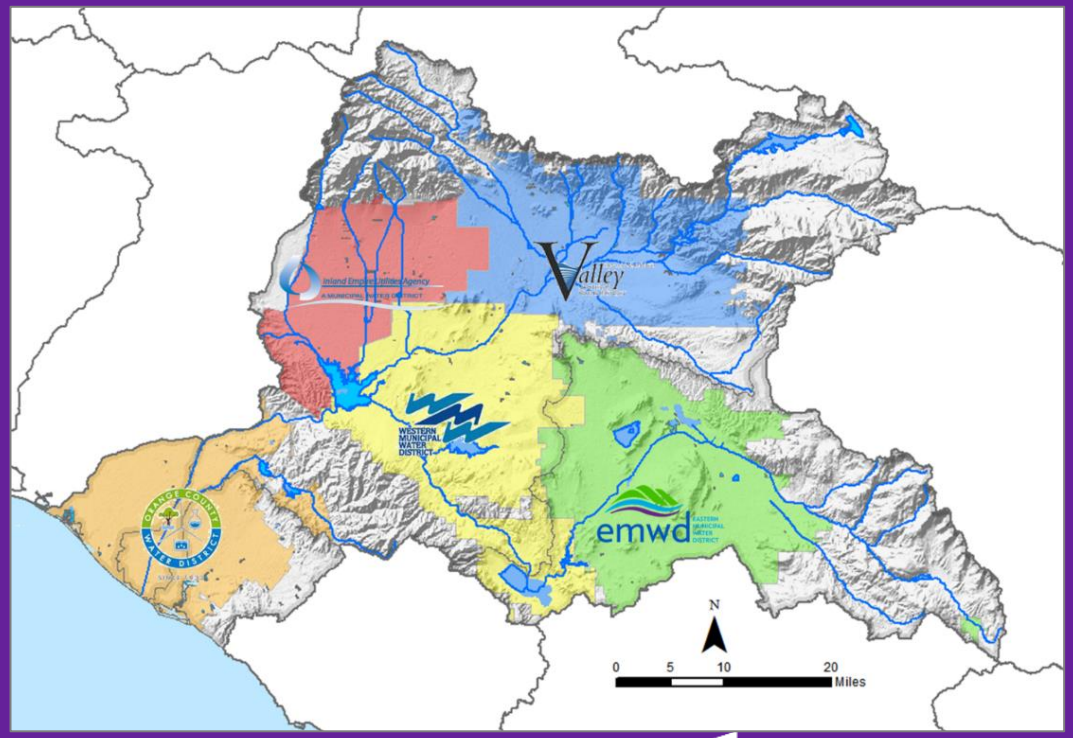
# SARCCUP Optimization Using the Decision-Support Model




**DSM Scenarios and Findings**

**PA 23 Meeting**

**December 5, 2017**

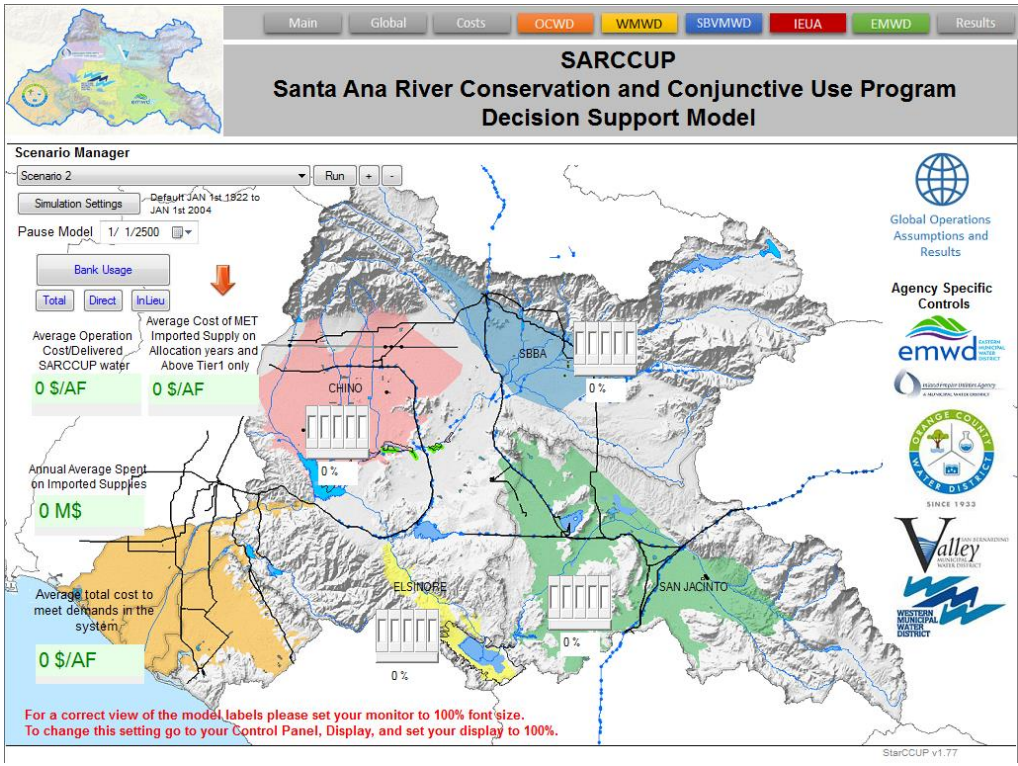
ch2m SM

# Presentation Outline

- DSM Scenarios
- Summary Results
- Decision Process and Dependencies
- Recommendations
- Next Steps

# DSM Model Overview

- Maximize the storage of wet year SWP water to produce “dry year yield”
- Simulate operations
- Identify any constraints
- Optimize operations and quantify the benefits and costs
- Determine ultimate size of the bank



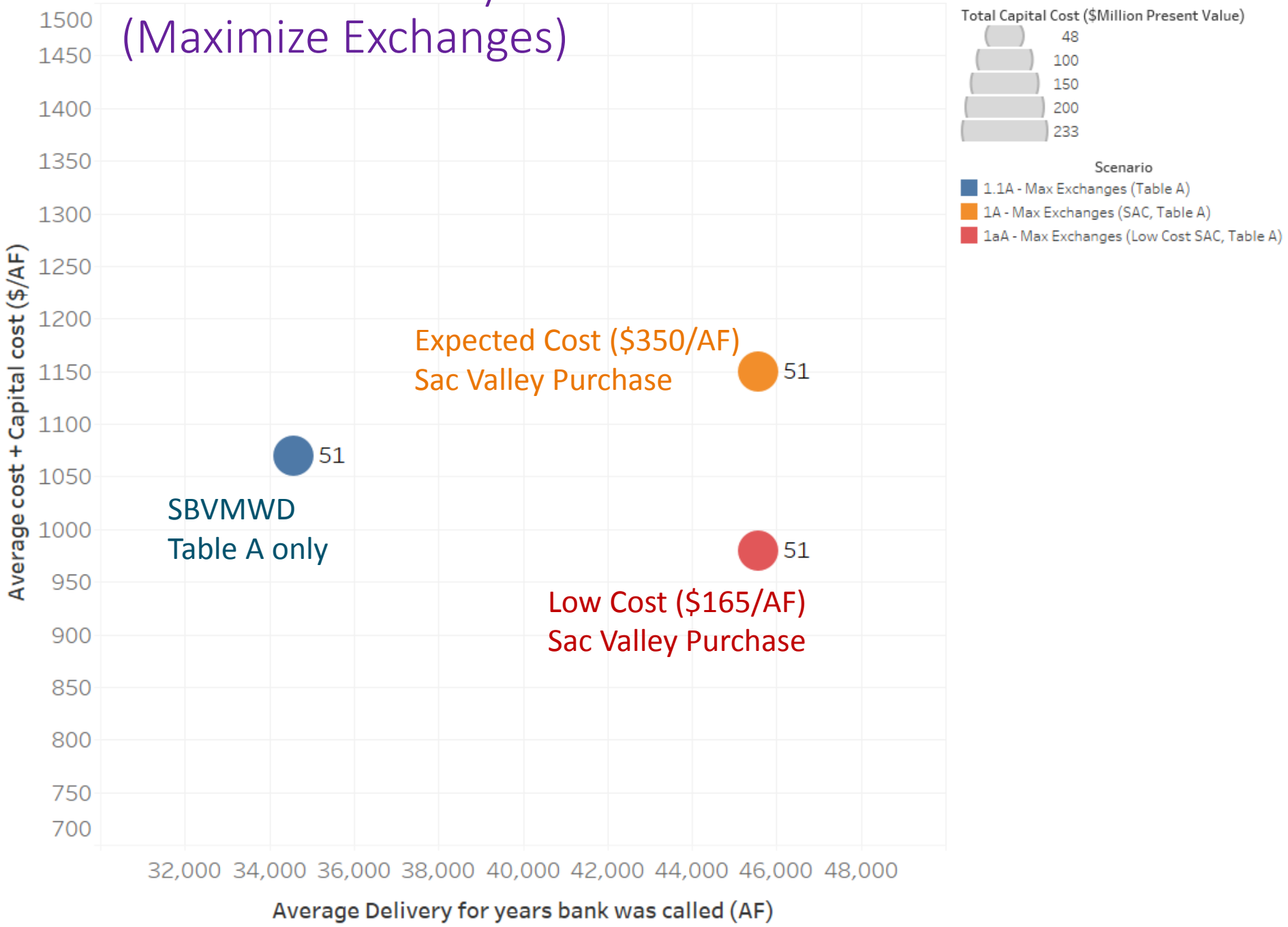
# DSM Scenarios Evaluated

- Scenario 1 – Maximize Exchanges (Baseline)
  - Production wells and treatment in Chino/IEUA
  - San Jacinto Recharge Project
  - La Sierra pipeline
- Scenario 2 – New Facilities to Deliver Non-MWD Supplies (Sac Valley purchases)
  - Baseline Feeder Extension, SBBA production wells
  - RPU facilities, SBBA production wells
  - Riverside-Corona Feeder, Cannon Campbell pipeline, SBBA production wells
- Scenario 3 – Chino Basin Bank Resizing
  - Reduce Chino Bank to 48,000 AF and 0 AF
  - Add storage at OCWD (36,000 AF) and WMWD (10,500 AF)
- Scenario 4 – Local Conveyance with Reduced Chino Bank
  - Baseline Feeder Extension and RPU + Cannon Campbell
  - Reduced Chino Bank size and OCWD/WMWD bank storage

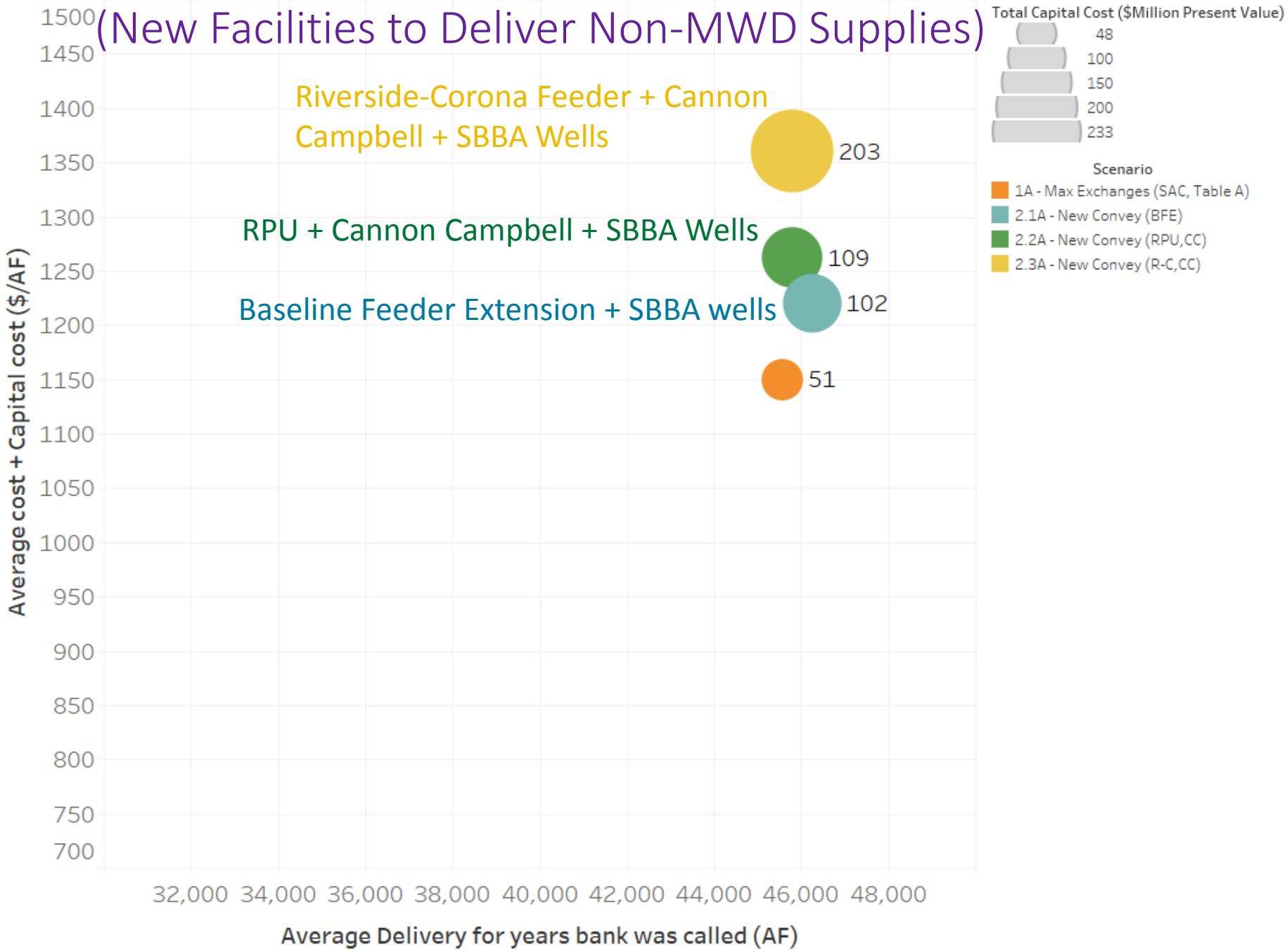
# Information/Modeling Updates

- Cost Assumptions
  - Reviewed and refined substantially
- Model Enhancements
  - Capacity limits, cost approach, available supply refinements
- Chino Basin losses
  - Refined estimate of one time, five percent loss for Chino Basin
  - Losses are now consistent with all other basins
- Baseline Feeder Extension costs and limits
  - Grant application costs were found appropriate
  - Five SBBA extraction wells
  - BFE constrained by quantity of treated water demand
- OCWD infrastructure needs

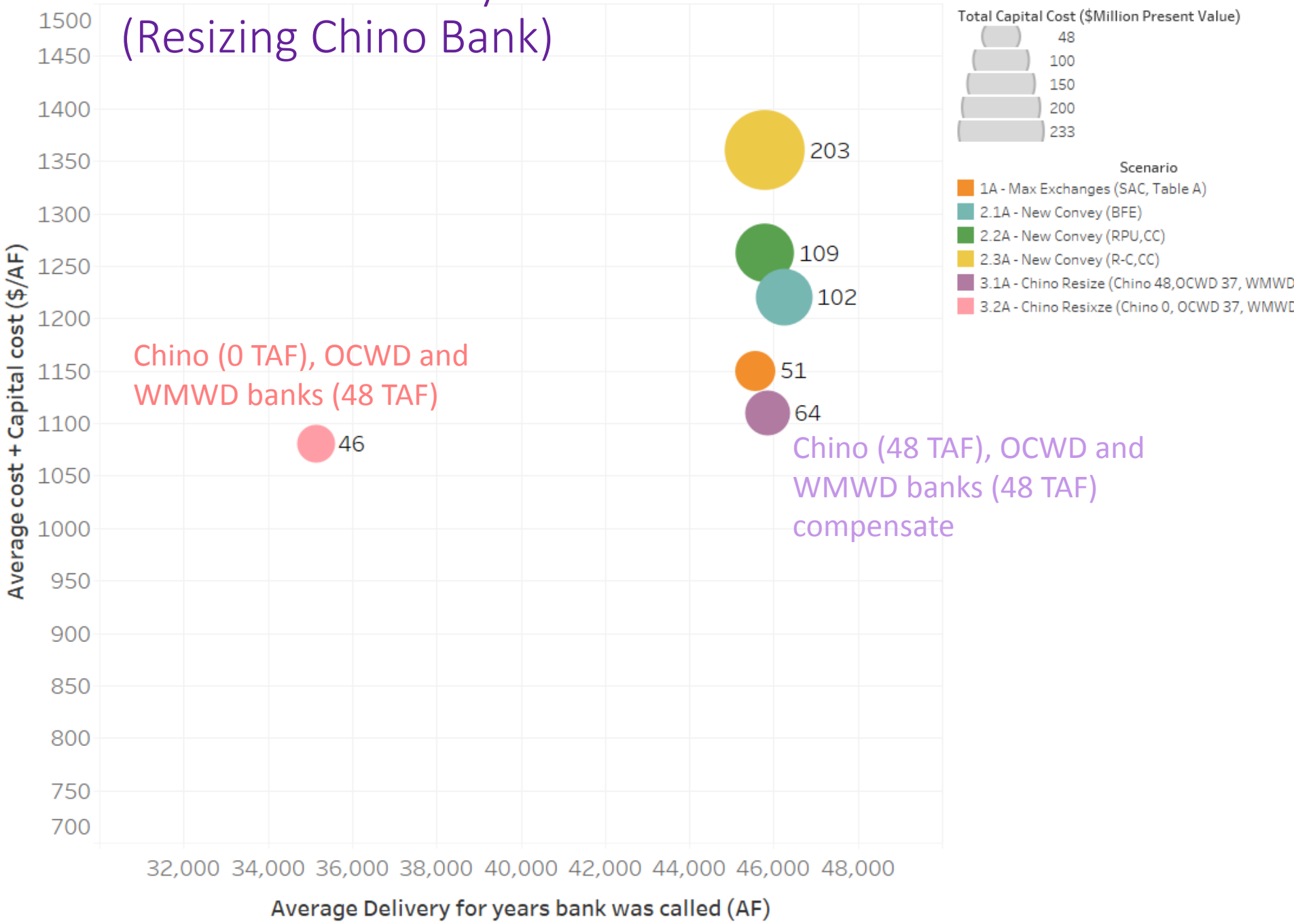
# Scenario Summary Results – Scenario 1 (Maximize Exchanges)



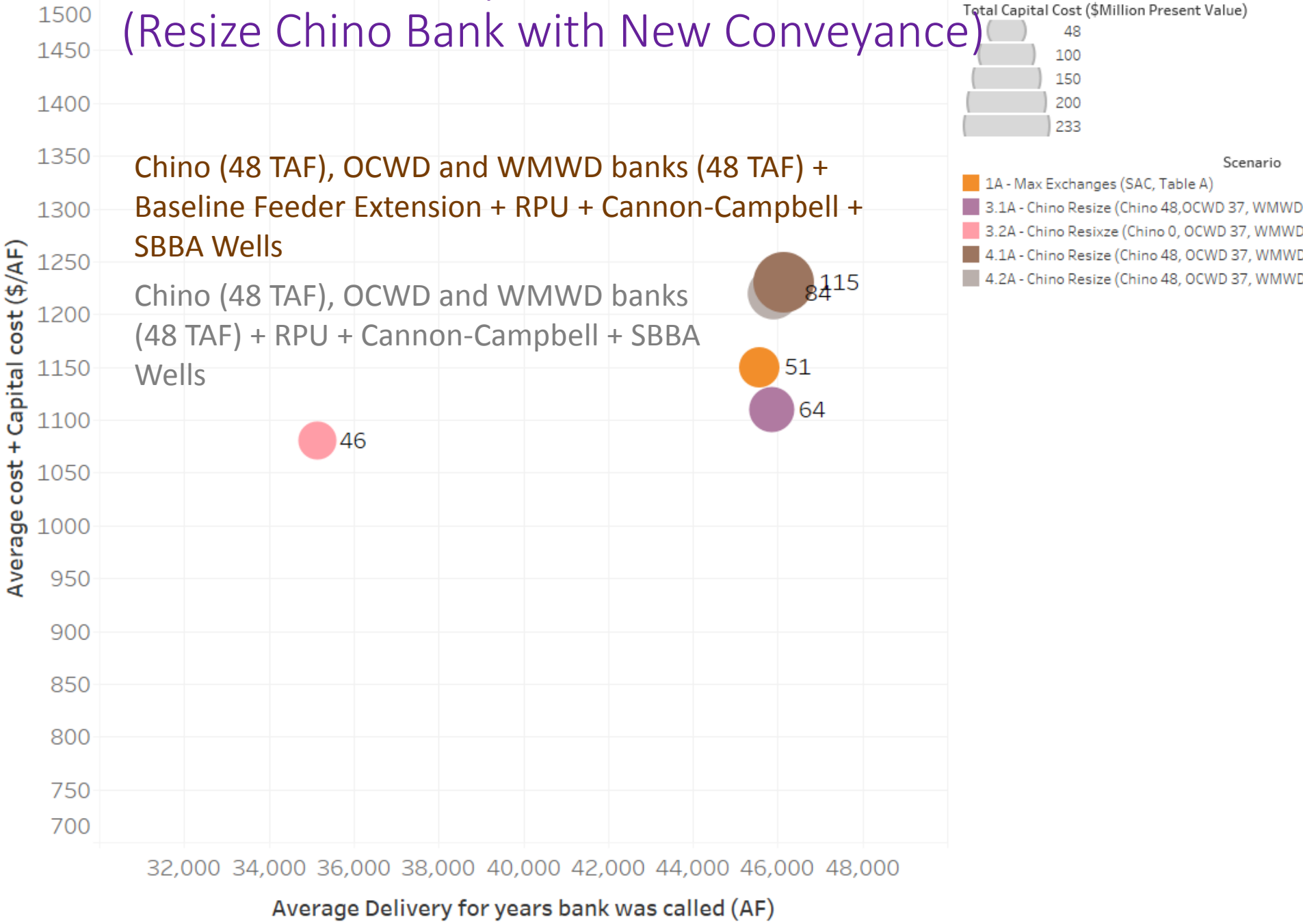
# Scenario Summary Results – Scenario 2 (New Facilities to Deliver Non-MWD Supplies)



# Scenario Summary Results – Scenario 3 (Resizing Chino Bank)



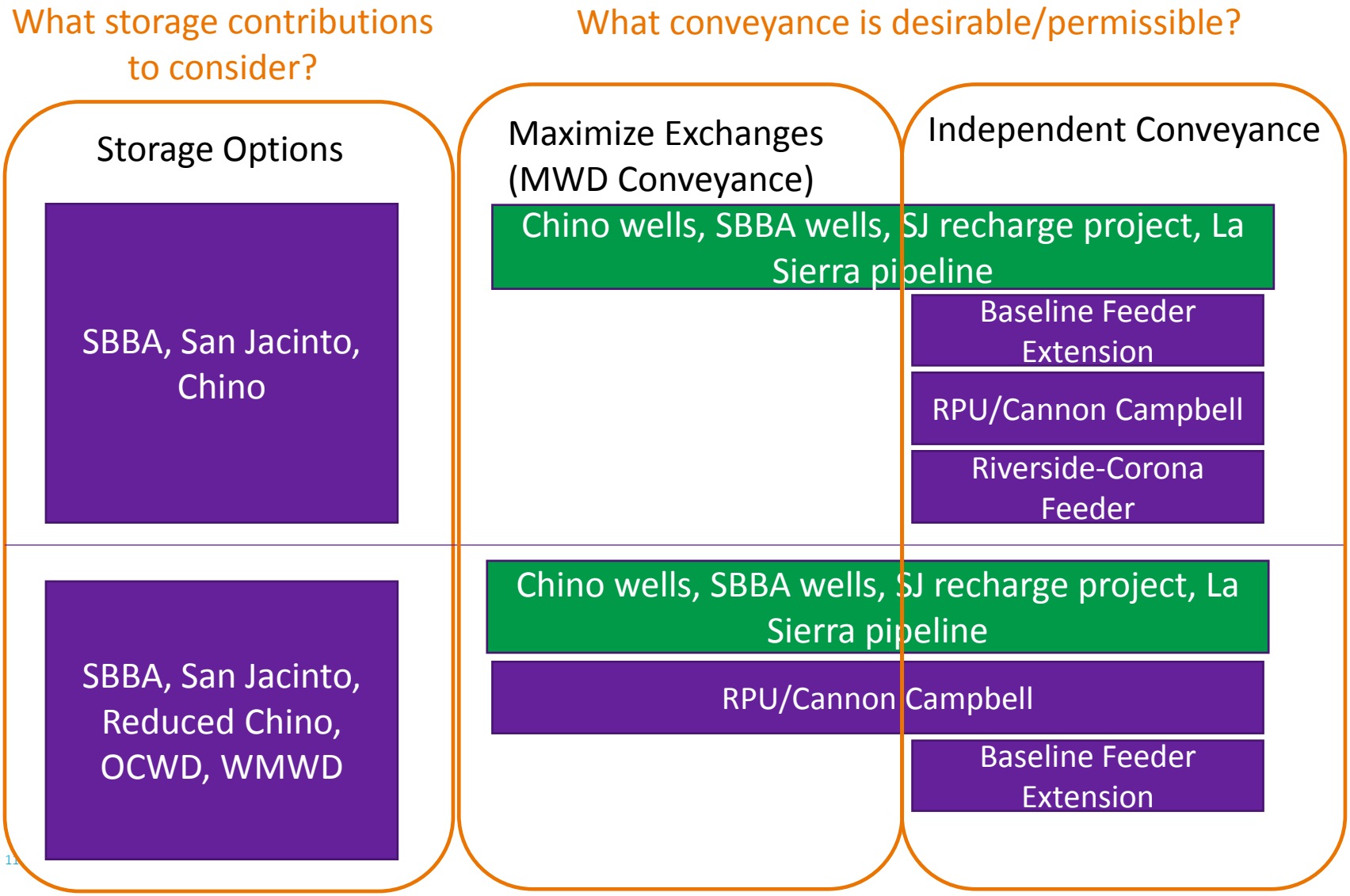
# Scenario Summary Results – Scenario 4 (Resize Chino Bank with New Conveyance)



# Summary of Modeling Results

| Scenario | Dry Year Yield (AF/Yr) | Unit Cost ($/AF, includes capital cost recovery) | Capital Cost Recovery ($/AF) | Capital Cost ($M) |
|---|---|---|---|---|
| **1A – Maximize Exchanges** | **45,600** | **$1,150** | **$62** | **$51** |
| 2.1A – New Conveyance (Baseline Feeder Extension) | 46,300 | $1,220 | $123 | $102 |
| 2.2A – New Conveyance (RPU + Cannon Campbell) | 45,800 | $1,220 | $87 | $72 |
| 2.3A – New Conveyance (Riverside-Corona Feeder + Cannon Campbell) | 45,800 | $1,360 | $247 | $203 |
| **3.1A Chino Resize (Chino 48 TAF, OCWD 37 TAF, WMWD 10.5 TAF)** | **45,900** | **$1,110** | **$78** | **$64** |
| 3.2A Chino Resize (Chino 0 TAF, OCWD 37 TAF, WMWD 10.5 TAF) | 35,100 | $1,080 | $73 | $46 |
| 4.1A Chino Resize (Chino 48 TAF, OCWD 37 TAF, WMWD 10.5 TAF) + BFE + RPU + Cannon Campbell | 46,100 | $1,230 | $139 | $115 |
| **4.2A Chino Resize (Chino 48 TAF, OCWD 37 TAF, WMWD 10.5 TAF) + RPU + Cannon Campbell** | **45,900** | **$1,220** | **$102** | **$84** |

# Decision Process and Dependencies



# MWD Policy Uncertainties

## 1. Storage of MWD member agency water in SBV Bank - outside of MWD Service Area

- MWD can only bill for water when it crosses the meter into their system. Consistent with MWD policies, MWD will not allow MWD member agencies to purchase then store water outside their service area to bring it back in at a later date
  - OPTION 1: Valley stores its own water, for benefit of SARCCUP (energy cost paid by SARCCUP agencies at the time its stored?); when MWD moves the water into its system via in-lieu SWP delivery of Valley's water, MWD pays the $100/AF to Valley that includes energy cost, and MWD member agencies pay Full Service Rate to MWD at time of delivery, and get reimbursed energy cost by Valley. SARCCUP agencies cannot exceed 50% of total available SBV water for purchase, counts as Extraordinary Supply. This option is preferred by MWD.
  - OPTION 2: MWD purchases/obtains physical storage in Valley's bank; MWD buys 100% of the water & stores it (water is *all* MWD-agency water); SARCCUP agencies can purchase up to 50% of the water in the future, when in allocation as it counts as Extraordinary Supply water, at the full rate in effect at the time of 'take'. MWD staff not sure if this option would fly with mgt.

# MWD Policy Uncertainties – cont'd

**2. Once MWD member agencies have purchased Valley Surplus SWP water and stored in their banks (i.e., within MWD service area), is there a cost associated with in-lieu deliveries provided via MWD at the time of "take"?**

- Yes, it's different water. Let's say Valley surplus water is purchased by Western and stored in IEUA's bank for future use. Western then calls for the water:
  - i. IEUA pumps it and uses it locally and foregoes their MWD delivery of the same volume
  - ii. Western then asks MWD to deliver that in-kind amount to them *in addition* to their normal MWD deliveries
  - iii. Western pays for that additional increment of MWD water at the current MWD rate at the time of delivery, and that additional water may be counted as Extraordinary Supply

# MWD Policy Uncertainties – cont'd

3. **Does MWD allow for wheeling of non-Table A water (i.e. SAC Valley/transfer water) through Valley's system for delivery directly to MWD member agency?**

- This question was not resolved by staff; MWD needs legal input

- MWD did state that any scenario cannot compete with MWD's purchase of water or harm MWD in any way

    - For example, demands on MWD are diminished by another agency providing supply to meet a MWD member agency demand

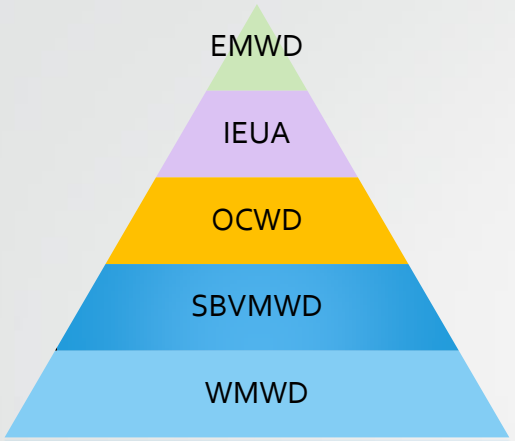
# Recommendations

- Determine storage contributions first
  - SBBA, Chino, San Jacinto, OCWD, WMWD Basins
  - **Recommendation: SBBA (64 TAF), Chino (50 TAF), San Jacinto (19.5 TAF), OCWD (36 TAF), WMWD (10.5 TAF)**
- Resolve MWD policy issues to determine whether independent conveyance is desired/useful for SARCCUP
- Match conveyance facilities with storage and MWD policy findings
  - e.g. Riverside Public Utilities pipeline and Cannon Campbell pump station required if Riverside bank is included,
  - e.g. No independent conveyance would be recommended if MWD policy does not color water to SARCCUP agencies on “put”
  - **Recommendation: Chino/IEUA South Zone production wells, San Jacinto Recharge Project, La Sierra pipeline, Riverside Public Utilities pipeline, Cannon Campbell pump station**

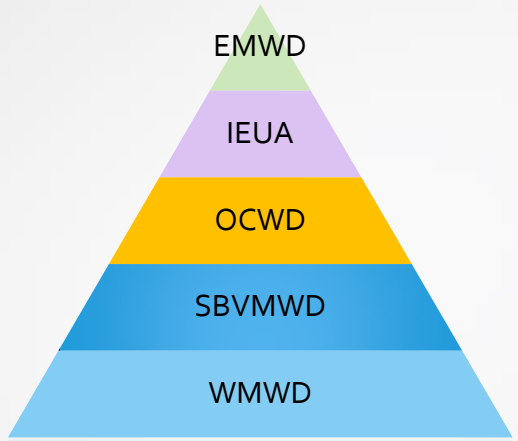
# A Proposal for the Sharing of SARCCUP Local Match Costs

PA 23 Committee
December 5, 2017
(Draft)

# Initial Grant Concept

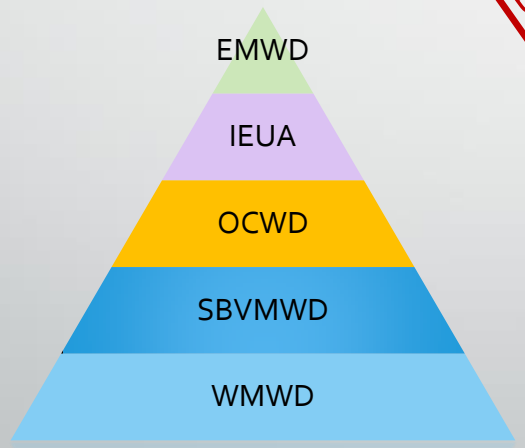



Chino Basin

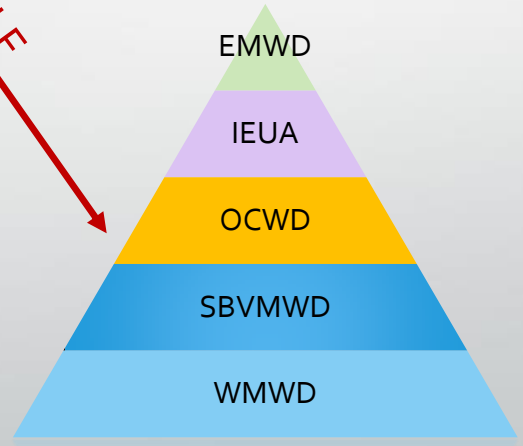



San Jacinto Basin

BLF



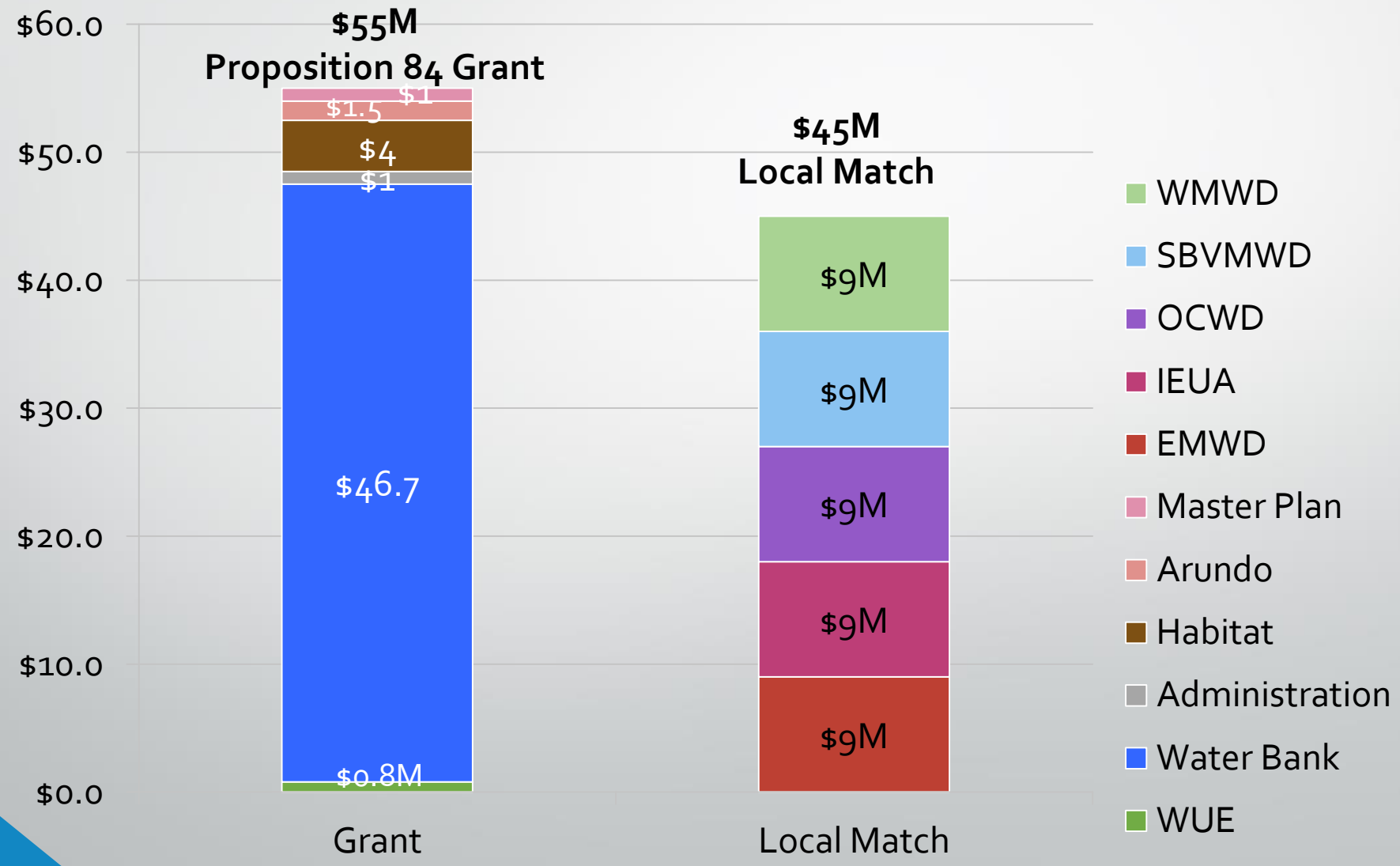

Elsinore Basin



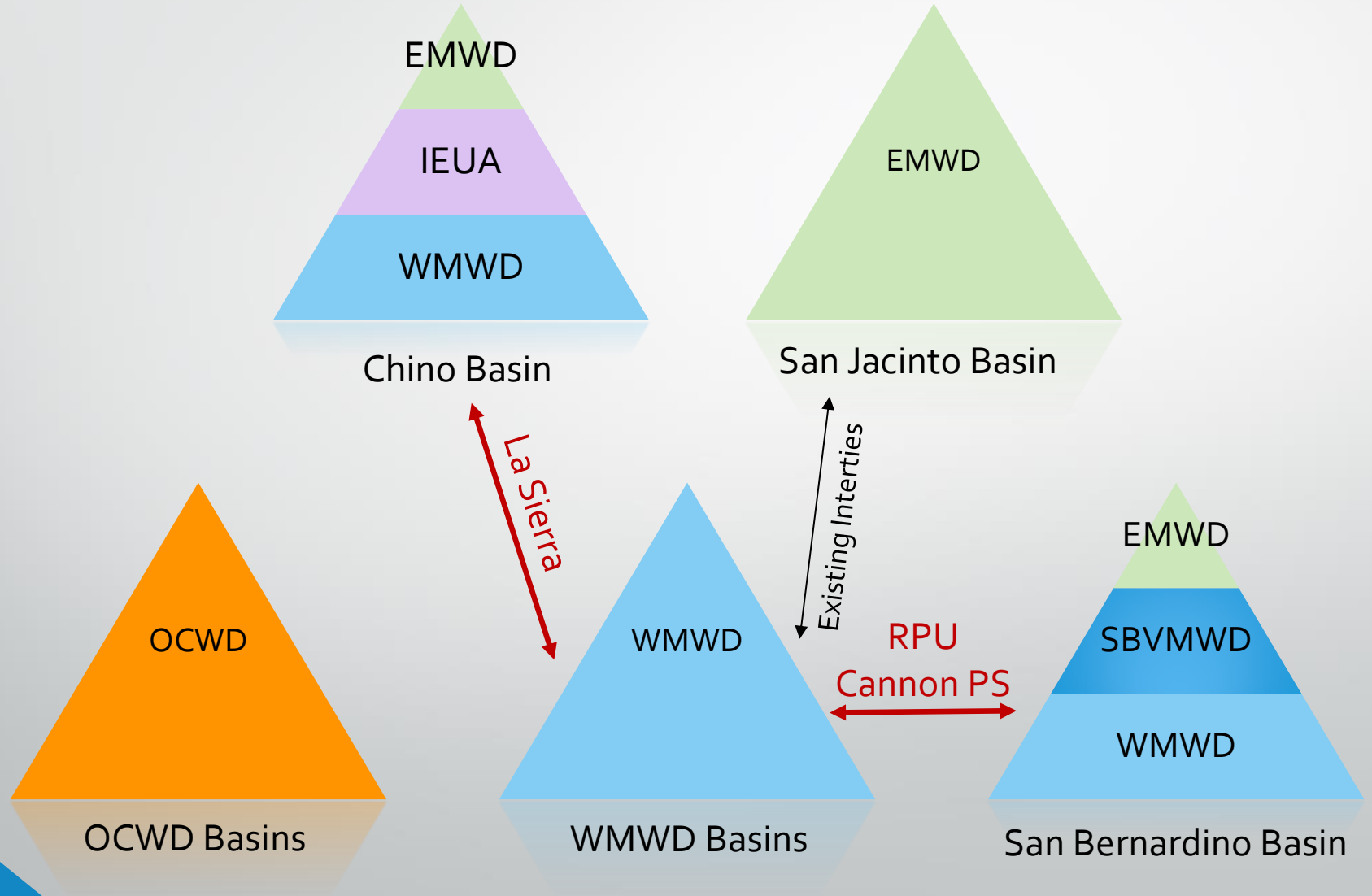

San Bernardino Basin

# Initial Cost Sharing Arrangement

## Total SARCCUP Project Cost = $100 million



# DSM Results: Scenario 3.1A (Recommendation)



# SARCCUP
## Local Match Cost Sharing Refinement

| | PM/WUE/MP-DSM | Arundo Removal | Habitat Restoration | Water Bank Infrastructure* |
|---|---|---|---|---|
| EMWD | ✓ | | | ✓ |
| IEUA | ✓ | | | ✓ |
| OCWD | ✓ | ✓ | | |
| SBVMWD | ✓ | | ✓ | |
| WMWD | ✓ | | | ✓ |

* Water bank infrastructure benefits are based on the capital projects in scenario 3.1A

# SARCCUP Scenario 3.1A
# Capital Program Cost Sharing Recommendation

| | PM/WUE/ MP-DSM | Arundo Removal | Habitat Restoration | Water Bank Infrastructure | Total Cost Share |
|---|---|---|---|---|---|
| EMWD | $636,649 | $0 | $0 | $6,923,133 | $7,559,782 |
| IEUA | $636,649 | $0 | $0 | $6,923,133 | $7,559,782 |
| OCWD | $636,649 | $2,488,053 | $0 | $0 | 3,124,702 |
| SBVMWD | $636,649 | $0 | $5,034,282 | $0 | $5,670,931 |
| WMWD | $636,649 | $0 | $0 | $6,923,133 | $7,559,782 |
| **TOTAL** | **$3,183,245** | **$2,488,053** | **$5,034,282** | **$20,769,399** | [(a)]**$31,474,979** |

(a) Locally funded cost share is 37.1% of project cost (total project = $84,849,560).

# SARCCUP Operational Examples

November 28, 2017

# SARRCUP Operational Examples

- Developed to demonstrate different SARCCUP Bank operating scenarios in line with Metropolitan Water District (MWD) policies
  1. San Bernardino Valley Water District Surplus State Water Project Water
     - Direct Delivery using SARCCUP facilities
     - In-Lieu Exchange using MWD facilities
  2. Non-State Water Project Transfer Water
     - Wheeled through MWD facilities
     - Wheeled through Valley facilities (+ SARCCUP facilities)
- Take-aways, under all scenarios:
  - SARCCUP Agencies and MWD made whole
  - SARCCUP Banks operating in line with MWD Policies
  - SARCCUP MWD member agencies receive Extraordinary Supply credit

# SARRCUP Operational Examples (cont'd)

1. San Bernardino Valley Water District Surplus State Water Project Water

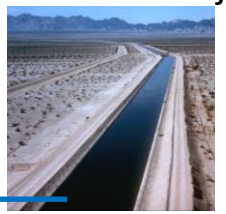
    - Direct Delivery using SARCCUP Facilities - Example A

# Example A – Put: WMWD purchases available Valley Surplus SWP Water for storage in Chino Basin

MWD Member Agencies

1,000 AF

State Water Project



IEUA

1,000 AF

2,000 AF

Valley Surplus

1,000 AF Recharged

Chino Basin

IEUA Banks 1,000 AF In Chino Basin For WMWD

Valley

SBBA

OCWD

WMWD

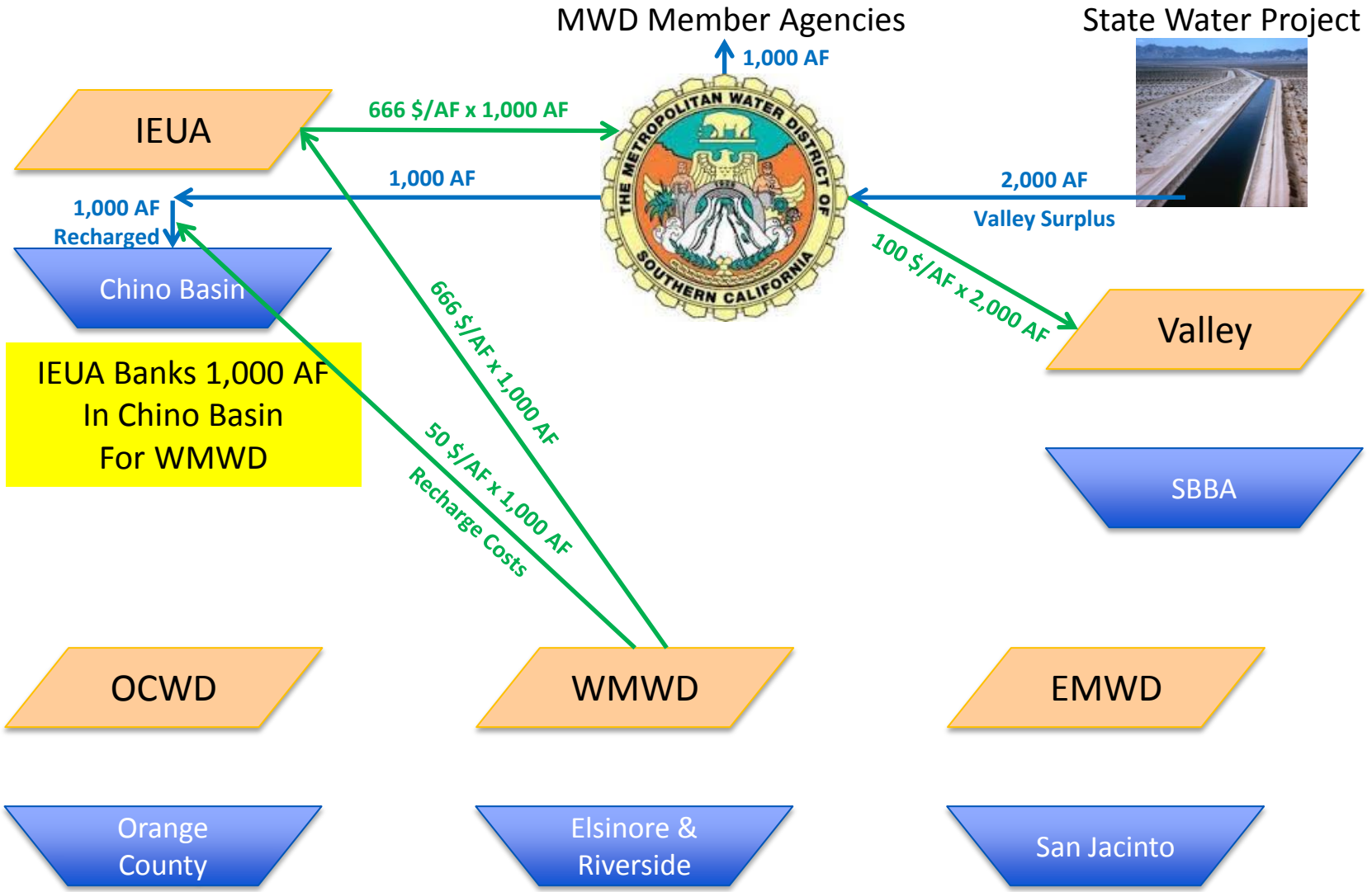
EMWD

Orange County

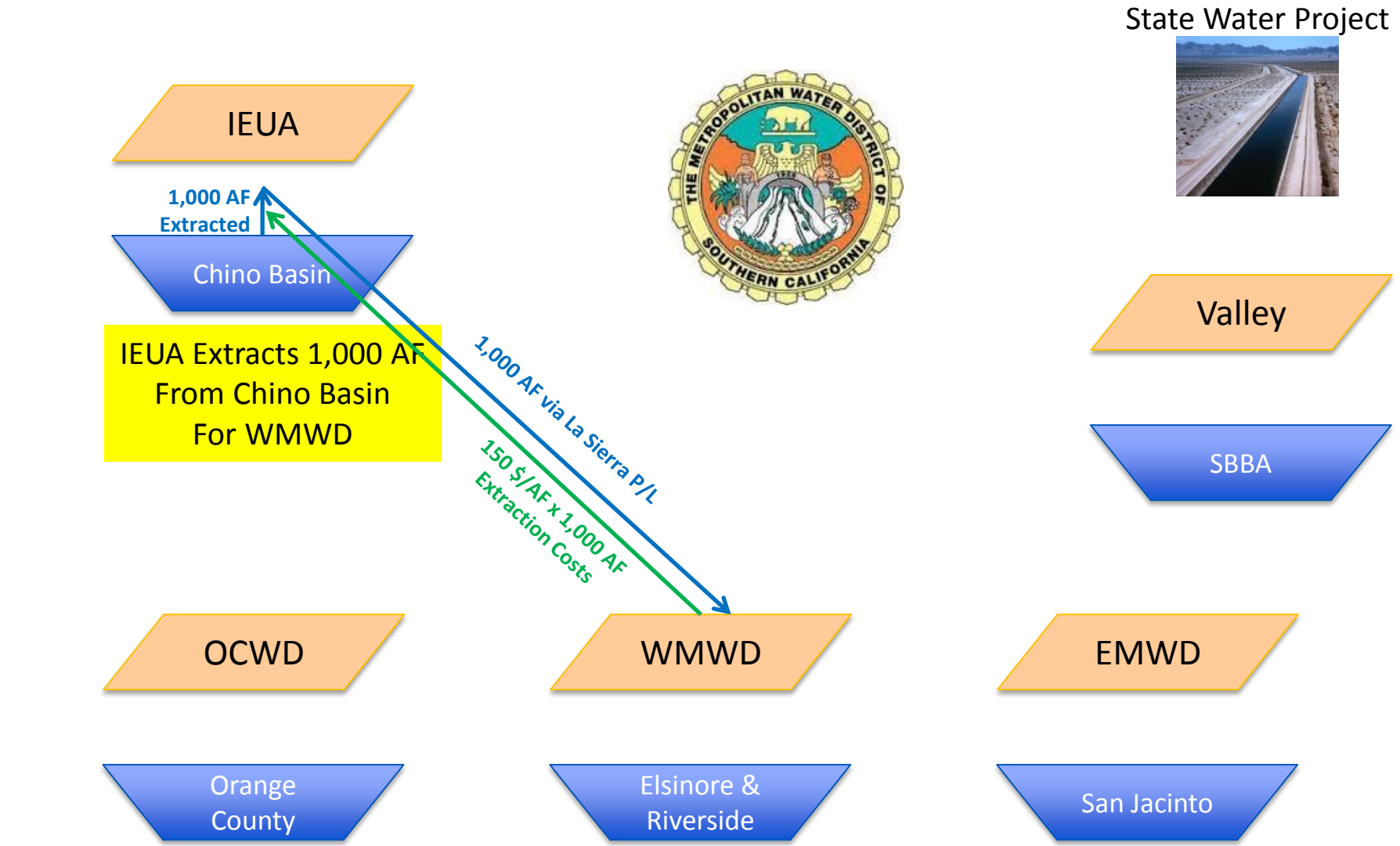
Elsinore & Riverside

San Jacinto

# Example A – Put$: WMWD purchases available Valley Surplus SWP Water for storage in Chino Basin



# Example A – Take$: WMWD calls on its banked supply from Chino Basin – Delivery via Direct Delivery

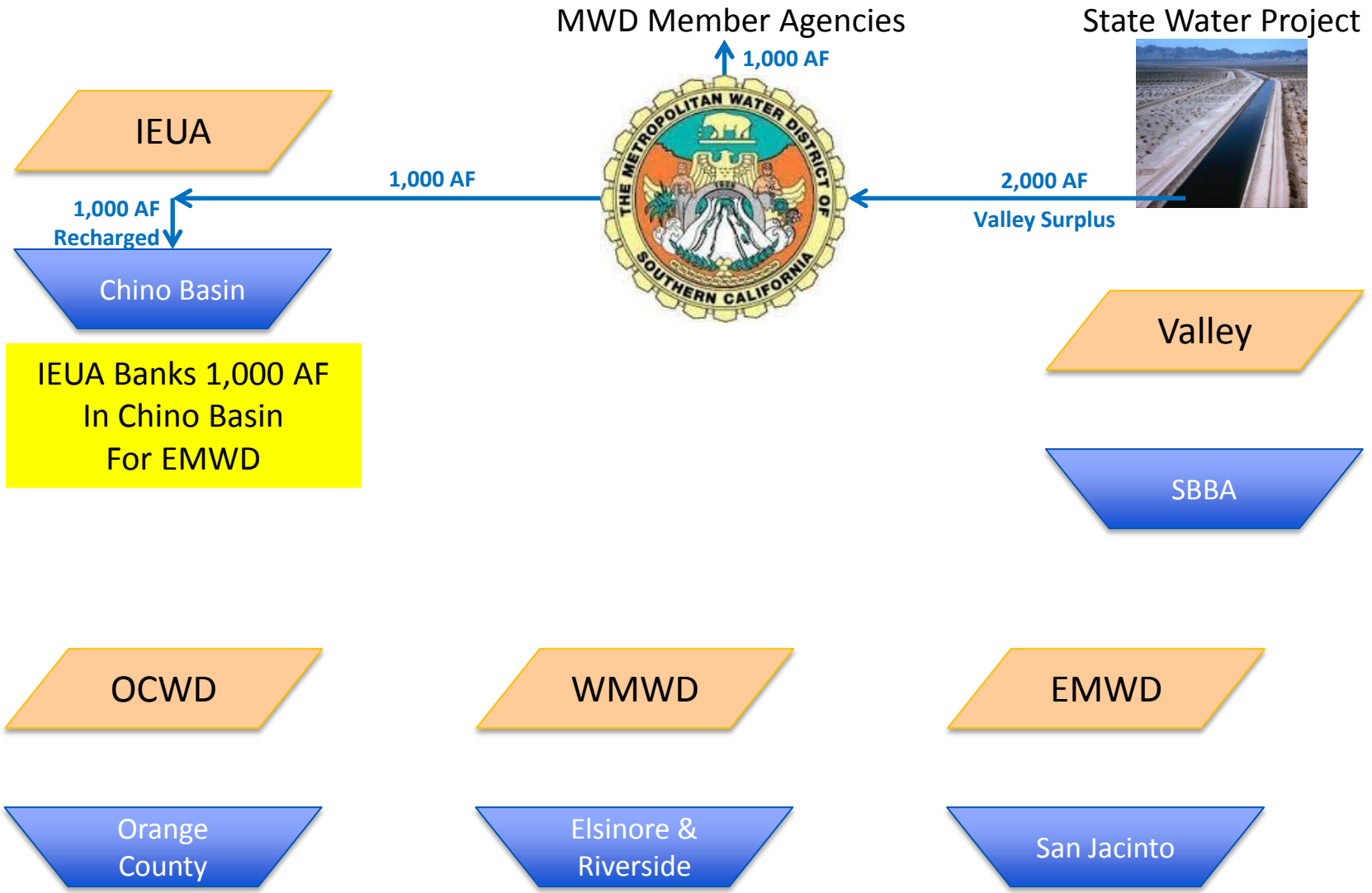


# SARRCUP Operational Examples (cont'd)

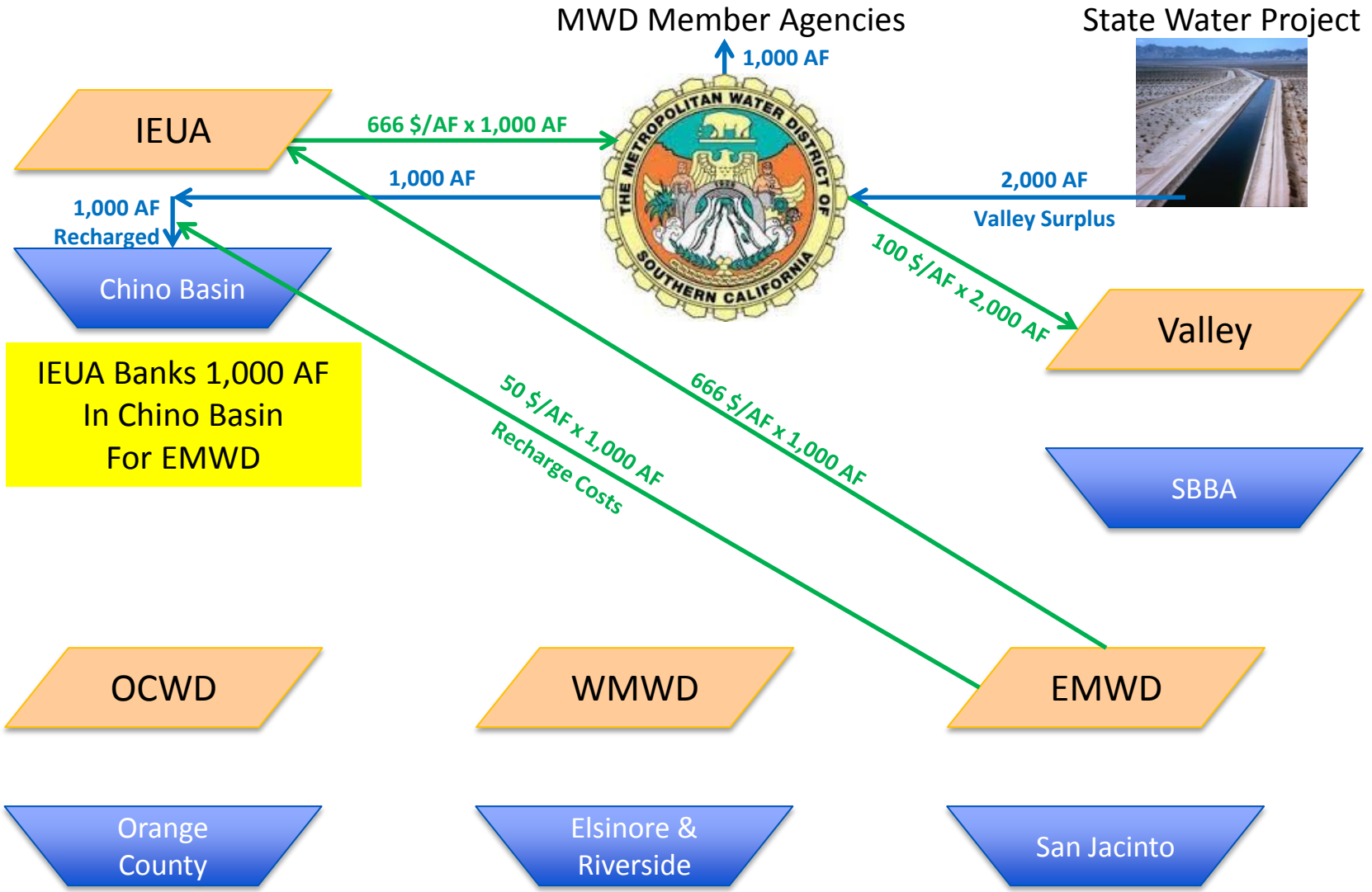
1. San Bernardino Valley Water District Surplus State Water Project Water

   - Direct Delivery using SARCCUP Facilities - Example A
   - In-Lieu Exchange using MWD facilities – Example B

# Example B – Put: EMWD purchases available Valley Surplus SWP Water for storage in Chino Basin



# Example B – Put$: EMWD purchases available Valley Surplus SWP Water for storage in Chino Basin



# Example B – Take: EMWD calls on its banked supply from Chino Basin – Delivery via In Lieu

State Water Project

IEUA

1,000 AF Extracted

Chino Basin

Normal Delivery Less 1,000 AF

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

1,000 AF (Extraordinary Supply) Normal Delivery Plus

Valley

SBBA

IEUA Extracts and uses locally 1,000 AF of EMWD Banked Water In Lieu of a MWD Delivery

OCWD

WMWD

EMWD

Orange County

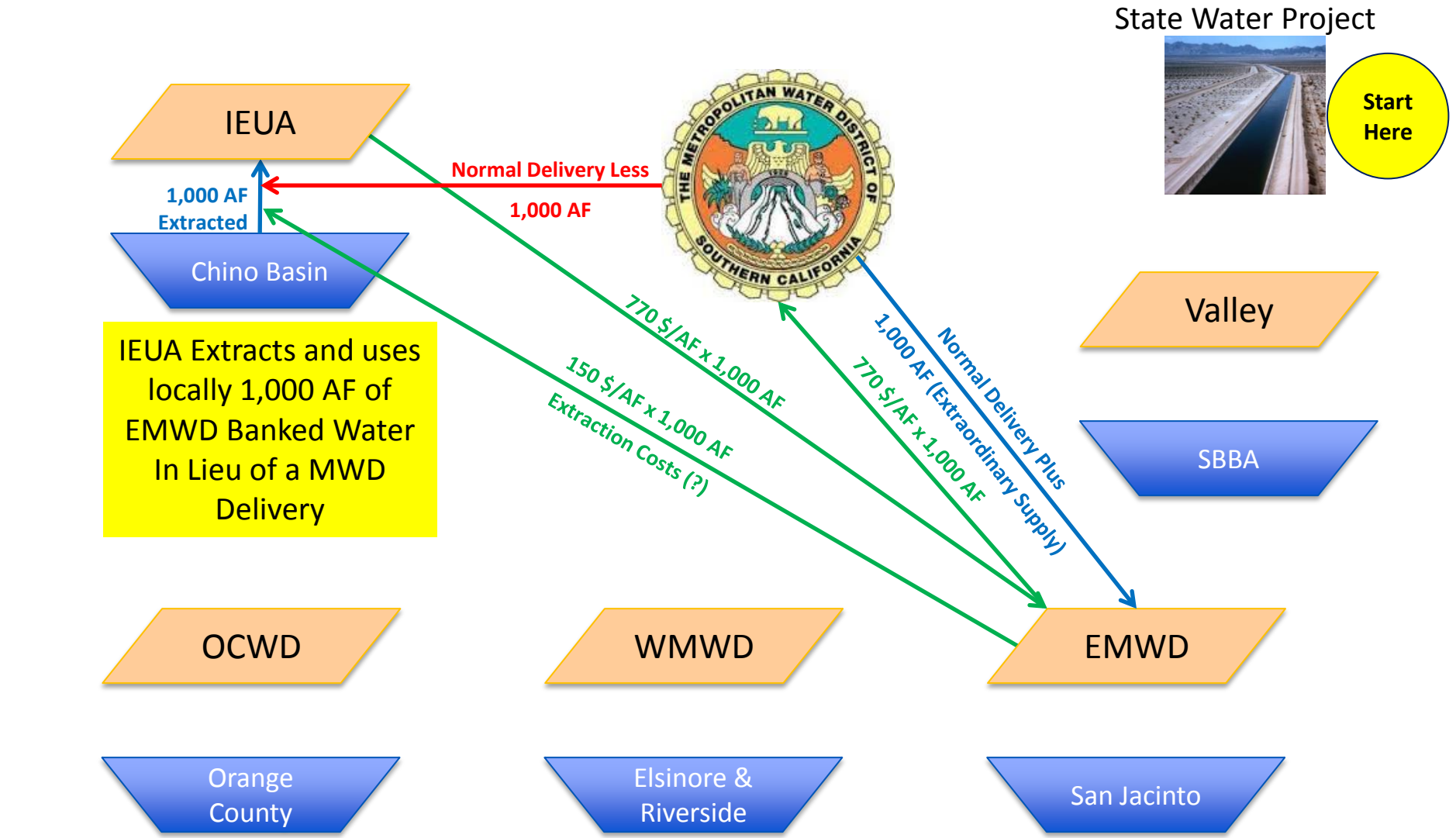
Elsinore & Riverside

San Jacinto



emwd

# Example B – Take$: EMWD calls on its banked supply from Chino Basin – Delivery via In Lieu



# SARRCUP Operational Examples (cont'd)

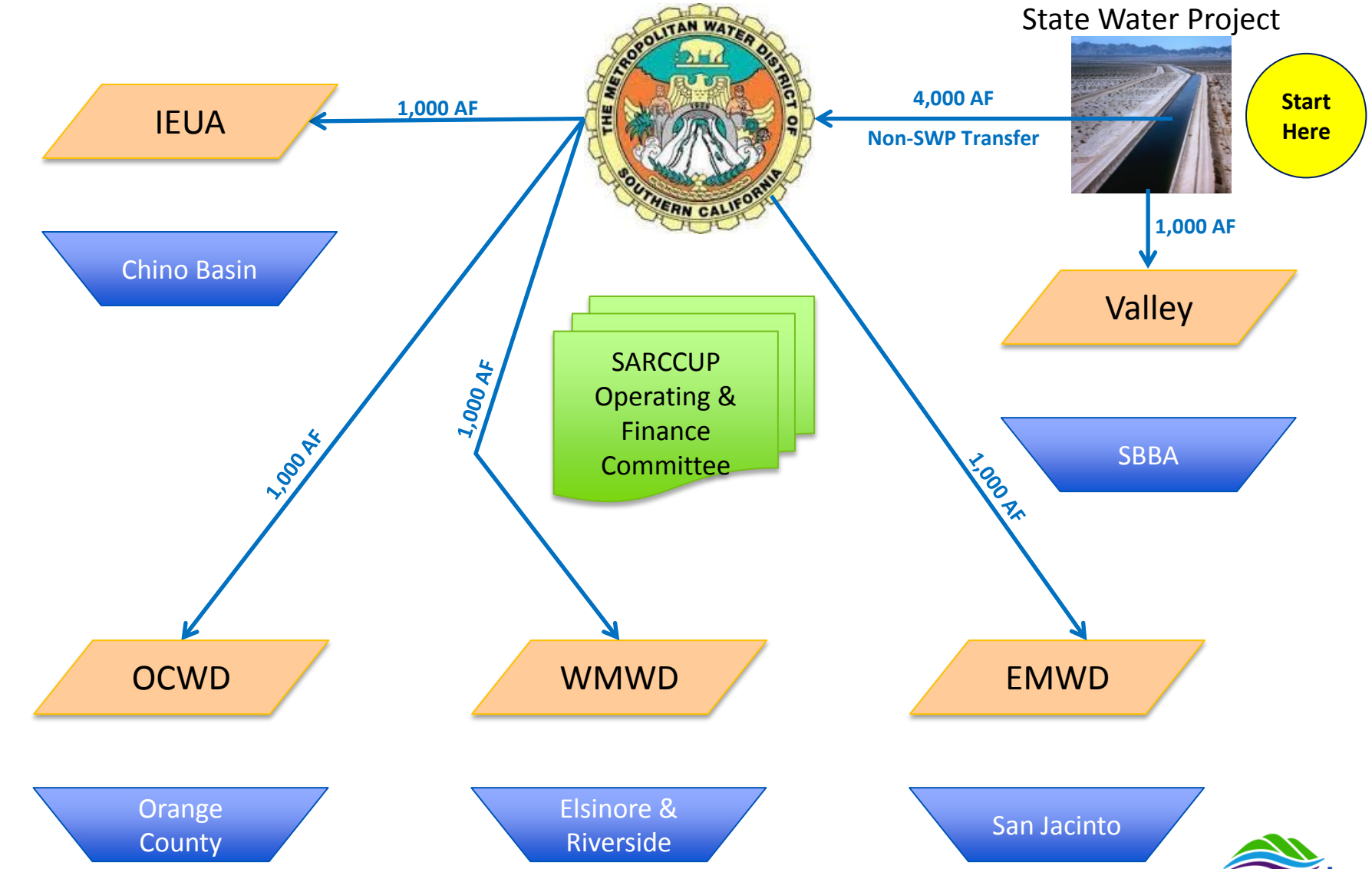
1. San Bernardino Valley Water District Surplus State Water Project Water

   - Direct Delivery using SARCCUP Facilities – Example A
   - In-Lieu Exchange using MWD facilities – Example B

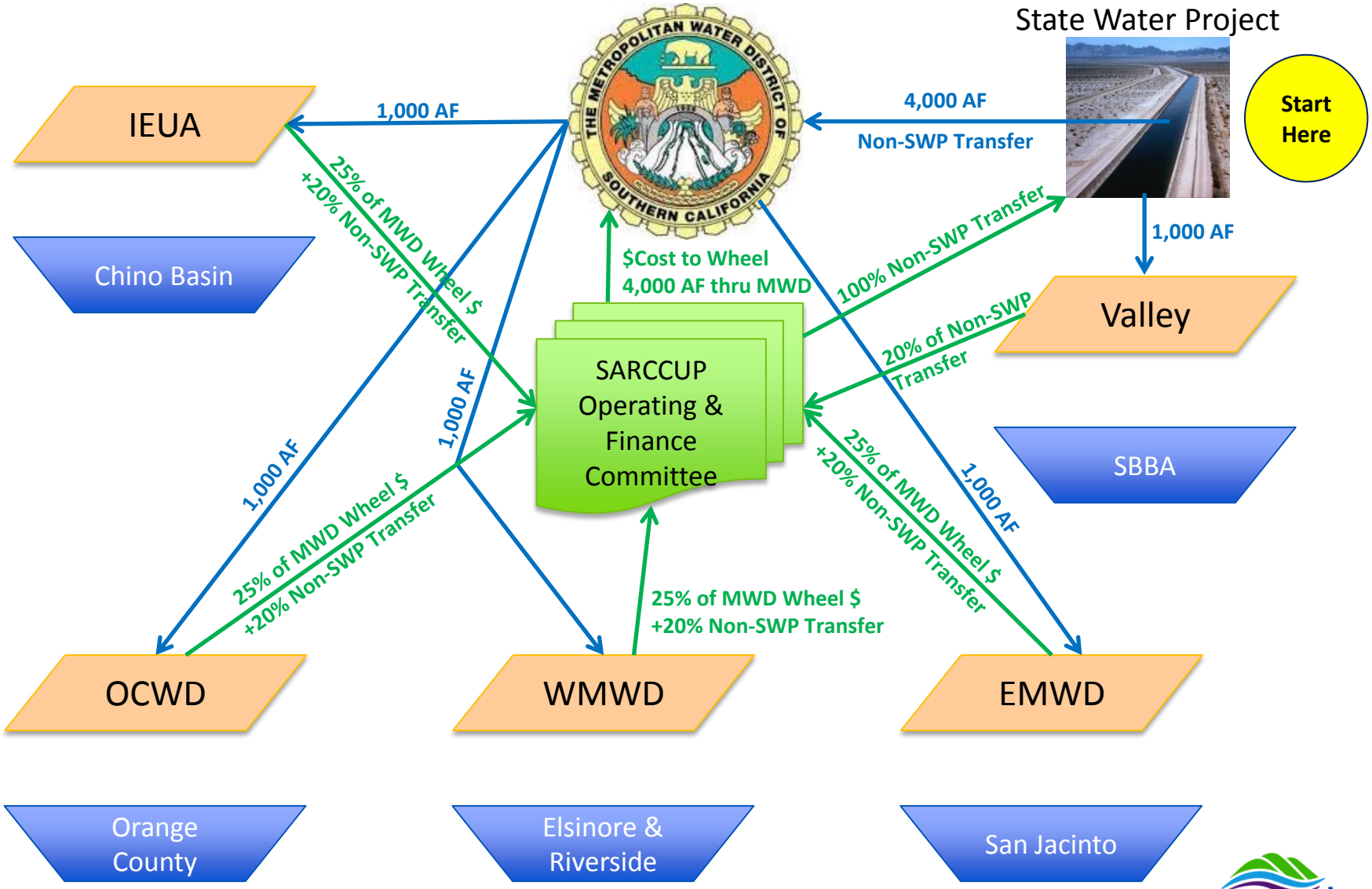
2. Non-State Water Project Transfer Water

   - Wheeled through MWD facilities – Example C

# Example C – SARCCUP Agencies purchase 5,000 AF of Non-SWP Transfer Water and Wheel 4,000 AF through MWD's System



# Example C$ – SARCCUP Agencies purchase 5,000 AF of Non-SWP Transfer Water and Wheel 4,000 AF through MWD's System



# SARRCUP Operational Examples (cont'd)

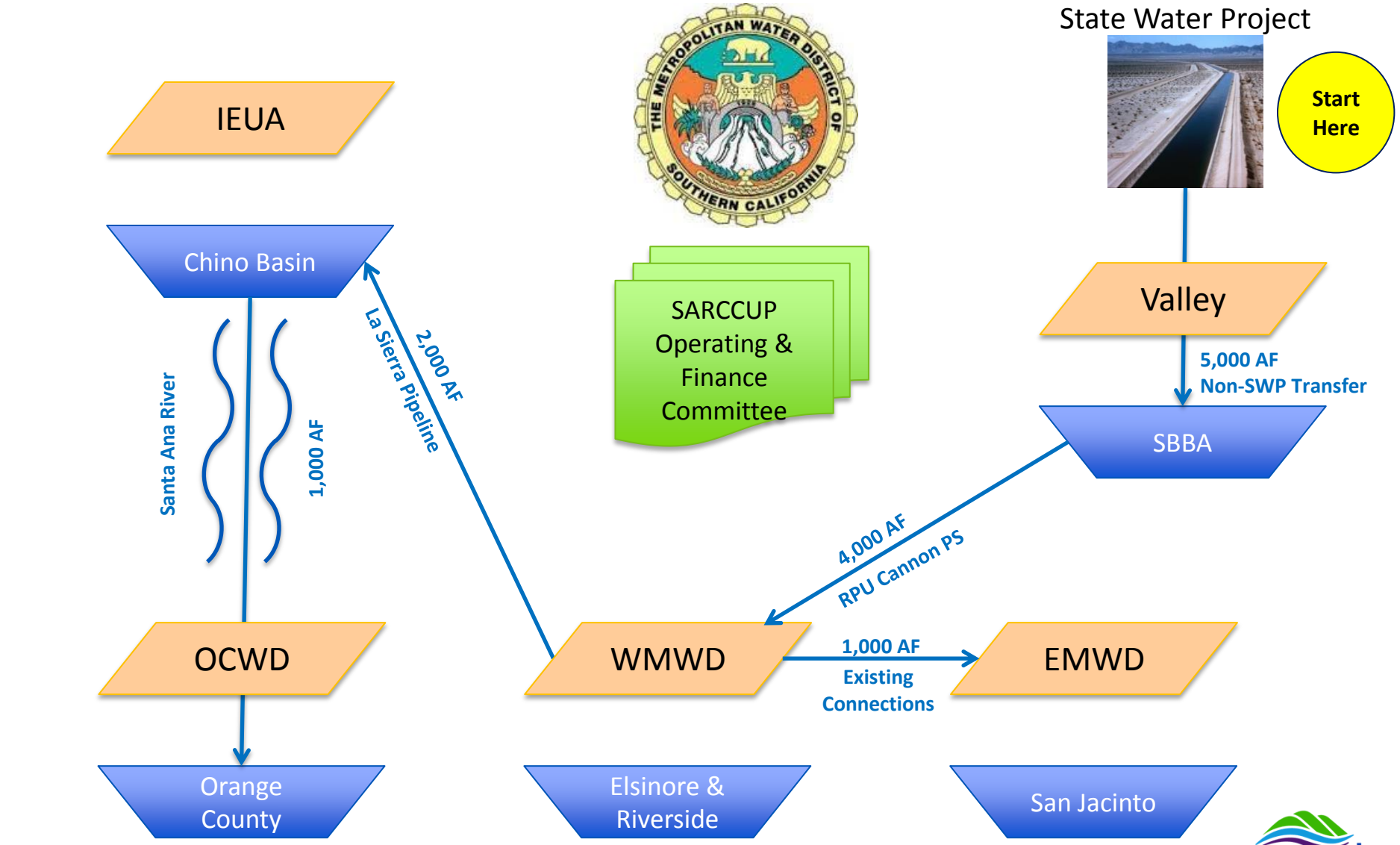
1. San Bernardino Valley Water District Surplus State Water Project Water

   - Direct Delivery using SARCCUP Facilities – Example A
   - In-Lieu Exchange using MWD facilities – Example B

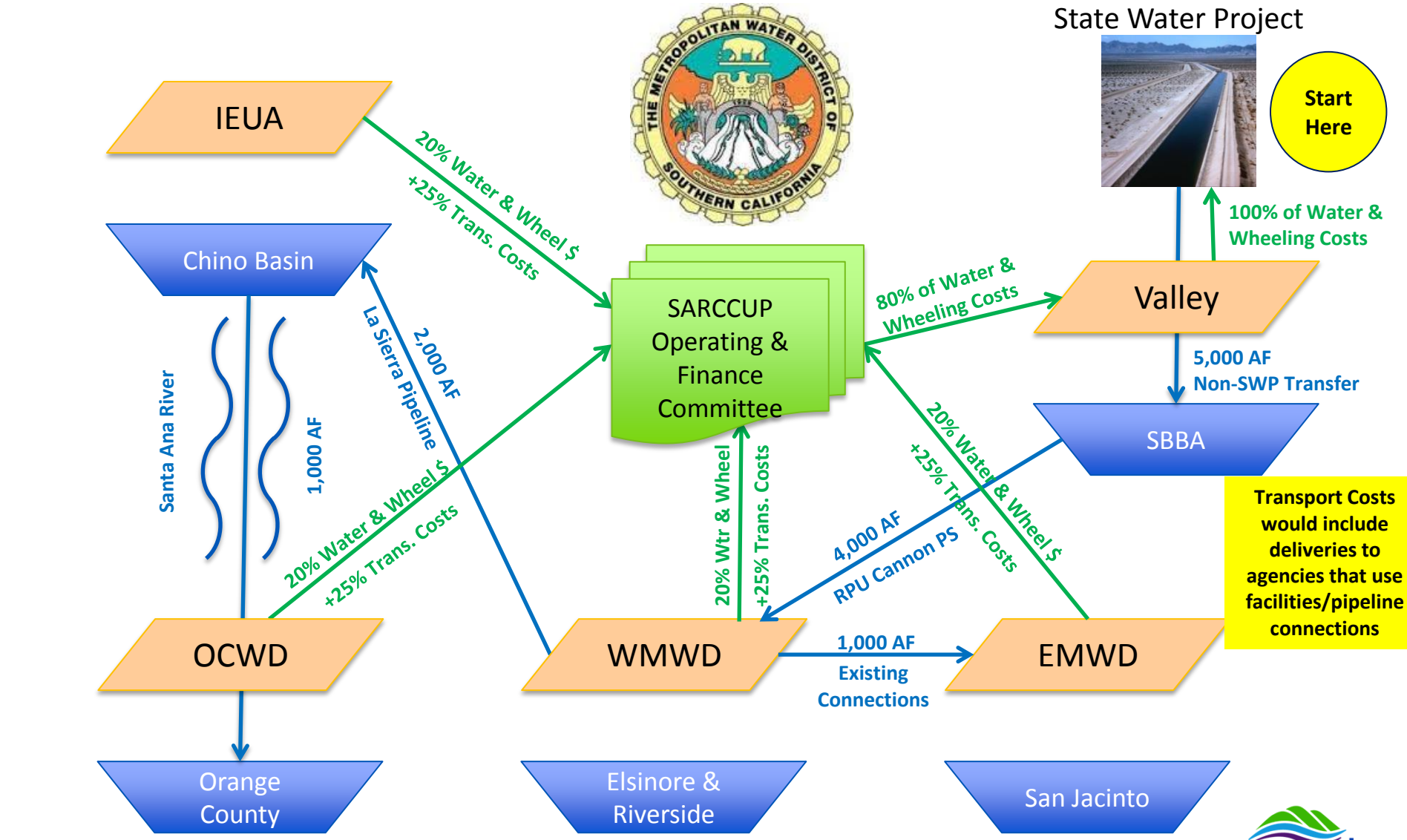
2. Non-State Water Project Transfer Water

   - Wheeled through MWD facilities – Example C
   - Wheeled through Valley facilities (+ SARCCUP facilities) – Example D

# Example D – SARCCUP Agencies purchase 5,000 AF of Non-SWP Transfer Water and Wheel it through Valley's System



# Example D$ – SARCCUP Agencies purchase 5,000 AF of Non-SWP Transfer Water and Wheel it through Valley's System



# SARRCUP Operational Examples - Summary

- Take-aways, under all scenarios:
  - SARCCUP Agencies and MWD made whole
  - SARCCUP Banks operating in line with MWD Policies
  - SARCCUP MWD member agencies receive Extraordinary Supply credit
- Next steps
  - Meet with MWD staff and new AGM to finalize terms
  - Develop final SARCCUP-MWD Operating Agreement

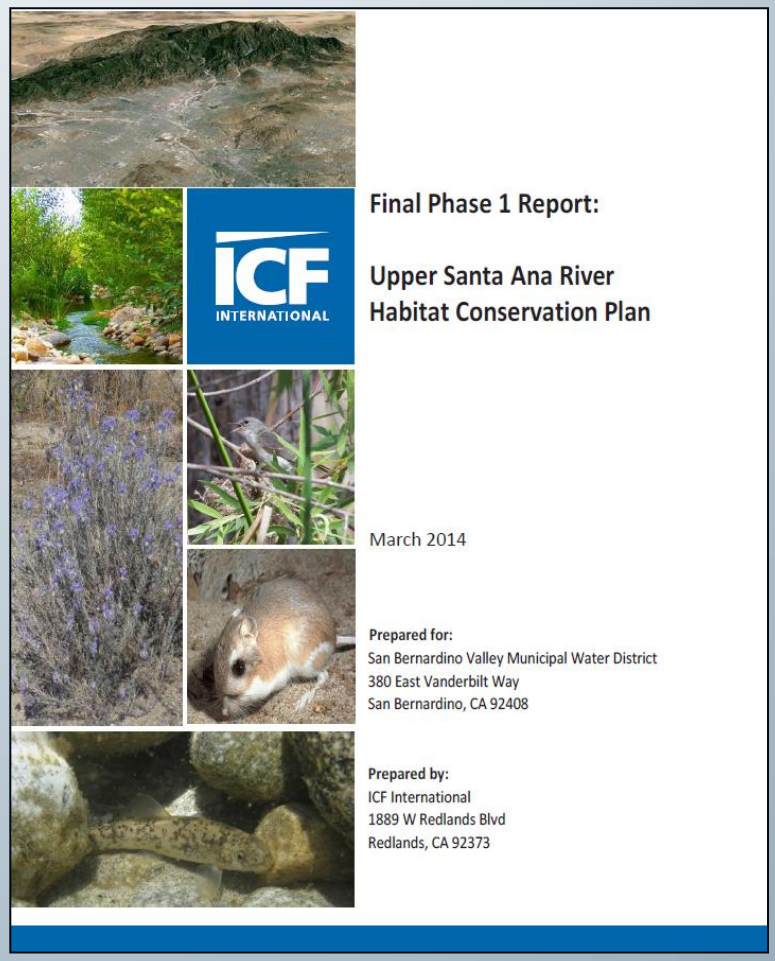
# Santa Ana River Conservation & Conjunctive Use Project

## PA 23 HOLE CREEK RESTORATION UPDATE

Heather Dyer, Water Resources Project Manager/Biologist
San Bernardino Valley Municipal Water District

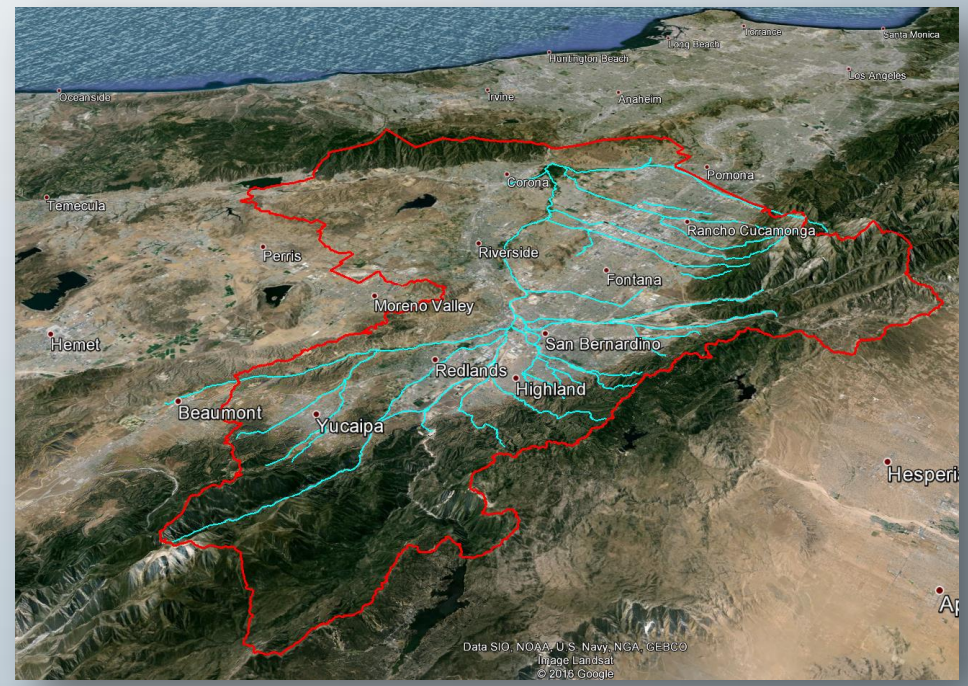
# UPPER SANTA ANA RIVER HABITAT CONSERVATION PLAN

- **May 2013 – HCP idea grew out of a meeting between Valley District and Ren Lohoefner, former Regional Director of US Fish and Wildlife Service (USFWS)**
- **September 2013 – Phase I: HCP Scoping Study approved**
- **April 2014 – Phase 2: HCP Team was assembled and plan development began**
- **2018 – CEQA/NEPA Process**
- **2019 – Incidental Take Permit Expected**
- **http://www.uppersarhcp.com/**



# HCP COVERED ACTIVITIES

- Endangered Species "Incidental Take" Coverage for Over 60 Covered Activities
  - New projects construction and operations
  - Existing Facilities Operations & Maintenance
  - New or existing projects with Hydrologic Effects to Santa Ana River
    - Stream Diversions for groundwater recharge
    - Increased capacity of basins
    - Reductions in WWTP effluent

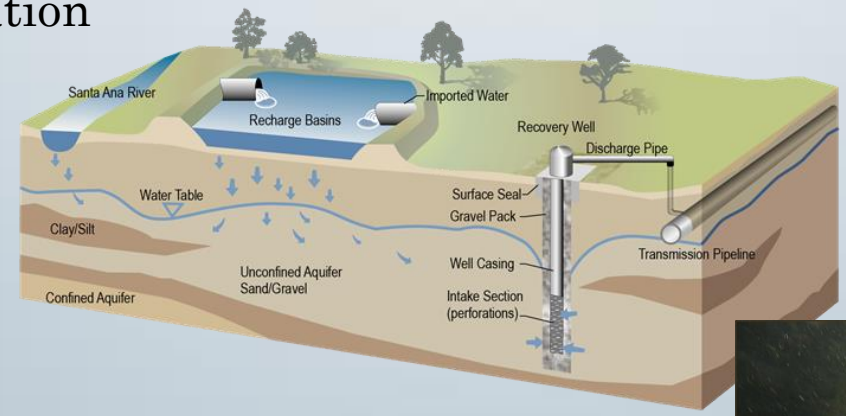


# HCP PERMITTEES

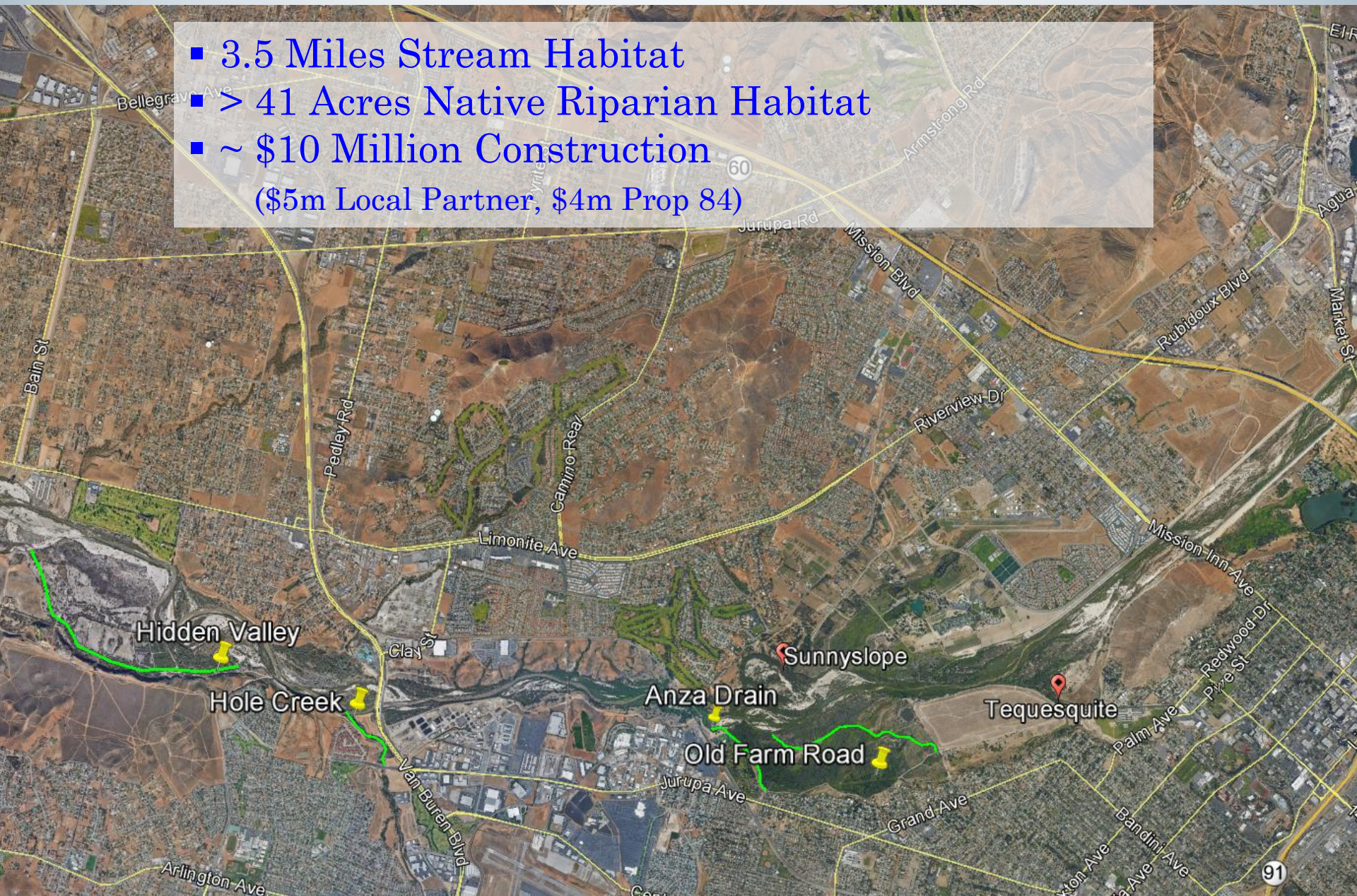
1. San Bernardino Valley Municipal Water District
2. San Bernardino Valley Water Conservation District
3. San Bernardino Municipal Water Department
4. Western Municipal Water District
5. East Valley Water District
6. West Valley Water District
7. Riverside Public Utilities
8. San Bernardino County Flood Control District
9. Inland Empire Utility Agency
10. City of Rialto
11. Metropolitan Water District of Southern California
12. Orange County Water District
13. Southern California Edison

# SARCCUP ELEMENTS

- Water Use Efficiency: Conservation-Based Rates Support, Water-use Efficient Landscaping Design
- Groundwater Banking: "Put and Take" Conjunctive Use Facilities
- Habitat Improvement: Arundo Removal & Santa Ana Sucker fish habitat restoration




# SARCCUP TRIBUTARY PROJECTS




- 3.5 Miles Stream Habitat
- > 41 Acres Native Riparian Habitat
- ~ $10 Million Construction
  ($5m Local Partner, $4m Prop 84)

# LOWER HOLE CREEK

- Highly urbanized stream
- Connected to Santa Ana River below Van Buren Blvd.
- This area of river has new importance to sucker population

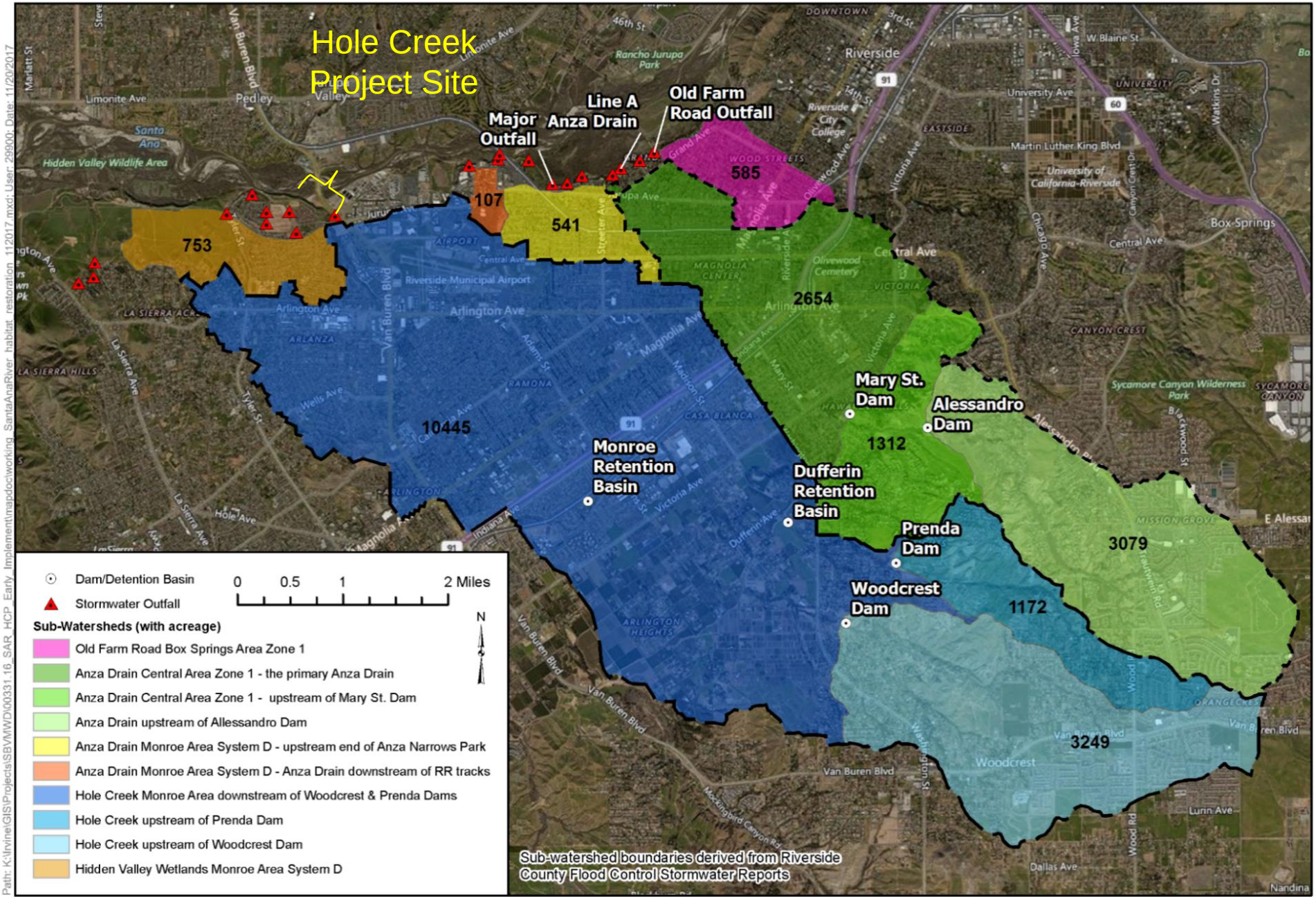
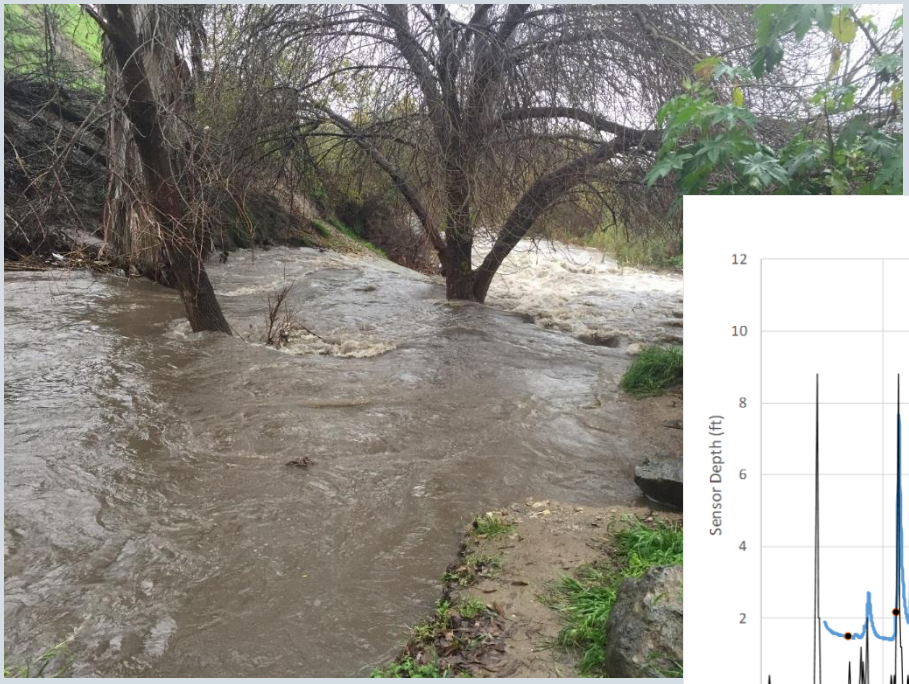
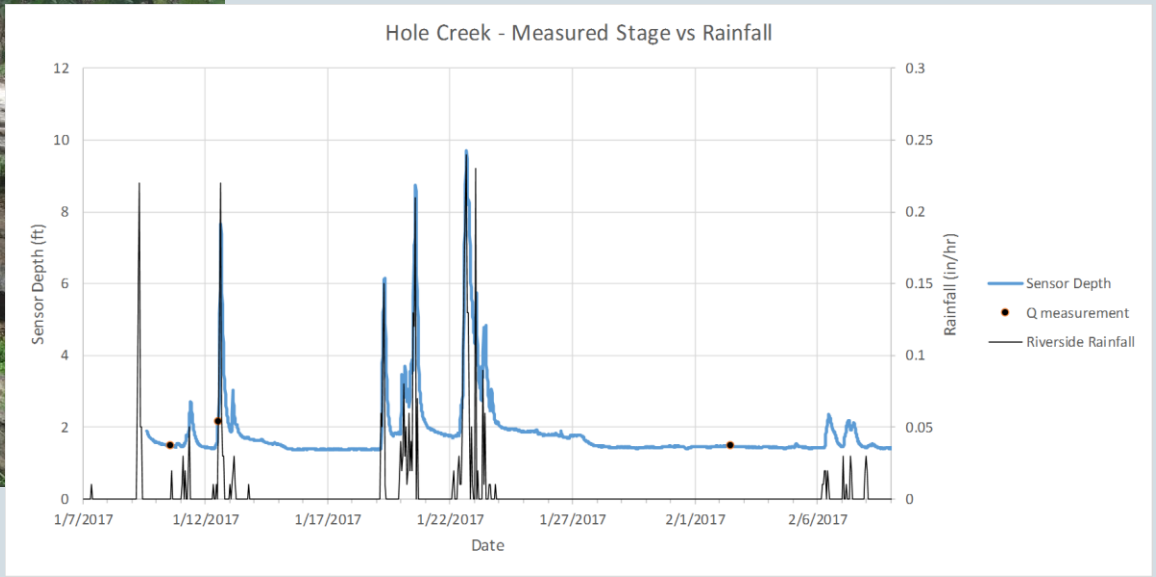



Figure 1
Sub-Watersheds Draining to Old Farm Road, Hole Creek, and Hidden Valley Wetlands

# Hole Creek Hydrology

- Baseflow ~1.5 cfs
- Flood flows can quickly exceed 3,000 cfs+

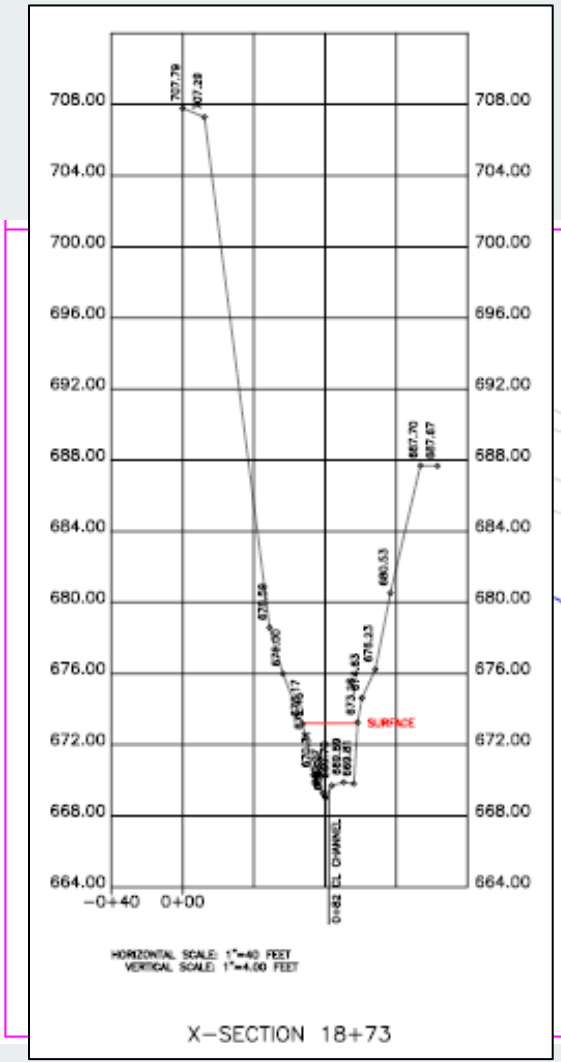


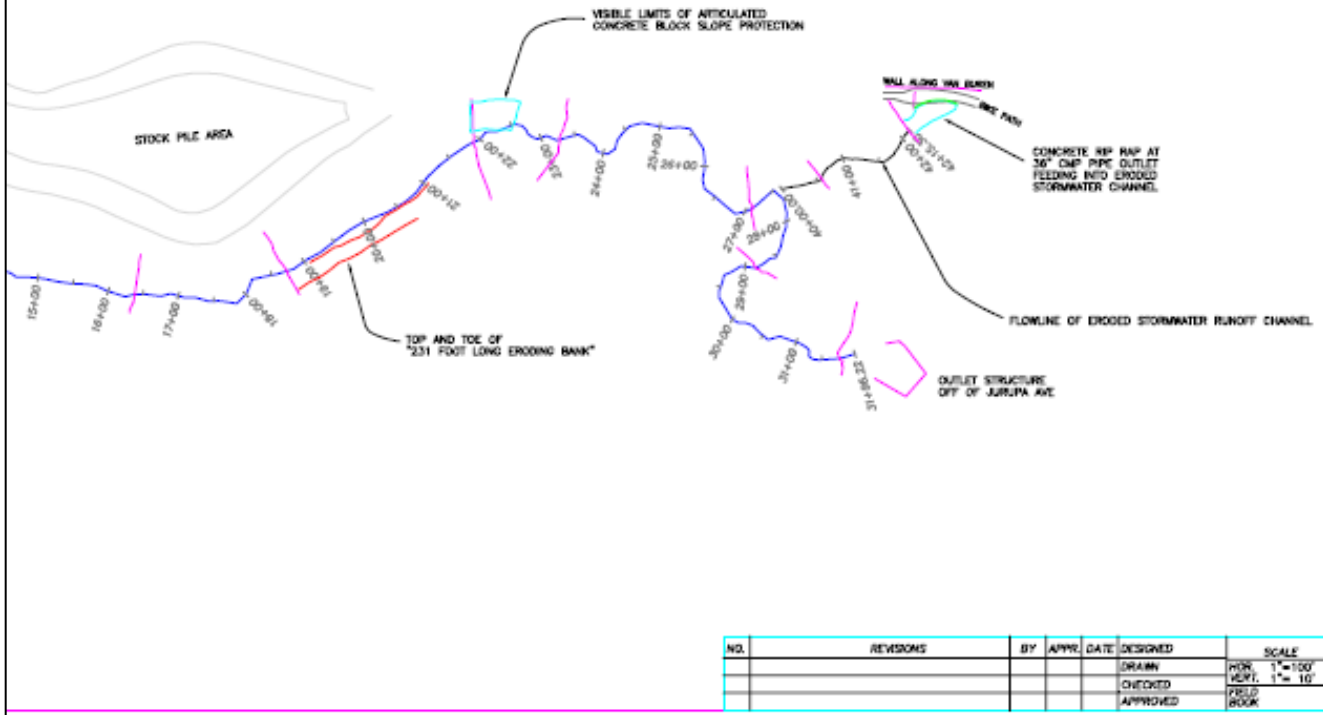


# Hole Creek Preliminary Design

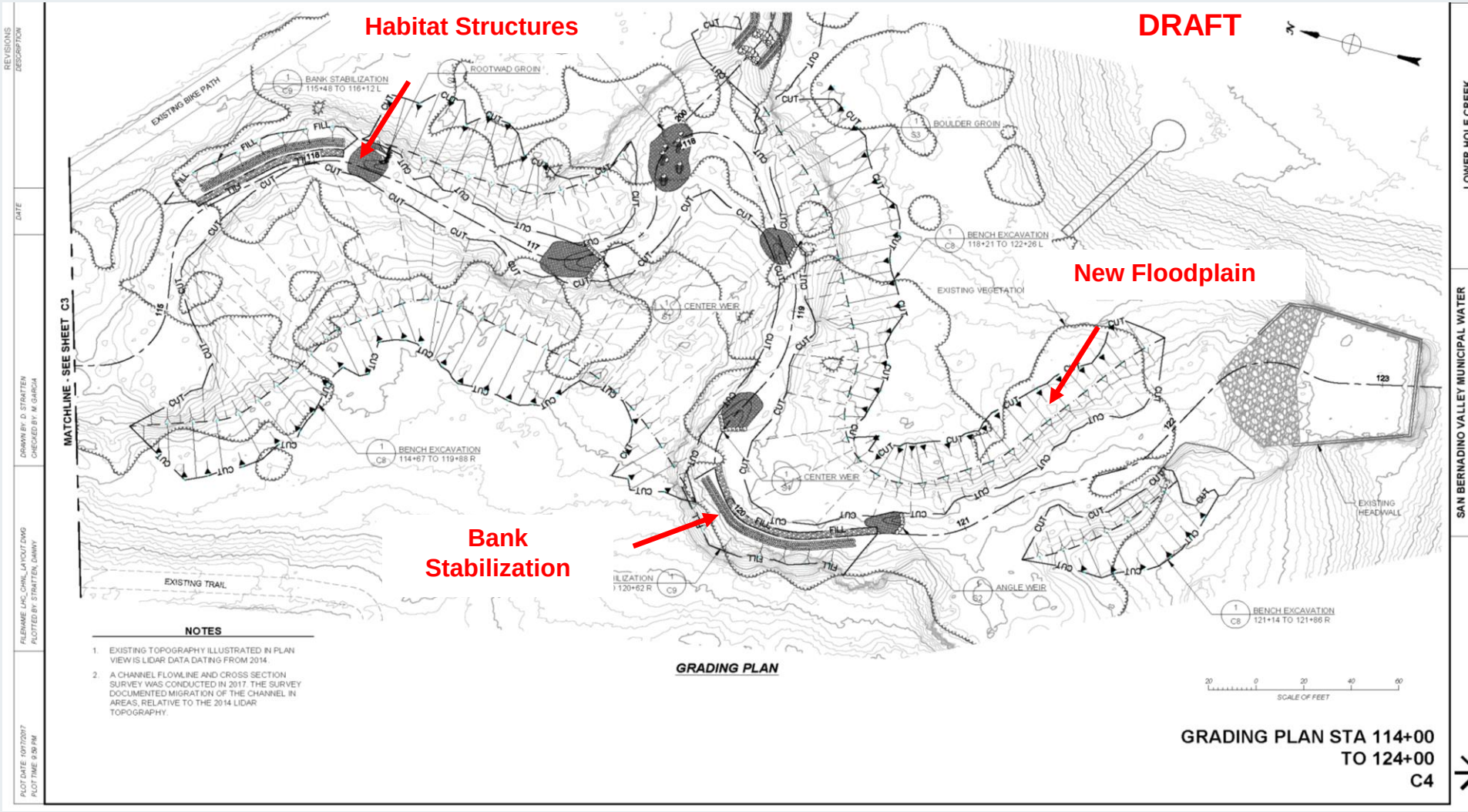
# Channel Profiles and Cross-Sections

- Field topographic survey used to supplement LiDAR elevations used in design development

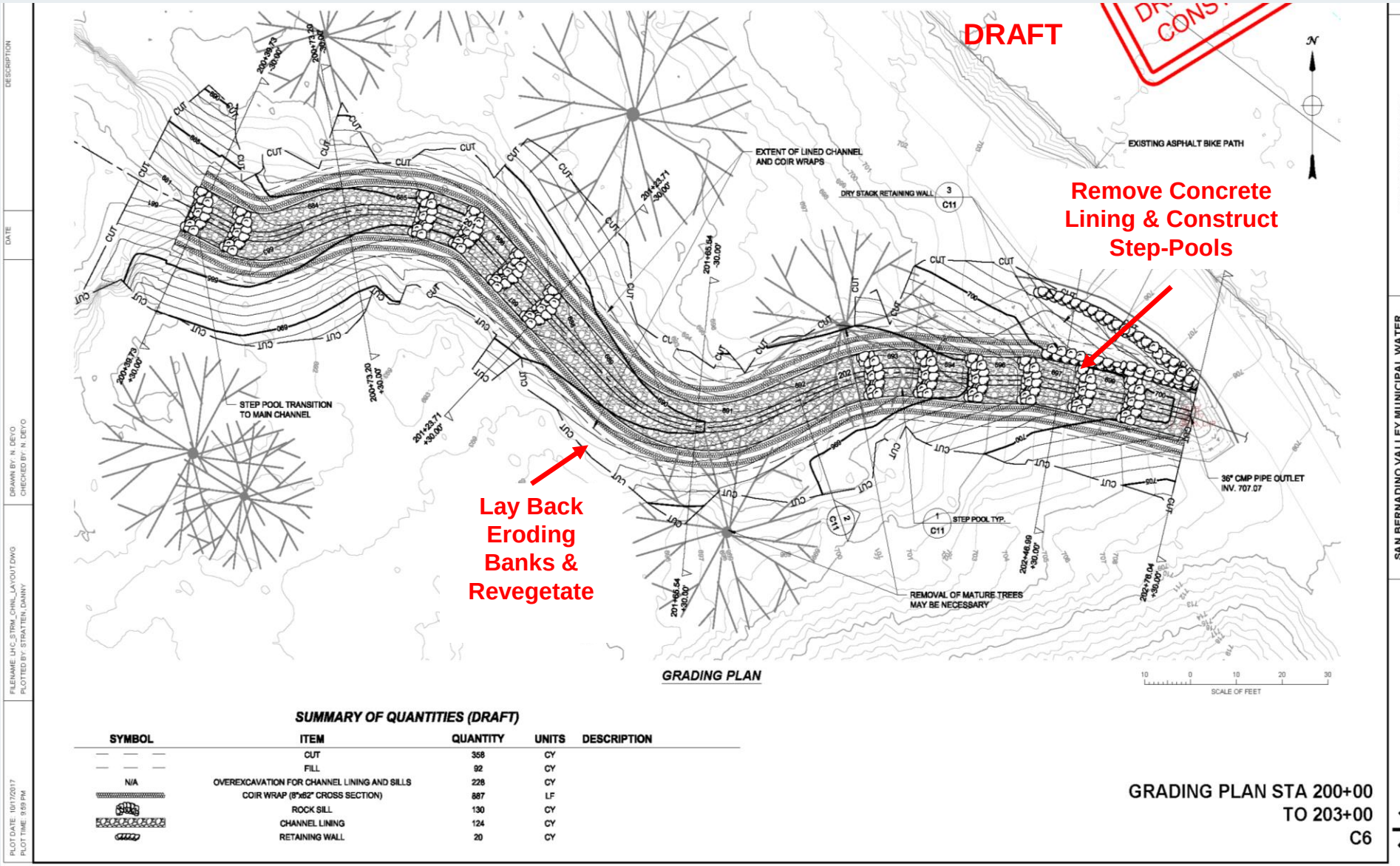


# 30% Restoration Design – Jurupa Outlet



# 30% Restoration Design – Van Buren Outlet



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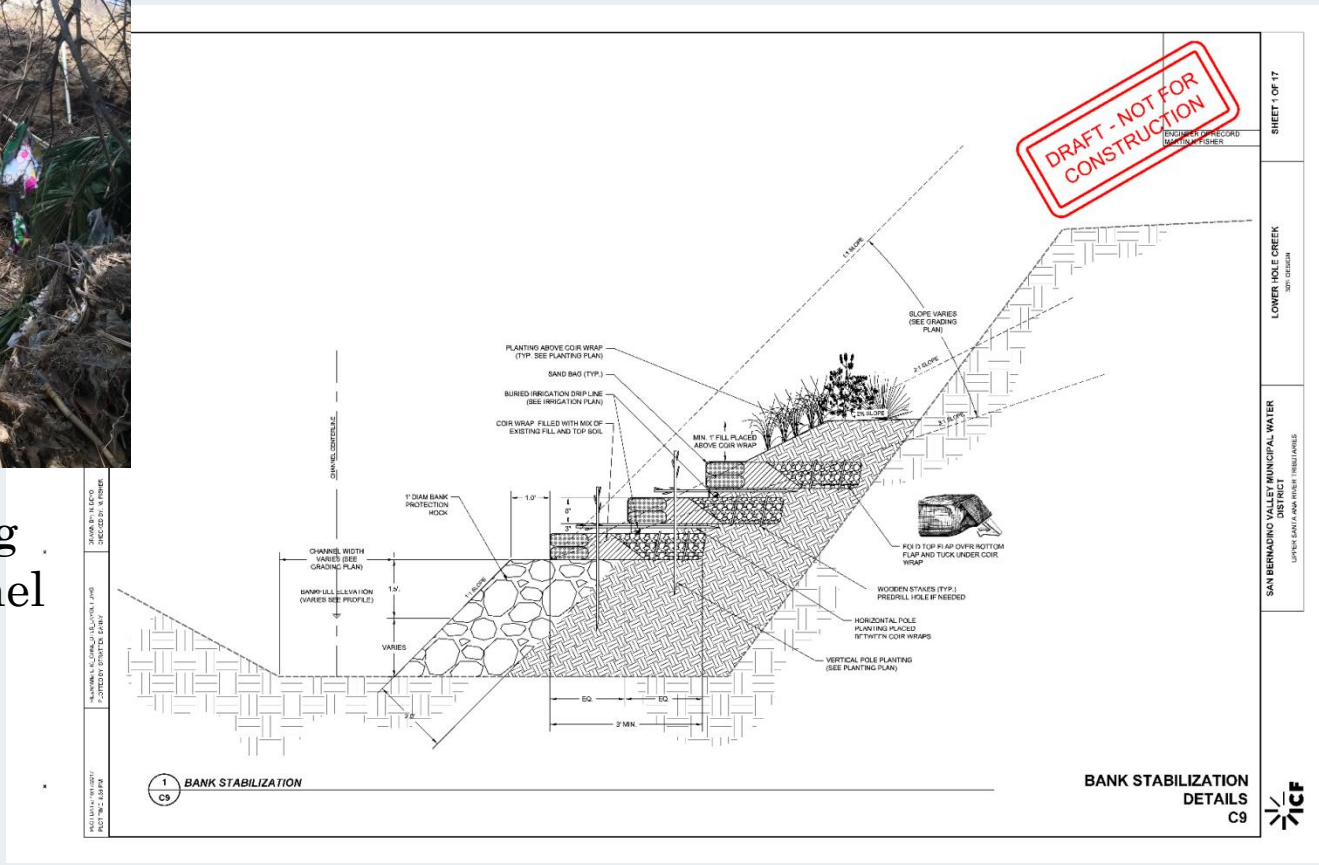
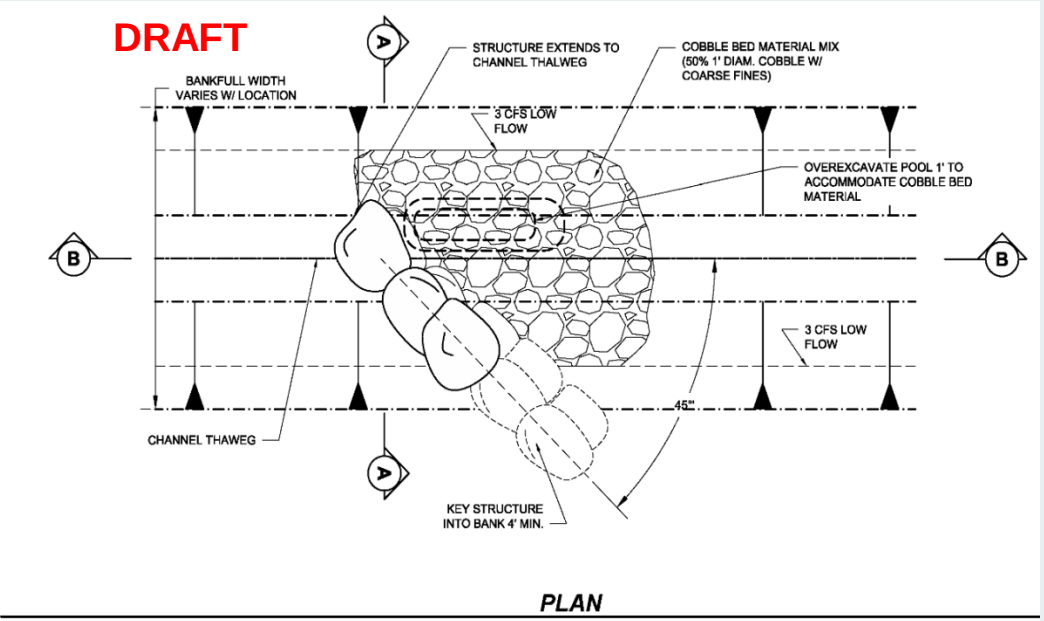
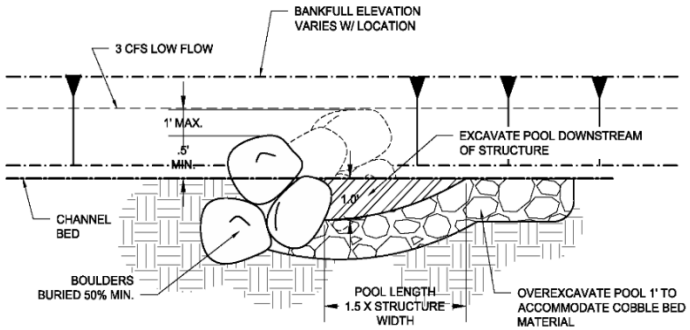
Eroding Bank Delivering Fine Sediment to Channel

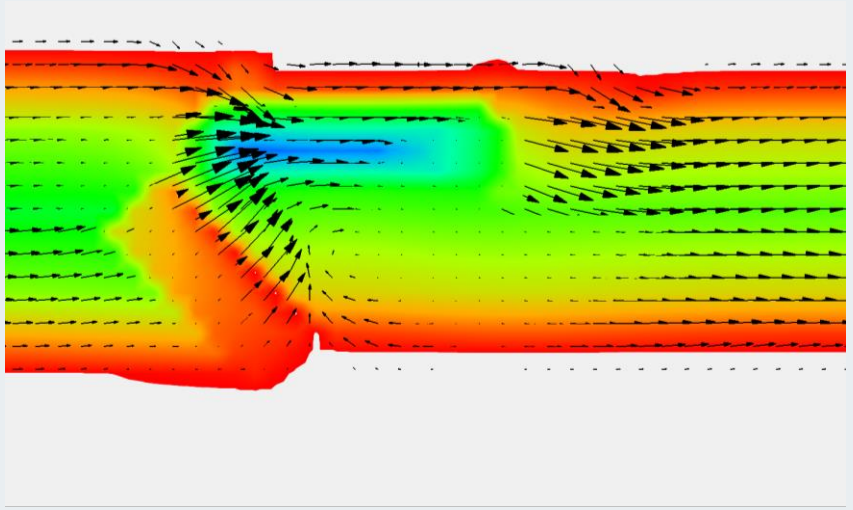



Bank Stabilization Detail

# 30% Restoration Design-
# Habitat Details and Performance Modeling



2D Modeling of Depths and Velocity Vectors of a Rock Groin Structure with Scour Pool Designed to Enhance Sucker Habitat

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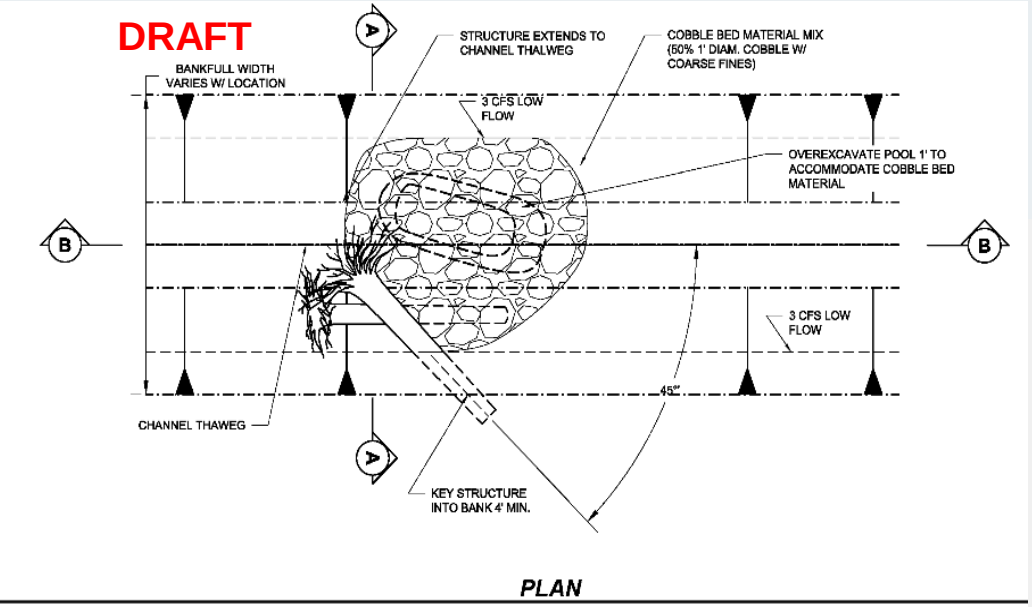
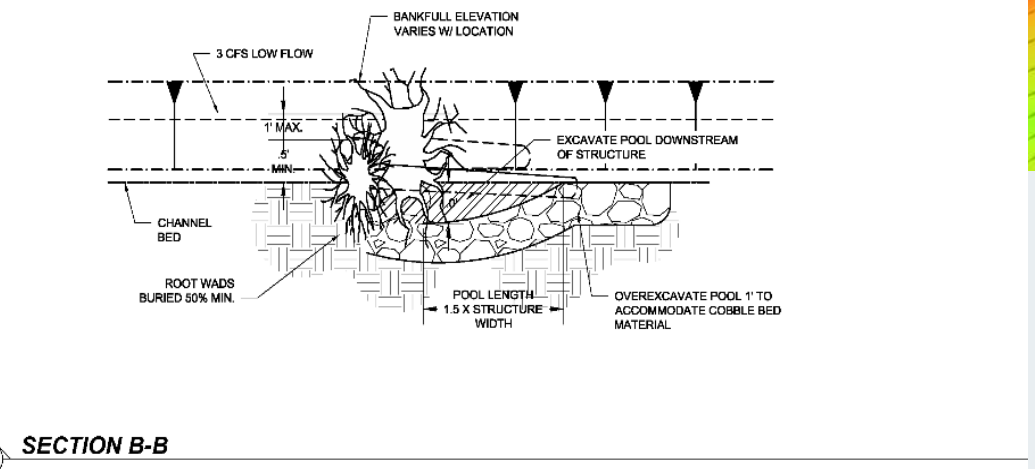
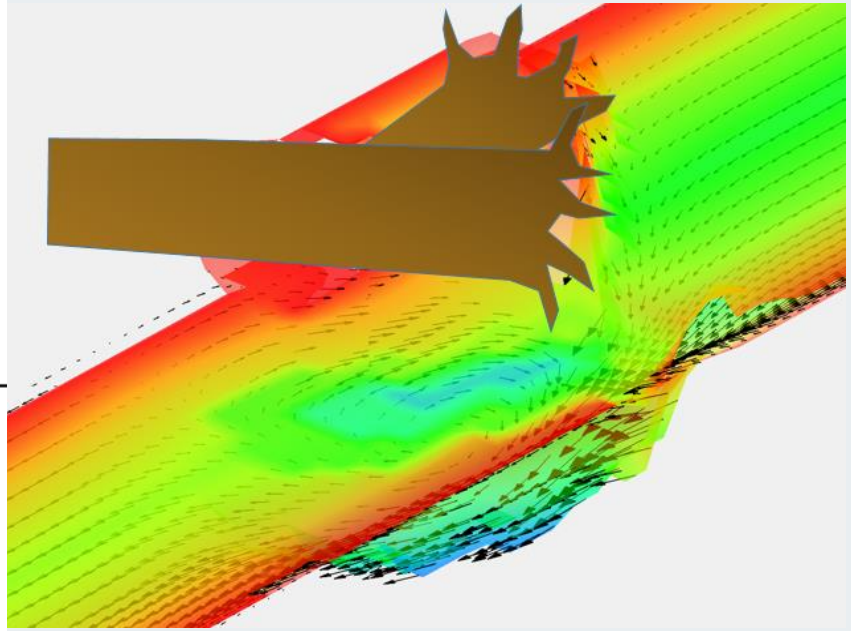
# Habitat Details and Performance Modeling



2D Modeling of Depths and Velocity Vectors of a Wood Structure with Scour Pool Designed to Enhance Sucker Habitat

# GOAL: INCREASE SUITABLE SUCKER HABITAT

# SUMMARY

- Hole Creek Prop 84 Funding (Grant and Local Match)
  - $99k – Design
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- Finishing the 30% Design Work and evaluating additional HCP opportunities at Lower Hole Creek.
- CEQA/Permitting for Tributaries - January 2018
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# QUESTIONS?


**Heather Dyer**
**Water Resources Project Manager**
heatherd@sbvmwd.com
**909-387-9256**

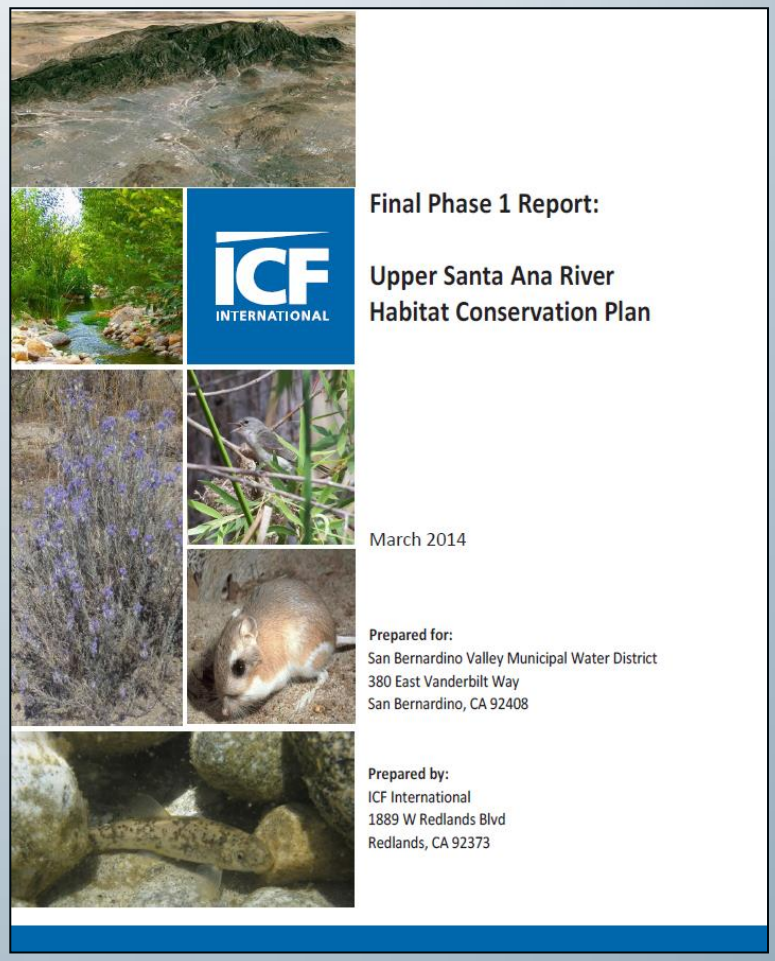
# Santa Ana River Conservation & Conjunctive Use Project

## PA 23 HOLE CREEK RESTORATION UPDATE

Heather Dyer, Water Resources Project Manager/Biologist
San Bernardino Valley Municipal Water District

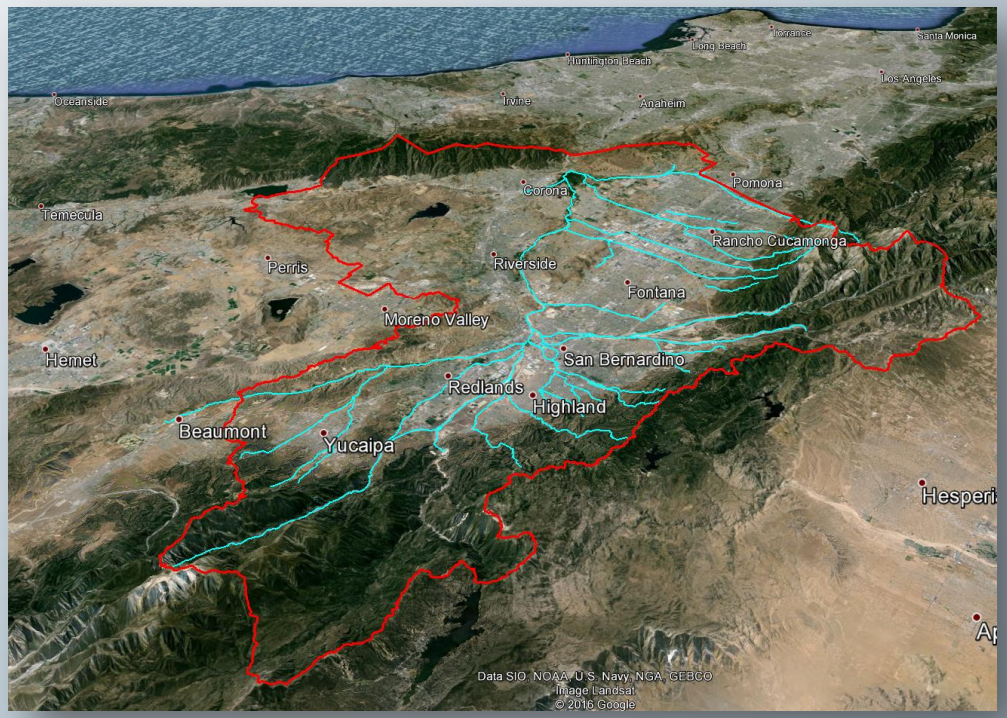
# UPPER SANTA ANA RIVER HABITAT CONSERVATION PLAN

- **May 2013 – HCP idea grew out of a meeting between Valley District and Ren Lohoefner, former Regional Director of US Fish and Wildlife Service (USFWS)**
- **September 2013 – Phase I: HCP Scoping Study approved**
- **April 2014 – Phase 2: HCP Team was assembled and plan development began**
- **2018 – CEQA/NEPA Process**
- **2019 – Incidental Take Permit Expected**
- **http://www.uppersarhcp.com/**



# HCP COVERED ACTIVITIES

- Endangered Species "Incidental Take" Coverage for Over 60 Covered Activities
  - New projects construction and operations
  - Existing Facilities Operations & Maintenance
  - New or existing projects with Hydrologic Effects to Santa Ana River
    - Stream Diversions for groundwater recharge
    - Increased capacity of basins
    - Reductions in WWTP effluent

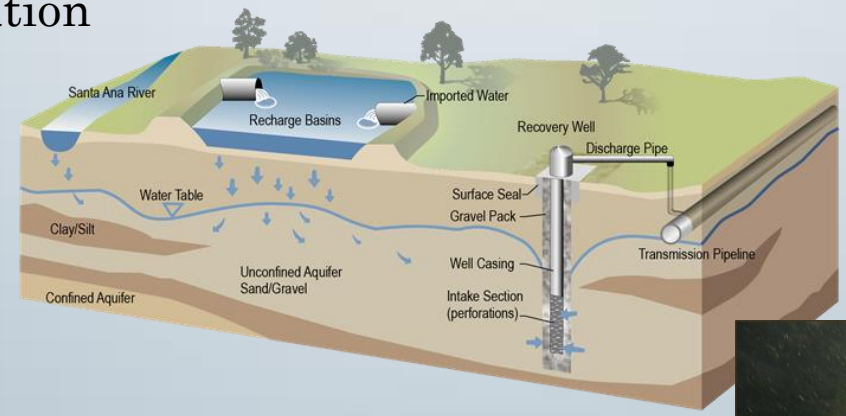


# HCP PERMITTEES

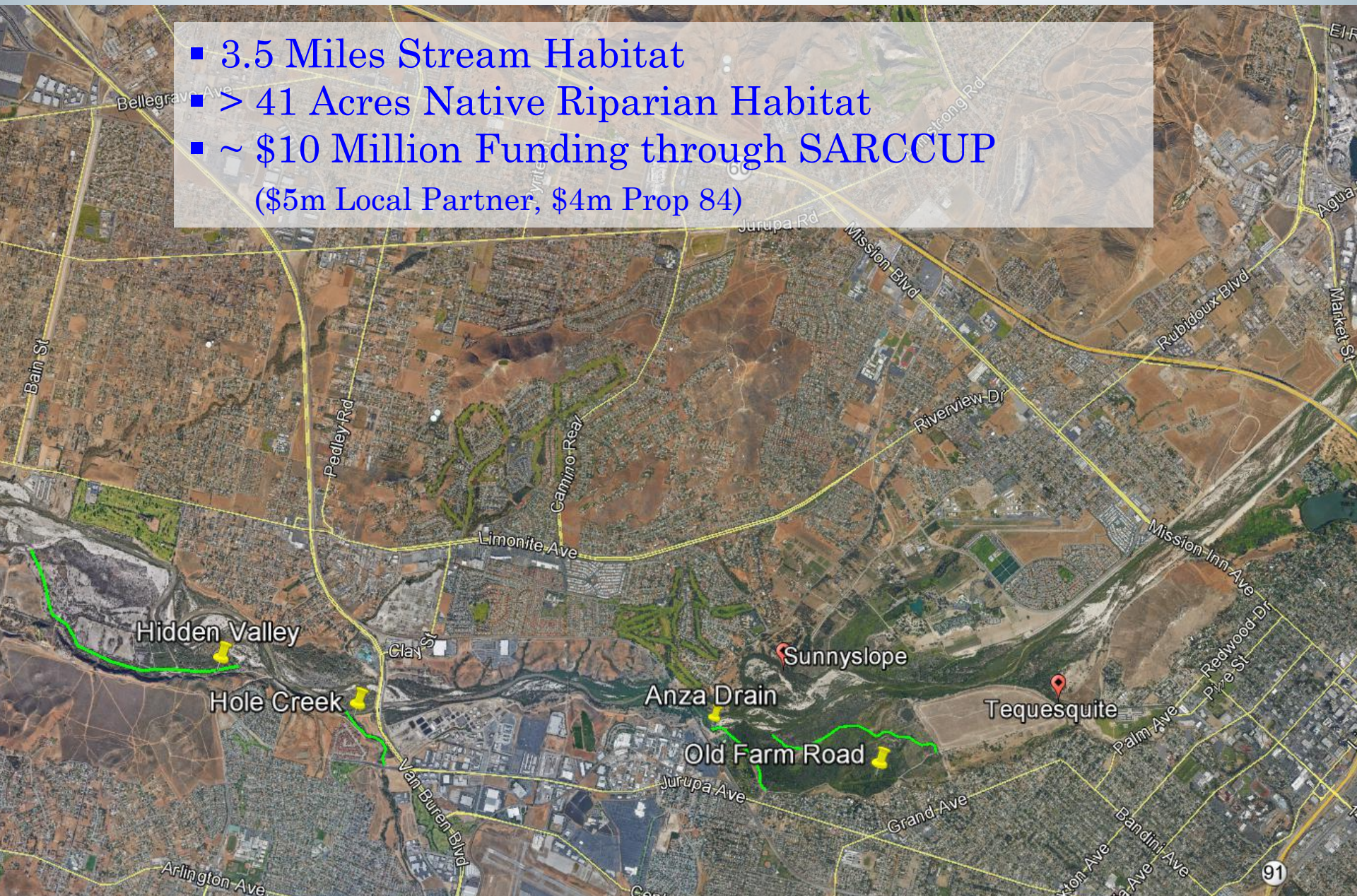
1. San Bernardino Valley Municipal Water District
2. San Bernardino Valley Water Conservation District
3. San Bernardino Municipal Water Department
4. Western Municipal Water District
5. East Valley Water District
6. West Valley Water District
7. Riverside Public Utilities
8. San Bernardino County Flood Control District
9. Inland Empire Utility Agency
10. City of Rialto
11. Metropolitan Water District of Southern California
12. Orange County Water District
13. Southern California Edison

# SARCCUP ELEMENTS

- Water Use Efficiency: Conservation-Based Rates Support, Water-use Efficient Landscaping Design
- Groundwater Banking: "Put and Take" Conjunctive Use Facilities
- Habitat Improvement: Arundo Removal & Santa Ana Sucker fish habitat restoration




# SARCCUP TRIBUTARY PROJECTS




- 3.5 Miles Stream Habitat
- > 41 Acres Native Riparian Habitat
- ~ $10 Million Funding through SARCCUP
  ($5m Local Partner, $4m Prop 84)

# LOWER HOLE CREEK

- Highly urbanized stream
- Connected to Santa Ana River below Van Buren Blvd.
- This area of river has new importance to sucker population

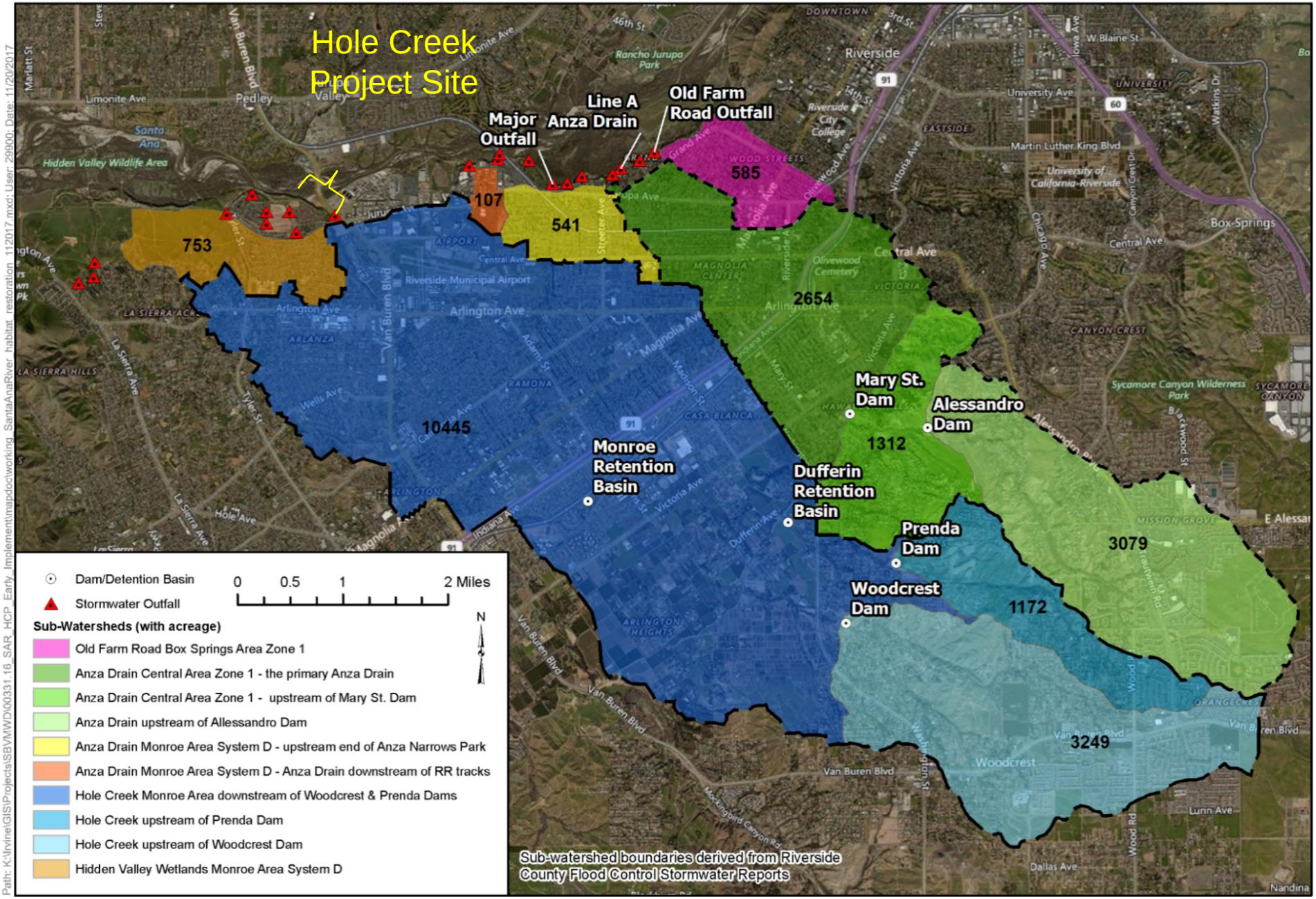
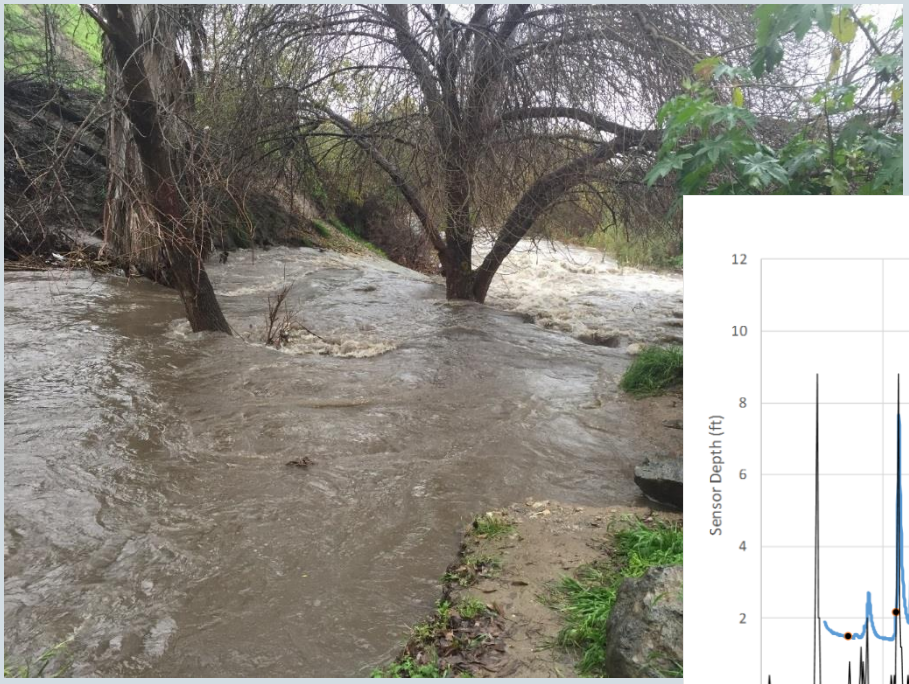
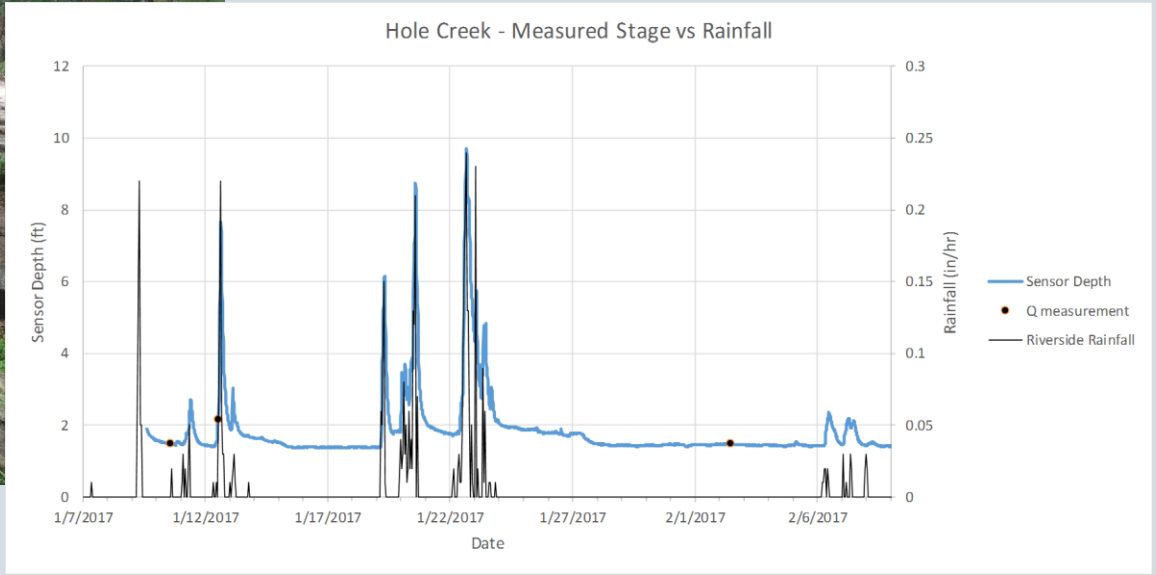



Figure 1
Sub-Watersheds Draining to Old Farm Road, Hole Creek, and Hidden Valley Wetlands

# Hole Creek Hydrology

- Baseflow ~1.5 cfs
- Flood flows can quickly exceed 3,000 cfs+





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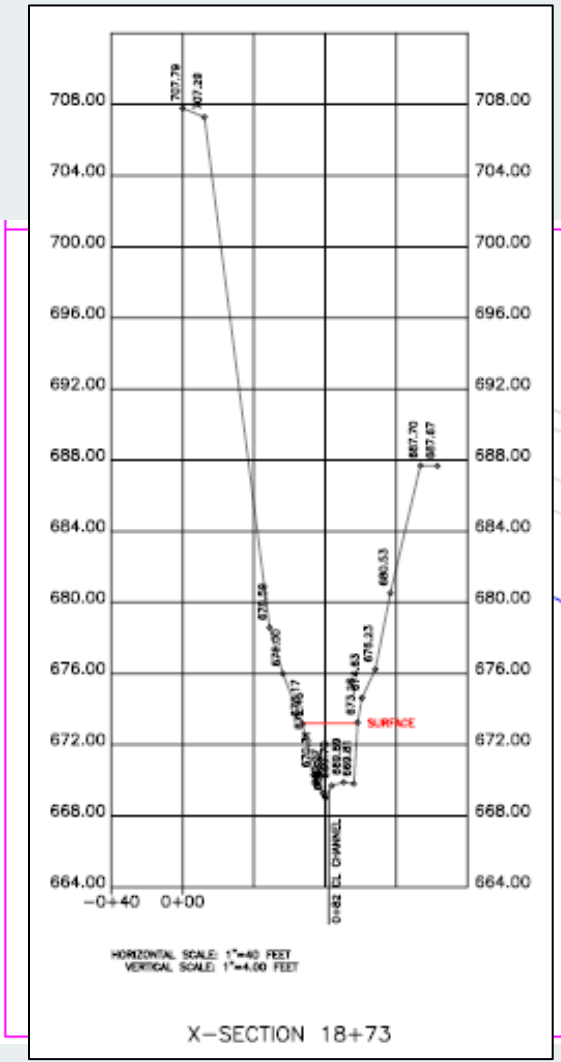


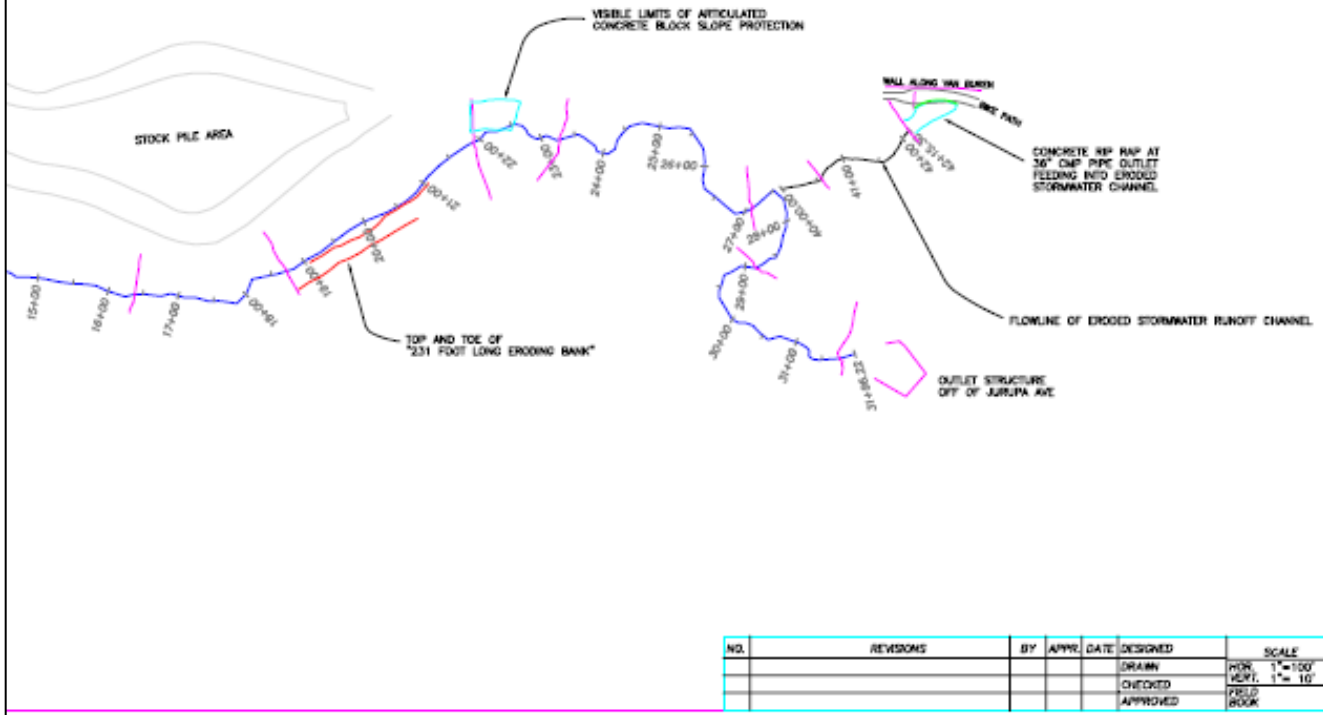

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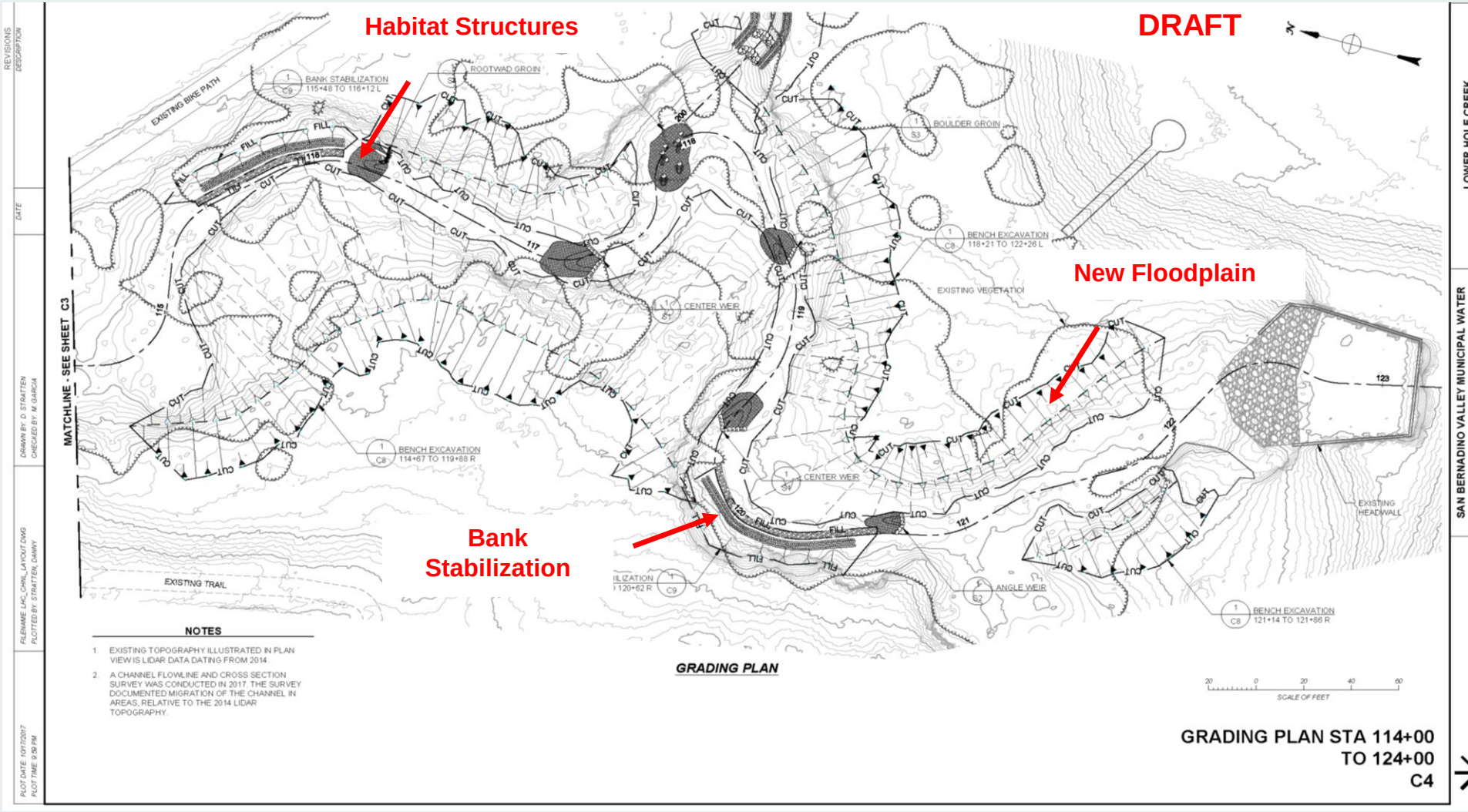

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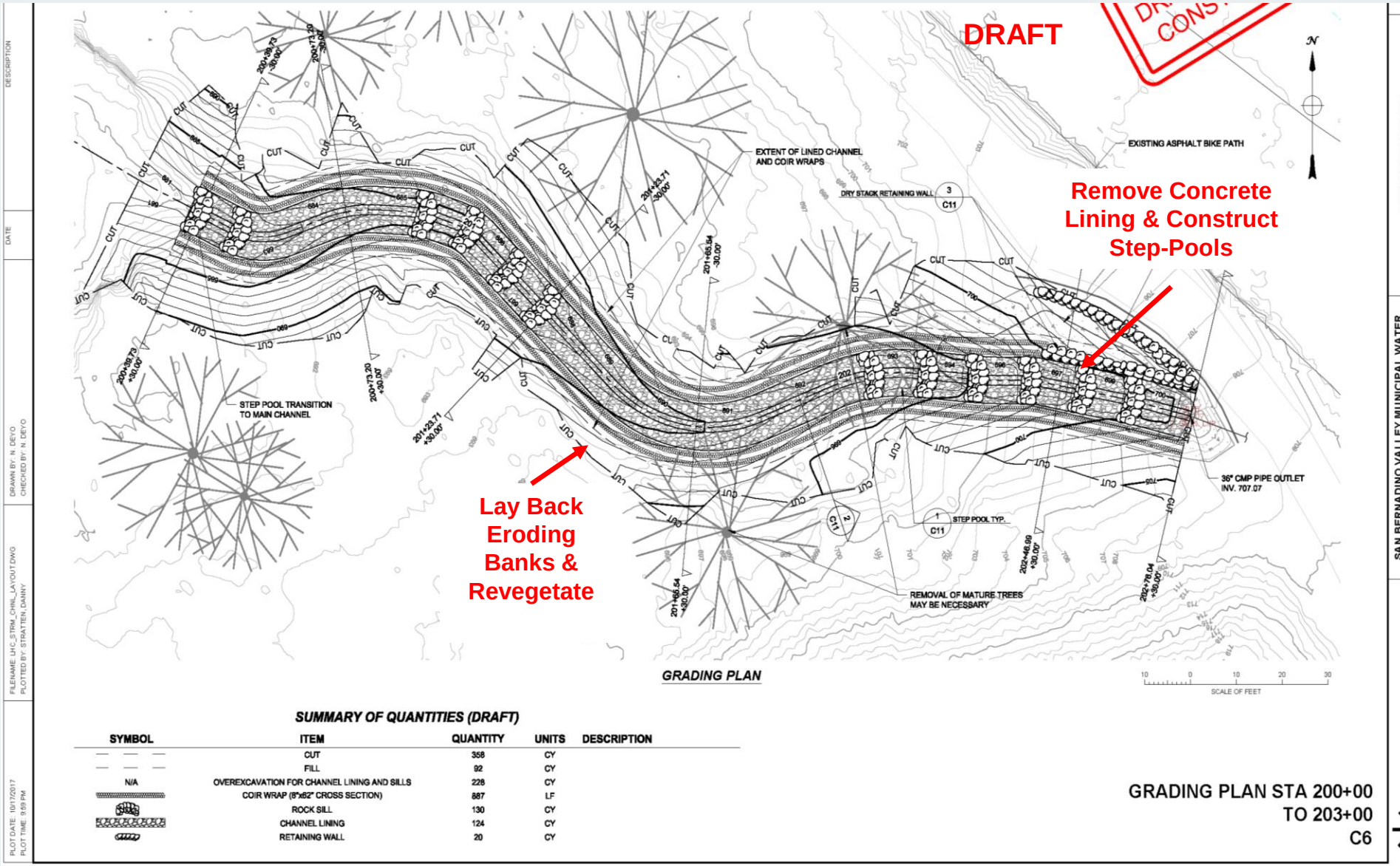

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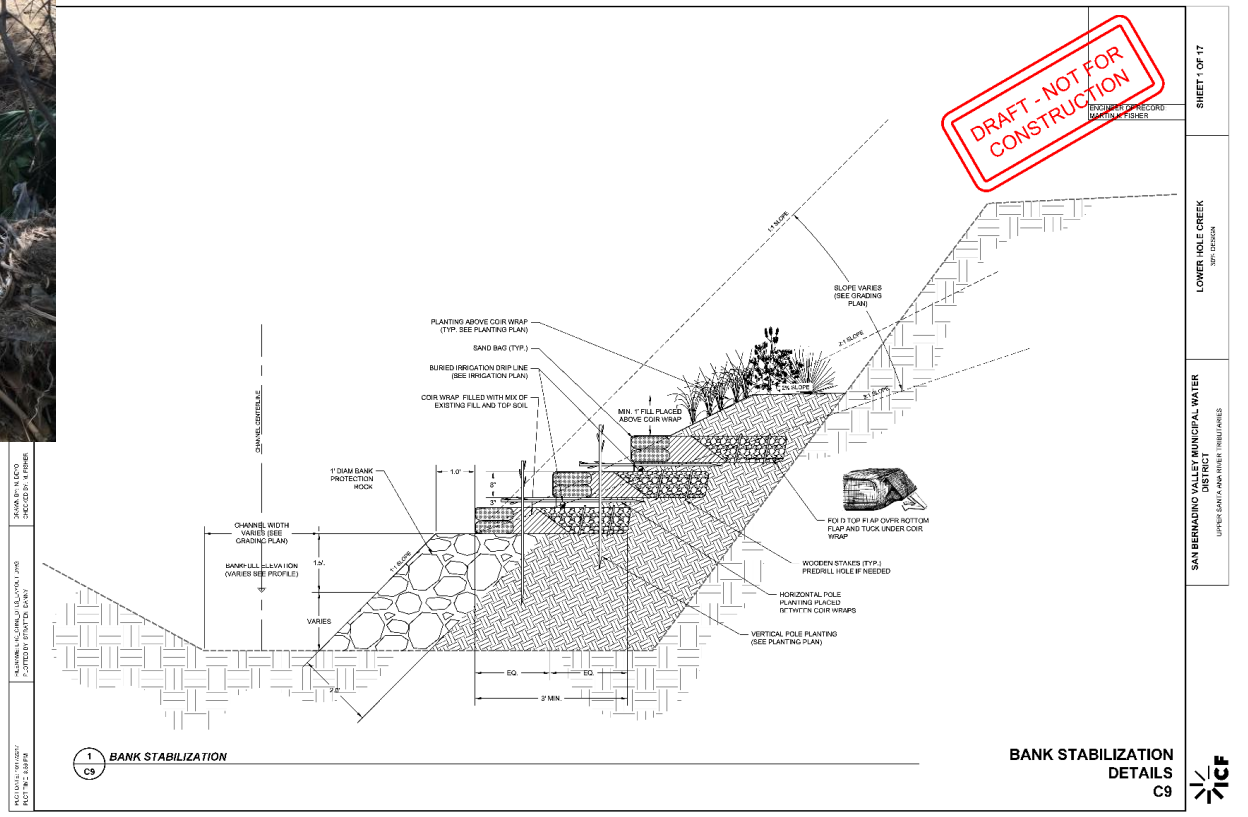


Bank Stabilization Detail

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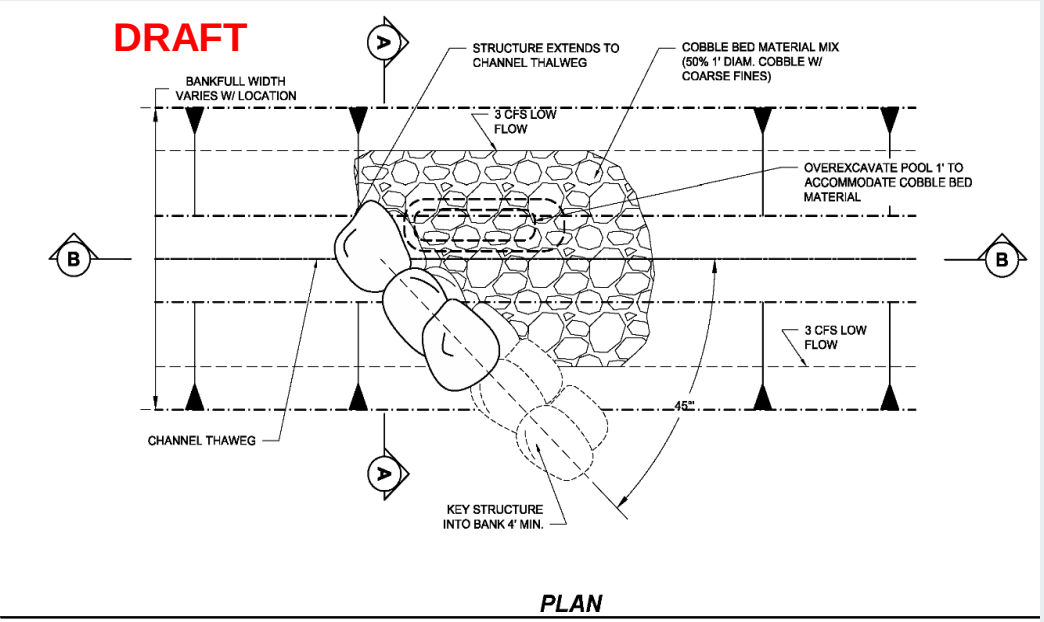


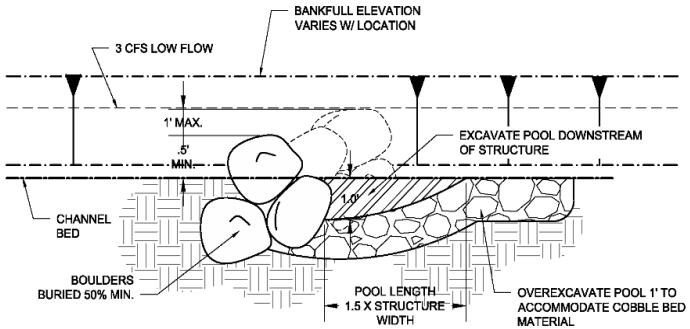


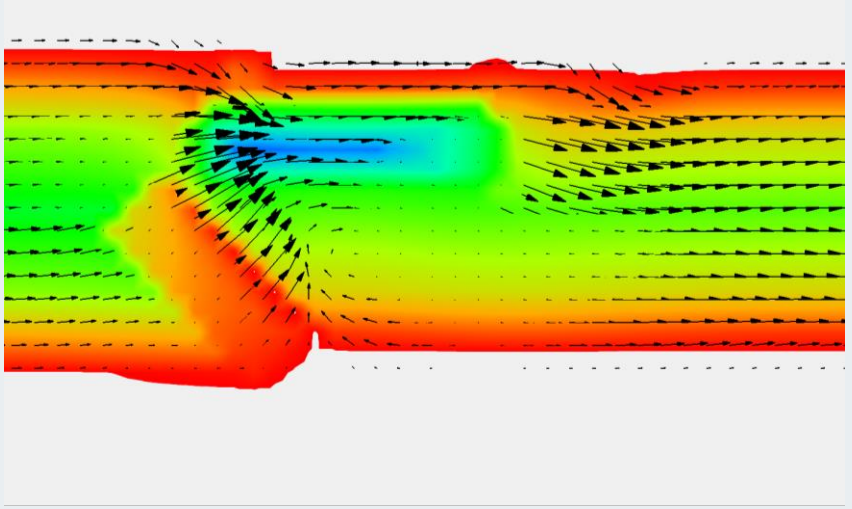

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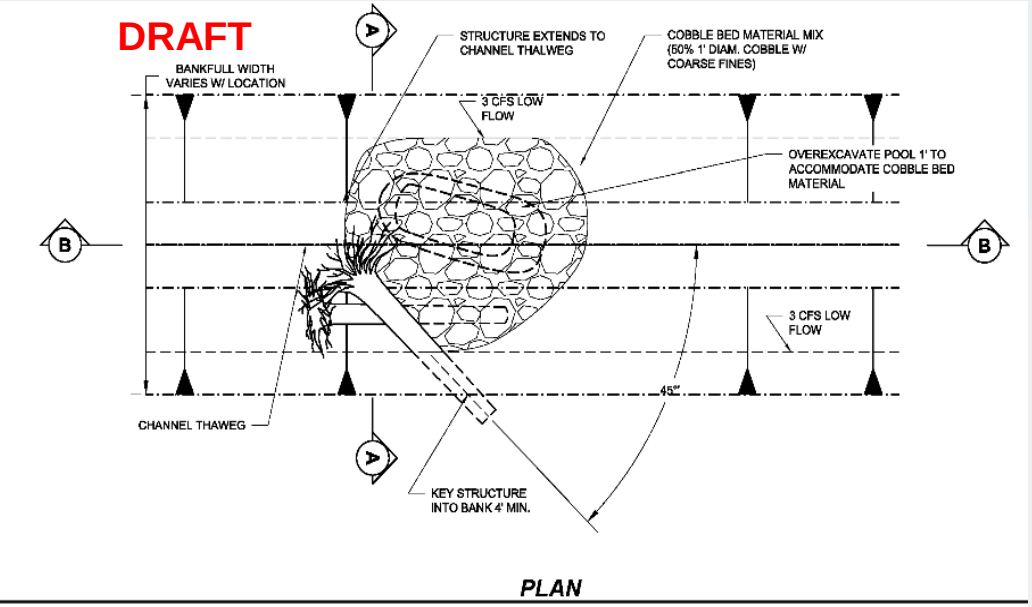


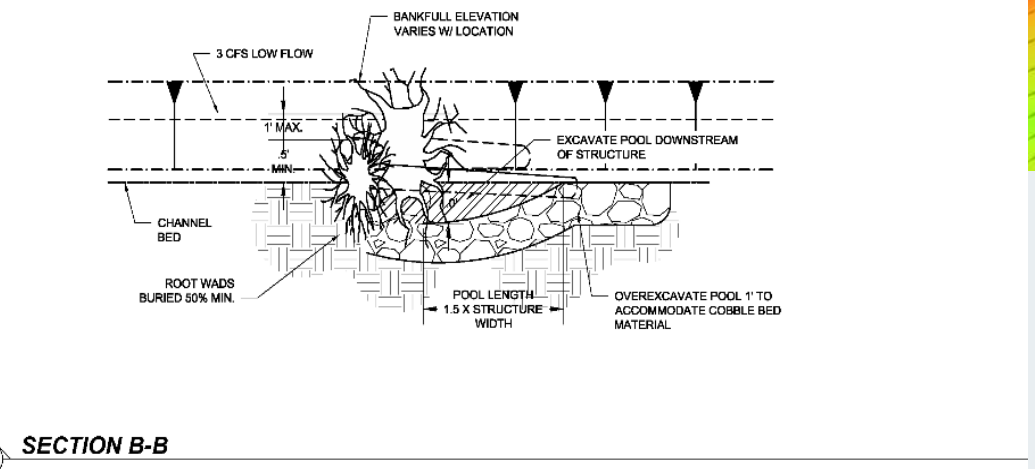


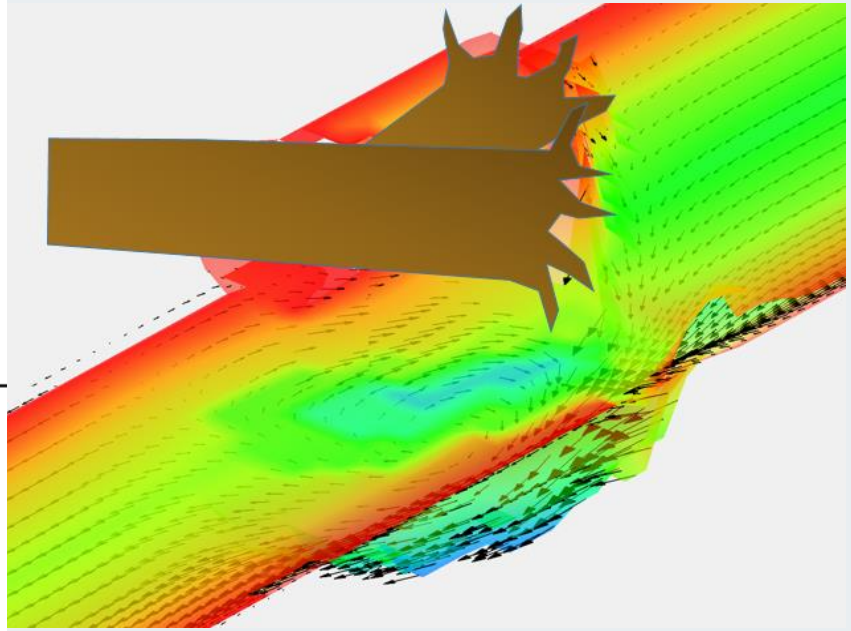

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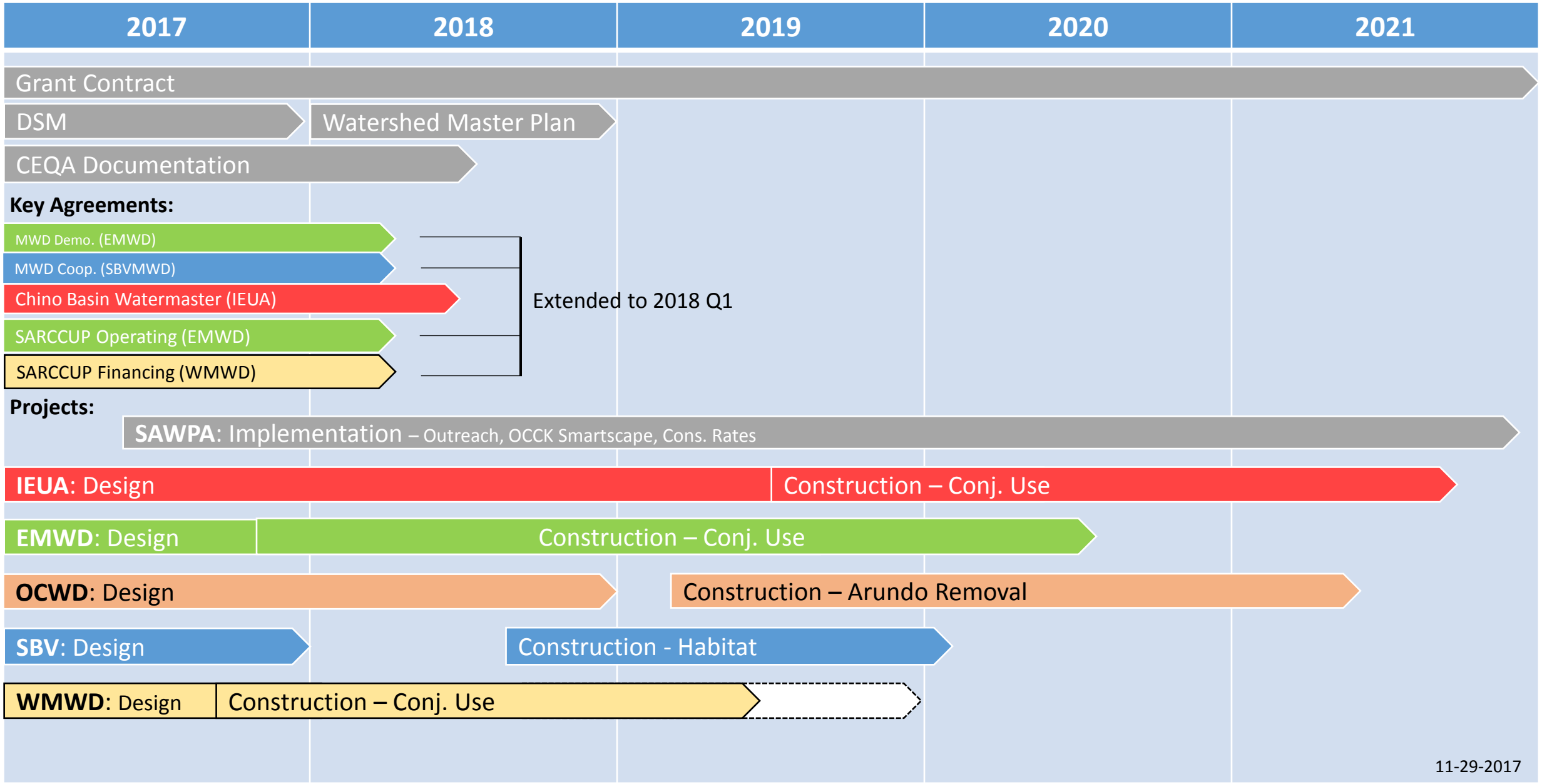
# Santa Ana River Conservation and Conjunctive Use Program – Project Schedule Updates

**Presenter:**
Brian Dietrick

December 5, 2017

National Experience. Local Focus.

# SARCCUP Schedule Roll-Up (By Agency)

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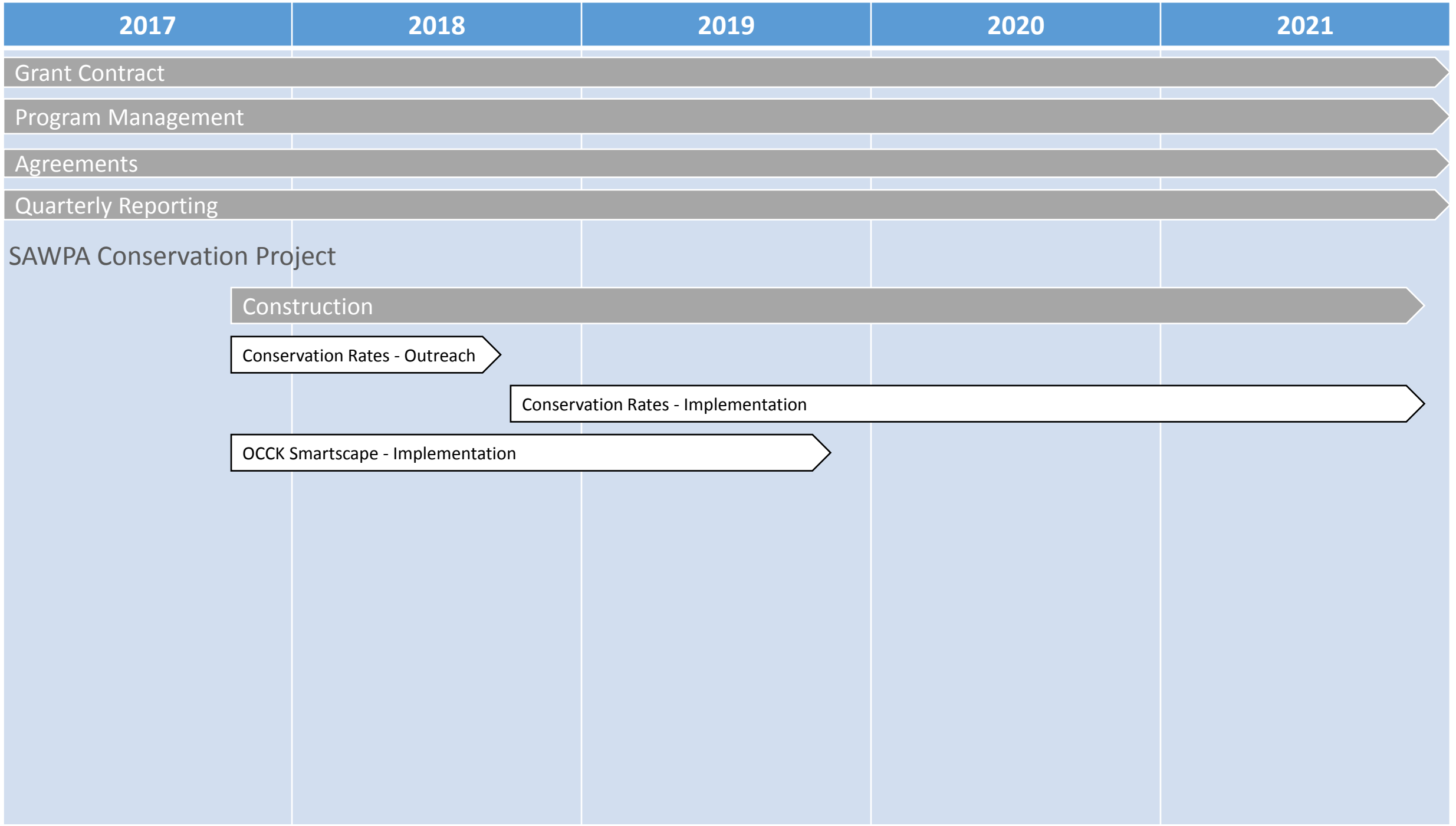
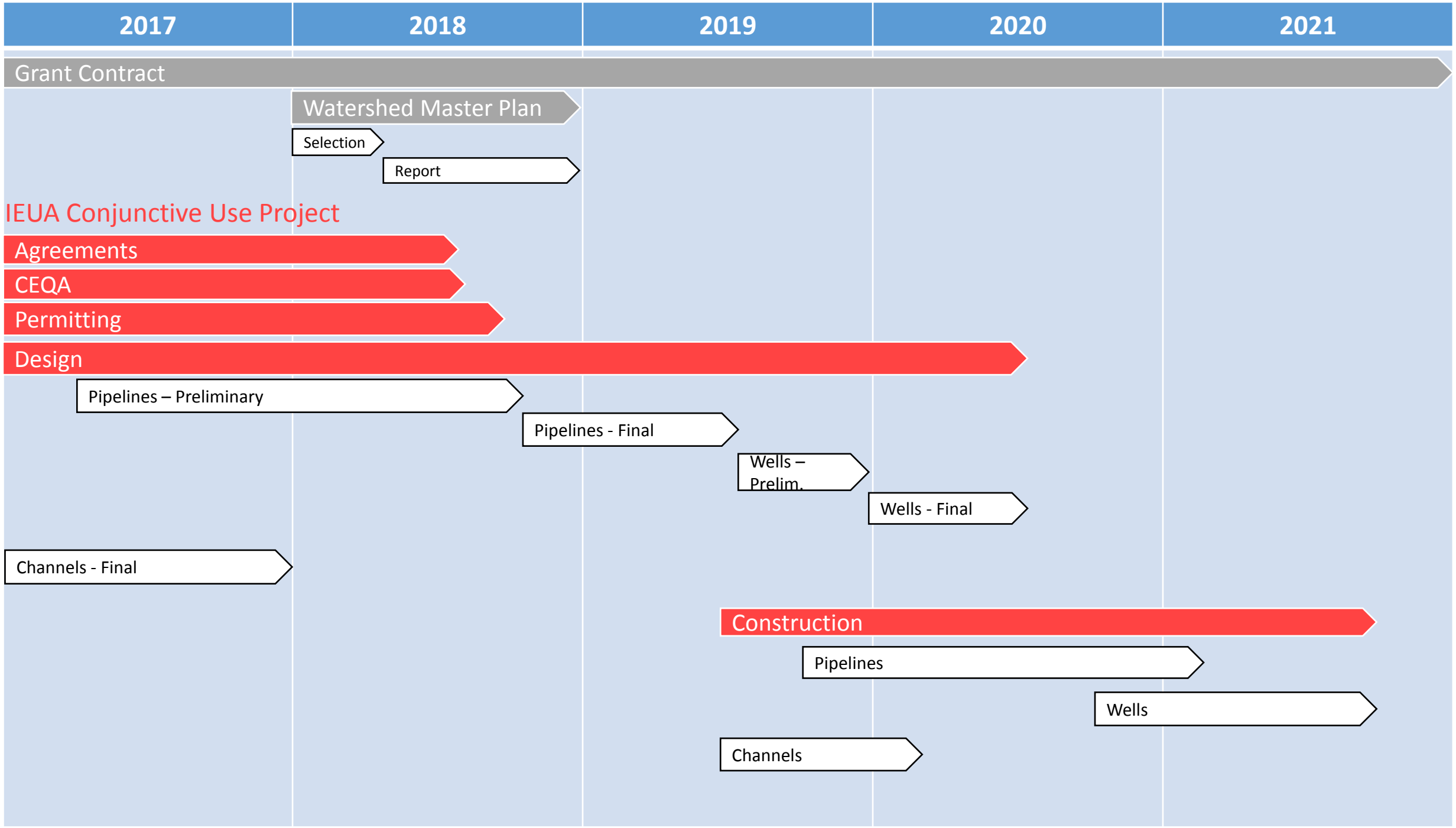
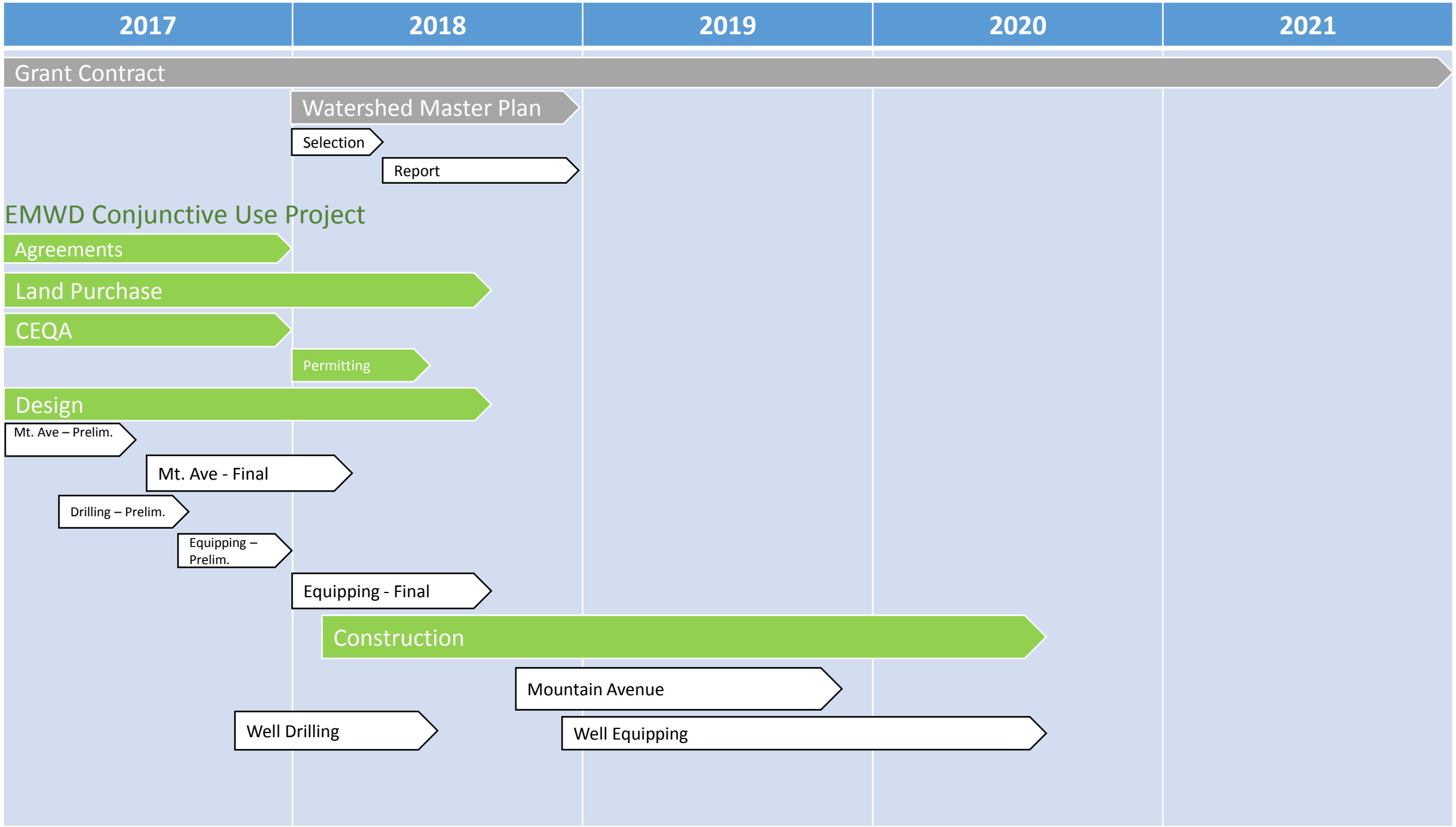
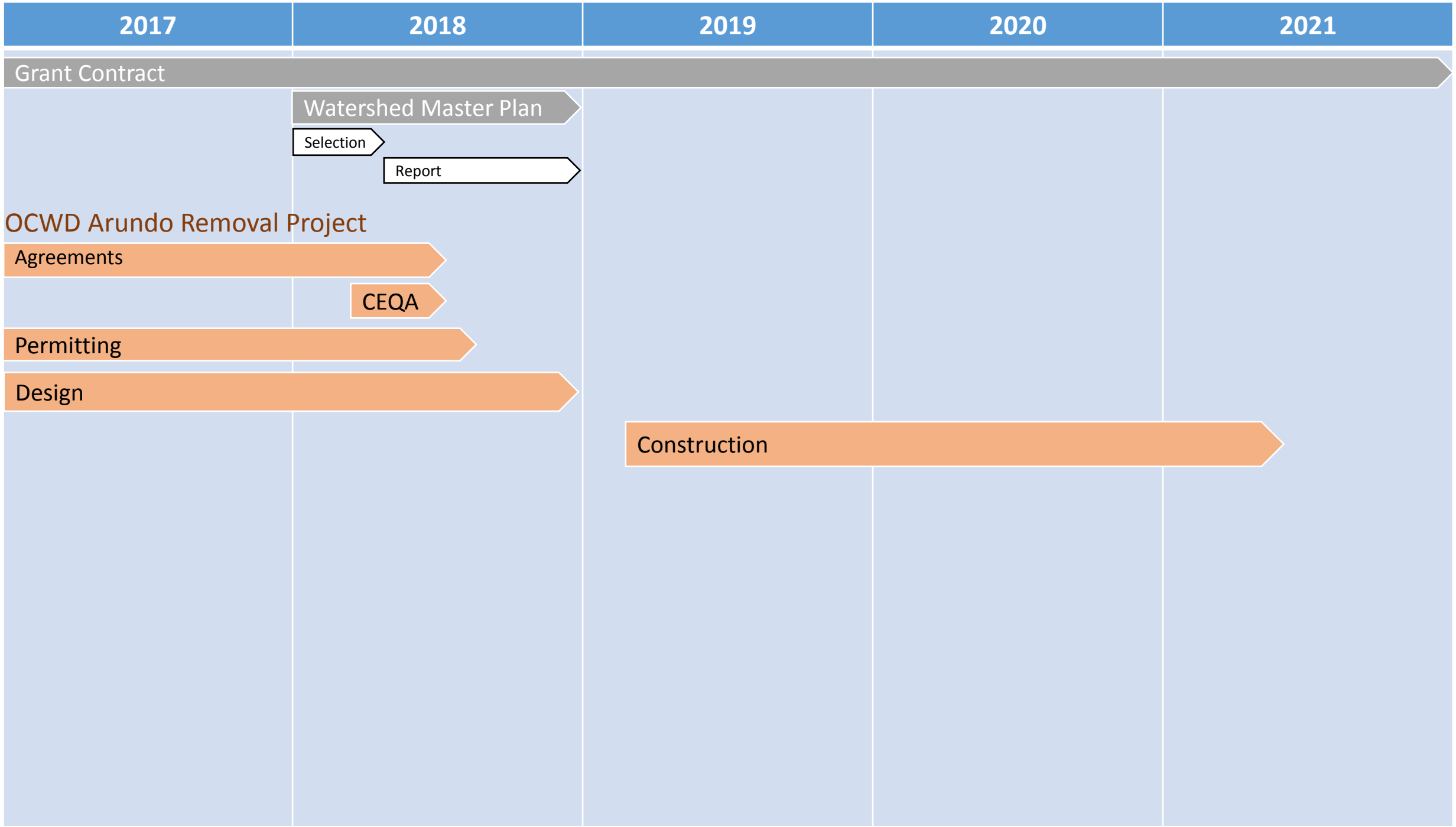
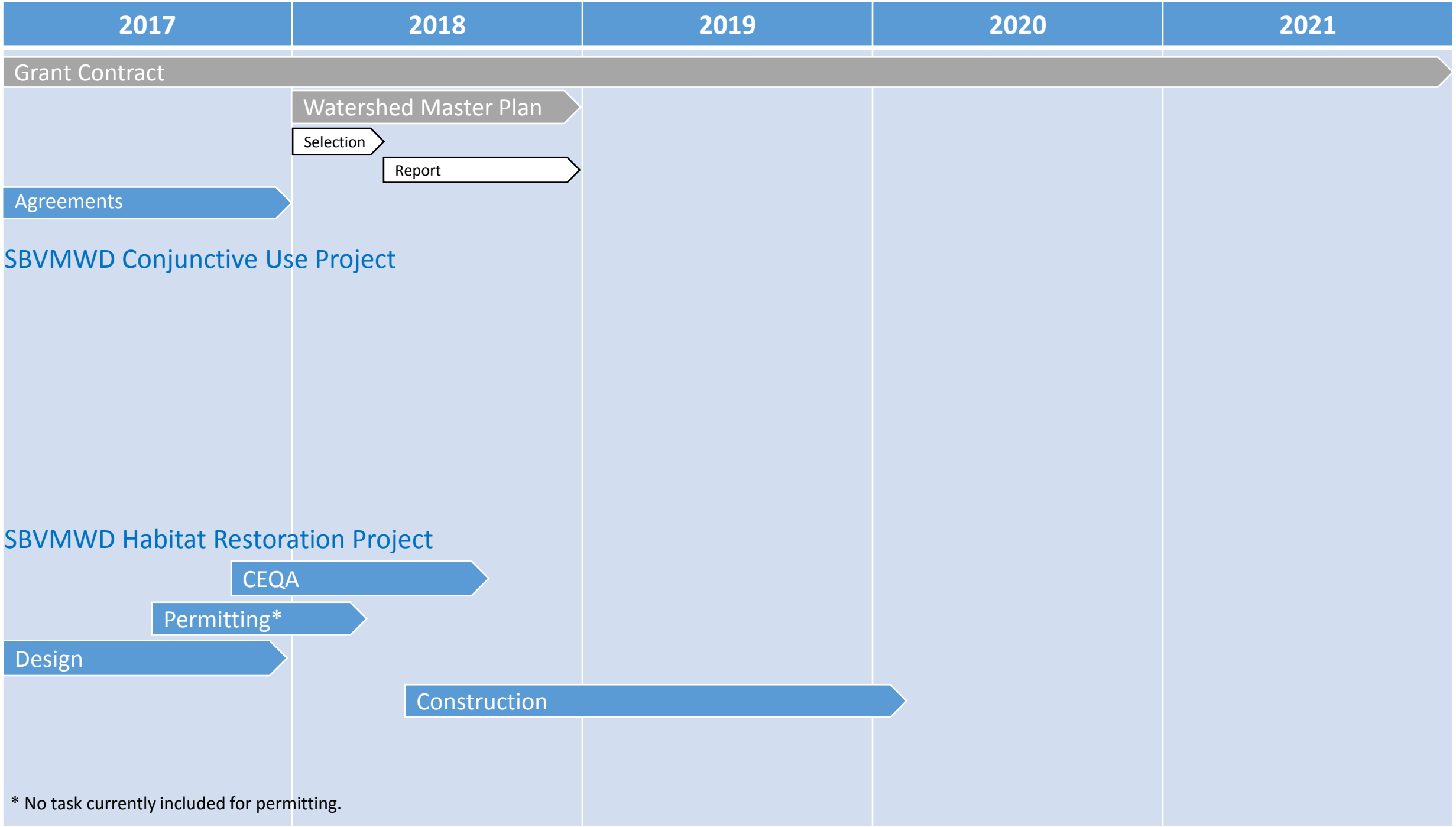
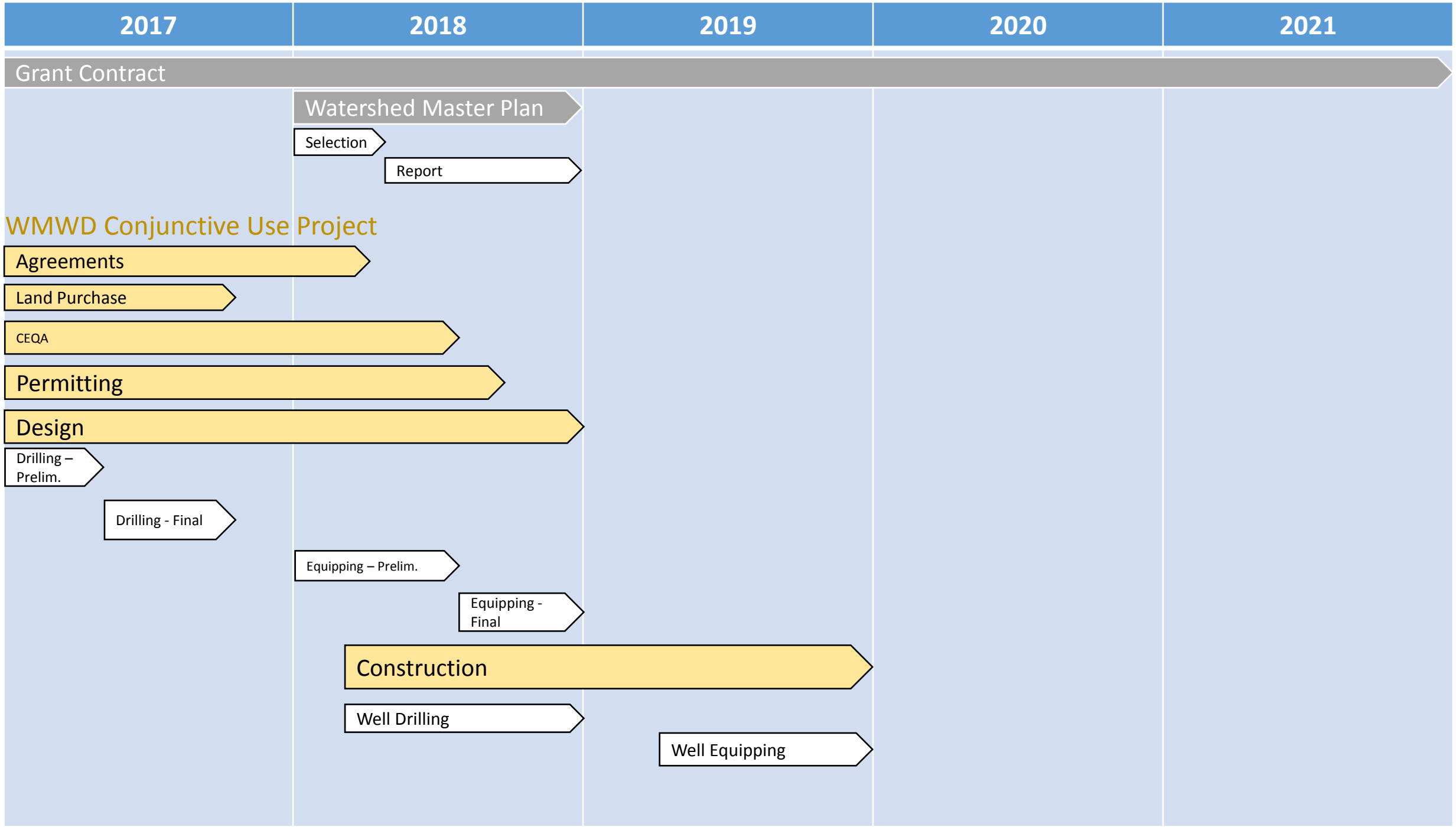

2017
2018
2019
2020
2021
Grant Contract
Program Management
Agreements
Quarterly Reporting
SAWPA Conservation Project
Construction
Conservation Rates - Outreach
Conservation Rates - Implementation
OCCK Smartscape - Implementation


2017
2018
2019
2020
2021
Grant Contract
Watershed Master Plan
Selection
Report
IEUA Conjunctive Use Project
Agreements
CEQA
Permitting
Design
Pipelines – Preliminary
Pipelines - Final
Wells – Prelim.
Wells - Final
Channels - Final
Construction
Pipelines
Wells
Channels


2017
2018
2019
2020
2021
Grant Contract
Watershed Master Plan
Selection
Report
EMWD Conjunctive Use Project
Agreements
Land Purchase
CEQA
Permitting
Design
Mt. Ave – Prelim.
Mt. Ave - Final
Drilling – Prelim.
Equipping – Prelim.
Equipping - Final
Construction
Mountain Avenue
Well Drilling
Well Equipping


2017
2018
2019
2020
2021
Grant Contract
Watershed Master Plan
Selection
Report
OCWD Arundo Removal Project
Agreements
CEQA
Permitting
Design
Construction


2017
2018
2019
2020
2021
Grant Contract
Watershed Master Plan
Selection
Report
Agreements
SBVMWD Conjunctive Use Project
SBVMWD Habitat Restoration Project
CEQA
Permitting*
Design
Construction
* No task currently included for permitting.


2017
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Selection
Report
WMWD Conjunctive Use Project
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Land Purchase
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Permitting
Design
Drilling – Prelim.
Drilling - Final
Equipping – Prelim.
Equipping - Final
Construction
Well Drilling
Well Equipping

# Santa Ana River Conservation and Conjunctive Use Program – Project Schedule Updates


**Presenters:**
Scott Goldman
Brian Dietrick


December 5, 2017

RMC water and environment
WOODARD & CURRAN
National Experience. Local Focus.