23RD ANNUAL

23RD LCI CONGRESS
OCTOBER 19-22

# Intermediate Last Planner System® Practical Application

Christian Pikel, The ReAlignment Group | Eric Lusis, Lynx Lean Services

LEARN BY DOING FROM THOSE WHO DO

Tuesday, October 19, 2021

# Health precautions to keep everyone as safe as possible at Congress:

- Wear masks at all times in indoor events.
- Complete your daily health screening on your phone and bring it with you when you enter the center each day.
- Practice social distancing to the extent possible. Seating at plenary sessions is structured to help with this.
- If you feel ill at any time, please leave the conference and return to your room/consult a physician as necessary.
- Ultimately, our collective health and safety at Congress is up to all of us. Thanks for your support!

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*"LCI would like to acknowledge and thank the work cluster for their leadership, work and collaboration to create this workshop. Learning opportunities like this exist because people like them engage to create them."*

-Kristin Hill, LCI, Director, Education Programs

Christian Pikel, The ReAlignment Group

Eric Lusis, Lynx Lean Services

Houston Brown, Brasfield & Gorrie Constructors

Rebecca Snelling, JE Dunn Construction

Ryan Ring, JE Dunn Construction

Perry Thompson, Parsons Electric

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# LCI Course:
# Intermediate Last Planner System®
# Practical Application
# 8 CEU

*Sign the sign-in sheet for credit*

# Learning Objectives

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Identify the essential foundational principles of each of the 5 connected conversations of LPS.

Engage in all of the connected conversations of LPS® from Milestone Planning to daily interaction through practical application.

Experience the process of constraint management to improve project workflow.

Gain practical insight to effectively use Percent Plan Complete (PPC) and variance to improve reliable project plan execution.

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# Rules of Engagement

- This is a safe zone
- Everyone has equal status
- Speak up and share your ideas
- Actively listen to others
- One conversation at a time
- Use E.L.M.O.
- Silence phones
- Be focused and engaged
- Stay on time
- Have fun!

# Lean Journey to Mastery

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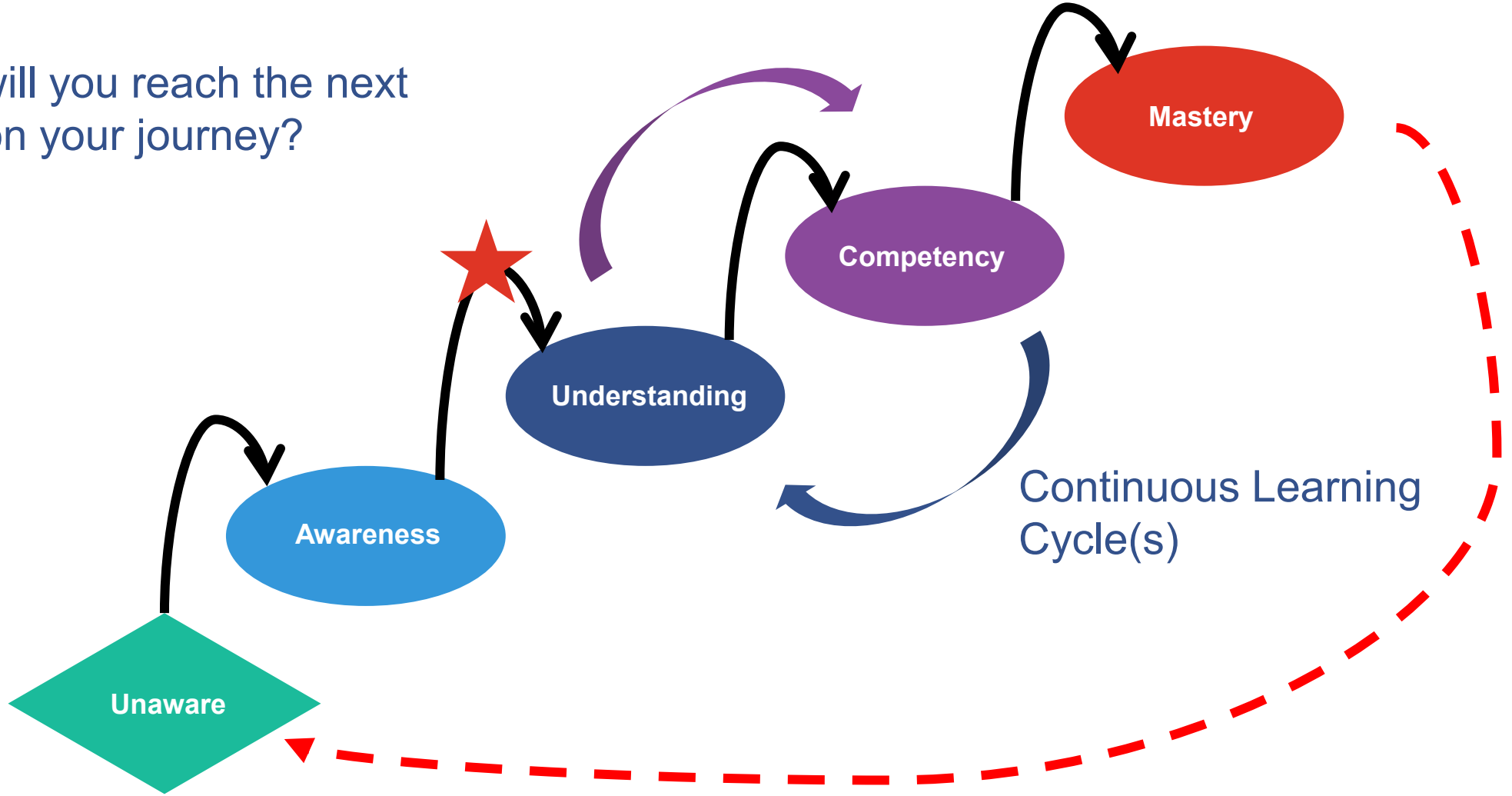
How will you reach the next level on your journey?



# Last Planner System Trademark

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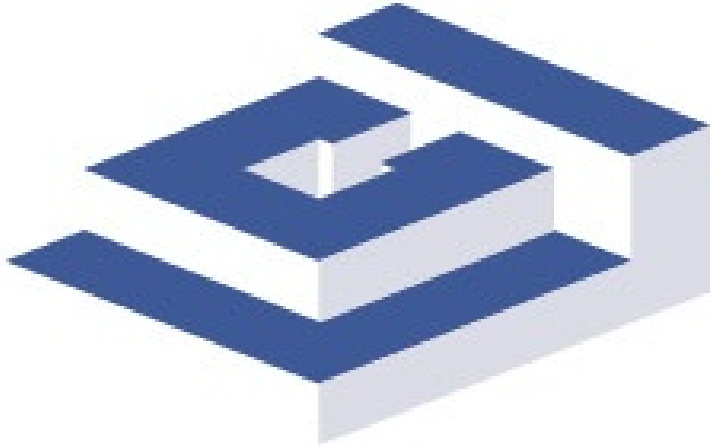
The Last Planner System® is a registered trademark of the *Lean Construction Institute*:

- Last Planner System®
- LPS®
- Last Planner®  (In reference to the person not the system)



# Definitions

## Lean:

A culture of respect and continuous improvement aimed at creating more *value for the customer* while identifying and eliminating waste.

## Lean Project Delivery System:

An organized implementation of Lean Principles and Tools, *of which LPS is one*, combined to allow a team to operate in unison to create flow.

# Six Tenets of Lean and LPS

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1. Respect for people
2. Optimize the Whole
3. Generate Value
4. Eliminate Waste
5. Focus on Flow
6. Continuous Improvement

# Where Can LPS Be Applied?

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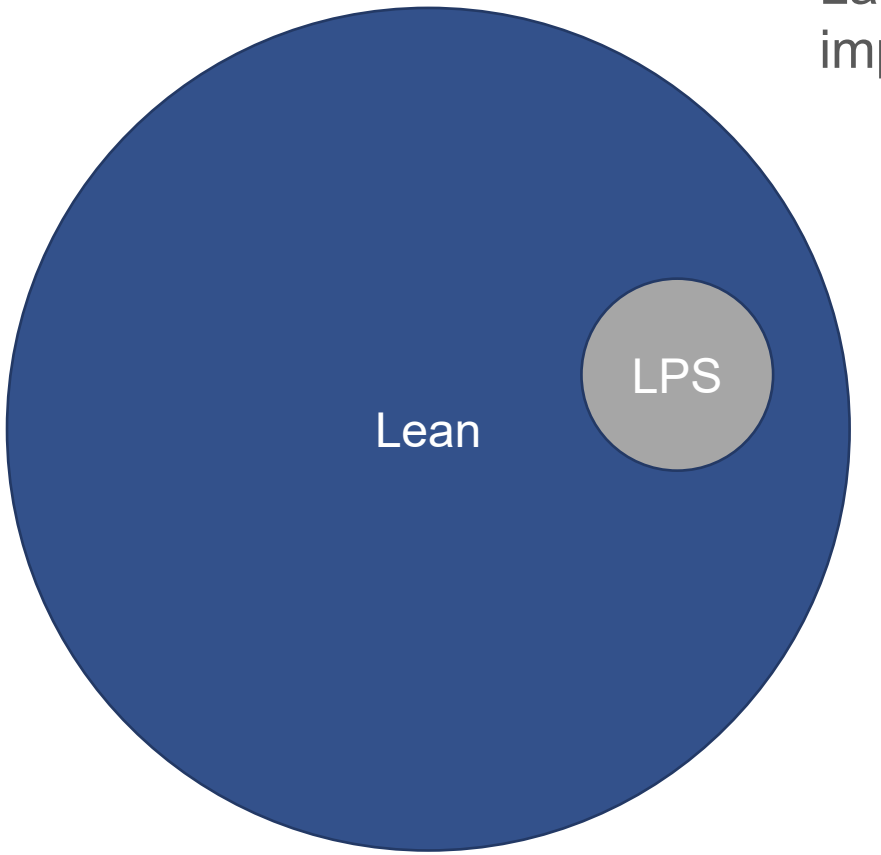
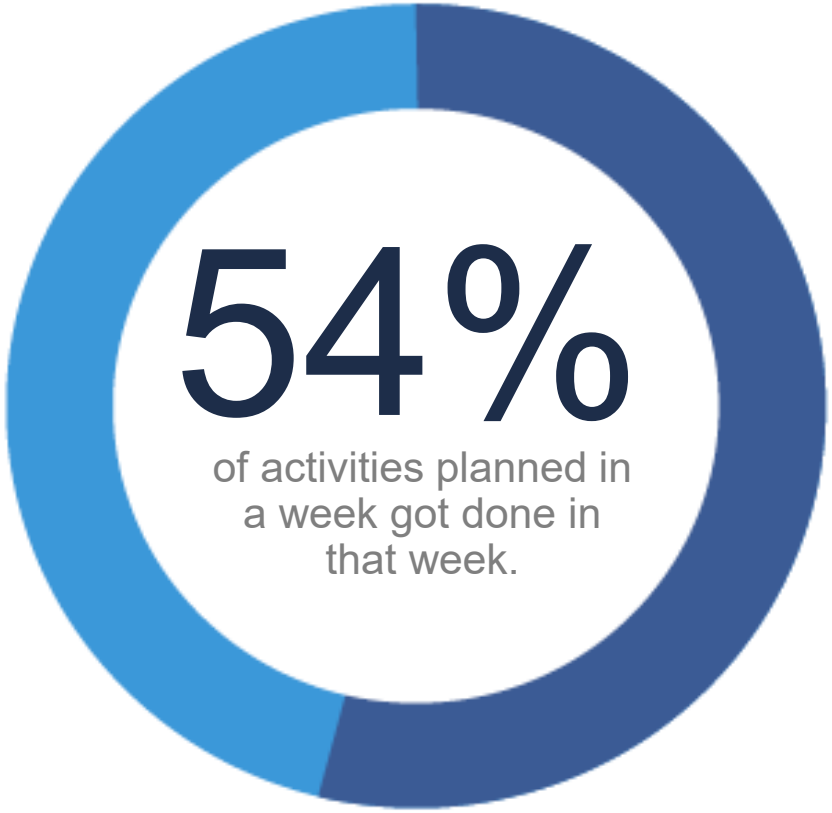
The Last Planner System supports a Lean Project *regardless* of the contract type or phase.




Lean is much more than just Last Planner System implementation.

# Brief History of LPS



# Why Status Quo Isn't Working

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1. Traditional planning systems are unable to produce a predictable workflow.
2. Workflow reliability directly affects system speed and cost.
3. All plans are forecasts, all forecasts are wrong.
    - The further in advance, the more wrong.
    - The more detail, the more wrong.

# Last Planner System Overview

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## 5 Connected Conversations

# Benefits

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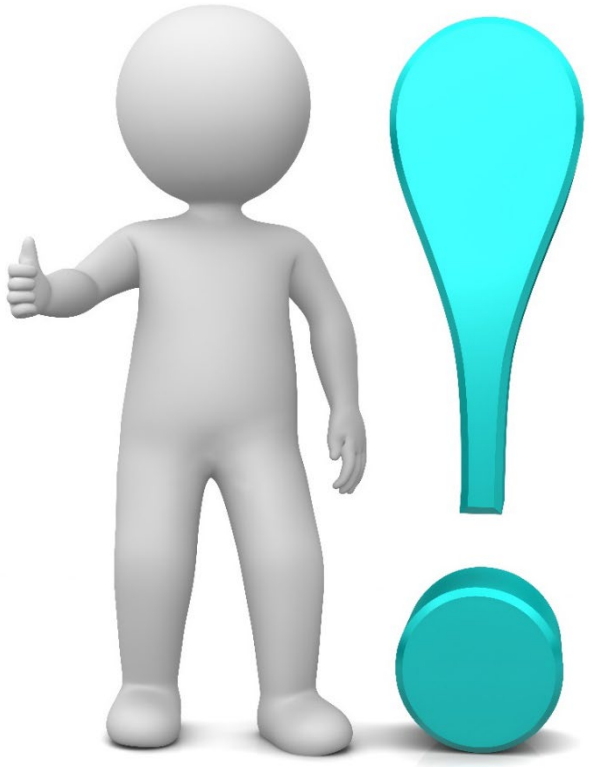
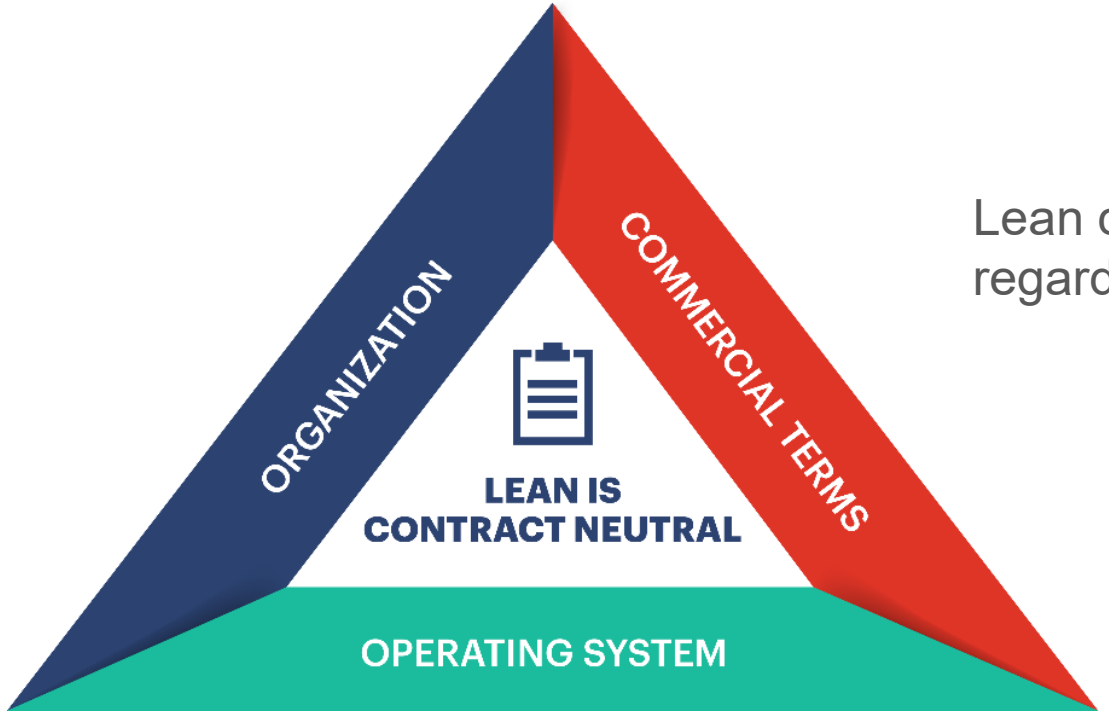
1. Improves communication & reliability.
2. Fosters an enjoyable environment, trust, and collaboration.
3. Promotes early stakeholder engagement.
4. Improves visibility of the project plan (transparency).
5. Creates team alignment.
6. Rapid learning through metrics, revealing areas for improvement.
7. Improves planning in both design & construction phases.



# Project Elements

Lean teams organize in a structure that leads to improved outcomes.




Lean can be implemented regardless of commercial terms.

A Lean Operating System is an organized implementation of Lean Principles and Practices combined to allow the People to operate in unison to create flow.

# Last Planner System Defined

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The Last Planner System is a *production planning system* designed to produce *predictable workflow* and *rapid learning* in programming, design, construction and commissioning of projects.

# System Defined

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**A system is a group of interacting or interrelated entities that form a unified whole.**

# System for Planning

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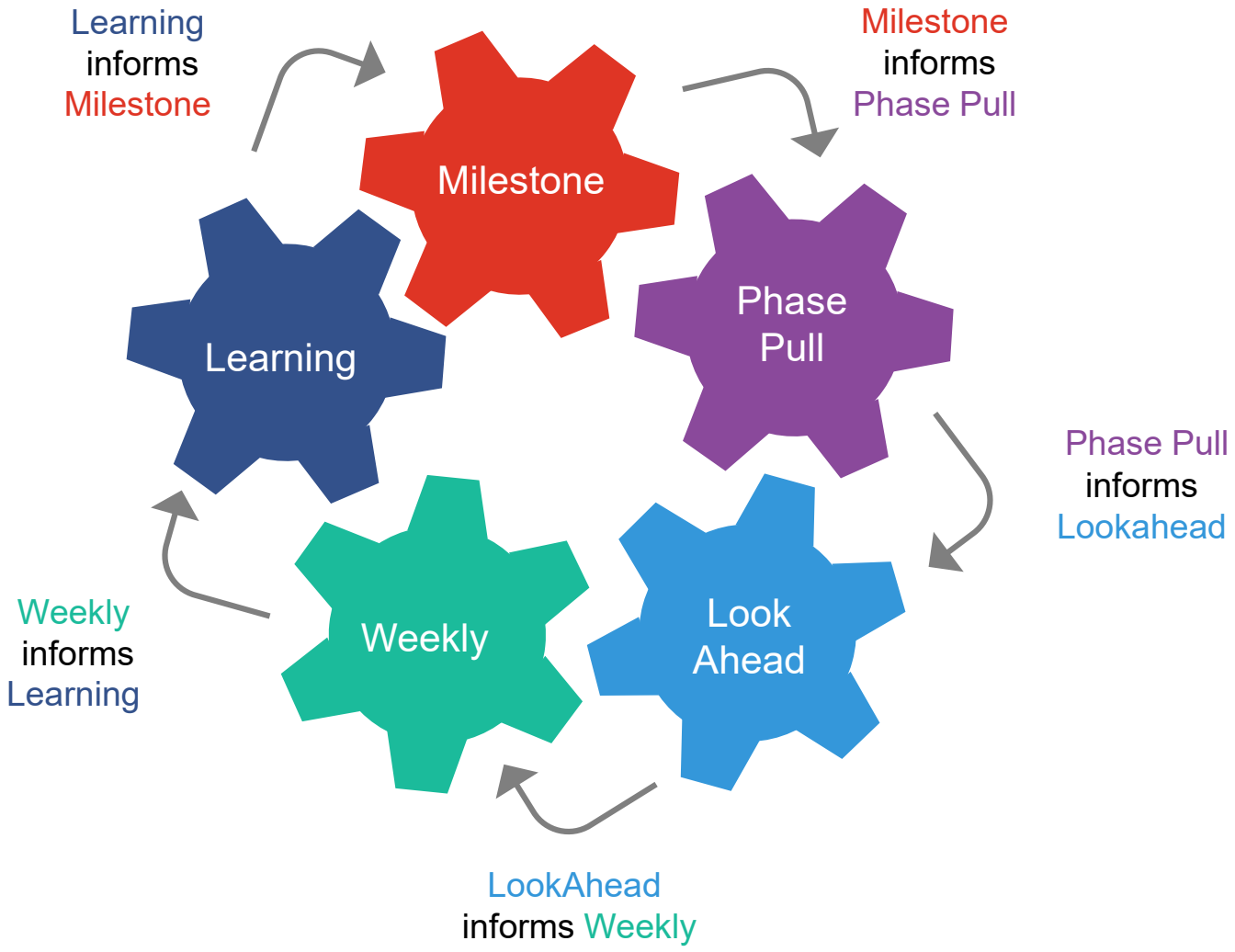

# Who Is The Last Planner®?

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The *Last Planner*® is the person closest to work with the authority to make decisions regarding the schedule and to make reliable commitments to complete the work of their discipline.

Last Planners®

# Discussion Question: Group

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What struggles have you observed with **different roles** while implementing LPS?


Group Discussion
10 minutes

# Consider the Project As A Promise

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- All groups can be viewed as operating as a *network of promises* or commitments, whether done well or poorly.
- The goal is *improving the quality* of commitments and to *actively take responsibility* for managing them.
- LPS is a planning system based on developing a *network of promises*, then delivering on the commitments.

# Elements Of A Promise

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- *The Customer:* The person making the request.
- *The Performer:* The person fulfilling the request.
- *Negotiated Conditions of Satisfaction (CoS):*
  - Are part of the language act of making a promise.
  - Are developed by the people involved in the request and promise.
  - Are mutually agreed to, measurable statements, that help to define the success of the project.
  - Inform the decision-making process.
  - Include a time frame.

# Basic Action Workflow Of A Promise

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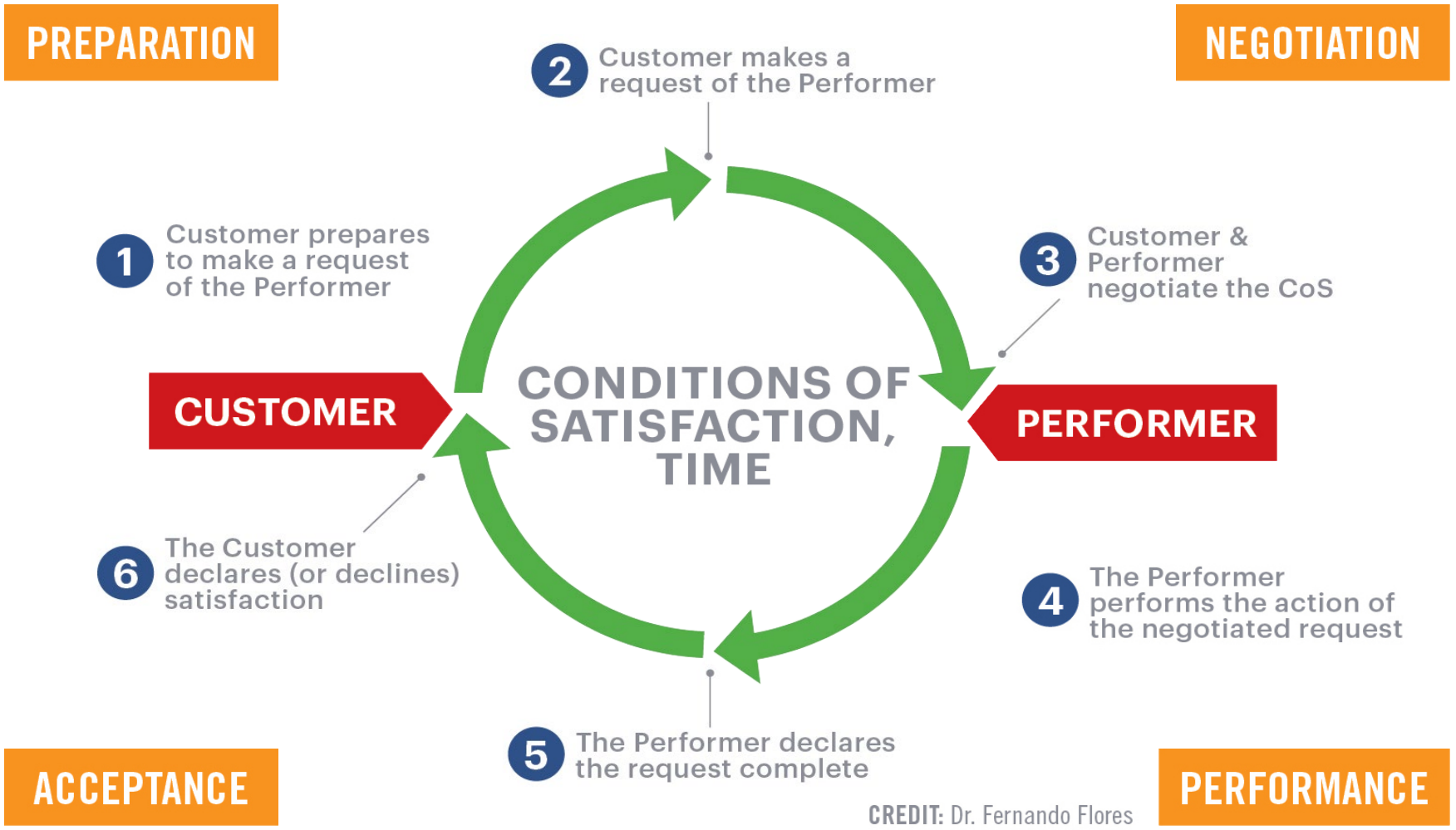

# Reliable Promises

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I can do it when…

- I have the ability to say “no”
- I am able to perform the work
  - Or I supervise performers
- I estimate how long hands-on it will take
- I have the capacity & I’ll allocate it
- I am not having a private unspoken conversation in conflict with the promise
- I will be responsible (clean up the mess)

*Commitment processes are conversation acts*

# Reliable Promising

Which of these are promises?

- I will do…
- Maybe I will…
- I'll try, we'll see what happens…
- Yes, I will do… if…
- I could probably do it
- No, I cannot do it
- Sure, I'll try to do…

*& which of these are useful?*

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# Reliable Commitments = Increase Trust

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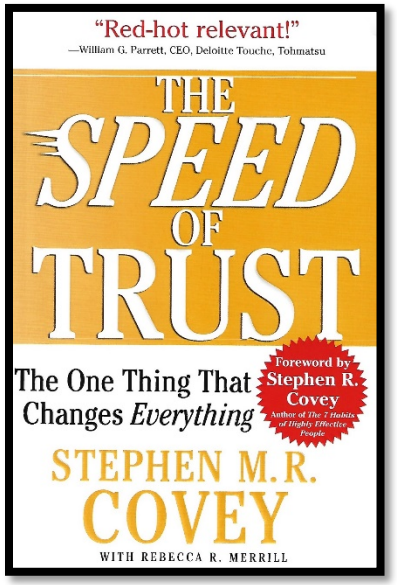
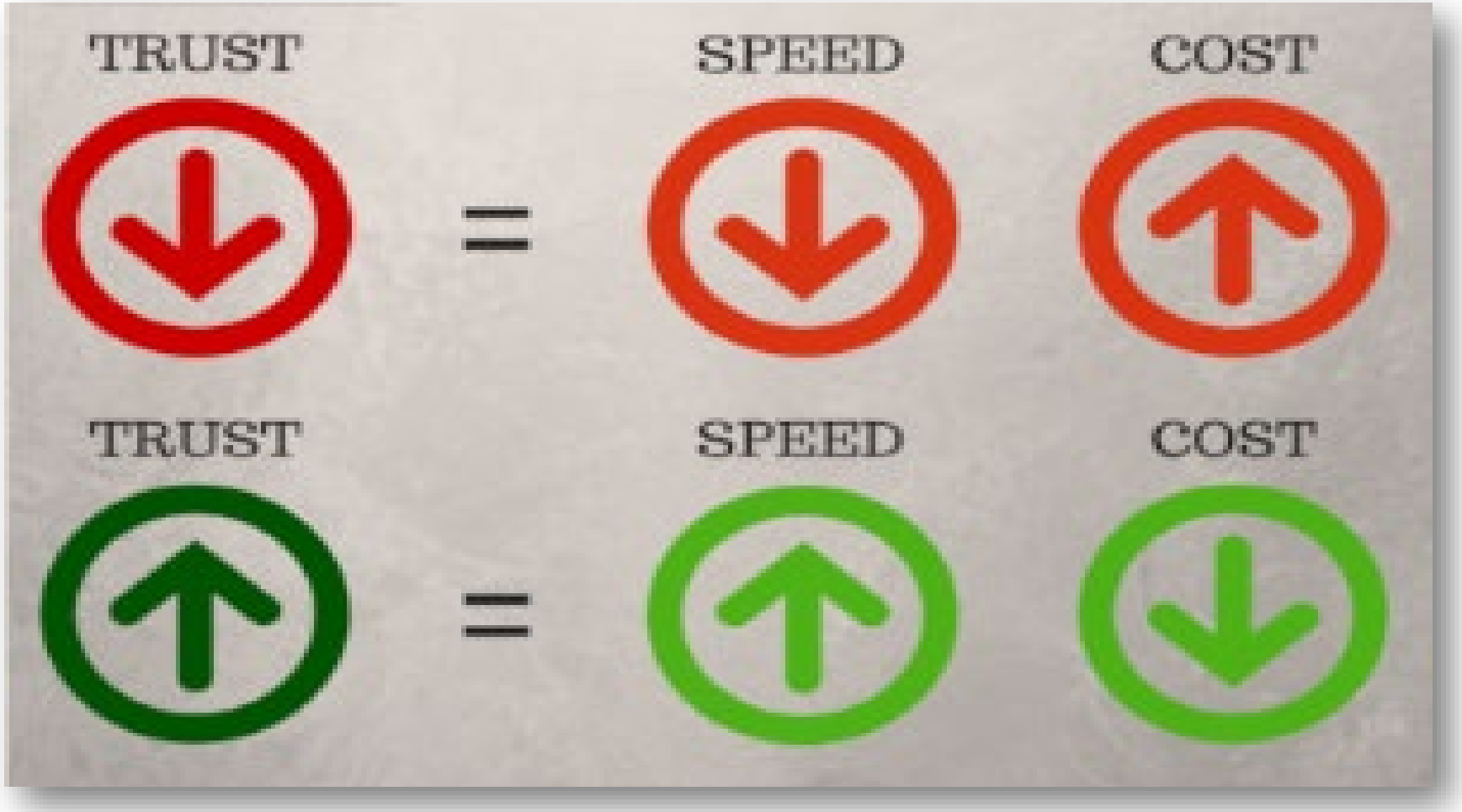
# Speed of Trust Formula



# 5 Connected Conversations Of LPS

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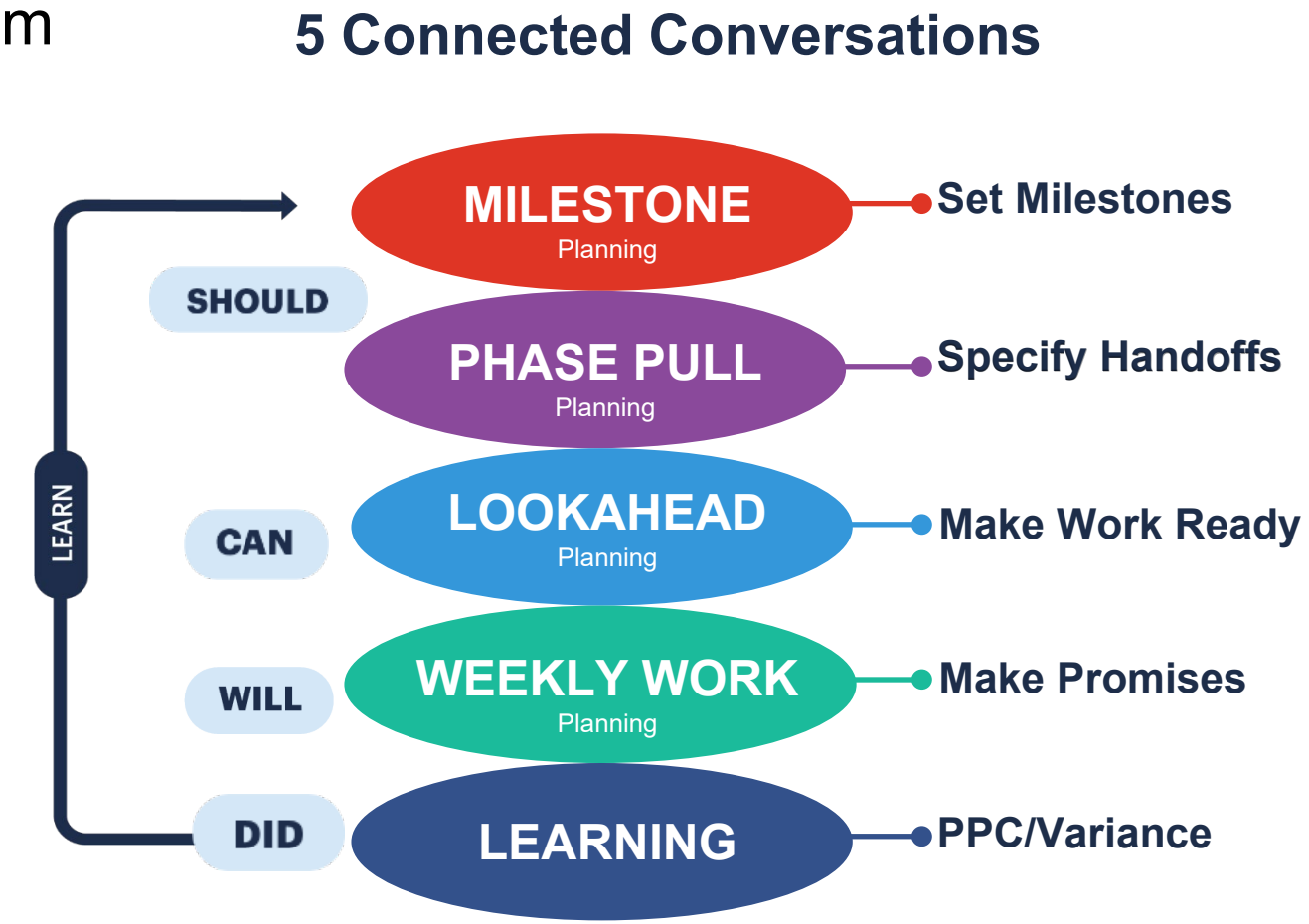
The LPS is a commitment-based system integrating 5 connected planning conversations:

1. Milestone Planning (Should)
2. Phase Pull Planning (Should)
3. Lookahead Planning (Can)
4. Weekly Work Planning (Will)
5. Learning (Did/Learn)



# Last Planner System Overview

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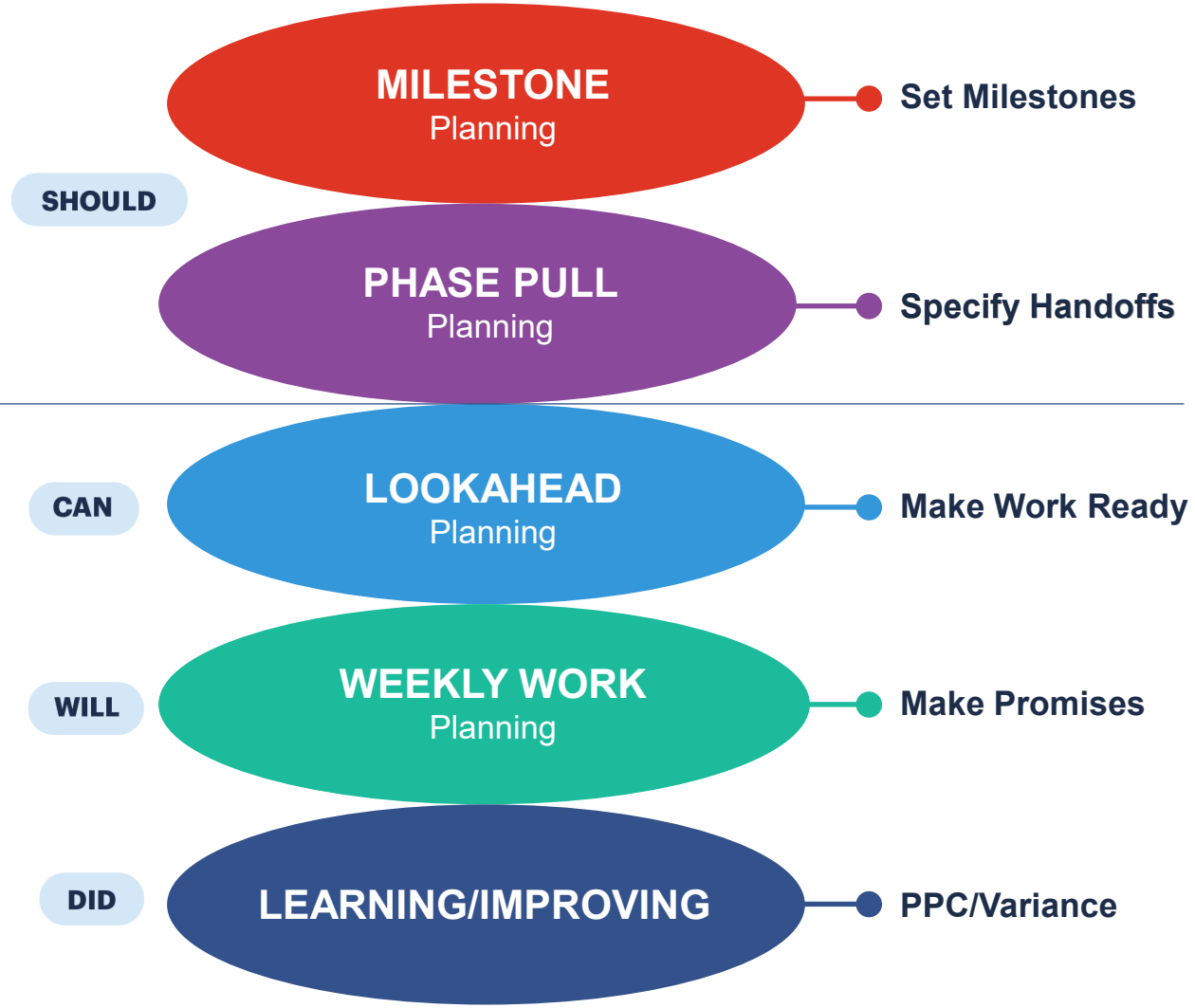
Collaborative Planning

As - Needed

Work Management
Continuous Improvement

Weekly



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# The Project – Tiny Home Development

For the remainder of this workshop, we will be using a *fictitious project* to practice application of each conversation in Last Planner System.

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# The Project – Tiny Home

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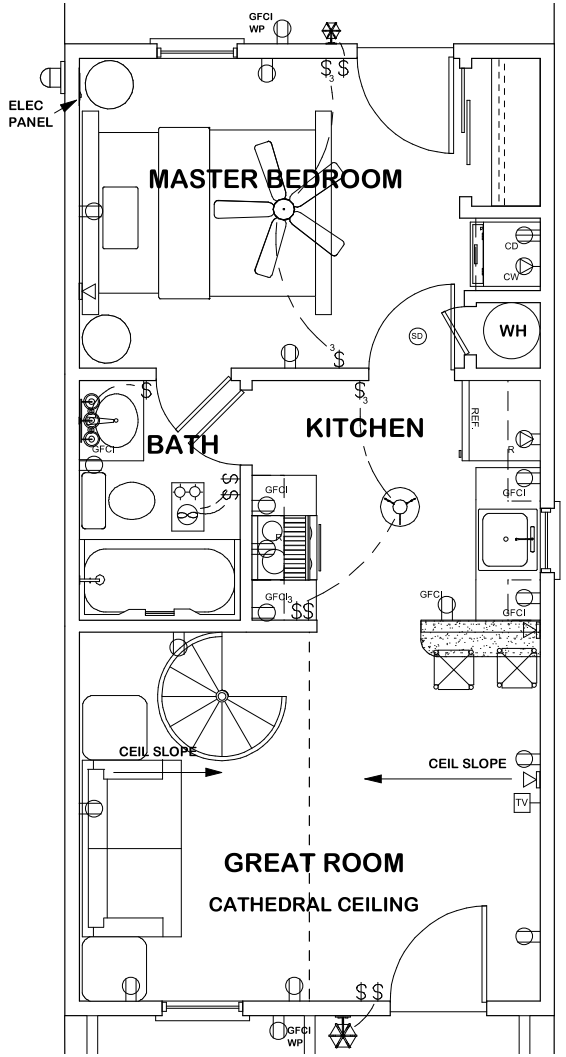
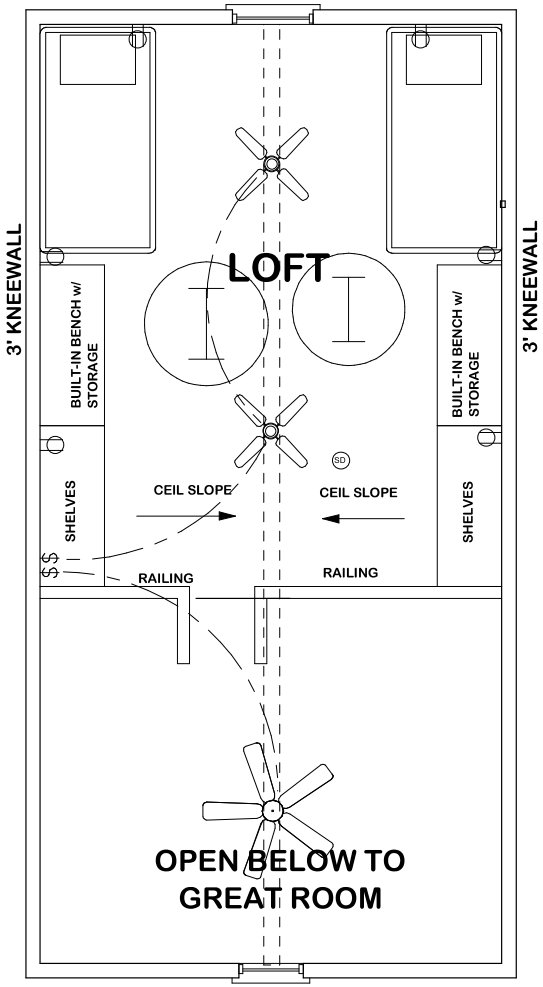
# The Project – Tiny Home

First Floor




Loft

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# Home Specifications

- 1 bedroom and 1 bath, as well as a sleeping loft.
- 8'-0" ceilings on first floor and cathedral ceiling in the loft, rising from a 3' knee wall.
- The house is 15'-0" wide and 30'-0" deep (+6' rear deck and 4' front porch)
- Gable metal roof with a main roof pitch of 10:12 and a hip roof over porch with a pitch of 6:12.
- Vinyl or hardi plank siding.
- Plan comes with pier and beam foundation.
- **Square Footage:**
- First Floor: 450
- Loft: 270
- **Total Heated Living: 720**
- Porch: 60
- Total Area Under Beam: 780

- Prefabricated steel spiral staircase.
- Dual zone split system heat pump HVAC with ductless cassette indoor units and pumped condensate drain.
- Kitchen & Bath Exhaust with through wall vents.
- Finishes:
  - Wood Plank Vinyl Flooring.
  - LED Lighting.
  - Energy Start & Low Consumption fixtures/appliances.
- Low-E Glazing.

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# Milestone Planning

The first conversation of LPS is *Milestone Planning.*

# Milestone Planning

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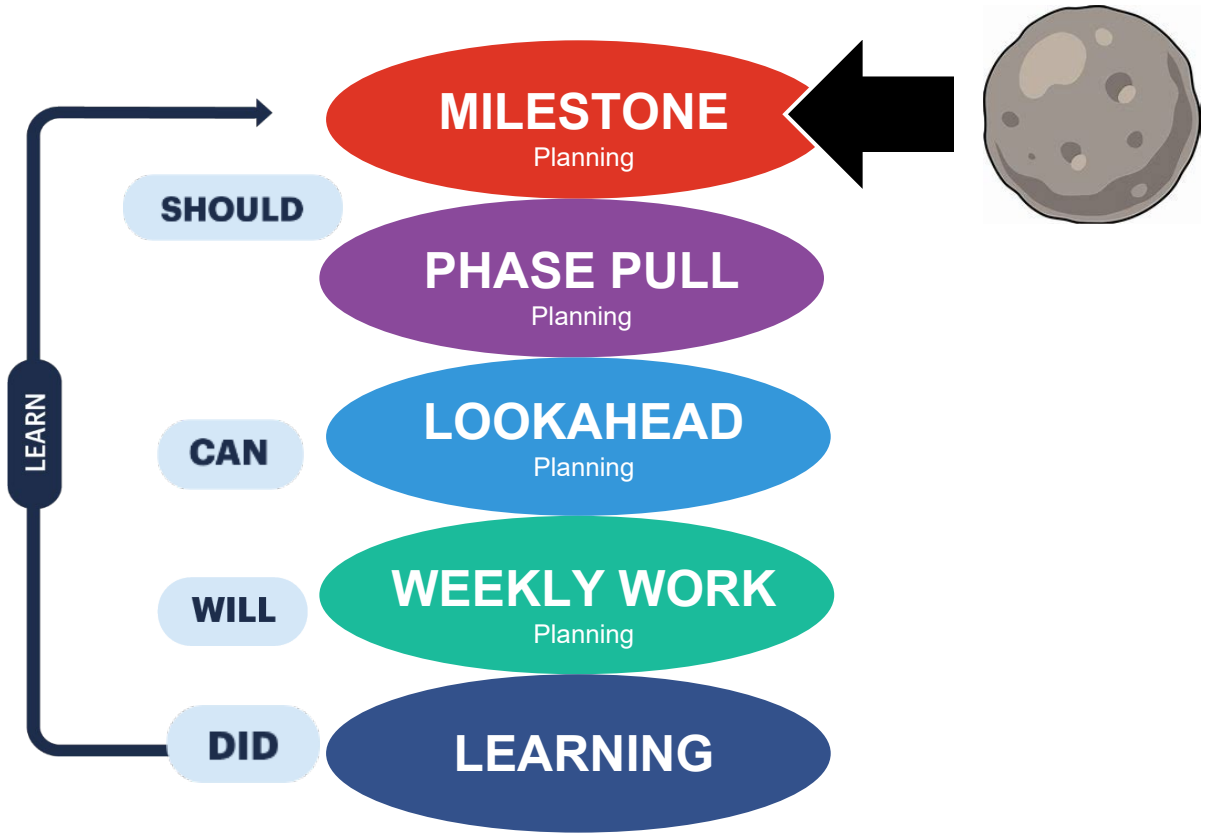
The goal of Milestone Planning is for the team to align with and *set the milestones* for the project.

This starts the we *"should"* be able to do conversation.

## 5 Connected Conversations



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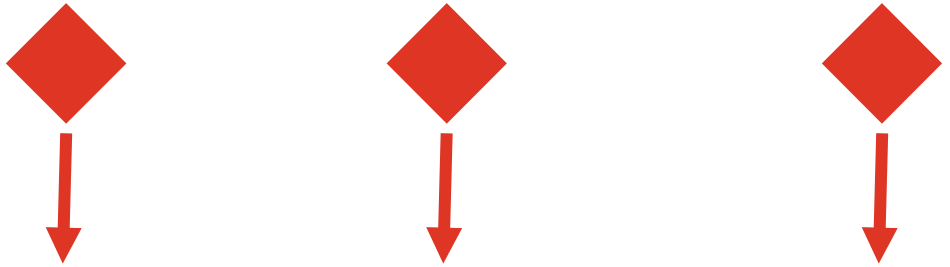
# Milestone Definition

Project Milestones are a significant event which *releases* work in another major phase or trade.

Milestones should be *broken down by each trade* for their interim milestones to support the project requirements.



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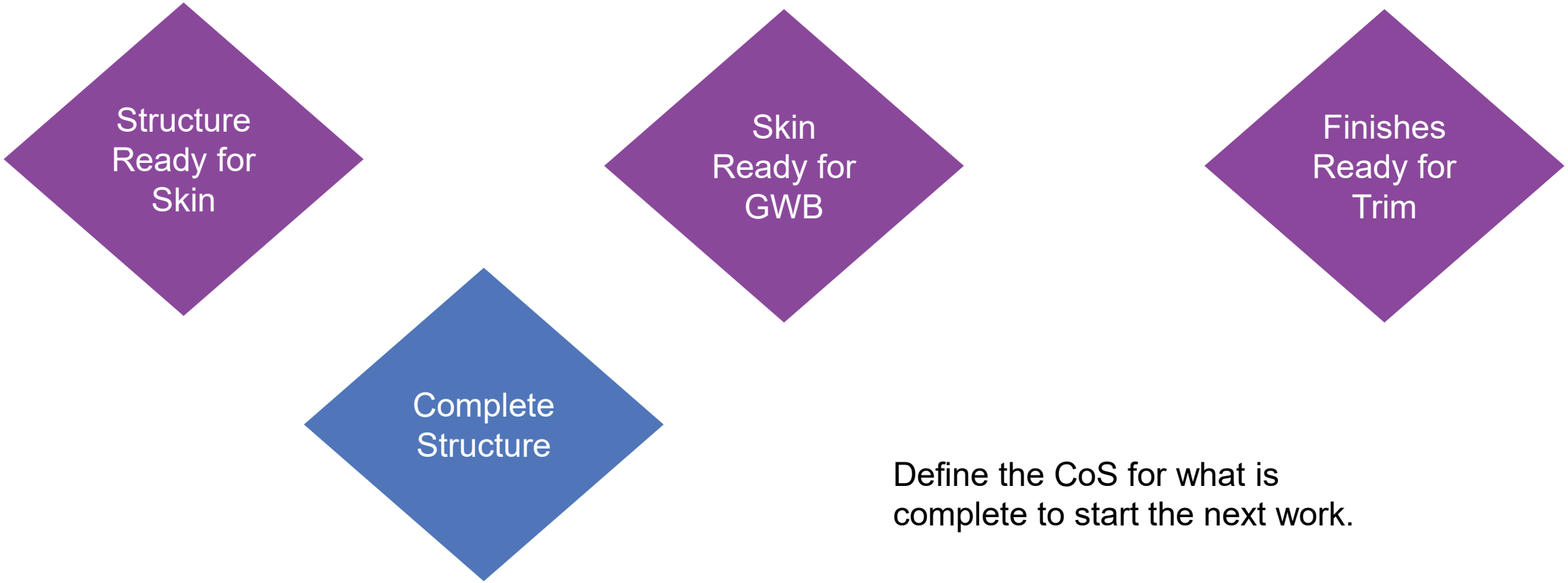
# Milestone Examples




Define the CoS for what is complete to start the next work.

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# Milestone Planning: WHY

Teams that skip Milestone Planning/Alignment risk:

- Disconnect in the LPS Conversations.
- Misaligned prioritization of work.
- Delivering too large a batch for milestone completion versus just what is required to release the next phase/trade.
- Loss of visual management control of overall project road map.

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# Milestone Planning: WHEN

- As *early* in the project as possible.
- Can be done even *before we know the building design.*
- Should form the basis of continuing *onboarding as trades* engage in the project.
- Should set the *schedule for Phase Pull Planning* events.
- May be *conceptual* early on to provide a framework.

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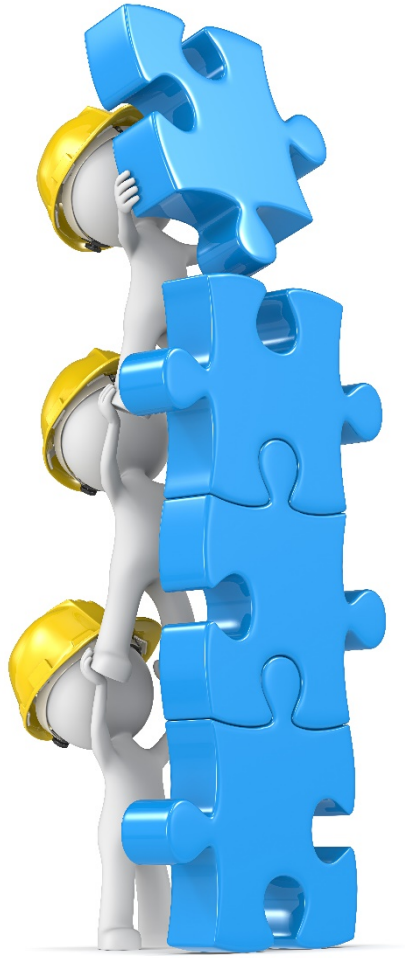
# Milestone CoS: "Definition of Done"

- Team aligns on a clear description of the *work included* in the milestone by each trade.
- What is *essential* to satisfy the pull of the released phase.
- *High level*, don't get bogged down in minute activities.



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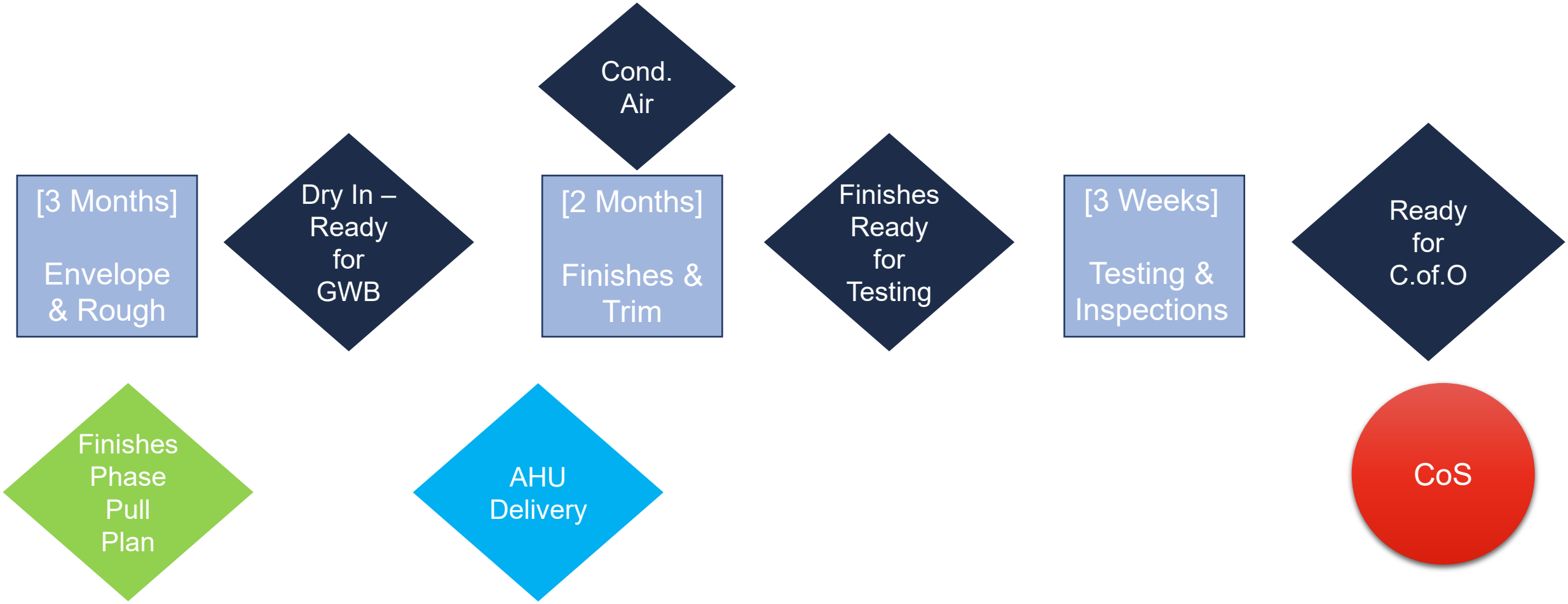
# Creating the Milestone Plan



# Creating the Milestone Plan

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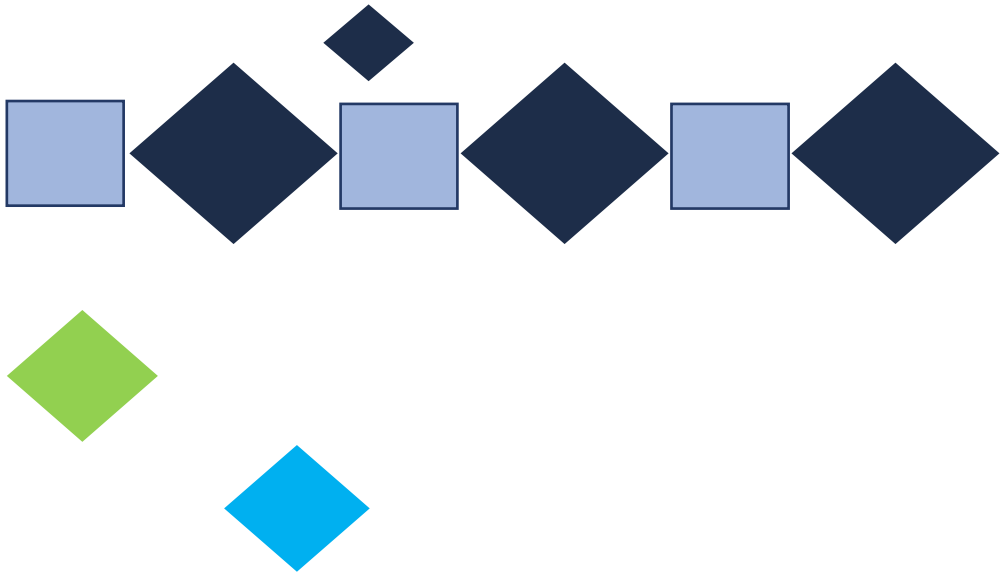

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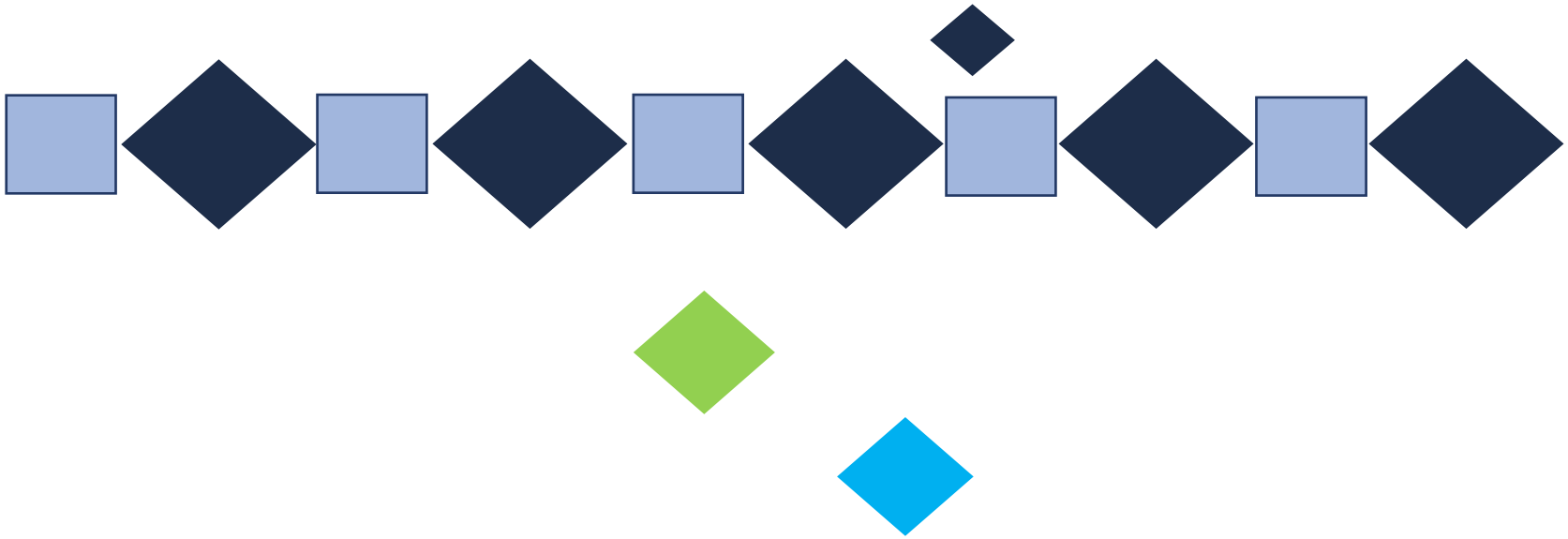

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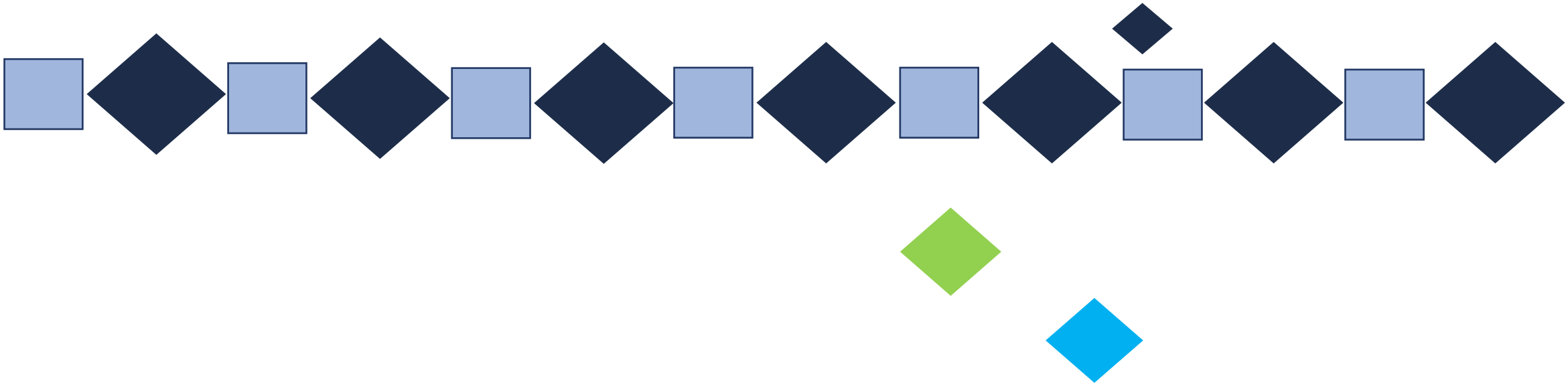

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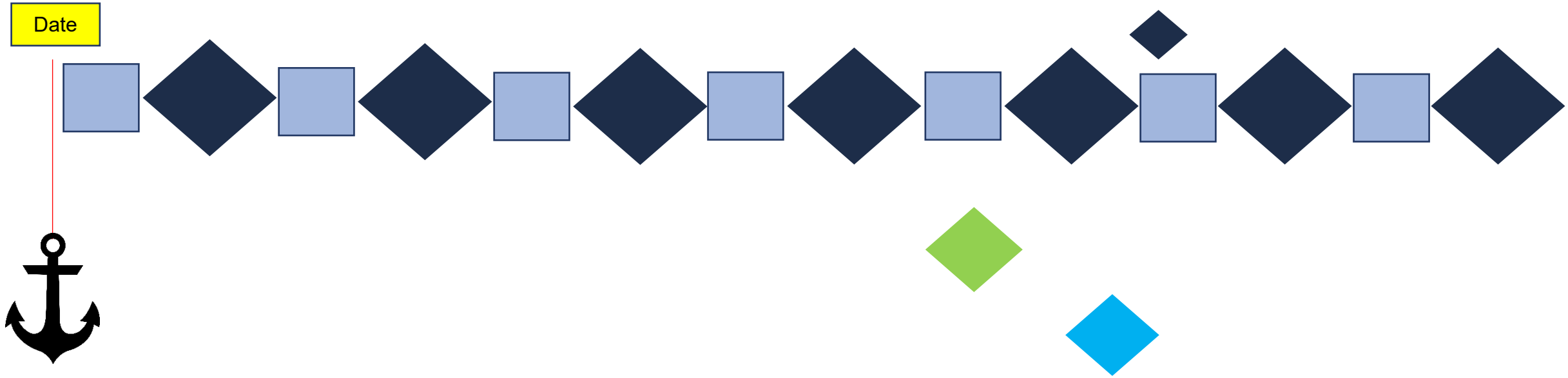

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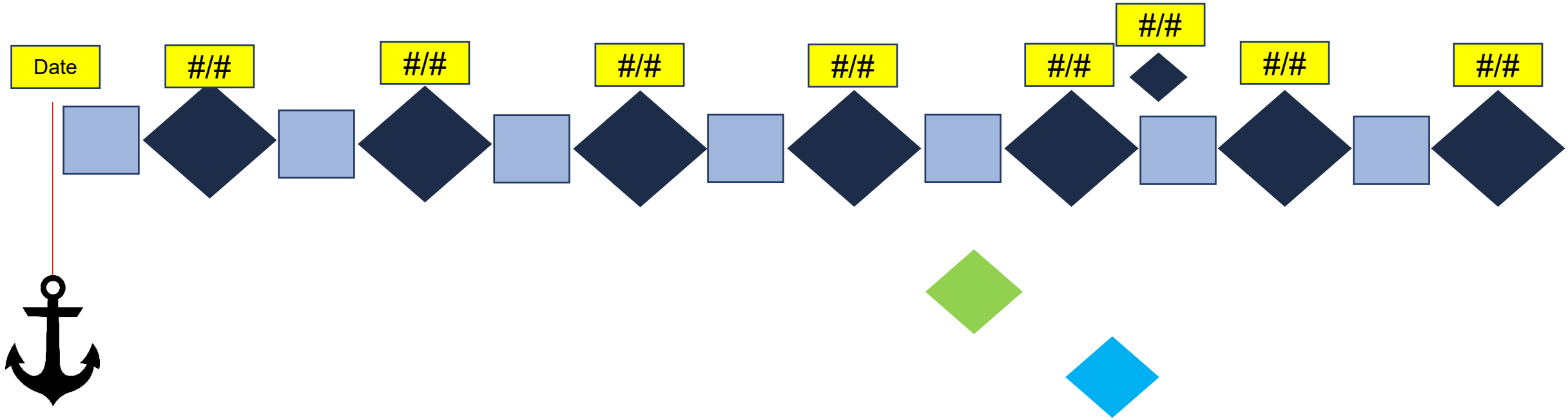

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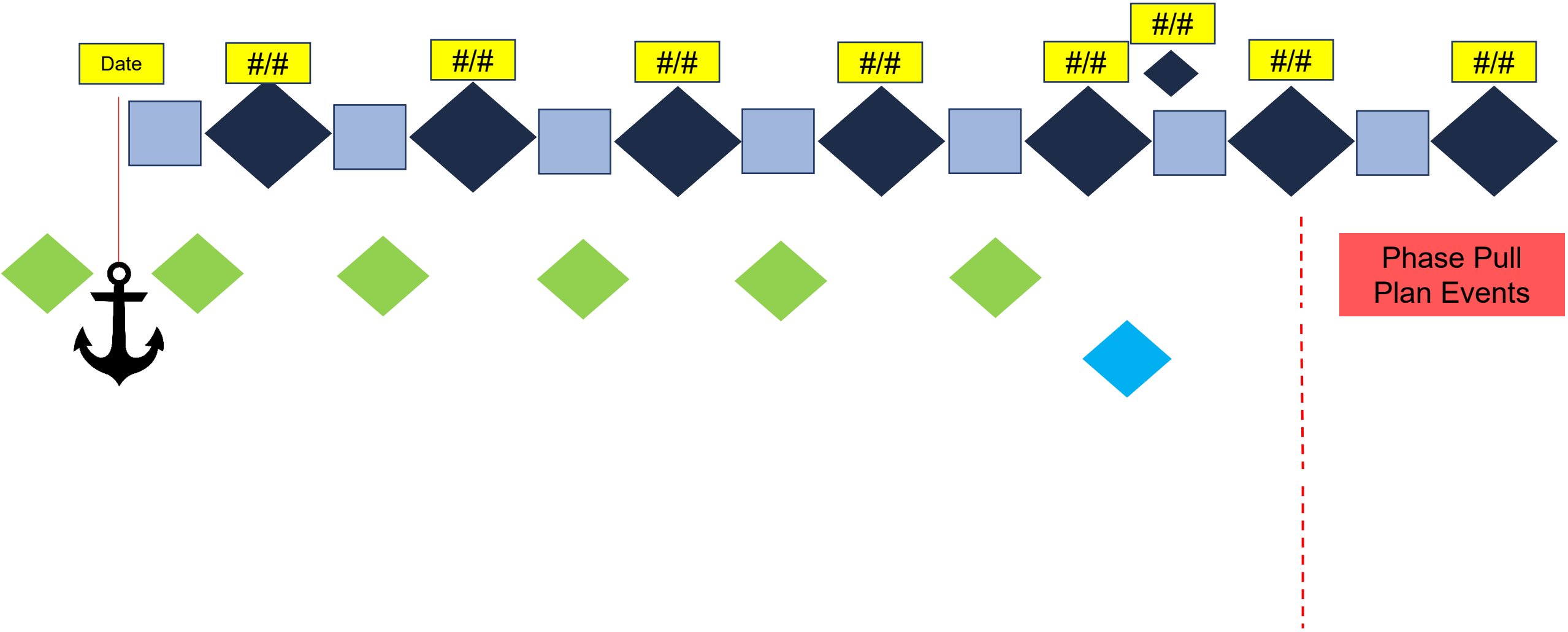

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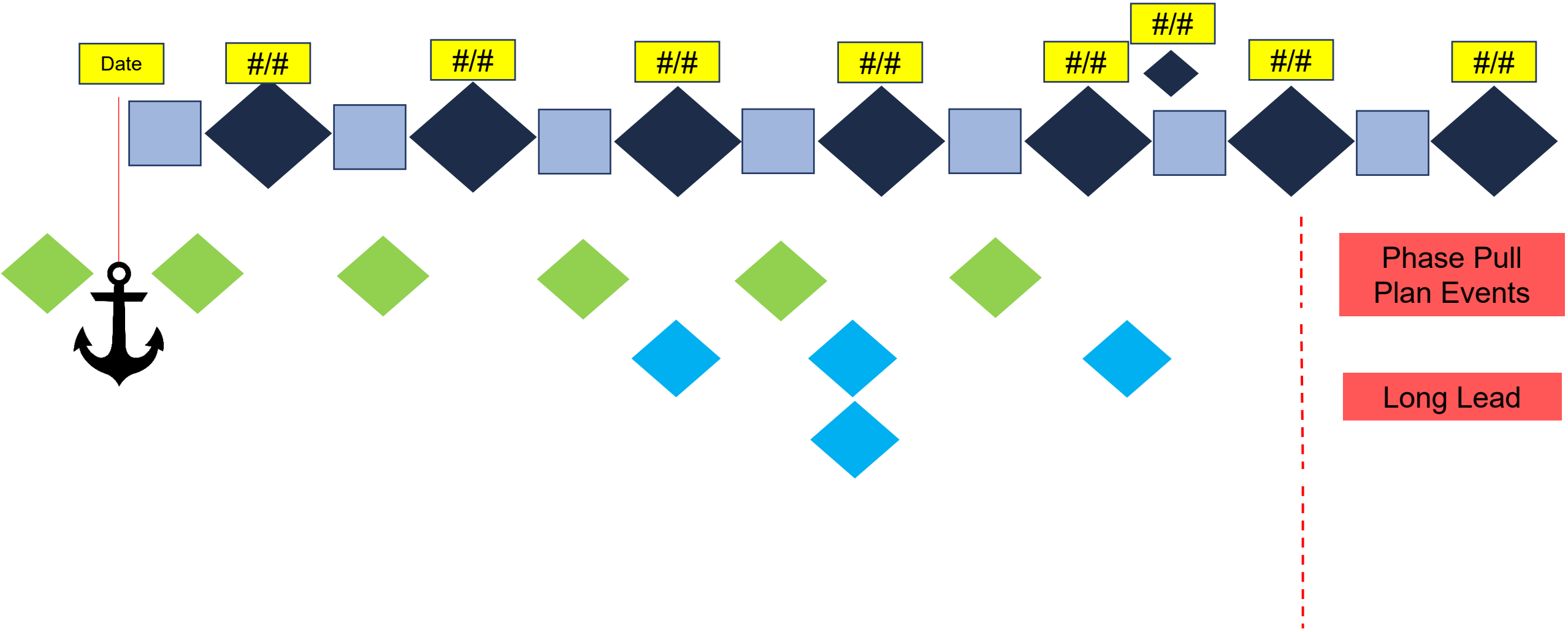

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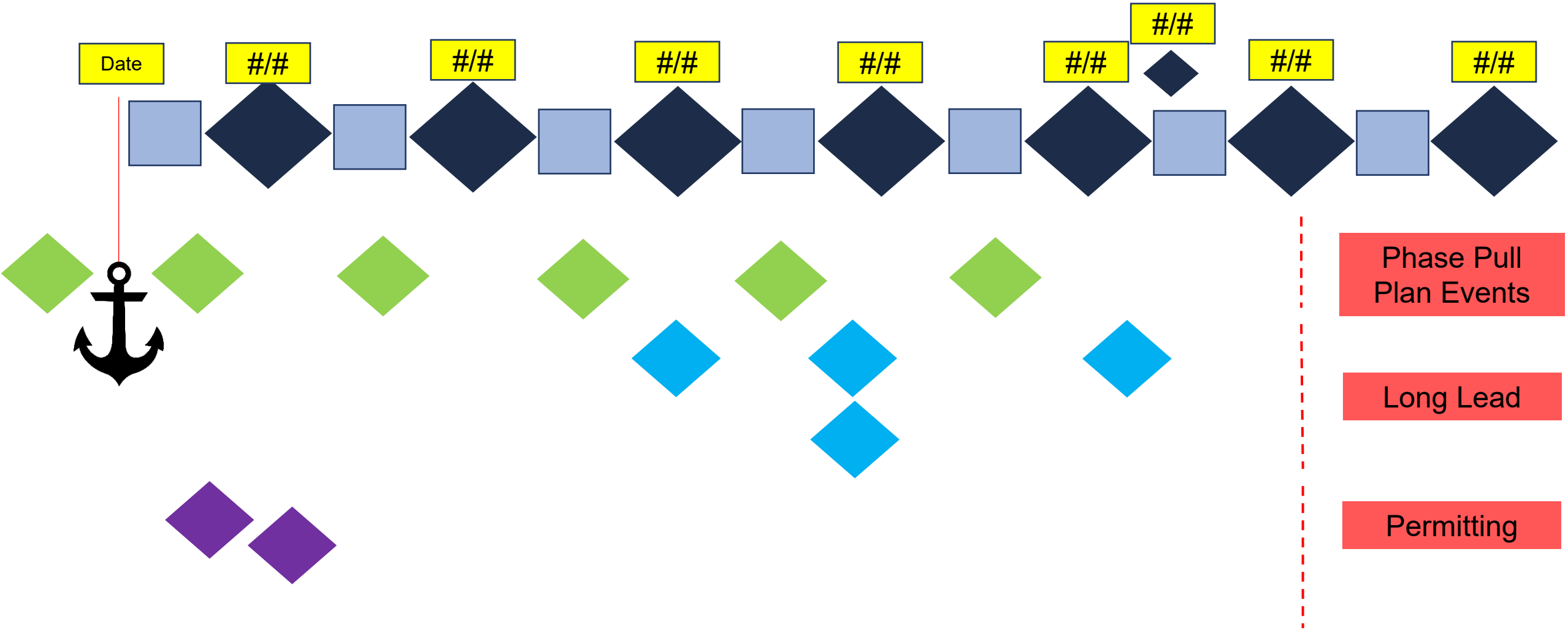

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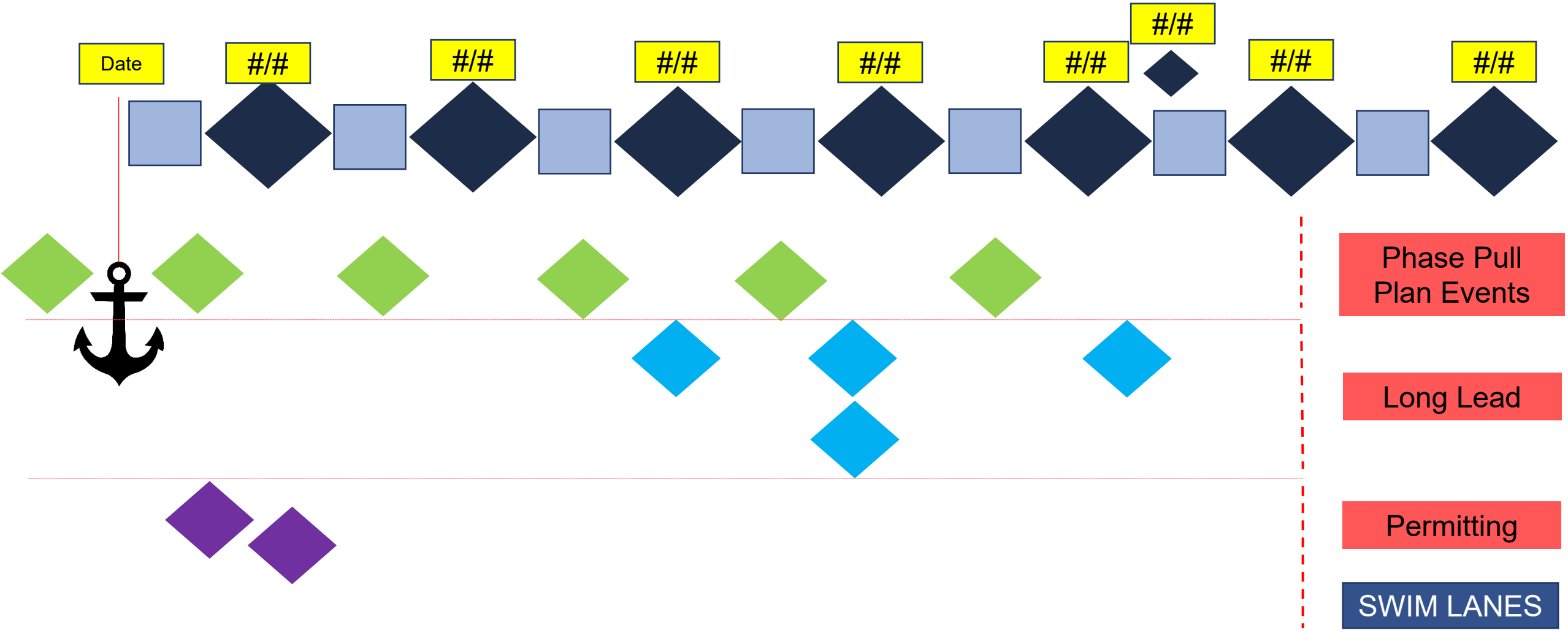

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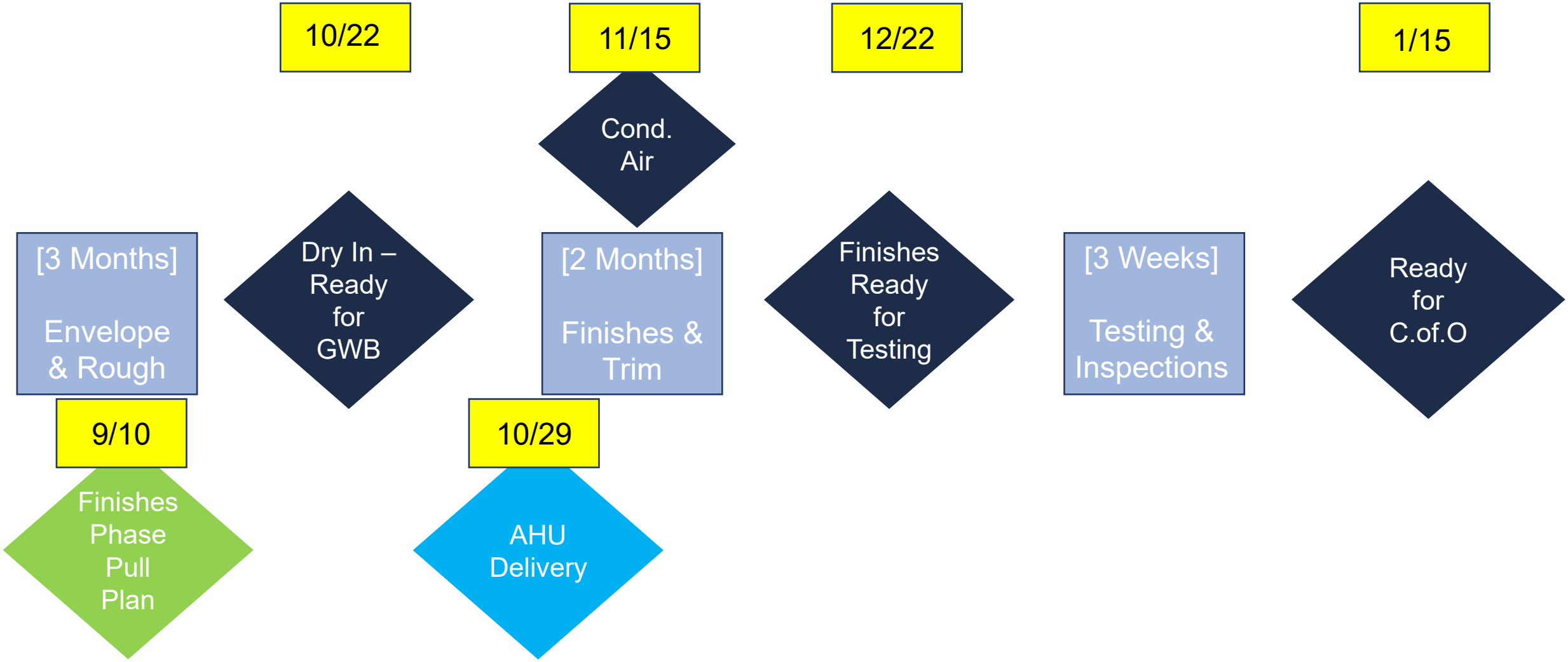

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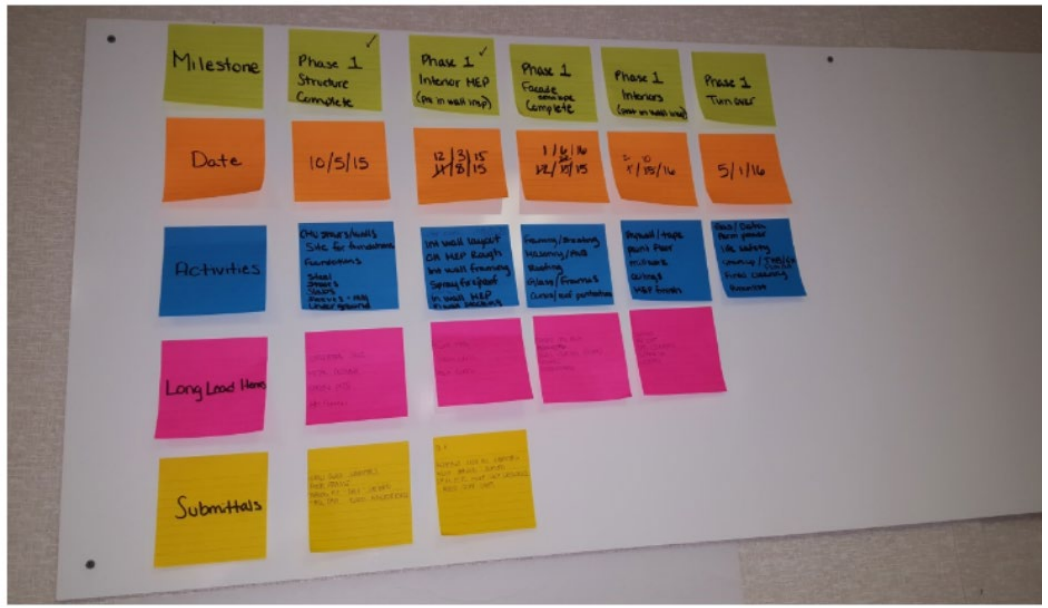
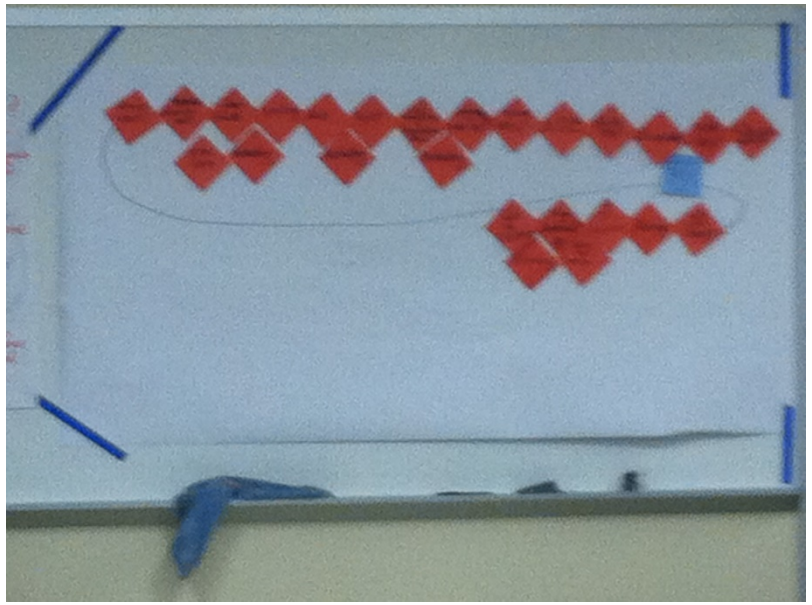
# More than one way to format



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# Activity: Tiny Home Project Milestone Plan

Activity Description:

- Use blank paper, post-its and sharpies
- Start with final milestone
- Create construction milestone structure and flow
- Estimate phase durations
- Arrive at the beginning:  1 Week from ‘Permit in Hand’
- Populate Dates Forward

20 Minutes


# Phase Pull Planning

The second conversation of LPS is *Phase Pull Planning.*

# Phase Pull Planning

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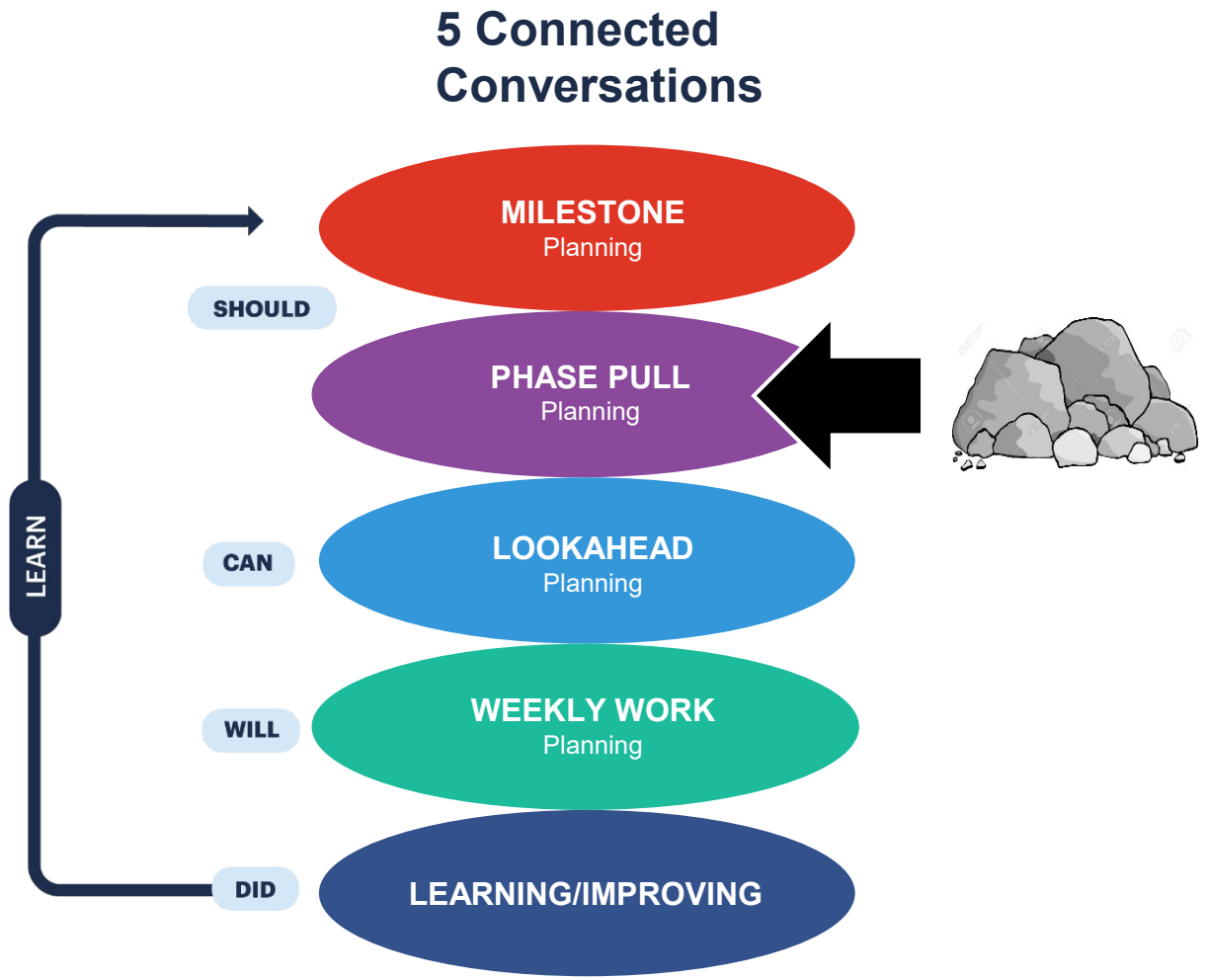
The goal of Phase Pull Planning is for the team to determine the key *handoffs* of work or information needed to deliver a milestone.

This continues the *we "should" be able* to do conversation.

Pull may validate or change the sequence in Milestone Planning output.

Milestone planning is a pre-requisite.



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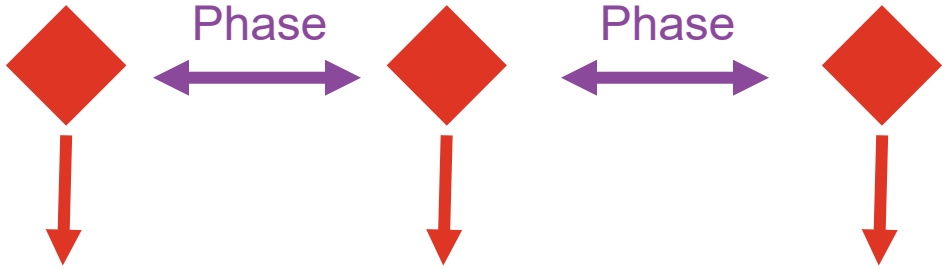
# Phase Definition

Phase:

A period of the project, where a *specific group of activities* is scheduled to be accomplished.

A phase can be either a time period or a group of activities leading to the *accomplishment of a defined goal/milestone*.





Courtesy of: Brasfield & Gorrie

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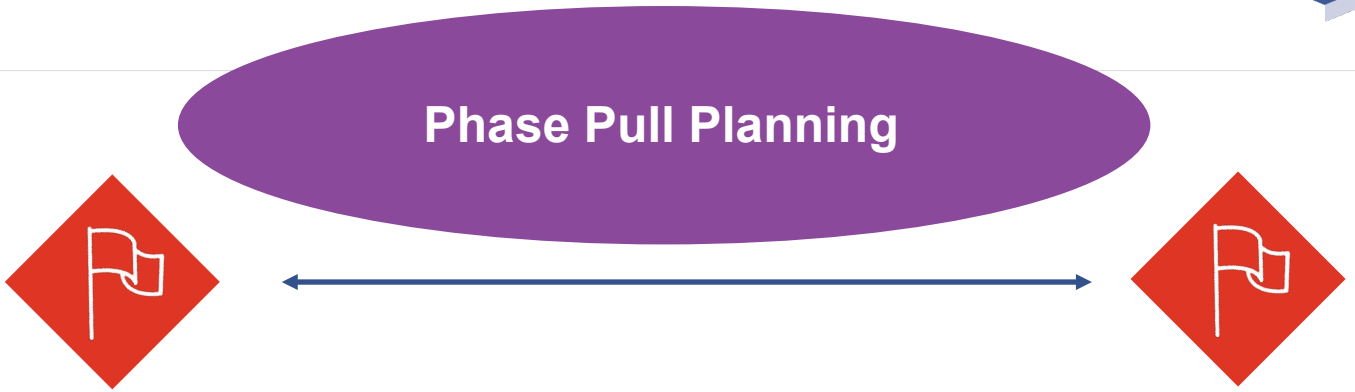


Courtesy of: PCL Construction

Phase of the work scaled per the milestone size to be an appropriate batch size

Informed by the *Milestone Plan*

Work out the structure and durations

After – add dates and transfer to the *Look Ahead Plan*

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# Push vs. Pull

Push:

- Advancing work based on central schedule.
- Releasing materials, information, or directives possibly according to a plan, but irrespective of whether the downstream process is ready to process them.

Pull:

- Advancing work when the next in line customer is ready.
- A “Request” from the customer signals that the work is needed and is “pulled” from the performer.

66

# Pull: Creating Flow

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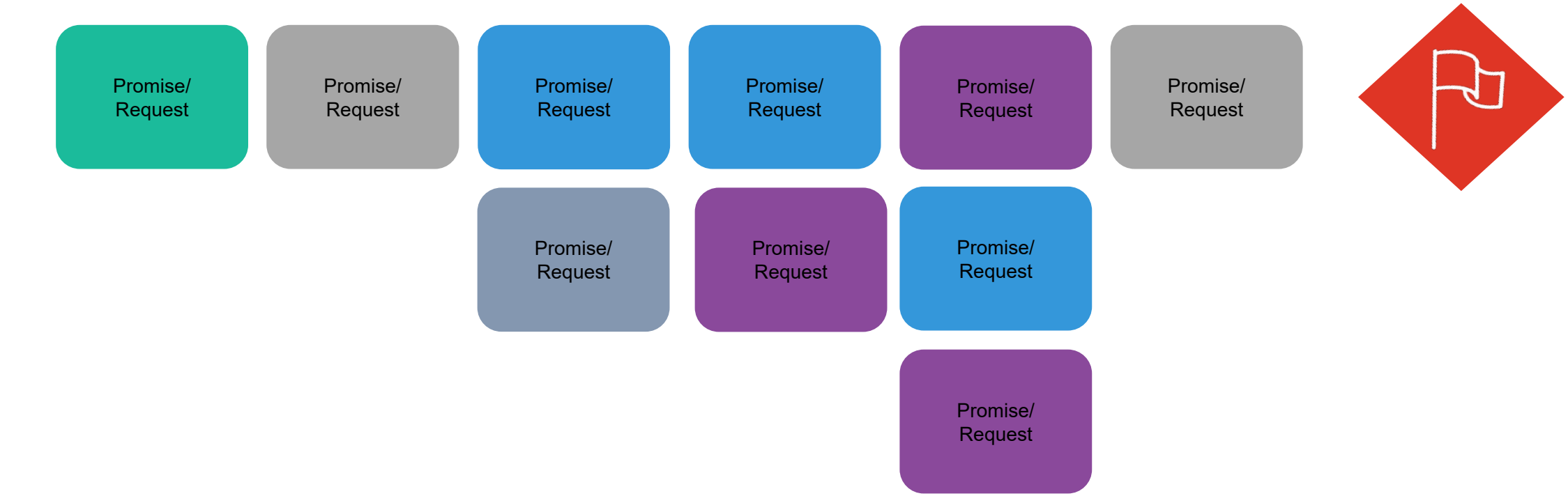
**Develop the Plan**




**Execute the Work**

67

# Phase Pull Planning: “Should”

Phase Pull is performed to *plan the work for each milestone*.

- Examples: Structure Ready for Skin, Dry-In Ready for Gypsum Board

The Phase Pull Plan is a high-level view of what the team *“should” be able to do*, breaking  into  .

Avoid *excessive detail* to minimize planning rework.


Courtesy of: JE Dunn

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# Phase Pull Planning: WHY Collaborate

- Tap into the knowhow of the people that will do the work.
- Ensure the Last Planners can achieve the original promise date of the milestone.
- Better understand each others' needs between handoffs.
- Align to a plan as a team - 'our plan' vs 'their plan'.
- When work is made to flow, everyone benefits.


Courtesy of: PCL Construction

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# Phase Pull Planning:  Preparation

## Identify Milestone and 'Conditions of Satisfaction'

- Identify Milestone the team will pull from.
- Determine work areas and batch sizes.
- Phases should be no more than a 2-3 month batch size.
- Break longer duration phases into interim milestones.
- "Conditions of Satisfaction" (CoS): Create a definition of Done for the Milestone.
- Align on the flow of work direction for all trades.

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# Example: Work Area/Batch Plan

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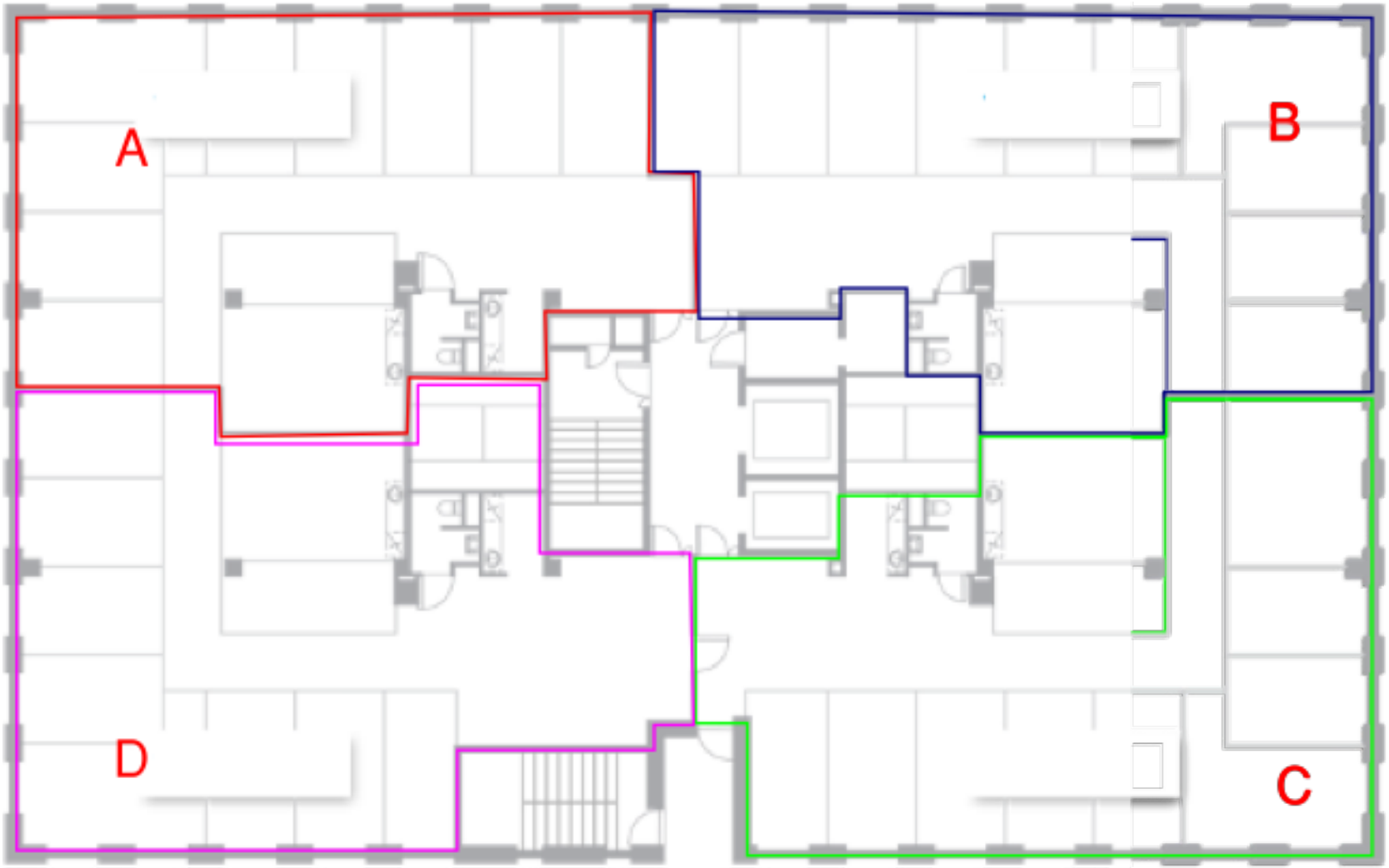
# Example: Work Area/Batch Plan



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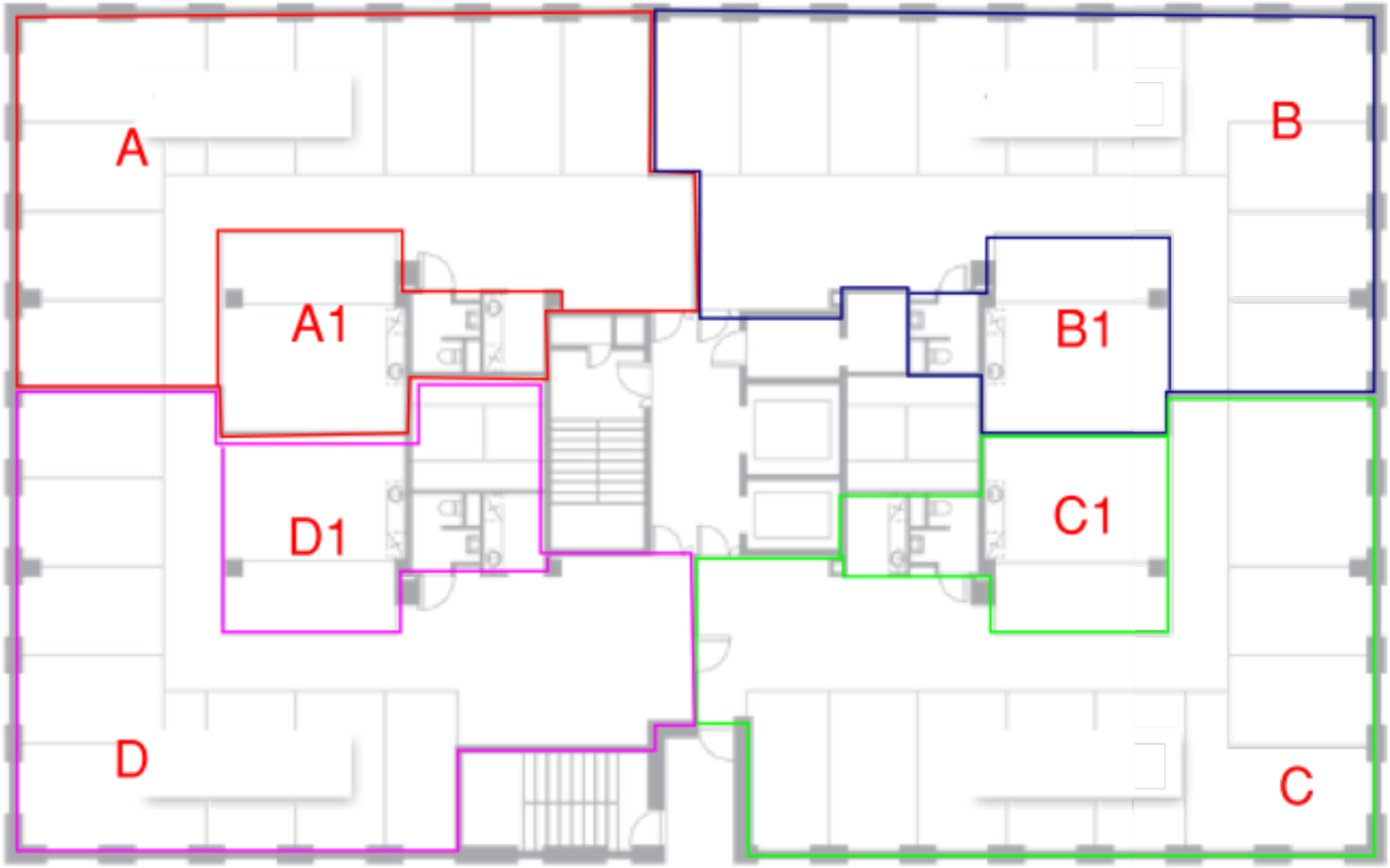
# Example: Work Area/Batch Plan



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# Phase Pull Planning: HOW

## Last Planners Create Tags

- Create a legend of color tags by trade.
- Include location/area to create flow of work.
- Breakdown duration estimates by area.
- Break up the work that is longer than ~5-10 days.
- Understand what you need from other trades to release your work.


Courtesy of: The ReAlignment Group

# Phase Pull Planning: Example Tag

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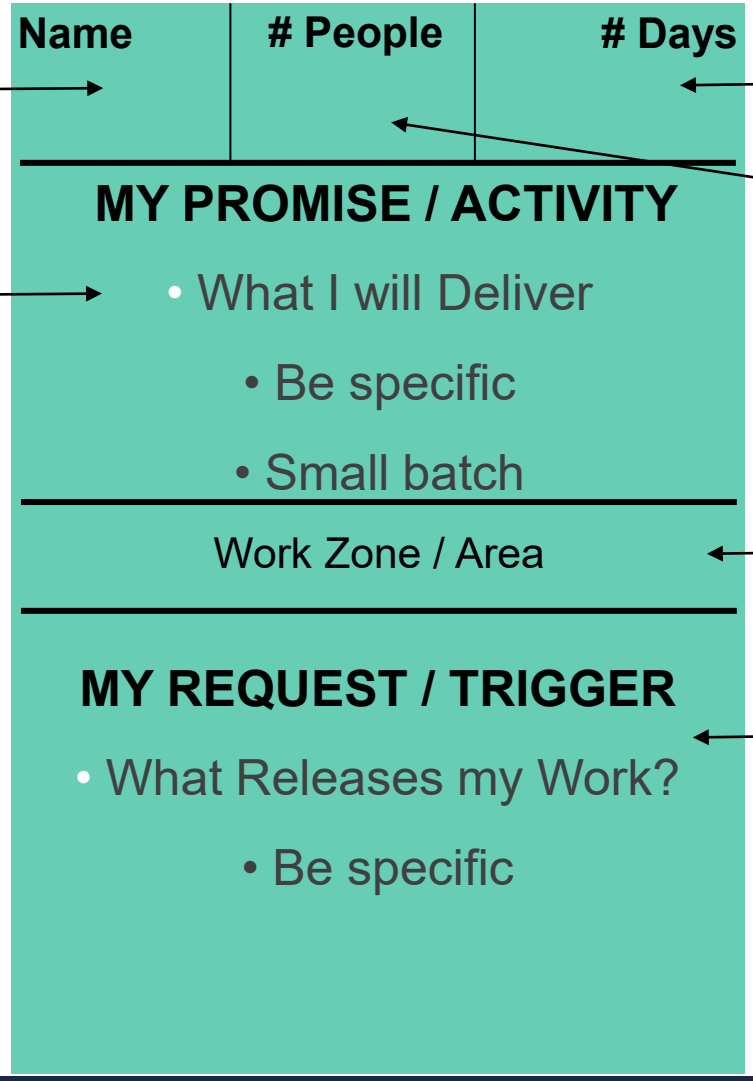
Name of person making the commitment

Description of the activity




Duration of the work in days

# of People for the work

Work zone or area

Description of the predecessor activity or work that releases the start of your activity

- Format tag to best fit your team needs
- Add more information as valued
- Color code by trade or discipline

# Phase Pull Planning: HOW

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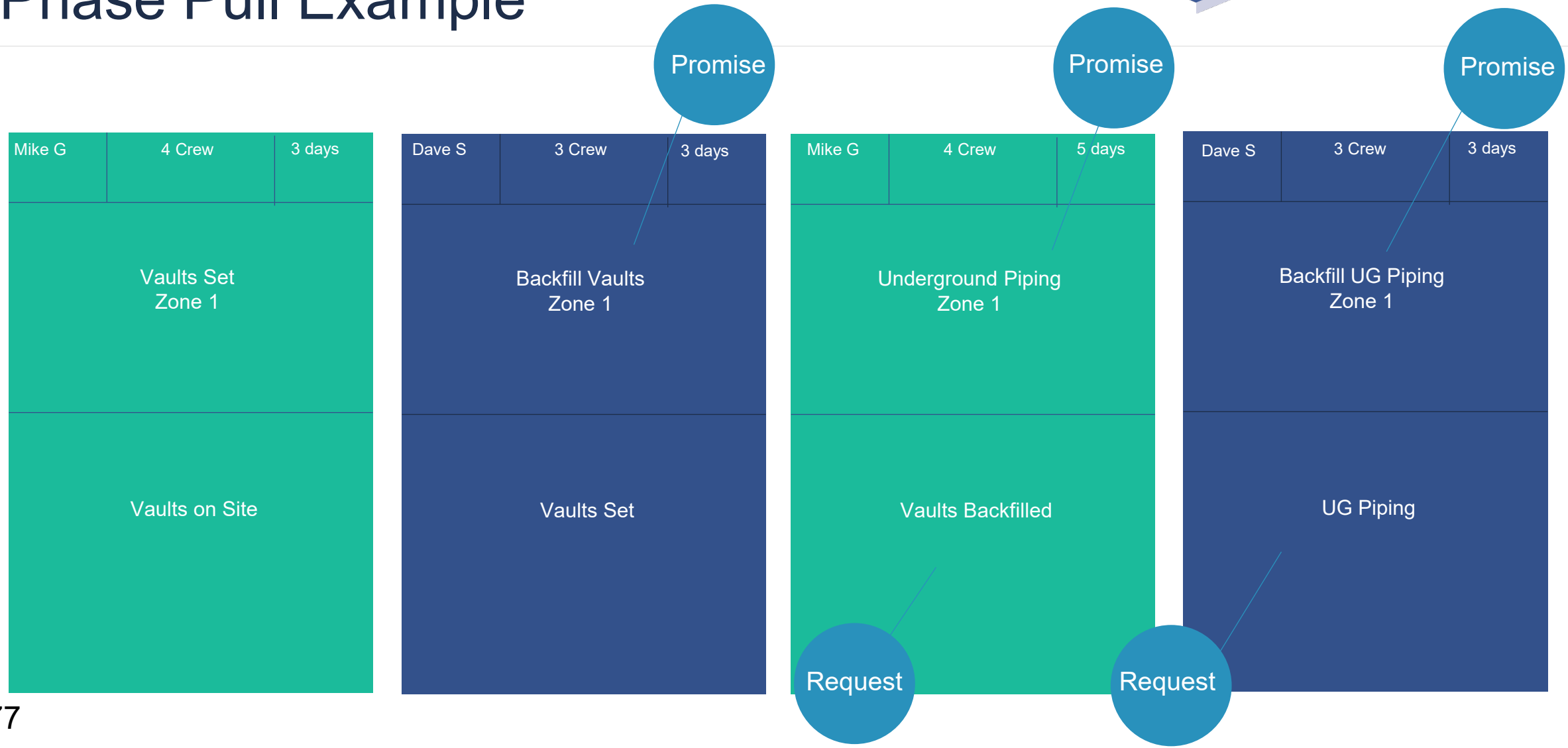
Create the Pull:

- Place the Milestone tag at the right end of the paper.
- Work backwards from the phase completion milestone.
- Begin with the last activity needed to complete the milestone and work backwards.
- Last Planners placing pull tags with ‘Requests’ must ask the other trade to meet the need by placing the corresponding tag.
- Gradually the team builds a network of commitments that satisfy each step in the process.

# Phase Pull Example




77

# Phase Pull Planning: HOW – "Should"

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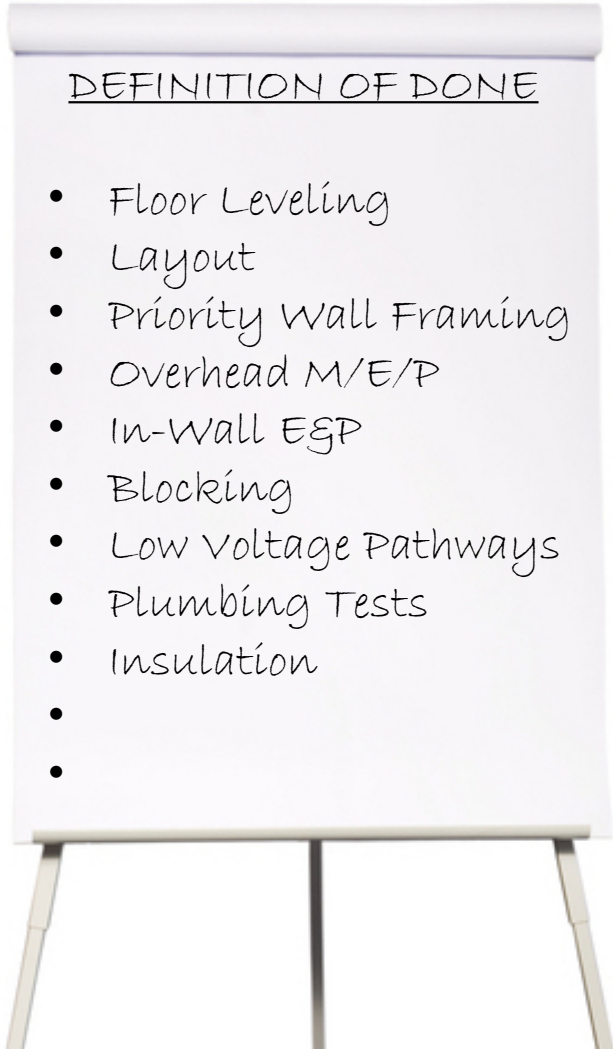
Step1: Define "Done" – the CoS for completion

In-Wall
Ready For
Gyp
Area A1



# Phase Pull Planning: HOW – “Should”

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# Phase Pull Planning: HOW – “Should”

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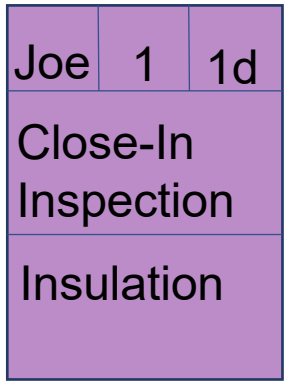



# Phase Pull Planning: HOW – “Should”

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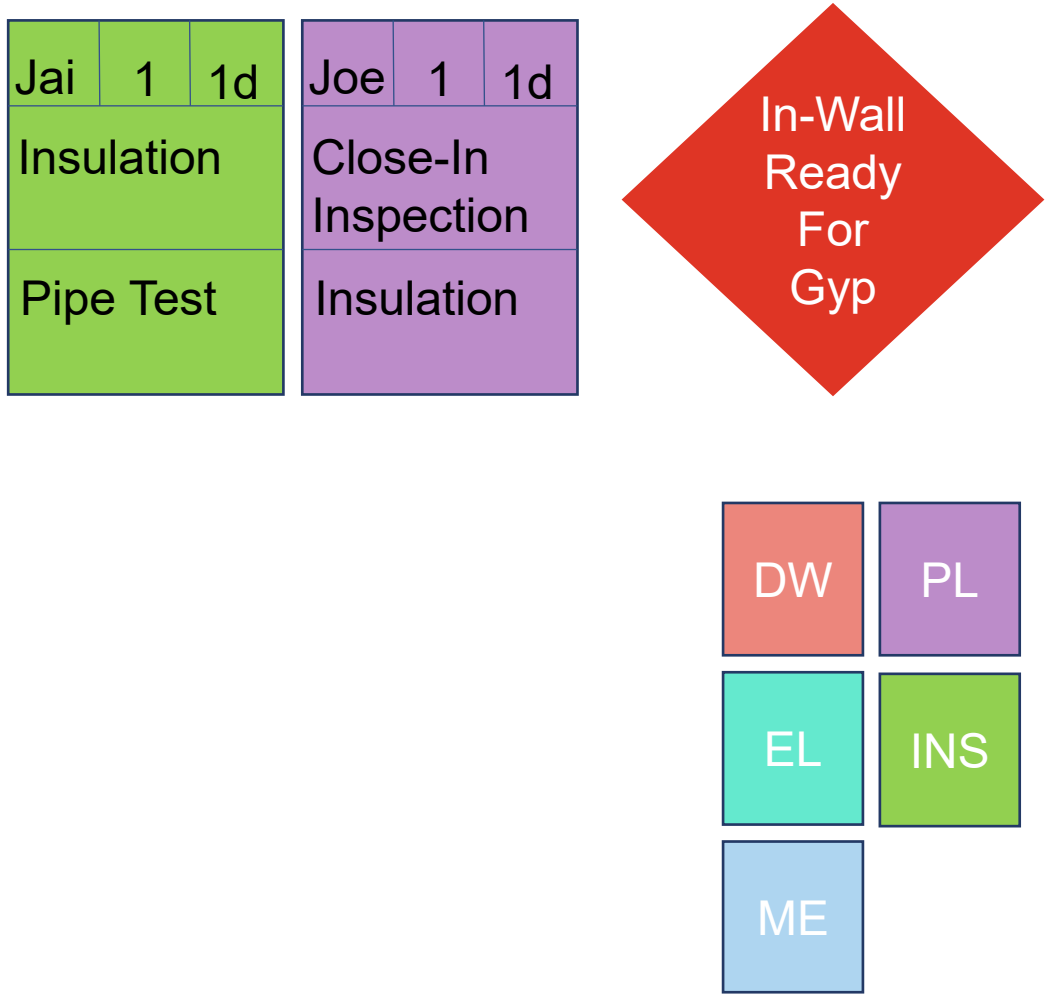

# Phase Pull Planning: HOW – “Should”

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| Joe | 1 | 5d |
|---|---|---|
| In-Wall Piping | | |
| OH Dist & Electrical | | |

| Joe | 1 | 2d |
|---|---|---|
| Pipe test | | |
| In-Wall Pipe | | |

| Jai | 1 | 1d |
|---|---|---|
| Insulation | | |
| Pipe Test | | |

| Joe | 1 | 1d |
|---|---|---|
| Close-In Inspection | | |
| Insulation | | |

In-Wall Ready For Gyp

DW
PL
EL
INS
ME

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# Phase Pull Planning: HOW – "Should"

| Al | 1 | 4d |
|---|---|---|
| Priority Walls | | |
| Layout | | |

| Joe | 1 | 8d |
|---|---|---|
| OH Dist | | |
| Priority Wall Framed | | |

| Joe | 1 | 5d |
|---|---|---|
| In-Wall Piping | | |
| OH Dist & Electrical | | |

| Joe | 1 | 2d |
|---|---|---|
| Pipe test | | |
| In-Wall Pipe | | |

| Jai | 1 | 1d |
|---|---|---|
| Insulation | | |
| Pipe Test | | |

| Joe | 1 | 1d |
|---|---|---|
| Close-In Inspection | | |
| Insulation | | |

In-Wall Ready For Gyp

| Al | 1 | 1d |
|---|---|---|
| Close-In Inspection | | |
| R.I. Done | | |

DW PL EL INS ME

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# Phase Pull Planning: HOW – "Should"

| Al | 1 | 4d |
|---|---|---|
| Home Runs | | |
| Layout | | |

| Al | 1 | 4d |
|---|---|---|
| Framing | | |
| Home Runs | | |

| Al | 1 | 4d |
|---|---|---|
| In Wall | | |
| Framing | | |

| Al | 1 | 4d |
|---|---|---|
| Priority Walls | | |
| Layout | | |

| Joe | 1 | 8d |
|---|---|---|
| OH Dist | | |
| Priority Wall Framed | | |

| Joe | 1 | 5d |
|---|---|---|
| In-Wall Piping | | |
| OH Dist & Electrical | | |

| Joe | 1 | 2d |
|---|---|---|
| Pipe test | | |
| In-Wall Pipe | | |

| Jai | 1 | 1d |
|---|---|---|
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| Joe | 1 | 1d |
|---|---|---|
| Close-In Inspection | | |
| Insulation | | |

| Al | 1 | 1d |
|---|---|---|
| Close-In Inspection | | |
| R.I. Done | | |

In-Wall Ready For Gyp

DW PL EL INS ME

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# Phase Pull Planning: HOW – "Should"

| Al | 1 | 4d |
|---|---|---|
| Priority Walls | | |
| Layout | | |

| Joe | 1 | 8d |
|---|---|---|
| OH Dist | | |
| Priority Wall Framed | | |

| Joe | 1 | 5d |
|---|---|---|
| In-Wall Piping | | |
| OH Dist & Electrical | | |

| Joe | 1 | 2d |
|---|---|---|
| Pipe test | | |
| In-Wall Pipe | | |

| Jai | 1 | 1d |
|---|---|---|
| Insulation | | |
| Pipe Test | | |

| Joe | 1 | 1d |
|---|---|---|
| Close-In Inspection | | |
| Insulation | | |

In-Wall Ready For Gyp

| Al | 1 | 4d |
|---|---|---|
| Home Runs | | |
| Layout | | |

| Al | 1 | 4d |
|---|---|---|
| Framing | | |
| Home Runs | | |

| Al | 1 | 4d |
|---|---|---|
| In Wall | | |
| Framing | | |

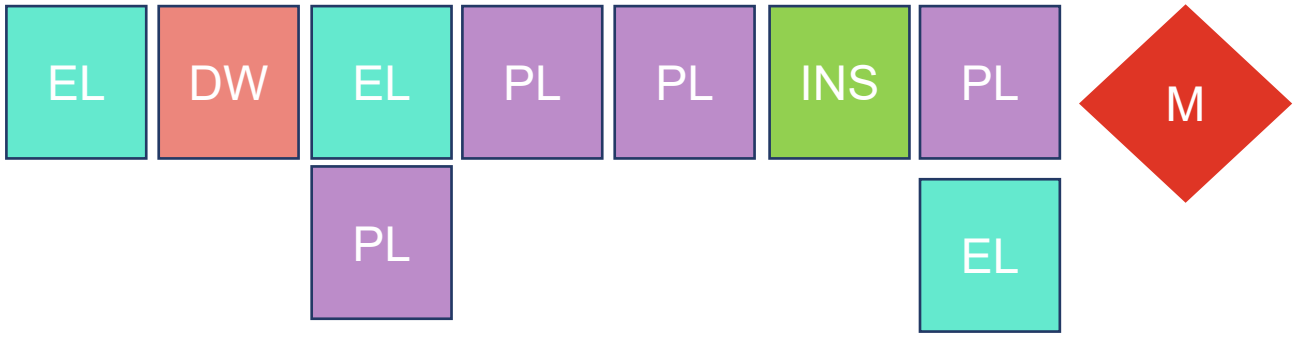
| Al | 1 | 1d |
|---|---|---|
| Close-In Inspection | | |
| R.I. Done | | |

| Al | 1 | 4d |
|---|---|---|
| Priority Walls | | |
| Layout | | |

| Joe | 1 | 8d |
|---|---|---|
| OH Dist | | |
| Priority Wall Framed | | |

DW PL EL INS ME

# Phase Pull Planning: HOW – “Should”



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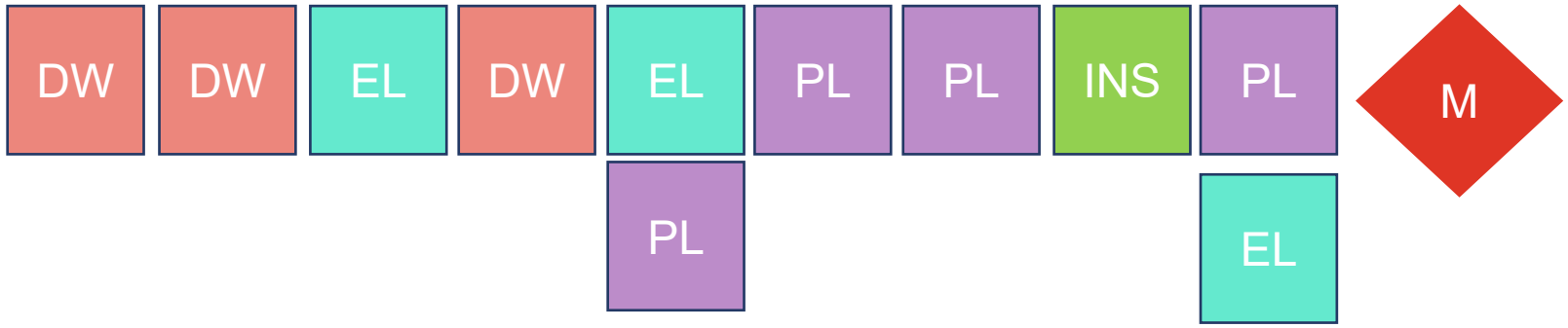
# Phase Pull Planning: HOW – “Should”



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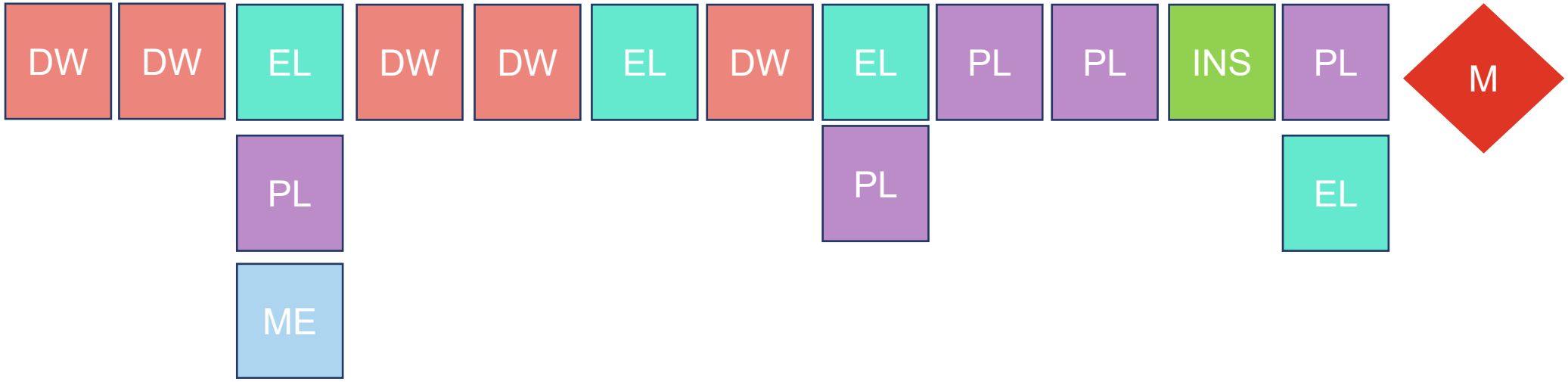
# Phase Pull Planning: HOW – “Should”



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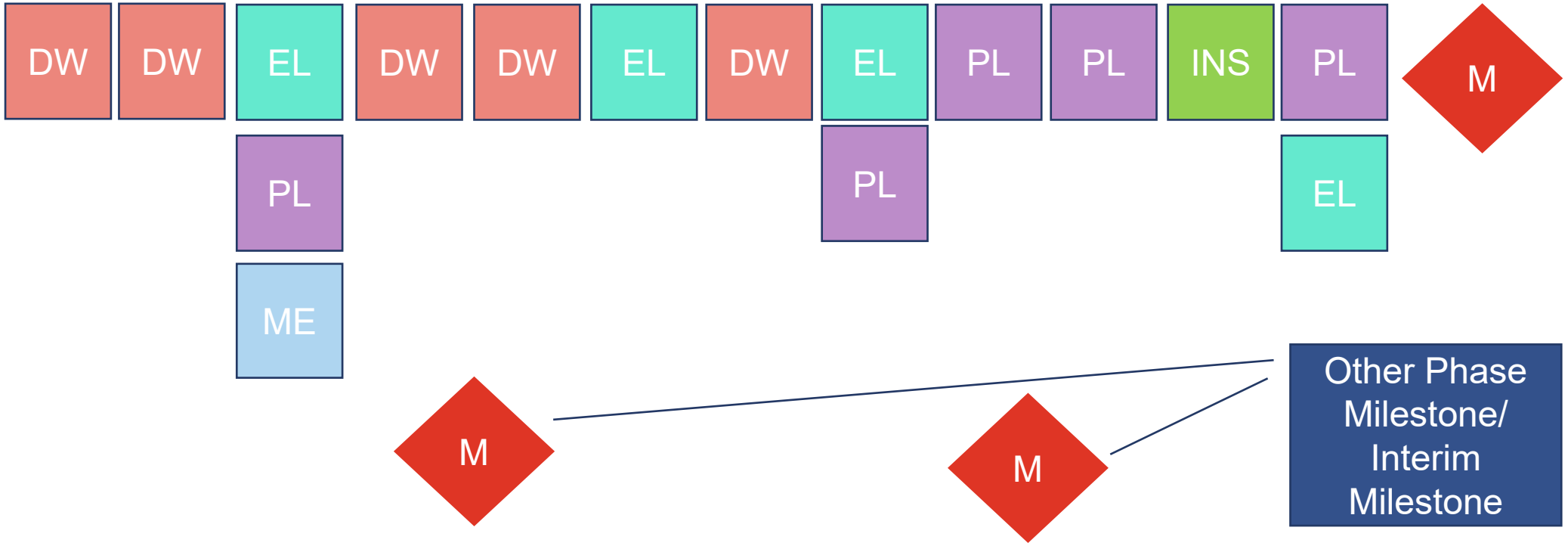
# Phase Pull Planning: HOW – “Should”



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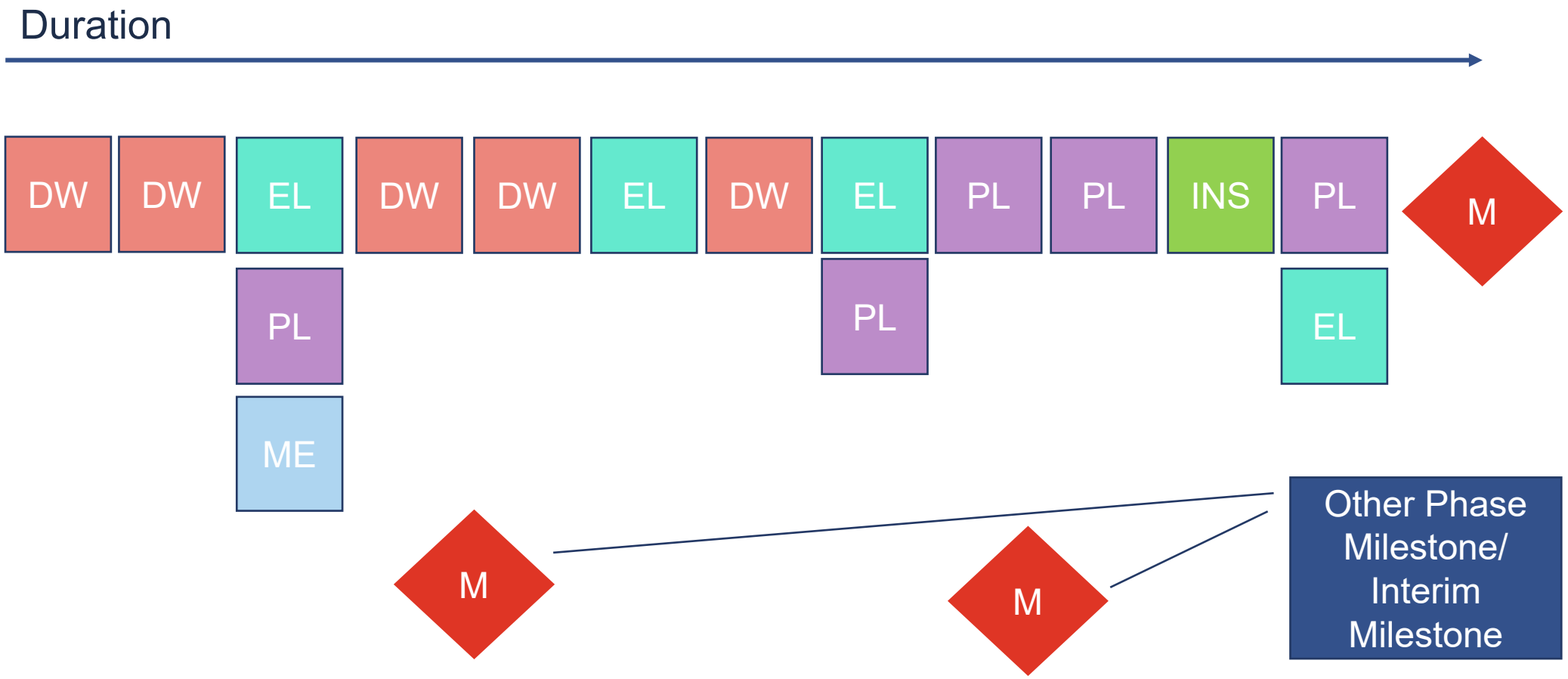
# Phase Pull Planning: HOW – "Should"



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# Phase Pull Planning: HOW Wrap-up

## Forward Pass Check:

- When most of the tasks are on the board, do a *forward pass* through the network.
- The group actively listens/talks through the sequence.
- Make sure all the needed information is on the tags.

## Validate Phase Duration:

- Count days on the longest path(s).
- If the duration exceeds requirement, the Phase Pull Plan is incomplete.

## Record the Plan (options):

- Photograph the results and share with the team.
- Update to P6/Master Schedule.
- Implement digital LPS tools.
- Keep a living Phase Pull Plan in the planning area.

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# Phase Pull Planning: HOW Wrap-up

Step 1 - Identify milestones and define “conditions of satisfaction”

Step 2 - Last planners break down their work in to tasks

Step 3 - Pull from the milestone backwards to build a network of commitments

Step 4 - Forward pass, check and adjust

Step 5 - Optimize the whole

Step 6 - Record the plan


TIME FOR A BREAK

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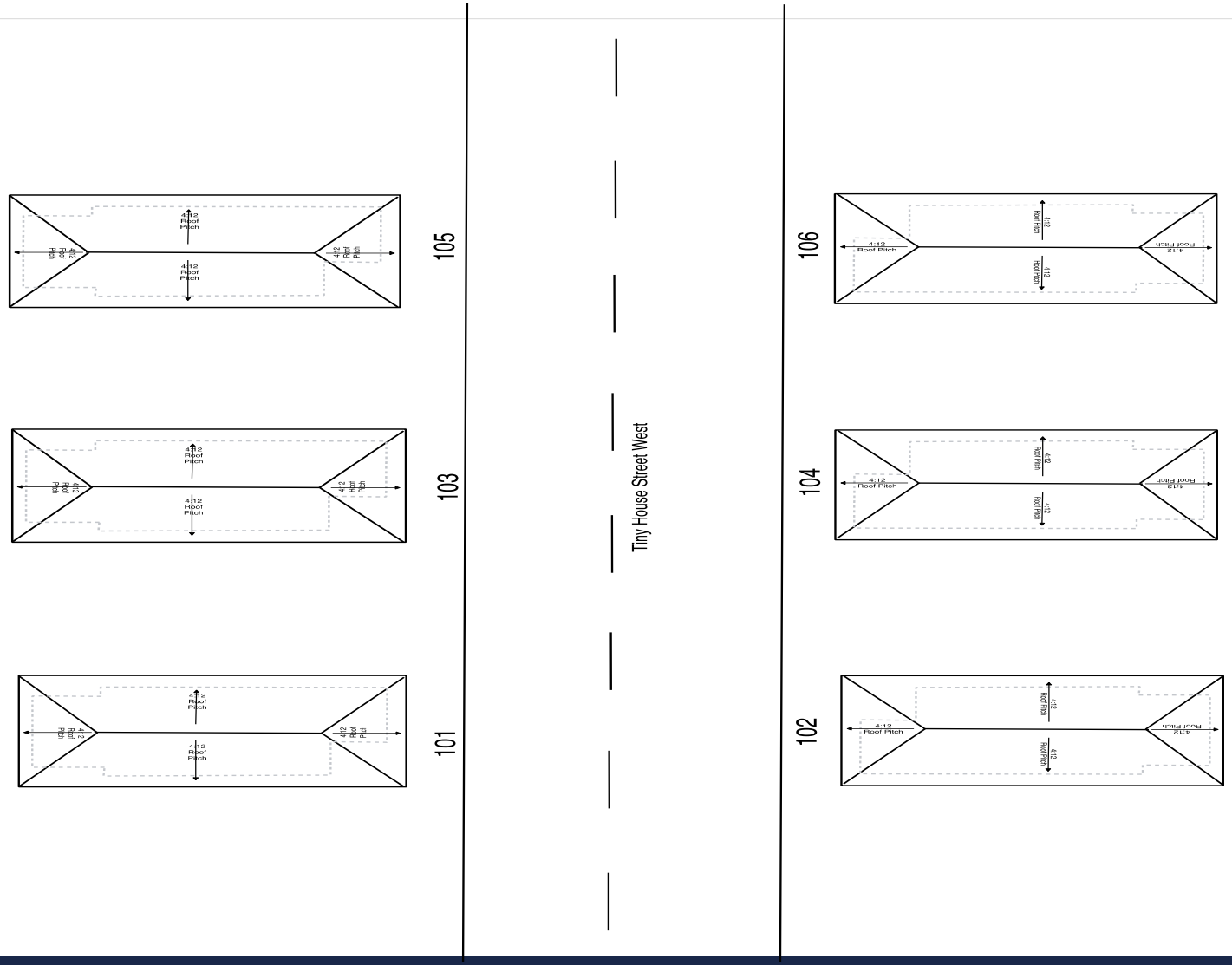
# Activity: Tiny Home Phase Pull Plan

- Preparation – 15 Min
  - Select Milestone
  - Define CoS
  - Create Area/Batch & Flow Plan
- Trade Preparation – 10 Min
  - Activities & Duration Estimates
- Create Phase Pull Plan – 20 Min
  - Pull Activities
  - Validate Plan

45 Minutes

# Tiny Home Batch & Flow



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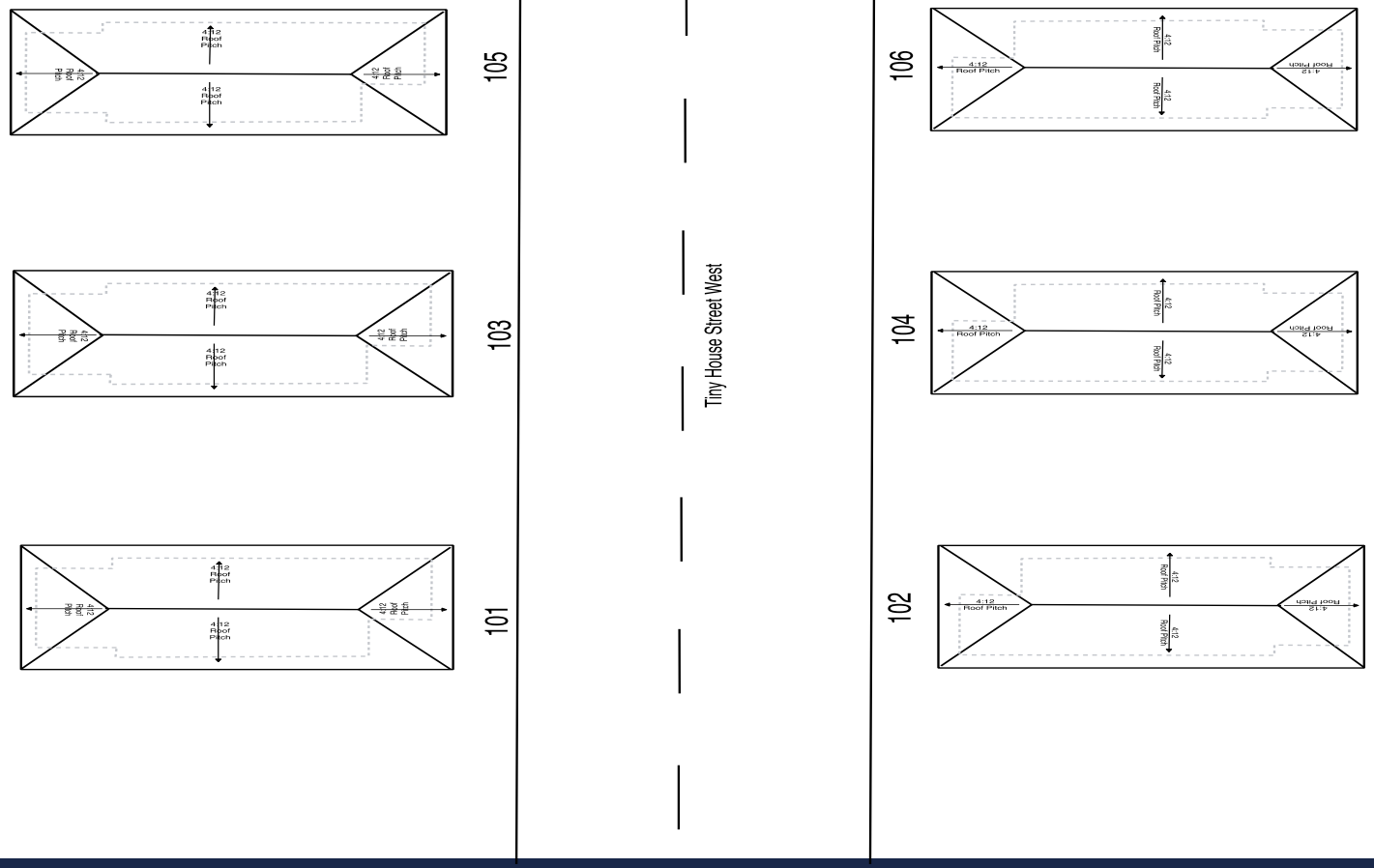
# Why Batch Size Matters



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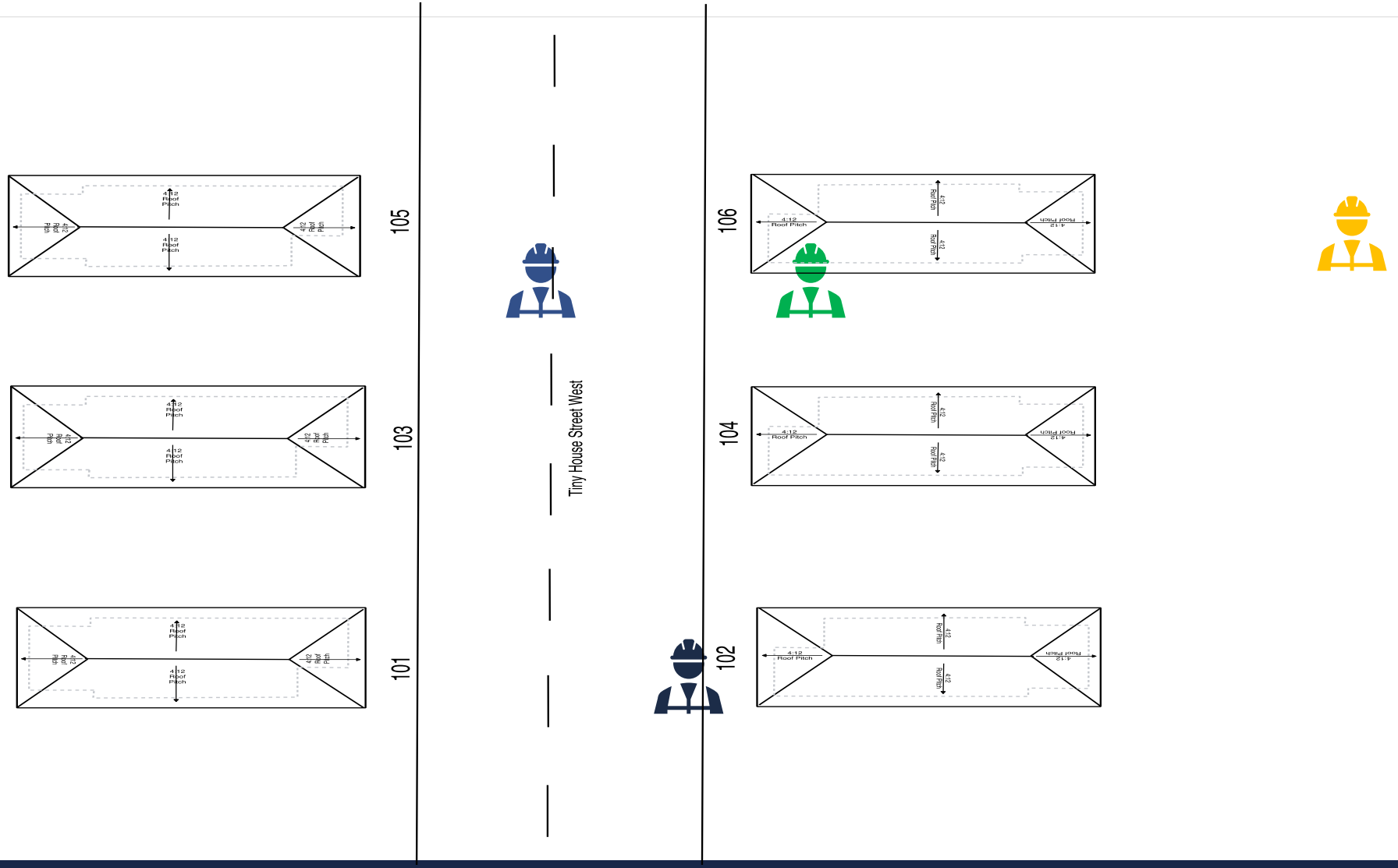
# Why Batch Size Matters



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# Activity: Tiny Home Phase Pull Plan

- Preparation – 15 Min
  - Select Milestone
  - Define CoS
  - Create Area/Batch & Flow Plan
- Trade Preparation – 10 Min
  - Activities & Duration Estimates
- Create Phase Pull Plan – 20 Min
  - Pull Activities
  - Validate Plan

45 Minutes

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# Weekly Planning Meetings

Weekly planning activities and tools that encompass the remaining conversations of LPS – Can, Will, Did and Learning.

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# Weekly Planning Conversations

- Look Ahead Planning
- Weekly Work Planning
- Learning & Improving
- Celebrating Wins
- Building Trust


Courtesy of: JE Dunn

# Lookahead Planning

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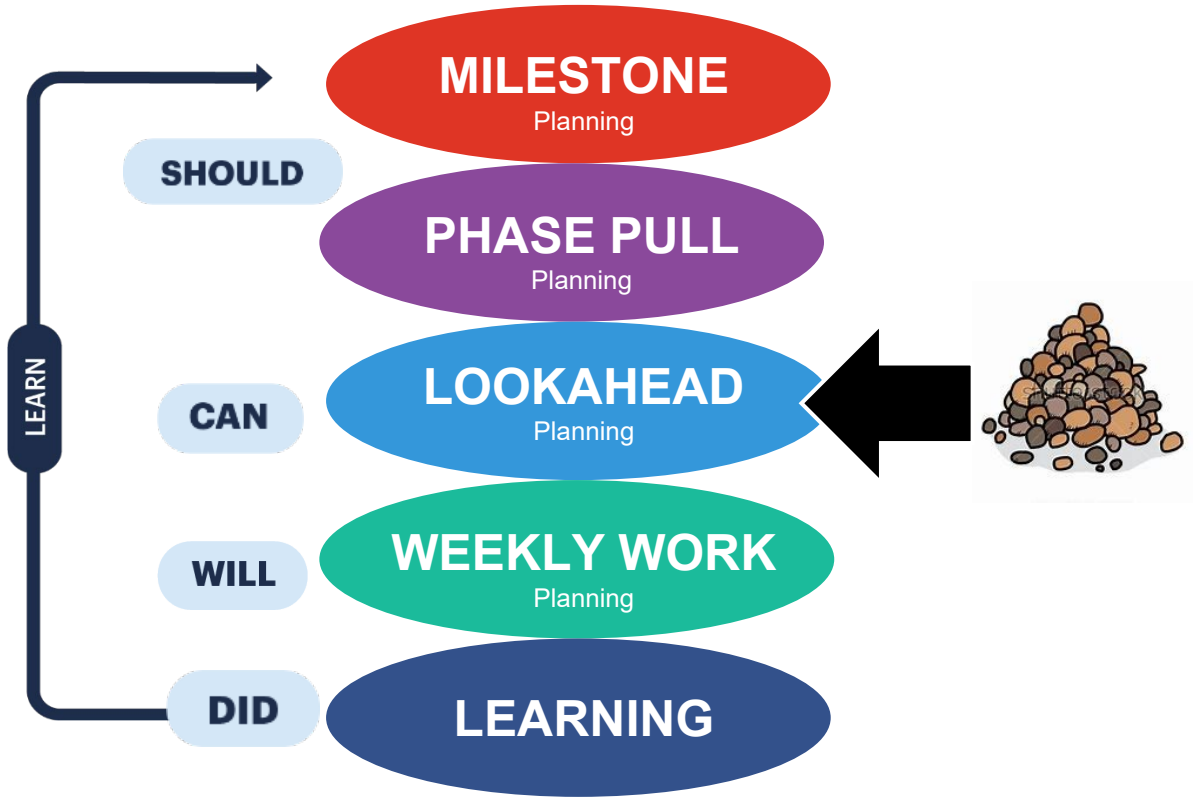
The third conversation of LPS is *Lookahead Planning. (LAP)*

This level focuses on making work ready or assuring that the work that *should* be done, *can* be done by identifying and *removing constraints* in advance of need.

The conversation is we *"can"* do this.

## 5 Connected Conversations



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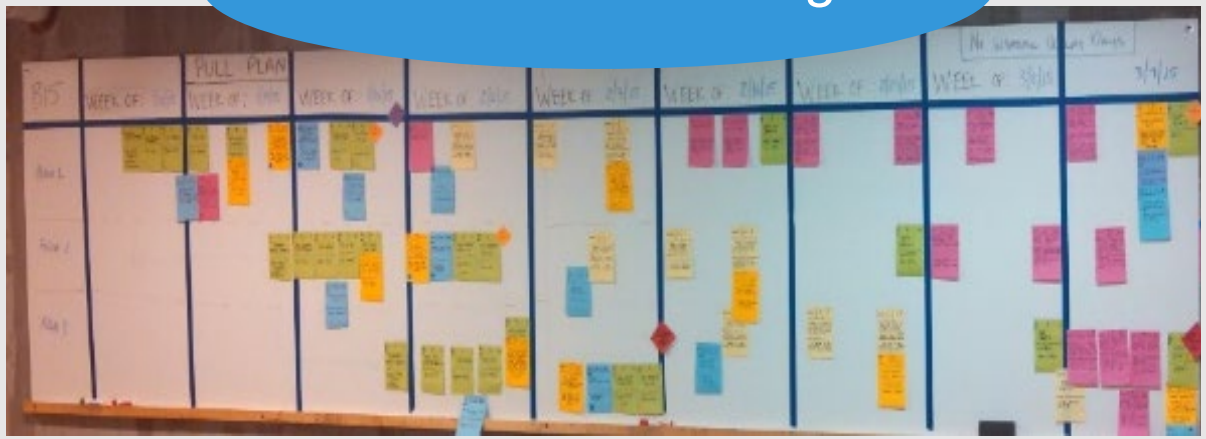
# LookAhead Planning




Project:
Project No.:
Responsible Person:

| Constraint Number | Activity Number | Constraint Description | RFI No. | Responsible Person | Responsible Company | Date Identified | Date Need Resolution | Date Resolution Promised | Actual Date Resolved |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |
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| | | | | | | | | | |
| | | | | | | | | | |

Constraint Log

- Transferred from the *Phase Pull Plan* to a plan with dates/weeks.
- Boards, P6 or other software documentation.
- Rolling (6-10 weeks) LookAhead to “make work ready”.
- Supports Team Meeting Discussion/Action for:
  - *Risk Log*
  - *Constraint Log*
  - Informs the *Weekly Work Plan*

# Constraint Log Example

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Project:
Project No.:
Responsible Person:

| Constraint Number | Activity Number | Constraint Description | RFI No. | Responsible Person | Responsible Company | Date Identified | Date Need Resolution | Date Resolution Promised | Actual Date Resolved |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
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| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

DATE PROMISED

CONSTRAINT DESCRIPTION

RESPONSIBLE PERSON & CO

DATE IDENTIFIED

DATE NEEDED

DATE RESOLVED

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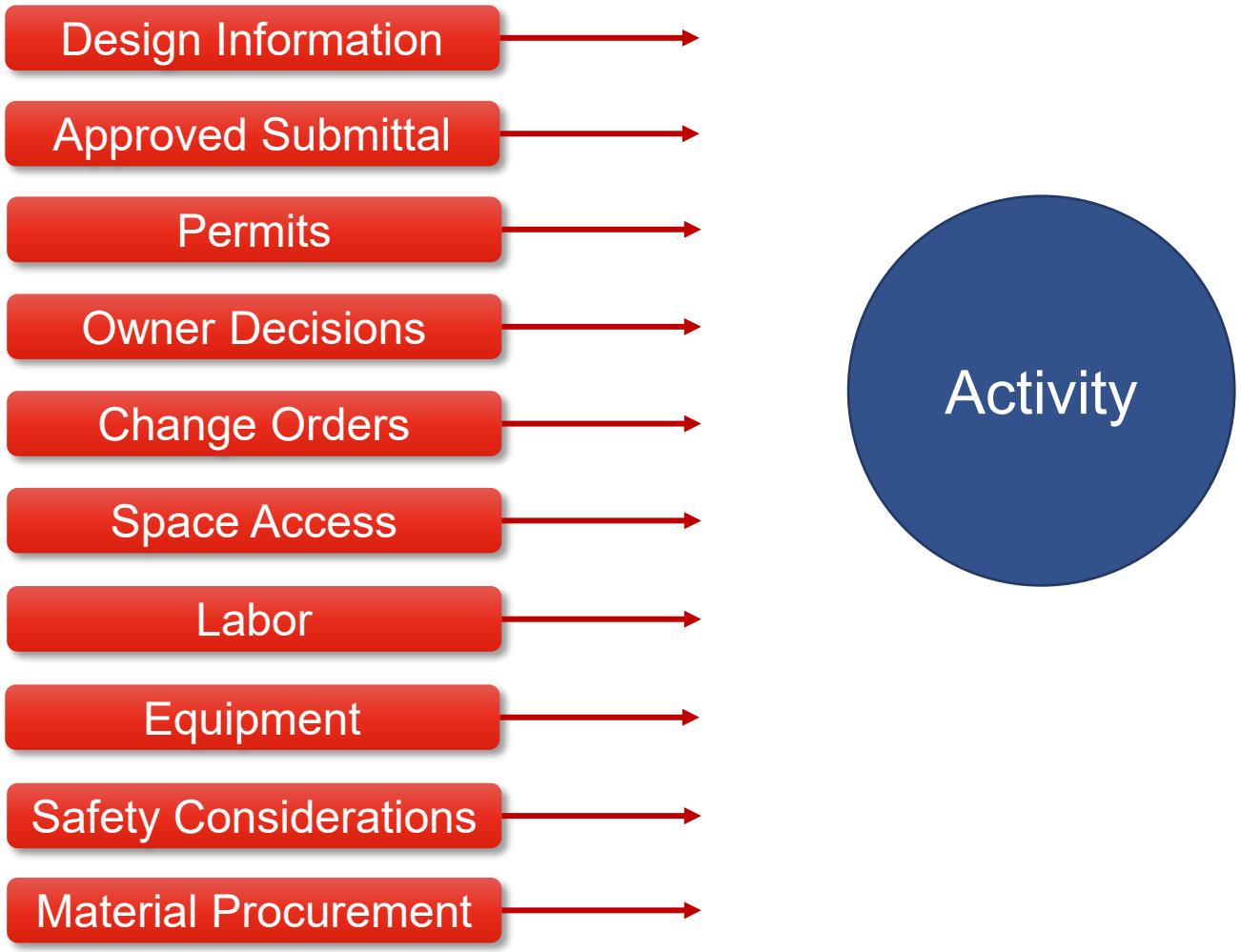
# Constraint Defined

Constraint:
An item or requirement that **will prevent an activity** from starting, advancing or completing as planned.



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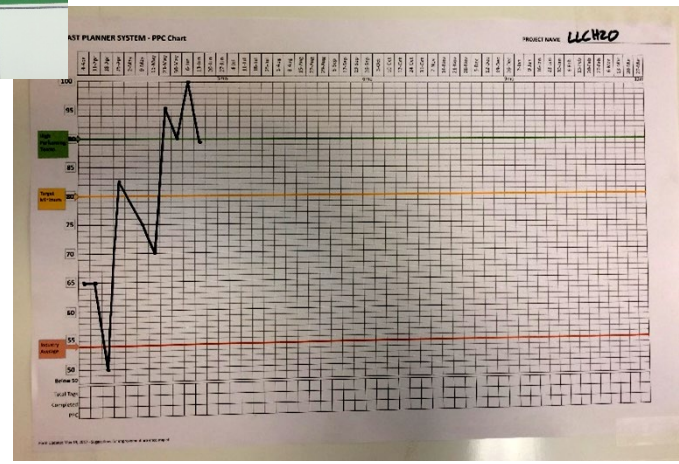
# Weekly Planning Meeting: Round 1 Agenda

- Review Plus/ Delta
- General announcements
- Look Ahead Plan Update
  - Rotate and add new activities
  - Update existing constraints
  - Identify new constraints
- Last Week's PPC/ Variances
- Weekly Work Plan created/negotiated for next week
- Round Robin to address any new issues not covered
- Plus/Delta




TIME FOR A BREAK

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# Activity: Tiny Home Look Ahead Plan

- Create Look Ahead Boards
  - Swim lanes by area
  - Follow color legend
  - 3-4 Weeks of activities
  - More detailed than Phase Pull Plan
- Setup Constraint Log

# Activity: Tiny Home Constraint Log Update

- Review Look Ahead Plan
  - Activity Starts – Make Ready
  - Set a date out 6 weeks
- Identify Constraints
  - For each activity start, deal a ‘Constraint Card’
  - Record any constraints on the log
  - Correlate to look ahead plan with dots

# Report out

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How did it go?

Any aha moments?

# Weekly Work Planning

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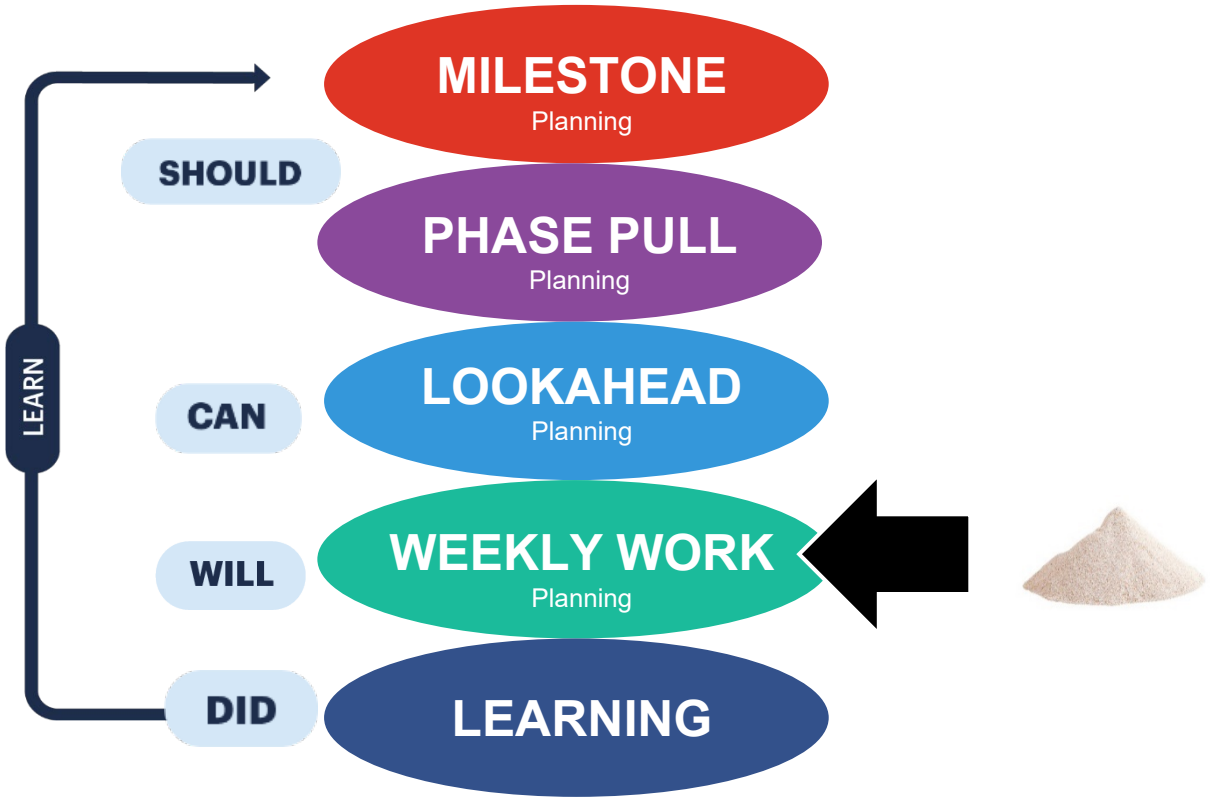
The fourth conversation of LPS is *Weekly Work Planning. (WWP)*

The goal of this level is for the Last Planners to *establish the plan* for the upcoming week at the daily level.

The conversation is I *"will"* do this.

## 5 Connected Conversations



# Weekly Work Planning

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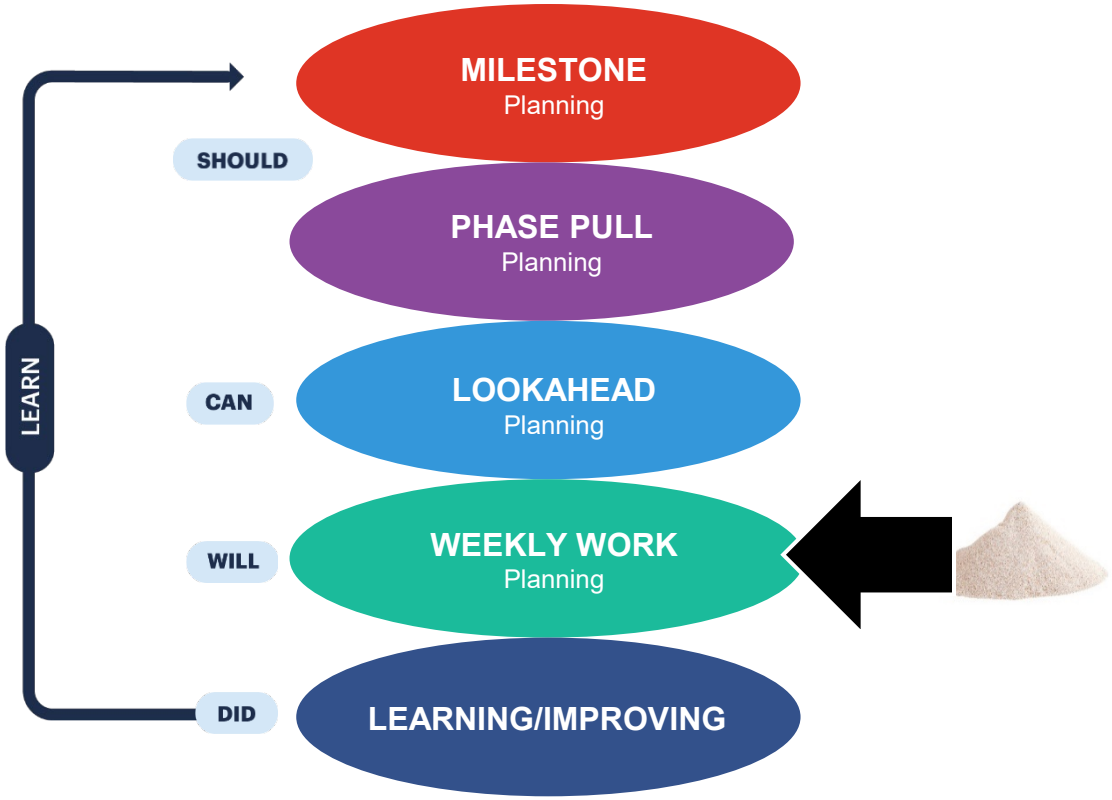
This is the level that the team identifies the *promised task completions* agreed upon by the *Performers* for the upcoming week.

The WWP is used to determine the *success* of the planning effort and to determine what *factors limit performance*. And is the basis of measuring PPC (Percent Plan Complete).

This is done during a *Check-in Session or Huddle.*

## 5 Connected Conversations



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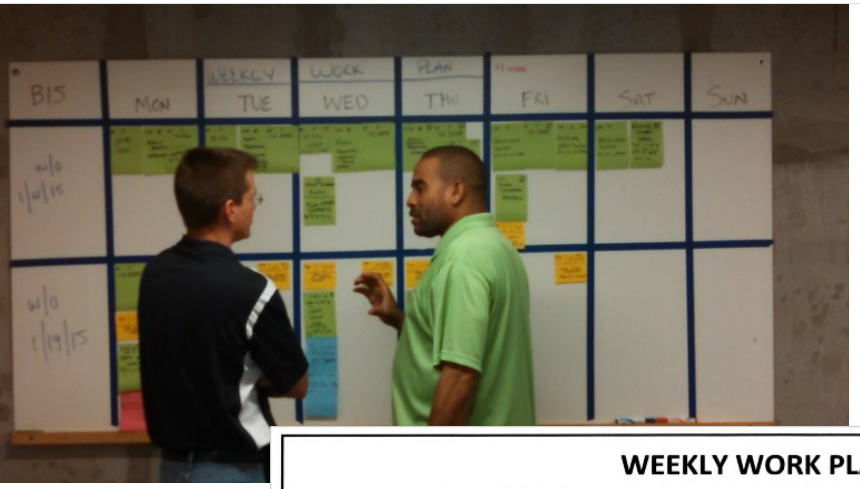


# Weekly Work Planning

## WEEKLY WORK PLAN

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area: | | CATEGORY* OF PLAN FAILURE | | | | | | | | | | TOTAL ACTIVITIES | 10 |
| Contractor: | | 1 Coordination | 5 Prerequisite Work | 9 Submittals | | 13 Space | | | | | | ACTIVITIES COMPLETED | 5 |
| Shift: | | 2 Design | 6 Labor | 10 Approvals | | 14 Site Conditions | | | | | | PERCENT PLAN COMPLETE (PPC) | 50% |
| Last Planner: | | 3 Owner Decision | 7 Materials | 11 Equipment | | 15 | | | | | | | |
| | | 4 Weather | 8 Contracts/COs | 12 RFIs | | 16 | | | | | | | |

| Activity ID | ASSIGNMENT DESCRIPTION<br>Safe - Defined - Sound - Proper Sequence - Right Size - Able to Learn | Responsible Person | Start Date | | 05-Oct-09 | | | | | DONE? | | LEARNING<br>REASONS FOR PLAN FAILURE | Category* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Mon | Tue | Wed | Thu | Fri | Sat | Sun | YES | NO | | |
| | ***Column Grid A1 - G8*** | | | | | | | | | | | | |
| | ***Joes Framing*** | *Bill* | | | | | | | | | | | |
| 7055 | *Top Track Install* | | *4* | *4* | | | | | | *1* | | | |
| 7060 | *Framing Walls* | | | *4* | *4* | | | | | *1* | | | |
| 7065 | *Backing Install* | | | | *4* | *4* | | | | | *0* | *IOR not available* | 10 |
| | ***Sparky's Electrical*** | *Jim* | | | | | | | | | | | |
| 1605 | *Rough in Walls* | | | *2* | *2* | *2* | *2* | | | *1* | | | |
| 1610 | *Rough in Ceilings* | | | | | *2* | *2* | *2* | | | *0* | Need grid elevation layout | 5 |
| | ***Acme Mechanical*** | | | | | | | | | | | | |
| 1505 | *Plumbing - in wall rough in - Install* | | | | *2* | | | | | | *0* | Walls not inspected | 10 |
| 1510 | *Plumbing - ceiling rough in - Install* | | | | | *2* | | | | | *0* | | |
| | ***Column Grid G9 - J 12 Kitchen servery*** | | | | | | | | | | | | |
| | ***Joes Framing*** | *Bill* | | | | | | | | | | | |
| 7055 | *Top Track Install* | | | | | | *4* | | | *1* | | | |
| 7060 | *Framing Walls* | | | | | | | *4* | | *1* | | | |
| 7065 | *Backing Install* | | | | | | | *2* | | | *0* | room not available | 1 |
| | **Workable Backlog** ( My "Plan B": What work can I do without affecting other trades if above plan breaks down? ) | | | | | | | | | *5* | | | |

- Informed by the Look Ahead Plan
- Detail work by trade at the Daily Level
- Detailing of the next week
- Informs the Daily Huddle
- Take to the field

112

# Weekly Work Planning

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## Weekly Work Plan *Informs* the Daily Huddle


Courtesy of: PCL Construction

Courtesy of: Turner/DPR JV

# Weekly Work Planning Example

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"What, Where, Who & When"

## WEEKLY WORK PLAN

Work Beginning:

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area: | | CATEGORIES OF PLAN FAILURE | | | | | | | | | TOTAL ACTIVITIES | 31 | | |
| Contractor: | | 1 Coordination | 5 Prerequisite Work | 9 Submittals | | 13 Space | | | | | ACTIVITIES COMPLETED | | | |
| Shift: | | 2 Eng/Design | 6 Labor | 10 Approvals | | 14 Site Conditions | | | | | PERCENT PLANNED COMPLETE | 0% | | |
| Last Planner: | | 3 Owner Decision | 7 Materials | 11 Equipment | | 15 | | | | | | | | |
| | | 4 Weather | 8 Contracts/COs | 12 RFIs | | 16 | | | | | | | | |

| Activity ID | Commitment Description<br>Safe - Defined - Sound - Proper Sequence - Right Size - Able to Learn | Responsible Person | Start Date | | 1\28 | | | | | DONE? | | LEARNING | Category |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Mon | Tue | Wed | Thu | Fri | Sat | Sun | YES | NO | REASONS FOR PLAN FAILURE | |
| 1 | Pour new moat floor on the south side of the building | B.A.M | 4 | 4 | | | | | | | | | |
| 2 | Adjust (4) down spouts on the south side of the building | B.A.M | 2 | 2 | 2 | | | | | | | | |
| 3 | Patch masonry around 6 conducter boxes on the roof | B.A.M | 1 | 1 | 1 | 1 | 1 | | | | | | |
| 4 | Install base on 2nd floor in the south side class rooms | B.A.M | | 3 | 3 | 3 | 3 | | | | | | |
| 5 | Install wainscoting on the first floor north side | B.A.M | | 4 | 3 | 4 | | | | | | | |
| 6 | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | |
| 8 | Pull wire for Chiller | Ryan | 5 | | | | | | | | | | |
| 9 | Security rough-in on all floors | Ryan | 3 | 3 | 3 | 3 | 3 | | | | | | |
| 10 | Basement rough-in complete | Ryan | 4 | 4 | 4 | 4 | 4 | | | | | | |
| 11 | | | | | | | | | | | | | |
| 12 | Hang and finish all rated chases | Fred | | | 3 | 3 | | | | | | | |
| 13 | Reframe and hang dry wall in hallway 121 | Fred | 4 | 4 | 4 | 3 | 5 | | | | | | |
| 14 | Sand dry wall in hallway 139 | Fred | 2 | 2 | | | | | | | | | |
| 15 | Finish dry wall in west class room 107,144 | Fred | 3 | 3 | 3 | 3 | | | | | | | |
| 16 | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | |
| 18 | Rough-in media center ceiling | Troy | 5 | | | | | | | | | | |
| 19 | Get fresh air duct inspected in attic | Troy | | | | 6 | | | | | | | |
| 20 | Get north west chase duct inspected | Troy | | | | 6 | | | | | | | |
| 21 | Insulate north west chase duct | Troy | | | 4 | | | | | | | | |
| 22 | Tie in vav boxes in the attic | Troy | 3 | 3 | 3 | | | | | | | | |
| 23 | Start tying in vav boxes in the east wing 1st and 2nd floors | Troy | 4 | 4 | 4 | 4 | | | | | | | |

What & Where?

Crew Size?

Who?

When will it be done?

# Weekly Planning Meeting: Round 1 Agenda

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- ~~Review Plus/ Delta~~
- ☑ General announcements
- ☑ Look Ahead Plan Update
  - Rotate and add new activities
  - Update existing constraints
  - Identify new constraints
- ~~Last Week's PPC/ Variances~~
- ➡ Weekly Work Plan created/negotiated for next week
- ➡ Round Robin to address any new issues not covered
- ➡ Plus/Delta

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# Weekly Work Planning: Preparation

Questions to ask when preparing  for the WWP:

- Will I have the appropriate amount of staff on site to perform the work?
- Do I have the material needed?
- Is it the right sequence?
- Is it safe?
- Are there any open constraints that need to be resolved?
- Do the tasks tie directly to look ahead plan?  If no, ask why?

# Activity: Tiny Home Weekly Work Plan Week 1

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- Setup Weekly Work Plan Template
- Pick 1 week from Look Ahead Plan
- Detail weekly planning activities on WWP
- Ensure no constrained activities
- Check for missing activities
- Round Robin
- +/Delta


30 Minutes

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# Learning While Doing

Executing the weekly work plan, daily huddles, variances and tracking plan reliability.

# Learning/Improving

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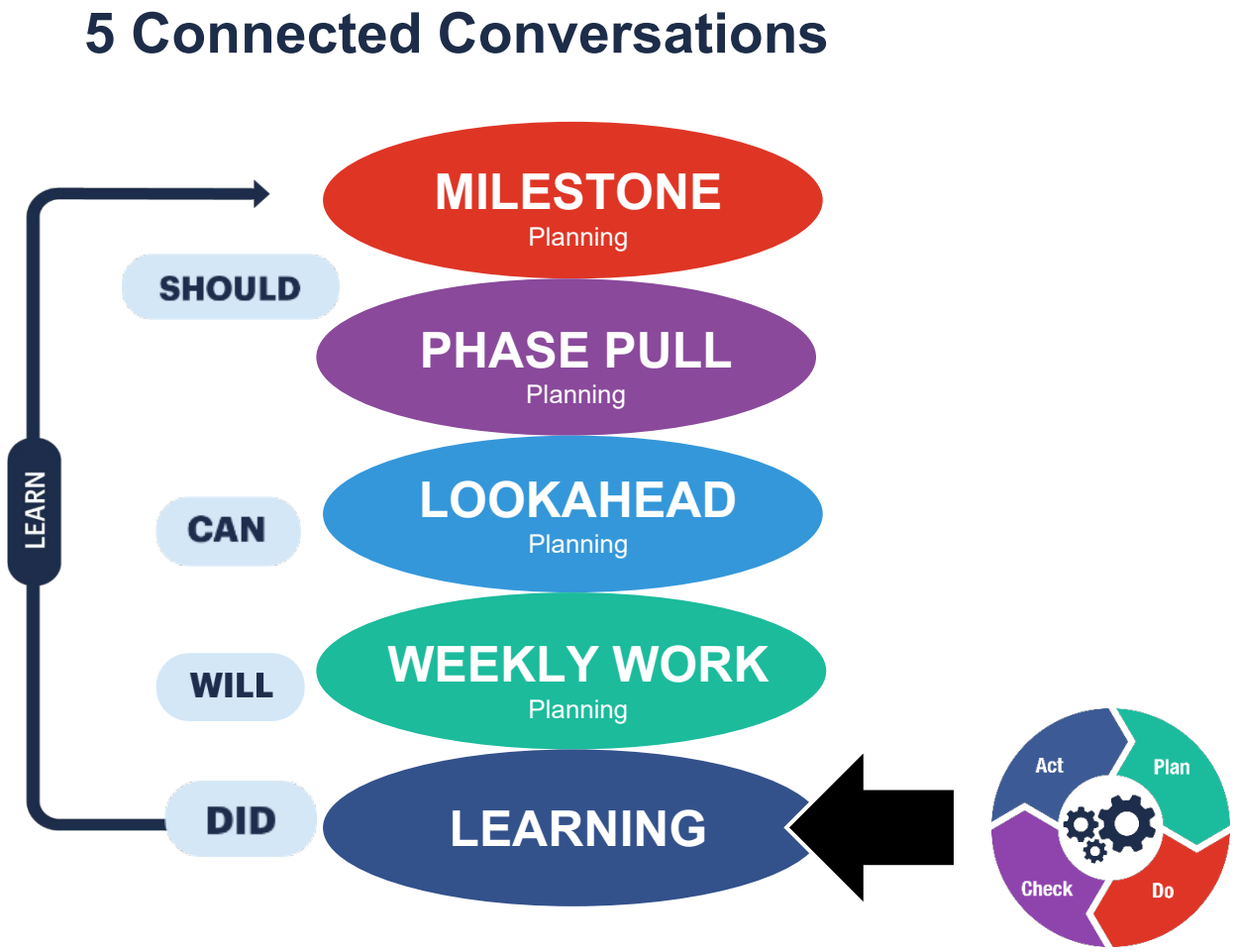
The fifth conversation is *Learning/Improving*.

The goal is for the team to *learn* from the cycle and take *actions for improving* going forward fulfilling PDCA.

The conversation is what we *"Did"* and *"Learned"*.



# Daily Huddle

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1. What *did* I complete?
2. What *will* I complete?
3. What needs to be *re-planned*?
4. How can we *improve* future planning?

Photo Courtesy of: KHS&S

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# Daily Huddle: How

- Superintendents/Foremen huddle every day
- Status Weekly Work Plan Daily
- Held in front of Weekly Work Plan Boards
  - Or with Weekly Work Plan in hand
- Be respectful time
  - 10-15 minutes
- Each Superintendent/Foreman report out their work

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# Daily Huddle



Photos Courtesy of: Brasfield & Gorrie

# Learning From Daily Huddles



The *Percent Plan Complete* (PPC) is calculated for the period or week.

PPC is the basic measure of how well the *planning system is working*

Photo Courtesy of: DPR Construction

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# Calculating PPC

As Planned

$$\text{WEEKLY PPC} = \frac{\text{\# Completed Activities}}{\text{\# Planned Activities}} = \frac{16}{20} = 80\%$$

# Percent Plan Complete (Plan Percent Complete)

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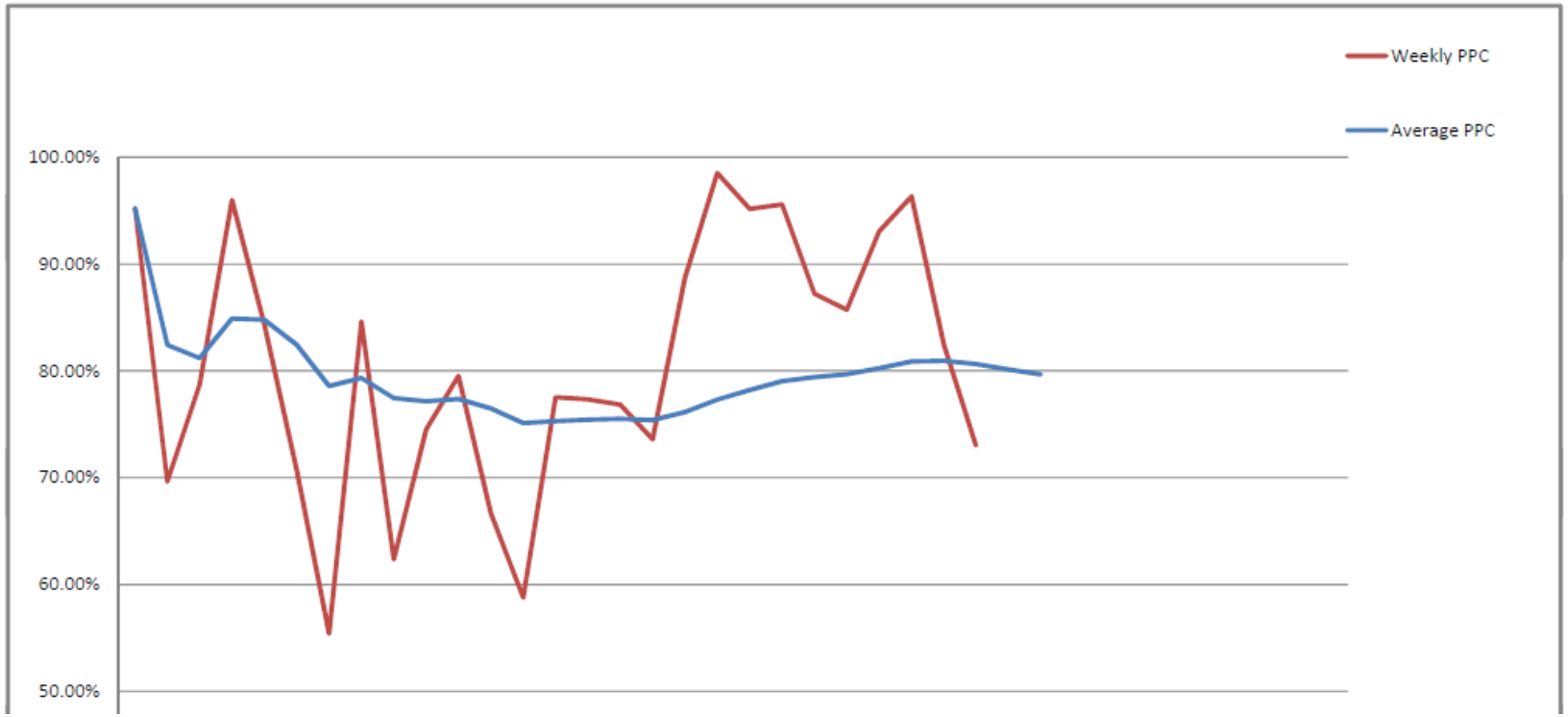
## OVERALL PLAN PERCENT COMPLETE

**PROJECT AREA**
THEATERS

Current Overall PPC = 79.67%
As of: 6/1/2014

| Week # | Week Ending | Number of Tasks | Number Completed | PPC | Average | Tasks Not Done |
|---|---|---|---|---|---|---|
| 1 | 11/17/2013 | 21 | 20 | 95.24% | 95.24% | 1 |
| 2 | 11/24/2013 | 79 | 55 | 69.62% | 82.43% | 24 |
| 3 | 12/1/2013 | 47 | 37 | 78.72% | 81.19% | 10 |
| 4 | 12/8/2013 | 50 | 48 | 96.00% | 84.90% | 2 |
| 5 | 12/15/2013 | 83 | 70 | 84.34% | 84.78% | 13 |
| 6 | 12/22/2013 | 99 | 70 | 70.71% | 82.44% | 29 |
| 7 | 12/29/2013 | 65 | 36 | 55.38% | 78.57% | 29 |
| 8 | 1/5/2014 | 52 | 44 | 84.62% | 79.33% | 8 |
| 9 | 1/12/2014 | 85 | 53 | 62.35% | 77.44% | 32 |
| 10 | 1/19/2014 | 98 | 73 | 74.49% | 77.15% | 25 |
| 11 | 1/26/2014 | 83 | 66 | 79.52% | 77.36% | 17 |
| 12 | 2/2/2014 | 66 | 44 | 66.67% | 76.47% | 22 |
| 13 | 2/9/2014 | 97 | 57 | 58.76% | 75.11% | 40 |
| 14 | 2/16/2014 | 89 | 69 | 77.53% | 75.28% | 20 |
| 15 | 2/23/2014 | 97 | 75 | 77.32% | 75.42% | 22 |
| 16 | 3/2/2014 | 82 | 63 | 76.83% | 75.51% | 19 |
| 17 | 3/9/2014 | 106 | 78 | 73.58% | 75.39% | 28 |
| 18 | 3/16/2014 | 80 | 71 | 88.75% | 76.13% | 9 |
| 19 | 3/23/2014 | 67 | 66 | 98.51% | 77.31% | 1 |



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# Reasons For Variance

- Factors that prevented a task from being completed as promised.
- Used by the team to promote learning concerning the failure of the planning system to produce a predictable workflow.
- Assigned a category of variance.
- Enable a team to identify those areas of recurring failure that require additional reflection and analysis.

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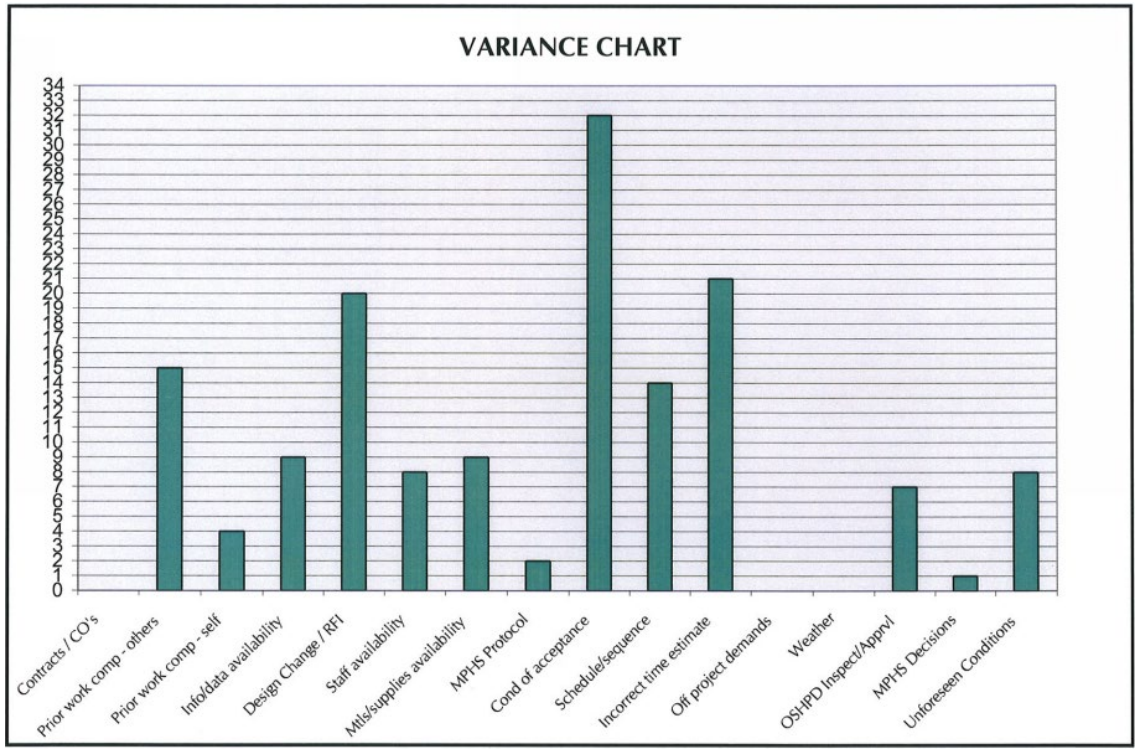
# Taking Action For Variance

When a variance or failure occurs, the team must *discuss the likelihood* of it occurring again and determine *actions to mitigate such.*



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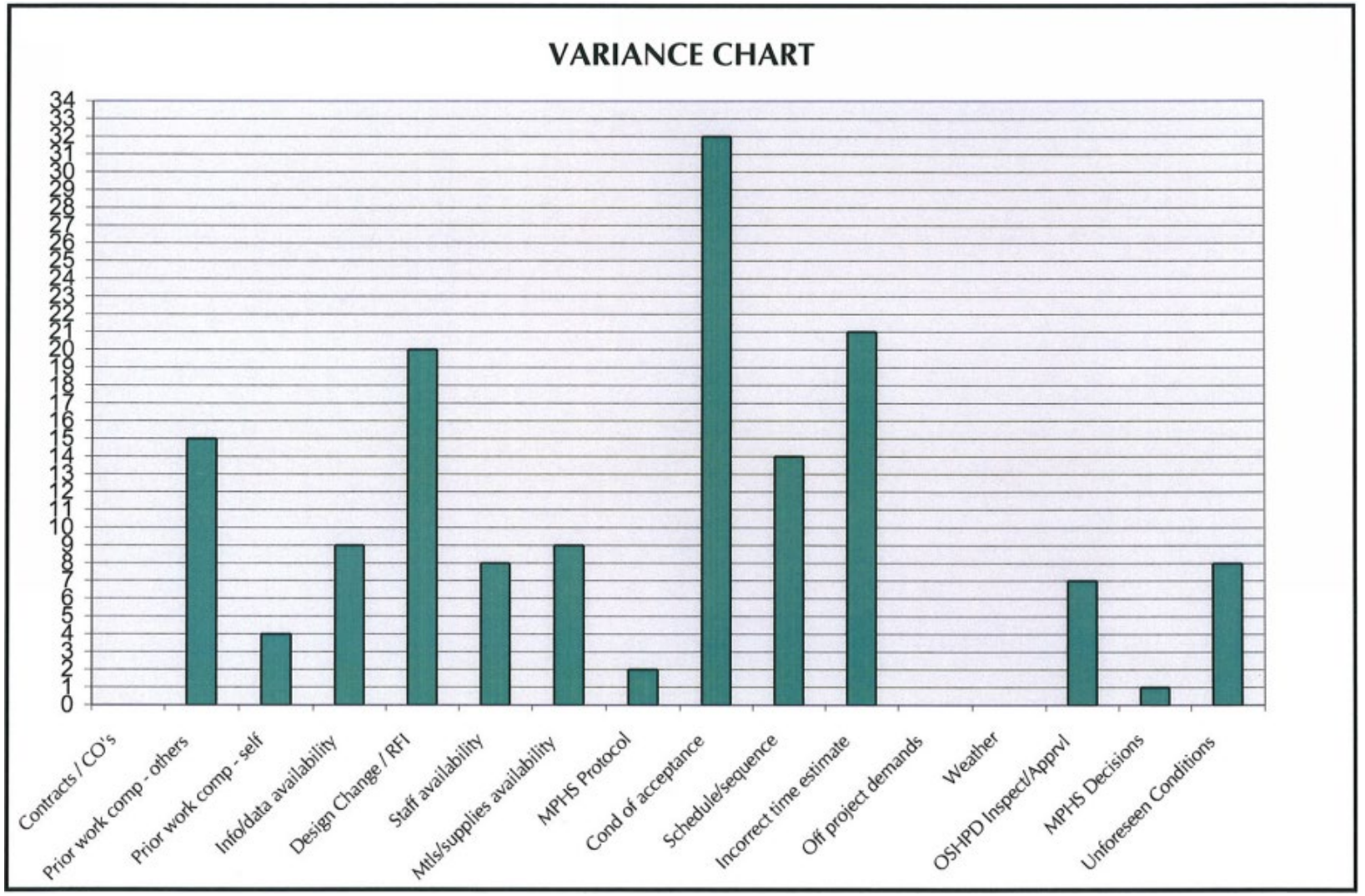
# Variance Chart Example




TIME FOR A BREAK

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# Activity: Tiny Home - Work the Plan

- Perform 1 week of Daily Huddles to process your WWP
- For each day, trades with activities draw ‘variance’ cards
- For activities completed as planned, record ‘Yes’
- For impacted activities, record ‘No’ and reason for the variance
- Are there things we can do today adjust for variances that may reoccur tomorrow?

15 Minutes

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# Weekly Planning Meeting 2 (and subsequent)

- Review Plus/ Delta
- General announcements
- Last Weeks PPC/ Variances
- Current WWP Check-in
- Look Ahead Plan Update
  - Rotate and add new activities
  - Update existing constraints
  - Identify new constraints
- Weekly Work Plan created/negotiated for next week
- Round Robin to address any new issues not covered
- Plus/Delta

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# Successful Weekly Planning Meetings

- *Consistency* is key
  - Start on time/ end on time.
  - Assign a timekeeper.
  - Everyone in the room that needs to be there.
  - Same expectations for everyone.
- Everyone's voice is heard.
- Last Planners talk more than the facilitator.
- LAP distributed weekly, up to date, and aligns with master schedule and WWP.
- Use Parking lot.

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# Activity: Tiny Home - Weekly Work Plan Week 2

Follow Agenda for Weekly Planning Meeting

- Update Variance/PPC Chart
- Discuss weekly work plan variances and PPC – what can we change to improve?
- Observe team dynamic – who is disengaged?
- Have fun!
- Take photos of your planning wall – you're done!

10 Minutes

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# Weekly Meeting 2 Agenda

- ☑ Review Plus/ Delta
- ☑ General announcements
- ☑ Last Weeks PPC/ Variances
- ☑ Current WWP Check-in
- ☑ Look Ahead Plan Update
  - Rotate and add new activities
  - Update existing constraints
  - Identify new constraints
- ☑ Weekly Work Plan created/negotiated for next week
- ☑ Round Robin to address any new issues not covered
- ☑ Plus/Delta

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# Wrap Up – Report Out & Questions from Activities?

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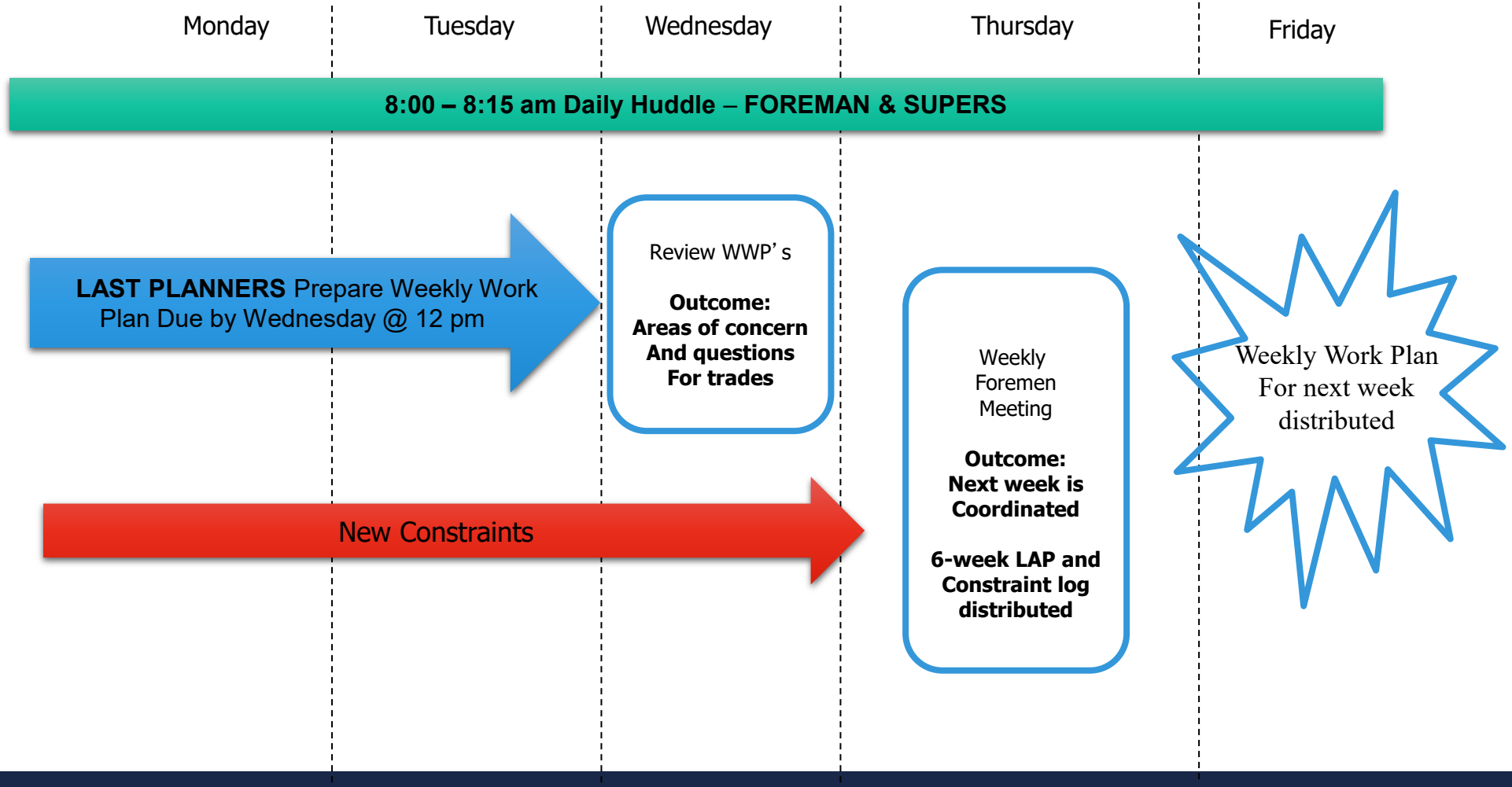
# Weekly Planning Cycle



# Benefits of LPS

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1. Improves communication & reliability.
2. Fosters an enjoyable environment, trust, and collaboration.
3. Promotes early stakeholder engagement.
4. Improves visibility of the project plan (transparency).
5. Creates team buy in.
6. Rapid learning through metrics, revealing areas for improvement.
7. Improves planning in both design & construction phases.

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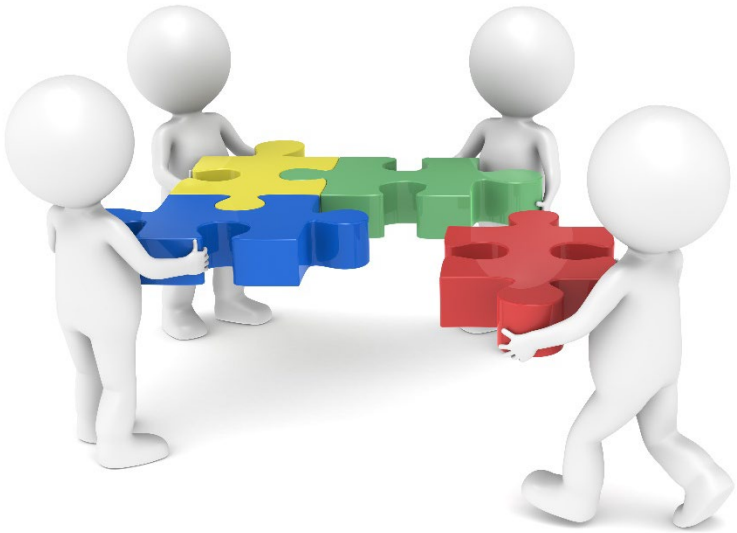
# Remember…..

- Your forms and other artifacts may *look different* from what we showed you today. Or even different from project to project.
- That is not a problem – as long as you are staying true to the *foundational principles of LPS* – the right people having the right conversations in order to make and keep reliable commitments.



- Likewise the forms and artifacts don't make the system work. It's the *conversations coupled with continuous improvements* that make the system work.

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# Table Activity: Each Table Assigned 1

1. How would a trade partner use LPS, even if the GC does not?
2. What should you do when the plan fails in a big way?
3. What can you do to help create “aha” moments to get others on board?
4. How might you scale the system for a small project? A large project?
5. What would you expect to see, feel and hear on a high performing project?

Timing dependent?

# Table Activity: Revisit Flip Chart

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Revisit Flip Chart from the question in the morning:

*"What have you seen or do you think different roles struggle with regarding LPS?*

- *Capture answers on flip chart (trade foreman, GC sup., GC PM staff, etc.) so you can connect back to throughout the day"*

Discuss roles to ensure the group has empathy and knows how to help others.

# Lean Journey to Mastery

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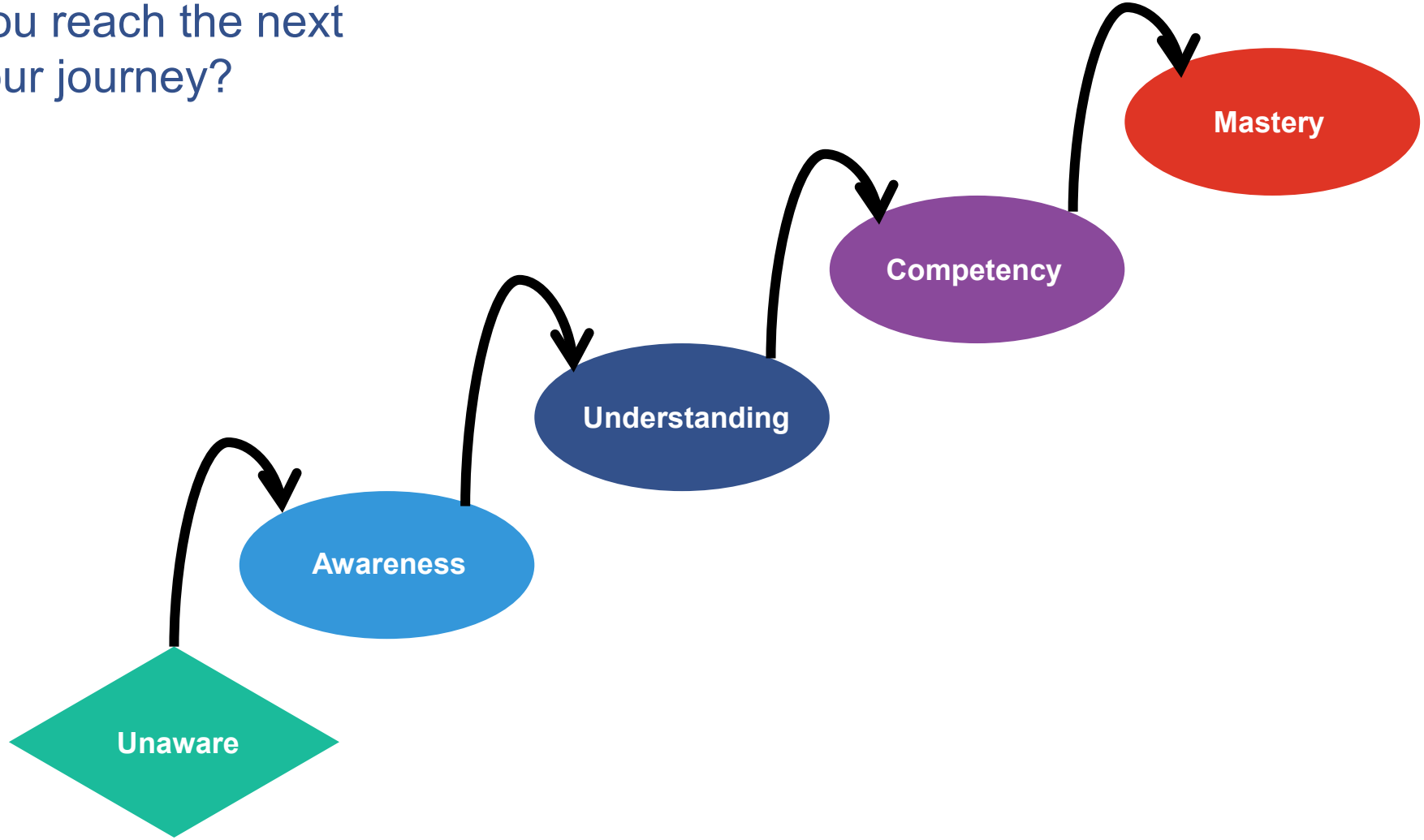
How will you reach the next level on your journey?



# More on Learning

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## Books:


## Events:

- Local Community of Practice
- Congress (October)
- Design Forum (May)

## eLearning:

Learn on your own time without taking time off project work.

## Start learning now:

www.LeanConstruction.org

# eLearning Courses

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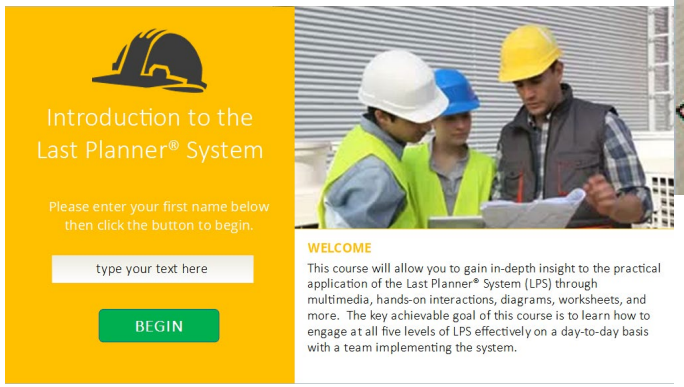
- Introduction to the Last Planner System®
- Introduction to Lean Project Delivery
- Lean in the Design Phase
- Effective Big Room
- Target Value Delivery
- Last Planner System® in Design





# Questions

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# Learning Objectives Reviewed

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Identify the essential foundational principles of each of the 5 connected conversations of LPS.

Engage in all of the connected conversations of LPS® from Milestone Planning to daily interaction through practical application.

Experience the process of constraint management to improve project workflow.

Gain practical insight to effectively use Percent Plan Complete (PPC) and variance to improve reliable project plan execution.

# Conduct Plus/Delta

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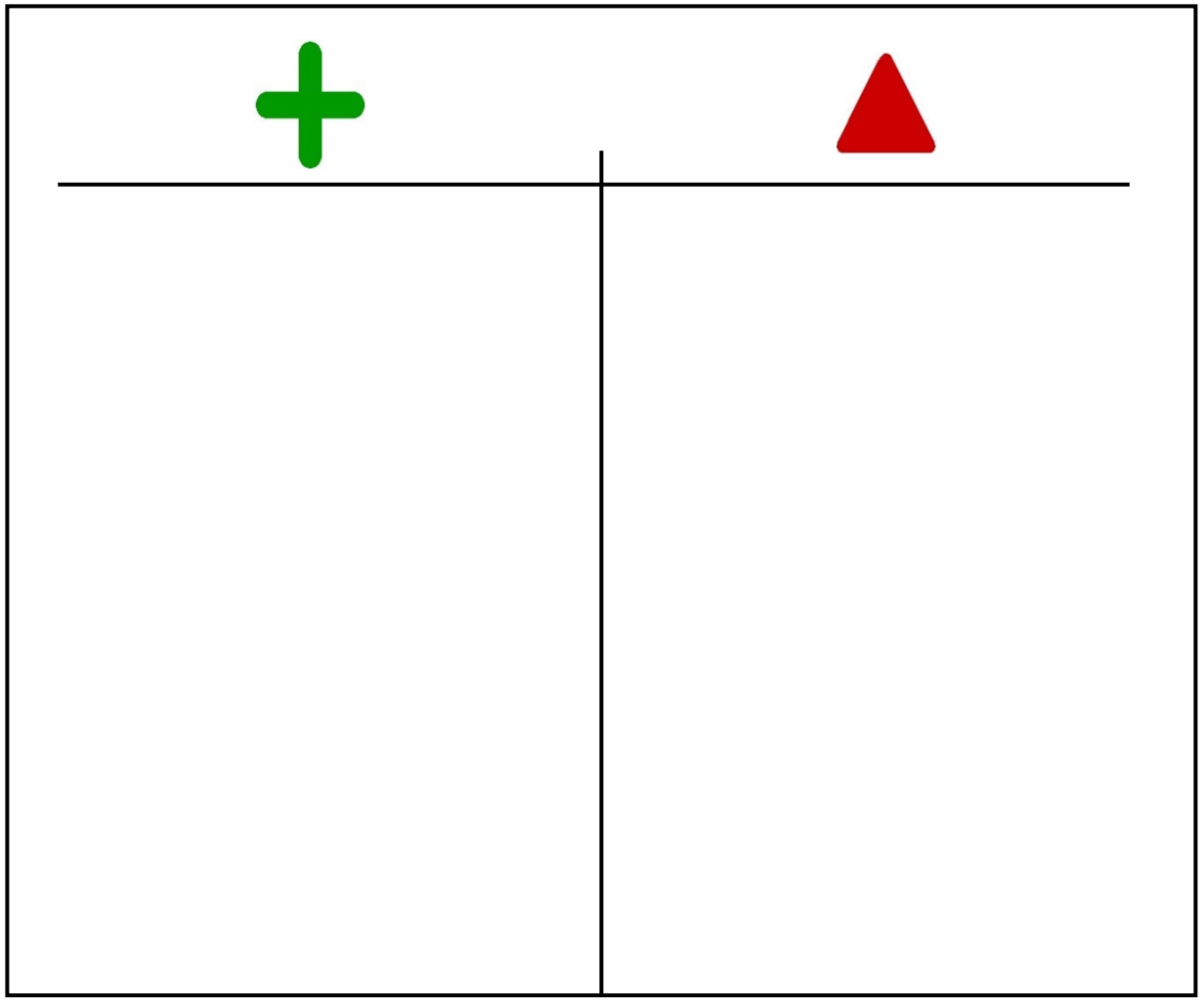
**Plus:** What produced *value* during the session?

**Delta:** What could we *change to improve* the process or outcome?



# Documents & Templates

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https://bit.ly/3AUFJ4c

**Slides, templates & example documents**