



Cristen

Decentralized Wastewater Systems: From Planning and Design to Operations

Part 2: Program Development, Planning, Permitting, and Organizational Considerations

September 19, 2024



SOUTHWEST
ENVIRONMENTAL
FINANCE CENTER



Meet the Team



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SU-EFC

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Background



Cristen



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*Collection and
Disposal Systems*



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*Wastewater
Treatment*



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Project Delivery



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*Ownership &
Permitting*

Target audience



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1. Wastewater treatment operators
2. Civil/Environmental engineers and planners
3. Leaders of organizations that may be able to help with implementation (e.g., agency leadership, owners of existing private wastewater systems, funding agencies, non-governmental organizations, etc.)

Poll: Who is in the audience?



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- Who' is in the audience?
 - » Operator and/or maintenance personnel
 - » Consulting engineer
 - » Manager or engineer of a utility or agency
 - » Manufacturer or vendor
 - » Other (Please type in the chat)

Poll: Project Experience



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- What systems have you had experience with?
 - » Centralized wastewater systems
 - » Decentralized wastewater systems
 - » Individual wastewater systems
 - » More than one of the above
 - » None of the above

Agenda Parts 1 + 2



Part 1: Planning, Design, and O&M Considerations for Collection, Treatment, and Disposal Systems

Part 2: Program Development, Planning, Permitting, and Organizational Considerations



Introduction and background

Individual wastewater systems
Why decentralized systems?

Design, construction, and operation and maintenance considerations

Collection systems
Treatment systems
Effluent management or disposal systems
O&M staffing

Program development, planning, and permitting considerations

Process and timelines
Funding and ownership
Permitting
Case study

Recap of what was learned



Collection



- Gravity sewers
- Vacuum sewers
- Liquid-only pressure sewers
- Low-pressure sewers

Treatment



- Conventional activated sludge
- Extended aeration activated sludge
- Membrane bioreactor (MBR) attached growth systems
- Moving bed biofilm reactor (MBBR)
- Constructed wetland

Disposal



- Water reuse
- Absorption trench/bed
- High or low-pressure drip
- Seepage pit
- Evapotranspiration
- Injection well
- Surface water discharge

Learning objectives



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1. Understand the components of a decentralized wastewater system and why it makes sense for some individual wastewater system conversions.
- 2. Discuss the steps that are involved with planning, design, and construction of a new decentralized system.**

Why decentralized systems?



Approximately **20 percent** of homes in the U.S. are **not** connected to public sewers (Olsen et al., 2022; U.S. Census Bureau, 2021).



Of the homes not connected to sewers, approximately **52 percent** have a household income of less than or equal to **\$61,000** (U.S. Census Bureau, 2017).



There is a strong correlation between income and sewer access for Florida, Hawaii, Delaware, and Rhode Island (U.S. EPA, 2021).

— Agenda



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1. Project Ownership
2. Permitting
3. Funding
4. Project Delivery Options
5. Implementation Schedule
6. Case Study



Mike

01

Project Ownership

Ownership options



Mike



Existing public agency

e.g., city, county, special district

Likely requires formation of a project-specific, sewer assessment district



New public entity

e.g., special purpose district created



Private ownership

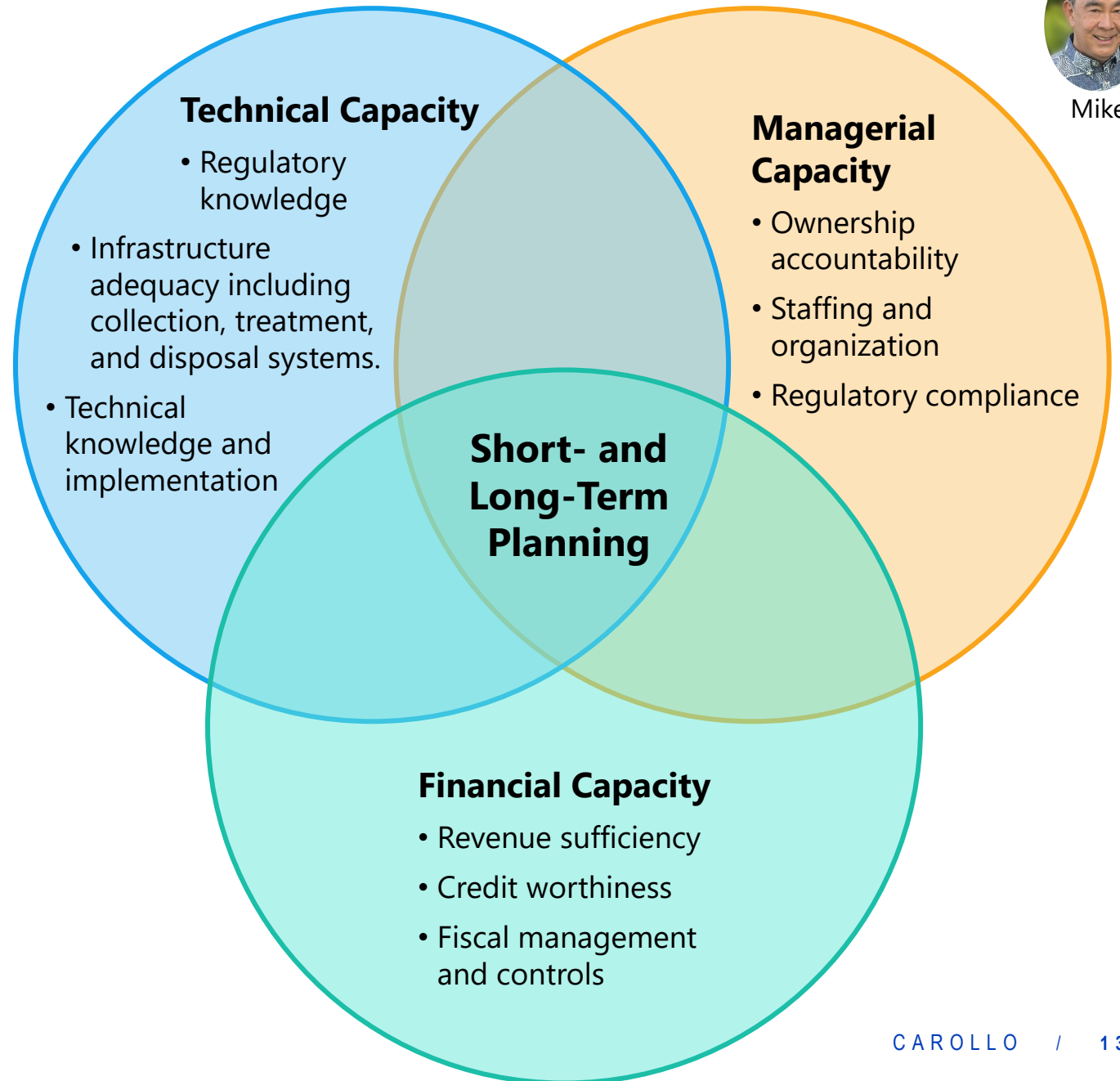
e.g., HOA, investor-owned utility looking at decentralized options



Mike

Project ownership

- Requires technical, managerial, and financial (TMF) capacity for:
 - » Planning, design, and implementation.
 - » Operation and ensuring regulatory compliance.
 - » Securing of capital financing and meeting annual revenue needs.



<https://www.epa.gov/dwcapacity/learn-about-capacity-development>



Mike

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Permitting



Mike

—
A range of approvals and permits are required for project implementation

- **Federal**

- » Section 106 of the National Historic Preservation Act
- » Section 7 of the Endangered Species Act
- » USEPA
- » FAA (if near airport)

—
 Additionally,
 federal approvals and
 permits can include a
 large list of "crosscutter"
 authorities when
 chasing federal funding

https://health.hawaii.gov/sdwb/files/2018/04/Attachment-4_Environmental-Cross-Cutters.pdf



Mike

ATTACHMENT 4A – ENVIRONMENTAL CROSS-CUTTERS

Environmental Authorities	Procedure	Responsible Agency
ARCHEOLOGICAL AND HISTORIC PRESERVATION ACT OF 1974, 16 U.S.C. 16 U.S.C. § 469a-1	Obtain review for all projects.	State Historic Preservation Office Native Hawaiian Organizations, and U.S. Environmental Protection Agency in certain cases
Bald and Golden Eagle Protection Act, 16 U.S.C. §§668-668c	Permit required for taking eagles.	U.S. Department of the Interior
CLEAN AIR ACT, 42 U.S.C. 7506(c)	Coordinate to assure project conforms with State Implementation Plan (SIP).	State Department of Health, Clean Air Branch
COASTAL BARRIER RESOURCES ACT, 16 U.S.C. §§3501-3510	Obtain review if project is located on a coastal barrier island.	State Coastal Zone Management Agency
COASTAL ZONE MANAGEMENT ACT OF 1972, 16 U.S.C. §§ 1451-1464	Obtain review if project is located in coastal zone.	State Coastal Zone Management Agency
ENDANGERED SPECIES ACT 16 U.S.C. §§ 1531-1543	Obtain review by U.S. Fish and Wildlife Service and/or National Marine Fisheries Service for all projects.	U.S. Fish and Wildlife Service and/or National Marine Fisheries Service, and U.S. Environmental Protection Agency in certain cases
ENVIRONMENTAL JUSTICE, EXECUTIVE ORDER 12898	Identify and address the disproportionately high and adverse human health or environmental effects of project on minority or low-income populations.	U.S. Environmental Protection Agency
FARMLAND PROTECTION POLICY ACT, 7 U.S.C. §§ 4201-4209	Obtain review if project area contains prime farmland.	U.S. Department of Agriculture
FISH AND WILDLIFE COORDINATION ACT, 16 U.S.C. §§ 661-664	Obtain review for all projects.	U.S. Fish and Wildlife Service
FLOODPLAIN MANAGEMENT, EXECUTIVE ORDER 11988 as amended by EXECUTIVE ORDERS 12148 and 13690	Obtain review if project is located in or affects 100-year flood plain.	Federal Emergency Management Agency
MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT, 16 U.S.C. §§ 1801 <i>et seq.</i>	Obtain review if project is located in area with Wild and Scenic Rivers.	National Marine Fisheries Service and U.S. Environmental Protection Agency in certain cases
Marine Mammal Protection Act, 16 U.S.C. §§1361 <i>et seq.</i>	Permit required for taking of marine mammals.	U.S. Fish and Wildlife Service and National Marine Fisheries Service
MIGRATORY BIRD TREATY ACT, 16 U.S.C. §§703 <i>et seq.</i>	Obtain review if project impacts breeding bird species.	U.S. Fish and Wildlife Service
NATIONAL HISTORIC PRESERVATION ACT OF 1966, 54 U.S.C. §3300101 <i>et seq.</i>	Obtain review for all projects.	State Historic Preservation Office Native Hawaiian Organizations
PROTECTION OF WETLANDS, EXECUTIVE ORDER 11990, as amended by EXECUTIVE ORDER 12608	Obtain review if project area contains wetlands.	U.S. Army Corps of Engineers
RIVERS AND HARBORS ACT, 33 U.S.C. § 403	Obtain review if project requires construction of any structure in or over a navigable water of the U.S. or if structure or work will affect the course, location, or condition of a water body.	U.S. Army Corps of Engineers
SAFE DRINKING WATER ACT, 42 U.S.C. §§ 300f-300j-9	Obtain review if project could affect sole source aquifer.	State Department of Health, Safe Drinking Water Branch, U.S. Environmental Protection Agency
WILD AND SCENIC RIVERS ACT, 16 U.S.C. §§ 1271 <i>et seq.</i>	Obtain review if project is located in area with Wild and Scenic Rivers.	National Park Service, U.S. Forest Service, Bureau of Land Management



Mike

Local approvals and permits are required for project implementation (cont.)

- **State**

- » Environmental assessment (EA) or environmental impact report (EIR)
- » Department of Health, State Department of Environmental Protection, etc.
 - Waste discharge, UIC, reuse, or NPDES permit
 - Air quality permit
 - Biosolids disposal or reuse
 - Approval to Construct, Approval to Use

- **Local**

- » Planning approvals
 - Land use permits
 - Zoning variances
- » Building and grading permits
- » Right of way work approvals and/or acquisition of easements



Mike

Some final words of advice on permitting and approvals...

- Start early! i.e., *engage* your regulatory or approving authority early and often (consultation) on your project details and timeline.
- If applicable, make them aware of Federal funding intentions, so they can apply the appropriate local - or Federal - application, review and approval processes
- If your project is eligible for Federal funding, these agencies can guide you through potential cross cutting authority requirements.

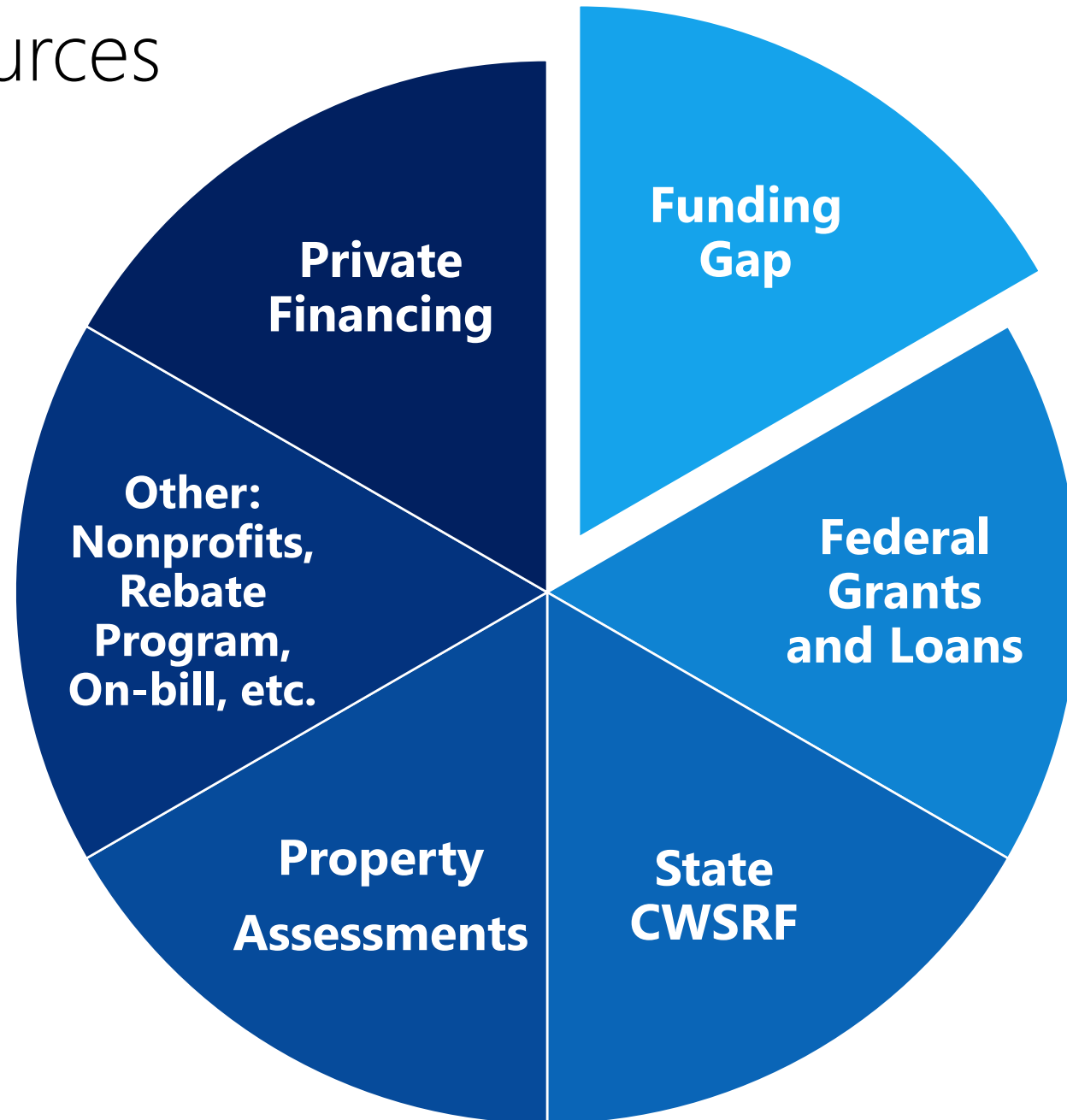


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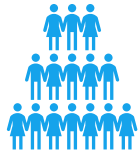
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Funding

Funding sources



Considerations for funding options



Who is eligible to apply?
Municipality, non-profit organization, individual homeowner, etc.



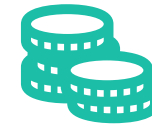
Is an entity needed for pass-through funding?



Is up-front cash required? (e.g., funding matches)



What projects are covered by the funding program? (e.g., water reuse opportunities)



Is there cost share or matching required?



What other requirements are there? (e.g., federal funding requirements)

Potential federal grants and loans

- U.S. Bureau of Reclamation (USBR), WaterSMART
 - » Title XVI WIIN Act Water Reclamation and Reuse
 - » Drought Response Program and Resiliency Projects
- U.S. EPA Community Change Grants



— BUREAU OF —
RECLAMATION



U.S. Environmental
Protection Agency

Potential federal grants and loans (cont'd)

- U.S. Congress, Community Project Funding and Congressional District Spending
- U.S. EPA Water Infrastructure Finance and Innovation Act (WIFIA)
- National Rural Water Association, Rural Water Loan Fund
- U.S. Dept of Agriculture, Water and Waste Disposal Loan and Grant Program





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— BUREAU OF —
RECLAMATION

U.S. Bureau of Reclamation (USBR), WaterSMART *Title XVI WIIN Act Water Reclamation and Reuse*

- Projects for water reuse and impaired ground and surface water in the **17 Western States and Hawaii**.
- Funding for **planning, design, and construction** of water reuse projects in partnership with local governments, and other entities with water or power delivery authority.
- Feasibility study **must meet WTR 11-01**.
- Maximum grant award is **\$30M or 25% of total project cost**.
- Costs are reimbursed.
- Applicant required to provide summary of cash for project and compliance with **federal cross cutters**.



U.S. Bureau of Reclamation (USBR), WaterSMART *Drought Response Program, Due 10/7/24*



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— BUREAU OF —
RECLAMATION

- Program goals are to **build resiliency to drought** by:
 - » Increasing the reliability of water supplies.
 - » Improving water management.
 - » Providing benefits for fish and wildlife and the environment.
- Applicant doesn't need a drought contingency plan but must demonstrate that the project is supported by an **existing drought contingency plan related to the project location**.
- Funding for **planning, design, and construction** of water reuse projects in partnership with local governments, irrigation, water, or wastewater districts, and other entities with water or power delivery authority.
- Maximum grant award is **\$10M** for projects to be **completed within 2-3 years** of award. **Minimum 50% cost share** required.
- Costs are **reimbursed**. Applicant required to provide **summary of cash** for project and compliance with **federal cross cutters**.



U.S. EPA Community Change Grants

Due 11/21/24



- Inflation Reduction Act (IRA) provides EPA with \$2 billion available to communities impacted by **climate change, legacy pollution, and historical disinvestments.**

- Track 1: Community-Driven Investments for change: \$1.96 billion, increments of **\$10-20 M awards.** Eligibility:
 - » Must be an established **partnership** between a **Community Based Organization** (CBO) and a federally recognized tribe, local government, or higher education institution.
 - » Must benefit disadvantaged communities per the **IRA Disadvantaged Communities Map.** Technical assistance is available. Projects must be completed within the 3-year period of performance. **No match required.**
 - » Compliance with **federal cross cutters** required.



U.S. EPA Community Change Grants



Track 1 applications must include projects that fall into at least one Climate Action Strategy and one Pollution Reduction Strategy:

Climate Action Strategies:

- Mobility and Transportation Options for Preventing Air Pollution and Improving Public Health and Climate Resilience.
- Energy-Efficient, Healthy, and Resilient Housing and Buildings.
- Green Infrastructure and Nature Based Solutions.
- Microgrid Installation for Community Energy Resilience.
- Community Resilience Hubs.
- Brownfield Redevelopment for Emissions Reduction and Climate Resilience.
- Waste Reduction and Management to Support a Circular Economy.
- Workforce Development Programs for Occupations that Reduce Greenhouse Gas Emissions and Air Pollutants.

Pollution Reduction Strategies:

- Indoor Air Quality and Community Health Improvements.
- Outdoor Air Quality and Community Health Improvements.
- Clean Water Infrastructure to Reduce Pollution Exposure and Increase Overall System Resilience.
- Safe Management and Disposal of Solid and Hazardous Waste.



Water Infrastructure Finance and Innovation



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- Low interest **loan** for **large dollar value** water, wastewater, stormwater, green infrastructure, energy efficiency projects, alternative water supply, aquifer recharge, drought preventing/reduction/mitigation projects or a **package of projects** serving a similar purpose.
- Provides up to **49% of the total project financing; with 51% match.**
- Max loan term is 35 years from substantial completion (including 5-year deferment of start of repayments). **Min project cost of \$20M or \$5M for small community projects** (25,000 pop. or less). Projects can be combined to reach the minimum.
- Non-profit organizations and non-profit organizations and government partnerships can be funded.
- Interest rate is equal to the US Treasury rate on the day of closing plus one basis point. Funds can be used to cover **planning/design (retroactive)** and **construction** activities.
- **Two step application process:** Letter of Interest and Application.
 - » Letters of Interest can be submitted on a rolling basis. After application submittal, it can take 4 to 7 months to close on the loan.
 - » **Application fees: average \$200,000 to \$300,000** pending reviews and legal negotiations. Program provides a reimbursement for costs incurred. Requires applicant to provide initial outlay of cash for project.
- Compliance with **federal cross cutters** required.



Rural Water Loan Fund



- Funding for **small** water and wastewater utilities.
- Eligible projects include **short-term repair costs**, small capital projects, or pre-development costs associated with larger projects.
- Systems must be public entities (municipalities, counties, special purpose districts, Native American Tribes, nonprofit corporations and cooperatives) **serving up to 10,000 persons**, or in rural areas.
- **Below market interest rate** (currently 3%) and a maximum repayment period of 10 years.
- Loan amounts **may not exceed \$200,000 or 75%** of the total project cost.
- **No administrative fees.** No grants or principal forgiveness.



U.S. Dept of Agriculture, Water and Waste Disposal Loan and Grant Program



- Funding for eligible **rural areas (pop. 10,000 or less)** for sewage and solid waste disposal. Focus is to restore a deteriorating water supply, or to improve, enlarge, or modify a water facility or an inadequate waste facility.
- Preference to **projects merging small facilities and those serving low-income communities.**
- Borrowers must have the legal authority to construct, operate and maintain the proposed services or facilities, **local governments and private non profits** are eligible.
- Financing is available in **long-term** (up to 40 years), **low-interest rates** (determined quarterly) are provided based on the need for the project and the median household income (MHI) of the area.
- **Grants** available as a percentage of the eligible project costs:
 - » **Max 75% of the eligible costs when the MHI is \leq 80%** of the state MHI and the project is necessary to alleviate a health or sanitary problem.
 - » **Max 45% when the MHI is $>$ 80%** of the state MHI but does not exceed 100%.



Clean Water State Revolving Fund (CWSRF)



- Financing for publicly owned wastewater treatment works (POTWs) owned by a state or county agency.
- Projects to **prevent contamination of groundwater and coastal water resources.**
- The program provides **low interest loans** to agencies to construct point source and nonpoint source water pollution control projects.
- Financing terms **vary by state.** Disadvantaged communities may be eligible for lower rates and principle forgiveness. Bipartisan Infrastructure Law added funds to all state revolving funds for their base loans as well as **specific funding for emerging contaminants** (on EPA Emerg. Cont. list).

Example projects are as follows:

- » New, expanded or rehabilitation of wastewater treatment plants
- » **Decentralized wastewater treatment systems**
- » **Cesspool replacement**
- » Watershed pilot projects
- » **Water reuse systems**
- » Sludge reuse, treatment, and disposal
- » Septage handling and treatment facilities

THE CLEAN WATER STATE REVOLVING FUND

Low-Cost Infrastructure Financing Since 1987

Totals:

\$172 billion in funding
for water quality infrastructure projects

48,022 loan agreements
(through FY2023)

How it works:

 **EPA funds state CWSRFs**
each year, with **20% state match.**



All 50 states and Puerto Rico have CWSRFs.



Clean Water State Revolving Fund (CWSRF)



See EPA Fact Sheet



Financing Decentralized Wastewater Treatment Systems

INTRODUCTION

Approximately one in five households in the United States rely on decentralized wastewater systems, such as single-family home septic systems or community cluster systems, for wastewater treatment and disposal. For communities relying on decentralized systems,



costs to repair, replace, or install systems can be expensive, and these costs are often the homeowner's responsibility. EPA's [Financing Decentralized Wastewater Treatment Systems: Pathways to Success with the Clean Water State Revolving Fund Program](#) Guide helps community leaders, local and state decentralized

wastewater treatment programs and state Clean Water State Revolving Fund (CWSRF) administrators understand how the CWSRF can be a viable source of financing for decentralized systems.

The Guide details (1) the CWSRF Program; (2) How to Use the CWSRF to Finance Decentralized System Projects; (3) Options for CWSRF Loan Repayment; and (4) Initiating a Financing Program for Decentralized Wastewater Systems with the CWSRF. This summary sheet highlights key content from these sections.

1 The CWSRF Program

EPA's CWSRF Program, administered individually by each state and Puerto Rico, provides low-cost financing for wastewater infrastructure and water quality projects, including decentralized wastewater system projects. The CWSRF functions like an environmental infrastructure bank, providing funding, primarily in the form of below-market interest rate loans to eligible borrowers. However, it is important to note that States are afforded extensive flexibility in administering their program, including defining project and applicant eligibilities, financing terms, and loan forgiveness options for qualified borrowers. Contact your state for [details](#).

CWSRF Financing Fundamentals



Is my project eligible for CWSRF funding?

- Planning and design
- Construction
- CWSRF CANNOT pay for [operations and maintenance](#) (O&M)

Your state's CWSRF staff can help you understand what costs may/may not be included in a CWSRF loan.



What kinds of projects are eligible?

- New septic system installation
- Repair/replacement projects
- Converting cesspools to septics
- Cluster systems or community package plants
- Certain fees associated with setting up a special district or a Responsible Management Entity



Am I eligible to apply?

The CWSRF may lend to:

- Communities, municipalities, townships, counties, political subdivisions
- Individual homeowners
- Citizen groups
- Non-profit organizations
- Public utility companies



What terms are available?

Within statutory limits, state CWSRF programs have a great deal of flexibility to offer borrowers, including leeway with:

- Interest rate and repayment loans
- Limited amounts of loan forgiveness
- Sculpted repayment structures to accommodate borrower cash flows

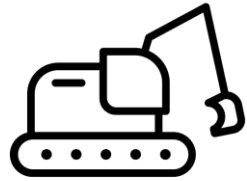
Check with staff in your state about how a CWSRF loan can be customized to fit your needs.





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Tips



Identify a critical and competitive project

- Funding for **planning, design, research, and construction**
- **“Shovel Ready”** = Funding program must coincide with project term
- Understand the funding program requirements, priorities, and goals and **how your project aligns**

Public **Protect**
Climate Change **Habitat** Environmental
Impacts Community Justice
 Benefit **Water**
 Strategy **Quality**
 Economic **Rural** **Expand** Financial
 Development **Need**
Resiliency Low-to-moderate
 Leveraging **income (LMI)** **Regionalization**
Innovative Energy
Technology Mitigation Efficiency
GHG Reductions **Upgrade** **Disadvantaged**
 Compliance **Community**
Alternative **Community** **Green**
Supply **Support** **Infrastructure**

Tips



Understand the cost and cash flow implications

- Notification of Award may not occur for **6+ months** after submittal
- Most are **reimbursements** NOT cash up front
- Grants typically do not cover full cost of a project, **matching funds** typically required (e.g., 50% cost share)
- **Federal “cross-cutter”** requirements will add to project cost and timeline
 - » Build America Buy America (BABA)
 - » American Iron and Steel (AIS)
 - » National Environmental Policy Act (NEPA)
 - » Davis-Bacon
 - » Disadvantaged Business Enterprise (DBE)
- **Grant administration costs** may be able to be included in your request!

Tricks



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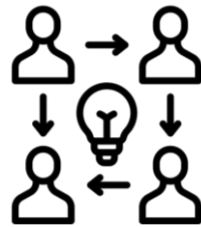
- Review or prepare **PLANNING DOCUMENTS** (master, comprehensive, regional plans, hazard mitigation plans) critical projects should be named.



- Reach out to program contacts **EARLY**



- **PREPARING** for the application process is necessary to effectively meet program deadlines



- Collaborate with your internal and external stakeholders **OFTEN**



- **ORGANIZE** your team for reporting and disbursement requirements



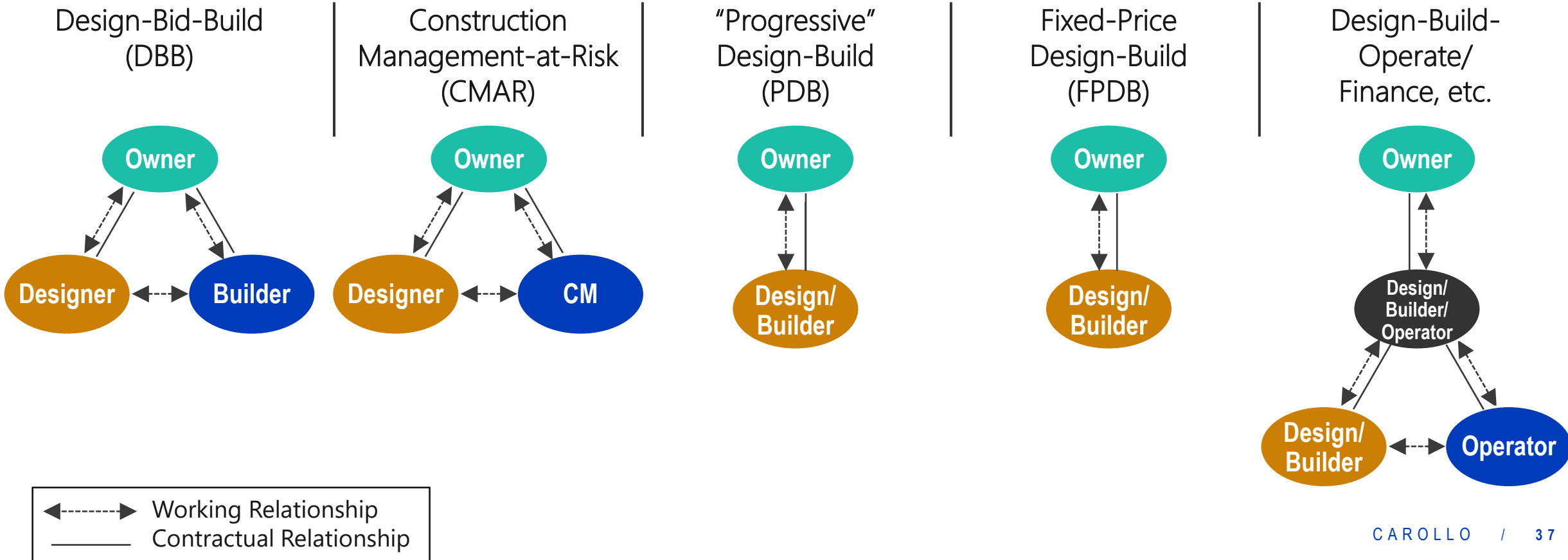
Jason

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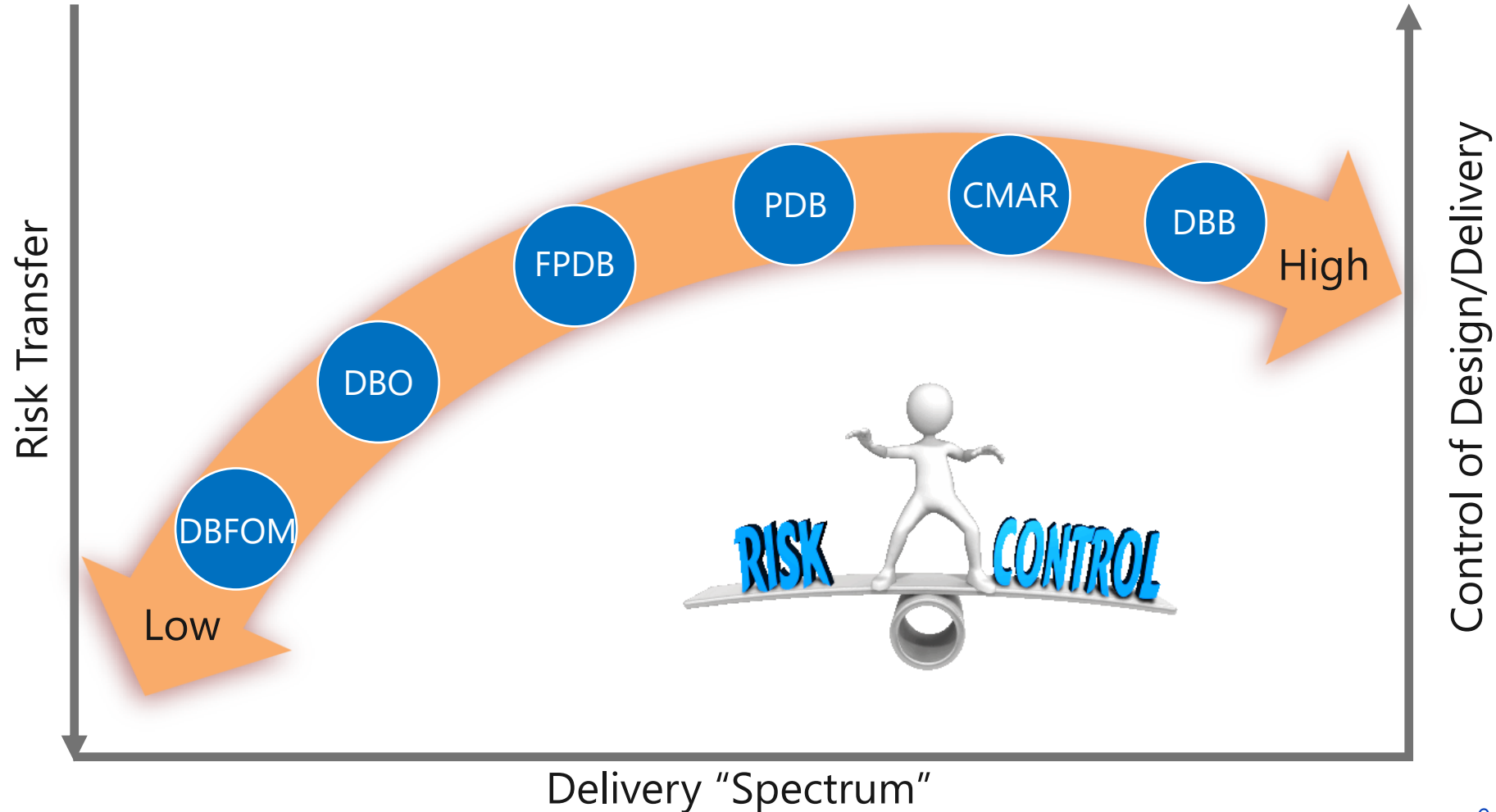
Project Delivery Options

Full spectrum of delivery methods utilized in the w/ww industry to satisfy specific project and owner objectives

Traditional Delivery	Alternative (or Collaborative) Delivery			
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The “right” delivery approach(es) should balance the owner’s desired level of control and risk transfer



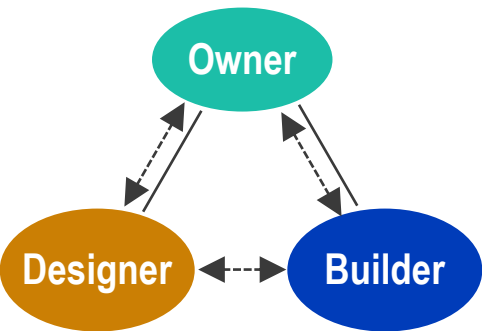


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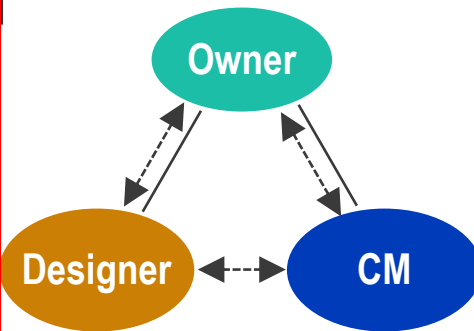
Traditional Delivery (Conventional Procurement)

Traditional Delivery

Design-Bid-Build (DBB)

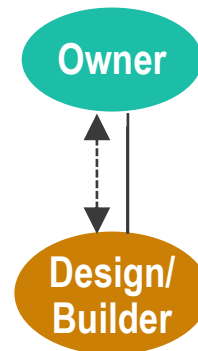


Construction Management-at-Risk (CMAR)

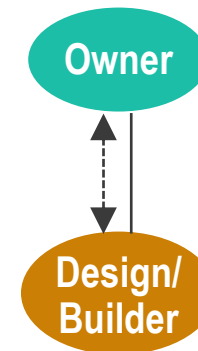


Alternative (or Collaborative) Delivery

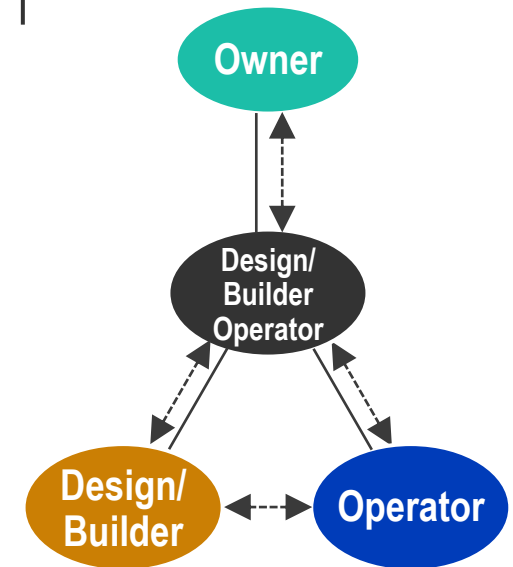
"Progressive" Design-Build (PDB)



Fixed-Price Design-Build (FPDB)



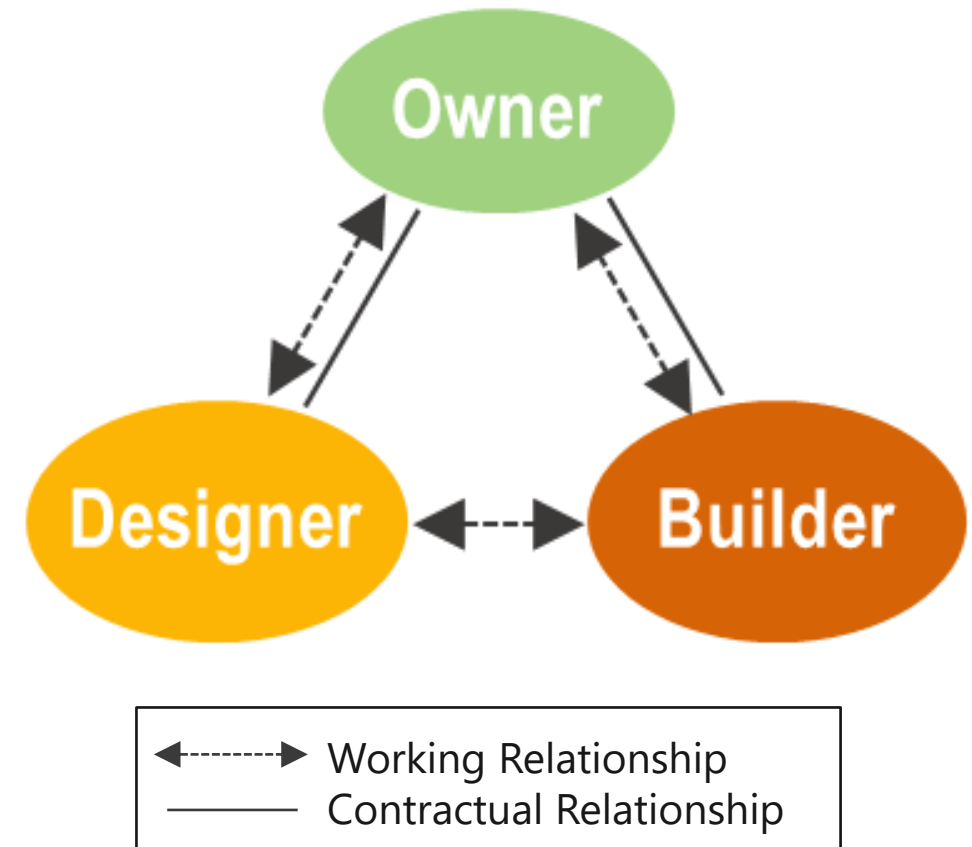
Design-Build-Operate/Finance, etc.



Design-Bid-Build (DBB)

- Overview

- Owner contracts with Engineer to develop design for project
- Engineer develops design to 100% and provides engineer's cost estimates
- Low bid competition for construction (limited negotiations)
- Owner contracts with Contractor to complete construction activities
- Deviations from design or existing conditions results in change orders

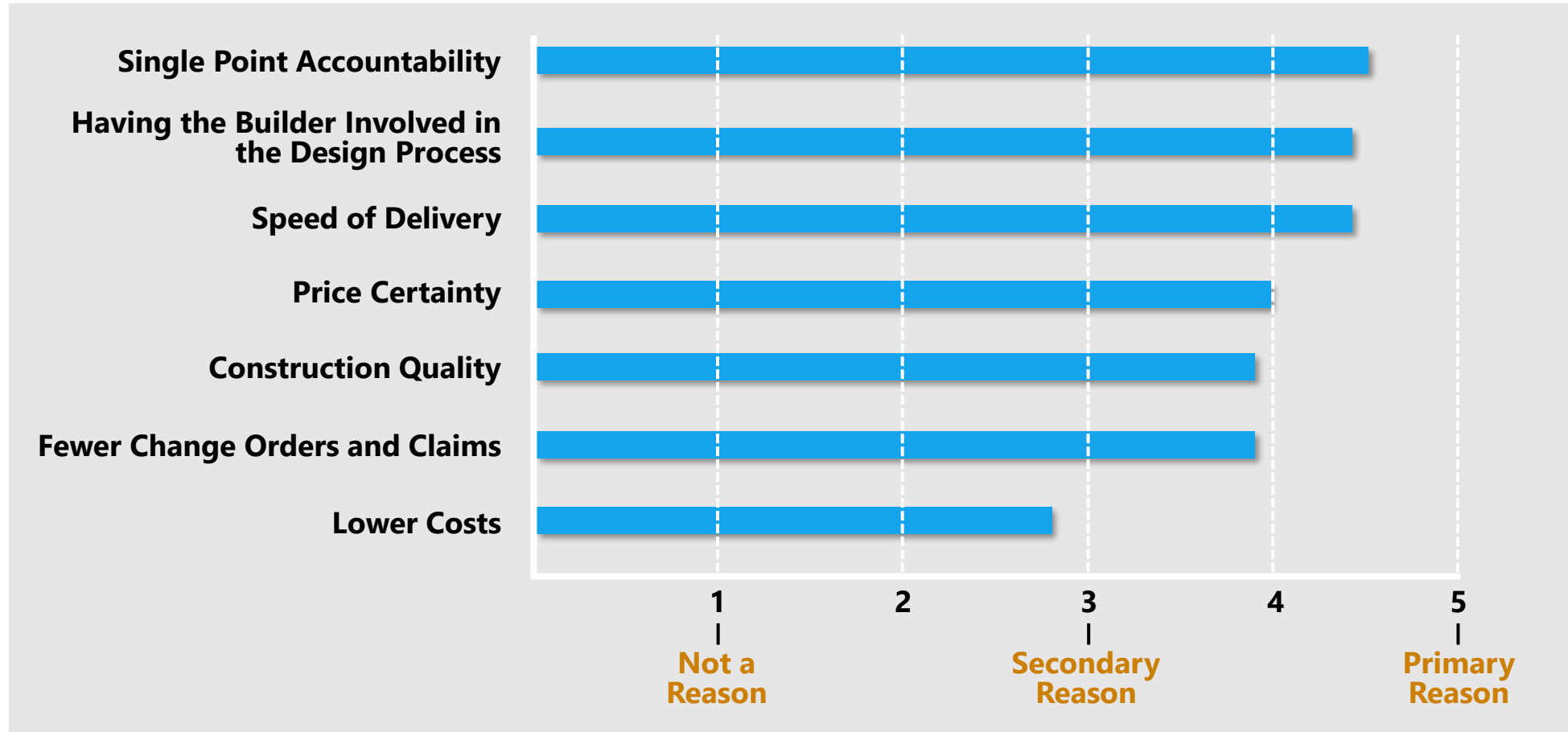


Advantages/Disadvantages: DBB

Advantages	Disadvantages
<ul style="list-style-type: none">• Owner & Contractor familiarity• High-level of Owner control over design elements• Competitive bidding environment (if there are multiple bidders)	<ul style="list-style-type: none">• Construction cost determined at bid time• Selection based on low-bid (limited qualifications)• Sequential schedule• No Contractor input during design• Greater potential for disputes and change orders



Owner survey on reasons for use of alternative/collaborative project delivery



Recent feedback from owners in consideration of using alternative/collaborative project delivery...



- Importance of scope to budget given uncertain marketplace pricing
- Increase project delivery throughout at organizational level
- Increase contractor interest (limited low bid interest)
- Management of long-lead equipment risk (i.e., electrical)

Alternative/Collaborative Delivery (CMAR)



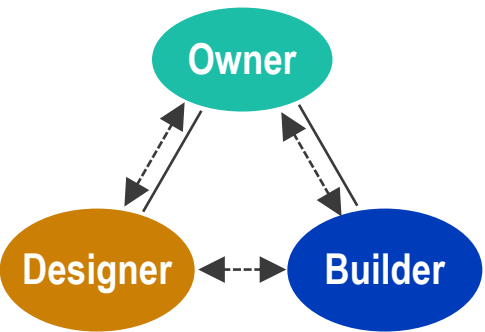
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Public-Private Partnerships

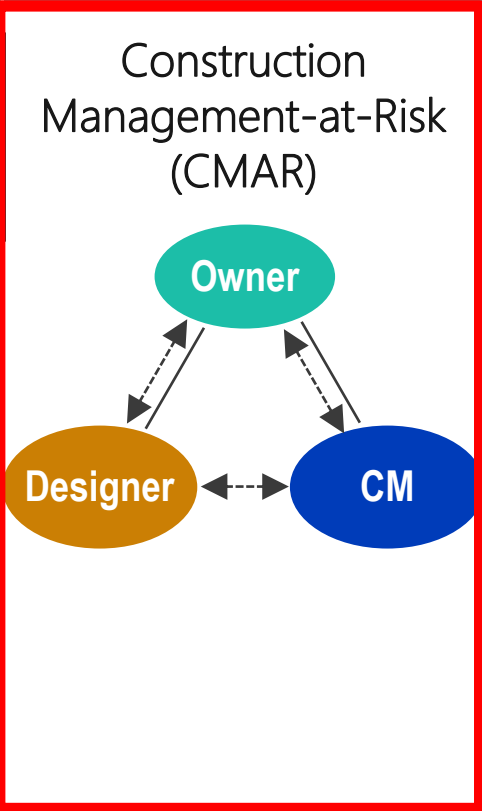
Traditional Delivery

Alternative (or Collaborative) Delivery

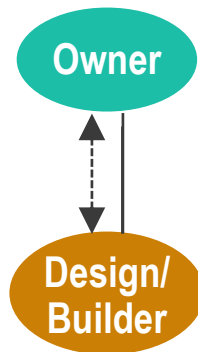
Design-Bid-Build (DBB)



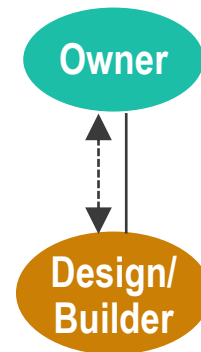
Construction Management-at-Risk (CMAR)



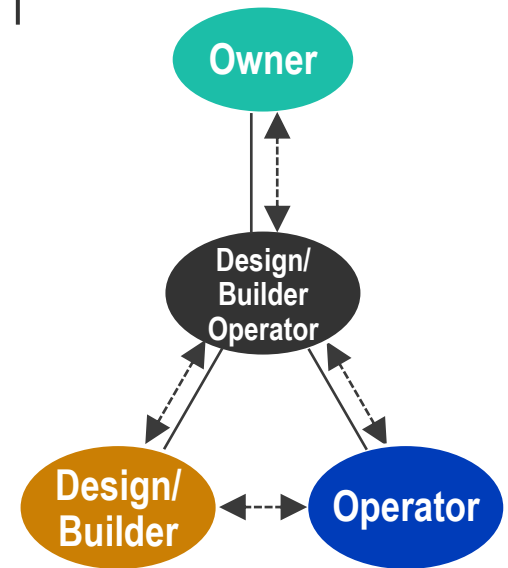
"Progressive" Design-Build (PDB)



Fixed-Price Design-Build (FPDB)



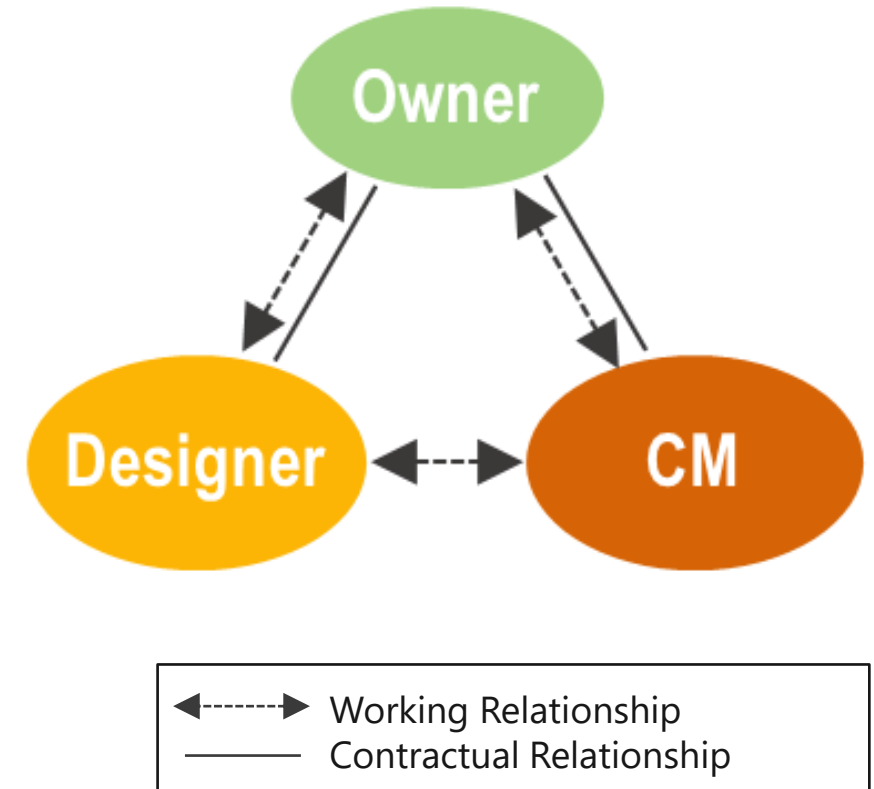
Design-Build-Operate/Finance, etc.



Construction Manager-at-Risk (CMAR)

- Overview

- Owner contracts with Engineer to develop design for project
- Owner separately procures Contractor based on qualifications with limited “price” aspects (not cost to construct)
- Contractor works with Engineer and Owner during site investigations and design; prepares cost estimates
- Contractor provides GMP proposal (\$ to complete construction) and if accepted executes contract amendment with Owner
- Contractor completes construction similar to DBB (early work an option)



Advantages/Disadvantages: CMAR



Advantages

- Qualifications-based Contractor selection
- Ability of Owner to select Designer
- Ability to design to budget
- Shortened schedule potential
- Contractor input into design and site investigations

Disadvantages

- Owner managing multiple contracts (forced relationship Contractor/Engineer)
- Negotiating Guaranteed Maximum Price (GMP) sometimes difficult
- Owner/Engineer maintain design risk

Alternative/Collaborative Delivery (PDB)



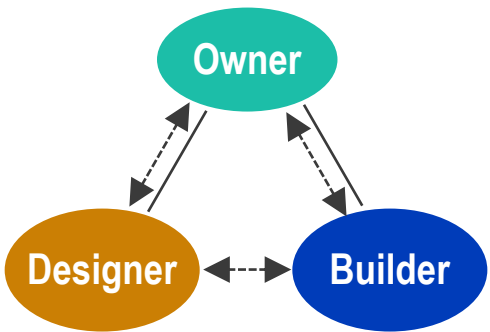
Jason

Public-Private Partnerships

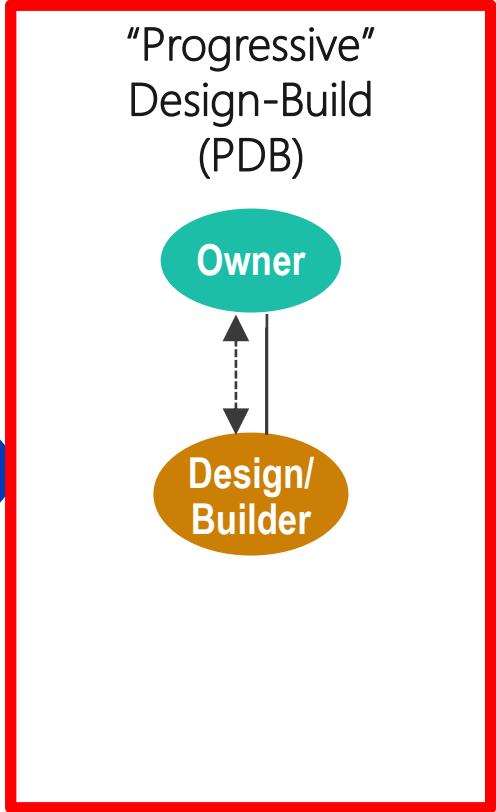
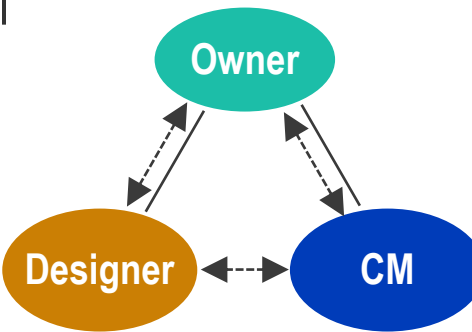
Traditional Delivery

Alternative or Collaborative Delivery

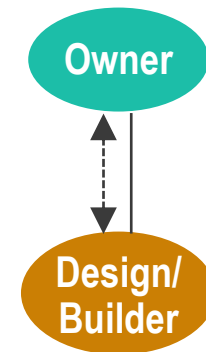
Design-Bid-Build (DBB)



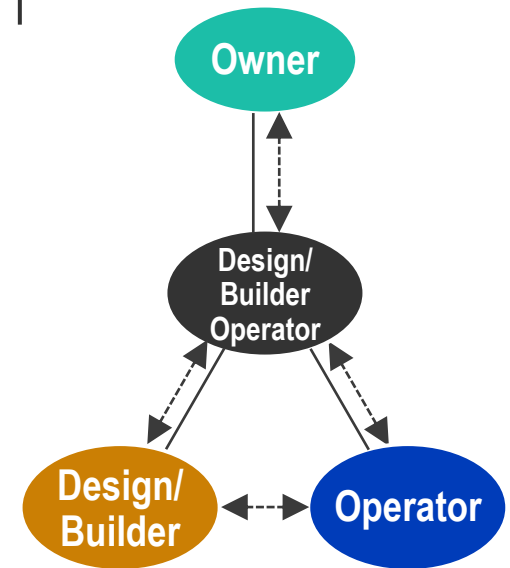
Construction Management-at-Risk (CMAR)



Fixed-Price Design-Build (FPDB)



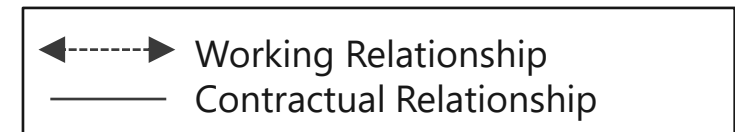
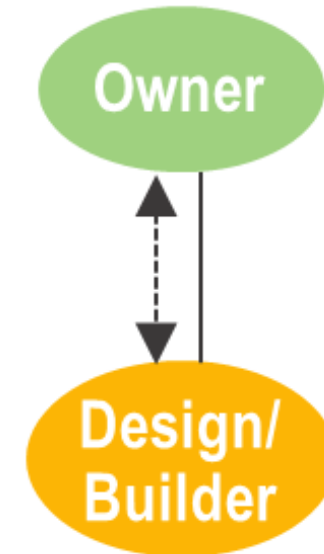
Design-Build-Operate/Finance, etc.



Progressive Design-Build (PDB)

- Overview

- Owner procures Design-Build Team based on qualifications with “limited” price elements
- Single contract for design and construction activities (DB Team responsible for design and construction performance)
- Design and costs are developed during pre-construction in collaboration with Owner
- Contractor provides GMP proposal (\$ to complete construction) and if accepted executes contract amendment with Owner
- Off-ramp available to Owner if design or pricing cannot be agreed
- Construction responsibilities unique in comparison to DBB



Advantages/Disadvantages: PDB



Advantages	Disadvantages
<ul style="list-style-type: none">• Qualifications-based selection• Owner substantially involved in design phase• Innovation from Design-Builder allows potential cost savings• Flexibility to design to budget• Shortened schedule potential• Transfer of design-related risk to Design-Builder	<ul style="list-style-type: none">• Owner does not hold design contract• Design-Builder contract price established after contract award• Negotiating GMP can sometimes be challenging

Alternative/Collaborative Delivery (FPDB)



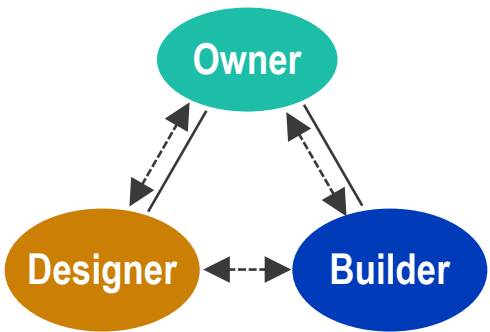
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Public-Private Partnerships

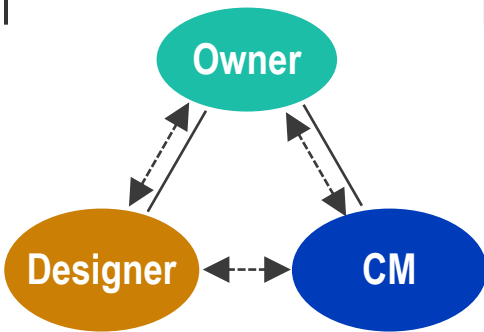
Traditional Delivery

Alternative or Collaborative Delivery

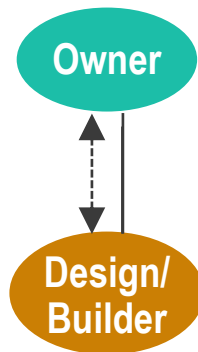
Design-Bid-Build (DBB)



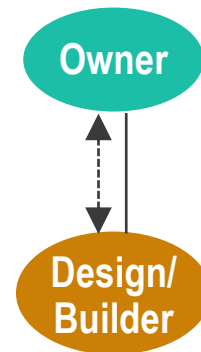
Construction Management-at-Risk (CMAR)



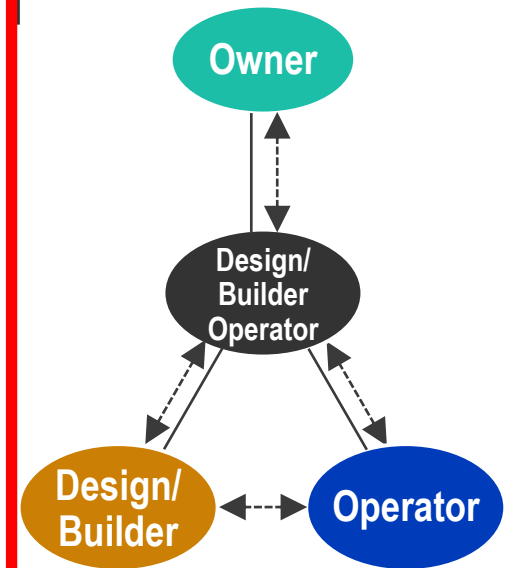
"Progressive" Design-Build (PDB)



Fixed-Price Design-Build (FPDB)



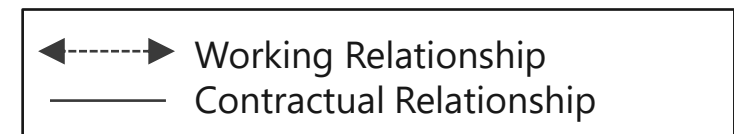
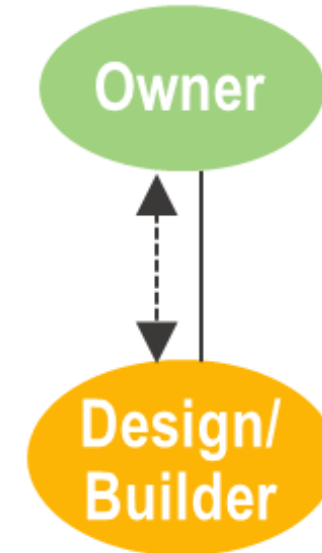
Design-Build-Operate/Finance, etc.



Fixed-Price Design-Build (FPDB)

- Overview

- Owner develops conceptual / preliminary design ahead of procurement (typically 10 – 30%)
- Design-Build Team procured on low bid or best value basis (some quals and technical approach)
- Single contract for design and construction activities (DB Team responsible for design and construction performance)
- Construction responsibilities unique in comparison to DBB



Advantages/Disadvantages: FPDB



Jason

Advantages

- Single contract to manage
- Innovation from Design-Builder allows potential cost savings
- Shortened schedule potential
- Single point of responsibility (risk assignment)

Disadvantages

- Owner does not hold design contract
- Procurement/selection of DB complicated
- Design-Builder contract price established prior to design completion
- Existing conditions and permitting uncertainty prior to DB contract

Public-Private Partnerships (DBO-M-F)



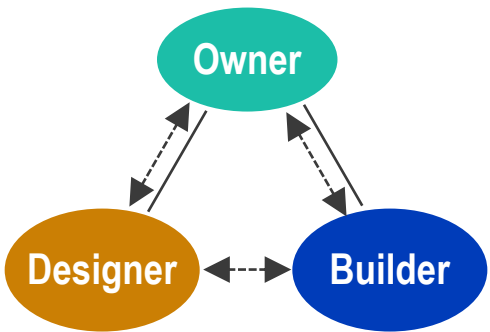
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Public-Private Partnerships

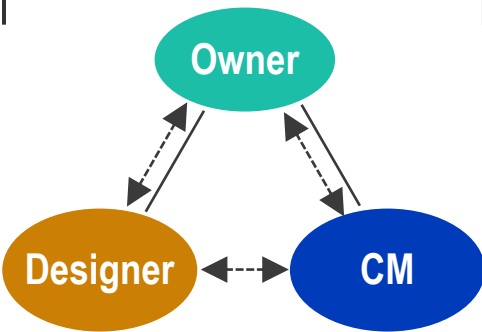
Traditional Delivery

Alternative or Collaborative Delivery

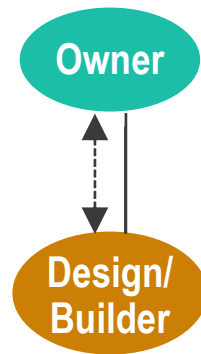
Design-Bid-Build (DBB)



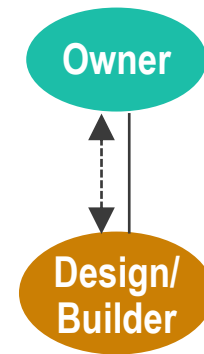
Construction Management-at-Risk (CMAR)



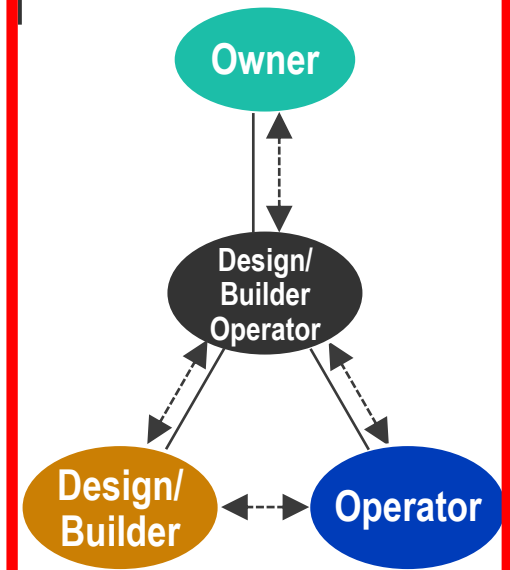
"Progressive" Design-Build (PDB)



Fixed-Price Design-Build (FPDB)



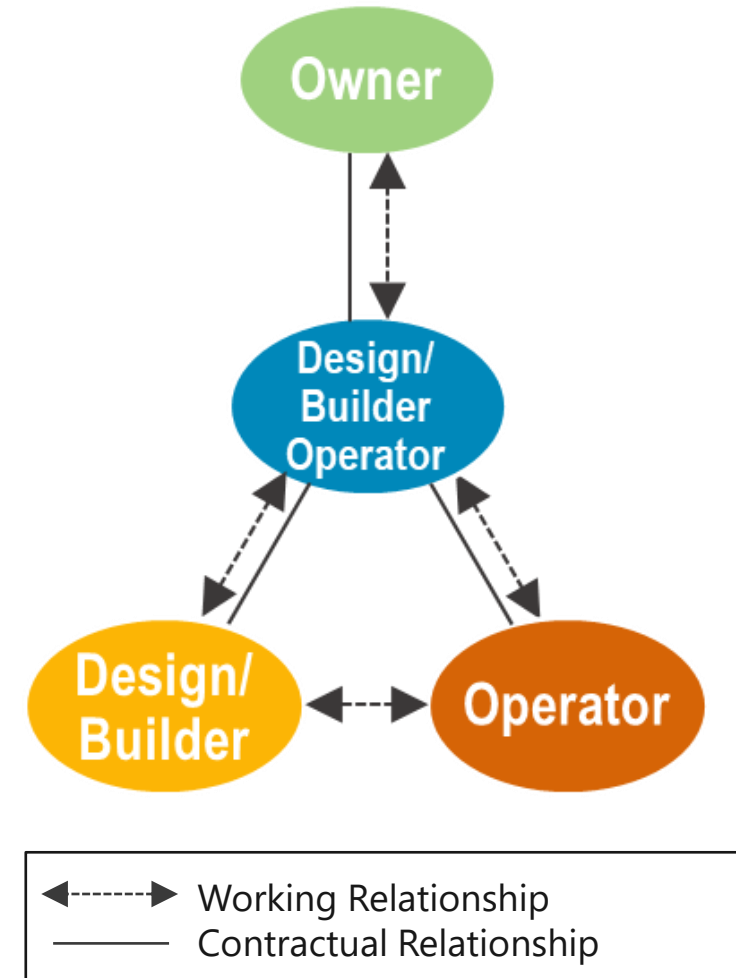
Design-Build-Operate/Finance, etc.



Design-Build-Operate (DBO-M-F)

- Overview

- Owner develops conceptual / preliminary design ahead of procurement (typically 10 – 30%)
- Contractor procured on low bid or best value basis
- Fixed price contract to complete design + construction + O&M for period of time (i.e., 20-years)
- Also, may include financing by private entity
- DBO operates and maintains project for period and then transfers assets to Owner or extends contract



Advantages/Disadvantages: DBO-M-F



Jason

Advantages	Disadvantages
<ul style="list-style-type: none">• Single contract to manage• Reduced Owner staffing• Innovation from Design-Build-Operator allows potential cost savings• Potential lower life-cycle costs (relative to DB)• Transfer of design and operational related risk• Single point of responsibility• Performance the responsibility of DBO	<ul style="list-style-type: none">• Decreased Owner control of design, construction quality, and operations• High-level of Owner contract oversight required• Complex and costly procurement and contracting process• Potential decreased competition• Potential lack of public and political support with P3 ventures

Considerations for Selecting a Delivery Method



	DBB	CMAR	PDB	FPDB
Schedule				
Selection Criteria	\$	QBS \$/QBS	QBS \$/QBS	\$\$/QBS
Design Responsibility (Owner's)	100%	100%	0%-30%	10%-34%+
Design Turnover Timing (Owner's)				
Price Certainty				
Owner Design Engagement				
Risk Transfer <small>Owner Contractor/CD Firm Design-Builder</small>				
Potential for Innovation				

- Importance of schedule certainty and acceleration
- Ability to increase contractor interest
- Degree of design input important
- Timing of price certainty
- Complexity of project warrants early contractor involvement
- Governing body's appetite for contracting that is not low bid
- Opportunity for risk transfer



Jason

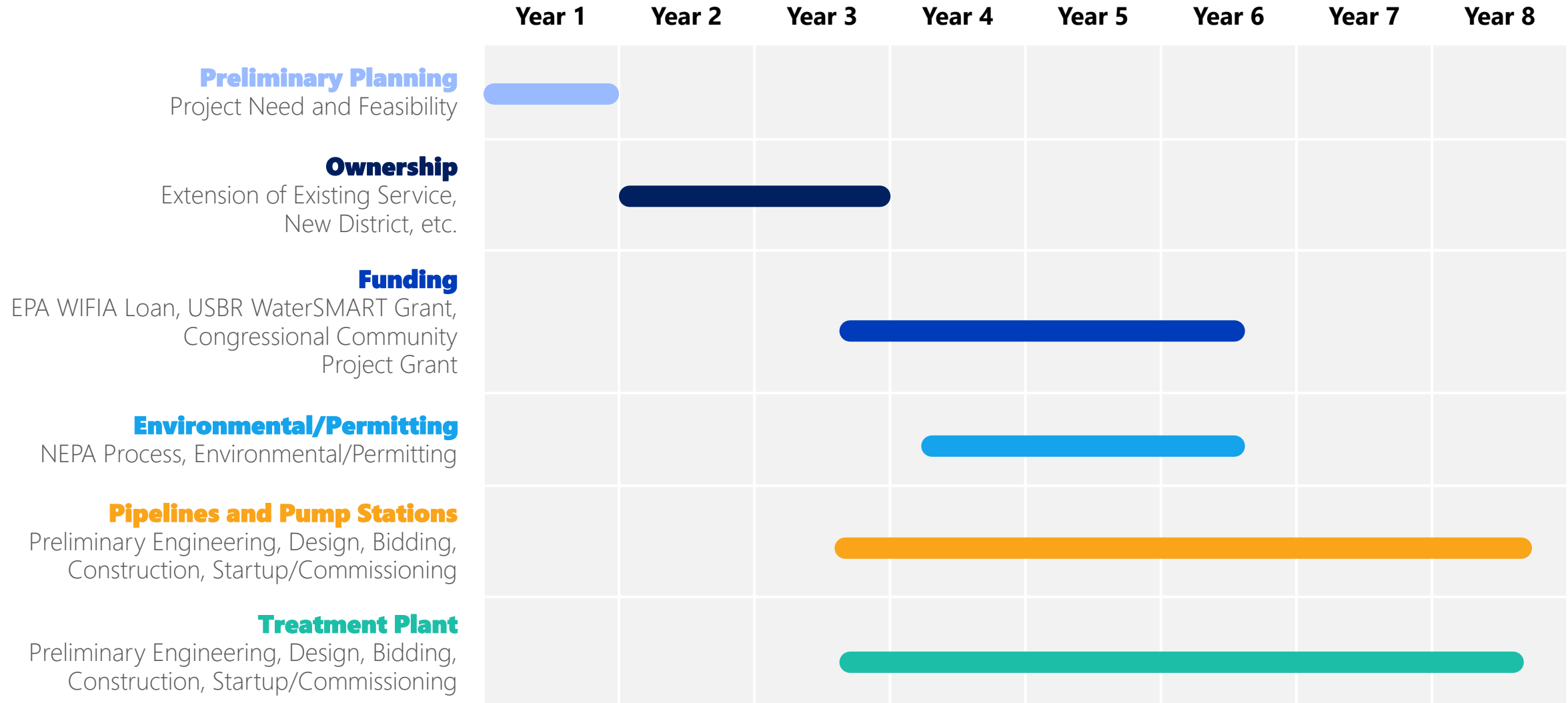
05

Implementation Schedule



Jason

Example of Typical Minimum Schedule





Jason

06

Case Study

Hi-Desert (CA) Water District's Phase 1 Wastewater Treatment and Reclamation Project (*aka septic to sewer*)

Case Study Discussion Topics

- District Overview
- Background and Project Need
- Funding and Revenue Sources
- Permitting and Implementation
- Project Delivery Method(s)
- Implementation Schedule



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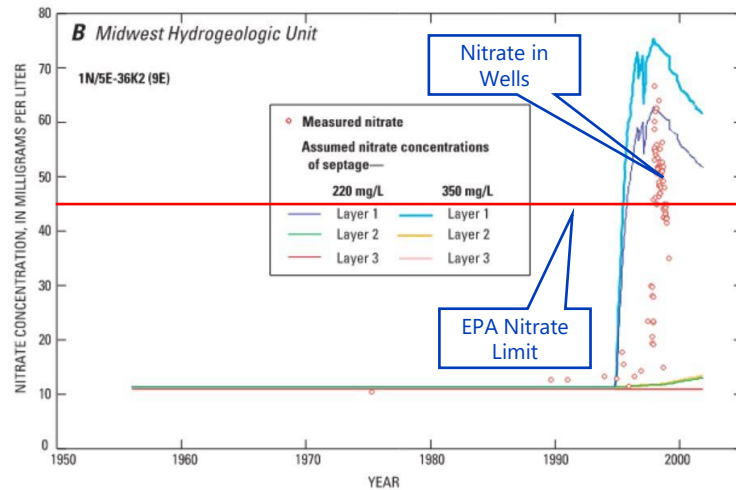
District Overview



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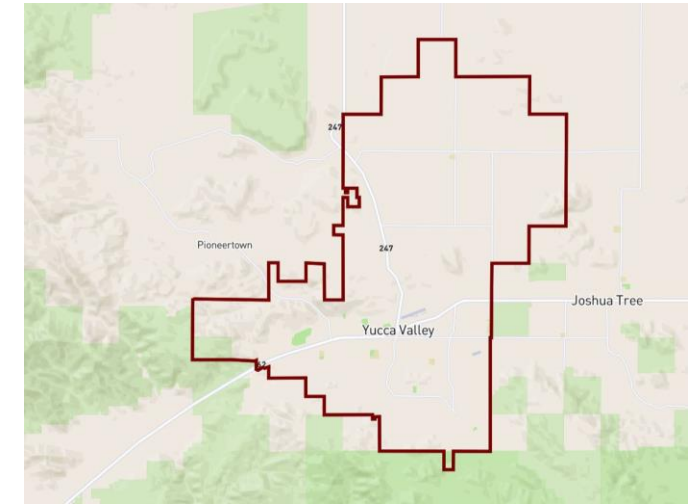


HDWD is a special district formed in 1962 to provide drinking water to the disadvantaged community of Yucca Valley, CA



Primary drinking water source: groundwater

2003 USGS study showed nitrate concentrations in groundwater wells exceeded EPA limits due to septic tank discharges



LAFCO authorized sewer as an active function of the District

All residents were on septic systems. There was no collection system or treatment plant

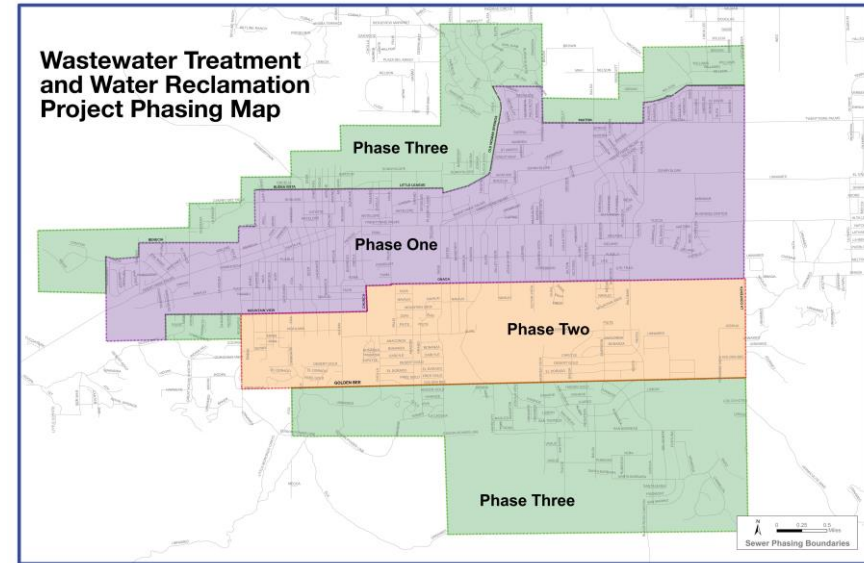
Background and Project Need

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

RESOLUTION NO. R7-2011-0004

Amending the Water Quality Control Plan for the Colorado River Basin Region to Prohibit Septic Tank Discharges in the Town of Yucca Valley, San Bernardino County

A prohibition on septic tank discharges was issued for Yucca Valley, CA in 2012



HDWD developed a phased program to eliminate septic tanks.

Phase 1 (\$152M) included:

- *New collection system (77 miles of pipe and 3 lift stations)*
- *New MBR wastewater treatment plant*
- *Groundwater recharge*

Funding and Revenue Sources

- Phase 1 Funding Sources:
 - » Earmarked Title XVI Bureau of Reclamation Grant
 - » Other small grants <5% of project cost
 - » CWSRF (Small disadvantaged communities)
 - Low interest loan (1%)
 - Grant
 - » Expanded Use Loan (through SRF)
- Revenue Sources to Funding Repayment:
 - » Assessment District (tax bill)
 - » Local sales tax increase (Measure Z)

Town of Yucca Valley's Measure Z

Assessment Billing Amount for Tax Years 2023/2024 as reduced by the Measure Z sales tax revenue

Phase 1 Property Classification	Estimated Annual Charge	Final 2023/2024 Charge (After Measure Z)
Single Family Residence (SFR)	\$706.50	\$312.64
Multi-Family Residential (MFR) per unit	\$538.11	\$238.12
Mobile Home Park (MHP) per mobile home	\$404.89	\$179.17
Mobile Home Park (MHP) Vacant Parcel	\$308.29	\$136.42
Vacant Parcel	\$545.02	\$241.18
Deferred	\$322.50	\$142.71
Commercial	Varies	Varies
Phase 2 & 3 Property Classification	Estimated Annual Charge	Final 2023/2024 Charge (After Measure Z)
SFR and Vacant Parcel	\$189.80	\$83.99
Commercial/MFR/MHP	Varies	Varies



Project Permitting and Implementation

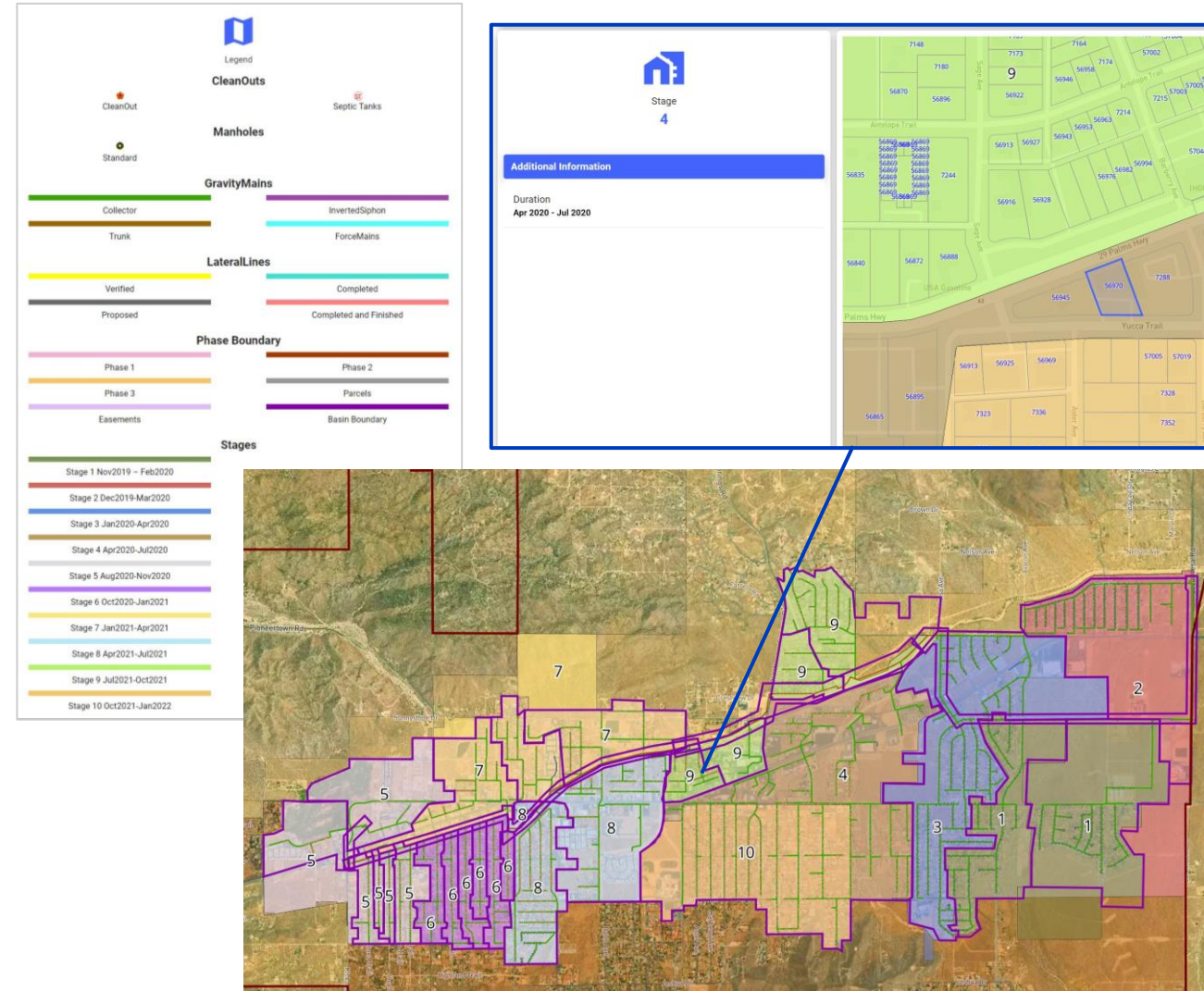
- Environmental
 - » CEQA IS/MND
- Permitting
 - » Town of Yucca Valley
 - » Caltrans
 - » San Bernardino County Flood Control District
- Prop 218 to Establish Sewer Rates
- Property Acquisition
 - » Over 400 easements
- Design & Supporting Studies
 - » Collection System Design
 - » Wastewater Reclamation Facility Design
 - » Survey
 - » Floodplain Study
- Public Outreach
- Standards Development
- Stakeholder Coordination
- Construction



Jason

Public outreach was a key element of project implementation

- Extended throughout the entire project duration
- Multiple outreach methods were used
 - » Mailers
 - » Door hangers
 - » Local radio station
 - » Community meetings
- Dedicated project website
 - » One location for all information
 - » Map providing timing and expected duration of impact for each parcel



Project delivery method



Jason



Collection System

- » Design Bid Build (DBB)

Why DBB?

- » Significant easement acquisition, and timing of acquisition was unknown
- » Significant SBCFCD coordination/permitting



Wastewater Reclamation Facility

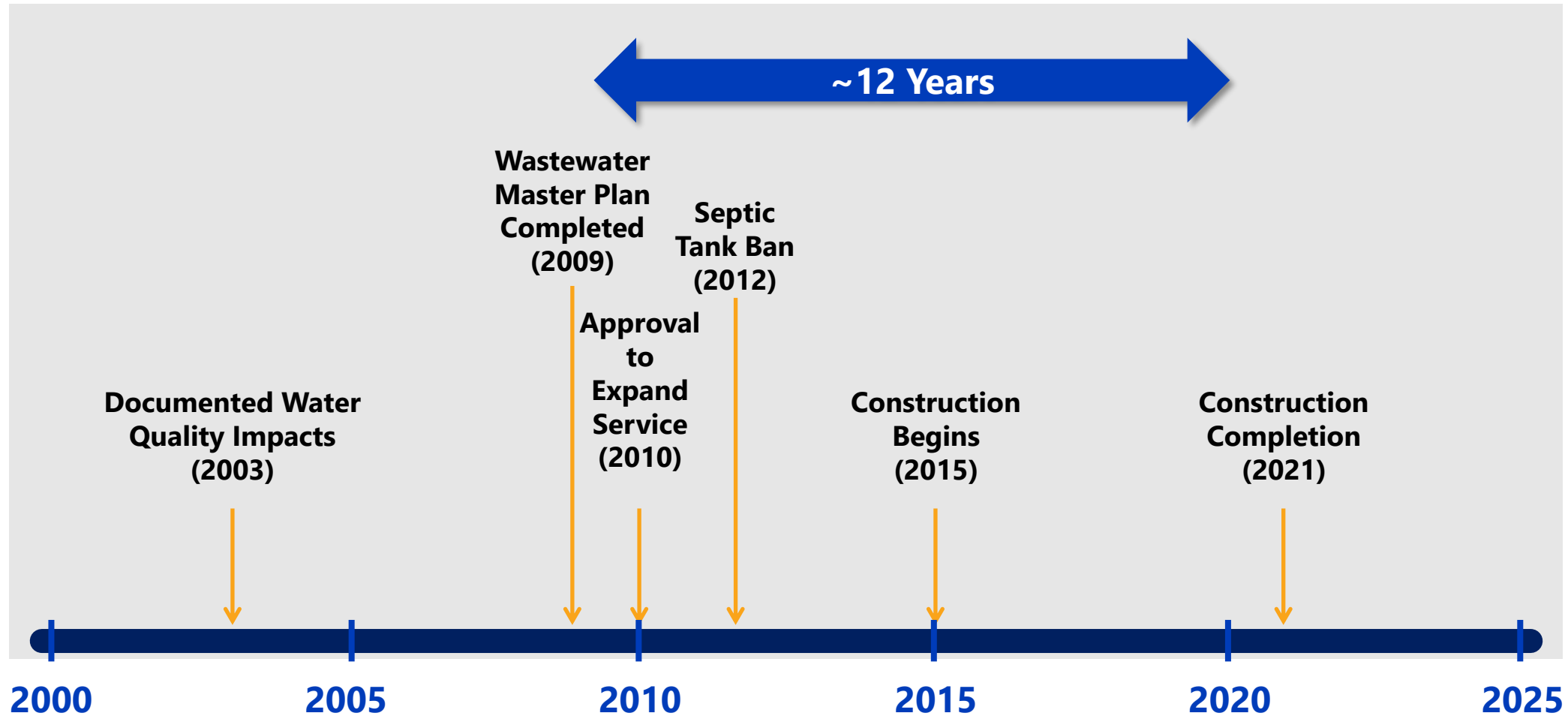
- » Progressive Design Build (PDB)

Why PDB?

- » Opportunities for innovation and cost savings
- » Opportunity for shorter project duration



Phase 1 Implementation Schedule



Recap of what was learned



Ownership



-
- Existing public agency
 - New public entity
 - Private ownership
 - Low-pressure sewers

Permitting



-
- Federal
 - State
 - Local

Funding



-
- USBR WaterSMART
 - EPA WIFIA
 - RWLF
 - USDA
 - CWSRF

Recap of what was learned (cont'd)



Project Delivery



-
- Design-Bid-Build
 - Design-Build
 - Design-Build-Operate
 - Design-Build-Operate-Finance

Schedule



-
- ~8 years minimum required

Case Study



-
- Multiple project delivery methods (DBB, DB)
 - Public outreach was critical to project success
 - 12 year implementation timeline



Cari

Mahalo!

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Cari Ishida cishida@carollo.com

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Cristen

Q&A and Discussion