

# Advanced Work Packaging

## PROJECT ALIGNMENT FOR STREAMLINED EXECUTION

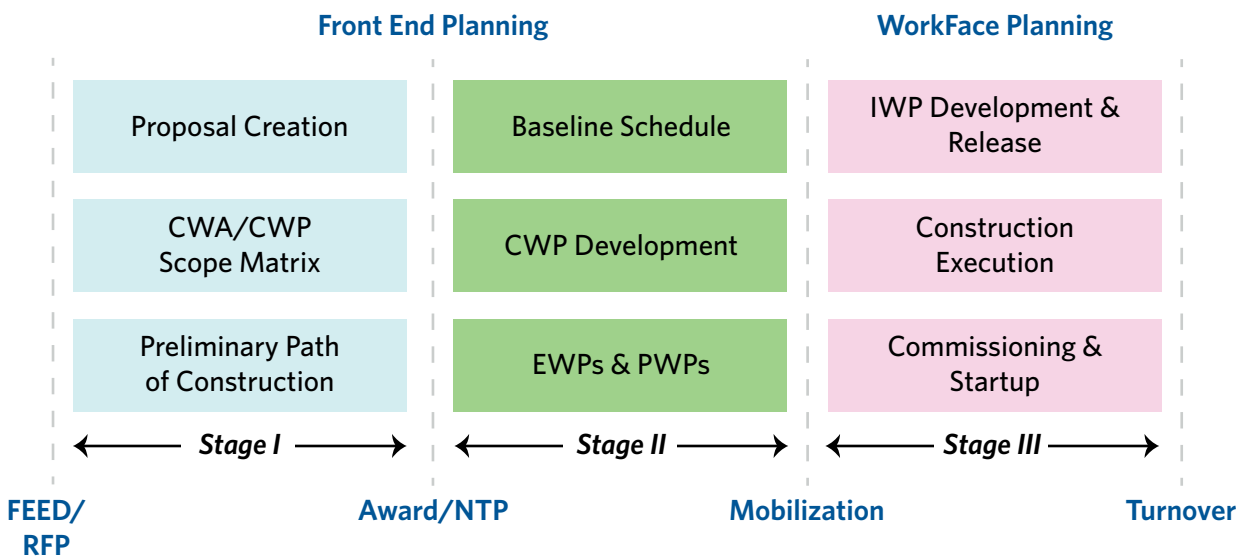
Advanced Work Packaging (AWP) is used to provide constraint-free, executable work while improving alignment between the project delivery functional groups — Engineering, Procurement, and Construction — with a focus on streamlined project execution.

Two components make up the AWP process: Front End Planning (FEP) and WorkFace Planning (WFP). With several planning gateways and feedback loops within our end-to-end AWP process, we can ensure collaboration, communication, and the development of a workable plan.

### WORK BREAKDOWN STRUCTURE COMPONENTS

- Engineering Work Packages (EWP)
- Procurement Work Packages (PWP)
- Construction Work Packages (CWP)
- Installation Work Packages (IWP)
- Turnover Packages (TOP)
- Construction Work Areas (CWA)

**Effective AWP Implementation leads to an increase in time-on-tools and optimized results for safety, quality and productivity. Early collaboration with owners, suppliers and trade partners contributes to efficient project execution.**



## STAGE I

### ***Proposal Creation***

Our proposal response team produces a bottom-up detailed estimate, inclusive of quantities and man-hours. We will utilize CWA and CWP to form the project communication and execution structure.

### ***CWA/CWP Scope Matrix***

Key elements of the WBS begin to take shape with the identification of CWA and CWP scope. These boundaries form the means to plan, sequence, quantify, and estimate the work, while also providing the basis to scope subcontract packages.

### ***Preliminary Path of Construction***

Developed by our Pre-Construction Group, this provides the initial work sequencing from project award to system turnover. Our engineering and procurement groups can use this to align deliverables to the optimum plan. The POC also highlights key areas of focus and facilitates proactive risk assessment and mitigation.

## FRONT END PLANNING (FEP)

FEP begins with the end in mind, using a construction driven approach that formalizes the components and methodology for project success.

### **Stage I of FEP**

Stage I is identified as the period of time from FEED/Receipt of RFP from the Owner, to contact negotiations, and ultimately Notice of Award or NTP/LNTP.

Stage I deliverables are generated through a series of Integrated Phase Planning workshops, and include all stakeholders and subject matter experts. Key objectives of the IPP workshops include:

- Perform constructability analysis and establish the critical path.
- Identify preliminary CWA and CWP scope delineations.
- Identify primary interface and information handoff points.
- Establish preliminary sequencing of CWP, EWP and PWP deliverables.
- Develop preliminary procurement strategy.
- Develop construction manpower optimization plan.

### **Stage II of FEP**

Stage II is identified as the period of time from Notice of Award or NTP/LNTP, to Detailed Engineering, and ultimately to start of construction.

Integrated Phase Planning efforts continue into Stage II, ensuring there is a staged turnover plan from Estimating/Proposals to Project Execution. Outputs of Stage II IPP workshops include:

- Refined CWA & CWP scope boundaries.
- Facilitate project team alignment, consensus, and support of the Path of Construction.
- EWP and PWP progress toward their respective CWPs.
- Information staging for WorkFace Planning and IWP identification.

The Construction Work Package evolves into a deliverable that provides the staging point for information to be used during WorkFace Planning. The CWP scope boundaries and Path of Construction are refined as needed, based on detailed EWP and PWP input. Startup & Commissioning professionals ensure the refined CWA/CWP plan still aligns with the overall Turnover & Commissioning plan.

STAGE II

Baseline Schedule

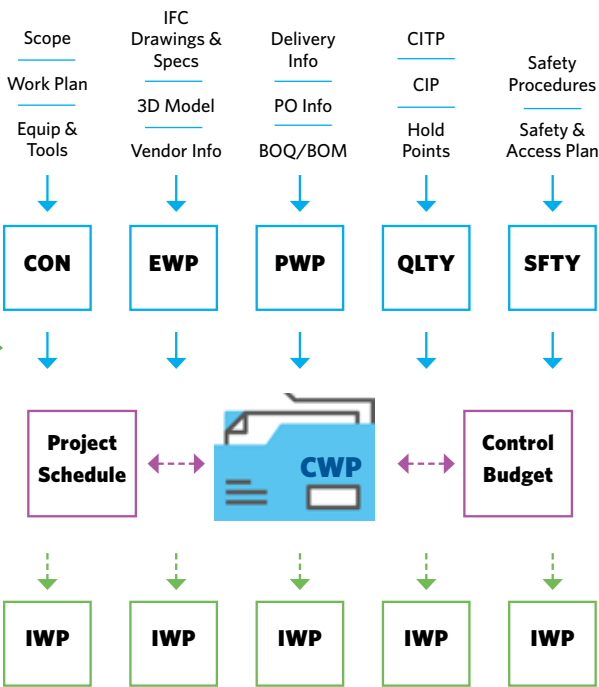
The proposal schedule is developed into the baseline schedule inclusive of CWA, CWP, EWP, PWP and TOP. Continuous monitoring and reporting is available to provide early project indicators. EWP & PWP monitoring — “readiness reporting” — is essential to ensure progress as planned.

Construction Work Packages

The readiness of the CWP to support WorkFace Planning is measured along with a collaborative constraint removal process.

Engineering Work Packages & Procurement Work Packages

EWPs and PWPs are developed and delivered in the sequence mapped to the POC. The development and maintenance of an intelligent, fully-attributed 3D model also occurs during this stage.



WORKFACE PLANNING (WFP)

A continuation of the planning efforts started during Front End Planning, WFP is structured to ensure streamlined workflow to the field. By organizing, staging, and delivering all the elements necessary, we enable craft professionals to perform work in a safe and efficient manner.

Construction Work Packages are the foundation upon which WFP occurs, and from which IWPs will be developed.

CWP	IWP Identification	Scope	Engineering	Work Instructions	Budget	Material	Equipment & Tools	Quality	Safety	Last Planner Final Check	Planned Start
IWP #001	■	■	■	■	■	■	■	■	■	✓	✓

Effective WorkFace Planning is measured by several key performance indicators:

- **Safety** — No work packages delayed or shut down in the field due to safety concerns.
- **Construction Turnover to Startup** — No partial system turnovers.
- **Schedule Certainty** — Percent Planned Complete (PPC) is tracked through the Last Planner Process.
- **IWP Lifecycle** — Percentage of IWPs identified at 90-day interval, percentage of IWPs ready for release to field 2 weeks before start of work, percentage of IWPs closed out within 1 week of work completion.
- **Quality** — No re-work, no punch lists.
- **Craft Tool Time** — Down time is minimized, time-on-tools is optimized.

Collaborative constraint removal during IWP Development ensures all requirements are met in a lead-up to the start of the planned work. CWP information is refined as needed to address the specific work assigned to the IWP. Once all constraints are removed, a content review is completed and a “Go/No-Go” decision is made to release the IWP to the field for execution.

Our WFP process utilizes the Project Schedule and Path of Construction as guidelines for IWP development. Building on IPP efforts of Front End Planning, collaboration meetings continue with more project execution stakeholders joining planning development.

The project execution team establishes reoccurring Integrated Phase Planning sessions throughout the project — each serving a specific purpose in the lead up to the start of work.

90-Day Look Ahead	6-Week Look Ahead	Weekly Work Plans
Communicate the path/sequence of work for the next three months.	Communicate the path/sequence of work for the next six weeks.	Perform final check on any and all IWPs scheduled for release to field within the next week.
Establish initial identification of upcoming IWPs, i.e. Release Plan.	Monitor IWP progress toward release to the field, i.e. Readiness.	Review work scheduled for the next week to address trade coordination, material/equipment and staffing.
Breakdown critical path items, discuss risk identification and mitigation.	Participants include Project Field Manager, Construction Manager, Superintendents, Construction Coordinators, Project Controls Managers and General Foremen.	Participants include Superintendents, Construction Coordinators, Scheduling Managers, General Foremen and Foremen.
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The Daily Improvement Huddle is a vital element of WorkFace Planning. This enables field professionals to track and analyze their work, discuss issues and successes, and implement countermeasures to positively affect their work. Our Opportunity for Improvement (OFI) program provides the structure to gather, document, and implement ideas from the field. OFI details and results are then shared with the entire project team and catalogued for future reference.

Our Lean principles and company culture of continuous improvement empower field professionals to provide feedback and develop strategies to enhance work execution.

Our project-specific WorkFace Planning strategy addresses moving from producing IWPs based on a bulk CWA methodology to a system closure approach in line with the optimal startup sequence as identified during Front End Planning. This involves developing IWPs for Testing & Turnover Packages which include Testing and Acceptance criteria.

