

# **Project Controls for Optimal Execution**

Scheduling Techniques to Optimize Execution Tony Bolstad, *Senior Project Controls Manager*; Scheduling & Information Services, Inc.

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## Agenda

n Scheduling Practices and Project Success
n Schedule Development
n Schedule Risk Analysis
n Project Execution
n Capturing Delays and Impacts~

#### n Dr. Andrew F. Griffith, PE

- n Hypothesis:
  - n There is a positive and significant relationship between scheduling practices used early in the project life-cycle and the ultimate success of the project.

#### n Independent Project Analysis, Inc. based study

- n 494 completed major industrial capital projects (72% from North America, 58% petro-chemical)
- n Projects authorized from 1993 to 2003 (Median Q3 2000)
- n Average cost of \$24MM, median \$4.3MM, range \$100k to \$934MM
- n 59 different owner organizations~

#### n Methodology:

- n IPA project data collected at project authorization and project completion
- n Measures of project success:
  - n Absolute cost performance relative to the industry benchmark for comparable projects (Cost Index)
  - n Absolute execution schedule performance relative to the industry benchmark for comparable projects (Schedule Index)
  - n Cost growth relative to the estimated cost at the time of project execution, and
  - n Schedule slip relative to the planned project finish date set at the time of authorization~

**n** At the time of authorization, successful projects had the following schedule characteristics: n Integration of all project phases into a single schedule n Definition / FEL, Detail Design, Procurement, **Construction and Startup** n Application of Critical Path Method (CPM) n Resource loading of the project schedule, and n Detailed review of the schedule by the core project team~

Scheduling Practices and Project Success									
<b>Outcome Metric</b>	Projects with Integrated Schedules	Projects without Integrated schedules							
Absolute Cost Index Project Cost / Industry Avg.	0.96	1.02							
Percent Schedule Slip	8%	26%							

<b>Outcome Metric</b>	Projects that applied CPM	<b>Projects that did</b> <b>not apply CPM</b>
Absolute Cost Index	0.97	<b>1.02</b>
Percent Cost Growth	0%	6%
Percent Schedule Slip	14%	26%

<b>Outcome Metric</b>	Resource Loaded Schedules	Non Resource Loaded schedules
Absolute Cost Index	0.95	<b>1.02</b>
Percent Schedule Slip	9%	19%

<b>Outcome Metric</b>	Projects that did Core Team reviews	Projects that did not do Core Team reviews
Percent Cost Growth	0%	11%

n Project Definition Rating:
n No schedule – 3% (15 projects)
n Milestone schedule – 55% (272 projects)
n CPM Network schedule – 29% (143 projects)
n CPM Network with resource loading – 13% (64 projects)~

Outcome Metric	Resource Loaded CPM	CPM	Milestone
Absolute Cost Index	0.95	0.98	1.03
Percent Cost Growth	-1%	2%	5%
Absolute Schedule Performance	0.91	0.97	1.04
Percent Schedule Slip	2%	19%	25%

N Summary of Dr. Griffith's findings:
 n Fully Integrated schedule
 n Use Critical Path Method (CPM)
 n Resource load the schedule
 n Early detailed review of the schedule by the core project team~

n Projects with the highest level of schedule definition at authorization had on average:
n 8% lower cost
n 13% faster schedules
n They were more predictable:
n 6% less cost growth
n 23% less schedule slip~

**n** Project Schedule Structure

n Contractual Language

n Clear DOR

n WBS

n Easily understood

n Supports the major phases of the project

n Supports the major components of the project

n Coding

n Responsibility

n Phase

n Area (physical or administrative area)

n Activity ID structure

n Calendars~

- n Master Project/Subproject structure
  - n Time and cost savings
    - n Dates are synchronized between schedules
    - n Information updated one time only
    - n Concurrent updating of schedules
  - n Ability to link between projects
    - n Schedules stay synchronized even when checked out
    - n Links between projects are maintained at the master schedule level
    - n Activity coding dictionaries, layouts, and filters are synchronized
  - n Ability to "check out and check in" a project to individual companies for their updating.
    - n Ability to do schedule comparisons both at the master project and sub project levels~

#### n Master Project/Subproject structure

- n Subprojects are useable during the month without effecting the master schedule.
  - n 3 week look ahead
  - n "what if" analysis
- n Subprojects can be transmitted as legal documents
- n Security
  - n Each entity has access to only their subproject.
  - n Subprojects do not have access to activities in the master other than viewing linked activities.
  - n Data dictionary structure is controlled at the master level~

- n Standards/ Definitions / Conventions
  - n Activities
    - n Criteria (scope, duration)
    - n Descriptions: Verb, Noun, Location
    - n Understandable when taken out of context
  - n Resources
    - n Major disciplines (electricians, welders, ironworkers...) n Major Equipment~

#### n Standards/ Definitions / Conventions

- n Numbering scheme and format for:
  - n Filters
  - n Layouts
  - n Reports
- n Conventions for Adding Activities
- n Master Project / Subproject Check In/Out Process
- n Updating Cycle / Process
- n Target Schedules
- n Reproducible from week to week
- n Provides appropriate information for each entity:
  - n Owner
  - n Engineer/Architect
  - n Contractor
  - n Subcontractor~

# n Software Configuration n Schedule calculations



Schedule/Level Calculation Options	×	Schedule/Level Calculation Options	×
General Advanced	ß	General Advanced	1
Automatic scheduling and leveling — C Sche <u>d</u> ule automatically C Le When scheduling activities apply —	evel automatically  ( <u>O</u> ff	When interproject relationships exist Recognize relationships and update interproject file Recognize relationships witho <u>u</u> t updating interproject file	
Eetained logic     C P Calculate start-to-start lag from	<sup>&gt;</sup> rogress o⊻erride	C Ignore inter <u>p</u> roject relationships Project Group scheduling	
C Actual start	Larly start		
● <u>C</u> ontiguous C In	nterruptible	C each project	
Critical Calculate total float as	loncritical	Allow scheduling and leveling of individual projects      Recognize external relationships	
C Most critical C S	}tart float (● Einish float		
	OK Cancel Help	OK Cancel Help	

#### n Software Configuration n Resource/Cost

Automatic Cost/Resource Calculation Rules for PG02:C42B
Ide <u>n</u> tifier: Dat <u>e</u> :
<ul> <li>□ Link remaining duration and schedule percent complete</li> <li>□ Ereeze resource units per time period</li> <li>○ Add actual to ETC</li> <li>○ Subtract actual from EAC</li> <li>□ Allow negative ETC</li> </ul>
When quantities change, use current unit prices to recompute costs:
Use the update percent complete against budget to estimate Actual guantity to date C Link actual to date and actual this period
✓ Link budget and EAC for non-progressed activities Calculate variance as:
Perform these calculations during each schedule computation
Apply these rules when moving from one Cell to another <u>R</u> esource
Transfer Default OK Cancel Help

#### n Schedule Integrity

n QA steps
n Close open ends
n Remove Mandatory and Start/Finish On constraints
n Justify every constraint used
n Verify contractual Milestones / Dates are entered
n Balance resource loading to the estimate
n Review Float

n Low Float
n High Float

n "Test" the schedule~

n Schedule Integrity Check n Schedule reports:

n P3

#### n PertMaster "Sanity Check" reports

Sanity Check Report

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Project Title	CSI
Project Name	D:\0SIS\CSI\BASE.pin

#### Sanity Report Summary

A breakdown of the problems encountered in the project.

Section	Number of Problems
Constraints	No problems found.
Open-ended Tasks (start and finish tasks)	1
Out of sequence updates (broken logic)	No problems found.
Links with lags longer than 0 units	18
Negative lags	4
Positive lags on Finish to Start links	14
Start To Finish links	No problems found.
Lags between tasks with different calendars	No problems found.
FF to a Milestone	No problems found.
SS from a Milestone	No problems found.
Start Milestones driving Summary completion date	No problems found.
Links To/From Summary Tasks	No problems found.

#### n Constraint documentation

Act ID	Activity Description	Constraint Start Type	Constraint Start	Constraint Finish Type	Constraint Finish	Constraint Record
Rawsoi	n Builders Supply Exterior Glass					
0432	Install Wood Doors and Hardware FL1_VEH	No-earlier-than	11/21/05			Resources not available
0431	Install Wood Doors and Hardware FL1A	No-earlier-than	11/21/05			Resources not available
0430	Install Wood Doors and Hardware FL1B	No-earlier-than	11/21/05			Resources not available
0429	Install Wood Doors and Hardware FL1C	No-earlier-than	11/21/05			Resources not available
0428	Install Wood Doors and Hardware FL1D	No-earlier-than	11/21/05			Resources not available
0427	Install Wood Doors and Hardware FL1E	No-earlier-than	11/21/05			Resources not available
0426	Install Wood Doors and Hardware FL1F	No-earlier-than	11/21/05			Resources not available
Thysse	n Krupp Elevator					
0535	Receive Elevators on site			No-earlier-than	11/07/05	5 Days aftr Vendor Ship

#### n Float Review

Act ID	Description	Orig Dur	Early Start	Early Finish	Total Float	2005 MAR APR MAY JUN JUL AUG SEP OCT NOV DEC								
0	·													
P1010	Project Planning	5	23MAR05	29MAR05	0	Project Planning								
P1030	Procure Subcontractors	20	30MAR05	26APR05	0	Procure Subcontractors								
P1070	Obtain Permits	10	20APR05	03MAY05	0	Obtain Permits								
5d														
P1114	Engineer Approve Reinforcing Steel	15	06APR05	26APR05	5d	Engineer Approve Reinforcing Steel Submitals								
9d														
P1113	Engineer Approve Concrete Submitals	15	06APR05	26APR05	9d	Engineer Approve Concrete Submitals								
24d														
P1111	Engineer Approve Structural Steel Submitals	15	27APR05	17MAY05	24d	Engineer Approve Structural Steel Submitals								
P1201	Fab and Deliver Structural Steel	30	18MAY05	28JUN05	24d	Fab and Deliver Structural Steel								
27 d														
P1115	Engineer Approve Tilt Up Panel Submitals	15	06APR05	26APR05	27d	Engineer Approve Tilt Up Panel Submitals								
34d														
P1110	Engineer Approve Joist &Truss Submitals	15	27APR05	17MAY05	34d	Engineer Approve Joist &Truss Submitals								
P1200	Fab and Deliver Steel Joists & Trusses	20	18MAY05	14JUN05	34d	Fab and Deliver Steel Joists & Trusses								
48d														
P1112	Engineer Approve Steel Roof Deck	15	27APR05	17MAY05	48d	Engineer Approve Steel Roof Deck Submitals								
P1202	Fab and Deliver Steel Roof Deck	20	18MAY05	14JUN05	48d	Fab and Deliver Steel Roof Deck								
49d														
P1090	Procure HVAC Ductwork and Equipment	40	27APR05	21JUN05	49d	Procure HVAC Ductwork and Equipment								
63d														
P1080	Procure Electrical Fixtures	20	27APR05	24MAY05	63d	Procure Electrical Fixtures								
67 d														
P1100	Engineer Approve Windows/Doors/Shutter	15	27APR05	17MAY05	67d	Engineer Approve Windows/Doors/Shutter Submitals								
P1150	Procure Windows/Doors/Shutters	20	18MAY05	14JUN05	67d	Procure Windows/Doors/Shutters								
P1190	Procure / Fab Casework	30	15JUN05	27JUL05	67d	Procure / Fab Casework								
72d														
P1101	Engineer Approve Stairs/Hndrail/Canopy	15	27APR05	17MAY05	72d	Engineer Approve Stairs/Hndrail/Canopy Submitals								
P1151	Procure Stairs/Handrail/Canopies	20	18MAY05	14JUN05	72d	Procure Stairs/Handrail/Canopies								
P1180	Procure Flooring	20	15JUN05	13JUL05	72d	Procure Flooring								

#### **n** Schedule Testing

Au:t 10	Description	Orig Dur	Rian Dim	Faily Start	Hachy Finish	Total Float	<b>5</b> 6	V AB	8 AP?	Ne/	JUN	JUL	ULE BLA	SEP	COT	NOV	E EC
+Seneral																	
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+5 .c																	
		95	- 68	07AE 705	25AUCC5	53e	С										
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(Euileing 3																	
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		125	17.8	24MAS1.5	TENOM 5	1	1			-							
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Αct ID	Dreadiption	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float	ŝ.	
(Ceneral								
		162	165	20VARX -	36 40/-05	2	1	
(Site								
		50	50	07APRIS	20AUG05	Eld		
(Building 1								
		19	· 19	30APRIS	2040/405	2		
(Building 3								
		1 20	120	1VA°X	07 40405	12d		
(Building 2								
		6	10	247A*00	2040405	)		
39595	Projekt Compiele	)	С		20 40/405	)	2	♦=n a Complete

#### n Schedule Integrity

n Review cycle

n Scheduler's Peer Review

n Project Manager / Superintendent

n Core Team (Stakeholders)

n First Iteration

n Hard Logic – Focus on what's physically possible

n No resource leveling or soft logic

n Second Iteration

n Soft or Preferential Logic added

n Resources leveled~

#### n Logic Review



## **Risk Analysis**

#### **n** Some of Pertmaster's Features

- n Risk Analysis
  - n Monte Carlo Simulation
- n Cost Analysis and Cost Risks
- n Individual Task Analysis and Entire Project Analysis
- n Tornado Graphs
- n Probabilistic Branching / Task Exists?
- n Resource Risk
- n Schedule Comparisons
- n Network Diagrams / PERT
- n Pertmaster: <u>www.pertmaster.com</u> ~

## **Risk Analysis**

n Single Path (CPM) vs. Monte Carlo technique

- n 3 Durations (min, most likely ,max) using a Triangular Distribution
- n Each iteration has it's own critical path (1000 iterations)

n CPM - **Does not take uncertainty into account** n Traditional CPM shows only 1 critical path

n Distribution graph presents likelihood of finish dates~

## **Risk Analysis**

#### How Does Monte-Carlo Simulation Work?

iteration •One ball is selected for each iteration. 5 Constrained by envelope 2 Multiple iterations 10 davs 5 65 7 10 78 9 11 12 13 14 15 16 17 10 11.... Likely Min Max PertMaster Project Analytic

#### Distribution Triangle for Individual Activities









#### Distribution Triangle for Individual Activities



## **Baseline Schedule in Pertmaster**

		Rem	Min	Likely	Max	Duration		Aug '04 Sep '04 Oct '04 Nov '04 Dec '04 J									
Name	Description	Duration	Dur	Dur	Dur	Function	19	9 26 2 9 16 23 30 6 13 20 27 4 11 18 25 1 8 15 22 29 6 13 20 27 3									
1000	Notice to Proceed	0					٠	Notice to Proceed									
1030	Procure Misc Eq and Materials	35	32	35	39	Triangle(32,35,39)		Procure Misc Eq and Materials									
1020	Documents IFC	5	5	5	6	Triangle(5,5,6)		Documents IFC									
1060	Procure Subcontractors	21	19	21	23	Triangle(19,21,23)		Procure Subcontractors									
1110	Procure HVAC Ductwork and Equipment	26	23	26	- 29	Triangle(23,26,29)		Procure HVAC Ductwork and Equipment									
1680	Procure Light Fixtures	14	13	14	15	Triangle(13,14,15)		Procure Light Fixtures									
1730	Procure Ceramic Tile	5	5	5	6	Triangle(5,5,6)		Procure Ceramic Tile									
1750	Procure / Fab Casework and Shelving	20	18	20	22	Triangle(18,20,22)		Procure / Fab Casework and Shelving									
1770	Procure Signage	10	9	10	11	Triangle(9,10,11)		Procure Signage									
1780	Procure Appliances	14	13	14	15	Triangle(13,14,15)		Procure Appliances									
1790	Procure Playground Eq. and Shed	20	18	20	22	Triangle(18,20,22)		Procure Playground Eq. and Shed									
1040	Mob to Site	3	3	3	3	Triangle(3,3,3)		Mob to Site									
1050	Demo Existing Interior	5	5	5	6	Triangle(5,5,6)		Demo Existing Interior									
1200	Erect / Frame Walls L2	14	13	14	15	Triangle(13,14,15)		Erect / Frame Walls L2									
1400	Install Metal Framing L2	5	5	5	6	Triangle(5,5,6)		Install Metal Framing L2									
1640	Install Roof Penetration RF	1	1	1	1	Triangle(1,1,1)		Install Roof Penetration RF									
1650	Patch Roof and Install Pads RF	3	3	3	3	Triangle(3,3,3)		Patch Roof and Install Pads RF									
1530	Install Door Jams	3	3	3	3	Triangle(3,3,3)		Install Door Jams									
1590	Install Soffit Framing L2	7	6	7	8	Triangle(6,7,8)		Install Soffit Framing L2									
1220	Install HVAC Ductwork & DampersL2	10	9	10	11	Triangle(9,10,11)		Install HVAC Ductwork & DampersL2									
1240	Install Electrical Rough-in Walls L2	11	10	11	12	Triangle(10,11,12)		Install Electrical Rough-in Walls L2									
1260	Install Phone & Data Cabling L2	5	5	5	6	Triangle(5,5,6)		Install Phone & Data Cabling L2									
1560	Install Electrical Rough-in Soffits L2	4	4	4	4	Triangle(4,4,4)		Install Electrical Rough-in Soffits L2									
1570	Install Electrical Rough-in Ceiling L2	4	4	4	4	Triangle(4,4,4)		Install Electrical Rough-in Ceiling L2									
1300	Install Sprinkler System L2	5	5	5	6	Triangle(5,5,6)		Install Sprinkler System L2									
1520	Install HVAC Exhaust Fans & Relief Hoods	4	4	4	4	Triangle(4,4,4)		Install HVAC Exhaust Fans & Relief Hoods RF									
1270	Install Security System RI Walls L2	6	5	6	7	Triangle(5,6,7)		Install Security System RI Walls L2									
1280	Install Plumbing Rough-in Walls L2	5	5	5	6	Triangle(5,5,6)		Install Plumbing Rough-in Walls L2									
1550	Install Phone & Data Trim	2	2	2	2	Triangle(2,2,2)		Install Phone & Data Trim									
1500	Install Concrete PG	4	4	4	4	Triangle(4,4,4)		Install Concrete PG									
1540	Install Security System Trim L2	2	2	2	2	Triangle(2,2,2)		Install Security System Trim L2									
1330	Install Relites and Glass Panels L2	5	5	5	6	Triangle(5,5,6)		Install Relites and Glass Panels L2									
1600	Install Plumbing Overhead L2	5	5	5	6	Triangle(5,5,6)		Install Plumbing Overhead L2									
1440	Install Acoustic Ceiling Grid L2	5	5	5	6	Triangle(5,5,6)		Install Acoustic Ceiling Grid L2									
1510	Install EPDM Rubber Playground Surface F	5	5	5	6	Triangle(5,5,6)		Install EPDM Rubber Playground Surface PG									
1580	Install Electrical Trim L2	4	4	4	4	Triangle(4,4,4)		Install Electrical Trim L2									
1610	Install Plumbing Trim L2	1	1	1	1	Triangle(1,1,1)		Install Plumbing Trim L2									
1120	Wall Cover Inspection	1	1	1	1	Triangle(1,1,1)		Wall Cover Inspection									
1250	Install Light Fixtures L2	5	5	5	6	Triangle(5,5,6)		Install Light Fixtures L2									
1310	Install Fire Alarm Smoke Detectors L2	4	4	4	4	Triangle(4,4,4)		Install Fire Alarm Smoke Detectors L2									
1320	Install Insulation L2	5	5	5	6	Triangle(5,5,6)		Install Insulation L2									
1480	Install Playground Equipment PG	5	5	5	6	Triangle(5,5,6)		Install Playground Equipment PG									

## **Baseline Schedule in Pertmaster**

		Rem	Min	Likely	Max	Duration		Au	ig '04		Se
Name	Description	Duration	Dur	Dur	Dur	Function	19	26 2	9 10	6 23 30	6
1000	Notice to Proceed	0					٠	Notic	e to Pr	oceed	
1030	Procure Misc Eq and Materials	35	32	35	39	Triangle(32,35,39)					
1020	Documents IFC	5	5	5	6	Triangle(5,5,6)			Docum	ients IFC	
1060	Procure Subcontractors	21	19	21	23	Triangle(19,21,23)				📖 Pro	ocure
1110	Procure HVAC Ductwork and Equipment	26	23	26	29	Triangle(23,26,29)					Pro
1680	Procure Light Fixtures	14	13	14	15	Triangle(13,14,15)				Procure L	.ight
1730	Procure Ceramic Tile	5	5	5	6	Triangle(5,5,6)			Procur	e Cerami	o Tile
1750	Procure / Fab Casework and Shelving	20	18	20	22	Triangle(18,20,22)				💴 Pro	cure
1770	Procure Signage	10	9	10	11	Triangle(9,10,11)			🔲 Pro	ocure Sig	nage
1780	Procure Appliances	14	13	14	15	Triangle(13,14,15)				Procure A	Applia
1790	Procure Playground Eq. and Shed	20	18	20	22	Triangle(18,20,22)				💴 Pro	cure
1040	Mob to Site	3	3	3	3	Triangle(3,3,3)			Mobit	to Site	
1050	Demo Existing Interior	5	5	5	6	Triangle(5,5,6)			🗖 De	mo Existi	ng In
1200	Erect / Frame Walls L2	14	13	14	15	Triangle(13,14,15)				E	rect
1400	Install Metal Framing L2	5	5	5	6	Triangle(5,5,6)					nstall
1640	Install Roof Penetration RF	1	1	1	1	Triangle(1,1,1)			l Ir	nstall Roo	of Per
4050	Details Deletional le stall Devia DD	2			2	Triber electron of the				Der	t - le . E

Min and Max are 10% of Most Likely or Original Duration

## **Finish Date Analysis**


#### **Risk Project**

Entire Plan : Finish Date





### **Tornado Graphs – Criticality Index**

n During the risk analysis iterations, the number of times an activity was critical is recorded ~



#### **Schedule Sensitivity Index**

**Risk Project** 

1000

#### **n** The SSI identifies and ranks the tasks most likely to influence the project duration / finish ~



## **Duration Sensitivity**

- n Correlation between the duration of a task and the duration of the project.
- n The task with the highest duration sensitivity is the task that is most likely to increase the project duration ~.



#### **Cost Risk**

#### n Can be view by activity or entire project ~



#### **Project Execution**

Note: The second sec

### **Project Execution**

n Field use
n Communication Tools
n Short Interval Schedules
n Discipline Reports
n Critical Path
n Planning Tools
n Resource Histograms~

### **4 Week Schedule**

Layout	: 🛛 ALL - All Activities No Sor 🔽 🛛 🔛	Filter: 4W	/K - Four wee	k lookah 💽	💽 🍸   Lower views: 👬 🔁 🖽
- +	1570				
Act	Activity	Original	Percent	Early	2004
ID	Description	Duration	Complete	Start	D2 D9 16 23 30 D6 13 20 27 D4 11
1030	Procure Misc Eq and Materials	35	60	26JUL04	▲ Procure Misc Eq and Materials
1060	Procure Subcontractors	21	85	26JUL04	Procure Subcontractors
1110	Procure HVAC Ductwork and Equipment	26	40	26JUL04	► Procure HVAC Ductwork and Equipment
1750	Procure / Fab Casework and Shelving	20	75	26JUL04	Procure / Fab Casework and Shelving
1790	Procure Playground Eq. and Shed	20	75	26JUL04	✓ Procure Playground Eq. and Shed
1070	Construction Hammock	76 *	4	11AUG04	
1200	Erect / Frame Walls L2	14	45	11AUG04	4 ▲ Erect / Frame Walls L2
1650	Patch Roof and Install Pads RF	3	0	19AUG04	₄ A Patch Roof and Install Pads RF
1400	Install Metal Framing L2	5	0	24AUG04	4 Install Metal Framing L2
1220	Install HVAC Ductwork & DampersL2	10	0	31 AUG04	4 Install HVAC Ductwork & DampersL2
1530	Install Door Jams L2	3	0	31 AUG04	4VInstall Door Jams L2
1590	Install Soffit Framing L2	7	0	31 AUG04	₄
1240	Install Electrical Rough-in Walls L2	11	0	13SEP04	▲ Install Electrical Rough-in
1260	Install Phone & Data Cabling L2	5	0	13SEP04	△VInstall Phone & Data Cabling L2
1560	Install Electrical Rough-in Soffits L2	4	0	13SEP04	<u>∆</u> Install Electrical Rough-in_Soffits L2
1570	Install Electrical Rough-in Ceiling L2	4	0	13SEP04	<u>∠</u> Install Electrical Rough-in Ceiling L2

#### n Data Date + 28 Days

- n Activities in progress
- n Activities that will start within 28 days ~

### **4 Week Schedule x Subcontractor**

l	ayout:	SUB - Org. by Subcontra 💌 👪 📔 🛛	Filter: 4WK	< - Four wee	ek lookah 💽	• 🔻	Low	er viev	vs: 👬	<b>i</b> 🗉								
-	• <b>  +  </b> •	1030																
Τ	Act	Description	Original	Early	Early											2004	_	
	ID	Description	Duration	Start	Finish	02	119	16	23	30	D6	13	20	27	04	11	18	25
	Cont	ractor					1			1 1 1 1			1		1	1	1	1
[	1030	Procure Misc Eq and Materials	35	26JUL04	13SEP04		1					- Proc	cure Mis	c Eq ar	nd Mater	ials	1	
	1060	Procure Subcontractors	21	26JUL04	20AUG04				Procure	Subcon	tractor	rs					-	
ľ	1110	Procure HVAC Ductwork and	26	26JUL04	30AUG04	_	_			A Procu	ire HV.	AC Duo	stwork a	and Equ	ipment		1	
	1750	Procure / Fab Casework and Shelving	20	26JUL04	20AUG04				Procure	/Fab Ca	asewo	ork and	Shelving	g				
[	1790	Procure Playground Eq. and Shed	20	26JUL04	20AUG04		1	V	7Procure	Playgro	und Ec	q. and S	Shed				1	
	1070	Construction Hammock	76 *	11.AUG04	29NOV04		Δ											
	Roof	ing - Costner Roofing								I I I I			1		1	1	1	
[	1650	Patch Roof and Install Pads RF	3	19AUG04	23AUG04				🗖 Patch	n Roof a	nd Inst	tall Pad	sRF				-	
	Metal	- Nicholas & Sons Metals		•			1		1			1	1	1	1	1	1	1
[	1400	Install Metal Framing L2	5	24AUG04	30AUG04					🔼 Install	l Metal	Framin	g L2		1		1	
	Roug	h Carpentry Framing - Car	oenter (	Capenti	ŷ								1				1	1
[	1200	Erect / Frame Walls L2	14	11.AUG04	30AUG04		4			A Erect	/Fram	ne Walls	s L2				1	
	1530	Install Door Jams L2	3	31 AUG04	02SEP04					<b>∆−</b> V In:	stall Do	oor Jam	is L2			1	1	
	HVA	C - Sprint HVAC Services																
[	1220	Install HVAC Ductwork & DampersL2	10	31.AUG04	14SEP04							📥 Ins	stall HVA	\Ċ Duct	work &	Damper	sL2	
	Teleo	communications - Renzl Tel	ecomm	unicati	ons													
[	1260	Install Phone & Data Cabling L2	5	13SEP04	17SEP04								'Install P	hone &	Data Ca	abling L2	2	1
	Elect	ric - Sparky Electric Compa	iny															-
[	1240	Install Electrical Rough-in Walls L2	11	13SEP04	27SEP04							<b></b>		📥 Inst	all Electr	rical Rou	igh-in ۱	Walls L
	1560	Install Electrical Rough-in Soffits L2	4	13SEP04	16SEP04							ا <del>ک ک</del>	nstall Ele	ectrical	Rough-i	in Soffit	s L2	
	1570	Install Electrical Rough-in Ceiling L2	4	13SEP04	16SEP04								nstall Ele	ectrical	Rough-i	in Ceiling	g L2	
	Finis	h Carpentry / Millwork - Albe	erts Cai	pentry														
[	1590	Install Soffit Framing L2	7	31 AUG04	09SEP04					Δ	V Ir	nstall S	offit Fra	ming L2	2		1	1
													1		1	1		
							1		1	1 1		1	1	1	1	1	1	1

### **Critical Path Activities**

Act		Early	Early	Total											200	04													2005
ID	Description	Start	Finish	Float	_ J I 19	UL  26	02	ДU0 09  1	3 6   23	30	06	SE 13	P 20	27	04	11	СТ  18	25	01 (	1 80	NOV 15 2	2	29 0	DE 3   13	C 20	27	03	JAN 10 17	7 24
1110	Procure HVAC Ductwork and	26JUL04	30AUG04	0			-			Y	Procu	urel	нуас	Du	ctwo	rk a	and Eq	uipm	ent										
1070	Construction Hammock	09AUG04	29NOV04	0				4						:		:					: :	-	🗸 Con	struc	tion H	lamm	ock		
1220	Install HVAC Ductwork & DampersL2	31 AUG04	14SEP04	0						<u> /</u>		÷v	Install	ΉV	AC D	ouct	work	& Da	mper	rsL	2						1		
1240	Install Electrical Rough-in Walls L2	13SEP04	27SEP04	0								Æ		🔽 le	nștali l	Ele	ctrical	Rou	gh-in	i Wé	alls L2	2				1	1		
1440	Install Acoustic Ceiling Grid L2	28SEP04	04OCT04	0										<u>.</u>	🕂 İn:	sta	II Acou	istic	Ceilir	ng (	Grid L	2				1	1		
1320	Install Insulation L2	05OCT04	110CT04	0						1	1	1	1		<u>/</u>	V la	nstall l	nsuk	ation	L2					1	1	1	I I I I	
1430	Install GWB Gypsum, Drywall, and	12OCT04	22OCT04	0											1	æ	V	Insta	il GV	٧Ð (	Gypsi	ım,	Dryw	all, ar	nd Taj	ping L	2		
1390	Install Chair Rails, Wall Caps, Wood	25OCT04	29OCT04	0											1		4	. V	Instal	II CI	hair R	ails	Wall	Caps	, Woo	d Ra	ils Lí	2	
1470	Install Shelving L2	01NOV04	02NOV04	0														4	V Ins	stall	Shelv	/ing	L2				1		
1360	Install Doors and Hardware L2	03NOV04	09NOV04	0											1				<b>A</b>	V Ir	nstall [	Doo	rs and	Hard	lwar	e L2	1		
1350	Install Casework L2	10NOV04	19NOV04	0		1							1		1					æ	<b>T</b> V)r	nsta	all Cas	ewor	k L2		1   		
1370	Install Tile Flooring L2	22NOV04	29NOV04	0																	i 🧸		V Inst	all Ťile	Floo	ring L	2		
1420	Install Mirrors L2	22NOV04	23NOV04	0	1																- 4	V In	stall N	lirrors	: L2		1		
1380	Install Carpet and Rubber Base L2	24NOV04	29NOV04	0																	1	_	V Inst	all Ca	rpet a	and R	ubbe	er Bas	e L2
1450	Install Signage L2	30NOV04	01DEC04	0	I									1									🖅 Ins	tali S	ignag	e L2	1		
1460	Install Appliances L2	30NOV04	01DEC04	0		1		1		1						1							🖅 Ins	tall A	ppliar	nces	L2		
1080	Punchlist	02DEC04	21DEC04	0																			_		T F	Punch	list		
1090	Commissioning	17DEC04	28DEC04	0												i.					1			- 14	<u> </u>	<b>‡</b> 70	omm	issioni	ing
1100	Project Complete		28DEC04	0										1		1										♦Pi	rojec	t Com	plete
•	I	1	1	•			Ĺ							J		. I	I				11		I.				I	I	
							•	4-4																					
					ISPI	ay: (	vua	ntity																		-			
				10	- <sup>1 10</sup>		1											1								_			
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				4		╂┏	ц.						┢╋╋	÷	╞╒╤╴╡										ᡶ᠘	i i	<u> </u>		
				2	-				╺╆╋	╉	-++-	Π															1		
										-															_				
		26 UL	02	09  1 AU	6  23 3	3	06	13 S E	20 EP	27	04	[11 C	18 XCT	25	01	08	NOV	22	29 0	6  13 DE	20 EC	27	03	10 18 JAN	24				
											200	04													2005				

## **Manpower Loading**

#### Bar Chart View / Histogram



#### **Project Execution**

n Management use n Communication Tools n Critical Path n Milestone Summary n Phase Summary n Variance reports n Planning Tools n 3 Month Lookahead n Combined Histograms n Risk Reports~

#### n Milestone Summary

Activity	Activity	Early	Early	Total	200	DEC		EEB	MAR	APR	MAX	2	800	AllO	SEP	OCT	HOV
ID	Description	Start	Finish	Float	61	62	63	64	66	68	67	68	69	60	81	82	63
М								1	1			1					i
0222																	
M020																	i
H_PS 6016	Mile A07: 5kv Subs access MEP SubworkContractual	01NO\/05*		140	н рзб	160			-								
I_PS 65110	PS: All Slabs Complete & towers out		01DEC05	58	- 1	N PS 65	110	1	-								i
H_PS 6018	Mile A09:Surge Tank access for MEP Sub Contract	01FE806*		56		Ŧ		oh_ps≀	20180								
H_PS 6012	Mile A03:Lev2 access for MEP Subwork Contractual	06FEB06*		22				+Р	60120								
H_PS 6013	Mile A04:Lev1 access for MEP Subwork Contractual	13FE806*		15				<sup>+</sup> ♦+_	s 60130								
H_PS 6014	Mile A05:GLVL access for MEP Subwork Contractual	01MAR06*		21				1	<mark>∲</mark> н_РS6	0140							
H_PS 6017	Mile A08:Penin Sh access for MEP SubworkContract	10MAR06*		39				1	і́ фн_рз	60170		!					i
H_PS 6019	Mile A1D:ConflSh access for MEP Subwork Contract	11MAR06*		-69					¦ ∳н_рз	60190							i
H_PS 6020	Mile A11: Perm Power Available by BES Contract	05APR06*		-35				1		<b>∳</b> H_PS	60200						
M025	•									ľ							
H_PS 6046	Mile P07:Exhaust Fans on Site		18NO\05	-110		PS 6046	þ										
H_PS 6043	Mile P04:LL3,LL4 WET Main Pumps & Motors on site		28NO\05	-181		H_PS 60	431	:	:			:					
H_PS 6049	Mile P10: 5kV Substation Equipment on Site		01DEC05	-62	1	H_PS6	0490	1	1								i
H_PS 6043	Mile P04:LL4 DRY Main Pumps and Motors on site		13DEC05	-196		₽	S 60430	1	-			!					i
H_PS 6045	Mile PD6: Pumps Motors for Lev3 on Site		13DEC05	-135		♦Н_Р	S 60450										
H_PS 6047	Mile P08:Make Up Units and Exhaust Fans on Site		15DEC05	16		_ ∳H_F	S 60470										
H_PS 6048	Mile PD9: OMB Equipment on Site		30 D E C 05	-91			H_PS6	480									
H_PS 6050	Mile P11:Confluent Shaft Gates on Site		13FEBD6	-105				€ <b>♦</b> ₩_1	s 60500								
M030	•							1.									i
H_PS 6061	Mile MD2:LL3 MEP install. complete (1st Phase)		11JAN06	73			<b>◆</b> H_P	\$ 60610	-								
H_PS 6060	Mile M01:LL4 MEP install. complete (1st phase)		15FEBD6	-1			ļ • .	_	PS 6060	þ		!					i
H_PS 6062	Mile M03:LL2 MEP install. complete (1st phase)		24APR06	21				]	-	🔶	₩_PS608	20					i
H_PS 6063	Mile MD4:LL1 MEP install. complete (1st Phase)		24APR06	21						<u> </u>	H_PS 606	30					
H_PS 6064	Mile M05:GLVL MEP installations complete		24APR06	21						🍝	H_PS 608	40					
H_PS 6065	Mile M06:OMB+5kv Subs. MEP Installation complete		25APR06	36						•	H_PS 60	850					
H_PS 6066	Mile M07:Confluent Sh. MEP Installation complete		05MAY06	-5							<b>♦</b> H_PS	¢0660					
H_PS 6067	Mile MD8:Subst. Completion of all MEP Subc. Wk		30JUN06	15									∲н_рѕ6	9670			
H_PS 6068	Mile MD9:Final Compl.+Accept. of all MEP SubC Wk		30JUN06	31				1					фн_рзө	9680			
0229																	
M216								1	1			1					j
I_PS 95010	LL3:BES Sump Pump Control Panels onsite by Owner		15N0\05*	30	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	6 950 10											
0236					Ť												
0220																	
I_PS 63630	LL2: Area ready for MEP Subcontractor work		D6DEC05	55		<mark>⇔</mark> _PS ę	3630	1				1					i

#### n 3 Month Look Ahead

	Activity	Activity	Oria	Rem	9%	Earbr	Earbr	Total		2005	•		2006
	ID	Description	Dur	Dur	Comp	Start	Finish	Float		NOV	<u> </u>	2 9	JAN
М									0 117 124 15	1 K 114 E1 E0	b nz na zo	Ľ 0	116 123 1
	0222										1		
	H PS 60160	Mile A07: 5kv Subs access MEP SubworkContractual	0	0	D	01N0\05*		140	- 1	Mile A07: 5ky Subs acces	s MER SubworkContractual		
	H PS 60470	Mile P08: Make Lin Linits and Exhaust Fans on Site		0	0		15DEC05	16		Make Up Upits and Exhaust			
	H PS 60610	Mile M02:113 MEP install complete (1st Phase)	10	0	0		11 JAN06	73	- Mille POSt	Mile M02:	12 MER install complete (1	+ Phone M	
		inite inder the initial complete (ist mase)					11094600	10		Mile Moz.	-	st Fliase <sub>N</sub>	·
	UZZ7 H PS 84080	Al Areas: Submit Rectrical Submittals	155	41	00	27 111044	BODEC05	17					
	H_F3 04000	Al Aeas, Subhit Bechical Subhittais	07	11	- 00	273010474	DIFEROR	17				All Areas:	Submit Electrica
		Al Aleast, Review Approve Becilical Submittais	100	02	75	0000044	0710.05	11	_				
	H_PS 64230	LL4 Purchase/Rec Valves, Piping & Ductwork matis	120	0	75	22FEBUSA	07N0705	15	_	VLL4 Purchase/Rec \	Alves, Piping & Ductwork ma	tis	
	H_PS 64020	LL4 Install Bectrical Support System	24	20	75	ZUJUNUSA	3010 005	17	_		VLL4 Install Electrical Suppo	rt System	
	H_PS 84640	LL4 Install Bectrical Equipment	60	41	50	11JUШ5A	SUDECUS	62			:R	LL4 Install	Electrical Equip
	H_PS 84420	LL4 Install HVAC Duct	37	17	80	UTAUGUSA	23NU/05	15	_	VLL4 I	istall HVAC Duct		
	H_PS 84660	LL4 Install Branch Conduit	28	41	30	15AU G05A	30DEC05	23			: H \	LL4 Install	Branch Conduit
	H_PS 84350	LL4 Install Pump Pedestals	15	9	50	100CT05A	11N0\/05	15		LL4 Install Pump	Pedestals		
	H_PS 84510	LL4 Install S-Piping	60	54	15	240 CT05A	20JAN06	17		¥	X	-X	LL4 Inst
	H_PS 84360	LL4 Pump Pedestal Cure Time	5	2	40	270CT05A	02NO\05	15		VLL4 Pump Pedestal Cure	Time		
	H_PS 84430	LL4 Install Main Pumps: WET WEATHER	14	14	0	29NO\05	16DEC05	-1			LL4 Install M	ain Pumps	: WET WEATHER
	H_PS 84400	LL4 Install Sinks	5	5	0	30NO\05	D6DEC05	47	1	<u> </u>	LL4 Install Sinks		
	H_PS 84630	LL4 Install Fixtures	28	28	D	01DEC05	11JAN06	68	1 1	LL4 Install Fixtures	<u>4</u>		7
	H_PS 84670	LL4 Install Conduit Raceway	30	30	D	06DEC05	19JAN06	11	1 1	LL4 Install Conduit Race	way 🛆 🛛 🗧 🗧		
	H_PS 84435	LL4 Install Main Pumps: DRY WEATHER	14	14	D	14DEC05	04JAN06	8	1 1	L4 Install Main Pumps: DR*		HT I	
	H_PS 84540	LL4 Install Seal Water Piping	25	25	0	19DEC05	25JAN06	14		LL4 Install Se	al Water Piping 🔨 🖁 🖁	H	<b>− H − ∇</b>
	H_PS 84550	LL4 Install Above Floor Drain Piping	32	32	D	19DEC05	D3FEBD6	7		LL4 Install Above Fi			
	H PS 84370	LL4 Install Platforms & Misc. Steel	40	40	0	19DEC05	15FE806	-1		LL4 Install Platform	ns & Misc. Steel		
	H PS 84440	LL4 Install Sump Pumps	30	30	0	04JAN06	15FEB06	-1			LL4 Install Sump Pum	- A	
	H PS 84560	114 Install Volute Vent Lines	20	20	0	05.1AN06	025 5806	8			Lid loctali Voluto Vort Lir		
	H PS 84680	114 Install Wine ( Branch	7	7	0	20 JAN06	30 JAN06	11			LL4 Instan Voide Vent En	es <u>/ _</u>	
	0000		<b>_</b> '			20074400	000/4400	1					
	UZZ9 H IPS 83130	Purchase (Rec. 11-3 Valves, Pining & Ductured: Mtls	180	20	80	04MAR05A	80N0\05	51			70		
	U DC 02510	112 Install Postford Support System		20	60	12000000	2010.05	48	-		V Purchase/Rec LL-3 valves,	Piping & D	UCTWORK MILS.
	H_F3 03310	Les install Bectrical Support System		20	15	12327034	0005005	40			LL3 Install Electrical Suppo	nt System	
	H_PS 83320	Install LL-3 HVAC Duct	00	39	15	14SEPUSA	28DEC05	09	_			istali LL-3 i _	HVAC Duct
	H_PS 83520	LL3 Install Cable Tray	38	28	40	ISSEPUSA	12DEC05	00	_		LL3 Install Cable	Tray	
	H_PS 83430	Install LL-3 Pumped & Above Slab Urain Piping	30	14	50	030C106A	18NU/05	84		Vinstall LL-	3 Pumped & Above Slab Drai	n Piping	
	H_PS 83410	Install LL-3 Air Piping	40	17	40	030CT05A	23N0\/05	81		VInstal	LL-3 Air Piping		
	H_PS 83240	Install LL-3 Crane Rails	20	17	50	170CT05A	23N0\/05	32		VInstal	LL-3 Crane Rails		
	H_PS 83500	LL3 Install Device Box	19	19	D	02NO\05	30NO\05	56			LL3 Install Device Box		
	H_PS 83420	Install LL-3 S-Piping	45	45	D	04NO\05	11JAN06	50	Install LL-3 S-Pipin	94	,	×	7
	H_PS 83310	Install LL-3 Fans	15	15	D	21N0\05	13DEC05	37	1		Vinstall LL-3 Fan	5	
	H_PS 83440	Install LL-3 Seal Water Piping	16	16	D	21NO\05	14DEC05	68			✓Install LL-3 Se	al Water Pi	ping
	H_PS 83550	LL3 Install Branch Conduit	20	20	D	21NO\05	20DEC05	56	1		LL3 Insta	I Branch (	Conduit
	H_PS 83300	Install LL-3 Cranes	10	17	D	28NO\05	20 D E C 05	32	1	Λ.	: Vinstall LL	3 Cranes	
	H_PS 83330	Install LL-3 Sinks	15	15	D	01DEC05	21DEC05	63	1		Vinstall L	L-3 Sinks	
	H_PS 83540	LL3 Install Bectrical Equipment	45	45	D	01DEC05	06 F E B 06	46	– II3 <mark>-</mark>	- stall Electrical Equipment			
	H_PS 83340	Install LL-3 Pump Motors	10	10	D	14DEC05	28DEC05	72				stall LL-3 I	Pump Motors

#### n Period Analysis

- n Last Period vs. Current Period
- n Baseline plan vs. Current Period

#### n "Bang for the Buck"

- n Float and Resource Analysis to determine which activity progress/completion will yield the best results
- n Identify tighter sequential activity coordination
- n "Finish on Friday"
  - n Identify which tasks need to finish this week to keep things on track
  - n Helps prevent the 95% and holding syndrome~

#### Establish the Baseline Schedule for Variance Comparison

Act	Di-4i	Orig	Rem	Actual	Early	Early	Total							2004					
ID	Description	Dur	Dur	Duration	Start	Finish	Float	%	JUL 12 15 26	G 02	09	AUG	23	30	06	SEP 13	20	27	04
1000	Notice to Proceed	] 0	0	0	23JUL04 A			100	Notic	ce to Procee	:d								
1020	Documents IFC	5	5	0	26JUL04	30JUL04	2d	0		Docum	ients IFC						1		
1030	Procure Misc Eq and Materials	35	35	0	26JUL04	13SEP04	7d	0			-	-	-	-	-	Procu	re Misc E	and Mate	erials
1060	Procure Subcontractors	21	21	0	26JUL04	23AUG04	2d	0				_	📫 Proc	ure Subo	contractor	rs			
1110	Procure HVAC Ductwork and Equipment	26	26	0	26JUL04	30AUG04	0	0						💻 Proc	cure HVA	C Ductworl	k and Equ	ipment	
1680	Procure Light Fixtures	14	14	0	26JUL04	12AUG04	68d	0			-	Procure L	ight Fixtu.	res	i i	1	1	1	
1730	Procure Ceramic Tile	5	5	0	26JUL04	30JUL04	79d	0		Procur	e Ceramic	Tile							
1750	Procure / Fab Casework and Shelving	20	20	0	26JUL04	20AUG04	56d	0					Procure	/Fab Ca	isework a	nd Shelving	3		
1770	Procure Signage	10	10	0	26JUL04	06AUG04	78d	0			Procure	Signage							
1780	Procure Appliances	14	14	0	26JUL04	12AUG04	74d	0				Procure A	Appliance:	s					
1790	Procure Playground Eq. and Shed	20	20	0	26JUL04	20AUG04	59d	0					Procure	Playgrou	und Eq. an	id Shed			
1040	Mob to Site	3	3	0	02AUG04	04AUG04	2d	0			Mob to Sit	e į							
1050	Demo Existing Interior	5	5	0	02AUG04	06AUG04	2d	0			🗖 Demo E	xisting Inte	erior				1		
1070	Construction Hammock	78 *	78 *	0	09AUG04	29NOV04	0	0											-
1200	Erect / Frame Walls L2	14	14	0	09AUG04	26AUG04	2d	0					E E	Frect / Fr	ame Walls	s L2	1		
1640	Install Roof Penetration RF	1	1	0	11AUG04	11AUG04	61d	0			🗖 Ir	nstall Root	f Penetrati	ion RF					
1400	Install Metal Framing L2	5	5	0	20AUG04	26AUG04	2d	0						nstall Me	tal Framin	g L2	1		
1650	Patch Roof and Install Pads RF	3	3	0	20AUG04	24AUG04	61d	0					Pat	ch Roof	and Instal	l Pads RF			
1530	Install Door Jams	3	3	0	27AUG04	31AUG04	44d	0						📥 Ins	stall Door v	Jamis			
1590	Install Soffit Framing L2	7	7	0	27AUG04	07SEP04	55d	0		1	1				insi 🗖	tall Soffit Fr	aming L2		
1220	Install HVAC Ductwork & DampersL2	10	10	0	31 AUG04	14SEP04	0	0			1	1	1		1	insta	II HVAC E	uctwork &	3 Da
1240	Install Electrical Rough-in Walls L2	11	11	0	13SEP04	27SEP04	0	0									1	📫 Install E	lectr
1260	Install Phone & Data Cabling L2	5	5	0	13SEP04	17SEP04	10d	0									nstall Pho	ne & Data	Cab
1560	Install Electrical Rough-in Soffits L2	4	4	0	13SEP04	16SEP04	52d	0								in:	stall Electi	ical Rough	n-in
1570	Install Electrical Rough-in Ceiling L2	4	4	0	13SEP04	16SEP04	7d	0								in:	stall Electi	ical Rough	ņ-in i
1300	Install Sprinkler System L2	5	5	0	15SEP04	21 SEP04	4d	0			1	1		-	1		💻 Insta	Sprinkler	Sys
1520	Install HVAC Exhaust Fans & Relief Hoods	4	4	0	15SEP04	20SEP04	47d	0									🗖 Install	HVAC ExP	naus
1270	Install Security System RI Walls L2	6	6	0	17SEP04	24SEP04	10d	0									ir 🚽	iștall Secu	irity
1280	Install Plumbing Rough-in Walls L2	5	5	0	17SEP04	23SEP04	2d	0									ins	tall Plumbi	ng R
1550	Install Phone & Data Trim	2	2	0	17SEP04	20SEP04	10d	0									🗖 Install	Phone & D	)ata
1500	Install Concrete PG	4	4	0	22SEP04	27SEP04	29d	0										🗖 Install C	;onc
1540	Install Security System Trim L2	2	2	0	22SEP04	23SEP04	41d	0									🗧 🗖 Ins	tall Securi	ity S

Using the Variance Reports to Illustrate Delays and Impacts Week 4: Current to Baseline Schedule Comparison

Act		Oria	Rem	Actual	Early	Early	Total		Finish			_			200	04				
ID	Description	Dur	Dur	Duration	Start	Finish	Float	%	Variance	J 19	26	02	Д  09	10G 16	23	30	06	SE 13	P 20	27
1780	Procure Appliances	14	0	15	26JUL04 A	13AUG04		100	-1				Pr	ocure.	Appliances	S			1	
1790	Procure Playground Eq. and Shed	20	5	15	26JUL04 A	20AUG04	59d	75	0						Procure Pl	laygrou	nd Eq. ar	nd Shed		
1040	Mob to Site	3	0	6	02AUG04 A	09AUG04		100	-3	Ν			Mob to	Site						
1050	Demo Existing Interior	5	0	7	02AUG04 A	10AUG04		100	-2	V			Demo	Existin	g Interior					
1640	Install Roof Penetration RF	1	0	2	09AUG04 A	10AUG04		100	1				🗖 Install	Roof P	enetration	RF				
1070	Construction Hammock	76 *	73*	3	11AUG04 A	29NOV04	0	4	0							-				
1200	Erect / Frame Walls L2	14	11	3	11AUG04 A	30AUG04	0	45	-2							Erec	t / Frame	e Walls L	2	1
1650	Patch Roof and Install Pads RF	3	3	0	19AUG04	23AUG04	62d	0	1				1		Patch	Roof ar	nd Install	Pads RF		
1400	Install Metal Framing L2	5	5	0	20AUG04	26AUG04	2d	0	0				1		Ins	stall Met	al Framin	ng L2		
1530	Install Door Jams	3	3	0	27AUG04	31 AUG04	44d	0	0				1			insi	tall Door	Jams		
1590	Install Soffit Framing L2	7	7	0	27AUG04	07SEP04	55d	0	0				1				lns	stall Soff	t Framin	g L2
1220	Install HVAC Ductwork & DampersL2	10	10	0	31 AUG04	14SEP04	0	0	0									In	stall HV.	AC Ductw
1240	Install Electrical Rough-in Walls L2	11	11	0	13SEP04	27SEP04	0	0	0				1							ins
1260	Install Phone & Data Cabling L2	5	5	0	13SEP04	17SEP04	10d	0	0				1						■ Install	Phone & I
1560	Install Electrical Rough-in, Soffits I 2	4	4	0	13SEP04	16SEP04	52d	0	Ω		1		1			1	1		Install E	iectrical F

n Late Activities – Why?
n Create Plan to Mitigate / Recover ~

#### **n** "Bang for the Buck"

Act		Oria	%	Total	Early	Early	200
ID	Description	Dur	Comp	Float	Start	Finish	NOV 14 21 28
95	1						
0471	Install Drywall TB&T FL2A	25	95	-67d	10/12/05 A	11/11/05	Install Drywall TB&T FL2A
0472	Install Drywall TB&T FL2B	25	95	-68d	10/22/05 A	11/11/05	▲ Install Drywall TB&T FL2B
90							-
0192	Install Electrical Fire Alarm FL2A	3	90	-29d	09/26/05 A	11/11/05	Install Electrical Fire Alarm FL2A
0210	Install Electrical Fire Alarm FL2C	3	90	-29d	09/26/05 A	11/11/05	Install Electrical Fire Alarm FL2C
0030	Install Security System Rough In FL2D	8	90	-34d	10/07/05 A	11/11/05	Install Security System Rough In FL2D
0219	Install Electrical Fire Alarm FL2D	10	90	-29d	10/07/05 A	11/11/05	Install Electrical Fire Alarm FL2D
0031	Install Security System Rough In FL2C	8	90	18d	10/07/05 A	11/11/05	✓Install Security System Rough In FL2C
85							
0247	Install Roof-Tile RF_C	3	85	-27 d	06/13/05 A	11/09/05	▲ Install Roof-Tile RF_C
0249	Install Roof-Tile RF_D	7	85	-27 d	06/13/05 A	11/09/05	Install Roof-Tile_RF_D
0245	Install Roof-Tile RF_B	3	85	-27 d	06/20/05 A	11/09/05	▲Install Roof-Tile RF_B
0239	Install Roof-Tile RF_A	7	85	-27d	06/27/05 A	11/09/05	Install Roof-Tile_RF_A
0720	Prep Sidewalk Subgrade SITE	5	85	-57d	08/25/05 A	11/11/05	Prep Sidewalk Subgrade SITE
80							
0716	Install Curb and Gutters @ Streets SITE	12	80	-52d	09/16/05 A	11/09/05	Install Curb and Gutters @ Streets SITE
0916	Install Curb and Gutters @ Building SITE	10	80	-50d	09/16/05 A	11/09/05	Install Curb and Gutters @ Building SITE
75							
0261	Apply Paint FL1_VEH	3	75	-44d	08/09/05 A	11/29/05	Apply P
1028	Install Elect Underground to pk lighting MOT	5	75	-36d	09/21/05 A	11/11/05	Install Elect Underground to pk lighting MO
0532	Install Lockers Sheriff's FL1E	5	75	-34d	09/22/05 A	11/11/05	Install Lockers Sheriff's FL1E

# **Capturing Delays and Impacts**

n Illustrating/Documenting
n Forecasting
n "What if" analysis~

**n** Use the schedule to illustrate impacts from the following types of events: nNon-excusable, Non-compensable n Subcontractor Performance n Contractor Performance nExcusable, Non-compensable n Force Majeure nExcusable, Compensable n Design Error n RFI's~

Delays & Impacts always need to be evaluated against the current plan
 nDocument and illustrate the delay
 nAnalyze the impact
 nGet acknowledgement of the delay~

- n Subcontractor Delays can be recognized by the general or the sub.
- n Delays are addressed in the schedule after a known or potential impact has been identified. nStart or Finish Date Variance nConst. Sequence change nPerformance issue (low % complete)~

n Delay recognition occurs at or just behind the data date. nCan be for work currently in progress or in the future nVery little advance warning nGenerally not seen until late nNot readily acknowledged by the Sub or GC nUsually non-compensable~

n Document the Impact

 nEnter actual dates, % complete

 n Add coding to be able to group or filter the delay

 nAdd additional activities if needed
 nAdd notes to Log

 n Show variance from target finish

 Develop recovery options~

## **Impact from a Subcontractor**

#### ueyout; ANALYSIS - Upiter : 💽 🔛 🖬 😰 Friet: AN-17 - Anergans 💦 💽 🝸 Lower views: 🚛 🚛 📖

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Act Activity	Orlg	Rem	- No -	Carly	Carly	Finish	Total										1.1 miles	æ							
Description	Den	Due	Cuarty	Start	Finish	Variance	Roat	3	4	5 3 7 8	- 9 - I	1 1	12 12	S 14	1Ē.	13	17 18	.e. 3 19	21	21	22 2	9 - 94	4 26	23	27 23
General																									
1240 Establish Cite Denchmarks	2	C	100	22APRO A	24820008	-2		ala, sul	ist =	:Fainnin::															
1100 - Aspurve Mir Du sien	8	1	76 (	0106/02/5	15k0/003	ſ	130			App tové Y x Ďas	si l														
1550 Project Concellen	n	ſ	ſ		198EF13	5	20													.	♦F ¢,s	əct Çe	np əle		
Admin Building								1																	
1020 Externale for Didg Foundations	0	2	76	20APRCO A	LOKIN/CO	-2	20		-	Financial for Hing P	F II II II I	re:													
1040 Instal underground ut des	12	2	· C (	CSMAYOD A	26ktAYC0	-1	De			tre (0).	հիշցվո	n týlilili													
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1130 Justa Ikabar Admin Hidg Fon	12	1.0	ı ·	STNAYUS	THUSE IS		- 20				📫 1918	Rébar.	Admin Di	legțer	•										
1520 - Onderground Work Compiete	U U	L	l		26MA7U3	-1	110			= Undere	tround 🚧	orkģom	: ete												
1160 Prep Tower Crane Fdr	1	-1	- C	CYUUNC3	10JUN03	-3	Эс				קיבור 📥	тифе: С	iane To-	·											
1490 FRP Pre-Cast Walls for Admin 2 dq	20	20		Califico	DOJULO:	-2	30							FSÓP	က်ဆ	aģisans	ļu Sem	ir Allg							
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1170 - Con Admir Blog Film Charle Film	28	- 28	r I	I RIUNO3	1510102	÷	20	1						-	ure 4:	lir n H	dg - dh (	Clane	-dr						
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1220 TowerCrane Hammock	32.*	827	ի փ	CADOLD3	J28E-J3	-2	20								****		*****	× 3.5.5.8		<b>ν</b> τ»	venorat	ne ¦ai	mmoek		
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1420 Erect 2nd Floor Oteel Admin Didg	0	C		C4AUC00	14AU 000	-2	- c	1						{		1	_	Fried 1	Spet Flu	e : Ele	a Salmi	ն Գիկ	9		
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1540 Maint Birdg Friett Complete	n	ſ	ſ		118EE13	\$	71												Γ.	<ul> <li>Ma</li> </ul>	htt de	3E și l	Oc mple	le	

# **Impact Illustrated**

#### Luyout (VPC+Organized a 🔽 🚧 💅 – ter 🔺 - All Estivities 💽 🍸 Luxe-reneval 🕼 💭 📼

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Contra	ptor																							
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1400	Erect Ease Columns for Admin Eldg	12	·2	2 D 16JULOS	55AUG03	-2	2c						_				Terr Da	sse Cr		'n A'	nir Flog			
1410	Erect 1c. Hour stock Achim Eleg	=	8	C 25JULUS	1770/305	2	- 4e										torect (	ist - bo	or Stee	Adm	n Biđg			
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1450	Erect The-Dast Walls Dround Floor	4	2	L 0540 003	1240/005	-2	- 2c									_	Er	эрі Гіе	¦-Cast∤	(valle) :	Orquine P	ber		
1470	Frost Jud Floor Fool Admin Flog	- 1	Û	1 11AU.SM	21AU.301	2	40											E	ec. Sic	: Fluçi	Sloof A	linin 31	d <u>e</u>	
1430	Erect Fre-Cast Vealls 1st Flocy Admin Blog	1		0 1340.003	13AUC03	-2	2c									-	I T	<b>-</b> 19	rt Pre-	Cast	Vals 1st	T chr.4	vir r l	r In 📄
14/0	Erect Frei Scol Walls Zie Floer winner Bildg-	4	2	1 21/0 903	s6AU/BUS	2	- 2e											_	ete 🗧	t i 're-t	last vYs	is 2nd	Floor À	emir <mark>i</mark> Eleg
1440	Frest Roof Steel Admin Oldy	1		T 2540.300	2040,301	-2	14												F	: 60	if Stells	Amin 3	šblig	
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1720	Underground Work Complete	-	Π	-	25MAY00		$\geq 1c$		, • Ji	dargream	ie Work (	Semple												

#### **Impact Recovery Plan**

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- + Form Ach in Blac Fdr 30A 18.3 Web Activity Description Act Orla Rein 🖓 Early Start Carly Finish Total SHE TH Ш Dur Dur Comp Linish Variance | loat 5 6 7 7 5 10 11 12 17 14 15 6 17 17 19 20 21 23 27 24 25 26 27 A Subcontractor Performance Deficiency Subcontractor -Elicinato for Bide Foundations. 1720 Enclosate for Olds Foundations 75 25AEPER & 10YAY03 2 - Dr Contraction 1120 Funn Admin Blde Fdr 12 3 14 MAY28 39MAY03 Four AdminiBilly for Changed Calendar to Sidays/Week 0  $\Delta t$ 1100 Justa Repai Atrop Dito Etr 12 1 21 MAM10 Urefall Peber Admin Dida. TRI UKIMI Эr ..... 💻 Fibur Admin Bido Edn 1140 Pour Aernin Bleg Ferr 4 2 1 1.JUNE3 15.01/03 - 1 36 1170 Gue Acrain Dica Fen / Civite Fib. 27 20 T 17JUNTO 14.ULTO Care Admin Bille Hdr 7 Drarie Fer Ъ, Moh 2 Frent Towar Grane D DEJULCE MUUE3 1100 Mob & Erect Tower Orshei -1 36 14.0 Erect Euclid Columns for Achim Erda 1... 15JUL2 \_4/U/4U5 30 Erect Ease Columns for Admin Bidg -5 24JU CT 540,901 5cEnco 1st Fluor St ed Armin Blog. 1410 Fred 1st Floor Freel Admin Fidal 0 Effect 2nd Floor Steel Admin Bldg 14.00 Erect 2rd Floor Steel Acrim Elda 1 31JULE 1340.040-= 8 - ' 50 1470 Fred FielSed Walls Smith Ebru 4 2 1.0120.301 11 AUG01 a, Erec, Pie Cast Wells Ground Floor Erect Ord Floor Freel Admin Eleg. Ξ 20AUC03 50 1430 Erect 3rd Floor Eteel Admin Elda 8 0.07AU003 Erect Pre-Cast Wals 1st Hoor Admin Elda 1460 Erect Frei Stol Walls 19t Floor Aeron Bleet 3 2 0.15/0.305 13/0/305 30 1470 Erect Ele-Cast Wells Pro Eloci Admin Oldo 11340.901 25AU.301 💻 Franci Pre Dagi 🦗 ut sižad El du Aduria Bilu 4 Эc Erect Roof Steel Admin Elda 1440 Erect Kool Steel wdmin Bidd 1 1 21AU 305 s/AU/JUS 50 1 credit re-Cast Walls Bid Floor Acrim 1450 Erect Fre Cald Wills Str Fluer Acroin Blog 4 1 22AU303 1 SEE13 3 0.026EP03 136ET13 🖕 Admin Dick El (far. 1530 Admin Bloc Eufer -1 Adminibility She Complete 1530 Admin Blee Shell Complete 133E-13 30 --• Emjer - Sympoly ( 1550 Project Consolete 0 1385510 <u>а</u> Subcontractor Late Start Subcortispion. install Uncerpround UL it as Changed Calendar to 5 days / Week 1240 Instellunderground Unhaes 1± 10 05MAY13 A [32YAY03] υl - 50 1750 Justa Temp Flecture 4 T 15MAMTO 222230 ٥l 2rnotali - pir o Eloctilo - Unregulated Work Complete 1520 Understround V-brk Complete 0 22YAY03 0 12c

## **Uncontrollable Delays**

- Delays are addressed in the schedule after the impact has been identified
  - nCan impact work in progress or work in the future
  - nAdd the impact to the schedule
  - nAdd the "consequence" activity
  - nAdd logic or change durations to illustrate the impact~

## **Impact from Weather - Start**

#### Layout: BLDG - Organized b 🔽 📓 🖬 Filter: All - All activities 🛛 🔽 Lower views: 👫 📮 🕮

- +		_							
Act	Activity	Orig	Rem	%	Early	Early	Finish 1	otal	WEK
U.	Description	Dur	Dur	Comp	Start	Finish	Variance I	Toat	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
Gen	eral						,		
1000	Notice to Proceed	0		100	14APR03 A		0		
1010	Contractor Mobilize	8	0	100	14APR03 A	24APR03 A	0		
1240	Establish Site Benchmarks	2	0	100	22APR03 A	24APR03 A	-2		stablish Site Benchmarks
1110	Deliver Final IFC Drawings	0	0	100		23APR03 A	1		Aliver Final IFC Drawings
1090	Submit Conc. Mix Design	0	0	100		30APR03 A	1		◆Submit Conc. Mix Design
1100	Approve Mix Design	8	0	100	01MAY03 A	15MAY03 A	0		Approve Mix Design
1550	Project Complete	0	0	0		08SEP03	-1	3d	Project Complete
Admi	in Building								
1020	Excavate for Bldg Foundations	8	0	100	28APR03 A	13MAY03 A	-2		Excavate for Bidg Foundations
1040	Install Underground Utilities	12	0	100	06MAY03 A	21MAY03 A	1		
1120	Form Admin Bldg Fdn	12	0	100	14MAY03 A	29MAY03 A	0		Form Admin Bldg Fon
1060	Install Temp Electric	4	0	100	19MAY03 A	22MAY03 A	0		Install Temp Electric
1130	Install Rebar Admin Bldg Fdn	12	1	92	20MAY03 A	09JUN03	-1	3d	Install Rebar Admin Bidg Fdn
1520	Underground Work Complete	0	0	100		22MAY03 A	0		Underground Work Complete
1160	Prep Tower Crane Fdn	4	0	100	02JUN03 A	05JUN03 A	0		Prep Tower Crane Edn
1490	FRP Pre-Cast Walls for Admin Bldg	20	16	20	02JUN03 A	03JUL03	0	8d	FRP Pre-Cast Walls for Admin Bldg
1180	Pour Tower Crane Fdn	1	1	0	09JUN03	09JUN03	0	11d	Pour Tower Crane Fdn
1140	Pour Admin Bldg Fdn	4	4	0	10JUN03	16JUN03	-1	3d	
1170	Cure Admin Bldg Fdn / Crane Fdn	28	28	0	17JUN03	14JUL03	-4	Зd	Cure Admin Bldg Fdn / Crane Fdn
1190	Mob & Erect Tower Crane	4	4	0	08JUL03	14JUL03	-1	3d	Mob & Erect Tower Crane
1220	Tower Crane Hammock	32 *	32 *	0	08JUL03	01 SEP03	-1	Зd	Tower Crane Hammock
1400	Erect Base Columns for Admin Bldg	12	12	0	15JUL03	04AUG03	-1	3d	Erect Base Columns for Admin Bldg
1410	Erect 1st Floor Steel Admin Bldg	8	8	0	24JUL03	06AUG03	-1	5d	Erect 1st Floor Steel Admin Bldg
1420	Erect 2nd Floor Steel Admin Bldg	8	8	0	31JUL03	13AUG03	-1	5d	Erect 2nd Floor Steel Admin Bldg
1450	Erect Pre-Cast Walls Ground Floor	4	4	0	05AUG03	11AUG03	-1	3d	Frect Pre-Cast Walls Ground Floor
1430	Erect 3rd Floor Steel Admin Bldg	8	8	0	07AUG03	20AUG03	-1	5d	Erect 3rd Floor Steel Admin Bldg
1460	Erect Pre-Cast Walls 1st Floor Admin Bldg	4	4	0	12AUG03	18AUG03	-1	3d	Erect Pre-Cast Walls 1st Floor Admin Bldg
1470	Erect Pre-Cast Walls 2nd Floor Admin Bldg	4	4	0	19AUG03	25AUG03	-1	3d	Erect Pre-Cast Walls 2nd Floor Admin Bldg
1440	Erect Roof Steel Admin Bldg	4	4	0	21 AUG03	27AUG03	-1	5d	Erect Roof Steel Admin Bldg
1480	Erect Pre-Cast Walls 3rd Floor Admin Bldg	4	4	0	26AUG03	01 SEP03	-1	3d	Erect Pre-Cast Walls 3rd Floor Admin Bldg
1560	Admin Bldg Buffer	4	4	0	02SEP03	08SEP03	-1	3d	Admin Bidg Buffer
1530	Admin Bldg Shell Complete	0	0	0		08SEP03	-1	3d	Admin Bldg Shell Complete
Main	tenance Building								
1310	Form Maint. Bldg Fdn	8	4	50	02JUN03 A	12JUN03	0	9d	Form Maint. Bldg Fdn
1340	Install Rebar Maint Bldg Fdn	8	8	0	16JUN03	26JUN03	0	9d	Install Rebar Maint Bldg Fan
1500	FRP Pre-Cast Walls for Maint Bldg	16	16	0	16JUN03	10JUL03	0	30d	FRP Pre-Cast Walls for Maint Bldg
1350	Pour Maint Bldg Fdn	1	1	0	30JUN03	30JUN03	0	9d	Pour Maint Bidg Fdn
1360	Cure Maint Bldg Fdn	28	28	0	01JUL03	28JUL03	0	15d	Cure Maint Bldg Fdn
1370	Erect Steel for Maint Bldg (shell & roof)	12	12	0	29JUL03	18AUG03	0	9d	Erect Steel for Maint Bldg (shell & roof)
1510	Erect Pre-Cast Walls Maint Bldg	4	4	0	19AUG03	25AUG03	0	9d	Erect Pre-Cast Walls Maint Bldg
1570	Maint Bldg Buffer	2	2	0	26AUG03	27AUG03	0	9d	Maint Bldg Buffer
1540	Maint Bldg Shell Complete	0	0	0		27AUG03	0	9d	Maint Bldg Shell Complete

## **Impact from Weather - Illustrated**

#### Leyout IMPC-Organized b 💽 📓 🙀 Filter All-All activities 🛛 💿 🍸 Lower views 👫 📮 🛄

- + +	FRIP Pre-Cast Walls for Admin Bldg						_				
Act 1D	Activity Description	Orig Dur	Rem Dur	5 Comp	Early Start	Early Finish	Finish Variance	Tot Fle	ial iat	2003 JUN JUL AUG SEP 09 16 23 30 07 14 21 28 04 11 18 25 01 08 15	22
Week	8/9 Severe Weather Delay										
1490	FRP Pre-Cast Walls for Admin Bidg	20	16	20	02JUN03 A	0910103	-3		54	FRP Pre-Cast Walls for Admin Bldg Suspend 06/09 - Resume 06/12	
Contri 1310	actor Form Maint, Bldg Fdn	8	- 4	50	02JUNOS A	18JUN03	-3		Бd	Form Maint, Bidg Edn Suspend 06/09 - Resume 06/12	
1200	SEVERE WEATHER - 5" RAIN	3	0	100	07JUNOS A	A EDINUE	0	t		SEVERE WEATHER - 5' RAIN Added Activity	
1210	DELAY POUR FOR DEWATERING	2	2	0	10JUN03	11JUN03	0		10	DELAY POUR FOR DEWATERING Added Activity	
1140	Pour Admin Bildg Fdn	4	- 4	0	12JUN08	18JUNCS	-3		10	Pour Admin Bida Edn Added Dewatering Pred.	
1560	Admin Bldg Buffer	4	4	0	04SEP03	10SEP03	-3		14	Admin Bit	lg Buffer
1530	Admin Bidg Shell Complete	0	0	0		105EP03	-3		10	Project C	omplete
+		Uodat	e Act	ivity – S	1 Weather	Impact Ider	otification	Reli	ef	×	
		Act D2J Den Prov Sus	0 - FRP uel Ste UUN03 cent C gross	Pre-Ce ut omplete	st Wells for A	Admin Bidg Early (0940 Berr Resug	r Finish 1203 cerang durat cerang durat		FT H		

## **Impact from Weather - Extension**

#### Layout, IMPC - Organized b 🔽 📓 📓 Filter: All - All activities 🛛 🚽 🍸 Lower views: 👫 티 🕮

· +																										
Act	Activity	Orig	Rem	%	Early	Early	Finish	Total		II IN								2003		0ED						
ID	Description		Dur	Dur	Comp	Start	Finish	Variance	Float	02	09 16	23	30	07 14	4 2	21 28	8 04	11 18	3 25	01 08	3 15	22 :	29 06			
Weel	(8/9 Severe Weather D	elay																								
1310	Form Maint. Bldg Fdn		8	4	50	02JUN03 A	18JUN03	4	3 6d			Form Ma	int. Bld	g Fdn <b>S</b> u	uspen	nd 06/09	- Resum	e 06/12								
1490	FRP Pre-Cast Walls for Admin	Bldg	20	16	20	02JUN03 A	09JUL03		3 5d					FRP	Pre-Ċ	≿ast Ẃal	lls for Adn	nin Bldg <b>S</b>	uspend O	5/09 - Re:	sume 06/1	2				
1200	SEVERE WEATHER - 5" RAIN	3	0	100	07JUN03 A	09JUN03 A	0	)	•		E WEATH	HER - 5'	" RAIN <b>A</b>	\dded	I Activit	У										
1210	DELAY POUR FOR DEWATER	RING	2	2	0	10JUN03	11JUN03	0	) 1d		DELA	Y POUR I		EWATER	RING	Added #	Activity									
1180	Pour Tower Crane Fdn		1	1	0	12JUN03	12JUN03		3 8d		■ Pour	Tower Cra	ane Fdn	Added	Dewa	atering	Pred.									
1140	Pour Admin Bldg Fdn		4	4	0	12JUN03	18JUN03		3 1d			Pour Adn	nin Bldg	g Fdn <b>Ad</b>	lded I	Dewate	ring Prea	<b>i.</b>								
1560	Admin Bldg Buffer		4	4	0	04SEP03	10SEP03		3 1d												Admin Bl	dg Buffe	er			
1530	Admin Bldg Shell Complete		0	0	0		10SEP03		3 1d												♦Admin B	idg She	Il Complete			
1550	Project Complete		0	0	0		10SEP03	-3	3 1d	1											♦Project (	omplet	e			
<	Constraints - SI Weath			1t 🔉	<						Cor	nstraint	s - SI		ther			nt 🗙	1							
	1550 Drain at Complete										155	0 - Droia	not Cou	molata					1	_						
	1550 - Project Complete			ĵ↓							100	0 - FTOJE		mpiete				Ť↓								
	E Start constraint	🗖 Einich	conctra	int								Start or	onetrai	nt		Finish	conetra	unt								
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	C Late	💿 Late									C	Late			•	La <u>t</u> e										
	<b>_</b>	14SEP03	}	-										-	17	7SEP0	3	-								
-				Sep	otemb	er 2003											Sept	ember	2003							
	🗖 Start <u>o</u> n	Sun	Mon	Tue	) We	d Thu	Fri	<u>Sat</u>				Start <u>o</u> r	ì			Sun	Mon	Tue	Wed	Thu	Fri	Sa	<u>t</u>			
	<b></b>	•	1	2	3	4	5	6						-	1		1	2	3	4	5	6				
	Expected finish	7	8	9	10	11	12	13 🚽				Expect	ed fini	sh		7	8	9	10	11	12	13				
	<b></b>	14	15	16	17	10	10	20						-	1	14	15	16	17	10	10	20				
-		14	10	10	- 17	10	19	20								14	15	10	- ''	10	19	20	-			
	🗖 Floa <u>t</u> constraint	21	22	23	24	25	26	27				Floatic	onstra	int		21	22	23	24	25	26	27				
	C Zero total float										C	Zero to	tal floa	at							1		-			
	$\mathbf{C}$ As late as possible	28	29	30							C	<u>A</u> s late	as po	ssible		28	29	30								
l		_					14SEP	03													16SE	P03				
							HULLI	~~ <b>_</b>													IVUL		<b>T</b>			

## **Impact from Weather - Extension**

#### Leyout 🖓 PC. Groonized b 🕒 🕼 🕍 Hillin 🔺 All potivities 🛛 🔽 Lower works 🛍 🖬 🕋

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1	D.	Description	Dur	Dur l	omp	Start	l inish	Variance	l loat	<b>6</b> 2	-0	U.N.	22	-0		.II • •			الله .	G Maria atau	-	-0	3F 2				COT.	-0	22
W	/eek	8/9 Severe Weather Delay								117	9	19	-61		<u>,                                    </u>		20			iii a					79	11		20	<i>11</i>
ľ	0	Folio Mairo Filig Thi	-	4	50	TRUMPIA	inaukna –	ر ۱	-1		Ŀ	F	.nn Mar	E J	y Fun Sc	wheny	06/09	- Resur	ne <b>06</b> /1) T	ž									
1,	490	FR — re-Cast Walls, or Admin Blug	2.	16	⊥U	12. JNU: A	0500_3	-3	73					_	= FRT	Fre-Ças	n Výsli	ls for Ad	m'n Bld,	Suepend (	6/09	Resun	1 <b>9</b> 06/	12					
Ľ	200	STVERE WEAT IFRASTRAIN	-	Π	170	77. UNIT A	A GUUNTO A	n			SF.	(=R= ) 	(VEATH)	FP ñ	PANA	lddeid A	uclivity	Y											
1.	2°U	DELAY POUR FOR DEWATE (ND)	÷	2	U	10. JND:	1100/13	U	t:		<b>=</b> 08	ÈAY ( T	TOURF	CR ĐẾ	EWATER	s NC  Ad	lded A	\ctivity											
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1	140	Poer Aernin Eley Edn	4	2	U	12. UNUS	15JUNU3	-3	t :		L	P:	ou∙⊉em	ir Ele	g Fdh Λ#	ded De	Water	ring Pre	d.				1				[		
ľ	nn	∔dmin Dirg Duffer	- 4	1	n	1497E00	1735250	<u>_</u>	-1													A	lçain P	lý j Bu	lier –				
1	530	Admin Blog Shell Con piele	-	U	U		113E (13	-3	t:		Г											• 4	drnt	sidg et	ișii Cor	mplete			
1	m.	Piniati Complete	-	- A	- A		1135910		- 11													+	Ioject	(erp	de Chi	inged	Const	Taint r	2 days

### **Impact from Weather - Final**

#### Layout: BLDG - Organized b 🔽 📓 🖬 Filter: All - All activities 🛛 🝸 Lower views: 👫 📮 🖽

Act	Activity	Orig	Rem	%	Early	Early	Finish	Total	Α	DR	МАЗ	~		JUN		.0.1			A	200 LIG	3		SED			00	т		NO
IU.	Description	Dur	Dur	Comp	Start	Finish	Variance	Float	14	21 28 0	5 12	19 26	02 09	9 16	23 30	07 14	21	28	D4 11	18	25 (	01 08	15	22	29 06	3 13	20	27 03	3 10
Gene	eral	_																											
1000	Notice to Proceed	0	0	100	14APR03 A		0		◆ Noti	ce to Procee	3																		
1010	Contractor Mobilize	8	0	100	14APR03 A	24APR03 A	0			Contract	or Mobiliz																		
1240	Establish Site Benchmarks	2	0	100	22APR03 A	24APR03 A	-2			Establish	Site Ber	IChmarks																	
1110	Deliver Final IFC Drawings	0	0	100		23APR03 A	1			♦Deliver F	inal IFC D	)rawings																	
1090	Submit Conc. Mix Design	0	0	100		30APR03 A	1			♦ Suk	mit Conc	: Mix Desigi						_			_						_		
1100	Approve Mix Design	8	0	100	01MAY03 A	15MAY03 A	0				A	Approve Mix	Design																
1550	Project Complete	0	0	0		10SEP03	-3	3d														•	Project	Comp	lete Ch	anged	Const	raint +2	2 days
Aami	n Bullaing										_																		
1020	Excavate for Bldg Foundations	8	0	100	28APR03 A	13MAY03 A	-2				EX	cavate for E	ildg Fou	Indations															
1040	Install Underground Utilities	12	0	100	06MAY03 A	21MAY03 A	1					Install U	ndergro	und Utilitie	es Chang	ed Calei	ndar to	5 days	s / Weel	•									
1120	Form Admin Bldg Fdn	12	0	100	14MAY03 A	29MAY03 A	0					F	orm Adri	nin Bldg F	dn Chang	ed Cale	ndar te	o 5 day	s/Wee	ĸ									
1060	Install Temp Electric	4	0	100	19MAY03 A	22MAY03 A	0					Install 1	emp Ele	etric															
1130	Install Rebar Admin Bldg Fdn	12	1	92	20MAY03 A	09JUN03	-1	5d				_	<b></b> ^"	nstall Reb	ar Admin I	3ldg Fdn		_		_							_		
1520	Underground Work Complete	0	0	100		22MAY03 A	0					♦Under	ground \	Work Con	nplete														
1160	Prep Tower Crane Fdn	4	0	100	02JUN03 A	05JUN03 A	0						Prep	o Tower (	Crane Fdn														
1490	FRP Pre-Cast Walls for Admin Bldg	20	16	20	02JUN03 A	09JUL03	-3	7d								FRP F	re-Cas	t Walls	for Admi	in Bldg	Suspe	end 06/0	9 - Res	sume	06/12				
1200	SEVERE WEATHER - 5" RAIN	3	0	100	07JUN03 A	09JUN03 A	0						📫 S	SEVERE V	VEATHER	- 5" RAIN	Adde	d Activ	ity										
1210	DELAY POUR FOR DEWATERING	2	2	0	10JUN03	11JUN03	0	3d						IDELAY P	POUR FOR	DEWAT		Added	Activity										
1180	Pour Tower Crane Fdn	1	1	0	12JUN03	12JUN03	-3	10d						Pour To	wer Crane	Fdn Ad	ded De	ewater	ing Pre	d.	T			]					
1140	Pour Admin Bldg Fdn	4	4	0	12JUN03	18JUN03	-3	3d						Por	ur Admin E	ldg Fdn i	Added	Dewat	ering P	red.									
1170	Cure Admin Bldg Fdn / Crane Fdn	28	28	0	19JUN03	16JUL03	-6	6d									Cure A	dmin Bl	dg Fdn /	Crane	Fdn								
1190	Mob & Erect Tower Crane	4	4	0	10JUL03	16JUL03	-3	3d								╘━━	Mob & I	Erect T	ower Cra	ane									
1220	Tower Crane Hammock	32 *	32 *	0	10JUL03	03SEP03	-3	3d									CXXXX	XXXX	xxxxx	XXXX	<u> </u>	Tower	r Crane	Hamn	nock				
1400	Erect Base Columns for Admin Bldg	12	12	0	17JUL03	06AUG03	-3	3d										_	Erect I	Base C	olumns	for Adm	hin Bidg	1			-		
1410	Erect 1st Floor Steel Admin Bldg	8	8	0	29JUL03	11AUG03	-3	5d											Er	ect 1st	Floor S	Steel Adr	nin Bldg	g					
1420	Erect 2nd Floor Steel Admin Bldg	8	8	0	05AUG03	18AUG03	-3	5d												Ere	ct 2nd	Floor Ste	el Adm	nin Bld	ġ				
1450	Erect Pre-Cast Walls Ground Floor	4	4	0	07AUG03	13AUG03	-3	3d												Erect Pi	re-Cast	:Walis G	round f	Floor					
1430	Erect 3rd Floor Steel Admin Bldg	8	8	0	12AUG03	25AUG03	-3	5d												-	Erect	3rd Floo	or Steel	Admi	n Bldg				
1460	Erect Pre-Cast Walls 1st Floor Admin Bldg	4	4	0	14AUG03	20AUG03	-3	3d												Er	ect Pre	-Cast W	alİs 1 st	Floor	Admin E	Idg			
1470	Erect Pre-Cast Walls 2nd Floor Admin Bldg	4	4	0	21 AUG03	27AUG03	-3	3d													🛑 Ere	ct Pre-C	ast Wal	lis 2nd	Floor A	dmin B	ldg		
1440	Erect Roof Steel Admin Bldg	4	4	0	26AUG03	01SEP03	-3	5d	1													Erect R	of Ste	el Adn	nin Bldg				
1480	Erect Pre-Cast Walls 3rd Floor Admin Bldg	4	4	0	28AUG03	03SEP03	-3	3d	1												Ľ	Erect I	Pre-Cas	st Wall	s 3rd Fl	oorAdr	nin Bld		
1560	Admin Bldg Buffer	4	4	0	04SEP03	10SEP03	-3	3d	1														Admin E	jidg B	uffer				
1530	Admin Bldg Shell Complete	0	0	0		10SEP03	-3	3d										1		1	1	•	Admin	Èldg S	hell Cor	nplete -			
Main	tenance Building						1															÷							
1310	Form Maint. Bldg Fdn	8	4	50	02JUN03 A	18JUN03	-3	8d						Fo	rm Maint. E	ldg Fdn :	Suspe	nd 06/0	19 - Resi	ume O	6/12								
1340	Install Rebar Maint Bldg Fdn	8	8	0	19JUN03	02JUL03	-3	8d							in:	stall Reba	ar Maint	Bldg F	dn										
1500	FRP Pre-Cast Walls for Maint Bldg	16	16	0	19JUN03	16JUL03	-3	29d	1								FRP Pr	e-Cast	Walls for	Maint	Bidg								
1350	Pour Maint Bldg Fdn	1	1	0	03JUL03	03JUL03	-3	8d	1						0 P	our Main	t Bldg F	din											
1360	Cure Maint Bldg Fdn	28	28	0	04JUL03	31JUL03	-3	17d	1						<b>_</b>			<u>t</u> d	ire Maint	Bidg F	din								
1370	Erect Steel for Maint Bldg (shell & roof)	12	12	0	04AUG03	21 AUG03	-3	8d												E	rect St	eel for M	aint Blo	ig (sh	ell & roo	f)			
1510	Erect Pre-Cast Walls Maint Bldg	4	4	0	25AUG03	28AUG03	-3	8d	1												Er	ect Pre-C	Cast Wa	alls Ma	int Bldg				
1570	Maint Bldg Buffer	2	2	0	01SEP03	02SEP03	-3	8d	1												T_	∎ Maint E	Ildg But	ffer					
1540	Maint Bldg Shell Complete	0	0	0		02SEP03	-3	8d	1													🔶 Maint I	Bldg Sh	nell Co	mplete				

### **Impact from an RFI**

n RFI's are initiated by GC or subcontractor
 n RFI's are added to the schedule after a known or potential impact has been identified.
 nCommodity change
 nQty change
 nConst. Sequence change
 nDesign Clarification / Change~

### **Impact from an RFI**

n RFI's occur at or behind the data date nCan be for work currently in progress or for work in the future

n RFI's that don't go in the schedule nDimensional clarifications – 2" or 3" Stenciling nInstallation clarification – Torque to 100 ft lbs or 110 ft lbs~
## **RFI Impact - Start**

#### Layout: BLDG - Organized b 💌 📓 🖬 Filter: All - All activities 🛛 🔽 Lower views: 👫 📮 📺

- +										
Act	Activity	Orig	Rem	%	Early	Early	Finish	Total	2003 ADR MAY IIIN III AUG SER OCT	NC
ID	Description	Dur	Dur	Comp	Start	Finish	Variance	Float	14 21 28 05 12 19 26 02 09 16 23 30 07 14 21 28 04 11 18 25 01 08 15 22 29 06 13 20 27 03	10
Gene	eral									
1000	Notice to Proceed	0	0	100 1	14APR03 A		0		Notice to Proceed	
1010	Contractor Mobilize	8	0	100 1	14APR03 A	24APR03 A	0		Contractor Mobilize	
1240	Establish Site Benchmarks	2	0	100 2	22APR03 A	24APR03 A	-2		Establish Site Benchmarks	
1110	Deliver Final IFC Drawings	0	0	100		23APR03 A	1		Deliver Final IFC Drawings	
1090	Submit Conc. Mix Design	0	0	100		30APR03 A	1		♦ Submit Conc. Mix Design	
1100	Approve Mix Design	8	0	100 (	01MAY03 A	15MAY03 A	-		Approve Mix Design	
1550	Project Complete	0	0	0		10SEP03	-3	3d	Project Complete Changed Constraint +2     Project Complete Changed Constraint +2	days
Admi	n Building									
1020	Excavate for Bldg Foundations	8	0	100 3	28APR03 A	13MAY03 A	-2		Excavate for Bidg Foundations	
1040	Install Underground Utilities	12	0	100 (	06MAY03 A	21MAY03 A	1		Install Underground Utilities Changed Calendar to 5 days / Week	
1120	Form Admin Bldg Fdn	12	0	100 1	14MAY03 A	29MAY03 A	0		Form Admin Bidg Fdn Changed Calendar to 5 days / Week	
1060	Install Temp Electric	4	0	100 1	19MAY03 A	22MAY03 A	0			
1130	Install Rebar Admin Bldg Fdn	12	0	100	20MAY03 A	09JUN03 A	-1		Install Rebar Admin Bldg Fdn	
1520	Underground Work Complete	0	0	100		22MAY03 A	0		Underground Work Complete	
1160	Prep Tower Crane Fdn	4	0	100 (	02JUN03 A	05JUN03 A	0		Prep Tower Crane Fdn	
1490	FRP Pre-Cast Walls for Admin Bldg	20	0	100 (	02JUN03 A	09JUL03 A	-3		FRP Pre-Cast Walls for Admin Bidg Suspend 06/09 - Resume 06/12	
1200	SEVERE WEATHER - 5" RAIN	3	0	100 (	07JUN03 A	09JUN03 A	0		SEVERE WEATHER - 5" RAIN Added Activity	
1210	DELAY POUR FOR DEWATERING	2	0	100 1	10JUN03 A	11JUN03 A	0		DELAY POUR FOR DEWATERING Added Activity	
1180	Pour Tower Crane Fdn	1	0	100 1	12JUN03 A	12JUN03 A	-3		Pour Tower Crane Fdn Added Dewatering Pred	
1140	Pour Admin Bldg Fdn	4	0	100 1	12JUN03 A	18JUN03 A	-3		Pour Admin Bldg Fdn Added Dewatering Pred.	
1170	Cure Admin Bldg Fdn / Crane Fdn	28	0	100 1	19JUN03 A	16JUL03 A	-6		Cure Admin Bidg Fdn / Crane Fdn	
1190	Mob & Erect Tower Crane	4	0	100 1	10JUL03 A	16JUL03 A	-3		Mob & Erect Tower Crane	
1220	Tower Crane Hammock	32 *	19*	41 '	10JUL03 A	03SEP03	-3	3d	Tower Crane Hammock	
1400	Erect Base Columns for Admin Bldg	12	3	75 '	17JUL03 A	06AUG03	-3	3d	Erect Base Columns for Admin Bldg	
1410	Erect 1st Floor Steel Admin Bldg	8	5	38 :	29JUL03 A	11AUG03	-3	5d	Erect 1st Floor Steel Admin Bldg	
1420	Erect 2nd Floor Steel Admin Bldg	8	8	0	05AUG03	18AUG03	-3	5d	Erect 2nd Floor Steel Admin Bldg	
1450	Erect Pre-Cast Walls Ground Floor	4	4	0 (	07AUG03	13AUG03	-3	3d	Erect Pre-Cast Walls Ground Floor	
1430	Erect 3rd Floor Steel Admin Bldg	8	8	0	12AUG03	25AUG03	-3	5d	Erect 3rd Floor Steel Admin Bldg	
1460	Erect Pre-Cast Walls 1st Floor Admin Bldg	4	4	0	14AUG03	20AUG03	-3	3d	Erect Pre-Cast Walls 1st Floor Admin Bldg	
1470	Erect Pre-Cast Walls 2nd Floor Admin Bldg	4	4	0	21 AUG03	27AUG03	-3	3d	Erect Pre-Cast Walls 2nd Floor Admin Bidg	
1440	Erect Roof Steel Admin Bldg	4	4	0	26AUG03	01SEP03	-3	5d	Erect Roof Steel Admin Bldg	
1480	Erect Pre-Cast Walls 3rd Floor Admin Bldg	4	4	0	28AUG03	03SEP03	-3	3d	Erect Pre-Cast Walls 3rd Floor Admin Bldg	
1560	Admin Bldg Buffer	4	4	0	04SEP03	10SEP03	-3	3d	Admin Bidg Buffer	
1530	Admin Bldg Shell Complete	0	0	0		10SEP03	-3	3d	Admin Bldg Shell Complete	
Main	tenance Building									هد
1310	Form Maint. Bldg Fdn	8	0	100 (	02JUN03 A	18JUN03 A	-3		Form Maint. Bldg Fdn Suspend 06/09 - Resume 06/12	
1340	Install Rebar Maint Bldg Fdn	8	0	100 1	19JUN03 A	02JUL03 A	-3		Install Rebar Maint Bldg Fdn	
1500	FRP Pre-Cast Walls for Maint Bldg	16	0	100 1	19JUN03 A	16JUL03 A	-3		FRP Pre-Cast Walls for Maint Bldg	
1350	Pour Maint Bldg Fdn	1	0	100 (	03JUL03 A	03JUL03 A	-3		Pour Maint Bldg Fdn	
1360	Cure Maint Bldg Fdn	28	0	100 (	04JUL03 A	31 JUL03 A	-3		Cure Maint Bidg Fdn	
1370	Erect Steel for Maint Bldg (shell & roof)	12	12	0	04AUG03	21 AUG03	-3	8d	Erect Steel for Maint Bidg (shell & root)	
1510	Erect Pre-Cast Walls Maint Bldg	4	4	0	25AUG03	28AUG03	-3	8d	Erect Pre-Cast Walls Maint Bldg	
1570	 Maint Bldg Buffer	2	2	0	01SEP03	02SEP03	-3	8d		
1540	Maint Bldg Shell Complete	0	0	0		02SEP03	-3	8d	A Maint Bidg Shell Complete	
									$\mathbf{A} + \mathbf{A} + $	

# **RFI Impact – Add RFI**

Layout: BLDG - Organized b 🔽 📓 📓 Filter: STL - Structural Stee 🚽 🍸 Lower views: 👫 📮 📰

- + RFI #57: Steel Moment Connections

Act	Activity	Orig	Rom	Q.	Farly	Farly	Finich	Total													1	2003		
ID	Description	Dur	Dur	Comp	Start	Finish	Variance	Float	30 - r	17	JUL 14	21	28	Π4	AU0 11	9 18	25	01	3 108	SEP 15	22	29 (	16 - <sup>1</sup>	OCT 13 - 20
Admi	n Building																			102				
1220	Tower Crane Hammock	32 *	19 *	41	10JUL03 A	03SEP03	-3	Зd					×	XXXX	XXXX	(XXX	XXXX	<b>X</b> To	ower (	Crane	Hamr	nock		
1400	Erect Base Columns for Admin Bldg	12	3	75	17JUL03 A	06AUG03	-3	Зd						<b>E</b> r	ect Ba	ase C	olumr	ns for	Admi	in Bld	g			
1410	Erect 1st Floor Steel Admin Bldg	8	5	38	75 1730L03 A       0640G03       -3       3d         38 29JUL03 A       11AUG03       -3       5d         100 30JUL03 A       01AUG03 A       0       ■ RFI #57: Steel Moment Connections Added Act																			
1580	RFI #57: Steel Moment Connections	3	0	100	30JUL03 A	01AUG03 A	0				Erect Base Columns for Admin Bldg Frect 1st Floor Steel Admin Bldg RFI #57: Steel Moment Connections Added Activity Frect 2nd Floor Steel Admin Bldg													
1420	Erect 2nd Floor Steel Admin Bldg	8	8	0	05AUG03	18AUG03	-3	5d								Ere	ct 2nd	l Floo	r Stee	el Adn	nin Bl	g		
1450	Erect Pre-Cast Walls Ground Floor	4	4	0	07AUG03	13AUG03	-3	Зd							Ere	ect P	re-Cas	st Wa	alls Gi	round	Floor			
1430	Erect 3rd Floor Steel Admin Bldg	8	8	0	12AUG03	25AUG03	-3	5d						_			Ere	ct 3rd	Flooi	r Stee	l Adm	in Bldg		
1460	Erect Pre-Cast Walls 1st Floor Admin Bldg	4	4	0	14AUG03	20AUG03	-3	Зd								Er 🗖	ect Pi	re-Ca I	st Wa	alls 1s	t Floo	r Admii	n Bldg	3
1470	Erect Pre-Cast Walls 2nd Floor Admin Bldg	4	4	0	21AUG03	27AUG03	-3	Зd									⊨ Er	rect F	're-Ca	ist Wa	alls 2n	d Floor	Adm	in Blḋg
1440	Erect Roof Steel Admin Bldg	4	4	0	26AUG03	01SEP03	-3	5d										Ere	ct Ro	of Ste	el Adı	nin Bld	lg	
1480	Erect Pre-Cast Walls 3rd Floor Admin Bldg	4	4	0	28AUG03	03SEP03	-3	Зd										E	rect F	re-Ca	st Wa	ills 3rd	Floor	Admin
Maint	enance Building																					·		
1370	Erect Steel for Maint Bldg (shell & roof)	12	12	0	04AUG03	21AUG03	-3	8d								E	irect S	Steel :	for Ma	aint Bl	ldg (sł	nell & ro	oof)	
1510	Erect Pre-Cast Walls Maint Bldg	4	4	0	25AUG03	28AUG03	-3	8d									E	rect F	⊐ re-C: ∣	ast W	alls M	iaint Bl	dg	

## **RFI Impact – Capture Rework**

#### Layout, BLDG - Organized b 🔽 📓 Filter: STL - Structural Stee 🔽 🍸 Lower views: 👬 뒫 📰

- + Erect 1st Floor Steel Admin Bldg

Act	Activity	Oria	Dom	Q	Farly	Farly	Einich	Total													2	003					
ID	Description	Dur	Rem Dur	Comp	Start	Finish	Varian <u>ce</u>	Floa <u>t</u>	20-		JUL	24	20	04	AUC	G	05	04	S	EP		20	00	OCT	20.	07	00
									30	07	14	21	28	04	TT	18	25	01	08	15	22	29	06	13	20	27	03
Admi	in Building																										
1220	Tower Crane Hammock	36 *	23 *	36	10JUL03 A	10SEP03	-7	-1d					×	XXXX	xxxx	xxxx	(XXX)	xxx	Toy	wer C	rane l	Hamn	nock				
1400	Erect Base Columns for Admin Bldg	12	7	75	17JULO3 A	13AUG03	-7	-1d							Ere	ect Ba	ise Ci	olumi	ns for /	Admi	n Bldg	+4 D	ays F	Rem D	)ur fo	r Rev	work
1410	Erect 1st Floor Steel Admin Bldg	8	7	38	29JUL03 A	18AUG03	-7	1d								Erec	t 1st	Floor	Steel	Adm	in Bld	g <b>+2 l</b>	Days	Rem I	Dur f	or Re	work
1580	RFI #57: Steel Moment Connections	3	0	100	30JULO3 A	01AUG03 A	0							RFI#	7: Ste	el Mo	ment	Coni	nection	ns Ad	lded A	Activi	ty				
1420	Erect 2nd Floor Steel Admin Bldg	8	8	0	07AUG03	20AUG03	-5	3d	1						_	Ere	ect 2n	id Flo	or Ste	el Ac	i Imin E	lldg					
1450	Erect Pre-Cast Walls Ground Floor	4	4	0	14AUG03	20AUG03	-7	-1d						L		Ere	ect Pr	e-Ca	st Wal	ls Gr	ound l	Floor					
1430	Erect 3rd Floor Steel Admin Bldg	8	8	0	14AUG03	27AUG03	-5	3d						<b> </b> _		-	<b>E</b> re	ect 3i	rd Floo	, pr Ste	el Adı	min B	İdg				
1460	Erect Pre-Cast Walls 1st Floor Admin Bldg	4	4	0	21AUG03	27AUG03	-7	-1d									Ere	ect P	re-Cas	st Wa	ils 1s I	i Floo	r Adm	in Blo	İg		
1470	Erect Pre-Cast Walls 2nd Floor Admin Bldg	4	4	0	28AUG03	03SEP03	-7	-1d										E	rect Pr	re-Ca	st Wa	lls 2n	d Floo	or Adn	nin Bl	dg	
1440	Erect Roof Steel Admin Bldg	4	4	0	28AUG03	03SEP03	-5	3d									_	E	rect Ro	, pof St	teel Ai	dmin I	Bldg				
1480	Erect Pre-Cast Walls 3rd Floor Admin Bldg	4	4	0	04SEP03	10SEP03	-7	-1d											Ere	ect P	re-Cas	st Wa	lls 3ro	d Floor	r Adn	nin Bl	dg
Maint	tenance Building																										
1370	Erect Steel for Maint Bldg (shell & roof)	12	12	0	04AUG03	21AUG03	-3	8d								Er	rect S	teel f	for Mai	int Bl	dg (sh	ell &	roof)				
1510	Erect Pre-Cast Walls Maint Bldg	4	4	0	25AUG03	28AUG03	-3	8d									En En	rect F	<sup>o</sup> re-Ca	' stW	alls M	aint E	lldg				
		+				+	ti		1	1		1							1		1	1	1	1	1	1	1

## **RFI Impact – Capture Change**

#### Layout: BLDG - Organized b 🔽 📓 📓 Filter: STL - Structural Stee 🗹 🍸 Lower views: 🐫 🃮 🖽

- + Erect Steel for Maint Bldg (shell & roof)

Ant	A otivity	Oria	Dom	07	Farly	Farly	Finioh	Total						AUG       SEP       OCT       NO'         D4       11       18       25       01       06       15       22       29       06       13       20       27       03       10         Fower Crane Hammock         Erect Base Columns for Admin Bldg +4 Days Rem Dur for Rework         Erect 1st Floor Steel Admin Bldg +2 Days Rem Dur for Rework         Erect 1st Floor Steel Admin Bldg +2 Days Rem Dur for Rework         Erect 2nd Floor Steel Admin Bldg +1 Day for Design Change         Erect Pre-Cast Walls Ground Floor         Erect Pre-Cast Walls 1st Floor Admin Bldg         Erect Pre-Cast Walls 1st Floor Admin Bldg         Erect Pre-Cast Walls 2nd Floor Admin Bldg         Erect Pre-Cast Walls 2nd Floor Admin Bldg         Erect Pre-Cast Walls 2nd Floor Admin Bldg														
ID	Description	Dur	Dur	Comp	Start	Finish	Variance	Float		07	JUL	00		, A	AUG	or.	04	5	SEP	22	20 0		OCT	20	27	00	NO\	/
	· · · · · · · · · · · · · · · · · · ·								30	U7	14 21	20	5 U4	11	18	25	UI	Uð	15	22	29 l	Jb	13	20	21	03	10	17
Admi	n Building								L																			
1220	Tower Crane Hammock	36*	23 *	36	10JUL03 A	10SEP03	3       -7       -1d         13       -7       -1d         13       -7       -1d         13       -7       1d         14       -7       -7         14       -7       -7         15       -7       -7         16       -7       -7         16       -7       -7 <td></td> <td></td> <td></td>																					
1400	Erect Base Columns for Admin Bldg	12	7	75	17JUL03 A	13AUG03	-7	-1d			Erect Base Columns for Admin Bldg +4 Days Rem Dur for Rework Erect 1st Floor Steel Admin Bldg +2 Days Rem Dur for Rework RFI #57: Steel Moment Connections Added Activity																	
1410	Erect 1st Floor Steel Admin Bldg	8	7	38	29JUL03 A	18AUG03	-7	1d	1																			
1580	RFI #57: Steel Moment Connections	3	0	100	30JUL03 A	01AUG03 A	0		1			Erect Base Columns for Admin Bldg +4 Days Rem Dur for Rework Erect 1st Floor Steel Admin Bldg +2 Days Rem Dur for Rework Fred H#57: Steel Moment Connections Added Activity Erect 2nd Floor Steel Admin Bldg +1 Day for Design Change Erect Pre-Cast Walls Ground Floor																
1420	Erect 2nd Floor Steel Admin Bldg	8	9	) o	07AUG03	21AUG03	-6	1d	Г		Erect Base Columns for Admin Bldg +4 Days Rem Dur for Rework     Erect 1st Floor Steel Admin Bldg +2 Days Rem Dur for Rework     RFI #57: Steel Moment Connections Added Activity     Erect 2nd Floor Steel Admin Bldg +1 Day for Design Change     Erect Pre-Cast Walls Ground Floor																	
1450	Erect Pre-Cast Walls Ground Floor	4	4	0	14AUG03	20AUG03	-7	-1d	L		Erect Base Columns for Admin Bldg +4 Days Rem Dur for Rework     Erect 1st Floor Steel Admin Bldg +2 Days Rem Dur for Rework     RFI #57: Steel Moment Connections Added Activity     Erect 2nd Floor Steel Admin Bldg +1 Day for Design Change     Erect Pre-Cast Walls Ground Floor																	
1430	Erect 3rd Floor Steel Admin Bldg	8	9	) 0	14AUG03	28AUG03	-6	1d						1			Erect	3rd Flo	or Ste	el Ac	İmin Bl	dg +'	1 Day	for D	)esigı	n Chai	nge	
1460	Erect Pre-Cast Walls 1st Floor Admin Bldg	4	4	0	21AUG03	27AUG03	-7	-1d	Γ				Т		.   •	E	irect l	Pre-Ca	st Wal ∣	ls 1s	t Floor	Adm	in Bld	g				
1470	Erect Pre-Cast Walls 2nd Floor Admin Bldg	4	4	0	28AUG03	03SEP03	-7	-1d	1									Erect P	re-Cas	t Wa	İls 2nd	Floo	or Adm	iin Blo	dg			
1440	Erect Roof Steel Admin Bldg	4	5	Do	01SEP03	08SEP03	-7	1d										Ere	ct Roo	f Ste	el Adm	in Bl	dg <b>+1</b>	Day	for De	esign	Chan	ge
1480	Erect Pre-Cast Walls 3rd Floor Admin Bldg	4	4	0	04SEP03	10SEP03	-7	-1d	Г				Т					E	rect Pr	e-Ca	st Wall	s 3rd	Floor	Adm	in Bld	g		
Maint	enance Building																											
1370	Erect Steel for Maint Bldg (shell & roof)	12	13	0	04AUG03	25AUG03	-4	7d	Γ			_	E			Ere	ect St	eel for	Maint I	Bldg	(shell a	& roo	of) +1 I	) ay fe	or De	sign C	Chang	le
1510	Erect Pre-Cast Walls Maint Bldg	4	4	0	26AUG03	01SEP03	-4	7d							_	_	Er	ect Pre	e-Cast	Walls	s Maint	Bldç	g					

## **RFI Impact – Illustrated**

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Laura ILIDO O

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ñ et.	Activity	Oria	Dom	Q/_	Farbe	Farby	Finieh	Total																		2003	3			
ID	Description	Dur	Dur	Comp	Start	Finish	Variance	Float		7 4/	JUL	14	ho	0.	4	44	AUG 4		25	04		10	SEP	22	20	)	08	0C	20	27
RFI I	npact regarding Steel Connection	IS									+ 2		20	0	4			0	23	0		,0	10	22	23	,	00	13	20	21
1400	Erect Base Columns for Admin Bldg	12	7	75	17JUL03 A	13AUG03     -7     -1d       18AUG03     -7     1d   Erect Base Columns for Admin Bldg +4 Days Rem Dur for Rework Erect 1st Floor Steel Admin Bldg +2 Days Rem Dur for Rework Erect 1st Floor Steel Admin Bldg +4 Days Rem Dur for Rework Erect 1st Floor Steel Admin Bldg +4 Days Rem Dur for Rework Erect 1st Floor Steel Admin Bldg +4 D																								
1410	Erect 1st Floor Steel Admin Bldg	8	7	38	29JUL03 A	18AUG03	-7	1d	d d RFI #57: Steel Moment Connections Added Activity Exect Steel for Meint Bidg (shell & react) +4 Days Rem Dur for Rework																					
1580	RFI #57: Steel Moment Connections	3	0	100	30JUL03 A	01 AUG03 A	0		Erect Base Columns for Admin Bldg +4 Days Rem Dur for Rework Erect 1st Floor Steel Admin Bldg +2 Days Rem Dur for Rework RFI #57: Steel Moment Connections Added Activity Erect Steel for Maint Bldg (shell & roof) +1 Day for Design Ch																					
1370	Erect Steel for Maint Bldg (shell & roof)	12	13	0	04AUG03	25AUG03	-4	7d											Ere	ct Ste	el for	Maint	Bidg (	shell &	roof)	+1 Da	y for	Desigr	h Char	nge
1420	Erect 2nd Floor Steel Admin Bldg	8	9	0	07AUG03	21 AUG03	-6	1d					_					E	rect 2r	nd Flo	or Ste	el Adri	nin Blo	lg <b>+1 D</b> a	ay for	Des	ign C	hange		
1450	Erect Pre-Cast Walls Ground Floor	4	4	0	14AUG03	20AUG03	-7	-1d						Ľ	_			Ere	ect Pre	-Cas	Walls	Grou	nd Flo	or	· · · · · ·		1			
1430	Erect 3rd Floor Steel Admin Bldg	8	9	0	14AUG03	28AUG03	-6	1d						Т	_			-	+	Erect	3rd Fl	oor St	eel Ao	dmin Blo	lg + <b>1</b>	Day f	or De	sign Cl	hange	•
1460	Erect Pre-Cast Walls 1st Floor Admin Bldg	4	4	0	21 AUG03	27AUG03	-7	-1d						Т			.		<b>H</b> E	rect	Pre-Ca	st Wal	lis 1st	Floor A	dmin	Bldg				
1470	Erect Pre-Cast Walls 2nd Floor Admin Bldg	4	4	0	28AUG03	03SEP03	-7	-1d											•		Erect	Pre-C	ast V	Valls 2n	d Floo	r Adn	nin Blo	g		
1440	Erect Roof Steel Admin Bldg	4	5	0	01SEP03	08SEP03	-7	1d						T				_		-	-	Erect	Roof	Steel A	dmin I	3ldg +	i ⊦1 Day	for De	sign	Change
1480	Erect Pre-Cast Walls 3rd Floor Admin Bldg	4	4	0	04SEP03	10SEP03	-7	-1d								]			-			Ere	ct Pre	e-Cast V	Valis 3	Brd Fl	oor Ad	imin Blo	g	

#### **RFI Impact – Final**

#### Layout: BLDG - Organized b 🔽 📓 🖬 Filter: All - All activities 🛛 🔽 🍸 Lower views: 👬 🖡 🗐



### **Analysis of Impacts**

n Analyze Impacts Individually and as a whole
n Isolate the effect of each impact if possible
n Easier to do if analyzed at the time they happen~

## **Analysis of Impacts – By Event**

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1510	Firm Moult Flidg Film	*	ſ	101	1721 NBSA	181 HDS A	~								F	ruu kta 	si Filip	g Fil i S	insterni	1.00.00	Record	oo ea 0843											
1400	FRE Provident Web is for Admin Ekke	20	c	103	C2JUND3 A	2000L03 A	-3											1		7 (M) :	: for 41	n n Fildic 5	usper	nd 06 🖷	d - Rre	anne:	ng vizi						
1200	SEVEREWEATHER OF RAN	3	ſ	101	0 (71 NB3A)	tra i hite 🗚	ſ							<b>■</b> 58'	VEREW	E-7	Η∓ €"	5/4N)	Added a	Velivily	•												
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## **Analysis of Impacts – By Type**

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### **Presentation of Impacts**

Illustrate Impacts, then:
 nCommunicate the impact
 nGet acknowledgement of the impact
 nGet extension
 nPresent Multiple Options for Recovery (with \$'s)
 nDevelop new plan to proceed forward~

## **Presenting Options - RFI**

n Leave as is, finish 7 days late

nPro = costs and risks are known, plan is in place

nCon = extended GC's, Equipment \$'s

n Work crane related activities 5 or 6 days / Week nPro = Finish sooner, decreased GC & Equip. \$'s nCon = Increased direct \$'s, Decreased Productivity, increased Safety exposure

#### n Re-sequence the work (if possible) nPro = Finish sooner, decreased GC & Equip. \$'s nCon = Increased Safety Risk, Decreased Productivity~

### **RFI Impact – Whole Schedule**

Lavout: IMPC - Organized b 🔽 😼 👪 Filter: All - All activities 🖵 🍸 Lowerviews: 🚮 🛅 🗐

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1550 Project Complete

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- + 1120 20AUG03 Wed 2002 Orig Rem % Dur Dur Comp Act Activity. Early Start Early Finish Total MAY JUN JUL AUG SEP OCT NC 12 19 26 02 09 16 23 30 07 14 21 28 04 11 18 25 01 08 15 22 29 06 13 20 27 03 Description Finish Variance Float 05 28 Subcontractor Performance Deficiency Excavate for Bldg Foundations 1020 Excavate for Bldg Foundations 0 100 28APR03 13MAY03 81 -2 Form Admin Bldg Fdn Changed Calendar to 5 days / Week 1120 Form Admin Bldg Fdn 12 0 100 14MAY03 29MAY03 0 1130 Install Rebar Admin Bldg Fdn Install Rebar Admin Bldg Fdn 12 0 100 20MAY03 O9JUNO3 A -1 Subcontractor Late Start Install Underground Utilities Changed Calendar to 5 days / Week 1040 Install Underground Utilities 06MAY03 21MAY03 12 0 100 💻 Install Temp Electric 1060 Install Temp Electric 4 0 100 19MAY03 22MAY03 n 1520 Underground Work Complete 0 0 Underground Work Complete 100 22MAY03 0 Week 8/9 Severe Weather Delay Form Maint. Bldg Fdn Suspend 06/09 - Resume 06/12 1310 Form Maint, Bldg Fdn 8 0 100 02JUN03 A 18JUN03 A -3 FRP Pre-Cast Walls for Admin Bldg Suspend 06/09 - Resume 06/12 1490 FRP Pre-Cast Walls for Admin Bldg 20 0 100 02JUN03 A 09JUL03 A -3 SEVERE WEATHER - 5" RAIN Added Activity 1200 SEVERE WEATHER - 5" RAIN 3 0 100 07JUN03 A A CONULEO 0 DELAY POUR FOR DEWATERING Added Activity 10JUN03 A 1210 DELAY POUR FOR DEWATERING 2 0 100 11JUN03 A 0 Pour Tower Crane Fdn Added Dewatering Pred. 1180 Pour Tower Crane Fdn 1 0 100 12JUN03 A 12JUN03 A -3 Pour Admin Bldg Fdn Added Dewatering Pred. 1140 Pour Admin Bldg Fdn 4 0 100 12JUN03 A 18JUN03 A -3 1340 Install Rebar Maint Bldg Fdn 8 0 100 19JUN03 A 02JUL03 A -3 Install Rebar Maint Bldg Fdn 💻 Cure Admin Bldg Fdn / Crane Fdn 1170 Cure Admin Bldg Fdn / Crane Fdn 28 n 100 19JUN03 A 16JUL03 A -6 FRP Pre-Cast Walls for Maint Bldg 1500 FRP Pre-Cast Walls for Maint Bldg 16 16JUL03 A 0 100 19JUN03 A -3 Pour Maint Bldg Fdn 1350 Pour Maint Bldg Fdn 0 100 03JUL03 A 03JUL03 A -3 1360 Cure Maint Bldg Fdn 28 04JULO3 A 31JUL03 A -3 Cure Maint Bldg Fdn 0 100 Mob & Erect Tower Crane 1190 Mob & Erect Tower Crane 4 0 100 10JUL03 A 16JUL03 A -3 **RFI Impact regarding Steel Connections** 1220 Tower Crane Hammock 36 \* 23 \* 36 10JUL03 A 10SEP03 🍽 Tower Crane Hammock -7 36 1400 Erect Base Columns for Admin Bldg 12 75 17JUL03 A 13AUG03 -7 Зd Erect Base Columns for Admin Bldg +4 Days Rem Dur for Rework 7 5d Erect 1st Floor Steel Admin Bldg +2 Days Rem Dur for Reworl 1410 Erect 1st Floor Steel Admin Bldg 8 7 38 29JUL03 A 18AUG03 -7 RFI #57: Steel Moment Connections Added Activity 1580 RFI #57: Steel Moment Connections з 0 100 30JUL03 A 01AUG03 A n. Erect Steel for Maint Bldg (shell & roof) +1 Day for Design 1370 Erect Steel for Maint Bldg (shell & roof) 12 13 0 04AUG03 25AUG03 11d -4 0 07AUG03 5d Erect 2nd Floor Steel Admin Bldg +1 Day for Design Chang 1420 Erect 2nd Floor Steel Admin Blda 8 9 21AUG03 -6 Erect Pre-Cast Walls Ground Floor 1450 Erect Pre-Cast Walls Ground Floor 4 4 0 14AUG03 20AUG03 -7 Зd 💳 Erect 3rd Floor Steel Admin Bldg +1 Day for Design Cl 1430 Erect 3rd Floor Steel Admin Bldg 8 9 0 14AUG03 28AUG03 -6 5d Erect Pre-Cast Walls 1st Floor Admin Bldg Зd 1460 Erect Pre-Cast Walls 1st Floor Admin 4 4 0 21AUG03 27AUG03 -7 Erect Pre-Cast Walls Maint Bldg 1510 Erect Pre-Cast Walls Maint Bldg 4 4 0 26AUG03 0186203 11d .4 Erect Pre-Cast Walls 2nd Floor Admin Bldg 1470 Erect Pre-Cast Walls 2nd Floor Admin 4 4 0 28AUG03 03SEP03 -7 Зd Erect Roof Steel Admin Bldg +1 Dav for Desig 1440 Erect Roof Steel Admin Bldg 4 5 0 01SEP03 085EP03 -7 5d Maint Bldg Buffer 1570 Maint Bldg Buffer 2 2 0 0255503 03SEP03 .4 11d Maint Bldg Shell Complete 1540 Maint Bldg Shell Complete ol 03SEP03 11d 0 0 -4 Erect Pre-Cast Walls 3rd Floor Admin Bldg 1480 Erect Pre-Cast Walls 3rd Floor Admin 4 0 04SEP03 10SEP03 Зd 4 -7 💻 Admin Bldg Buffer 1560 Admin Blda Buffer 4 Зd 4 0 11SEP03 17SEP03 -7 ♦ Admin Bldg Shell Complete 1530 Admin Blda Shell Complete 0 17SEP03 -7 Зd

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-7

Project Complete Changed Constraint

# **RFI Impact – Isolated**

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Act	Activity	Oria	Rem	%	Early	Early	Finish	Total				_									200	)3						
ID	Description	Dur	Dur	Comp	Start	Finish	Variance	Float	07	JUL	04	10	04	AL 44	JG	25	0.	1	S ۵۰	SEP 45	22	20	0e	4.2	CT DO	27	02	10 NO
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1220	Tower Crane Hammock	36 *	23 *	36	10JUL03 A	10SEP03	-7	-1d	┝					XXX	×××	××××			• 10'	wer ( I	Jrane I	Hamm	IOCK					
1400	Erect Base Columns for Admin Bldg	12	7	75	17JUL03 A	13AUG03	-7	-1d					1	E	rect E	lase C	iolum	ns fo	or Adr	nin Bl I	dg +4	Days I	Rem	Dur f	or Re	work		
1410	Erect 1st Floor Steel Admin Bldg	8	7	38	29JUL03 A	18AUG03	-7	1d					<u> </u>		Er	ect 1st	t Floo	or Ste	eel Ad	lmin E	∃ldg +2	2 Day:	s Rem	i Dur	for Re	ework		
1580	RFI #57: Steel Moment Connections	3	0	100	30JUL03 A	01 AUG03 A	0		1				RFI #57:	: Ste	el Mo	ment C	Conine	ectio	ns Ad	ded	Activ	ity						
1370	Erect Steel for Maint Bldg (shell & roof)	12	13	0	04AUG03	25AUG03	-4	7d	1							<b>E</b> r	ect S	teel	for Ma	aint B	ldg (sl	hell &	roof) +	1 Day	y for C	)esign	Chan	ge
1420	Erect 2nd Floor Steel Admin Bldg	8	9	0	07AUG03	21 AUG03	-6	1d								Erect	2nd I	Floor	Steel	Adm	in Bldg	g <b>+1 D</b>	ay for	Des	ign Cl	hange		11
1450	Erect Pre-Cast Walls Ground Floor	4	4	0	14AUG03	20AUG03	-7	-1d	1				L		-	Erect F	Pre-C	ast V	Valls (	Groui	nd Floo	or						
1430	Erect 3rd Floor Steel Admin Bldg	8	9	0	14AUG03	28AUG03	-6	1d	1						+	+	Erec	t 3rc	Floor	Stee	Adm	in Bld	g +1 Da	ay for	r Desi	ign Chi	ange	
1460	Erect Pre-Cast Walls 1st Floor Admin Bldg	4	4	0	21 AUG03	27AUG03	-7	-1d	1						•		Erect	Pre	Cast	Walls	ist Fl	loor A	dmin B	lldg				
1510	Erect Pre-Cast Walls Maint Bldg	4	4	0	26AUG03	01SEP03	-4	7d							_		E E	Frect	Pre-C	ast V	Valls N	vlaint E	ldg					
1470	Erect Pre-Cast Walls 2nd Floor Admin Bldg	4	4	0	28AUG03	03SEP03	-7	-1d								•		Ere	ct Pre	-Cas	t Walls	s 2nd I	Floor A	dmin،	Bldg		1	
1440	Erect Roof Steel Admin Bldg	4	5	0	01SEP03	08SEP03	-7	1d							_				Erect	t Roo	f Stee	l Adm	in Bldg	; +1 D ∣	ay for	Desig	n Chai	nge
1570	Maint Bldg Buffer	2	2	0	02SEP03	03SEP03	-4	7d								_		∎ Mai	nt Bld	g But	ifer							
1540	Maint Bldg Shell Complete	0	0	0		03SEP03	-4	7d										♦Ma	aint Blo	ig Sh	iell Cor	mplete						
1480	Erect Pre-Cast Walls 3rd Floor Admin Bldg	4	4	0	04SEP03	10SEP03	-7	-1d											Ere	ect Pr	e-Cas	t Walk	s 3rd F	loor /	Admin	Bldg		
1560	Admin Bldg Buffer	4	4	0	11SEP03	17SEP03	-7	-1d										_		<b>Α</b>	dmin E	3ldg B	uffer					
1530	Admin Bldg Shell Complete	0	0	0		17SEP03	-7	-1d												•/	Admin I	Bidg S	Shell Co	omple	te			
1550	Project Complete	0	0	0		17SEP03	-7	-1d												♦F	Project	Comp	lete C	hang	ed Co	onstrai	nt +2 c	Jays

## **RFI Impact – Date Extension**

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	► -7																					
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Gen	eral																					
1000	Notice to Proceed	0	0	100	14APR03 A		0															Τ
1010	Contractor Mobilize	8	0	100	14APR03 A	24APR03 A	0															
1240	Establish Site Benchmarks	2	0	100	22APR03 A	24APR03 A	-2															
1110	Deliver Final IFC Drawings	0	0	100		23APR03 A	1															
1090	Submit Conc. Mix Design	0	0	100		30APR03 A	1															
1100	Approve Mix Design	8	0	100	01MAY03	15MAY03 A	0			- 1												
1550	Project Complete	0	0	0		17SEP03	-7	-1d	Proje	ect Cor	nplete	Change	d Con	strain	t +2 days	6						
Adn	nin Building						С	onstr	aints -	- SI F	RFI	IMPAC	Гб		×							
1020	Excavate for Bldg Foundations	8	0	100	28APR03 A	13MAY03 A																
1040	Install Underground Utilities	12	0	100	06MAY03	21MAY03 A		550 -	Project	Com	plete	)			↑↓							
1120	Form Admin Bldg Fdn	12	0	100	14MAY03	29MAY03 A						_										
1060	Install Temp Electric	4	0	100	19MAY03	22MAY03 A		🗖 <u>S</u> te	art cons	straint		🔽 <u>E</u> ir	nish c	constra	aint							
1130	Install Rebar Admin Bldg Fdn	12	0	100	20MAY03	09JUN03 A		O Ea	aly			OEa	ulv									
1520	Underground Work Complete	0	0	100		22MAY03 A		01.	to			<b>G</b> 1 a										
1160	Prep Tower Crane Fdn	4	0	100	02JUN03 A	05JUN03 A			ue				ĩe									
1490	FRP Pre-Cast Walls for Admin Bldg	20	0	100	02JUN03 A	09JUL03 A					Ψ.	16SE	P03		<b>_</b>							┛
1200	SEVERE WEATHER - 5" RAIN	3	0	100	07JUN03 A	09JUN03 A		= ~							Sep	tembo	er 20	003		. –		
1210	DELAY POUR FOR DEWATERING	2	0	100	10JUN03 A	11JUN03 A			art <u>o</u> n			<u>su</u>	<u>n    </u>	Mon	lue	vve	<u>a</u>	Inu	<u>⊢</u> ⊢r	Щ	<u>Sat</u>	
1180	Pour Tower Crane Fdn	1	0	100	12JUN03 A	12JUN03 A					-	1		1	2	3		4	5		6	
1140	) Pour Admin Bldg Fdn	4	0	100	12JUN03 A	18JUN03 A	-				_		+		+	-	-			+		
1170	Cure Admin Bldg Fdn / Crane Fdn	28	0	100	19JUN03 A	16JUL03 A		E Ex	pected	finish	ì	7		8	9	10		11	12	:	13	
1190	Mob & Erect Tower Crane	4	0	100	10JUL03 A	16JUL03 A					Ţ									$\top$		
1220	Tower Crane Hammock	36 *	23 *	36	10JUL03 A	10SEP03		·				14	1	15	16	17		18	19	<u>'</u>	20	
1400	Erect Base Columns for Admin Bldg	12	7	75	17JUL03 A	13AUG03		E Flo	ba <u>t</u> cons	strain	t			00	00	04		05	00	, T	07	
1410	Erect 1st Floor Steel Admin Bldg	8	7	38	29JUL03 A	18AUG03		<b>O</b> 7e	ro total	float				22	23	24		25	20	<u>'</u>	21	
1580	RFI #57: Steel Moment Connections	3	0	100	30JUL03 A	01 AUG03 A		C	loto or		ailala	25	2	29	30							
1420	Erect 2nd Floor Steel Admin Bldg	8	9	0	07AUG03	21 AUG03		U <u>A</u> s	nate as	, hos	siple	-20	<u> </u>	20								
1450	Erect Pre-Cast Walls Ground Floor	4	4	0	14AUG03	20AUG03													165	SEP	03	-
			-																			

#### **RFI Impact – Date Extension**

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- +	Changed Constraint +2 days Weat	her, +	4 day	s RFI																			
Act	Activity	Oria	Rem	%	Early	Early	Finish	Total							2003	3		_					
ID	Description	Dur	Dur	Comp	Start	Finish	Variance	Float	SE 15 (1	EP 22 29	06	0CT 13	20	27	03	NOV 10 17	24	01	DE 08 1	EC 5 22	29	05 1	JAN 2 1
Gene	eral						•															<u> </u>	
1000	Notice to Proceed	0	0	100	14APR03 A		0																
1010	Contractor Mobilize	8	0	100	14APR03 A	24APR03 A	0																
1240	Establish Site Benchmarks	2	0	100	22APR03 A	24APR03 A	-2																
1110	Deliver Final IFC Drawings	0	0	100		23APR03 A	1																
1090	Submit Conc. Mix Design	0	0	100		30APR03 A	1																
1100	Approve Mix Design	8	0	100	01MAY03	15MAY03 A	0						1					[]					
1550	Project Complete	0	0	0		17SEP03	-7	-1d	♦Press	oject Co	mplete	Chai	nged	Cons	strain	t +2 days	s Weat	ther,	+4 day	/s RFI			
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1020	Excavate for Bldg Foundations	8	0	100	28APR03 A	13MAY03 A				_													
1040	Install Underground Utilities	12	0	100	06MAY03	21MAY03 A		1550 - F	Proje	ct Corr	plete	;				↑↓							
1120	Form Admin Bldg Fdn	12	0	100	14MAY03	29MAY03 A																	
1060	Install Temp Electric	4	0	100	19MAY03	22MAY03 A		🗖 <u>S</u> ta	urt cor	nstrain	t		<u>F</u> ini:	sh co	onstra	aint							
1130	Install Rebar Admin Bldg Fdn	12	0	100	20MAY03	09JUN03 A		O <u>E</u> a	rly			C	Ear	ly .				ļ				_	
1520	Underground Work Complete	0	0	100		22MAY03 A		O Lat	P			6	Late	-									
1160	Prep Tower Crane Fdn	4	0	100	02JUN03 A	05JUN03 A			~														
1490	FRP Pre-Cast Walls for Admin Bldg	20	0	100	02JUN03 A	09JUL03 A		I			<b>Y</b>	2	3SEF	PO3					2000				
1200	SEVERE WEATHER - 5" RAIN	3	0	100	07JUN03 A	09JUN03 A							<u></u>	R	100	Sep	tem	ber 2	2003	; .   r	- mi	Cat	
1210	DELAY POUR FOR DEVVATERING	2	0	100	10JUN03 A	11JUN03 A			ara <u>o</u> ri			11-	Sur		lon	Tue		ea	In	<u>1   1</u>	-n	581	-
1180	Pour Tower Crane Fdn	1	0	100	12JUN03 A	12JUN03 A					Ψ.	1			1	2	:	3	4		5	6	
1140	Pour Admin Bldg Fdn	4	0	100	12JUN03 A	18JUN03 A								+									
1170	Cure Admin Bldg Fdn / Crane Fdn	28	0	100	19JUN03 A	16JUL03 A		E Ex	pecte	d finis	h		7		8	9	1	0	11		12	13	
1190	Mob & Erect Tower Crane	4	0	100	10JUL03 A	16JUL03 A					-				45	40		_	40			~~~	_
1220	Tower Crane Hammock	36 *	23 *	36	10JUL03 A	10SEP03		<u> </u>					14		15	16		1	18		19	20	_
1400	Erect Base Columns for Admin Bldg	12	7	75	17JUL03 A	13AUG03		🗌 Fic	a <u>t</u> co	nstrair	nt		21	.	22	22	2	и	25		ac	27	
1410	Erect 1st Floor Steel Admin Bldg	8	7	38	29JUL03 A	18AUG03		O Ze	ro tota	al float			21	+		20		.4	_25		20	27	_
1580	RFI #57: Steel Moment Connections	3	0	100	30JUL03 A	01 AUG03 A		C As	late a	38 009	sible		28		29	30							
1420	Erect 2nd Floor Steel Admin Bldg	8	9	0	07AUG03	21 AUG03		<u> </u>	12112 0		21010									_			
1450	Erect Pre-Cast Walls Ground Floor	4	4	0	14AUG03	20AUG03														23	3SEF	·03	-
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## **RFI Impact – Revised End Date**

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### Presenting Options – 5 Days / Week

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Act	Activity Description	Orig Dur	Rem Dur	% Comp	Early Start	Early Finish	Finish Variance	Total Float	JUN	2003 N JUL AUG SEP OCT NOV D	DEC
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RELI	npact regarding Steel Connection	IS				1					
1220	Tower Crane Hammock	32 *	19*	41	10JUL03 A	03SEP03	-3	7d		Record And And And And And And And And And An	
1400	Erect Base Columns for Admin Bldg	12	7	75	17JUL03 A	12AUG03	-8	9d	5-10	0's schedule Event Base Columns for Admin Bldg +4 Days Rem Dur for Rework	
1410	Erect 1st Floor Steel Admin Bldg	8	7	38	29JUL03 A	14AUG03	-7	11d		5-10's schedule Experimental Erect 1st Floor Steel Admin Bldg +2 Days Rem Dur for Rework	
1580	RFI #57: Steel Moment Connections	3	0	100	30JUL03 A	01 AUG03 A	0			5-10's schedule RFI #57: Steel Moment Connections Added Activity	
1370	Erect Steel for Maint Bldg (shell & roof)	12	13	0	04AUG03	20AUG03	-2	18d		5-10's schedule Erect Steel for Maint Bldg (shell & roof) +1 Day for Design Change	
1420	Erect 2nd Floor Steel Admin Bldg	8	9	0	06AUG03	18AUG03	-4	12d		5-10's schedule Erect 2nd Floor Steel Admin Bldg +1 Day for Design Change	
1430	Erect 3rd Floor Steel Admin Bldg	8	9	0	12AUG03	22AUG03	-3	12d		5-10's schedule Erect 3rd Floor Steel Admin Bldg +1 Day for Design Change	
1450	Erect Pre-Cast Walls Ground Floor	4	4	0	13AUG03	18AUG03	-7	9d		5-10's schedule Erect Pre-Cast Walls Ground Floor	
1460	Erect Pre-Cast Walls 1st Floor Admin Bldg	4	4	0	19AUG03	22AUG03	-6	9d		5-10's schedule Erect Pre-Cast Walls 1st Floor Admin Bldg	
1510	Erect Pre-Cast Walls Maint Bldg	4	4	0	21 AUG03	26AUG03	-1	18d		5-10's schedule Erect Pre-Cast Walls Maint Bldg	
1470	Erect Pre-Cast Walls 2nd Floor Admin Bldg	4	4	0	25AUG03	28AUG03	-5	9d		5-10's schedule Erect Pre-Cast Walls 2nd Floor Admin Bldg	[
1440	Erect Roof Steel Admin Bldg	4	5	0	25AUG03	29AUG03	-3	12d		5-10's schedule Erect Roof Steel Admin Bldg +1 Day for Design Change	
1570	Maint Bldg Buffer	2	2	0	27AUG03	28AUG03	-1	14d		Maint Bidg Buffer	
1540	Maint Bldg Shell Complete	0	0	0		28AUG03	-1	14d	1	Maint Bldg Shell Complete	
1480	Erect Pre-Cast Walls 3rd Floor Admin Bldg	4	4	0	29AUG03	03SEP03	-4	9d		5-10's schedule Erect Pre-Cast Walls 3rd Floor Admin Bldg	
1560	Admin Bldg Buffer	4	4	0	04SEP03	10SEP03	-3	7d		Admin Bldg Buffer	
1530	Admin Bldg Shell Complete	0	0	0		10SEP03	-3	7d		Admin Bldg Shell Complete	
1550	Project Complete	0	0	0		10SEP03	-3	7d		Project Complete Changed Constraint +2 days Weather, +4 days P	1-15

### Presenting Options – 6 Days / Week

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Erect Pre-Cast Walls 3rd Floor Admin Bldg 23JUN03 Md 2003 Activity Orig Rem % Act Early Early Finish Total JUN AUG SEP OCT NOV JUL ID Dur Dur Comp Start Finish Variance Float Description 23 30 07 14 21 28 04 11 18 25 01 08 15 22 29 06 13 20 27 03 10 17 24 01 **RFI Impact regarding Steel Connections** 1220 Tower Crane Hammock 29 \* 16 \* 45 10JUL03 A 29AUG03 0 10d CXXXXXXXXXX Tower Crane Hammock Erect Base Columns for Admin Bldg +4 Days Rem Dur for Rework 1400 Erect Base Columns for Admin Bldg -9 15d 6-10's schedule I 12 75 17JUL03 A 11AUG03 6-10's schedule Erect 1st Floor Steel Admin Bldg +2 Days Rem Dur for Rework -7 1410 Erect 1st Floor Steel Admin Bldg 38 29JUL03 A 13AUG03 17d 6-10's schedule 🔤 RFI #57: Steel Moment Connections Added Activity 1580 RFI #57: Steel Moment Connections 0 100 30JUL03 A 01 AUG03 A 0 6-10's schedule Erect Steel for Maint Bldg (shell & roof) +1 Day for Design Change 0 25d 1370 Erect Steel for Maint Bldg (shell & roof) 12 13 0 04AUG03 18AUG03 -3 6-10's schedule Erect 2nd Floor Steel Admin Bldg +1 Day for Design Change 9 15AUG03 1420 Erect 2nd Floor Steel Admin Bldg 8 0 06AUG03 18d 6-10's schedule Erect 3rd Floor Steel Admin Bldg +1 Day for Design Change 1430 Erect 3rd Floor Steel Admin Bldg 9 0 11AUG03 20AUG03 -1 18d -7 6-10's schedule Erect Pre-Cast Walls Ground Floor 1450 Erect Pre-Cast Walls Ground Floor 4 0 12AUG03 15AUG03 15d 6-10's schedule Erect Pre-Cast Walls 1st Floor Admin Bldg -5 1460 Erect Pre-Cast Walls 1st Floor Admin Bldg 4 0 16AUG03 20AHG03 15d 6-10's schedule 🔤 Erect Pre-Cast Walls Maint Bldg 1510 Erect Pre-Cast Walls Maint Bldg 4 0 19AUG03 22AUG03 2 25d 6-10's schedule Erect Pre-Cast Walls 2nd Floor Admin Bldg 1470 Erect Pre-Cast Walls 2nd Floor Admin Bldg 4 0 21 AUG03 25AUG03 -3 15d 6-10's schedule Erect Roof Steel Admin Bldg +1 Day for Design Change 1440 Erect Roof Steel Admin Bldg 5 0 21 AUG03 Ô. 26AUG03 180 Maint Bldg Buffer 2 1570 Maint Bldg Buffer 2 0 25AUG03 26AUG03 16d 6-10's schedule 🔤 Erect Pre-Cast Walls 3rd Floor Admin Bldg 1480 Erect Pre-Cast Walls 3rd Floor Admin Bldg 0 26AUG03 29AUG03 4 15d -1 Maint Bldg Shell Complete 1540 Maint Bldg Shell Complete 0 26AUG03 16d 0 0 Admin Bldg Buffer 1560 Admin Bldg Buffer 4 0 01 SEP03 n 04SEP03 10d Admin Bldg Shell Complete 1530 Admin Bldg Shell Complete n 04SEP03 Ω 10d Ω Ω Project Complete Changed Constraint +2 days Weather, +4 days RFI 1550 Project Complete 0 n Ω 04SEP03 0 10c

#### Capturing Delays and Impacts Summary

- n Foundation of schedule must be sound
  - nCover scope of work for all parties
  - nCoding structure
  - nLogic
  - nDurations
- n Update Regularly

nFile, Save As, ... for every update period nCapture AS, AF, % Comp., RD every week nAnalyze the Update nMaintain scheduler's narrative & log~

#### Capturing Delays and Impacts Summary

**n** Capture the Impacts

nAdd impacts to the schedule as they happen nLog changes to the schedule nCode the impact

nAnalyze

n Communicate

nPresent the impact nGet Acknowledgement nPresent Options nMake a new plan~

#### **Scheduling Techniques Summary**

#### n Solid Plan

nContractual Language nIntegrated Schedule – 5 Phases nCPM, Resource Loaded
n Built Well
n"Mechanics" are correct
nCoding / Structure is sound
nProtocol developed early~

#### **Scheduling Techniques Summary**

**n** Check the Schedule **nPeer Review** nReview with Core Team nPerform Risk Analysis **n** Use the Schedule **nField** Information nManagement Information **n** Capture the Problems **nIllustrate Impacts nForecast Delays** nProvide Options~



# The End

Scheduling Techniques to Optimize Execution Tony Bolstad, *Senior Project Controls Manager*; Scheduling & Information Services, Inc. <u>Tony.Bolstad@1sis.com</u>

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www.1sis.com

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