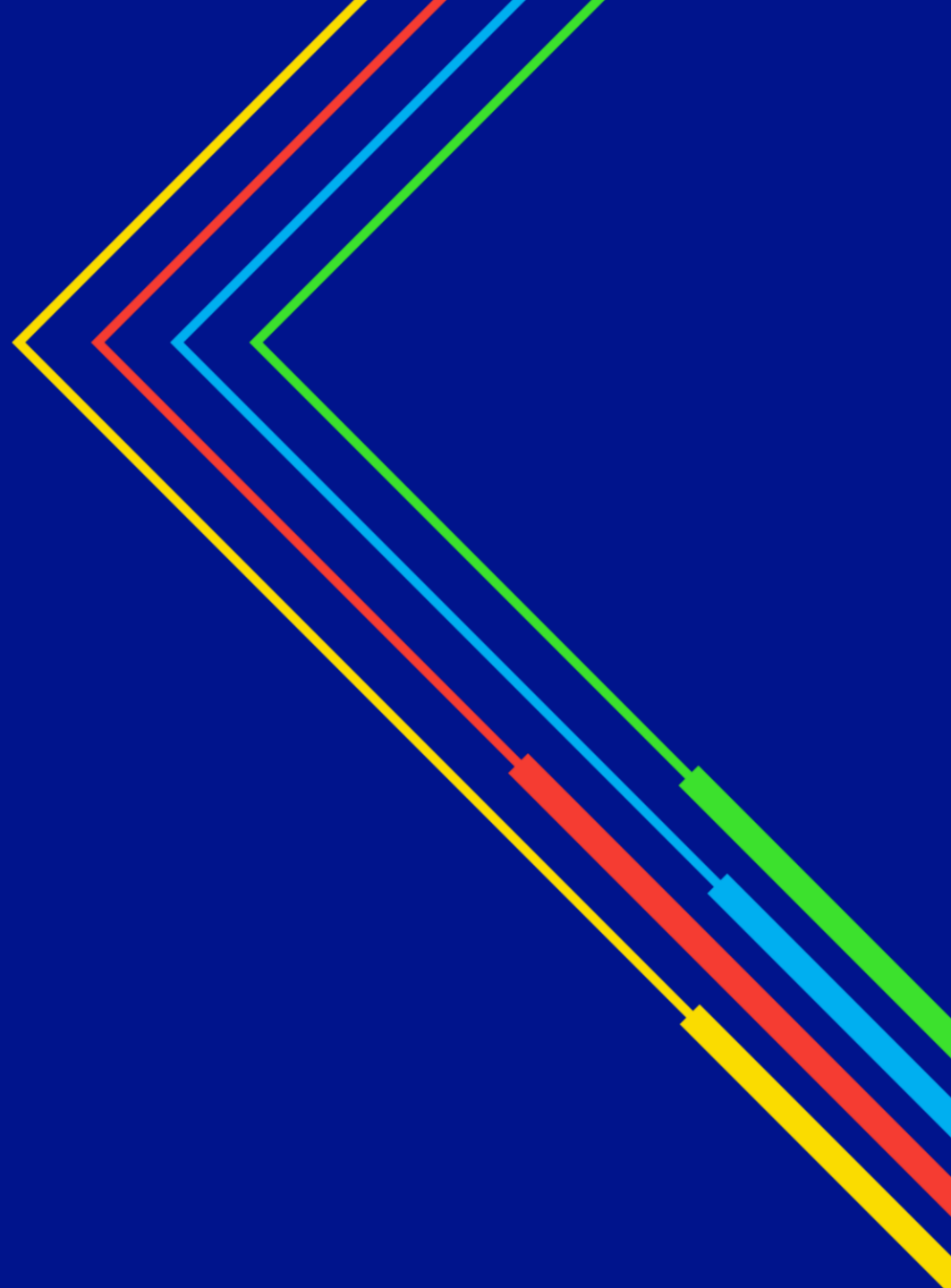


# End to End Project Management Process

Jonathan Falls & Sankalp Geetam

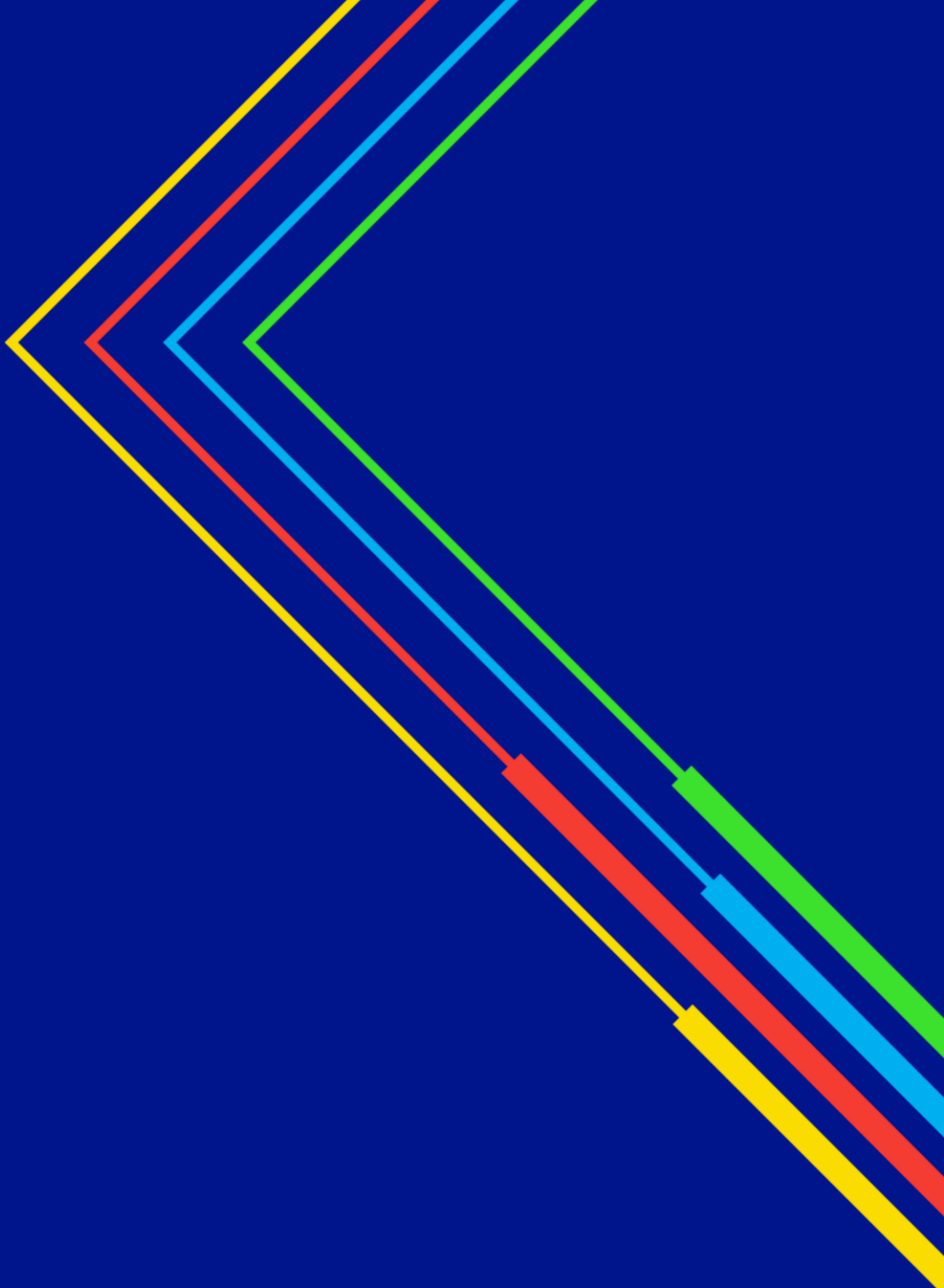
nationalgrid



# Agenda

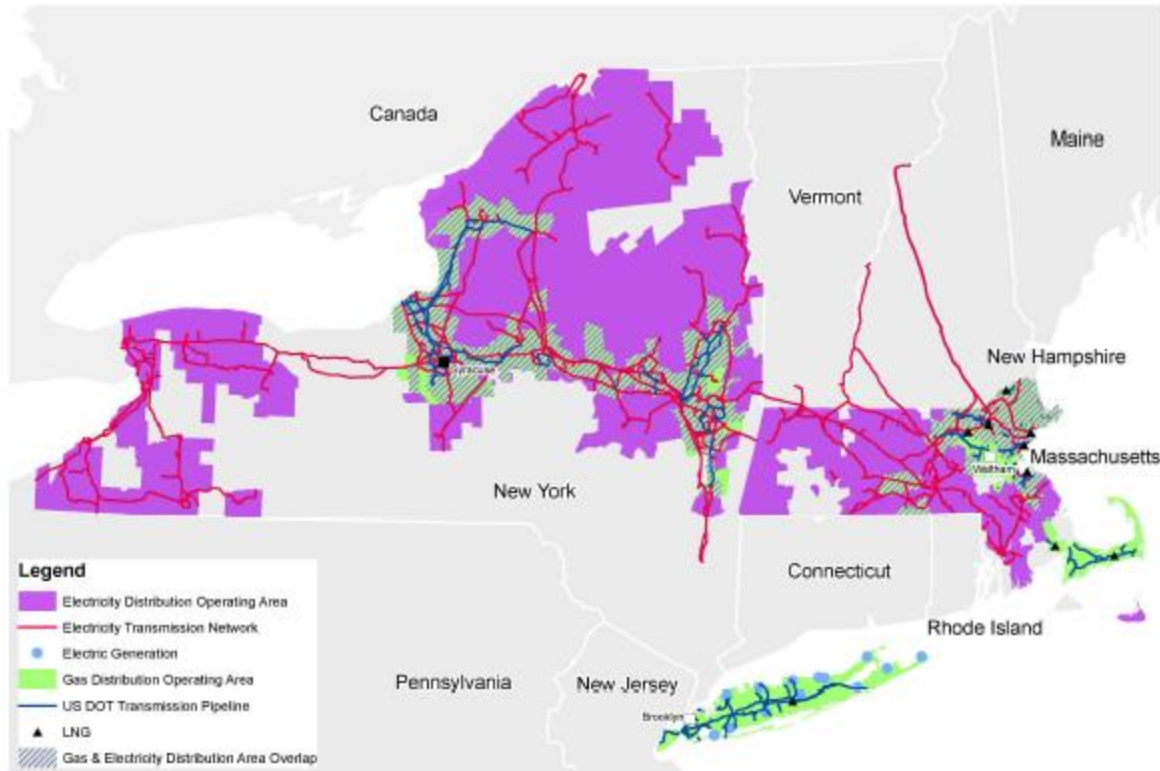
- 1 Organizational Overview
- 2 Standard Network Development Process (NDP)
- 3 NDP Lite
- 4 NDP Emergent

# Organizational Overview



# About National Grid

We are one of the largest investor-owned energy companies in the US



**nationalgrid**

**National Grid**

5.3M Residential + 600k Commercial  
= 5.9 million customer accounts

Residential & Commercial  
customers by region:

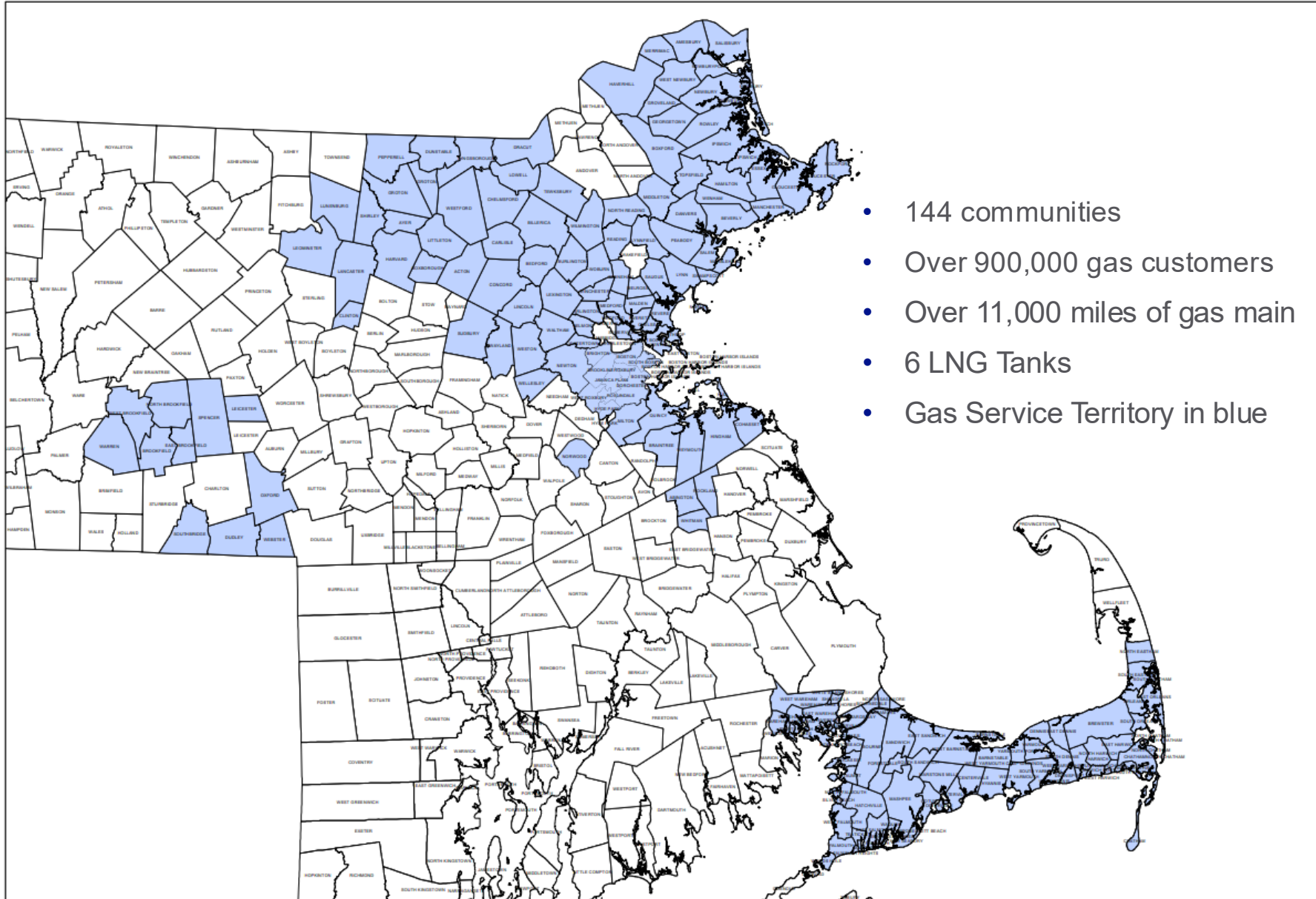


Gas 0.9 million  
Electric 1.3 million



UNY 1.7 million  
LI 0.6 million  
NYC 1.3 million

# MA Gas Service Territory



# Matrix Organization



# What is a Complex Project?

All capital projects receive a Complexity Score

Complexity Scores  $\geq 18$  are deemed Complex and move through NDP

Non-Complex Projects are addressed by separate Program Management team

Complexity Scoring Table Guideline					
	Factors	Weighting Factor	Score: 3	Score: 2	Score: 1
1	Cost	1	>10m	<10M, >2.5M	<2.5M
2	Project Components	1	See Project Components Section		
3	Outages	1	See Outage Complexity Lookup Table		
4	Community Outreach	1	Level 1	Level 2	Level 3
5	Asset complexity	2	See Asset Complexity Lookup Table		
6	Land/Rights	2	New land or easement	Maybe	No
7	Permits	2	Non-Routine	Multiple Routine	Single Routine
8	Procurement	1	Unique contract for transmission materials or "multiple unique" contracts for contractors or specialty services	"Unique" contract for specialty material, resources or outside Eng./ Environmental services	MSR or blanket PO's, utilizing in-house resources or contractor resources covered under an executed contract, or utilizing in-house Engineering services

## Project Types

Pressure Regulation

LNG

Gas Transmission Engineering

Distribution Engineering

Gas Planning

Future of Heat

Customer Connections/ CSC

# End to End Project Management

Complex Capital Delivery groups across National Grid launched the Network Development Process (NDP) in 2018

- NE Gas, NE Electric, NY Gas, & NY Electric created a combined governance process
- Each organization revised the process to have their own NDP

Through continuous improvement initiatives, NDP was adapted to add:

- NDP Lite in 2022 for projects of a lower complexity
- NDP Emergent in 2020 for projects with an immediate (< 12 month) business need

# Project Delivery Models

## Standard NDP

### Network Development Process

Systematic Approach to Deliver Large Projects with Greater Complexity

- LNG Modernization Projects
- Large Scale Transmission Piping
- Multiple season TS & Regulator Stations

## NDP Lite

### Network Development Process

Accelerated Stage Gate Process target lower complexity and lower dollar projects

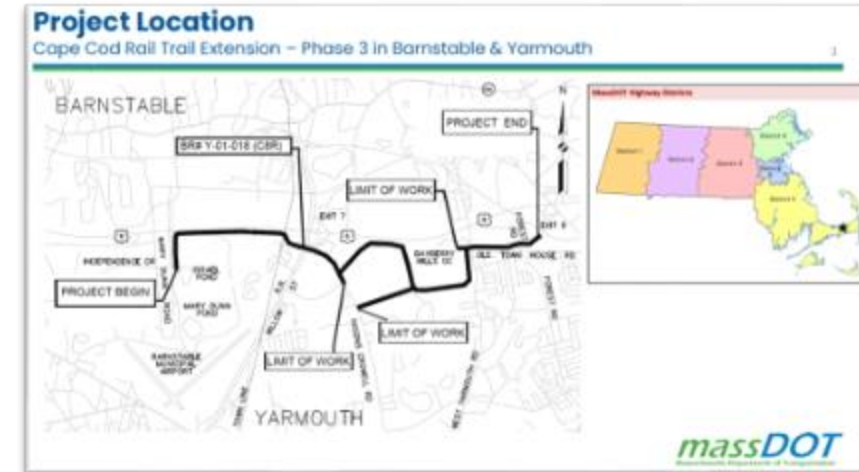
- Lining Projects
- Transmission Stations
- Smaller scope, large diameter piping

## Emergent

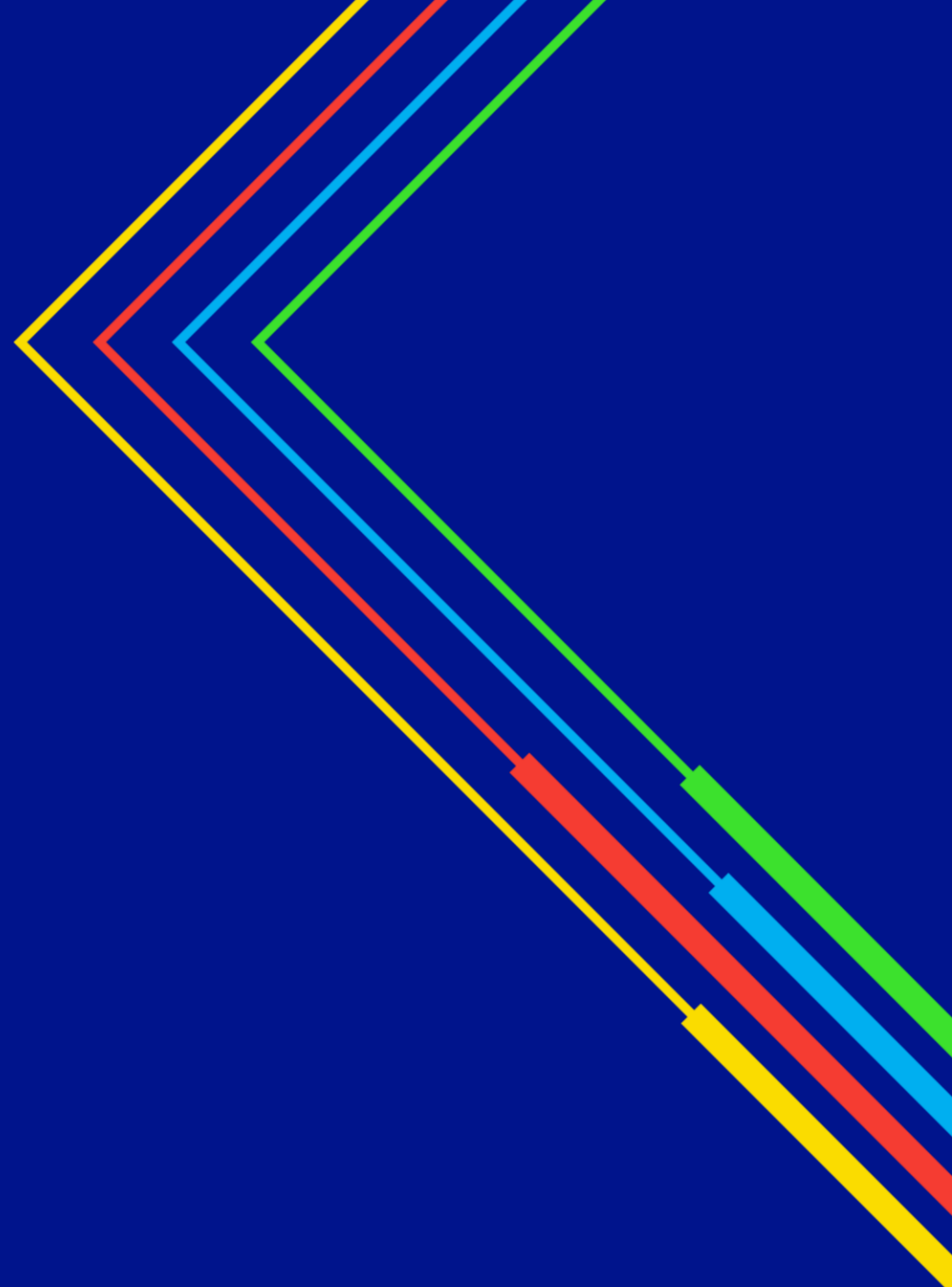
### Network Development Process

Complex Emergency Work

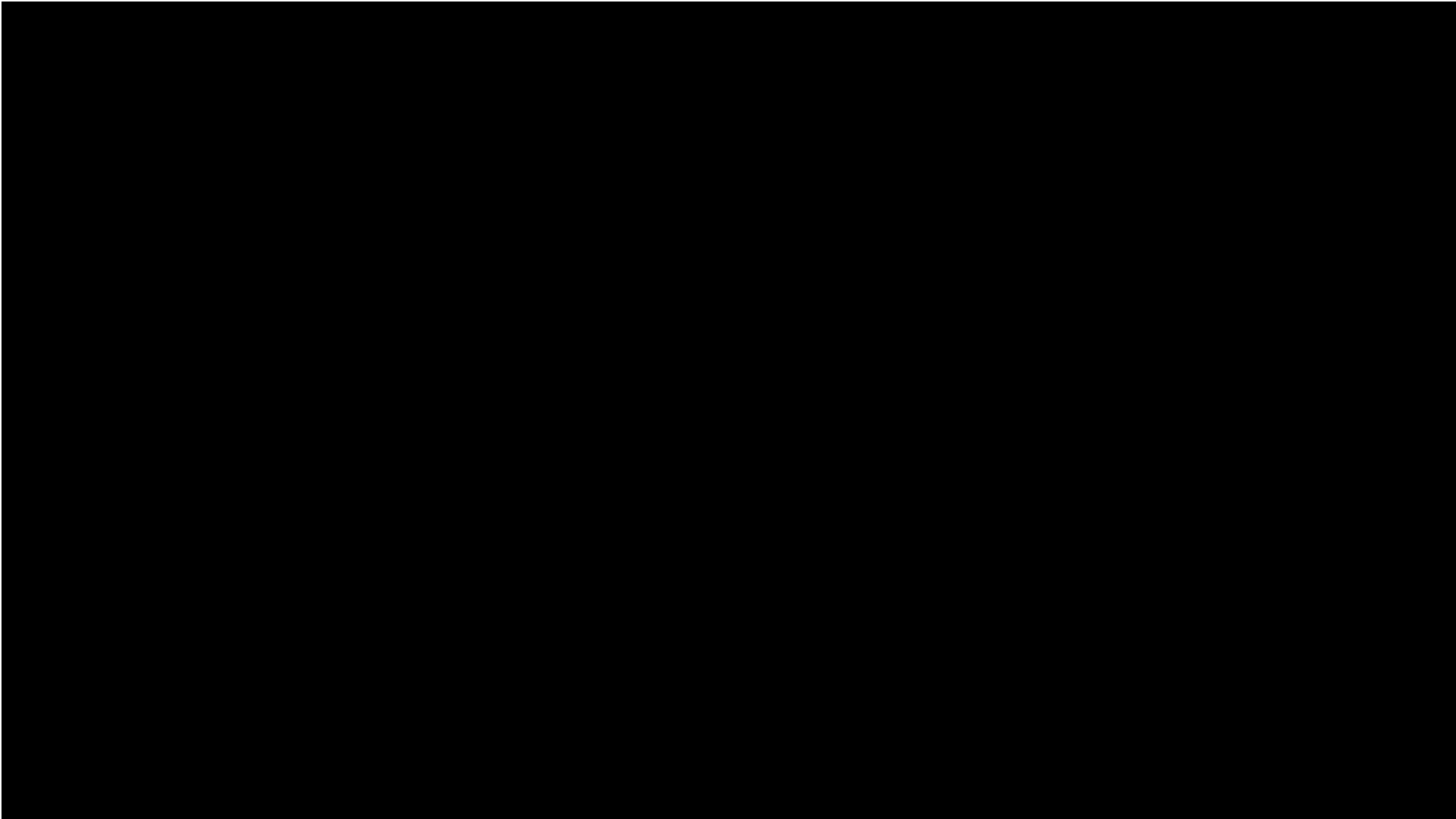
- Transmission Main Cut Outs
- Jobs driven by external timelines (e.g., MBTA, MADOT, Customer)



# Standard Network Development Process (NDP)



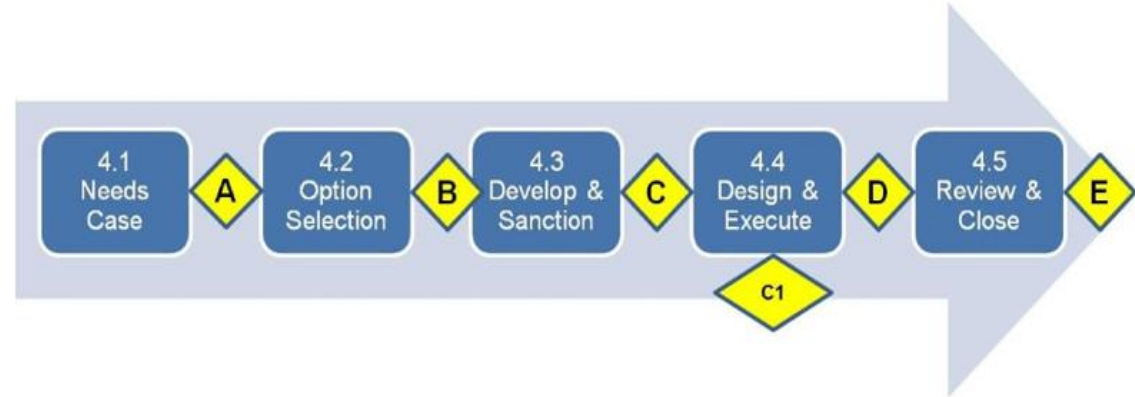
# Lowell Gas Modernization Project, HDD



# Background

## Network Development Process

A Stage-gate model that identifies categories of the project lifecycle and applies a “Gate” for substantiating that the project is ready for advancement to the next stage

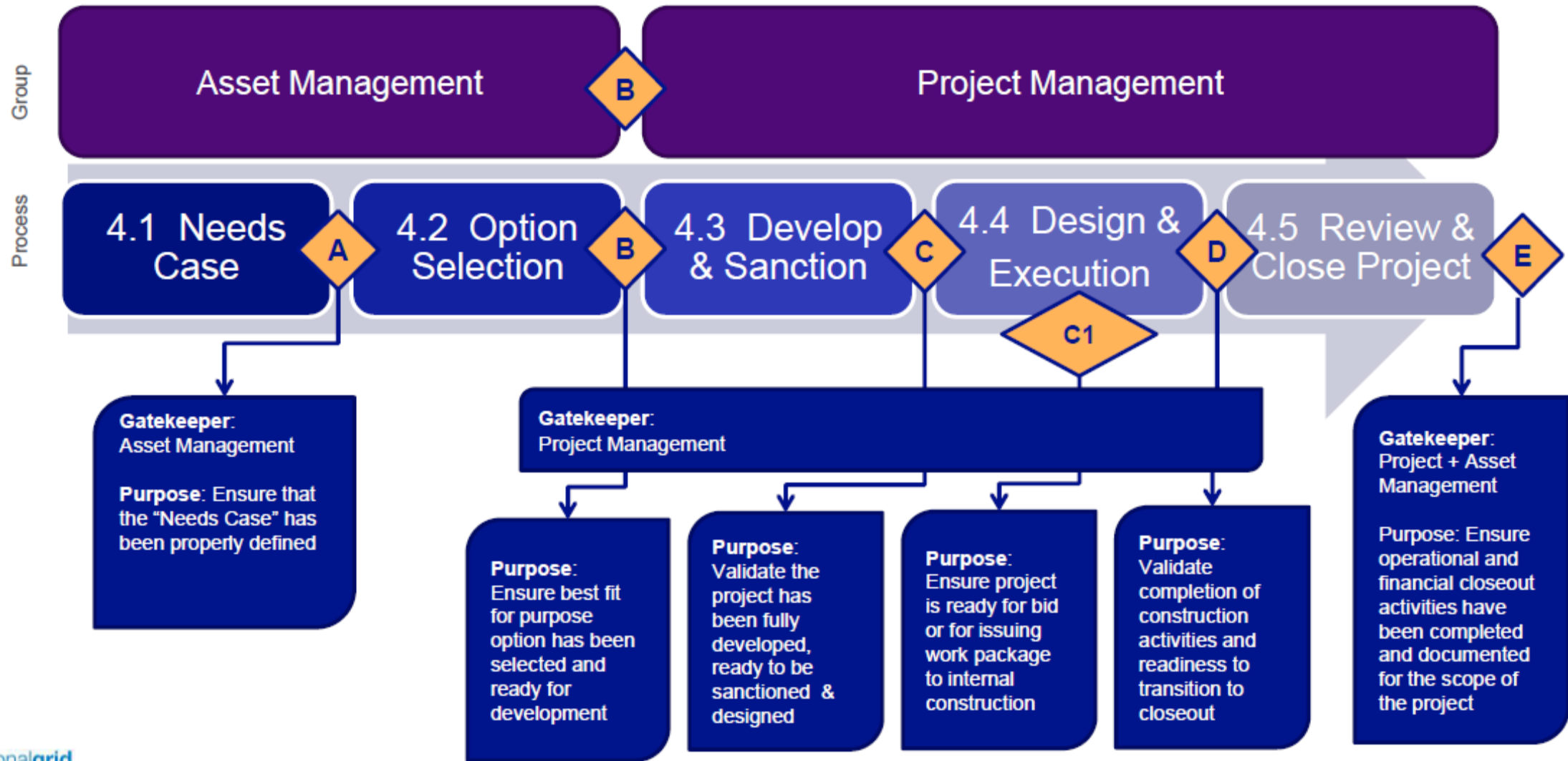


The aim is advancing a project through its lifecycle in an efficient and systematic way that:

- Identifies risks and management strategies
- Establishes a clear RACI
- Clarifies action items and required approvals
- Promotes completion of all tasks and decisions
- Ensures readiness for progression
- Eliminates false starts
- Avoids the need to remedy previous tasks or re-examine prior decision

STAGE & GATE	DESCRIPTION
4.1 & Gate A	Develop needs case based on system or Customer-driven requirements. Determine high-level options based on system modeling. Identify opportunities to bundle scope
4.2 & Gate B	Review and analyze high-level options, comparing high-level options for scope, cost, and risk to complete the project by the need date. Finalize consideration of opportunities to bundle scope. Select the preferred option.
4.3 & Gate C	Develop the preferred option to provide baseline scope, schedule, and cost for sanction. Develop plan for execution, resources, risk management, stakeholder management, and contract management.
4.4 & Gates C1 and D	Provide the final design and implement contract strategy. Construct, test, and commission the preferred option.
4.5 & Gate E	Ensure that investment elements have been closed in all business systems, and all recorded costs are final and complete. Confirm completion of all activities required for closing and archive all project documents

# NDP Standard Gate Definitions



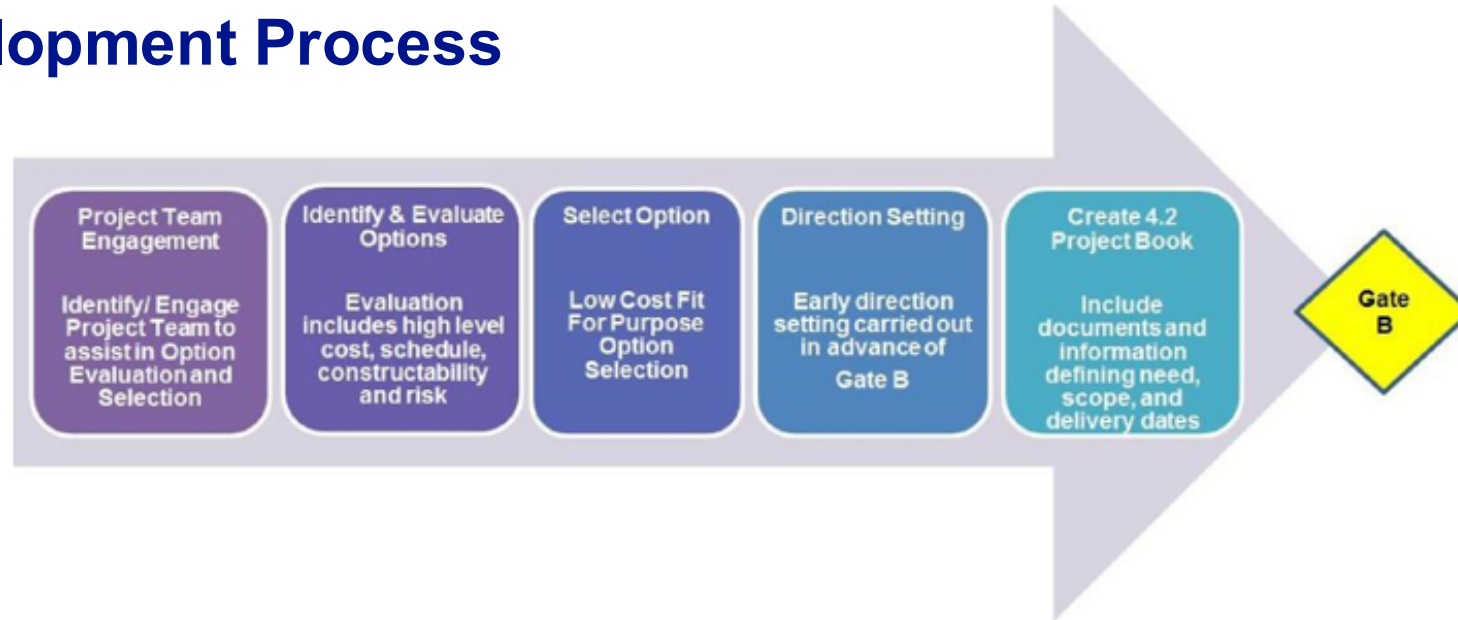
# Stage 4.1 Needs Case Network Development Process



Activity	Description
Need Identified.	Need is identified as a result of studies, operational or safety issues, regulatory requirements, or Customer requests.
Develop Needs Case.	Asset Manager develops a Needs Case, fully justifying the need and the problem to be solved. (If the need originates from another group such as Customer Group, the Project Sponsor from that group works with Asset Management to develop the Needs Case.)
Identify Options.	Various options are considered on the basis of feasibility, cost, performance, and safety. Bundling opportunities are sought. A most-viable option is identified.
Identify in Investment Portfolio.	Project is placed in the Investment Portfolio at a high level (may be a placeholder) to account for the cost in the 5-Year Investment Plan.
Gate A Review.	Asset Management VP (Electric or Gas) reviews the needs case, options, and most-viable option and approves project to progress to Stage 4.2 – Option Selection, when options are considered in more detail and the final option is selected.

# Stage 4.2 Options Selection

## Network Development Process



Activity	Description
Project Team Engagement.	A Project Team is assembled, ensuring that the team includes subject matter experts who can knowledgeably evaluate possible options and possible issues with those options.
Identify and Evaluate Options.	The team develops a high-level scope for and analyzes each option based on a variety of factors, concentrating on cost, feasibility, and appropriateness for addressing the need.
Select Option.	A final selection is made of a single option that represents the best solution based on the analysis of all the options.
Direction Setting.	Project Development begins involvement to ensure readiness for the project to move into Stage 4.3, a stage in which analysis is complete and development activities occur along with the expenditure of funds.
Create 4.2 Project Book and Gate B Presentation.	Assemble all documents required to pass through Gate B with a supporting presentation that summarizes the need being addressed, option selected with high-level scope, and required delivery dates.

# Stage 4.3 Develop & Sanction

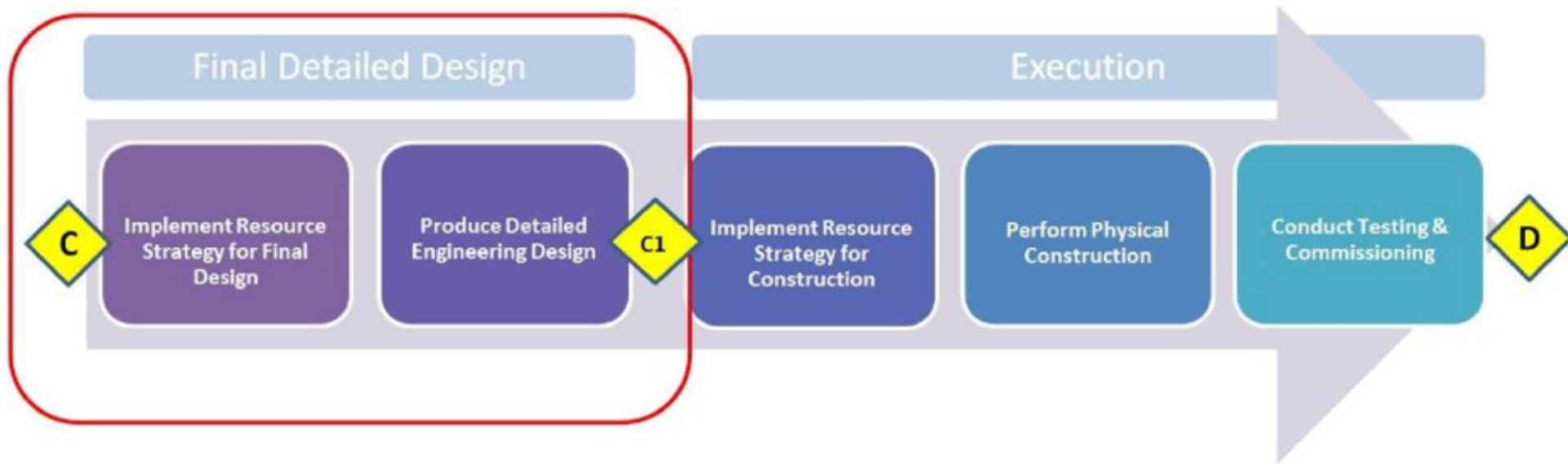
## Network Development Process



Activity	Description
Project Team Re-Assessment.	Adjust 4.2 – Option Selection Project Team for 4.3 activities.
Field Siting.	Construction site review, site specific investigative work, and document any site risks.
Produce Project Execution Plan (PEP).	4.3 Engineering work (level required to pass Gate C based on risk and Sanction approval), baseline schedule, risk profile, detailed cost estimate and sourcing strategy. <b>Note:</b> PEP is the same document as the 4.3 Project Book.
Freeze Project Execution Plan.	Final agreement with Project Team over project scope, cost, schedule, <u>risk</u> and sourcing strategy.
Approve Project Execution Plan.	PEP and Gate C approval ahead of final USSC Sanction.
Final Sanction.	Submit project to USSC for final Project Sanction. Final Project Sanction approves the project and allocates funding for final design and execution.

# Stage 4.4a Design

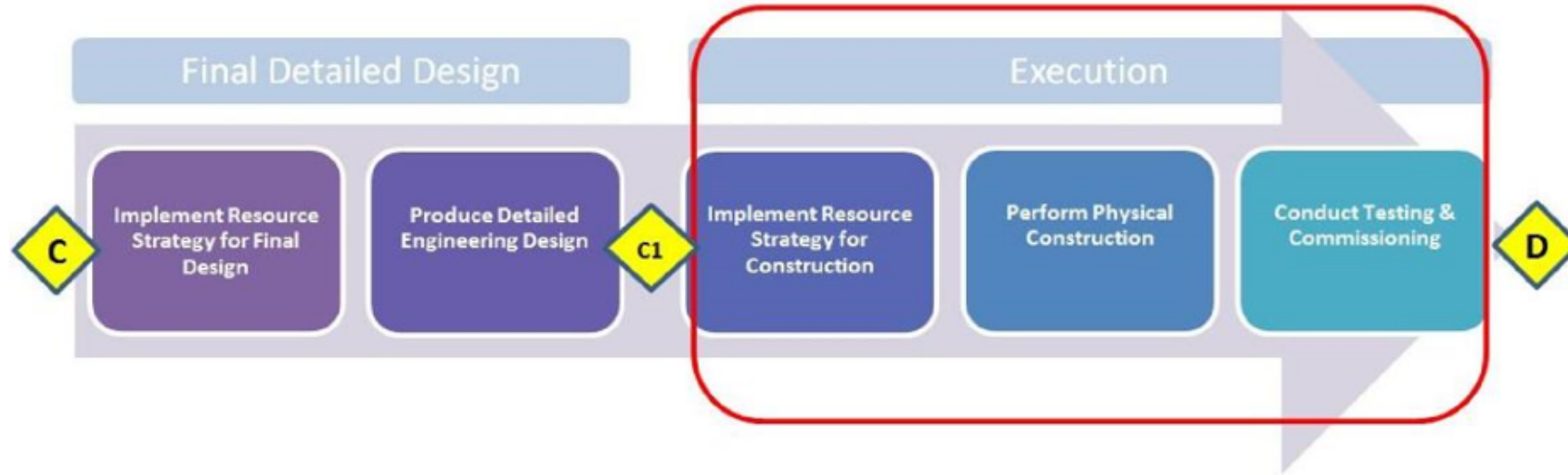
## Network Development Process



Activity	Description
Implement Resource Strategy for Final Design.	Implement and/or review the sourcing strategy for development of the detailed designs, either as an external project or for internal development of the designs.
Produce Detailed Engineering Design (In House and/or MSA).	Produce the 100% Designs and achieve approval from Project Team stakeholders, including Construction, Field Operations, and Safety.
Complete Gate C1 Review.	Hand off the project to Project Manager with no further (anticipated) need for design changes. Project Management accepts project for execution, with approval from Construction.

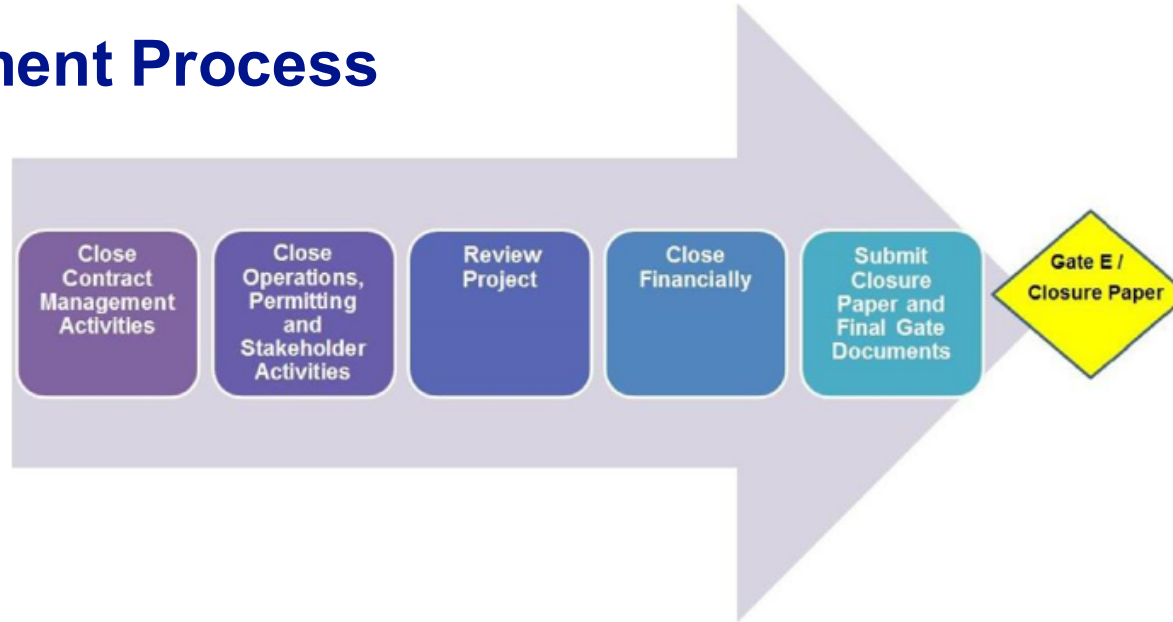
# Stage 4.4a Execution

## Network Development Process



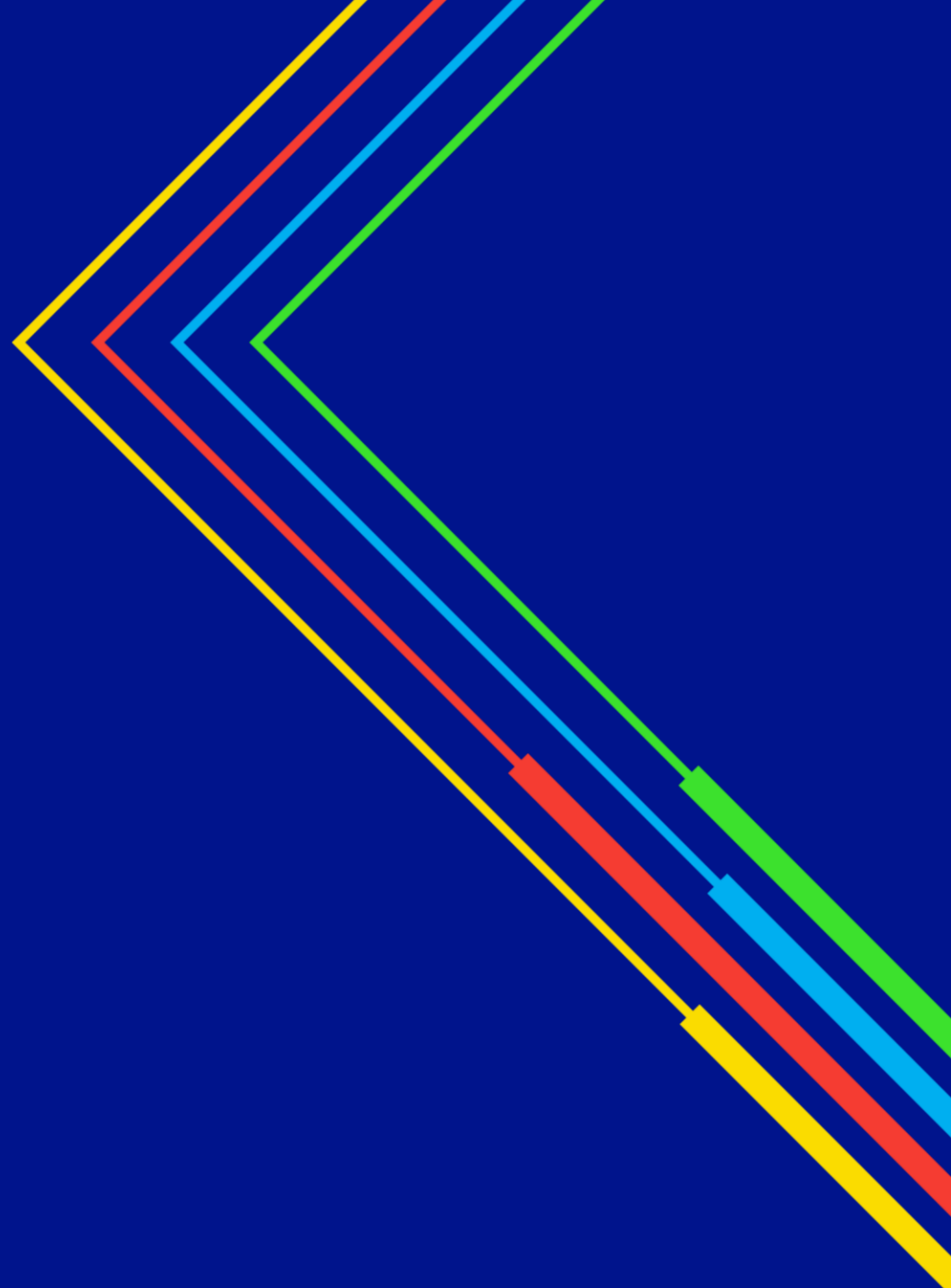
Activity	Description
Implement Resource Strategy for Construction.	The construction resource strategy may involve external constructors or internal workforces. If external, the resource strategy involves bid management, review of bids, award recommendations, and award of the contract. If internal, the Resource Planning group develops the Resource Strategy in conjunction with Field Operations/Maintenance, and Construction.
Perform Physical Construction.	Physical construction is performed from site-readiness through mobilization, construction, clean-up, and demobilization.
Conduct Testing and Commissioning.	Testing is performed to ensure safety and functionality. Placement in-service and commissioning occurs prior to handoff to Field Operations.
Complete Gate D Review.	Obtain Gate D approval to confirm construction complete and assets commissioned, and progress with the project closing activities.

# Stage 4.5 Review & Close Network Development Process

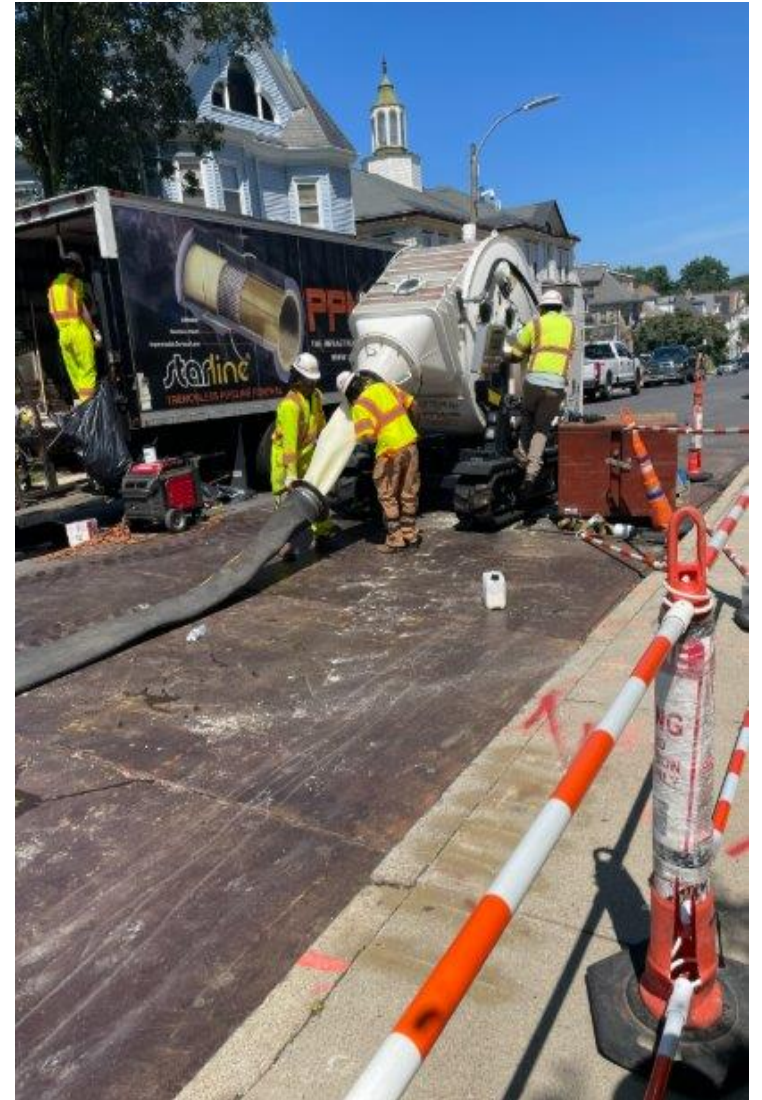


Activity	Description
Close Contract Management Activities.	Ensure invoices and change orders processed, contract closed and no open commitments on purchase order(s).
Close Operations, Permitting and Stakeholder Activities.	Closing of all non-financial activities, including updating maps, drawings and records based on information received from Step 4.4b.
Review Project.	Team review of project to scope, schedule, and cost, including finalizing lessons learned.
Close Financially.	Complete prerequisites for financial close, and close Work Order(s) and project(s). Confirm Work Orders are closed, dollars correctly transitioned to appropriate accounts, and project was unitized,
Submit Closure Paper and Final Gate Documents.	<p>Gate E — Review of all project documents (including Closure Paper) and approval of project to close by Gate E approver.</p> <p>USCC — Review and approval of project Closure Paper and final approval for project to fully close.</p> <p><b>Note:</b> Project first goes to Gate E, at which the Closure Paper and other documents are reviewed. As a final step, Closure Paper is submitted to USCC and presented at a meeting. When approved by the USCC the project becomes fully closed.</p>

# NDP Lite



# NDP Lite Example – Lining Project



# NDP Lite

## Launched June 2023

- Recognizes the NDP Playbook is not a one size fits all capital delivery model
- Aims to “right-size” the requirements allowing for delivery from inception in 2 years instead of the 4 years you typically encounter on NDP standard work

### Single Option Solution

- Removed Option Selection Process as these are single option projects
- Eliminated all tasks related to vetting multiple options

### Modified Gate Checklists, Process Flows, RACI

- Combined Gates A and B to create Gate B Lite
- Combined Gates C and C1 to create Gate C1 Lite
- Incorporated NDP Phase 4.3 activities into NDP Lite Phase 4.4A.
- Combined C/C1 created opportunity for earlier prefabrication during winter lulls

### Reduced Team Meetings and Cost Estimates

### Estimated Project Duration 24 - 27 Months

### Reduced Procurement bidding duration to 3-months due to lower complexity

### Kept Project Close-Out process the same

# NDP Lite Projects

## Project Criteria

*Complexity Score  
≤ 26*

*Risk Score  
≤ 49*

*Cost  
< \$8m*

*Single Option –  
Conceptual Work  
Scope Define*

*No Real Estate  
Purchases –  
Footprint Remains  
the Same*

*Stand Alone  
Projects*

## Project Attributes

*Transmission  
Valve  
Replacement*

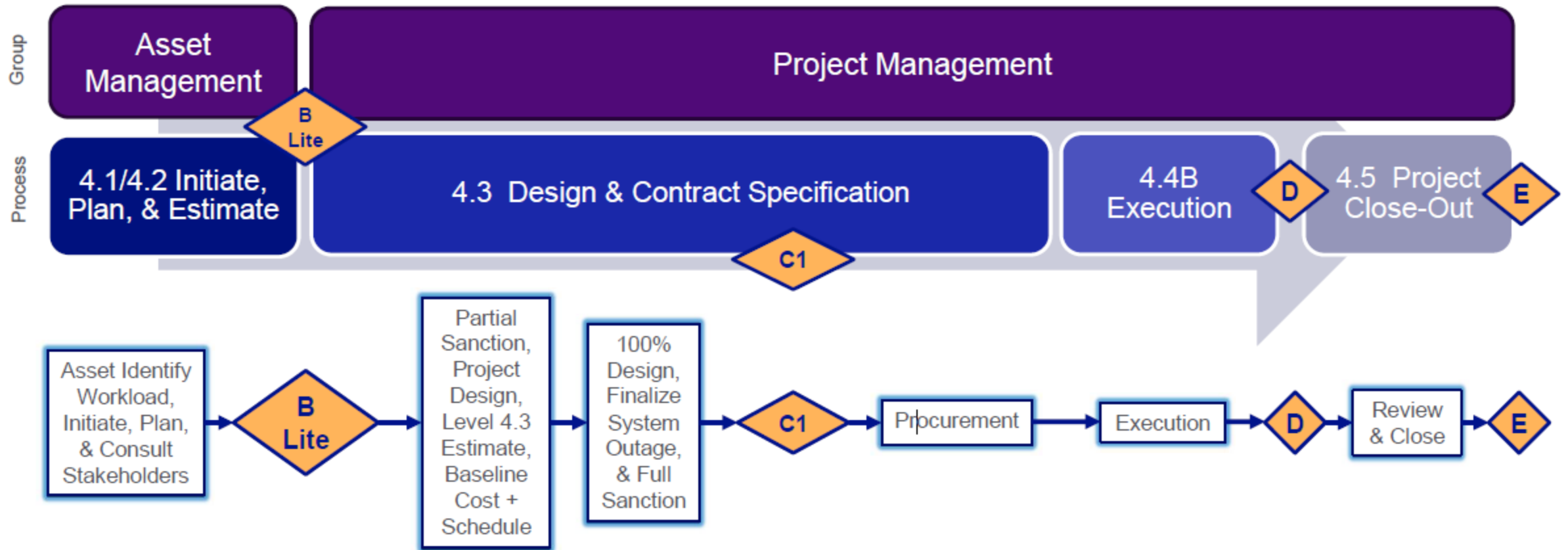
*Transmission  
Regulator  
Station*

*Lining Projects*

*Special Projects*

*Qualified Customer & Emergent Projects*

# NDP Lite Process Flow



# NDP Lite – Gate B Lite

## Gate B Lite Checklist – Initiate, plan & estimate approval to move on to design & contract specification

Merges A and B into Gate B Lite

**Gate A:** Driver of project identified, why and when of the project is known, entered into Capital Budget

**Gate B:** Complexity score calculated, no need to rank options or select preferred option, DOA approved, high-level design has begun and schedule developed

<b>Commodity</b>	<b>Gas</b>	<b>Checklist Revision</b>	
<b>Project Name</b>	Enter full title here	<b>Project Book Number</b>	Enter Project Book Number
		<b>Project Number(s)</b>	Enter Project Number(s)
<b>Sponsoring Organization</b>	Enter Organization	<b>Asset Management Contact</b>	Enter Name
		<b>Project Manager (if assigned)</b>	Enter Name

Ref	Checks	Location of Supporting Documents	Responsible Department	Criteria	Approval			Responsible Person (name)	Comments (Required)
					Y	N	N/A		
1.	Has Asset Management initiated the Copperleaf NDP Lite Workflow?	C55 – Copperleaf	Sponsor/Asset Management	Perform a Gate B Lite workflow run in C55 Copperleaf with Investment Planning to identify NDP Projects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2.	Is the need and driver clearly outlined to support progression through Gate B Lite?	Project Book	Sponsor/Asset Management	Clearly defined need & driver outlined in section 4.1 of the Project Book	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3.	Have a non-pipeline solution been considered?	Project Book	Sponsor/Asset Management	Alternative option other than do nothing have been considered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Ref	Checks	Location of Supporting Documents	Responsible Department	Criteria	Approval			Responsible Person (name)	Comments (Required)
					Y	N	N/A		
4.	Is the delivery date indicated?	Project Book	Sponsor/Asset Management	Date by which Asset Management expects system need will be resolved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5.	Has a cash flow matching the single option solution to meet the delivery date been identified and communicated with Investment planning?	Project Book	Sponsor/Asset Management	Asset Management single option shown with cost summary table in Project Book Section 4.1 populated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
6.	Has the latest cost book revision been utilized to provide the estimate for the single option?	Project Book	Sponsor/Asset Management	Cost book revision date indicated here is current	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Enter Cost Book Revision Date
7.	Has Complex Estimating provided a secondary review of calculations of the single option?	Project Book	Sponsor/Asset Management	Complete appropriate section of Project Book	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Enter Cost Book Revision Date

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<b>Version Number:</b> Version 01	<b>Version Date:</b> 01/23/2023	<b>Document Owner:</b> Manager of NY Gas Project Controls

# NDP Lite – Gate C1 Lite

Merges C and C1 into Gate C1 Lite

**Gate C:** Management of Change (MOC) will be initiated, Resource Strategy developed, long lead materials and permits in process of being secured, real estate requirements met or plans in plan (easement/PIC), USSC Sanction Approval (moved to a unique project specific paper), Focus of this gate is cost, schedule and scope

**Gate C1:** Constructability Review, Design Process Hazard Analysis (PHA) if required by policy, Produce detailed Engineering Design

Gate C1 Lite Checklist — Project Number: <Enter Project Number>

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## Gate C1 Lite Checklist - Approval to Progress to Field Execution

Commodity	Gas		
Project Name(s)	Enter full title here	Checklist Revision	Enter Revision Number
Sanction Paper #	Enter sanction paper number here	Project Number(s)	Enter Project Number(s)
Sponsoring Organization	Enter Organization	This Gate C1 Lite is X (number) of Y (total number) for sanction paper grouping? X of Y	X of Y
		Asset Management Contact	Enter Name
		Project Manager	Enter Name

Gate C1 Lite Checklist — Project Number: <Enter Project Number>

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Ref	Checks	Location of Supporting Documents	Responsible Department	Criteria	Approval			Responsible Person (name)	Comments (Required)
					Y	N	N/A		
1.	Have the funding project number(s) been generated for the single option?	Project Book	Sponsor/ Asset Management	Funding Number Initiated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

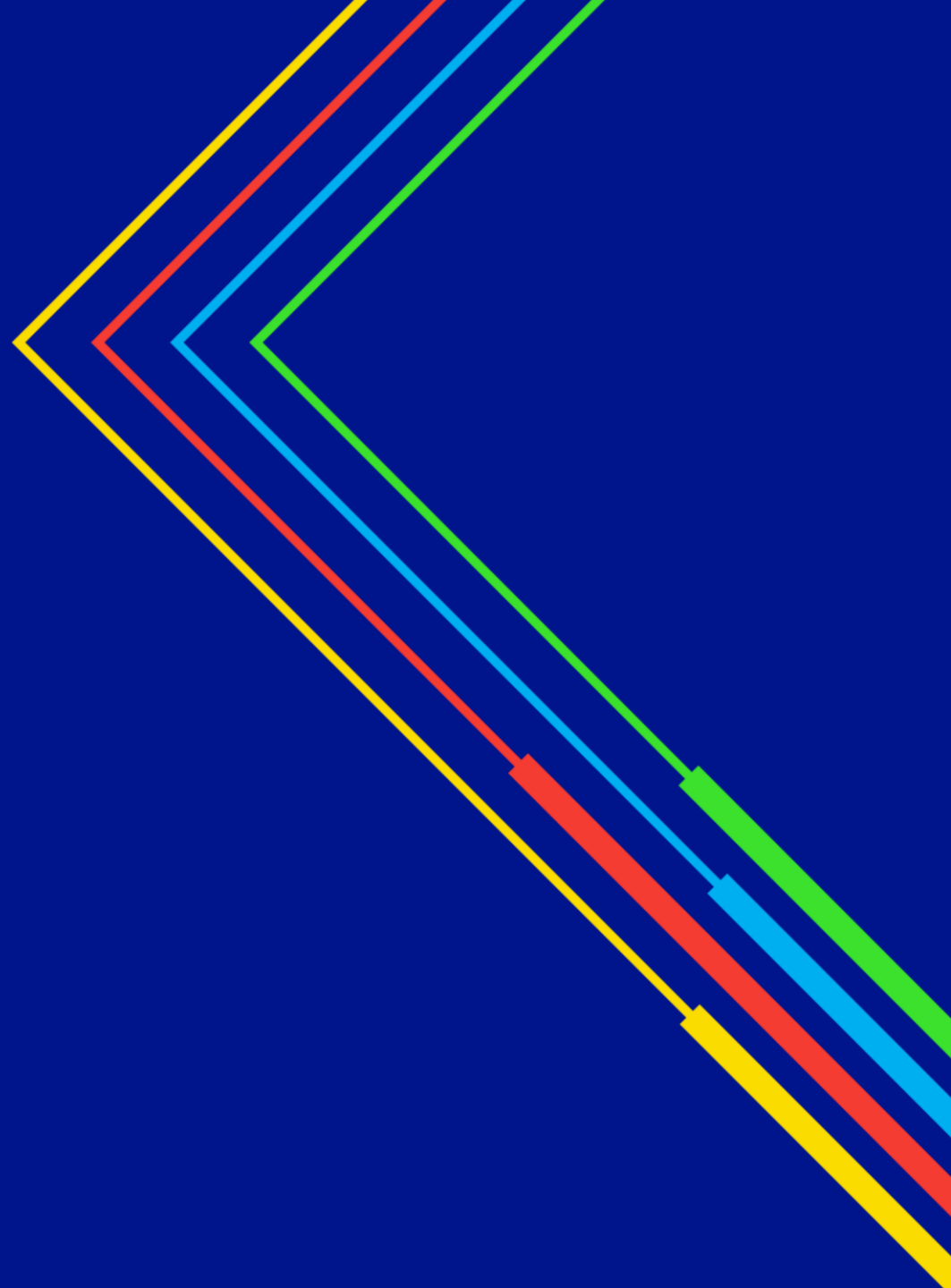
Gate C1 Lite Checklist — Project Number: <Enter Project Number>

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Ref	Checks	Location of Supporting Documents	Responsible Department	Criteria	Approval			Responsible Person (name)	Comments (Required)
					Y	N	N/A		
2.	Has appropriate DOA been approved for 4.4A Lite activities?	Project Book	Sponsor/ Asset Management	Approved DOA (Partial)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3.	Has GSO approved the project?		Project Management	If no, the risks associated with proceeding through Lite C1 without GSO approval need to be indicated in the Project Book.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4.	Has P6 Project Schedule been updated?		Project Management	P6 updated to reflect updated schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

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Version Number: Version 01	Version Date: 03/01/2023	Document Owner: Manager of NE Gas Project Controls

# Emergent NDP



# Emergent NDP Example - Symphony Station Pipeline Relocation

## Project Location

### Questionnaire for Emergent Project Classification

<b>Note</b>	This document should be used by Asset Management to assist in determining whether a project can be classified as emergent when the need for the project is identified.
-------------	--

Ref	Question	Y	N
1.	Is the project complex? (Complexity Score $\geq 19$ )	<input type="checkbox"/>	<input type="checkbox"/>
2.	Is this project required to be completed within 12 months?	<input type="checkbox"/>	<input type="checkbox"/>
3.	Has the need for this project been recently identified within the past few months? (0-3 months)	<input type="checkbox"/>	<input type="checkbox"/>
4.	Does this project affect the integrity or safety of the system if not pursued?	<input type="checkbox"/>	<input type="checkbox"/>
5.	Is this project classified as one of the following? a) Transmission b) Complex distribution c) CNG and LNG injection points d) Fast Track Complex Customer Projects (<12months)	<input type="checkbox"/>	<input type="checkbox"/>
6.	EMERGENT PROJECT- Have you answered "YES" to all the previous questions?	<input type="checkbox"/>	<input type="checkbox"/>

<b>For Reference</b>	Is this project in the approved business plan? (Yes / NO)
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# Emergent NDP – Key Variations from NDP

Shortened/Eliminated option selection requirements

Shortened overall project development activities

Modified Gate Checklists, Process Flows, RACI

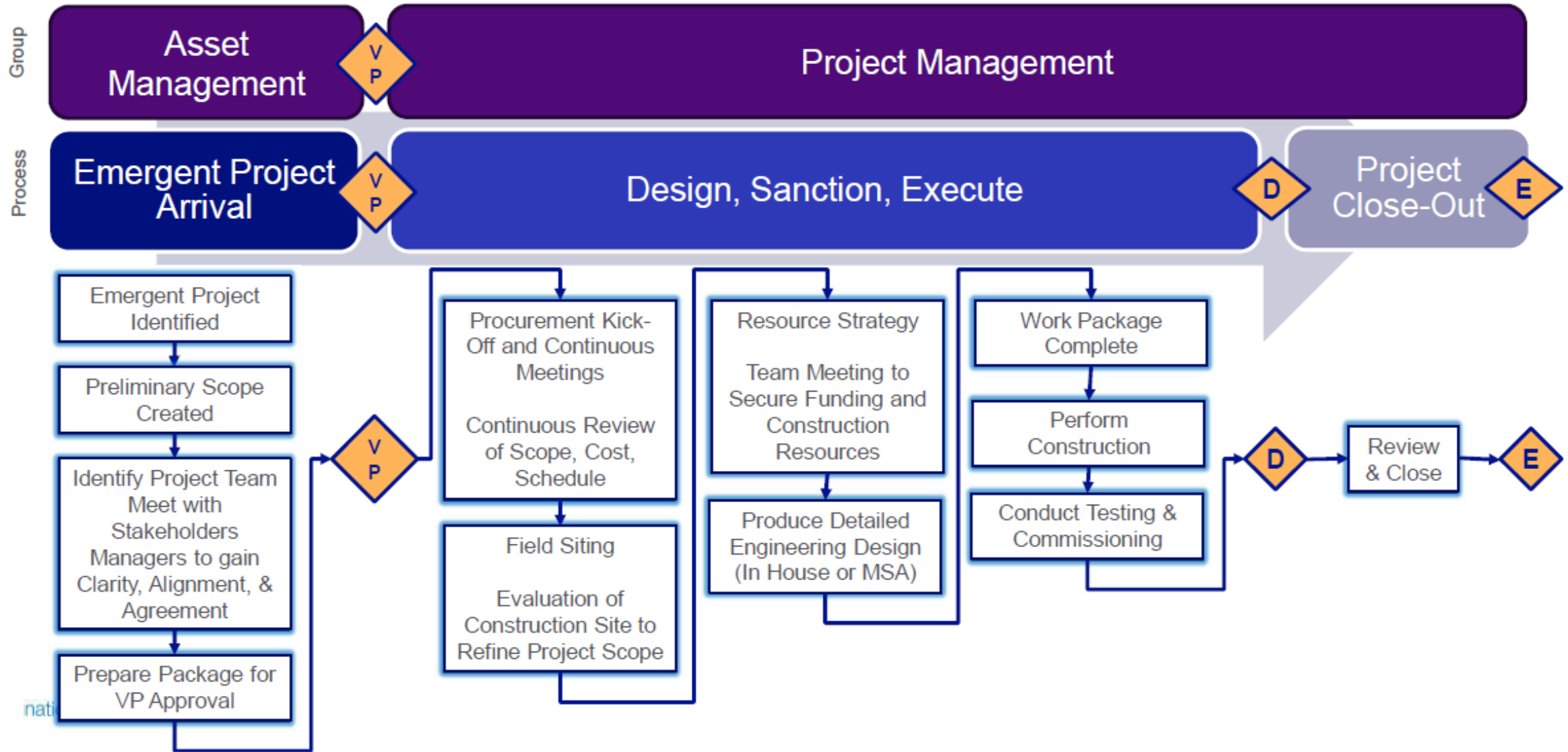
- Gates A and B are replaced by VP approval
- Gates C and C1 are bypassed

Bypassed formal estimates

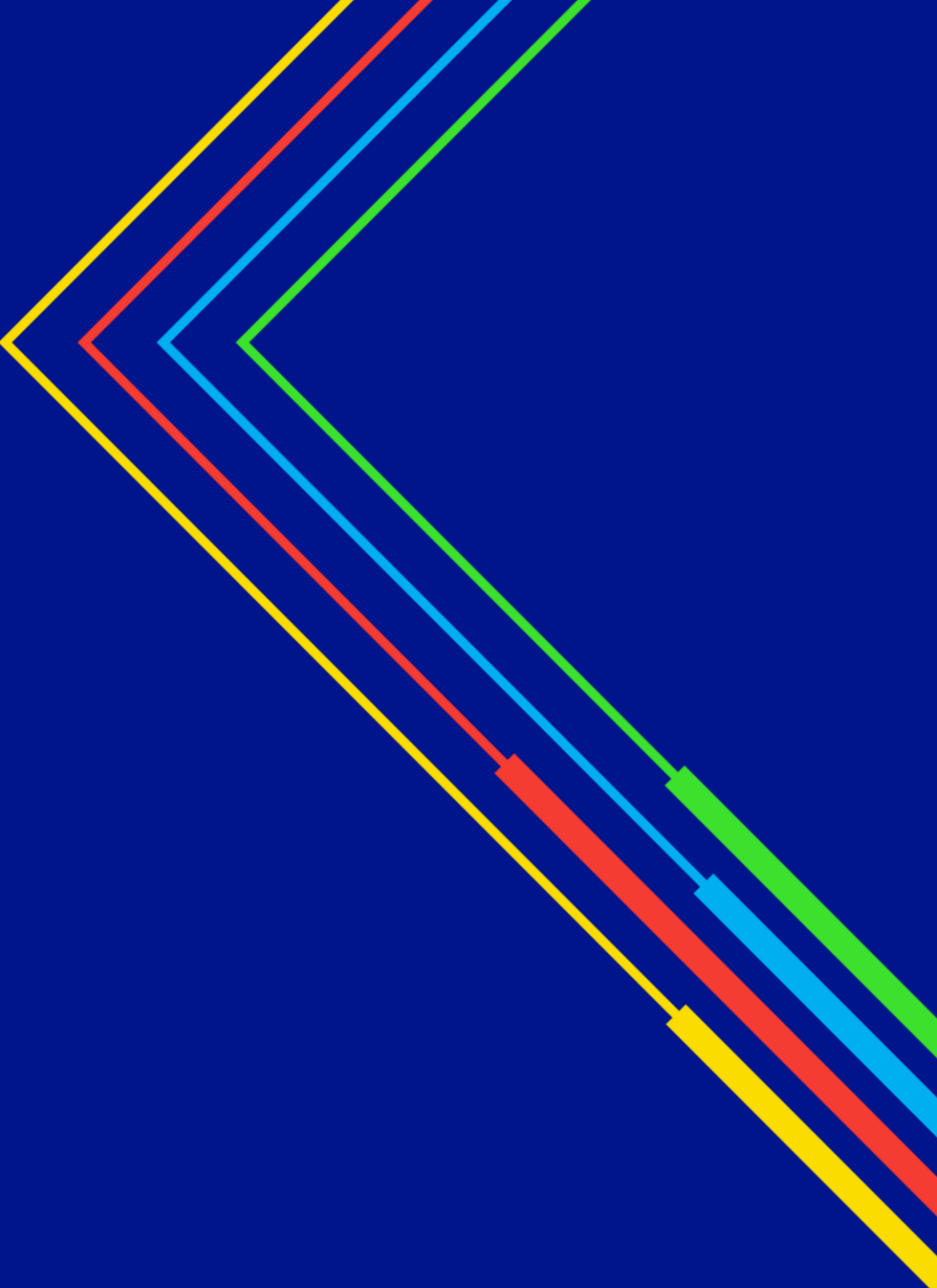
Estimated Project Duration within 12 months

Kept Project Close-Out process the same

# Emergent NDP



# Recap



# Network Development Process (NDP) Overview

## NDP Team

Project Management  
 Project Controls  
 Complex Construction  
 Contract Management  
 Compliance Execution  
 Project Engagement  
 Asset Management  
 Engineering  
 Environmental  
 Gas System Operations (GSO)  
 Field Operations  
 Estimating  
 Legal  
 Instrumentation & Regulation (I&R)  
 Investment Planning  
 Resource Planning  
 Procurement  
 Process Safety  
 Real Estate  
 & Others

## NDP

2018

*Standard: Full Projects*

Phases & Gates:

4.1 – Needs Case

**Gate A**

4.2 – Option Solution

**Gate B**

4.3 – Develop & Sanction

**Gate C**

4.4A - Design

**Gate C1**

4.4B - Execute

**Gate D**

4.5 – Review & Close

**Gate E**

## NDP Lite

2022

*Expedited: Single Solution Projects*

Phases & Gates:

4.1/4.2 Lite – Initiate, Plan & Estimate

**Gate B Lite**

Phase 4.4A Lite – Design

**Gate C1 Lite**

Phase 4.4A – Contract & Procure

Phase 4.4B – Execute & Construct

**Gate D**

4.5 – Review & Close

**Gate E**

## NDP Emergent

2020

*Exception: Walk-In Projects with VP Approvals to be completed within approximately 12 months*

Phases & Gates:

4.1 – Needs Case

4.2 – Option Solution

4.3 – Develop & Sanction

4.4A – Design

4.4B - Execute

**Gate D**

4.5 – Review & Close

**Gate E**