	Exec	Task Plan	Master Plan	Sub Proj Phase	Sub Proj Component	Quadrant
1 - Name of Project Here				1				
2 + PRECONSTRUCTION				1		Preconstruction		
40 + MOBILIZATION				1	00	Mobilization	s0	0
44 + CONTRACT DATES				1	00	Dates		0
53 - CONSTRUCTION				1	01	Construction	b0	
54 - Site Appurtances				1	04	Construction	s2	n
55 Locate all utilities		56		1	04	Construction	s2	n
56 Install Public Sanitary Sewer Line	55	57		1	04	Construction	s2	n
57 Install Storm Drainage	56			1	04	Construction	s2	n
58				1				
59				1				
60 + MEP OVERHEAD - COORDINATION I				1	01	Preconstruction	b0	
64 + AUGER CAST PILES/PILE CAPS	IFF+7 days			1	01	Construction	b0	
77 + EARTHWORK				1	01	Construction	b0	
79 + STRUCTURAL SLAB/SLAB ON GRA	101			1	01	Construction	b0	
89 + ELEVATED CONCRETE STRUC				1				
100 + TOWER CRANE RENTAL				1				
104 + MEP OVERHEAD				1				
111 + BUILDING SKIN				1				
134 + PARTITIONS				1				
140 + OUTSIDE HOIST				1				
144 + FINISHES				1				
160 + ROOF				1				
162 + ELEVATORS				1				
171 + PROJECT CLOSEOUT				1				

ID	Task Name	Type	Lag
56	Install Public Sanitary Sewer Line	Finish-to-Start (FS)	-3d

Data Input Into Microsoft Project-Calculate

1. Once all the data has been input into the program, as shown in previous pages, then you are ready to calculate the schedule to see where your final completion date falls.
2. In order to get to the calculation function, from the main tool bar, select **Tools, Options**, then the **Calculation Tab**.
3. The preferred setting of **Manual Calculations** is due to the fact that every time you input data your schedule will recalculate. This can be bothersome if you are trying to select activity codes and want to utilize the copy and paste, or fill down method for inputting these codes. (Note: it is better to set this up in the beginning of the input process for the reason listed above.
4. If your calculation criteria is set on **Manual**, then when you get ready to calculate, simply hit **F9**.

3 Preferred Setting



5

5. If you only want one critical path to appear in the schedule, then unclick this option.

5

5. If you only want one critical path to appear in the schedule, then unclick this option.

6

6. The slack level here will define what appears as the critical path. 0 slack = critical path in this schedule. Should you desire the critical path to be more broad ranging, then you would increase the value of slack to define a liberal version of the critical path.

Data Input Into Microsoft Project-Evaluate Contract vs. Completion

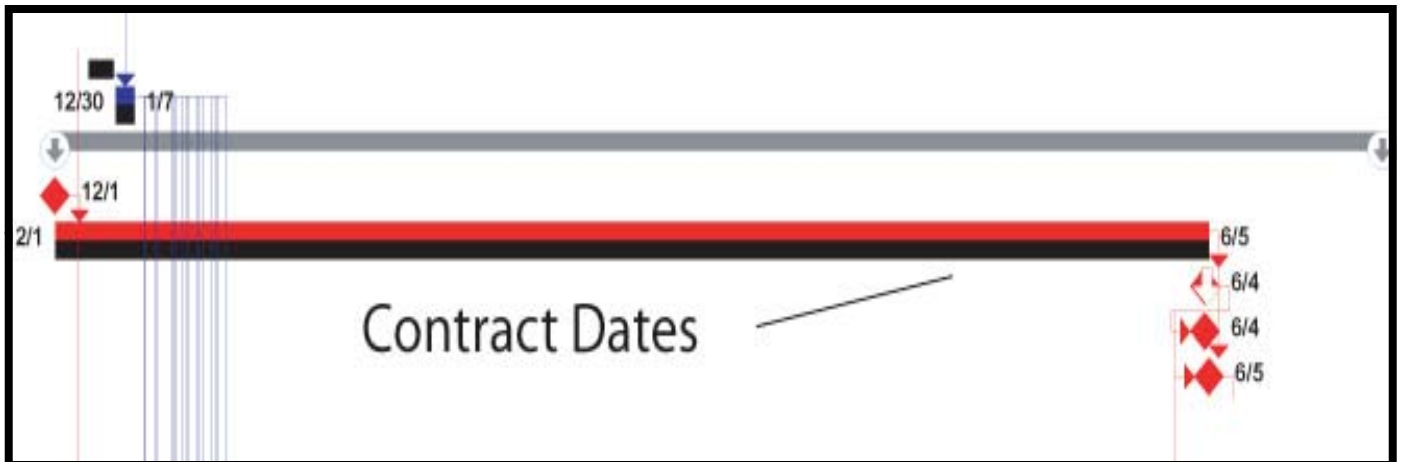
When evaluating a schedule, the very first thing you look at is the Critical Path. Typically, if the critical path is not defined then it is an alert that the schedule is not complete or properly linked together with logic.

You must also decide if the project warrants have more than one critical path. Once you are sure the critical path is correct for this project then you may proceed with the other evaluations.

1. As it was discussed on page 14 of this manual, if you input the tasks shown below into your schedule,
2. And added another activity called, **Contract Completion by Contractor**, where it's predecessor was all of the construction activities required by contract,
3. Then it would be very easy to determine whether the **schedule meets the contract requirements**.
4. At this point, if the schedule comes in before the deadline, then you can go directly to preparing the needed reports, if it doesn't, then you need to start modifying the **lag** time in the relationships of all the activities. (Refer to Page 44)

274	CONTRACT DATES	452 days	12/1/2004	8/28/2006
275	*Contract Start Date	0 days	12/1/2004	12/1/2004
276	*Contract Duration Base Bid & Alternates	393 days	12/1/2004	6/5/2006
277	*Contract Completion Date (Liquidated Damages)-Substa	0 days	6/4/2006	6/4/2006
279	Contract Delay Claimed by Vaughn	0 days	6/4/2006	6/4/2006
278	Contract Delay Awarded by TWU	0 days	6/5/2006	6/5/2006

279	Contractors Current Completion Date	0 days	7/3/06	7/3/06
-----	-------------------------------------	--------	--------	--------

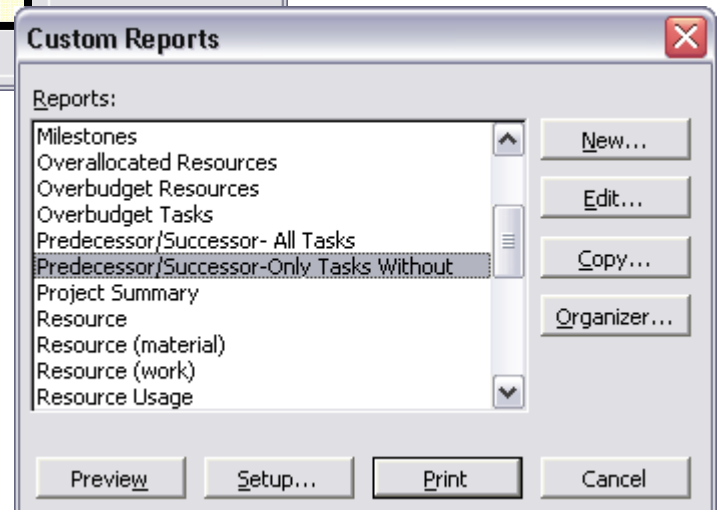
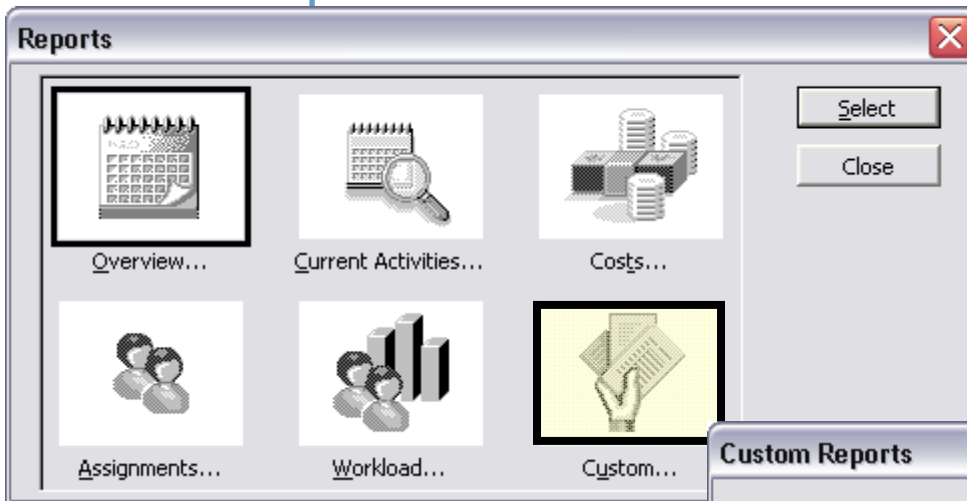


Data Input Into Microsoft Project-Evaluate Dependencies

1. Beside looking at the lag between dependencies, you must **evaluate whether all the activities have a predecessor and successor.**
2. When inputting data, it is very easy to overlook establishing predecessors and successors to every task, even though, each activity should have both.
3. So the next step would be to run a Predecessor/
4. To do this, in the tool bar select, **View**, then **Reports**. The pop up window shown to the left will appear.
5. Place your cursor over the **Custom** Icon and click the **Select** Button.

Successor Report to see which activities don't have one.

9



6. The **Custom Reports** Pop Up Menu will appear as shown on the right.
7. Highlight the **Predecessor/Successor-Only Tasks Without** report, then select Print.
8. A page from the **Actual Report** is shown on the next page.

Data Input Into Microsoft Project-Evaluate Dependencies

1. The report shown below gives you a listing of just those activities which don't have a predecessor or successor.
2. The next step would be to go back to your **Gantt View** of the schedule, locate the specific activity which doesn't have a predecessor or successor, and **assign** one.
3. Theoretically, there should only be two tasks which don't have both a predecessor or successor and that is the first and last task of the critical path.
4. Once they have all been assigned, then you can rest assured that your critical path is probably the right one.

Microsoft Project - Class Example.mpp

Page Setup... Print... Close Help

1

Predecessor/Successor Only Tasks in Month of 3/4/2005
Time Base is 12:26:04 PER LANA changed by mark

ID	Task Name	Start	Finish
55	Locate all utilities	12/20/2004	1/3/2005
57	Install Storm Drainage	1/19/2005	1/31/2005
58		12/1/2004	12/1/2004
59		12/1/2004	12/1/2004
194	normal activity	12/13/2004	1/3/2005

Page 1

Page: 1 of 1 EXT CAPS NUM SCRL OVR



Data Input Into Microsoft Project-Evaluate & Adjust

1. When you start to adjust the lag time for predecessors and successors, it is better to make these modifications in the Task Information box. (if you try and make these changes in the Predecessor or Successor Columns, then you must also type in the relationship of FS,FF, SS, or SF)
2. Go to the **Predecessor** tab, then to the **Lag** column, in the **Task Information** box, and input the **lag** you think is appropriate. In the example below, -3 means that the start of the successor activity will be 3 days before the completion of the predecessor activity.
3. When you are finished, click **OK**.
4. After pressing **F9**, and the schedule calculates, then the visual display will change to show the new FS relationship between the two activities.

Task List:

Task Name	Predecessor	Successors	Exec	Task Plan	Master Plan Area	Sub Proj Phase	Sub Proj Component	Quadrant
1 - Name of Project Here				1				
2 + PRECONSTRUCTION				1		Preconstruction		
40 + MOBILIZATION				1	00	Mobilization	s0	0
44 + CONTRACT DATES				1	00	Dates		0
53 - CONSTRUCTION				1	01	Construction	b0	
54 - Site Appurtenances			1	1	04	Construction	s2	n
55 Locate all utilities		56		1	04	Construction	s2	n
56 Install Public Sanitary Sewer Line	55			1	04	Construction	s2	n
57 Install Storm Drainage	56			1	04	Construction	s2	n

Task Information Dialog Box (Task: Install Storm Drainage):

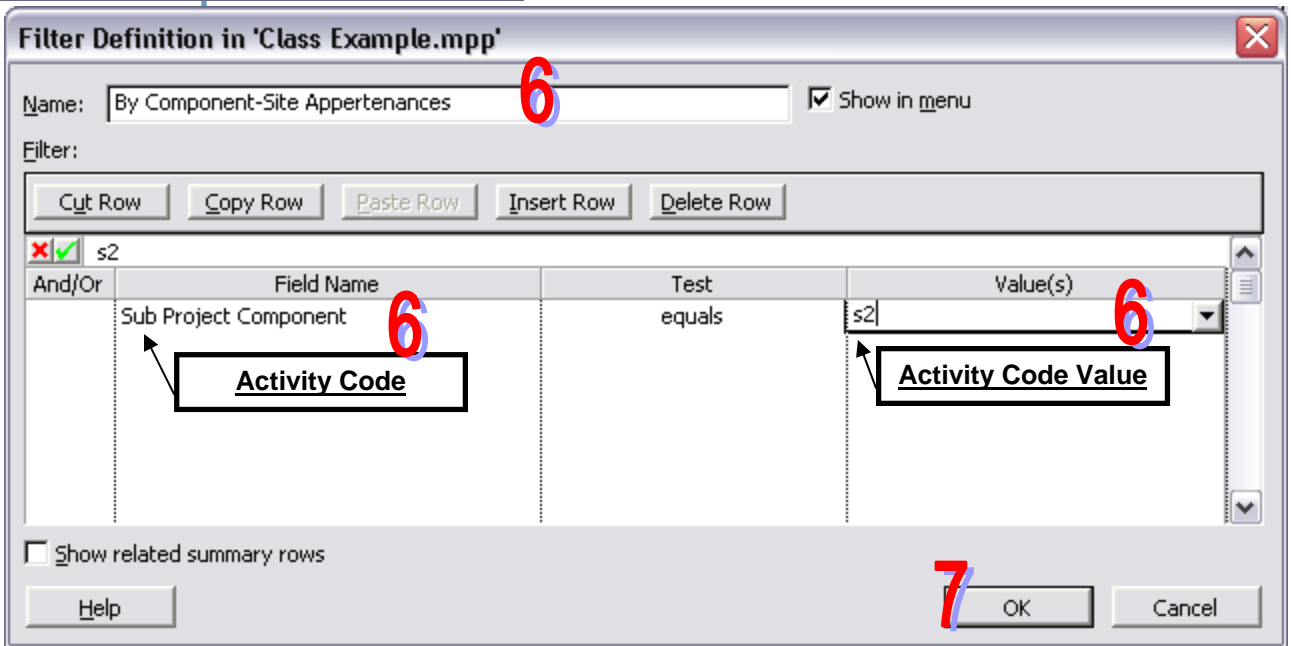
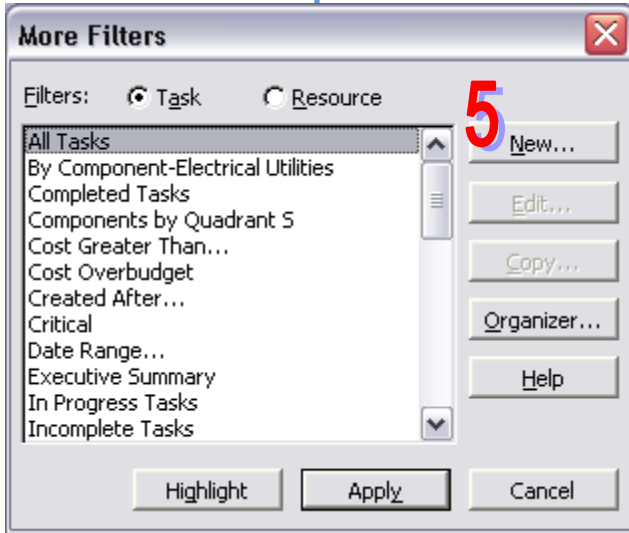
- Name: Install Storm Drainage
- Duration: 10d
- Predecessors:

ID	Task Name	Type	Lag
56	Install Public Sanitary Sewer Line	Finish-to-Start (FS)	-3d

Gantt Chart: Shows a timeline from Dec '04 to Feb '05. A red arrow indicates the relationship between task 56 and task 57, with a lag of -3 days.

Data Views from Microsoft Project-Filters

1. As we discussed on page 36, the **activity codes** enable the scheduler to greater flexibility in evaluation information.
2. **Filters** are the way to isolate certain information for analysis purposes or for reports where a specific person may only want to see a specific set of information (i.e. subcontractors only wanting to see their scope of work).
3. Go to the **Project** button in the tool bar, then select **Filtered For:.....**, then select the filter you want to use.
4. Once you click on this filter, the Gantt Screen will only show the information created from that Filter.
5. In the example given below, We are creating a new filter called **By Component-Site Appurtenances**.
6. We have told the filter to only collect tasks whose **Sub Project Component** = s2 (this is the Site Appurtenances Activity Code.)
7. Once you have completed defining which **Activity Code** you want the program to select, then select **OK**. The view shown on the next page will then appear on your screen.



Data Views from Microsoft Project-Filters

1. Notice that the view shown below only includes those activities associated with Site Appurtenances.
2. Once you select the **filter** you want to use, then select **Apply**.

The screenshot shows the Microsoft Project interface for a file named 'Class Example.mpp'. The main window displays a Gantt chart for the year 2005, with a task list on the left. The task list is filtered to show only tasks related to 'Site Appurtenances'. The Gantt chart shows three tasks: 'Locate all utilities' (5 days), 'Install Public Sanitary Sewer Line' (30 days), and 'Install Storm Drainage' (10 days). A red arrow labeled '1' points to the Gantt chart area.

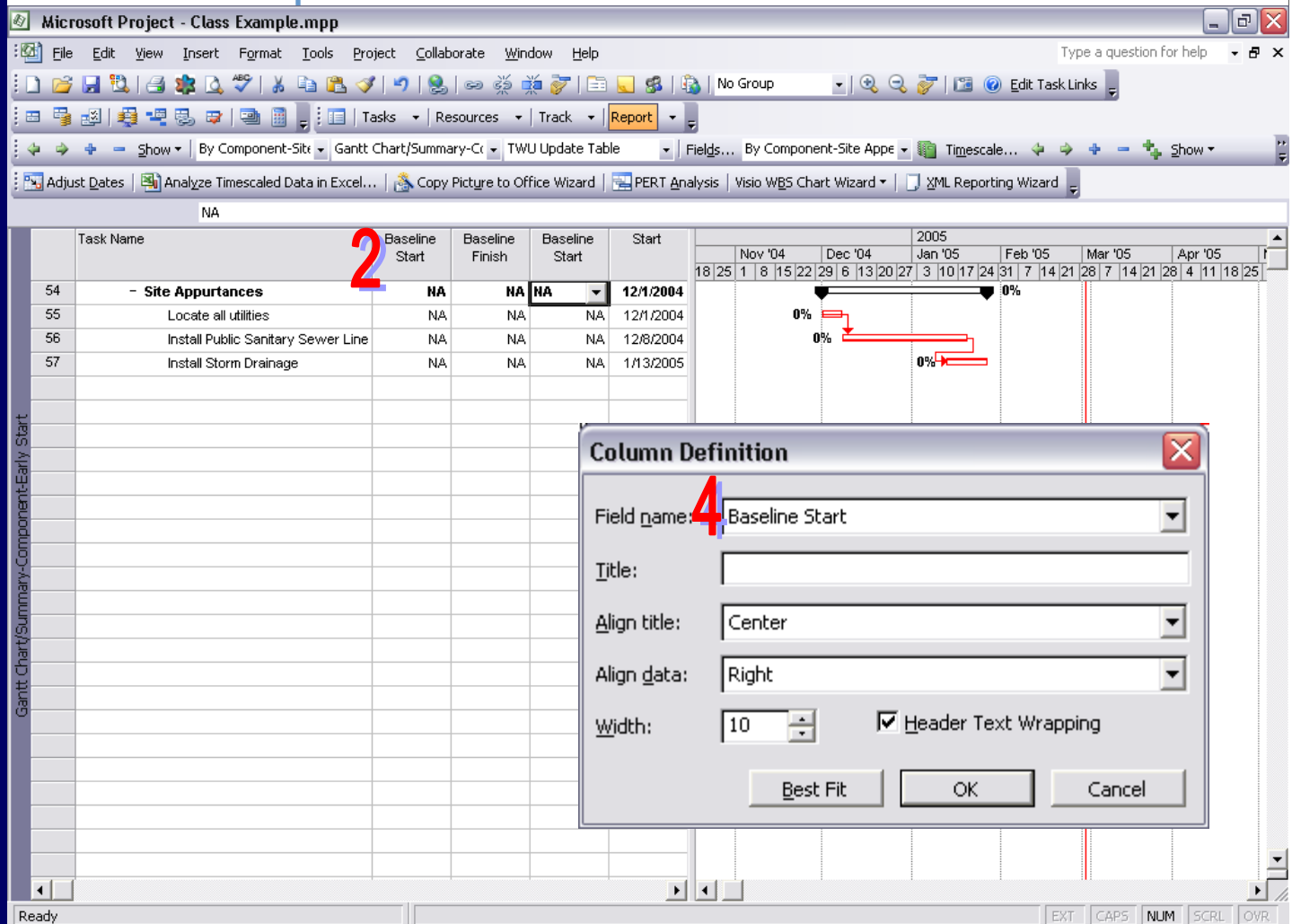
The 'More Filters' dialog box is open, showing a list of filters. The 'Task' radio button is selected. The filter 'By Component-Site Appurtenances' is highlighted in the list. A red arrow labeled '2' points to the 'Apply' button at the bottom of the dialog box.

Task Name	Duration	Start	Finish
- Site Appurtenances	40 days?	12/1/2004	1/26/2005
55 Locate all utilities	5 days	12/1/2004	12/7/2004
56 Install Public Sanitary Sewer Line	30 days	12/8/2004	1/19/2005
57 Install Storm Drainage	10 days	1/13/2005	1/26/2005

Data Input Into Microsoft Project-Baseline

Baseline:

1. **As was discussed on page 14, Every project should have a baseline established prior to updating it with any progress dates.** Besides being able to track progress against the baseline (reference point), the other reason for establishing this, is to create buy in by all participants that the plan established is the best to accomplish the project goal. Without buy in by the Owner of the project, it becomes almost impossible to extend the schedule due to any weather or change in scope delays.



1. Before starting the process of saving a baseline, it is necessary to **insert baseline start and baseline finish columns** in the Gantt Chart so the information can be included in future tracking reports.
2. This is accomplished by right clicking on the **column header**, then selecting **Insert Column**.
3. The pop up menu will appear as shown below.
4. Scroll down to the **Text** fields, and select the one that describes the **Baseline Start** as shown in parenthesis.
5. This column will now appear in your Gantt View.



Data Input Into Microsoft Project-Baseline

1. In order to set up a baseline, the next 6 pages must be followed in this order. (It is a quirky aspect of Microsoft Project)
2. In the toolbar select **Format**, then **Gantt Chart Wizard**.
3. The pop up window shown below will appear.
4. You will be prompted on a series of options.

Upon completion of the Gantt Chart Wizard, your project will appear in the bar chart area with a baseline. There will also be dates in the baseline columns shown on the previous page.

5. The recommended options for selection will be highlighted in the next few pages.

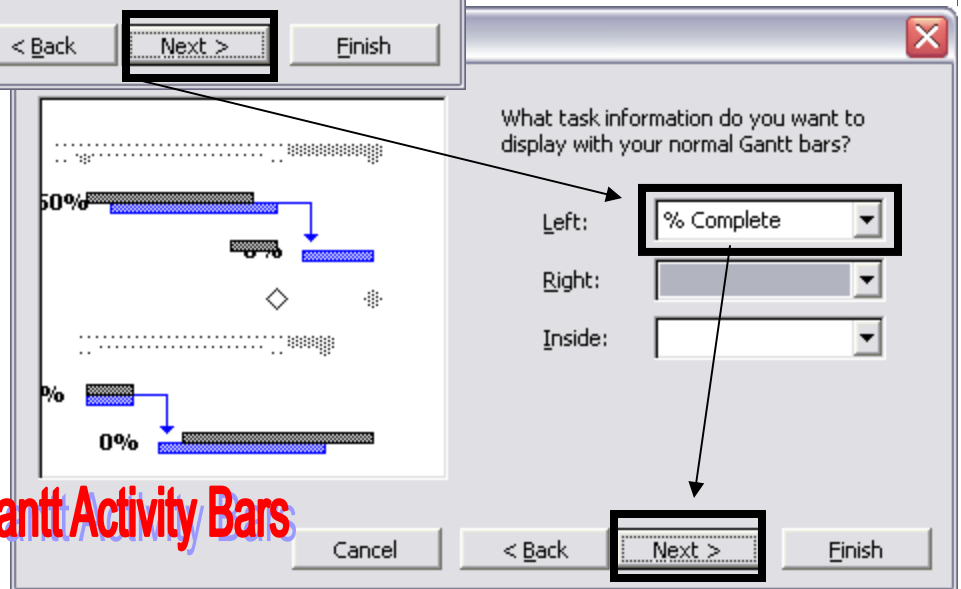
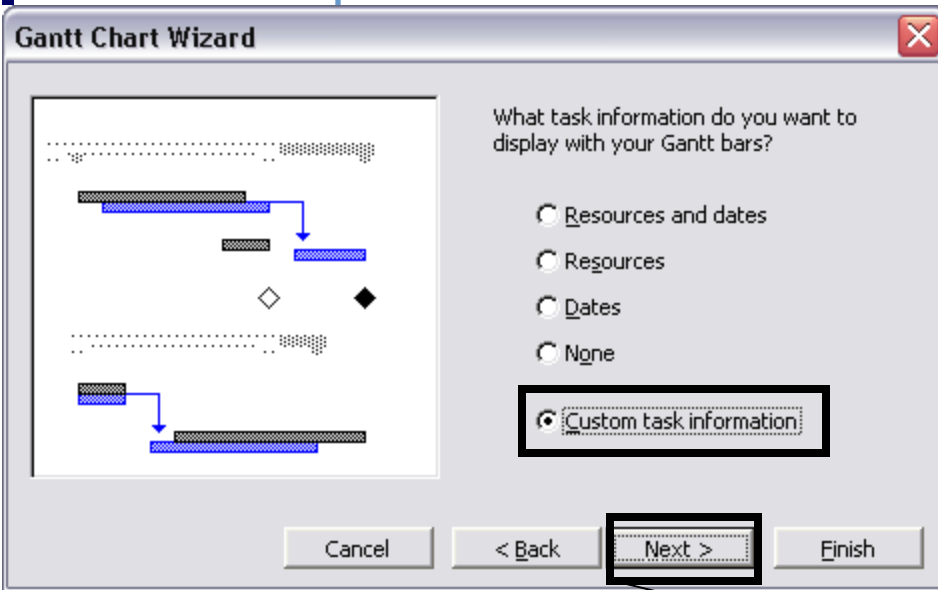
The screenshot shows the Microsoft Project interface with the Gantt Chart Wizard dialog boxes open. The main window displays a Gantt chart with a baseline. The task list is as follows:

Task Name	Baseline Start	Baseline Finish	Baseline Start	Start
54 - Site Appurtenances	NA	NA	NA	12/1/2004
55 Locate all utilities	NA	NA	NA	12/1/2004
56 Install Public Sanitary Sewer Line	NA	NA	NA	12/8/2004
57 Install Storm Drainage	NA	NA	NA	1/13/2005

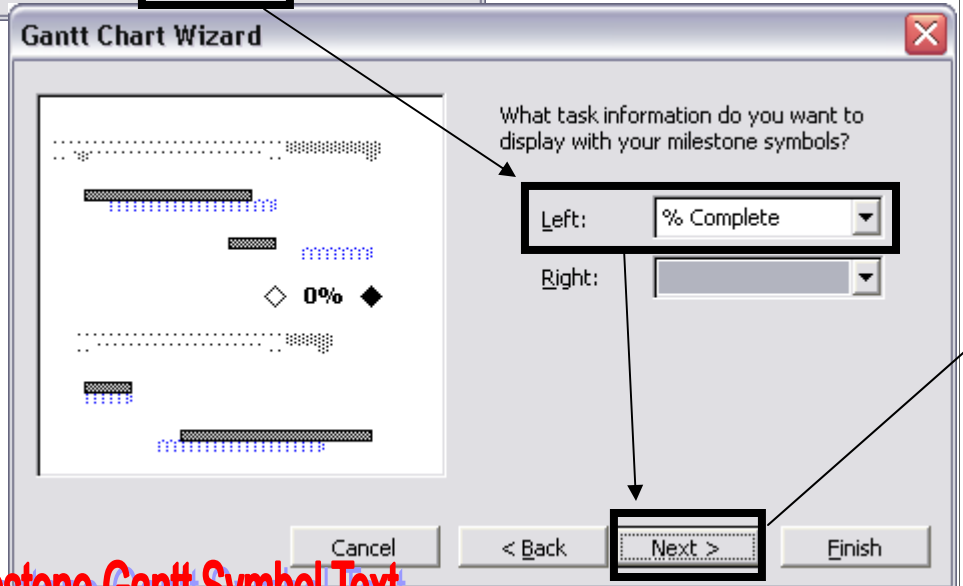
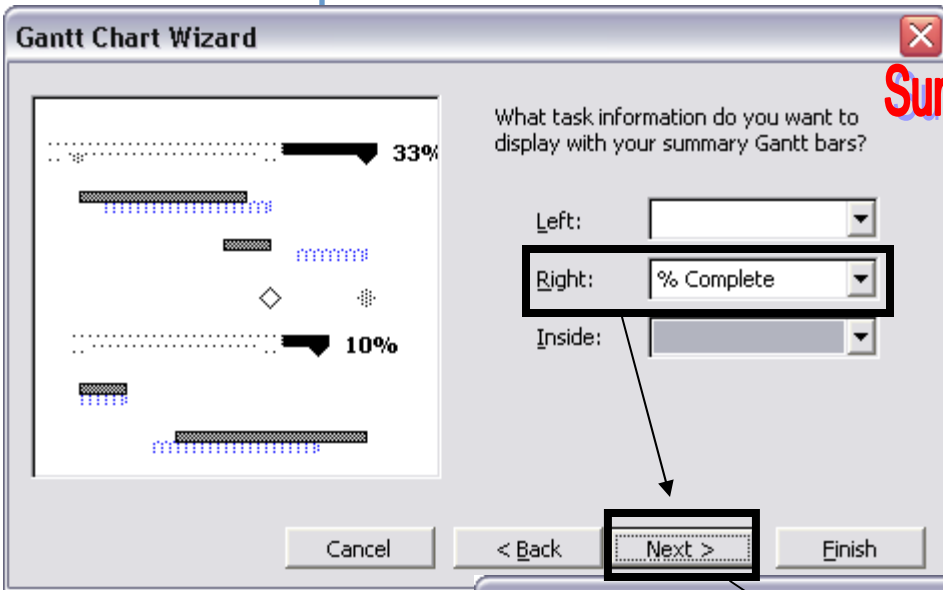
The Gantt Chart Wizard dialog boxes are shown in the foreground. The first dialog box, titled "Gantt Chart Wizard", has a "Next >" button highlighted with a red box and the number 3. The second dialog box, titled "What kind of information do you want to display in your Gantt Chart?", has the "Baseline" radio button selected and highlighted with a red box, and its "Next >" button also highlighted with a red box. The word "Baseline" is written in large red text at the bottom of the page.

Baseline

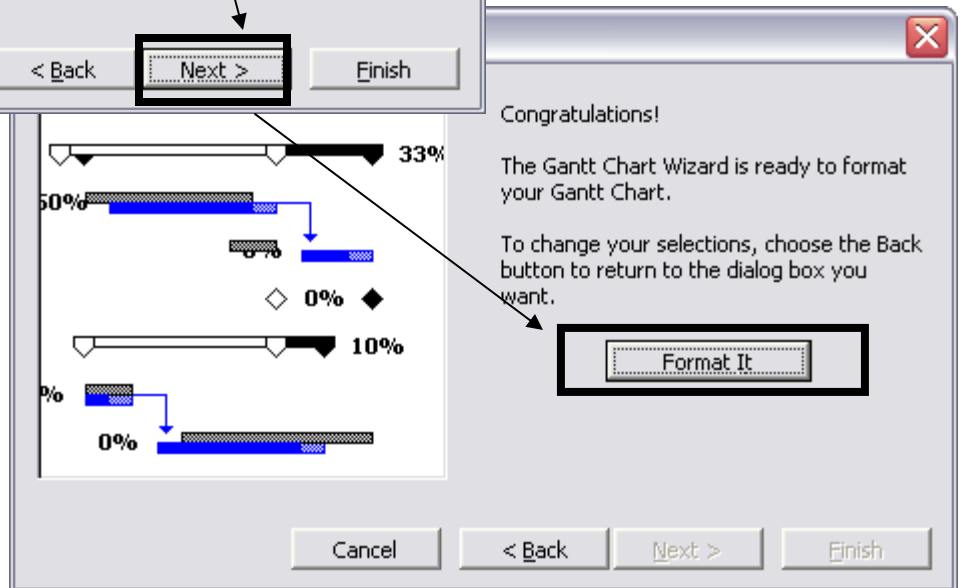
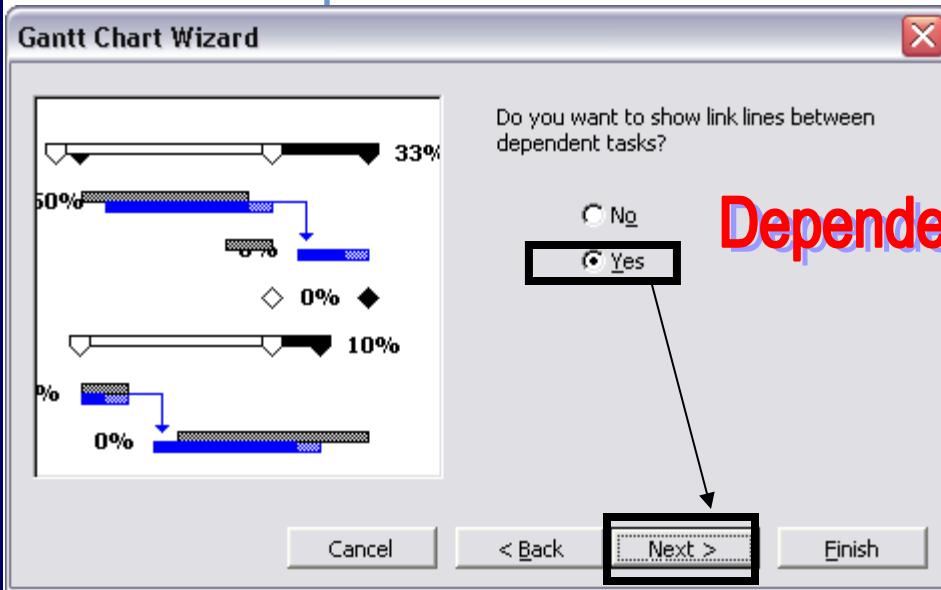
Data Input Into Microsoft Project-Baseline



Data Input Into Microsoft Project-Baseline



Data Input Into Microsoft Project-Baseline





Data Input Into Microsoft Project-Baseline

The screenshot shows the Microsoft Project interface with a Gantt chart. A 'Gantt Chart Wizard' dialog box is open, indicating that the Gantt chart is finished. The dialog box contains a checkered flag icon and the text: "Your Gantt Chart is finished! For more information about formatting your Gantt Chart, search Help for Gantt Chart." Below the text is an "Exit Wizard" button. The background shows a Gantt chart with tasks: "Site Appurtances", "Locate all utilities", "Install Public Sanitary Sewer Line", and "Install Storm Drainage". The chart shows a baseline at the top of each task bar.

Task Name	Baseline Start	Baseline Finish	Start	Finish
54 - Site Appurtances	NA	NA	12/1/2004	1/26/2005
55 Locate all utilities	NA	NA	12/1/2004	12/7/2004
56 Install Public Sanitary Sewer Line	NA	NA	12/8/2004	1/19/2005
57 Install Storm Drainage	NA	NA	1/13/2005	1/26/2005

At this point, Microsoft has indicated a Baseline for your schedule.

This is the weakest part of Microsoft Project because the baseline it establishes doesn't look good graphically. It places the baseline on the top of each activity bar. In order to change the appearance go to the next screen.

Data Input Into Microsoft Project-Format Bar Design

1. In the toolbar, select **Format**, then **Bar Styles**. 5
2. The pop up window shown below will appear. 2
3. You can highlight each individual bar (**Task**) 3
4. Then go to the **Bar Tab**. 4
5. Then select the **Bar Shape** drop down box and determine which style you like best. 5 **(Note: under this drop down box is where it is determined if the baseline will be placed on the top or bottom of the activity line)**
6. Then select the **Pattern** drop down box and highlight which of those you want. 6

Bar Styles 2

Cut Row Paste Row Insert Row

Task	Appearance	Show For ... Tasks	Row	From	To
Task		Normal, Noncritical	1	Start	Finish
Task Progress		Normal, Noncritical	1	Actual Start	CompleteThrough
Critical Task		Normal, Critical	1	Start	Finish
Critical Task Progre:		Normal, Critical	1	Actual Start	CompleteThrough
Baseline		Normal	1	Baseline Start	Baseline Finish
Milestone		Milestone	1	Start	Start

Text Bars 4

Start Middle End

Shape: 5 Shape: 6 Shape: 7

Type: Type: Type:

Color: Color: 7 Blue

Help

Save Baseline 9

Save baseline 10

Baseline (last saved on 3/4/2005)

Save interim plan

Copy: Start/Finish

Into: Start1/Finish1

For: 11

Entire project

Selected tasks

Roll up baselines:

To all summary tasks

From subtasks into selected summary task(s)

Set as Default

Help OK Cancel

9. Once you have selected the desired attributes for the **bar formats**, go to the toolbar and select **Tools**, then **Tracking**, then **Save Baseline**. The pop up window shown to the right will appear.
10. Select the **Save Baseline** Button, then click on the drop down button to designate the **Baseline Plan #** (Note: you can have several baselines established through the course of the job.)
11. Then select the **Entire Project** Button. Then click **OK**. (Note: use the selected tasks option when you are adding new tasks to the project after the original baseline has been saved. This allows new activities to be added to the baseline as scope of work is changed or expanded.)

Data Update Into Microsoft Project-Tracking

Before updating the schedule always save the previous version, then create a copy to apply your updated information to.

1. In order for a schedule to be effective it must be updated at regular intervals. The easiest way to update the schedule is to **add the columns in the Gantt chart shown below.**
2. Using the same process shown in previous sections, add the following columns.: **Actual Start, Actual Finish, % Complete, and Remaining Duration.**
3. Once these columns are set up, then you may start the update process.
4. You must always input the **Actual Start** date for the activity.
5. **If the activity has not been completed, then enter a percentage complete and/or remaining duration. If the task has been completed, then enter the Actual Finish Date.**

Task Name	Actual Start	Actual Finish	% Complete	Duration	Remaining Duration	Start	Finish
54 - Site Appurtances	12/1/2004	NA	39%	43 days?	26.11 days?	12/1/2004	1/31/2005
55 Locate all utilities	12/20/2004	NA	50%	10 days	5 days	12/20/2004	1/3/2005
56 Install Public Sanitary Sewer Line	1/3/2005	1/10/2005	100%	6 days	0 days	1/3/2005	1/10/2005
57 Install Storm Drainage	NA	NA	0%	10 days	10 days	1/18/2005	1/31/2005

6. Before you calculate the schedule, you must go to the **toolbar** and select **Project**, then **Project Information**.
7. When the pop up window opens, then go to the drop down box labeled as **Status Update Date**. In this field, input the date that you want the schedule to calculate from. In the example above, the Status Update Date is January 1st, denoted by the red vertical line.
8. Once the schedule has been calculated, **F9**, then the top progress bar of each activity shall move forward to reflect the progress.
9. You can now compare the baseline with the progress line for each activity and determine which areas of the project need to be focused on the most, in order to meet the original baseline schedule.

Scheduling-Review

1. What is the first thing you do after opening Microsoft Project?

2. When inputting data into Microsoft Project for a schedule, what order do you input the following information?
 - ___ a. Durations
 - ___ b. Activity Codes
 - ___ c. Tasks
 - ___ d. Dependencies
 - ___ e. Area Headers
 - ___ f. Phase Headers
3. At what point in time do you do your first calculation of the schedule?

4. What is a second pass, when do you do it, and what do you do when you make your second pass? _____

5. When critiquing a schedule, what is the first thing you look for?

6. What is an Activity Code?

7. Which of the following does an Activity Code do for the schedule/scheduler?
 - ___ a. Categorizes Tasks
 - ___ b. Makes Tasks Job Specific
 - ___ c. Allows specific reporting for specific groups on the project
 - ___ d. Makes the scheduler look like a GURU
 - ___ e. All of the Above
8. What is a baseline, when do you do it, and what does it represent to the project team?

Activity Code Matrix

Owners Project Scope and Deliverables Matrix Program Management

Purpose of code	Activity ID Codes	Master Phase	Master Plan Area	Sub Project Component	Summary Bar	SubProject ID	Department	Sub Project Phase	Company	Subtrade	CSI Specs	Submittal Package	IMEX	Flood/Elevation	Team Member	Area View	MNC View	Supl View	PIM View	Consultant View	Tenant View		
Scope Related Personnel Assignments Primary Responsibility = ● Support Responsibility = ○ Includes in Scope of Configuration (Yes = +) Exclude in Scope of Configuration (No = X)	Ability to Select Activities for the Design Consultant That Span all other ID Codes																					●	
	Ability to Select Activities for the PIM That Span all other ID Codes																						●
	Ability to Select Activities for the Supl. That Span all other ID Codes																						●
	Show Different Levels of Detail with Different End Users																						●
	Focus Schedule on a specific Area for Strategic Planning Purpose																						●
	Prepare Update Reports for Individual Team Members																						●
	Breakdown work into smaller Components to Match Construction																						●
	Provide Analysis of Work Potentially Impacted by Weather																						●
	Enable Submittals to Be Tracked in the Schedule																						●
	Ability to Sort Submittals by CSI #																						●
	Ability to create Reports for Const. Staff of Different Trades																						●
	Ability to Specify Activity Reports for Specific Vendors																						●
	Provide the Ability to Focus on a specific sequencing phase of a project																						●
	Notify/ing Dept's from the Owner's Office who are not closely linked to the project																						●
	Joint Language between Owner & Contractor of Areas of Construction Onsite																						●
Historical Tracking Of WorkPlan for Owner																						●	
Contractor Phasing of Detached Areas in project																						●	
Owner Contract Proximity to Site Issue																						●	
Owner Contract Timing Issue																						●	
Issue																						●	
Indicate Task that the Tenant Needs to View																						●	
Indicate Task that the Design Consultants Needs to View																						●	
Indicate Task that the Project Manager Needs to View																						●	
Indicate Task that the Superintendent Needs to View																						●	
Define Level of Detail of Tasks																						●	
Ability to Create Views for a Specific Area																						●	
Identify Specific Project Team Member with Activities																						●	
Identify Specific Location of Work within the Context of Master Phase																						●	
Identify Internal vs. External Areas and Provide Further Breakdown of Local																						●	
Identify Submittal Packages from the Submittal Log																						●	
Identify Work Specific to CSI Codes in the Specifications of the Project																						●	
Assigns work to a Specific Trade																						●	
Identify the Specific Company that is responsible for a task																						●	
Identify the Standard Phases of a Project from Land Acquisition to Building																						●	
Identify Dept. of Responsibility for the Activity																						●	
Identify Specific Areas of Construction within a Master Phase																						●	
Summary Of Each Different Schedule @ Different Point in Time																						●	
Contractor Breakdown of Key Scheduling Areas																						●	
Designate Major Areas of Construction																						●	
Summarizing Phases as designated by Owner																						●	

Exhibit 2 C

Activity Code Database

Resource

E Ernest
 L Lana

MPLP

*Master PlanPhase

3
 Phase 1-Nursing School
 Phase 2-TMH Garage

MPLN

*Master Plan Area

2
 *F Total Project
 Area
 01 Nursing School
 02 Sitework
 03 Parking Garage
 04 Public Utilities

MPID

Master ProjectID

2
 01 Master Phase 1:

MPPH

Master ProjPhase

2

SMNC

SubProjectID

3

SGMP

SubProject GMP

4

SPID

SubProjectID DP

2

SPCM

*SubProjComponent

3

00	Staging
E1	Environmental Asbestos Abate
F0	Mobilization
G01	Garage Structure
G02	Garage Exterior Finishes
G03	Garage Interior Finishes
G04	Garage Electrical Room
G05	Site Work
G08	Inspections
G09	Milestone Dates
G10	Hardscape
10	South Facade
1F	Crawl Space/Foundation
1G	Entrance Ramp & Stairs
1H	Low Roof Canopy
2F	1st Level/Floor
2G	Poured In Place Stairs
3F	2nd Level/Floor
4F	3rd Level/Floor
5F	4th Level/Floor
6F	5th Level/Floor
6G	Storm Water Service
7F	6th Level/Floor
7G	7TH Level/Floor
8F	Roof Level
8G	Sanitary Service
9F	North Facade
9G	Electrical Service
G11	Underground Electrical
G12	Landscaping
G14	Underground Utilities
G15	O&M Manuals
G16	As Built Drawings
G17	Contract Documents
G18	Punchlist
G19	Contract Documents
G20	Subcontractors
H00	Staging
H01	Demolition
H02	Structure
H03	Curtainwall
H04	MEP
H05	Interior Finishes
I01	Interior Structure
I02	Interior MEP Systems
I6	Interior Demolition
R1	Built Up Roof
R3	Roof Structural Framing
SR	Scope Revisions
T1	Tenant Build Out

Activity Code Database

SBPP

*SubProject Phase

2

BD	Branding
CC	Construction Closeout
CD	Construction Documents
CN	Construction
CP	Concept Design
CR	Community Relations
DD	Design Development
DE	Development Guidelines
DG	Directional Graphics
DM	Demolition
EN	Environmental
FE	Furniture & Equipment
FN	Financing
GL	Goal Completion
GM	Guaranteed Maximum
GT	Geotechnical
LA	Land Acquisition
LG	Legal Operations
LS	Leasing
MB	Mobilization
MS	Merchandising Season
OP	Operations
PA	PERSONNEL ASSIGNMENT
PC	Pre-Construction
PM	Property Management
PR	Procurement
PT	Permitting
SC	SCOPE REVISIONS
SD	Schematic Design
TR	Tenant Relocation
WD	WEATHER DELAYS
WR	Warranty

SUBT

Sub Trade R

7

AABATE	Asbestos Abatement
ACOUS C	Acoustical Ceiling
AIA	AIA
ARCH FI	Architectural Finishes
ARCH WO	Architectural Woodwork
ASPHALT	Asphalt Contractor
AUTO DO	Automatic Doors
AV EQUI	Audio Visual Equipment
BRL ROO	Barrell Roof
BU ROOF	Built Up Roof
CB	Cable Company
CERAMIC	Ceramic Tile
COMM	Communication
COMP CA	Computer Cabling
CONC SE	Concrete Sealer
CONCRET	Concrete
DAMPROO	Damproofing
DEMO	Demolition
DRILLIN	Drilling
DRYWALL	Drywall
EARTHWO	Earthwork
ELECTRI	Electrical
ELEVATO	Elevator
EMERG	Emergency Generator
ENVIRON	Environmental Testing
FIN HDW	Finish Hardware
FIRE AL	Fire Alarm
FIRE PR	Fire Protection
FIRE SP	Fire Sprinkler
FORMING	Formwork
FRAMING	Wood Framing
GC FIEL	GC Field Operations
GLAZING	Glass & Glazing
GREENSC	Greenscreen
HOLLOW	Hollow Metal
HVAC	HVAC
INSULAT	Insulation
LANDSCA	Landscaping
MASONRY	Masonry
MILLWOR	Millwork
MISC. M	Miscellaneous Metals
MTL ROO	Metal Roof
OH DOOR	Overhead Doors
ORNMTL	Ornamental Iron
OWN	Owner
PAINT	Painting
PAVER	Paver
PIERS	Drilled Piers
PILING	Soldier Piling

Activity Code Database

SUBT

Sub Trade R

7

PLASTER	Lath & Plaster
PLUMBIN	Plumbing
POSTAL	Postal Equipment
PRECAST	Precast Concrete
REENSC	xxxxx
REINF.	Steel Reinforcing
REINF.I	Steel Reinforcing Installation
RES FLO	Resilient Flooring
S METAL	Sheet Metal
SCHOOL	School Equipment
SEATING	Seating & Tables
SECURIT	Security
SIGNAGE	Signage
SKYLIGH	Skylights
SPRY FI	Spray Fireproofing
ST DECK	Steel Decking
ST.EREC	Steel Erector
ST.STEE	Structural Steel
STONE	Stone
STRIPIN	Striping
TERRAZZ	Terrazzo
TOILET	Toilet Partition
TXDOT	TxDot
UTILITY	Utilities
WATERPR	Waterproofing
WOOD DR	Wood Doors
WOOD FL	Wood Flooring

CSI

CSI Spec's R

5

01500	Temporary Facilities
01780	Closeout Documents
02070	Demolition
02122	Tree Protection
02200	Earthwork
02466	Drilled Piers
02721	Storm Sewer
02832	Ornamental Iron
02900	Landscaping
03100	Concrete Forms
03300	CIP Concrete
03350	Concrete Topping
03365	Architectural Finishes
03410	Precast Structural Concrete

CSI

CSI Spec's R

5

04810	Masonry
04816	Masonry
04820	CMU
05120	St. Steel
05310	Steel Deck
05500	Metal Canopy
05510	Steel Stairs
06402	Architectural Woodwork
07111	Waterproofing
07120	Damproofing
07130	Waterproofing
07242	EIFS
07411	Metal Roofing
07510	Built Up Roof
07620	Sheet Metal Flashing & Trim
07920	Joint Sealers
08110	Steel Doors & Frames
08111	Hollow Metal Frames
08211	Wood Doors
08331	Overhead Doors
08410	Aluminum Framing
08520	Aluminum Windows
08710	Finish Hardware
08800	Glazing
09200	Lath & Plaster
09253	Drywall
09260	Drywall & Metal Studs
09300	Ceramic Tile
09442	Terrazzo
09511	Acoustical Ceiling
09600	Resilient Flooring
09900	Paint
10100	Visual Display Boards
10160	Toilet Partition/Accessories
10200	Louvers
10552	Postal Equipment
11132	Audio Visual Equipment
12710	Seating & Tables
14201	Elevators
15125	Plumbing Drains
15160	Storm Piping System
15300	Fire Stand Pipe System
15330	Fire Sprinkler
15440	Plumbing
15855	HVAC
16120	Electrical Wiring
16400	Electrical Service Equipment
16500	Electrical Lighting
16510	Electrical
16620	Emergency Generator
16721	Fire Alarm
16740	Telecommunications

Activity Code Database

SUBP

Submittal Pkg. R

10

ACOUSTICAL	Acoustical Ceiling
ALUM WNDWS	Aluminum Windows
ALUM/GLAZ	Aluminum Framing & Glazing
ARCH FINSH	Architectual Finish Mock Up
ARCH WOOD	Architectural Woodwork
ASBESTOS	Asbestos Abatement
ASPH	Asphalt Mix Design
BRICK	Brick Mock Up Panel
BROOF MOCK	Barrell Roof Mock Up
BT GLAZING	Butt Glazing @ Clerestory
BUILDING	Building Construction
BUROOF	Built Up Roof
CAROUSEL	Carousel - 2 Deck
CERAMIC	Ceramic Tile
CIP CONC.	Concrete Mix Design
CMU	CMU
CMU SEALER	CMU Sealer
COMM	Communication Equip
CONC FORMS	Concrete Form Mock Up
CONC TOP	Concrete Topping
DRYWALL	Drywall & Metal Studs
EIFS MOCK	EIFS Mock Up Panel
ELECSERV	Electrical Service Equipment
ELEVATOR	Elevator
ELEVATORS	Elevators
EMERGEN	Emergency Generator
EW	Electrical Wiring Submittals
EXTERIOR	Exterior Construction
FC	FOLEY'S COURT
FIELDHOUSE	Field House Construction
FIN. HDW.	Finish Hardware
FIRE ALARM	Fire Alarm
FIRE PROT.	Fire Sprinkler Pipe Layout & Calculati
FIRE SPRNK	Fire Sprinkler
FMG CLG	FMG Ceiling
FORMING	Concrete Forming
FR LIMESTN	French Limestone
GENERATOR	Gas Generator
GFRGCOLUMN	GFRG Column Covers
GLASS	Glass Curtainwall
GREENSCREE	Greenscreen Panels
H. MTL.	Hollow Metal Frames
HVAC	HVAC
HVAC UNITS	HVAC Units
INSUL BD	Insulation Board

SUBP

Submittal Pkg. R

INTERIOR	Interior Construction
IP CONC. B	concrete
JT SEALERS	Joint Sealants
LANDSCAPE	Landscaping
LIGHTING	Electrical Lighting
LOUVERS	Louvers
LT	LORD & TAYLOR COURT
MISCMTL	Misc. Metal Iron
MROOF MOCK	Mtl Roof Mock Up
OH DOORS	Overhead Doors
ORNMTL G	Ornamental Iron Gates
P	Permits
PAINT MOCK	Paint Mock Up
PLUMBING	Plumbing
POSTAL	Postal Equipment
PRECAST	Precast
PROJ SCRNS	Projection Screens
PUNCH OUT	Project Close Out
PV	Pavers
RES FLOOR	Resilient Flooring
RT	Rotunda
SEATING	Seating & Tables
SECURITY	Security Systems
SIGNAGE	Signage & Graphics
SITWORK	Sitework Construction
SKYLIGHT	Skylights
SMTL MOCK	Sheet Metal Trim Mock Up
SP	Soil Proctor
ST STL BAR	Structural Steel Bar Joists
STEEL STR	Steel Stairs
STORM PIPE	Storm Piping System
STORMDRAIN	Storm Drains
STR MTL DK	Structural Metal Deck
STRIPING	Striping & HC Signage
STSTEEL	Structural Steel
SUMP PUMP	Sump Pump
SWITCHGEAR	Switchgear & Fixtures
SWITCHGR	Electrical Switchgear
T STL BARB	xxx
TERRAZZO	Terrazzo
TOILET P/A	Toilet Partitions & Ac cessories
VIS DIS BD	Visual Display Boards
WATRPRF	Waterproofing
WOOD DRS	Wood Doors

Activity Code Database

TMBR

Team Member

2

GF	Glenn Fuhrman
GH	Glen Hakemack
LC	Lana Coble
MT	Mark Thompson
PG	Pat Grant

AV

AREA VIEW

1

DSN

CONSULTANT VIEW

1

1	Architect
2	Owner
3	General Contractor
4	Tenant
D	Design Consultants

TVW

*Tenant View

3

Physical Therapy
Administration
Student One Stop
Mail Room
Security
Command Center
Catering
Public spaces
Auditorium & Class Rooms
Dock
Food Service
Fitness Center
Counseling
Building Maintenance
Computer Labs
Academic Learning Center
Nursing
Occupational Therapy
Faculty Offices
College of Health Sciences
College of Nursing
Research Center
Executive Suite