Design & Development of a Schedule Management Plan

Session #PRJ10

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PMI Global Congress EMEA 2011

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Chris Carson, PSP, CCM, PMP

- **Corporate Director of Project Controls, Alpha Corporation**
  - Developed and manages the PMO (Project Management Office) for Alpha Corporation
  - Responsible for standards, processes, and procedures for a team of schedulers, analysts, and project managers in multiple office locations, as well as analysis, work product, and testimony
  - Developed and manages the in-house project controls training program at Alpha
- **Certifications:**
  - PSP (Planning & Scheduling Professional – AACEi)
  - CCM (Certified Construction Manager - CMAA)
  - PMP (Project Management Professional – PMI)
- **University:** University of Virginia, Mechanical Engineering, 1968 - 1972
- **Professional Field:** 38 years of experience in Construction Management Services specializing in Scheduling, Schedule Analysis, Estimating, Claims
- **Active in PMI** (Project Management Institute) Scheduling Community of Practice
  - Vice President of Scheduling Excellence for CoS
  - Managing Director for SEI (Scheduling Excellence Initiative) writing Best Practices and Guidelines for Scheduling and Schedule Impact Analysis
  - Serving on team writing Best Practices for Scheduling for GAO
- **Active in CMAA** (Construction Management Association of America)
  - Served on committee revising Time Management Chapter of CMAA's CM Standards of Practice
- **Active in AACEi** (Association for the Advancement of Cost Estimating International)
  - Member of P&S and CDR Committees
  - Author of Recommended Practices in Scheduling & Editor of Forensic Schedule Analysis RP
- **Active in Planning Planet**
  - Chief Editor for US, writing Planner Users' Guide, developing accreditations through a Guild for planners and
- **Award**
  - "Significant Contributions to Scheduling Profession", 2008 CoS Annual Conference

Schedule Management Plan

- The PMBOK® Guide describes the Project Management Plan
  - "Process of documenting actions necessary to define, prepare, integrate, coordinate all subsidiary plans"
    - Knowledge Area – Integration
    - Process Group – Planning
  - Inputs
    - "Outputs from many planning processes are integrated to create the Project Management Plan (PMP)"
    - "Any baselines & subsidiary management plans that are output from other planning processes are inputs here"

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Schedule Management Plan

- The PMBOK® Guide
  - Does not describe or define the Schedule Management Plan
  - Except to note the existence of subsidiary plans such as the "Schedule Management Plan"
- Described in the introduction to Chapter 6 as a
  - "schedule management plan that selects a scheduling methodology, a scheduling tool, and sets the format and establishes criteria for developing and controlling the project schedule."

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Schedule Management Plan

- Purpose of the schedule management plan?
  - Schedule Development meets the criteria for a “project” in itself
  - The SMP provides a methodical approach for the schedule development
  - Keeps the schedule development on track
  - Prevents rework due to late understanding of needs
  - Allows buy-in from end users prior to development
  - Makes the schedule development session much more meaningful
  - Documents the assumptions and intention of the schedule
    - For reviewer and approver
    - For future reference
    - To facilitate changes in schedulers
    - Place to capture Lessons Learned

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Schedule Management Plan

- Scope of SMP vs. Schedule Development Processes
  - Schedule Management Plan– Conceptualizing the schedule effort (designing the schedule)
    - Planning
    - Starting with the end in mind
    - Providing concept of final product
    - Creating organizational structure to fulfill the concept
  - Development - Building the schedule
    - Define activities
    - Sequence activities - input logic
    - Estimate activity resources
    - Estimate activity durations
    - Develop schedule
    - Monitor and Control schedule

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Schedule Management Plan

- Documentation & use of Schedule Management Plan
  - Create a book or binder
  - Use the highest level of checklist outline items as tabs
  - Use the book as basis for SMP submittal documentation
  - Keep the book current during project
  - Use the book for handoff between schedulers
  - Share a copy of the book with superintendent/PM
- Timing of the SMP
  - Must be done prior to Schedule Development

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Components of Schedule Management Plan

1. Project Description
    1. Reference Documents Needed for the SMP
        1. Contract
        2. Project Drawings
        3. Specifications
        4. Scheduling Specification
        5. Notice to Proceed or Release Letter
        6. Any Owner produced master schedule
        7. Liquidated Damages schedule
        8. Area Designation Plan
        9. Sequencing plan
        10. Estimate & quantity surveys/bills of materials

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Components of Schedule Management Plan

2. Team Players
    1. Organizational Chart
    2. Who are Schedule Users?
        1. Who has Input
        2. Who Updates
        3. Who Checks for Accuracy
        4. Who Reviews
        5. Who approves
    3. Identify Responsibility Assignment Matrix (RAM)

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Components of Schedule Management Plan

- RAM Example (based on PMBOK® RACI Chart)
  - Correlates tasks with roles and individuals

RACI Chart (from PMBOK)	Roles				
Task	Project Controls Manager	Scheduler	Project Manager	Superintendent	Assistant Super
Schedule Design	R	I	C	C	I
Schedule Development	A	R	C	C	I
Schedule Statusing	I	A	I	A	R
Schedule Updating/Analysis	C	R	A	I	I
Schedule Reporting	C	R	I	I	A
Change Management	C	R	I	A	A
Recovery	C	R	I	A	I
Closeout	I	A	I	C	R

R = Responsible, A = Accountable, C = Consult, I = Inform

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Components of Schedule Management Plan

3. Software Identification
    1. Specific software required
        1. Required minimum and versions allowed
    2. Enterprise specific issues
        1. Users identified
        2. Schedules used for import or data source
        3. Levels of access
        4. Validation process
        5. For master schedules, establish data dates

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Components of Schedule Management Plan

4. Work Product
    1. What the Schedule can be used for (purpose)
    2. Reports Generated from the Schedule
        1. Who receives reports
        2. List of reports
        3. Samples of reports
    3. Glossary/Lexicon of ambiguous terms (or cultural terms – is it programme or schedule?)
5. Schedule Outline
    1. Key Activities being tracked
    2. Client Milestones
    3. Long Lead Items
    4. WBS Structure & cost accounts
    5. Other Contracts on Project

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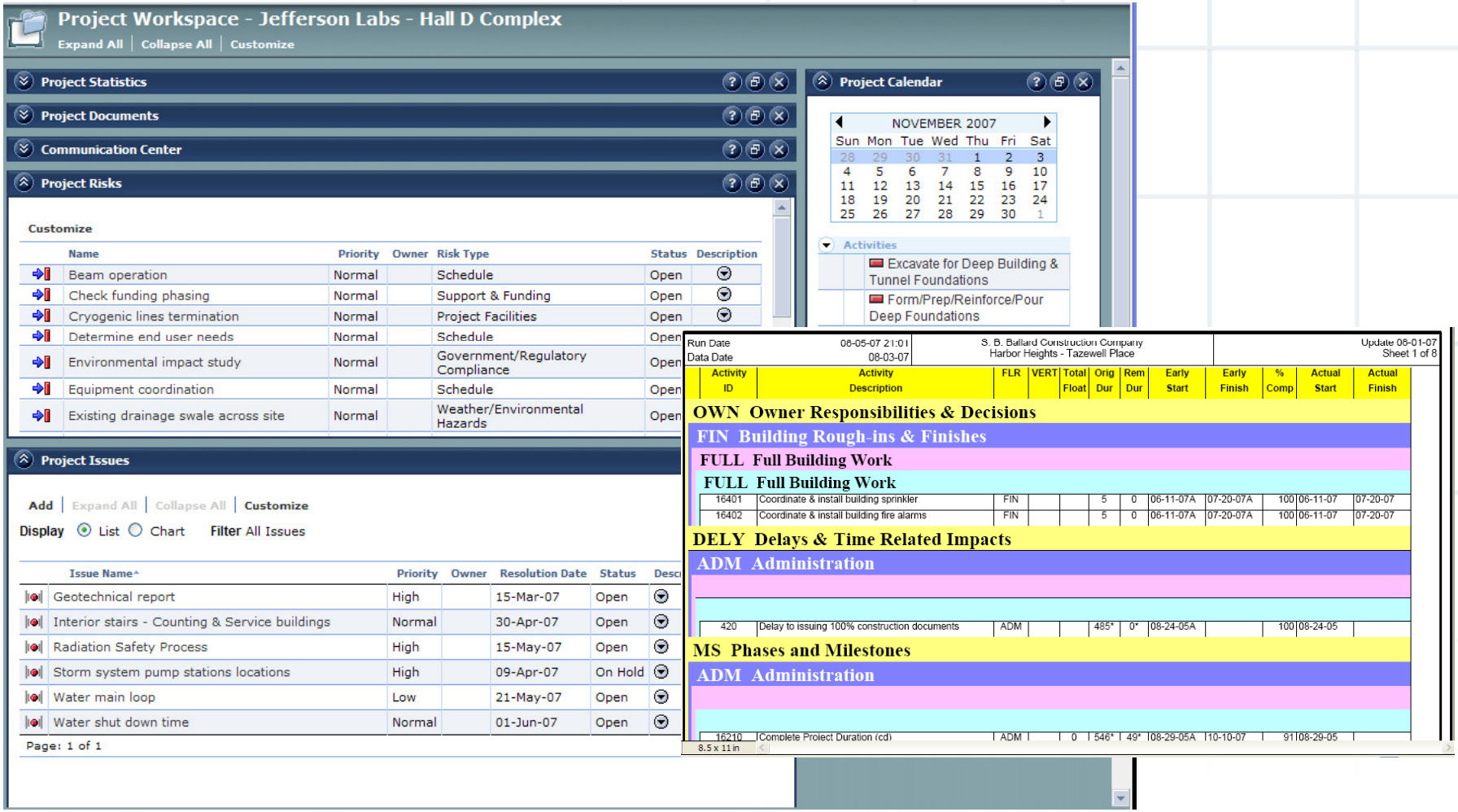
Components of Schedule Management Plan

- Reporting



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Components of Schedule Management Plan

6. Work Packages or Tenders
    1. By Contract
    2. As assigned by Client
7. Level of Detail
    1. Determine approach:
        1. Bottom-up (starting with detailed activities)
        2. Top-down (starting with summary schedule)
        3. Both (prepare Top-down, then Bottom-up)
    2. Identify frequency of updates
    3. Establish smallest activity duration range

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Components of Schedule Management Plan

8. Codes Dictionary
    1. For tracking and monitoring work:
        1. Work Phase
        2. Structure
        3. Area
        4. Floor or Station
        5. Location
    2. For Project Management:
        1. Responsibility
        2. Work Shifts
        3. Costs
        4. Resource
        5. Specification
        6. Change management

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Components of Schedule Management Plan

9. Calendars
    1. Establish number needed
    2. Define calendars and application
10. Costs & Resources
    1. Estimate & correlation to cost loading
    2. Bill of Quantities & use in resources
    3. Resource Crew descriptions
    4. Equipment descriptions
    5. How actual production will be monitored
    6. Earned Value Management System
11. Narrative Basis & Assumptions
    1. Procedure Used to create the Schedule/Programme
    2. Definitions/lexicon
    3. Description of sequence of work per structure

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Components of Schedule Management Plan

- Narrative Basis

Contractor Narrative

SPECIFIC AREAS OF WORK

Phasing of the project is as follows:

1. **Phase 1**: Includes storm drain, along with earthwork, p signalization and miscellaneous concrete work, on the from station 15+55 to 32+45. On the North bound side earthwork, paving, striping, signalization and miscellar be completed from station 32+00 to 42+20.
2. **Phase 2**: Traffic will be split around the existing medi outside work area that was completed during phase 1, a saw cut the existing pavement, remove the asphalt, inst permanent storm drain, and then pave the medians to th mix asphalt.
3. **Phase 3**: Traffic will then be moved to the Phase 1 wo to complete tie ins of existing roads, complete the storm light poles, and signals, also completing the widening o bound side and the south bound sides.
4. **Phase 4:** The final stage of work where traffic is split between the median into single lanes, one northbound and one southbound. E.V. Williams, Inc. will complete any remaining median work required at the time, the final paving and striping, brick paver crosswalks, lighting signalization and landscaping.

Sectioning of the project is as follows:

1. **Utilities and Storm Drain**
   Section 1 – Station 15+55 to Station 20+40
   Section 2 – Station 20+40 to Station 25+40
   Section 3 – Station 25+40 to Station 32+45
   Section 4 – Station 32+00 to Station 37+00

Alpha Corporation

Checklist for a Baseline Schedule Written Narrative

The purpose of the Narrative is to provide a summary of the work, explain the plan for construction, show how the schedule meets the specification and plan contractual requirements, identify potential problems, and summarize the Critical Path. The major components of the Written Narrative are:

- General description of the scope of work.
- Identification of any area designations.
- General description of the sequencing, including any necessary legend.
- Identification of any deviations from the contractually mandated sequencing.
- Identify any phasing.
- Identification of all Milestones that are contractually mandated.
- Identification of any other Milestones.
- Identify Traffic Control Plan, if applicable.
- Identification of problem areas of the project, and steps taken to limit risk.
- Identify any road closings, or utility coordination shutdowns, or other conflicts.
- List and explain Calendars.
- Explain Adverse Weather planning methodology incorporated in the schedule.
- Identify any unusual logic relationships, such as Start-to-Start or Finish-to-Finish Activity Types and rationale.
- Identify purpose and use of all relationship lags.
- Explain any Activity ID coding.

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Components of Schedule Management Plan

12. Risks & Constructability
    1. Brainstorming of issues
        1. Known problems (threats)
        2. Predicted problems
        3. Lessons Learned
        4. Outside influences
        5. Site condition concerns
        6. Opportunities
    2. Develop Risk Management Plan
        1. Initial process during baseline schedule development
        2. Process for use during updates

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Components of Schedule Management Plan

- Risk Management Plan
  - Based on PMBOK®

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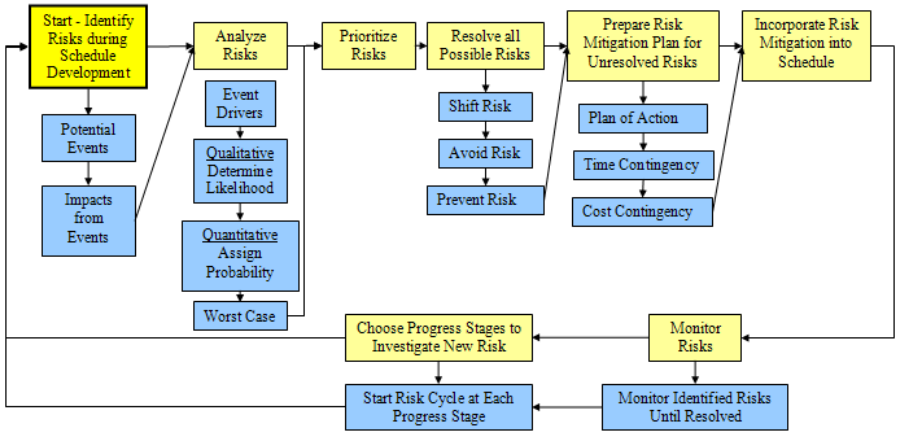
Master Risk Management Checklist

Project:

Risk Factors	Description/Explanation	Exist?	Likelihood	Consequence	Disposition
Constructability review performed					
Contract administration by designer					
Private or ROW work					
QC program of designer					
Quality of plans					
Quality of specifications					
Reputation of designer					
Stage of completion of documents					
Stage of permit authority reviews					
Subconsultants (structural, civil, MEP)					
Distance to asphalt plant					
Distance to batch plant					
New process usage (RCC?)					
New product usage					
Proposed QA/QC program					
Technical level of project					
Type of specification					
Land/site acquisition					



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Components of Schedule Management Plan

13. Weather planning
    1. Expected adverse weather
    2. Identify source or specification requirement
    3. Identify methodology
    4. Identify accounting method for actual weather

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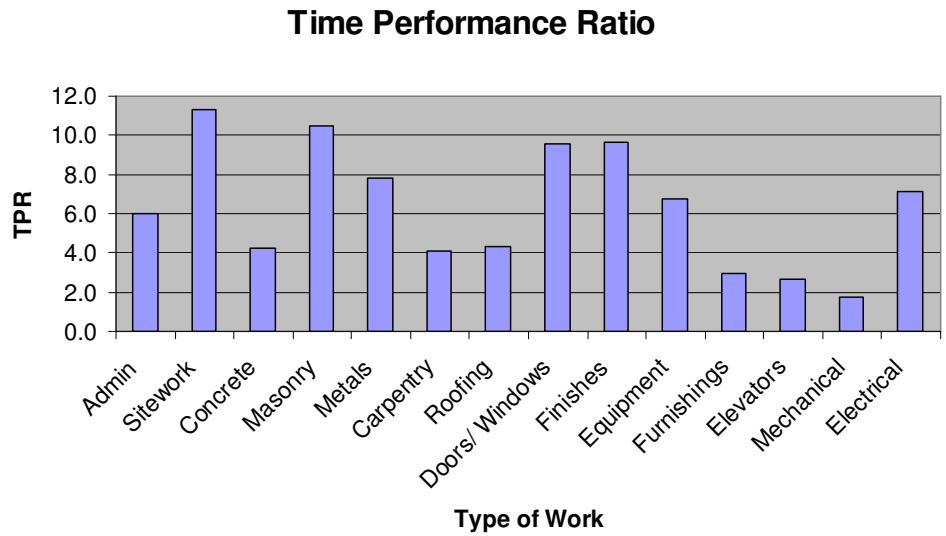
Components of Schedule Management Plan

14. Time Contingencies
    1. Amounts
    2. Specific trade (from risk management plan)
    3. Specific contractor contingency
    4. How carried
    5. Use historical data for reference



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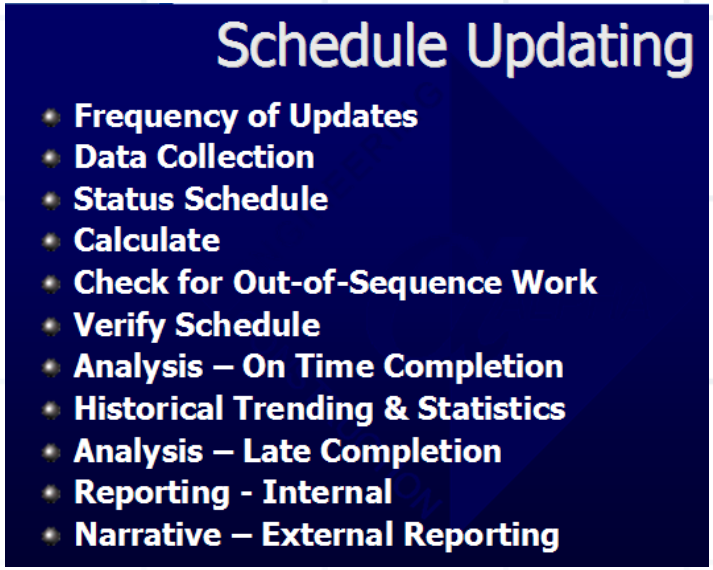
Components of Schedule Management Plan

15. Establish Update process
    1. Frequency
    2. Data request and transmission
    3. Validation
    4. Process flowchart



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Components of Schedule Management Plan

16. Change Management process
    1. Notification requirements
    2. Methodology allowed
    3. Process flowchart

Preparing a TIA

- Verify schedule (the current schedule)
  - Test for reasonableness
  - Ensure schedule logic models the actual project sequencing
  - Check for constraints
    - If constraints exist, establish methodology
      - Remove constraints, if possible
      - Insert logic to replace constraints
      - Verify accuracy of changes
      - Document use of methodology

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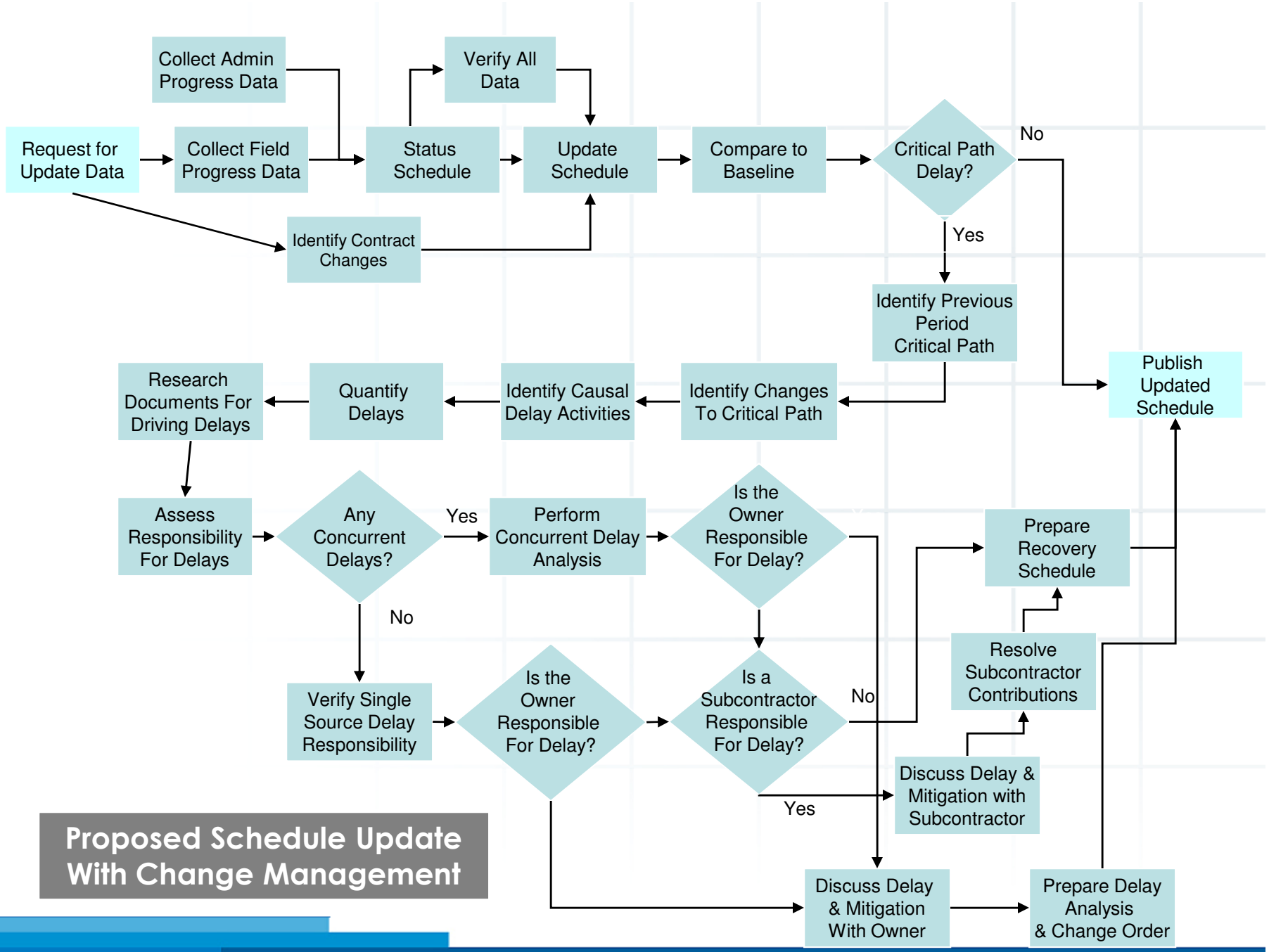
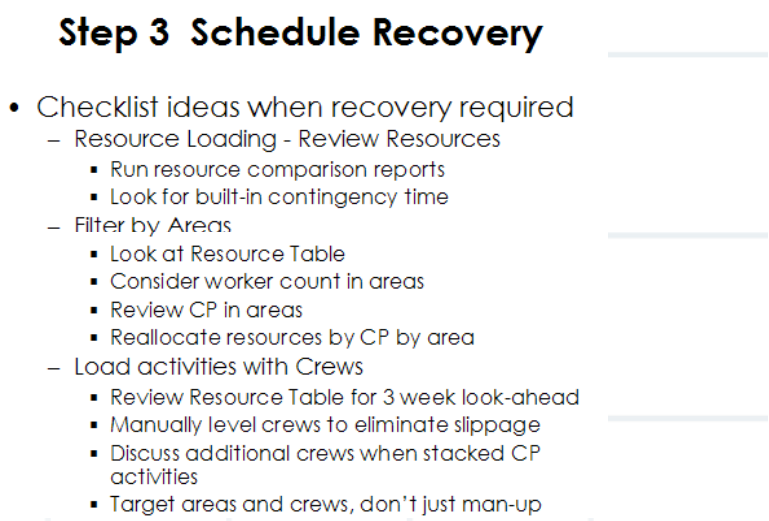


Proposed Schedule Update With Change Management

Components of Schedule Management Plan

17. Recovery process
    1. Identify what logic changes are acceptable without formal approval
    2. Identify what constitutes a Revision requiring approval
    3. Provide process description or flow chart



Step 3 Schedule Recovery

- Checklist ideas when recovery required
  - Resource Loading - Review Resources
    - Run resource comparison reports
    - Look for built-in contingency time
  - Filter by Areas
    - Look at Resource Table
    - Consider worker count in areas
    - Review CP in areas
    - Reallocate resources by CP by area
  - Load activities with Crews
    - Review Resource Table for 3 week look-ahead
    - Manually level crews to eliminate slippage
    - Discuss additional crews when stacked CP activities
    - Target areas and crews, don't just man-up

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Components of Schedule Management Plan

18. Dispute resolution process
    1. Review program for claims avoidance
        1. Reinforce planning for claims avoidance
        2. Identify specific program for claims avoidance during schedule updates and change management
    2. Identify steps if change management process fails or stalls
    3. Follow specifications
    4. Provide time frames for stages in process
    5. Provide process description or flow chart

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Schedule Management Plan

Conclusion

- For success in guiding Schedule Development, the SMP should be a completely different process
- SMP process done prior to Development
- SMP Process and results documented
- Documentation done in formal Schedule Management Plan Book
- Becomes a part of the Organizational Process Assets, providing policy, procedures, and guidelines for the team

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Schedule Management Plan

- Resources
  - See Lance Stephenson's "Schedule Basis Memorandum" paper, also addresses schedule levels
  - See AACEi's Total Cost Management
  - See PMBOK for Risk Management process
- Recommendations
  - Get involved with the SCoP SEI Project developing Best Practices and Guidelines for Scheduling
  - Get involved with AACEi and the Recommended Practices development
  - Get involved with CMAA in the Time Management development
  - Get involved with Planning Planet in the development of the Planners Users' Guide

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