# CHINO BASIN PROGRAM FEASIBILITY STUDY

Prepared by:

Inland Empire Utilities Agency

OCTOBER 2021

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### Prepared By:

**Inland Empire Utilities Agency**
**GEI Consultants, Inc.**

### With planning and technical support from:

Brown & Caldwell (Alternatives Preliminary Design)
Tom Dodson & Associates (Environmental Planning)

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# Acronyms and Abbreviations

| | |
|---|---|
| 1,2,3-TCP | 1,2,3-Trichloropropane |
| AF | acre-feet |
| AFY | acre-feet per year |
| AWPF | advanced water purification facility |
| Basin | Chino groundwater basin |
| BC | benefit-cost |
| CBP | Chino Basin Program |
| CBWB | Chino Basin Water Bank |
| CBWM | Chino Basin Watermaster |
| CCWRF | Carbon Canyon Water Recycling Facility |
| CDA | Chino Basin Desalter Authority |
| CDFW | California Department of Fish and Wildlife |
| CEC | contaminant of emerging concern |
| CEQA | California Environmental Quality Act |
| COS | cost of service |
| CVWD | Cucamonga Valley Water District |
| CWC | California Water Commission |
| DCP | Drought Contingency Plan |
| Delta | Sacramento-San Joaquin Delta |
| DWR | California Department of Water Resources |
| EWL | Etiwanda Wastewater Line |
| FWC | Fontana Water Company |
| FY | fiscal year |
| GHG | greenhouse gas |
| HGL | hydraulic grade line |
| HP | horsepower |
| IEBL | Inland Empire Brine Line |
| IEUA | Inland Empire Utilities Agency |
| IRP | Integrated Water Resources Plan |
| LACSD | Los Angeles County Sanitation District |
| MAF | million acre-feet |
| MBR | membrane bioreactor |
| Metropolitan | Metropolitan Water District of Southern California |
| MF | membrane filtration |
| MG | million gallons |
| mgd | million gallons per day |
| mg/L | milligrams per liter |
| $MTCO_2e$ | metric tons per year of $CO_2$ equivalents |

| | |
|---|---|
| MVWD | Monte Vista Water District |
| MZ | management zone |
| NPDES | National Pollutant Discharge Elimination System |
| NPV | net present value |
| NRW | non-recoverable wastewater |
| NRWS | Non-Reclaimable Wastewater System |
| OBMP | Optimum Basin Management Program |
| PCCP | prestressed concrete cylinder pipe |
| PDR | Preliminary Design Report |
| PEIR | Programmatic Environmental Impact Report |
| PFOA | perfluorooctanoic acid |
| PV | present value |
| RMPU | Recharge Master Plan Update |
| RO | reverse osmosis |
| RP | recycling plant |
| RWQCB | Santa Ana Regional Water Quality Control Board |
| SCAB | South Coast Air Basin |
| SCAQMD | South Coast Air Quality Management District |
| SCRB | Separable Costs – Remaining Benefits |
| SWP | State Water Project |
| TAFY | thousand acre-feet per year |
| TDS | total dissolved solids |
| TM | technical memorandum |
| TYF | Ten Year Forecast |
| UV-AOP | ultraviolet advanced oxidation process |
| UWMP | Urban Water Management Plan |
| VOC | volatile organic compounds |
| WFA | Water Facilities Authority |
| WSIP | Water Storage Investment Program |
| WTP | water treatment plant |

# Executive Summary

## Introduction and Background

The Inland Empire Utilities Agency (IEUA) strives to secure a reliable, high-quality water supply through the use of various water sources, including imported water, stormwater, groundwater, and recycled water for its member agencies. The use of groundwater and recycled water within the region is constrained by the Regional Water Quality Control Board and the State Water Resources Control Board – Division of Drinking Water, which define limits for total dissolved solids (TDS) and contaminants of emerging concern (CEC), such as 1,2,3-Trichloropropane (1,2,3-TCP), perfluorooctanoic acid (PFOA), and microplastics in IEUA's recycled water and groundwater.

These water quality challenges inform water supply reliability within the region. Rising levels of TDS and CECs threaten the continued use and recharge of recycled water, which accounts for 20 percent of IEUA's water supply portfolio. This supply is critical for the region as imported water supplies, which account for 25 percent of the region's water supply, become less reliable due to climate change and drought.

Recent projections indicate that no new supplies will be needed over the next 25 years to meet future demands. This assumes that all sources used by IEUA, including recycled water, are reliable through this timeframe. However, IEUA estimates that without taking additional action, TDS limits for recycled water direct non-potable use and groundwater recharge may be exceeded within the next 10 years. Additionally, CECs such as 1,2,3-TCP and PFOA are entering IEUA's regional water recycling facilities, which are not designed for their removal. Together, these concerns threaten the reliability of recycled water within the region.

As a result, the region's focus for the next 25 years is to enhance water supply reliability through the implementation of various management strategies, including advanced water purification. By treating recycled water to meet regulatory compliance limitations for TDS and other contaminants, the region is able to secure this resource, which both enhances water supply resiliency and protects the investments that the region has been making for over 20 years in the recycled water program.

Beyond 2050, IEUA has prioritized securing additional water supplies to support flexible resource management in light of the increased likelihood of drought and potential interruptions to imported water supplies due to catastrophic events. This requires additional investments in infrastructure to produce more local supplies within the region, such as groundwater and recycled water.

## Formulation of Alternatives

IEUA and its partners explored different alternatives to address the region's regulatory challenges and long-term water supply reliability needs while meeting the region's overarching objectives. Alternatives have been refined through extensive engagement with IEUA member agencies, Metropolitan Water District of Southern California (Metropolitan), and state agencies. This refinement has produced three project alternatives that address one or more of the region's objectives:

- No Action Alternative
- Alternative 1: Baseline Compliance Plan Alternative
- Alternative 2: Regional Water Quality and Reliability Plan Alternative
- Alternative 3: Chino Basin Program (CBP) Alternative

Under a No Action Alternative, there would be no expansion of existing recycled water systems or groundwater by member agencies of IEUA. Anticipated future growth would generally be served with imported potable water and local agencies would need to increase their water purchases or implement more restrictive conservation programs to satisfy potable water demand. The No Action Alternative results in the Chino Basin being out of regulatory compliance, threatens water supply, and does not meet the region's objectives, and was not considered further in this study's feasibility evaluation.

The Baseline Compliance Plan includes centrally located advanced water purification facilities that will be used with IEUA's existing conveyance system to help address the region's regulatory compliance challenges and deliver regional benefits in the form of enhanced water quality. These facilities include a phased 15 thousand acre-feet per year (TAFY) advanced water purification facility (AWPF) (9 TAFY on-line by 2030 and the remaining 6 TAFY on-line by 2040), pump station, 6 TAFY of external supplies, and brine conveyance pipelines. The Baseline Compliance Plan does not include groundwater injection facilities, new extraction wells or related interconnections, and does not create a new local water supply.

The Regional Water Quality and Reliability Plan builds upon the Baseline Compliance Plan to address regional water quality and water supply challenges. This alternative includes the same facilities as the Baseline Compliance Plan; however, the 15 TAFY would not be phased and would be on-line by 2030. Additionally, the Regional Water Quality and Reliability Plan differs from the Baseline Compliance Plan with the introduction of purified water pipelines, groundwater injection facilities, and groundwater extraction facilities with a capacity of 15 TAFY including pipelines, extraction wells, and pump stations.

Finally, the CBP further builds upon the Regional Water Quality and Reliability Plan to address regional water quality and water supply challenges, provide additional flexibility for groundwater management in the Chino Basin, and provide statewide benefits through a water exchange with the State Water Project (SWP). Similar to the Regional Water Quality and Reliability Plan, the CBP will consist of AWPF, injection wells, extraction wells, groundwater treatment facilities, external recycled water supplies, and a pipeline distribution network connecting the facilities to local agencies. The CBP differs from the Regional Water Quality and Reliability Plan by increasing total extraction capacity from 15 TAFY to 40 TAFY and with the introduction of facilities connecting the CBP pipeline distribution network to Metropolitan's water distribution system to allow for a portion of the water supply developed by the CBP to be pumped to Metropolitan to offset SWP Table A water supplies that would instead be released from Lake Oroville to create pulse flows in the Feather River for ecosystem benefits.

## Evaluation and Comparison of Alternatives

Based on the evaluation and comparison of the three alternatives, the CBP (Alternative 3) is the preferred alternative. While the Baseline Compliance Plan (Alternative 1) may represent the minimum required action by

IEUA, the economic analysis performed as part of this feasibility study (Appendix E) demonstrates that considerable additional value can be secured by IEUA by pursing either multi-purpose project alternative, the Regional Water Quality and Reliability Plan (Alternative 2) with a BC ratio of 1.22 or the CBP with a BC ratio of 1.08. The Proposition 1 Water Storage Investment Program funding available for the CBP results in lower costs to IEUA over the 50-year project life but provides marginally reduced water supply benefits over the first 25 years of implementation compared to the Regional Water Quality and Reliability Plan. If the additional water supply provided by the Regional Water Quality and Reliability Plan for these first 25 years of the project life is not required, the CBP offers a lower cost approach to securing significant value and a greater level of benefits as provided by the Regional Water Quality and Reliability Plan over the second 25 years of the project life.

## Description of the Preferred Alternative

The major components of the preferred combination of PUT facilities (or those that are associated with the recharge of recycled water into the Chino Basin) and TAKE facilities (or those that are associated with the extraction of groundwater from the Chino Basin) for the CBP include the following:

- PUT facilities
    - 15 TAFY AWPF located at IEUA's Regional Water Recycling Plant No. 4 (RP-4)
    - 7.1 miles of 8-inch to 30-inch pipelines from the AWPF to injection wells
    - One pump station at RP-4 to pump water from the AWPF to the conveyance pipeline to the injection wells
    - 16 injection wells (12 active, 4 on standby)
    - 1,400 feet (8-inch) pipeline for brine conveyance
    - 16.1 miles of 24-inch pipeline and two pump stations ranging from 430 horsepower (HP) to 670 HP to produce 6 TAFY of external supplies
- TAKE facilities
    - 24- to 48-inch turnouts and connections including:
        - 24-inch turnout to Fontana Water Company (FWC) Highland Zone (FWC F13 tanks)
        - 24-inch turnout to FWC Juniper Zone (FWC F17 tank)
        - 48-inch turnout to Cucamonga Valley Water District (CVWD) at the Lloyd W. Michael Water Treatment Plant
        - 24-inch turnout to Metropolitan at the Rialto Pipeline
    - 12 miles of 12- to 48-inch extraction well collector pipelines
    - Potable pipeline network to deliver water to agency turnouts including:
        - 6.3 miles of 48-inch pipeline to deliver to CVWD
        - 7.0 miles of 24-inch pipeline to deliver to FWC F13 tanks
        - 0.7 miles of 24-inch pipeline to delivery to FWC F17 tank
        - 0.8 miles of 24-inch pipeline to deliver to Metropolitan
    - 17 extraction wells
    - Two potable water pump stations
        - Potable Water Pump Station #1 – Reservoir to Lloyd Michael clearwell (CVWD Zone III): 5,300 HP
        - Potable Water Pump Station #2 – Lloyd Michael clearwell to the Rialto Pipeline: 650 HP

- One 5.0 million-gallon (MG) storage tank that would serve as a forebay for Potable Water Pump Station #1

The background assumptions and information necessary to formulate the preferred combination of PUT and TAKE facilities for the CBP are provided in Appendix C. The feasibility-level conceptual design for this combination of facilities is provided in Appendix D.

## Determination of Feasibility for the Preferred Alternative

The feasibility of the CBP is summarized below with respect to technical feasibility, environmental feasibility, economic feasibility, financial feasibility, and constructability.

### *Technical Feasibility*

IEUA has significant prior experience designing and constructing recycled water treatment facilities, groundwater recharge and recovery facilities, and associated pipeline and pumping distribution facilities. Experience includes environmental review and permitting, design, construction, equipping, and operation of treatment works, recharge basins, conveyance facilities, and turnout structures. Project facilities would be designed, located, and constructed to minimize potential impacts to adjacent users and would be constructed using existing, well-established, efficient, and reliable engineering and design standards, and construction standards.

Preliminary design reports were prepared (Appendix C and Appendix D), which provide a description of planning and design assumptions, an analysis of project alternatives, a description of the proposed facilities, how the facilities would be integrated with existing IEUA facilities, construction methods, capital and operations cost estimates, and replacement cost estimates.

Based on the analyses performed to date, the CBP alternative is considered to be technically feasible, constructible, and can be cost-effectively operated and maintained.

### *Environmental Feasibility*

The proposed CBP could result in significant impacts related to the construction-related greenhouse gas emissions that would result from the extension of water-related infrastructure. As such, though mitigation measures identified under air quality could reduce emissions from construction equipment and could ensure minimization of fugitive dust during construction of CBP facilities, project-related greenhouse gas emissions and air quality emissions are anticipated to exceed the South Coast Air Quality Management District thresholds, and therefore the proposed CBP could result in significant and unavoidable impacts related to construction of new or expansion of or modifications to existing water facilities.

Given the above, a statement of overriding considerations is anticipated to be required. It will address why the project benefits outweigh the project impacts.

### *Economic Feasibility*

Note that the costs and benefits for the CBP are only tabulated from a statewide perspective that considers comprehensive costs and benefits accruing to the state or nation as a whole. From this perspective, the CBP is projected to be economically feasible. With an estimated present value (PV) benefit of $1,259.8 (Table ES-1) and a present value cost of $1,171.0 (Table ES-2), the net present value is $88.7 million, resulting in a benefit-cost ratio of 1.08 (Table ES-3).

**Table ES-1: Alternative 3: CBP Benefit Summary**

| | Alternative 3: CBP |
|---|---|
| **PV Benefit ($ million)** | $1,259.8 |
| ***Water Supply Benefits*** | *$380.8* |
| **- Pump-In Benefit** | $10.0 |
| **- In-Lieu Benefit** | $62.5 |
| **- Metropolitan Demand Offset** | $249.5 |
| **- Shortage Avoidance Benefit** | $58.8 |
| ***Water Quality Benefits*** | *$593.8* |
| ***Emergency Supply Benefits*** | *$165.4* |
| ***Ecosystem Benefits*** | *$119.7* |

**Table ES-2: Alternative 3: CBP Cost Summary**

| | Alternative 3: CBP |
|---|---|
| **Total Capital Cost (2019 $ million)** | $665.9 |
| **PV Cost (2019 $ million)[1]** | $1,171.0 |
| ***Capital and Replacement Cost*** | *$589.2* |
| **- Loan Payment** | $299.6 |
| **- Replacement Cost** | $120.2 |
| ***Annual Costs*** | *$393.5* |
| **- O&M Cost** | $364.4 |
| **- NRW Cost** | $29.1 |
| ***Recycled Water Import Cost*** | *$188.3* |

**Notes:**
[1] Present value: capital and O&M costs evaluated for 50 years and discounted to 2019 dollars
O&M: operations and maintenance
NRW: non-recoverable wastewater

**Table ES-3: CBP Net Present Value Summary**

| | Alternative 3: CBP |
|---|---|
| **PV Cost ($ million)** | $1,171.0 |
| **PV Benefit ($ million)** | $1,259.8 |
| **Net Present Value ($ million)** | $88.7 |
| **Benefit – Cost Ratio** | 1.08 |

The results of the cost allocation analysis are delineated in Table ES-4. The CBP is a multi-purpose project with water supply reliability and water quality improvement primary project purposes, and subsidence avoidance and emergency water supply secondary project purposes. The cost allocation analysis, which considers separable costs assignable to single purposes and allocates remaining joint costs in recognition of monetized benefits for each project purpose, results in the largest assigned portion of project costs to water quality improvement purposes for the CBP (58 percent). Water supply reliability is assigned the next greatest portion of project costs at 36 percent. Finally, emergency water supply and environmental improvements are allocated relatively minor amounts of total project costs.

**Table ES-4: Allocated Annualized Life Cycle Costs by Project Purpose ($ million)**

| | Alternative 3: CBP | |
|---|---|---|
| **Project Purpose** | Annualized Cost | Percent of Total |
| **Water Supply** | $12.6 | 36% |
| **Water Quality** | $20.4 | 58% |
| **Emergency Supply** | $1.3 | 4% |
| **Environmental** | $1.0 | 3% |
| **Total** | $35.3 | |

## *Financial Feasibility*

IEUA will continue to pursue additional WSIP funding if it becomes available, as well as other State and Federal funding opportunities to offset remaining capital costs. The remaining balance of capital and operating costs will be financed by IEUA with cost recovery through:

1. IEUA wastewater rates under the Chino Basin Regional Sewage Service Contract which includes the following contracting agencies: the cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Upland, and Cucamonga Valley Water District in the city of Rancho Cucamonga (estimated at 30 percent of total life cycle project costs), and
2. Agreements with local participating agencies that will use a portion of CBP water supplies in lieu of water deliveries from Metropolitan (estimated at 70 percent of total life cycle project costs)

Specific funding plans for capital and continuing annual costs will be refined and presented through a Cost of Service (COS) study that is underway. The COS will describe the specific means for collecting revenue required for financing the program.

### *Constructability*

A detailed discussion of how the proposed facilities will be installed and the amount of time required for their construction is provided in the CBP Draft Program Environmental Impact Report (Appendix B). Non-complex design and construction techniques and various types of construction materials that are reasonably available will be used to construct the PUT and TAKE facilities associated with the CBP. Various types of skilled craftsmen and laborers will be used to construct the facilities associated with the CBP, with a significant workforce expected to be needed over the estimated five years of construction. The different types and associated number of skilled craftsmen and laborers needed to construct these facilities will be needed at different times over the duration of construction depending on the final design and construction schedule. Standard construction equipment will be used to construct the facilities associated with the CBP including bull dozers, backhoes, loaders, excavators, dump trucks, water trucks, compactors, cranes, rollers, grinders, paving machines, and rollers/vibrators. In summary, the CBP is expected to be able to be constructed with existing technology and available construction materials, work force, and equipment.

# 1 Introduction and Setting

## 1.1 Introduction

Inland Empire Utilities Agency (IEUA), located in western San Bernardino County, serves approximately 875,000 residents in a 242-square-mile service area. As a regional wastewater treatment agency, IEUA provides sewage utility services to seven contracting agencies under the Chino Basin Regional Sewage Service Contract: the cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Upland, and Cucamonga Valley Water District (CVWD) in the city of Rancho Cucamonga. In addition to the contracting agencies, IEUA provides wholesale imported water from Metropolitan Water District of Southern California (Metropolitan) to Water Facilities Authority (WFA), CVWD in the city of Rancho Cucamonga, and Fontana Water Company (FWC) in the city of Fontana. WFA then serves imported water to the cities of Chino, Chino Hills, Ontario, Upland, and Monte Vista Water District in the city of Montclair and adjacent unincorporated areas (Figure 1-1).


**Figure 1-1: IEUA Service Area**

IEUA and local partners have long-term plans to implement a variety of new infrastructure to meet future needs for wastewater treatment and potable water supplies, while increasing resiliency and sustainability of regional water resources management. Some of the facilities included in these plans are addressed in IEUA's ten-year forecast (TYF) and Integrated Water Resources Plan (IRP). The Chino Basin Program (CBP) provides an opportunity to implement critical long-term project components of these plans, addressing local, regional, and potentially statewide and federal water resources management issues. The CBP is a revolutionary, first-of-its-kind program designed to help the region move beyond traditional water management practices and into a new era of water use optimization. The CBP promotes proactive investment in managing the water quality of the Chino Groundwater Basin (Chino Basin or Basin) and in meeting regional water supply reliability needs in the face of climate change, while leveraging California's interregional plumbing system and the Chino Basin's future potential for water recycling to produce benefits to local, state, and federal interests. This report describes the CBP, these benefits, and summarizes its feasibility relative to other alternatives for addressing the region's needs.

## 1.2 Background

The Chino Basin retail water agencies' water supply portfolio includes imported and recycled water provided by IEUA, in addition to groundwater from both the Chino and surrounding basins, and local surface water from various creeks that originate in the San Gabriel Mountains and flow through the service area. The availability of imported water supplies is heavily dependent on hydrology and environmental regulations and results in highly variable annual imported water supplies to the IEUA service area. Because imported water rates are increasing and imported supplies are not as reliable as they were historically, IEUA and the region are committed to developing local reliable water supplies to provide greater reliability and resiliency for the region.

In the mid-1990s, IEUA identified recycled water as one of the critical components to provide a resilient water supply for the region, a hydrology-independent and reliable local supply source. Recycled water from the IEUA facilities through a regional recycled water distribution system is used directly for agricultural irrigation; industrial processes; irrigation of parks, parkways, schools, golf courses, commercial landscape sites, construction sites; and groundwater recharge. Since the year 2000, direct use of recycled water has increased nearly seven-fold compared to usage in 2000, with usage in recent years hovering around 20 thousand acre-feet per year (TAFY). On average, recycled water accounts for 20 percent of IEUA's water supply portfolio. Similarly, groundwater recharge of recycled water has also increased in the last ten years, with recent volumes hovering around three times higher than what was recharged in 2010.

The continued use of recycled water within the region is compliance driven, with regulatory limitations for total dissolved solids (TDS) in IEUA's recycled water and groundwater recharge. In the event of non-compliance, assets would become stranded, and IEUA would need to supplement the water supply portfolio with more expensive and/or less reliable sources. Today, IEUA estimates that, without taking additional action, TDS limits for recycled water direct use and groundwater recharge may be exceeded within the next 10 years.

This underscores IEUA's need for a long-term solution to secure recycled water as a resource within the region. Though there are a number of solutions that IEUA could implement to address the regulatory challenges within the region, none are as optimal as implementation of advanced treatment. Advanced treatment would address TDS levels for both direct use of recycled water and groundwater recharge and could also help address other regulatory challenges in the Basin (e.g., State Water Resources Control Board Title 17 and Title 22 regulations).

## 1.3 Chino Basin Program Overview

IEUA's CBP is an innovative approach to addressing local, regional, and statewide water resources management issues through strategic partnerships, creative water exchanges, and deployment of new critical infrastructure.

Integral to the CBP is a 15 TAFY advanced water purification facility (AWPF) that would remove salinity from recycled water, improving the sustainability of a resource that would otherwise be gradually degraded beyond usability, resulting in loss of local supplies, stranded assets, and increased reliance on State Water Project (SWP) supplies. Along with these water quality benefits, the CBP is uniquely designed to deliver other public benefits including:

- **Environmental benefits:** The CBP would develop new southern California advanced water treatment supplies to be stored in the Chino Groundwater Basin and exchanged in dry years for southern California-bound SWP supplies stored in northern California. The stored northern California water would subsequently be released as multi-day pulse flows to support anadromous fish populations in the Feather River and the Sacramento-San Joaquin Delta (Delta), providing a statewide public benefit.
- **Water supply benefits:** Proposed facilities under the CBP including advanced water purification facilities, groundwater recharge and extraction facilities, and other associated infrastructure, would provide a new average annual water supply of 15 TAFY. The new water supplies would be committed to environmental purposes through an exchange for SWP water supplies currently delivered to Metropolitan. During that time, economic water supply benefits would still be produced through savings associated with use of highly reliable local water supplies in lieu of Metropolitan deliveries. During the 25-year CBP water exchange commitment period, the facilities could be used by IEUA and its member agencies when not needed for the Water Storage Investment Program (WSIP) commitment. After the 25-year water exchange commitment for the CBP, all new water supplies produced by new infrastructure would be available for local use without restriction, with very high reliability. Additional extraction, conveyance, and interconnection facilities would improve the ability to manage water supplies within the Chino Basin for local use during all years and during years under which planned infrastructure maintenance and rehabilitation occurs. The CBP would also allow IEUA to avoid costs associated with procuring water supplies during years when Metropolitan is unable to deliver full contract supplies, resulting in water shortage avoidance benefits.
- **Emergency response benefits:** New water stored in the Chino Groundwater Basin will enhance emergency response water supply availability for IEUA and other participating agencies during crises such as prolonged drought, or catastrophic events or other infrastructure failure that limits delivery of imported water supplies. The CBP would include provisions to provide up to 50 TAFY of stored water in the Chino Groundwater Basin under emergency conditions to local agencies or regionally by utilizing Metropolitan's water distribution system.
- **Additional Regional Benefits:** CBP conjunctive use operations and new interconnection infrastructure could support additional investment for expanded use of the Chino Basin for water storage/conjunctive use programs that provide corresponding benefits to the Chino Basin. The CBP will also improve IEUA's ability to manage water supplies within the Chino Basin during planned infrastructure shutdown, such as the Rialto Pipeline rehabilitation, and provide additional flexibility in managing Chino Basin groundwater for water quality issues and subsidence.

## 1.4 Purpose and Scope

In August 2017, IEUA submitted a California Proposition 1 WSIP application for the CBP. In July 2018, the California Water Commission (CWC or Commission) approved maximum conditional funding for the proposal in the amount of $206.9 million. Additional funds became available in 2021 from the Temperance Flat Reservoir Project withdrawing from the program. The CWC used these funds to increase the conditional award to the maximum eligible amount plus a 2.5 percent inflation adjustment. This resulted in a current conditional award amount of $212,072,500. WSIP Regulations Section 6013(f)(2) states that all projects must meet the following statutory requirements to remain eligible for funding and show continued progress:

"(2) After January 1, 2022, a project will not be eligible for funding if the following conditions are not met:

- (A) All feasibility studies are complete and draft environmental documentation is available for public review;
- (B) The Commission makes a finding that the project is feasible, and will advance the long-term objectives of restoring ecological health and improving water management for beneficial uses of the Delta;
- (C) The Director of the Department receives commitments from not less than 75 percent of the non-public benefit cost shares of the project;"

At the time of the 2018 determinations the CWC made a finding that the CBP "appeared" to be feasible and that it would advance the long-term objectives of restoring ecological health and improving water management for beneficial uses of the Delta. Other elements of the statutory requirements, or proof thereof, are included in Appendix A (75% commitment for non-public benefits) and Appendix B (CBP Draft Program Environmental Impact Report [PEIR]).

In its technical review, staff and commissioners outlined their preliminary findings and identified areas of potential deficiencies. This feasibility study is designed to meet the 1/1/22 statutory requirements of the WSIP, provide supporting information to areas noted in the technical review, and provide an updated project description/preferred alternative, while following the suggested guidance of the CWC Technical Reference. This feasibility study has been developed from a statewide perspective that considers comprehensive costs and benefits accruing to the state or nation as a whole. The quantified costs and benefits presented here are valued from a statewide perspective and are intended to support a finding by the California Water Commission that the Chino Basin Program is feasible and qualified to receive Proposition 1 Water Storage Investment Program funding. These costs and benefits do not necessarily reflect specific financial impacts to IEUA or its member agencies that could affect investment decisions by those agencies. Table 1-1 below is a crosswalk that features elements from the CWC Technical Reference and where these elements can be found in this feasibility study.

**Table 1-1: CWC Technical Reference Elements Relative to the Feasibility Study**

| | Chapter 1 | Chapter 2 | Chapter 3 | Chapter 4 | Chapter 5 |
|---|---|---|---|---|---|
| Project Objectives | • | | • | | |
| Project Description | | | | | • |
| Project Costs | | | | • | • |
| Project Benefits | | | | • | • |
| Cost Allocation | | | | | • |
| Technical Feasibility | | | | • | • |
| Environmental Feasibility | | | | • | • |
| Economic Feasibility | | | | • | • |
| Financial Feasibility | | | | • | • |
| Constructability | | | | • | • |

## 1.5 Project Objectives

The formulation of planning objectives is a key step within the context of a regional feasibility study. Planning objectives presented here are formulated in response to existing conditions and related water resources problems, needs, and opportunities for the region. The planning objectives are used to guide the development and evaluation of alternatives to address these water resources management needs.

As previously discussed, water quality is a key constraint to addressing water supply reliability challenges within the region. As regulatory concerns associated with TDS and contaminants of emerging concern mount, recycled water and groundwater supply sources become less reliable without additional action. To secure these resources for the future, IEUA has prioritized enhancing water supply reliability over the next 25 years through a suite of solutions targeted at maintaining regulatory compliance. This includes protecting and improving groundwater quality in the Chino Groundwater Basin and improving recycled water quality.

Beyond these 25 years, and in light of the increased likelihood of extreme droughts and the risk of catastrophic events that could interrupt delivery of critical supplies to the region, IEUA has prioritized investment in water supply sources that promote flexible resource management.

By investing in basin-wide water supply infrastructure and local supplies, water supply reliability is improved through enhanced emergency response, improved groundwater supply and quality management, and expansion of recycled water supplies. This robust water supply portfolio available to the region will be more resilient and less susceptible to catastrophic events and the effects of climate change.

### 1.5.1 Protect and Enhance Regional Water Quality

- **Meet Permit Compliance for the Continued Use of Recycled Water in the Chino Groundwater Basin**

Groundwater is the most heavily relied on local water supply type, and the Chino and non-Chino Groundwater supplies have accounted for 53 percent of the regional water supply portfolio over the last decade. The vulnerability assessment for IEUA's 2020 Regional Drought Contingency Plan (DCP) illustrated how compromised groundwater quality poses a significant threat to local water supply reliability and can be compounded as other supplies currently used for blending, such as imported water, become less reliable. Thus, it is critical to enhance local groundwater treatment to help the region achieve its water reliability and resiliency objectives.

- **Maintain Commitments for Salt Management to Sustain and Enhance the Safe Yield of the Chino Groundwater Basin**

Recycled water is an increasingly essential asset to the region, particularly with the uncertain future of imported water supplies due to climate change and environmental factors. Since 2000, recycled water use within the region has increased by as much as seven times, with recharge of this water also increasing over the last 10 years. Recycled water is the region's most climate resilient water supply because the amount of water available is not affected by dry years. Today, recycled water makes up approximately 20 percent of IEUA's water supply portfolio and hundreds of millions of dollars have been invested into the regional recycled water program. Applications for recycled water face challenges in terms of changing wastewater quality and treatment requirements due to increases in indoor and outdoor water use efficiency standards and increasing regulatory and environmental requirements. Additionally, the use of recycled water is impacted by the groundwater quality of the Chino Groundwater Basin. Specifically, the applications for recycled water become constrained if the salinity in the Basin rises beyond specified regulatory limits. Maintaining and expanding recycled water projects to manage these challenges will both increase the resiliency of the regional water supplies and help to augment safe yield of the Chino Groundwater Basin through increased recharge of high-quality recycled water. Expansion of these projects is targeted for the next 10 years, which could have side stream treatment to reduce recycled water TDS levels to 100 milligrams per liter (mg/L), with an overall blended target of 500 – 515 mg/L.

### 1.5.2 Improve Regional Water Supply Reliability and Resiliency

- **Develop Infrastructure that Addresses Long Term Supply Vulnerabilities**

Historical planning documents recognize the increasingly uncertain future of imported water supply availability and the importance of local water supplies, particularly with changing climate conditions, and the economic impacts associated with potential shortages in Metropolitan deliveries. In particular, discussions on the anticipated Rialto Feeder rehabilitation in 2033 is projected to have supply interruptions up to 18 months; IEUA's imported water supply is 100 percent provided by the Rialto Feeder and alternative options are not available for IEUA and its agencies. To reduce dependence on imported water and provide flexibility in water resources management, IEUA and its member agencies desire to enhance the current IEUA recycled water and groundwater recharge programs by developing basin-wide infrastructure, thus enhancing regional water supply reliability and resiliency. Such infrastructure would improve the use of recycled water at a regional level through interagency connections and would enhance the local groundwater supplies through additional groundwater wells and wellhead treatment.

- **Provide a Source of Water for Emergency Response**

Regional water supply flexibility and redundancy enables the region to adapt to changes that limit, reduce, or make water supplies unavailable. Given the great distances that imported supplies travel to reach the Inland Empire, the region is vulnerable to interruptions along hundreds of miles of aqueducts, pipelines, and other facilities associated with delivering the supplies to the region. This infrastructure that the region relies on to deliver imported supplies is also susceptible to damage from earthquakes and other disasters. Unplanned or catastrophic occurrences could cut off the supply of imported water, which makes up 25 percent of the Basin's water supply portfolio. Further, groundwater supply is likely to be adversely impacted by climate change-induced temperature increases and drought. Together, as documented in IEUA's Urban Water Management Plan (UWMP), severe droughts or emergency circumstances could require demand reductions within the region between 10 and 40 percent. A key conclusion drawn from IEUA's IRP is that it is important to secure supplemental water when available to recharge the Chino Basin (through direct or in-lieu practices) to enable increased groundwater production during droughts or emergencies.

➢ **Enhance Recharge and/or Reduce Groundwater Production to Address Subsidence**

The Chino Basin Optimum Basin Management Program (OBMP), as overseen by the Chino Basin Watermaster (Watermaster), was adopted in 2000 to provide a framework to maximize recycled water use within the region. Included in the OBMP are four broad goals to address regional issues, needs, and interests. Goal 3, Enhance Management of the Basin, calls for the development and/or encouragement of "production patterns, well fields, treatment and water transmission facilities and alternative water supply sources to ensure maximum and equitable availability of groundwater and to minimize land subsidence." To improve groundwater conditions, the Chino Basin parties are encouraged to enhance groundwater recharge and/or reduce localized groundwater production in specific areas. In doing so, this helps secure the reliability of groundwater supplies, since future extraction could be curtailed to reduce subsidence.

### 1.5.3 Develop an Integrated Solution to Produce State/Federal Environmental Benefits

The Nature Conservancy has advocated that publicly funded water supply projects dedicate a portion of the created water storage and yield to the environment. Developing an integrated solution that achieves state and federal ecosystem benefits while enhancing local water supply reliability allows for a flexible operational framework wherein water supplies are more reliable and effectively managed. IEUA is committed to developing such a solution to ensure that investments are leveraged to produce environmental benefits on a state and national scale, as well as other local benefits.

## 1.6 Related Plans, Programs, and Studies

IEUA in conjunction with its member agencies conducted a series of regional planning efforts to better prepare for the region's future needs. Each planning report is backed by technical studies and supporting documentation to ensure regional planning efforts are well informed. Through these planning documents IEUA has identified future needs that the agency must meet to continue its track record of providing reliable, clean, and sustainable water to the region. The CBP combines various projects that will allow the region to meet the needs identified in these planning reports and is thus the cumulation of years of interagency planning efforts.

While each planning report is unique, there are shared themes including:

- The need to diversify water supplies and reduce dependency on imported water
- The negative impacts of climate change on water reliability
- An increasing need for advanced water treatment

- Furthering the beneficial use of water to restore natural populations and habitats

These themes have been intentionally addressed by components of the CBP. The CBP provides an opportunity to implement projects that address critical needs on a more expedited schedule, providing benefits earlier, not only for the local agencies, but for CBP partners across the state. Provided below is the complete list of regional planning documents that support the implementation of the CBP.

### 1.6.1 Ten Year Forecast

The purpose of the TYF is to catalog and schedule capital improvement projects over a multiyear period to identify critical capital improvement projects to meet treatment capacity and regulatory compliance. Each year, pursuant to the terms of the Regional Sewage Service Contract, IEUA submits a TYF of capacity demands and capital projects to the Regional Technical and Policy Committees. This TYF identifies projects for the subsequent 10 fiscal years that are needed for the rehabilitation, replacement, or expansion of the facilities owned or operated by IEUA.

The TYF is a document that links the vision of the Agency with a list of physical projects to fulfill that purpose. Projects identified in the TYF are necessary to accomplish IEUA's goals based on physical conditions of assets and forecasted regional projections of water and wastewater needs. Based on these projections, the TYF proposes a schedule for the implementation of projects based on necessity. The timing of the projects identified in the TYF are further refined during the capital budget development based on the availability of financial resources.

### 1.6.2 Optimum Basin Management Program

Pursuant to the 1998 Judgement that created the Watermaster, the development of a plan to manage the Chino Basin was created. The OBMP consists of nine key elements: comprehensive monitoring, comprehensive recharge, water supply planning for impaired areas, regional supplemental water programs, groundwater management, cooperation to improve basin management, salt management program, groundwater storage program, and a storage and recharge program.

### 1.6.3 Peace Agreement

In July 2000, the parties to the Judgment signed the Peace Agreement. The Agreement outlined the parties' intent to implement the OBMP as well as other related responsibilities for the Watermaster and the parties.

### 1.6.4 Chino Basin Recharge Master Plan Update (RMPU)

In September 2000, the Superior Court approved the Peace Agreement and authorized the implementation of the Chino Basin OBMP. The Peace Agreement required the preparation of a RMPU every five years starting in 2000. The parties to the Peace Agreement started a process in 2005 to revise the Peace Agreement and the Judgment. This revision process was completed in late 2007 (hereafter the Peace II Agreement) and was subsequently approved by the Superior Court on December 21, 2007. The Court's approval contained nine conditions subsequent that must be satisfied for the revisions to be effective. Condition Subsequent 8 required that the RMPU be completed and submitted to the Court by July 1, 2010. The scope of work and contents of the 2010 RMPU are based in part on the December 21, 2007 Court Order and the Watermaster's future groundwater replenishment requirements. The RMPU was last updated in 2018.

### 1.6.5 OBMP Implementation Plan

With the Peace Agreement, the parties developed an Implementation Plan outlining time frames for implementing tasks and projects in accordance with the Peace Agreement and OBMP.

### 1.6.6 IEUA Integrated Water Resources Plan

The 2015 *Integrated Water Resources Plan: Water Supply and Climate Change Impacts 2015-2040* (IRP) is the region's blueprint for ensuring reliable, cost effective, and environmentally responsible water supplies for the next 25 years. The IRP takes into consideration availability of current and future water supplies and accounts for possible fluctuations in demand forecasts and climate change impacts. The two key goals of this IRP are to integrate and update water resource planning documents in a focused, holistic manner and to develop an implementation strategy that will improve near-term and long-term water resources management for the region.

Based on projected water needs and available water supplies through 2040, the IRP utilized a modeling framework to analyze the effectiveness of adaptive strategies or water development actions. From this modeling effort, the core findings include the following:

- The region's past investments in local water supplies and the diversification of the available water resources have positioned the region well to deal with the future impacts of climate change.
- Portfolios that combined recycled water, supplemental water supplies, and water efficiency actions yielded the most adaptive strategies for the region – especially when recycled water programs were maximized.

### 1.6.7 Metropolitan IRP

Metropolitan is in the process of developing an update to its 2015 IRP. Similar to IEUA's IRP planning efforts, Metropolitan's update to its 2015 IRP is used to guide water supply investments, programs, and policies by analyzing factors that could challenge or benefit Metropolitan's water supply. In developing this update, Metropolitan has developed four scenarios to describe alternative future conditions that result in four levels of frequency and magnitude of projected shortages. This approach evaluates a broader view of potential outcomes in an effort to establish an adaptive management strategy that can help to enhance water supply reliability. The four scenarios that were used in this study to estimate the frequency and magnitude of future shortages are summarized in Figure 1-2.

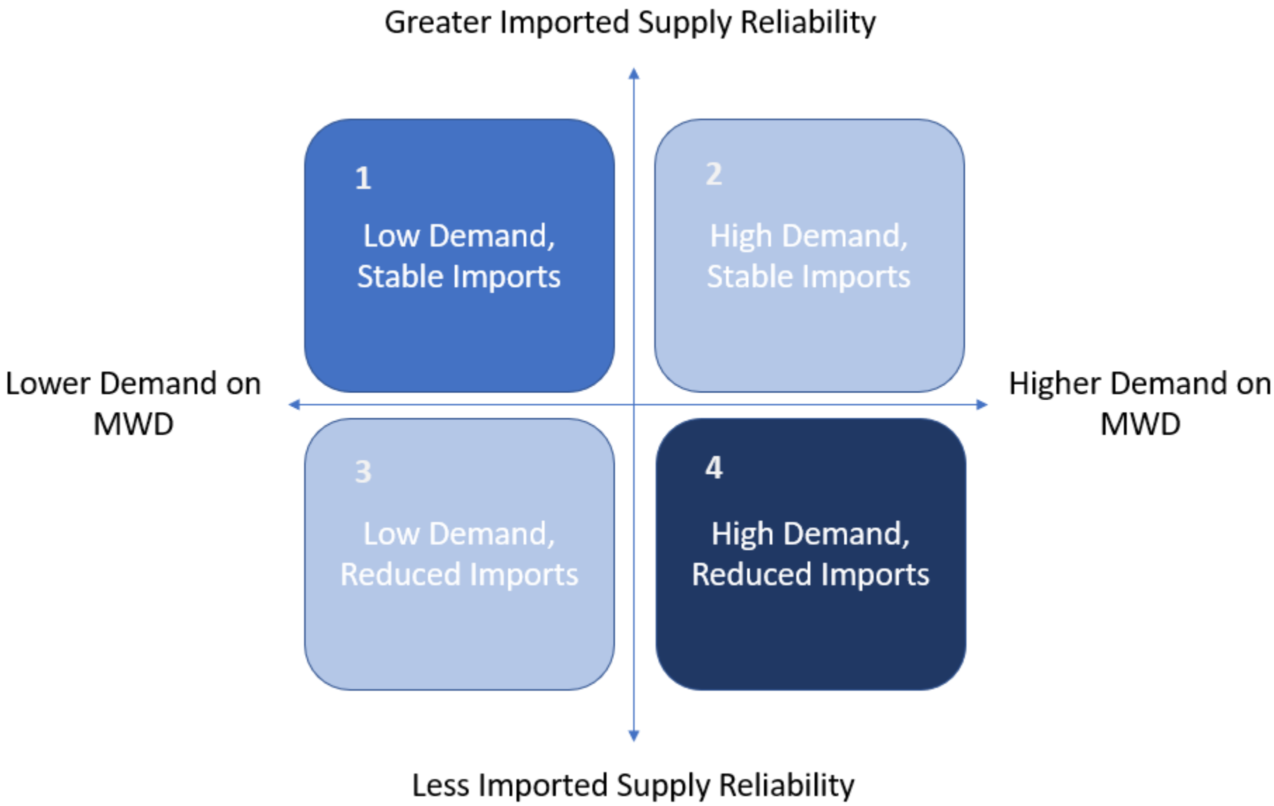


**Figure 1-2: Metropolitan 2015 IRP Update Future Conditions Scenarios (Metropolitan, 2021)**

### 1.6.8 Santa Ana River Basin Water Quality Control Plan (Basin Plan)

The regulatory framework that establishes the salinity management requirements and permit limitations are derived primarily from the Basin Plan. Based on the objectives that are established in the Basin Plan, IEUA's National Pollutant Discharge Elimination System (NPDES) permit conditions and recycled water groundwater recharge requirements are established by the Santa Ana Regional Water Quality Control Board (RWQCB).

The RWQCB developed the first Basin Plan in 1975 and has updated it several times since then. The plan defined TDS objectives ranging from 220 to 330 mg/L over a substantial portion of the Chino Basin. The ambient TDS concentrations in these areas exceeded the objectives, and therefore, restricted the use of IEUA's recycled water for irrigation and groundwater recharge.

To address this and similar regulatory compliance challenges across the groundwater basins in the Santa Ana Watershed, in the mid-1990's a Task Force consisting of 22 water resources agencies in the Santa Ana River Watershed was formed, and along with the RWQCB studied the impacts of Total Inorganic Nitrogen and TDS on water resources in the watershed. This culminated in the RWQCB's adoption of the 2004 Basin Plan amendment. This amendment included revised TDS and nitrogen objectives and beneficial uses for specific surface waters.

To promote the use of recycled water and manage artificial recharge of storm, imported, and recycled water, IEUA and the Watermaster proposed less stringent TDS limits. IEUA and the Watermaster also proposed a set of nine commitments that when combined with proposed TDS limits, provided the **“maximum benefits”** to the State. The RWQCB approved IEUA and the Watermaster’s proposal and less stringent objectives. These less stringent limits, known as the “maximum benefit” objectives, were adopted by the RWQCB in 2004 and effectively allowed for recycled water reuse and recharge by defining assimilative capacity within the Basin. The maximum benefit objectives are contingent upon IEUA and the Watermaster meeting the nine maximum benefit commitments as outlined in the Basin Plan and IEUA’s NPDES permit. Specifically, numeric limitations for TDS are imposed upon recycled water (550 mg/L) and groundwater recharge (420 mg/L). Actions that must be performed when the ambient water quality of the Chino Basin exceeds the maximum benefit objective (420 mg/L) are also defined.

### 1.6.9 California Water Resilience Portfolio Initiative

The California Water Resilience Portfolio Initiative is the result of an executive order issued by Governor Gavin Newsom in April 2019. The initiative directs state agencies to develop recommendations to improve water security as California confronts increasing risk resulting from more extreme droughts and floods, rising temperatures, depleted groundwater basins, and aging infrastructure. The initiative calls for a portfolio of actions to ensure the state’s long-term water resilience and ecosystem health. To develop the portfolio, state agencies conducted an inventory and assessment of key aspects of California water based on available information and input from tribes, agencies, individuals, groups, and leaders across the state. In January 2020 the California Natural Resources Agency, California Environmental Protection Agency and Department of Food and Agriculture developed the Draft Water Resilience Portfolio Report (Portfolio Report), which builds from this input and the myriad of state and local initiatives already underway. The draft Portfolio Report identifies a broad range of actions and establishes a collective recognition of the ways California can manage water to improve water security for all. Carrying out this portfolio will require cooperation across state agencies and with regional groups and leaders. The draft Portfolio Report serves as an important step toward achieving these ambitious goals.

## 1.7 Stakeholders and Partners

**IEUA –** IEUA is a wholesale supplier of imported water from Metropolitan, and a regional wastewater treatment agency. IEUA is focused on providing four key services:

1. Treating wastewater
2. Developing recycled water
3. Converting biosolids and waste products into a high-quality compost made from recycled materials
4. Generating electrical energy from renewable sources

Since its formation in 1950 as an agency to supply supplemental imported water from Metropolitan, IEUA has expanded to become a major provider of recycled water, a supplier of biosolids/compost materials, as well as continuing its leading role in water quality management and environmental protection in the Inland Empire. As previously discussed, IEUA provides sewage utility services to seven contracting agencies under the Chino Basin Regional Sewage Service Contract: the cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Upland, and CVWD in the city of Rancho Cucamonga. In addition to the contracting agencies, IEUA provides wholesale imported water from Metropolitan to WFA, CVWD in the city of Rancho Cucamonga and FWC in the city of Fontana; WFA then serves imported water to the cities of Chino, Chino Hills, Ontario, Upland, and Monte Vista Water District (MVWD) in the city of Montclair. Table 1-2 below provides a summary of each member agency, and the services areas are shown in Figure 1-1.

IEUA purchases only untreated imported water from Metropolitan. Two of IEUA’s retail water agencies (FWC and CVWD) provide treatment. IEUA’s third retail water agency, WFA, is comprised of five members as a Joint Powers Authority, including the cities of Chino, Chino Hills, Ontario, Upland, and MVWD. WFA purchases untreated imported water from IEUA, treats it, and delivers it to these retail water agencies. IEUA also provides wastewater service to seven contracting agencies under the Chino Basin Regional Sewage Service Contract, including the cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Upland, and CVWD.

As the lead on the CBP project, IEUA will be responsible for the successful implementation of the CBP, which includes the construction of the necessary infrastructure including the new AWPF. IEUA is a member of the Chino Basin Water Bank (CBWB) Joint Powers Authority along with CVWD, city of Ontario, and MVWD. IEUA, or IEUA as part of the CBWB with its partners, will ensure that the CBP aligns with the rules set forth by the Chino Basin Watermaster for the sustainable management of the Chino Groundwater Basin.

**Table 1-2: Retail Water Agencies within the IEUA Service Area**

| *Agency* | *Description* |
|---|---|
| *City of Chino* | The city of Chino serves water to a population of approximately 90,000 in the city and some unincorporated areas in San Bernardino County. |
| *City of Chino Hills* | The city of Chino Hills provides water to a population of approximately 80,000 in the city within its 46-square-mile service area that also includes small portions of Chino and Pomona. |
| *Cucamonga Valley Water District* | CVWD is a retail agency that provides water to approximately 190,000 customers within a 47-square-mile area comprised mainly of the city of Rancho Cucamonga. CVWD also provides water to small portions of the cities of Upland, Ontario, Fontana, and unincorporated areas of San Bernardino County. |
| *Fontana Water Company* | FWC is a retail investor-owned utility company that provides water to approximately 223,000 residents mainly in the city of Fontana, and also serves portions of the cities of Rancho Cucamonga and Rialto, outside the IEUA service area. |
| *Monte Vista Water District* | MVWD is a county water district founded in 1927 that provides retail water services to a population of approximately 130,000 in the city of Montclair, portions of the city of Chino, and unincorporated areas of San Bernardino County between Chino, Ontario, and Pomona. MVWD is also a wholesale water supplier to the city of Chino Hills, providing up to 21 million gallons per day (mgd) of water. |
| *City of Ontario* | The city of Ontario supplies water to a population of approximately 176,000 in the city and some unincorporated areas of San Bernardino County. The city of Ontario also serves a small portion of the city of Rancho Cucamonga. |
| *San Antonio Water Company* | San Antonio Water Company is a mutual water company that supplies water to approximately 3,371 residents in the unincorporated area of the city of Upland. |
| *City of Upland* | The city of Upland encompasses 15 square miles and serves water to approximately 77,000 people. |
| *West Valley Water District* | West Valley Water District serves approximately 82,000 customers in the communities of Bloomington, Colton, Fontana, Rialto, parts of unincorporated areas in San Bernardino, and Jurupa Valley in Riverside County. |

**Metropolitan Water District of Southern California –** Metropolitan is a regional wholesaler that provides water for 26 public member agencies to deliver – either directly or through their sub-agencies – to nearly 19 million people living in Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. Metropolitan imports water from the Colorado River via the Colorado River Aqueduct and from northern California via the SWP. These supplies supplement local supplies and Metropolitan's member agencies develop increased water conservation, recycling, storage, and other resource management programs. To supply its service area with reliable and safe water, Metropolitan owns and operates an extensive water system including: the Colorado River Aqueduct, 16 hydroelectric facilities, nine reservoirs, 819-miles of large-scale pipes, and five water treatment plants. Four of these treatment plants are among the 10 largest plants in the world, and Metropolitan is the largest distributor of treated drinking water in the United States. Metropolitan also helps its member agencies develop water recycling, storage, and other local resource programs to provide additional supplies and conservation programs to reduce regional demands.

Metropolitan is a vital partner in implementing the CBP. As a SWP Water Supply Contract holder, Metropolitan would serve as a fundamental party in completing proposed water exchange between supplies stored locally in the Chino Basin and SWP supplies stored in Lake Oroville.

**Watermaster –** On January 2, 1975, several Chino Basin producers filed suit in California State Superior Court for San Bernardino County to settle the problem of allocating water rights in the Chino Basin. On January 27, 1978, the Court entered a judgment in *Chino Basin Municipal Water District v. City of Chino et. al.* that led to adjudicating water rights in the Chino Basin and establishing the Watermaster. The Watermaster's function is to administer and enforce provisions of the 1978 judgment and subsequent orders of the Court, and to develop and implement an OBMP.

As the responsible party for the oversight of the Chino Basin Groundwater, the Watermaster will ensure the water entering the water bank complies with previously established guidelines and agreements including the OBMP, Peace Agreement, Chino Basin RMPU, and OBMP Implementation Plan.

**California Department of Fish and Wildlife (CDFW) –** The Mission of CDFW is to manage California's diverse fish, wildlife, plant resources, and habitats on which they depend, for their ecological values and for their use and enjoyment by the public.

CDFW is responsible for administering environmental benefits produced through WSIP projects, including the water supply created in northern California for environmental enhancement through the water exchange included in IEUA's CBP, and for ensuring that the benefits associated with pulse flows in the Feather River achieve the designated purpose.

**California Department of Water Resources (DWR) –** In cooperation with other agencies, DWR is responsible for the sustainable management of water resources of California to benefit the state's people and to protect, restore, and enhance the natural and human environments. DWR is committed to managing California's water resources, systems, and infrastructure, including the SWP, in a responsible, sustainable way.

While it is expected that CDFW will administer the CBP's ecosystem water supplies and benefits alongside assets provided by other WSIP projects, DWR's SWP infrastructure provides the basis for the CBP water exchange. Water supplies for Feather River pulse flows would be released by DWR from Lake Oroville, under terms of agreements with CDFW, Metropolitan, and other interests. Following a spring pulse flow release from Lake Oroville by DWR and coupled with delivery of water in the Chino Basin to Metropolitan, Metropolitan would subsequently forego a like quantity of Table A SWP deliveries, allowing DWR to reduce releases from Lake Oroville over the remainder of the calendar year and recover storage in the SWP system.

**State of California Natural Resources Agency –** The goal of California's Natural Resources Agency is to restore, protect, and manage the state's natural, historical, and cultural resources for current and future generations using creative approaches and solutions based on science, collaboration, and respect for all the communities and interests involved.

As previously noted, the Natural Resources Agency lead the development of a Draft Portfolio Report for the Governor's Water Resilience Portfolio Initiative. The draft Portfolio Report identifies a broad range of actions and establishes a collective recognition of the ways California can manage water to improve water security for all. Considering these actions requires cooperation across state agencies and with regional groups and leaders. The CBP aligns with the goals outlined by the Governor's initiative and integrates many of the same actions identified in the draft Portfolio Report to address local water management challenges and to help meet water security goals for the region and the state.

## 1.8 Report Organization

This feasibility study is organized into the following chapters:

- Chapter 1: Introduction and Setting
- Chapter 2: Existing and Likely Future Conditions
- Chapter 3: Formulation of Alternatives
- Chapter 4: Evaluation and Comparison of Alternatives
- Chapter 5: Selection of the Preferred Alternative

# 2 Existing and Likely Future Conditions

This chapter provides an overview of existing conditions in the Chino Basin, including water resources, socio-economic, and ecosystem conditions, and an overview of IEUA's existing infrastructure that supports the use of recycled water, groundwater, imported water, and surface water. Likely future without project conditions, which help to characterize the No Action Alternative presented in Chapter 3, are also defined.

## 2.1 Project Location

The Chino Basin covers approximately 235 square miles within the Upper Santa Ana River Watershed and lies within portions of San Bernardino, Riverside, and Los Angeles counties. The Chino Basin includes the following incorporated cities: Chino, Chino Hills, Eastvale, Fontana, Jurupa Valley, Montclair, Ontario, Pomona, Rancho Cucamonga, and Upland. Chino Basin also includes limited areas of unincorporated Riverside and San Bernardino counties.

The boundary of the Chino Basin is legally defined in the 1978 Judgment in the case of Chino Basin Municipal Water District vs. the City of Chino et al. Chino Basin is an alluvial valley that is relatively flat from east to west and slopes from the north to the south at a one to two percent grade. Valley elevation ranges from about 2,000 feet in the foothills to approximately 500 feet near Prado Dam. The Chino Basin is bounded:

- on the north by the San Gabriel Mountains and the Cucamonga Basin
- on the east by the Rialto-Colton Basin, Jurupa Hills, and Pedley Hills
- on the south by the La Sierra area and the Temescal Basin
- on the west by the Chino Hills, Puente Hills, and the Pomona and Claremont Basins

As previously noted, IEUA is a regional sewage treatment and water agency that provides wastewater treatment, solids handling, and recycled water to the west end of San Bernardino County. Five regional water recycling plants are used to treat wastewater from IEUA's service area. Those include Regional Water Recycling Plant No. 1 (RP-1), located in the city of Ontario; Regional Water Recycling Plant No. 2 (RP-2), located in the city of Chino; Regional Water Recycling Plant No. 4 (RP-4), located in the city of Rancho Cucamonga; Carbon Canyon Water Recycling Facility (CCWRF), located in the city of Chino; and Regional Water Recycling Plant No. 5 (RP-5), located in the city of Chino. Of the five plants, RP-2 is the only plant that does not produce any recycled water. In conjunction with these facilities, IEUA maintains and operates a desalter facility, Chino I Desalter, in the city of Chino and a biosolids composting facility, Inland Empire Composting Facility, in the city of Rancho Cucamonga on behalf of the Chino Basin Desalter Authority and Inland Empire Regional Composting Authority, respectively (Figure 2-1). IEUA is also the Metropolitan representative for the contracting agencies.

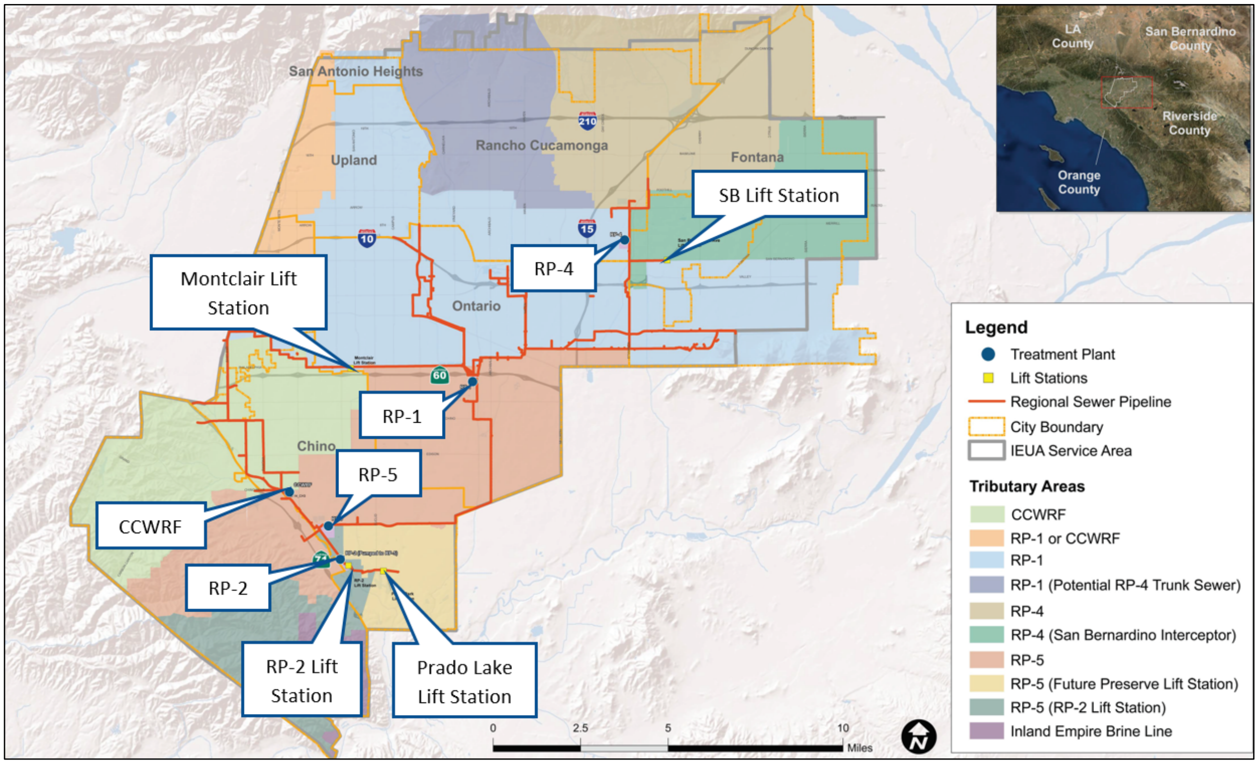

**Figure 2-1: IEUA Facility Locations**

## 2.2 Project Setting

### 2.2.1 Water Resources Conditions

Provided below is a brief discussion of water resources conditions in the Chino Basin, including climate and hydrology, on overview of the Chino Basin and IEUA's groundwater recharge program, IEUA's existing water supply portfolio, and existing water demands.

#### *2.2.1.1 Climate and Hydrology*

IEUA is located within the South Coast Air Basin (SCAB) that encompasses all of Orange County and the urban areas of Los Angeles, San Bernardino, and Riverside counties. The SCAB climate is characterized as "Mediterranean" with a semi-arid environment with mild winters, warm summers, and moderate rainfall. The average annual rainfall in the IEUA water service area is approximately 15 inches, most of which occurs during the winter months.

The principal drainage course of the Chino Basin is the Santa Ana River, which flows 69 miles across the Santa Ana Watershed from its origin in the San Bernardino Mountains to the Pacific Ocean. The Santa Ana River enters the Basin at the Riverside Narrows and flows along the southern boundary to the Prado Flood Control Reservoir where it is eventually discharged through the outlet at Prado Dam. Chino Basin is traversed by a series of ephemeral and perennial streams that include: Chino Creek, San Antonio Creek, Cucamonga Creek, Deer Creek, Day Creek, Etiwanda Creek, and San Sevaine Creek.

These creeks carry significant flows only during, and for a short time after, storm events that typically occur from November through March. Year-round flow occurs along the entire reach of the Santa Ana River due to year-round surface inflows at Riverside Narrows, discharges from municipal water recycling plants to the river between the Narrows and Prado Dam, and rising groundwater. Rising groundwater occurs in Chino Creek, in the Santa Ana River at Prado Dam, and potentially other locations on the Santa Ana River depending on climate and season.

#### *2.2.1.2 Chino Groundwater Basin*

The Chino Basin is an integral part of the regional and statewide water supply system. The Chino Basin is one of the largest groundwater basins in Southern California, containing approximately 5 million acre-feet (MAF) of water in storage, and has an unused storage capacity of approximately 1 MAF. Multiple cities and other water supply entities pump groundwater from the Basin for all or part of their municipal and industrial supplies. Agricultural users also pump groundwater from the Basin.

Although groundwater is an important local supply, the water quality in the lower Chino Basin area has been impacted by historical agricultural uses and now has high levels of nitrates and TDS. There are also some areas that exceed standards for perchlorate and volatile organic compounds (VOCs). These groundwater supplies require additional treatment and/or blending with higher quality imported water before it can be used as a potable supply. Watermaster works in partnership with municipalities, IEUA, and the RWQCB to address these water quality problems and to manage the Basin sustainably.

The Chino Basin is hydrologically subdivided into five groundwater zones or systems, referred to as management zones (MZ). Each MZ has a unique hydrology, and actions within one zone have little or no impact on adjacent zones. MZs are used to characterize the groundwater level, storage, production, and water quality conditions. Throughout these MZs, there are 19 existing spreading basins that have the capability of recharging stormwater, recycled water, and/or imported water into the Chino Basin.

#### *2.2.1.3 Groundwater Recharge*

IEUA, the Watermaster, the Chino Basin Water Conservation District, and the San Bernardino County Flood Control District jointly sponsor the Chino Basin recycled water groundwater recharge program that is an integral part of the OBMP and the region's water supply portfolio. This program was put in place to enhance water supply reliability and to improve drinking water quality throughout the greater Chino Basin. Annually, IEUA recharges on average between 30 and 40 TAFY of imported water, stormwater, and recycled water. The recharge infrastructure consists of a network of pipelines that direct stormwater run-off, imported water from the SWP, and IEUA recycled water to 16 recharge sites most of which consist of multiple recharge basins. These recharge basins provide capacity to recharge up to approximately 77.5 TAFY.

The Chino Basin recycled water groundwater recharge program assists in mitigating future water shortages in California caused by future limitations for importing water supplies from the SWP and provides a subsurface reserve of groundwater for local use. This enhances the current reliability of local groundwater supplies for a rapidly growing population and is an integral part of the local water supply planning. The groundwater recharge program is an important part of the overall Chino Groundwater Basin program and serves as a long-term solution to the water supply and water quality issues facing the greater Chino Basin.

Annually, IEUA recharges on average between 30,000 and 40,000 AF of imported water, stormwater, and recycled water. Past technical evaluations have estimated the net recharge capacity for the Chino Basin range to be approximately 115,000 to 130,000 AFY. This includes the ability to recharge water through the groundwater recharge basins and via in-lieu (increasing surface water supply to decrease groundwater pumping). Based on the Chino Basin Recycled Water Groundwater Recharge Program 2020 Annual Report, during the 2020 calendar year, 26,498 acre-feet (AF) of water was recharged in the Chino Basin, which included 7,351 AF of storm water and dry weather flows, 15,509 AF of recycled water, and 3,638 AF of imported water. Recycled water demand for groundwater recharge by agency in fiscal year (FY) 18/19 is provided in Table 2-1.

**Table 2-1: Recycled Water Demand for Groundwater Recharge by Agency for FY 2018/2019**

| Retail Agency | Recharge Allocation (AF) |
|---|---|
| **City of Chino** | 1,240 |
| **City of Chino Hills** | 1,018 |
| **CVWD** | 2,837 |
| **Fontana/FWC** | 2,233 |
| **Montclair/MVWD** | 495 |
| **City of Ontario** | 2,634 |
| **Upland** | 1,084 |
| **IEUA** | 0 |
| **San Bernardino County** | 0 |
| **TOTAL** | **11,542** |

**Note:** From IEUA 2018/2019 Recycled Water Annual Report

### *2.2.1.4 Water Supply*

The water resource inventory for the IEUA service area is made up of stormwater, recycled water, local surface water, groundwater, and imported water.

- Groundwater makes up the majority of the area's annual water supply and comes primarily from the Chino Basin and from basins adjacent to the Chino Basin. These basins include Cucamonga, Rialto, Lytle Creek, Colton, and the Six Basins groundwater basins.
- Imported water is purchased from Metropolitan.
- Recycled water is generated from IEUA's five recycling plants.
- Stormwater comes primarily from rain and snow starting in the San Gabriel Mountains and moving down through the Santa Ana watershed and diverted into groundwater recharge basins.
- Local surface water is similar to stormwater, but the water is diverted and treated at a water treatment facility within the service area.

Table 2-2 provides a recent summary of the raw water supply to the region, which is ultimately the source of supply for the recycled water processed at the IEUA water recycling facilities.

**Table 2-2: Water Supply by Type for IEUA Service Area**

| Water Supply | Percent of Total |
|---|---|
| Groundwater | 30% |
| Imported Water (SWP) | 25% |
| Recycled Water | 20% |
| Desalter Product Water | 15% |
| Stormwater and Other Local Water Supply | 10% |
| **TOTAL** | **100%** |

As noted in Table 2-2 above, approximately 25 percent of the water used in the region, on average, is imported from Metropolitan through the SWP. Due to water quality limitations (salinity, TDS) and operation of the regional recycled water program, IEUA only takes water from the SWP. IEUA strives to increase regional sustainability through the development of reliable local water supplies. These efforts include using water more efficiently, eliminating waste and unreasonable use, and making the region climate resilient through maximizing the use of recycled water.

#### *2.2.1.5 Water Demand*

IEUA's 2015 UWMP projected 2020 total urban demand to be approximately 210,500 AFY. However, actual demands decreased between 2015 and 2020 from 200,000 AF in FY 14/15 to 192,202 AF in FY 19/20. Average water use in the same period has been even lower, approximately 187,500 AFY (ranging from 168,800 AF in FY 15/16 to 203,400 AF in FY 17/18). This decrease is in part due to slow population growth (approximately 0.9 percent growth per year), changes in plumbing codes, implementation of water use efficiency programs, and the increased education of consumers about California drought conditions and their subsequent conservation measures.

As a wholesaler, IEUA supplies untreated imported water that is purchased from Metropolitan and supplied to its retail agencies. In FY 19/20, 66,438 AF of untreated imported water and 17,115 AF of recycled water for direct use were supplied to its retail agencies, and 13,381 AF of recycled water was recharged, as shown in Table 2-3.

**Table 2-3: IEUA Potable and Non-Potable Water Demands**

| Use Type | Description | Volume (AF)[1] |
|---|---|---|
| Sales to Other Agencies | Metropolitan Imported Water | 66,438 |
| Other Non-Potable | Recycled Water for Groundwater Recharge | 13,381 |
| Other Non-Potable | Recycled Water for Direct Use | 17,115 |
| | **TOTAL** | **96,934** |

**Note:** [1] Volume values from IEUA Annual Water Use Database and FY 19/20 Recycled Water Annual Report

The total water use of IEUA's eight retail agencies for FY 19/20 is shown in Table 2-4. Total water use includes recycled water for direct use but not recycled water for groundwater recharge. The total water use for FY 19/20 was 192,100 AF. The water use of the retail agencies is met by local surface water, stormwater, Chino Basin groundwater, non-Chino groundwater, and the Chino Basin Desalters, in addition to the imported water supplies by Metropolitan through IEUA and the recycled water for direct use shown in Table 2-3.

**Table 2-4: IEUA Water Demand by Retail Agency**

| Retail Agency | Volume (AF)[1] |
|---|---|
| City of Chino | 19,303 |
| City of Chino Hills | 14,493 |
| Cucamonga Valley Water District | 47,059 |
| Fontana Water Company[2] | 37,804 |
| Monte Vista Water District | 9,035 |
| City of Ontario | 39,666 |
| San Antonio Water Company | 6,219 |
| City of Upland | 18,520 |
| **TOTAL** | **192,100** |

**Notes:** [1] Volumes values from FY 19/20 Annual Water Use Report; includes recycled water for direct use; does not include recycled water for groundwater recharge. Interagency transfers within the region are not included.
[2] Includes demands within IEUA service area only.

### 2.2.2 Socio Economic Conditions

Land use and current population estimates within the IEUA service area are provided below.

#### *2.2.2.1 Land Use*

With few exceptions, as land is converted from natural undeveloped conditions to human uses, it becomes more impervious and produces more stormwater runoff. Historically, when land use has converted from natural and agricultural uses to urban uses, imperviousness has increased from near zero to between 60 and almost 100 percent, depending on the specific land use. Figure 2-2 summarizes land use into three broad categories (urban, agricultural, and native/undeveloped) and shows the change (and projected change) in estimated total imperviousness in the Chino Basin associated with the transitioning land uses over time from 1933 to 2030. Figure 2-2 is based on land use mapping for the years shown on the x-axis and projected land use from the land use control agencies. Land use in the Chino Basin was predominantly in an agricultural and undeveloped state until about 1984: urban uses accounted for about 10 percent from 1933 through 1957, grew steadily thereafter to about 26 percent in 1975, and reached about 60 percent in 2000. In 2040, the fraction of the Chino Basin that is projected to be impervious is about 78 percent. Based on an investigation to recalculate the Chino Basin Safe Yield, the impact of these land use changes reduced the deep infiltration of precipitation and applied water from about 140,000 acre-feet per year in the period 1930 through 1940 to less than 100,000 acre-feet per year by and after 2000.

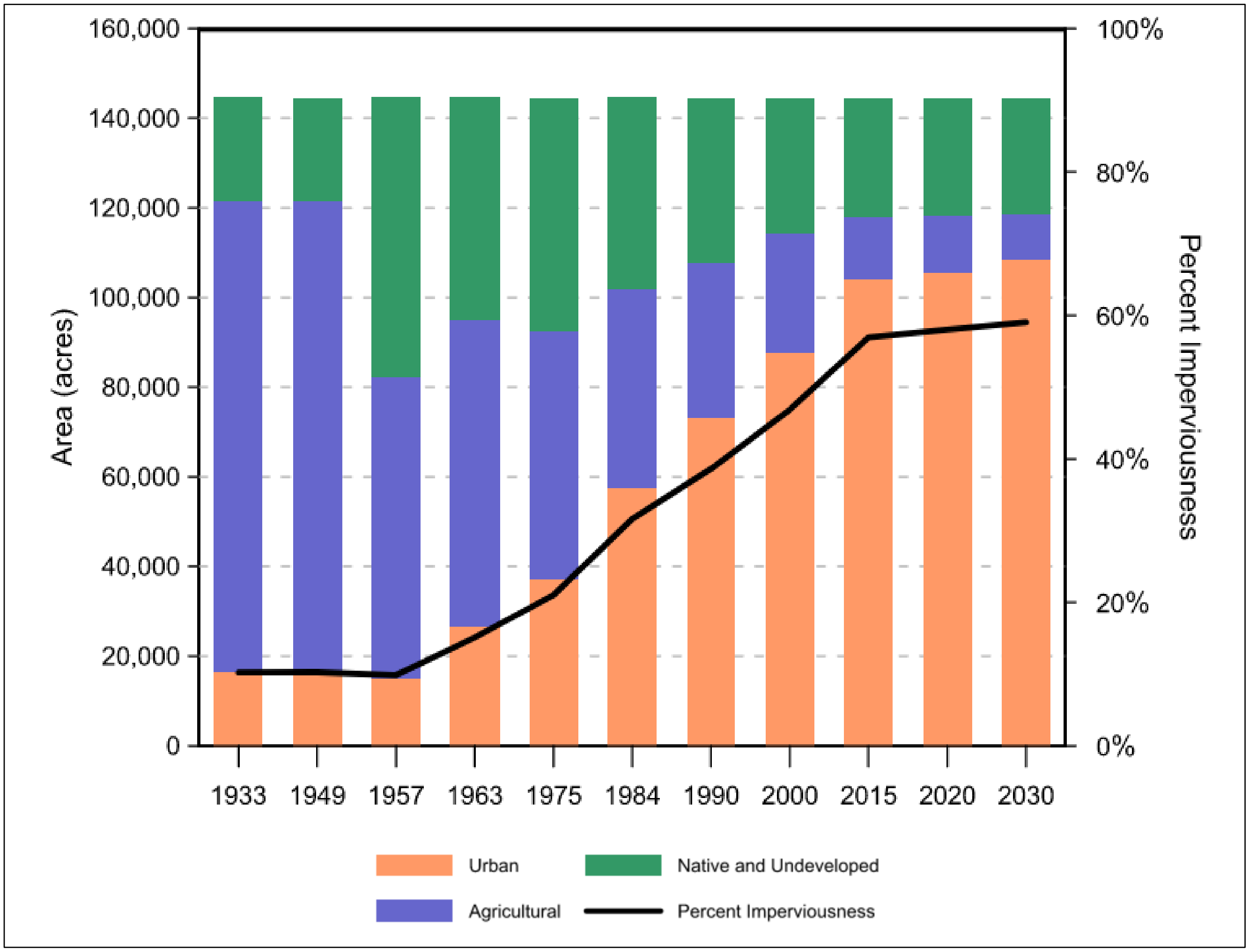


**Figure 2-2: Historic and Projected Distribution of Land Use in the Chino Basin**

#### *2.2.2.2 Population*

As detailed in IEUA's 2020 UWMP, IEUA's service area currently serves a population of approximately 906,046 in 2020 and has an expected growth rate of approximately 0.90 percent per year. Population projections are provided in Section 2.4.1.

### 2.2.3 Ecosystem Conditions

Provided below is a brief discussion on existing biological and cultural resources in the Chino Basin, along with a brief overview of existing biological resources in the Feather River.

#### *2.2.3.1 Chino Basin Biological Resources*

A large majority of the approximately 225,000 acres that comprise the Chino Basin has been previously developed or disturbed by human activity. Relatively speaking, very few pristine areas of undisturbed natural habitat remain. However, some biologically sensitive areas exist.

Three major vegetational communities occur in the Chino Basin. First is riparian habitat, which occurs in low lying sections of the Chino Basin and along the Santa Ana River and streams running into the Chino Basin. The riparian habitat is dominated by extensive stands of black willow and smaller stands of arroyo willow. Several stands of tall cottonwoods and a single stand of sycamore have been identified. The second habitat type is upland habitat characteristic of coastal sage scrub, plus grasses and exotic weeds. This upland area has been heavily impacted by agriculture and grazing activities. The third major vegetational type is the aquatic and semi-aquatic communities occurring in permanent streams and artificial duck ponds, and intermittently filled reservoirs and streams within the Basin. The wildlife in the riparian area includes a variety of amphibians, mammals, and birds.

In addition to the riparian community, there are also freshwater marsh, eucalyptus groves, coastal sage scrub, riverine, grassland, and ruderal communities found within the project area. Cattails and reeds are the dominant species within the freshwater marsh habitat.

The Santa Ana River and its tributaries within the Chino Basin are also significant areas for biological resources as they provide refugia and breeding grounds for neotropical migrant species as well as provide habitat linkages and movement corridors connecting various large blocks of relatively undisturbed habitat areas.

The Prado Basin Reservoir area comprises 9,741 acres northwest of Corona and south of Chino. Approximately 4,000 acres of this area can be classified as riparian woodland vegetation, of which 2,000 to 2,500 acres is dense riparian habitat dominated by large stands of willow woodland. This is one of the largest remaining riparian woodland areas in southern California. This area supports a wide array of sensitive species, both floral and faunal including a total of 311 species of vascular plants belonging to 65 families.

Prado Basin is dominated by flood plain riparian plant communities, with upland habitats primarily restricted to the perimeter of the Basin. Hydrological conditions promote the establishment of riparian vegetation. A freshwater marsh habitat component is also present a because standing water is seasonally abundant in the Prado Basin upstream of the Prado Dam.

The present biological condition of Prado Basin was created by the construction of Prado Dam in 1941. Prado Dam was built where Chino Creek, Cucamonga Creek (also known as Mill Creek, south of Pine Avenue) and Temescal Wash have their confluence with the Santa Ana River. Due to a combination of the high groundwater table, storm flow accumulation held behind the Dam, sewage treatment plant effluent and irrigation runoff, a resultant perennial river flow exists that has created and sustains the extensive wetland habitat in the Chino Basin. Presently, the riparian woodlands in the Chino Basin comprise the largest single stand of this habitat in southern California. Prado Basin supports a myriad of habitat types, including but not exclusive to cottonwood/willow riparian forest, riparian scrubland, herbaceous riparian, freshwater ponds, freshwater marsh, riverine, sandy wash, fallow fields, agricultural land, ruderal, coastal sage scrub, and oak woodland.

The riparian habitat within the overall Chino Basin is in various seral stages and generally consists of tall, multilayered, open, canopy riparian forests. The dominant vegetative species within this riparian forest include: Eucalyptus, Fremont cottonwood (Populus fremontii), black cottonwood (P. tremuloides), and several tree willows (Salix spp).  Characteristic species, in addition to the eucalyptus and cottonwood, include black willow (S. goodingii) narrow-leved willow (S. exigua), arroyo willow (S. lasiolepis), red willow (S. laevigata), sandbar willow

(S. hindsiana), mulefat (Baccharis salicifolia), Sycamore (Platanus recemosa), and elderberry (Sambucus mexicana).

#### *2.2.3.2 Feather River Biological Resources*

The rivers draining the Central Valley of California and adjacent Sierra Nevada and Cascade Range were once renowned for their production of large numbers of Pacific salmon. The Central Valley rivers and creeks, including the Feather River, have historically been the source of most of the Pacific salmon produced in California waters. Chinook salmon (*Oncorhynchus tshawytscha*) historically were, and remain today, the only abundant salmon species in the Central Valley.

Populations of native Chinook salmon have declined dramatically since European settlement of the Central Valley in the mid-1800s. California's salmon resources began to decline in the late 1800s and continue to decline.

A major factor affecting anadromous salmonids was hydraulic gold mining, which began in the 1850s. By 1859, an estimated 5,000 miles of mining flumes and canals diverted streams used by salmonids for spawning and nursery habitat. Habitat alteration and destruction also resulted from the use of hydraulic cannons, and from hydraulic and gravel mining, which leveled hillsides and sluiced an estimated 1.5 billion cubic yards of debris into the streams and rivers of the Central Valley.

Despite the prohibition of hydraulic mining in 1894, habitat degradation continued. Habitat quantity and quality have declined due to construction of levees and barriers to migration, modification of natural hydrologic regimes by dams and water diversions, elevated water temperatures, and water pollution from agriculture and industry.

Although the effects of habitat degradation on fish populations were evident by the 1930s, rates of decline for most anadromous fish species increased following construction of major water project facilities, which primarily occurred around the mid-1900s. Many of these water development projects completely blocked the upstream migration of Chinook salmon to spawning and rearing habitats and altered flow and water temperature regimes downstream from terminal dams. As urban and agricultural development of the Central Valley continued, numerous other stressors to anadromous salmonids emerged and continue to affect the viability of these fish today. Some of the more important stressors include: the high demand for limited water supply resulting in reduced instream flows, increased water temperatures and highly altered hydrology in the Sacramento-San Joaquin Delta, barriers to historic habitat, widespread loss of tidal marsh, riparian and floodplain habitat, poor water quality, commercial and/or recreational harvest, and predation from introduced species such as striped bass.

#### *2.2.3.3 Cultural Resources*

**Prehistoric Archaeological Resources in the Chino Basin**

Almost all the prehistoric sites and isolates previously identified within the Chino Basin occur in relatively concentrated clusters near sheltered areas near the base of hills or on elevated terraces, hills, and finger ridges near reliable sources of water. This distribution pattern is corroborated by the ethnographic literature that identifies such settings as the preferred settlement environment among Native Americans of the Inland Empire region. The areas of heightened sensitivity include the relatively undeveloped areas along the bases of the San Gabriel, San Bernardino, and Jurupa mountains and Chino Hills near the Prado Basin, in the upper reaches of the mountain creeks (such as San Antonio Creek, Cucamonga/Day Creek, and San Sevaine Creek), and along the Santa Ana River. The geomorphologic setting and the extent of past ground disturbances suggest that most of the valley floor at lower elevations is unlikely to contain potentially significant archaeological deposits of prehistoric origin.

**Historic-Period Archaeological Resources and Built-Environment Features**

Known historic-period sites are noticeably concentrated around early settlements, such as the downtown areas of the various communities, and along major transportation routes. The distribution complements the demonstrated pattern of development over the past 200 years. The older urban cores of the communities, therefore, generally demonstrate higher levels of sensitivity than large tracts of formerly rural land used in agriculture and dairy production, such as those being increasingly developed into suburban residential neighborhoods, warehouse complexes, and shopping centers in recent decades. Common sites to be expected include essentially all types of buildings and structures from the late-19th and to the mid-20th centuries, structural remains, historic landscapes, refuse deposits, irrigation works, and other infrastructure features such as power transmission lines, roads, and railroads.

Some of the roads deserve special attention in this respect in light of their unique historic association and design character, such as Euclid Avenue, Foothill Boulevard (formerly U.S. Route 66), Valley Boulevard (formerly U.S. Route 70/99), Mission Boulevard (formerly U.S. Route 60), and Baseline Road/Avenue, which is notable more as the physical representation of the San Bernardino Baseline than for the road itself.

**Paleontological Resources**

There are a few small areas where Very Old Alluvial Fan Deposits, dating to the Early Pleistocene Epoch, are present on the surface. These sediments typically have a high potential to contain nonrenewable paleontological resources and are considered to be highly sensitive for paleontological resources. Similar deposits elsewhere in southern California have yielded scientifically significant fossils of plants and animals from the Pleistocene Epoch, including mammoths, mastodons, ground sloths, dire wolves, short-faced bears, saber-toothed cats, horses, camels, and bison. Consequently, the potential of finding vertebrate fossils where Pleistocene age alluvial sediments are encountered is moderate to high. Based on the mapped surface geology and/or previous fossil finds, conditions favorable for fossil preservation occur within the Chino Basin at the following five locations:

- A small area near the Rancho Cucamonga Creek, north of Foothill Boulevard ($Qvof_1$).
- Close to the Santa Ana River, southwest of Van Buren Boulevard and the Jurupa Mountains ($Qoa_a$, *Qof*, $Qof_{1a}$, $Qvoa_a$, $Qvo_{3a}$, and $Qvof_a$).
- Non-igneous portions of the Jurupa Mountains, specifically two areas on the north side ($Qvof_1$ and $Qvof_3$).
- In Chino Hills, north of Chino Hills Parkway and west of State Route 71 ($Qvof_a$).

- Areas in and around the Prado Basin, generally east of State Route 71, west of Hellman Avenue, north of the Santa Ana River, and south of Merrill Avenue. This large area of older alluvium from the Pleistocene Epoch (*$Qvof_a$*, *$Qvo_a$*, and *Qvof*) is assigned high paleontological sensitivity beginning at the surface, particularly on the terraces adjacent to the Prado Dam and the non-ponded areas behind the dam. During previous studies, the Natural History Museum of Los Angeles County and the San Bernardino County Museum identified a fossil vertebrate locality from sediment lithologies similar to those that may occur as subsurface deposits at this location. Both museums consider the Prado Dam area to be of high paleontological sensitivity.

## 2.3 Existing IEUA Facilities

Provided below is an overview of IEUA’s existing facilities that support the use of recycled water, groundwater, imported water, and surface water within the region.

### 2.3.1 Recycled Water

As previously discussed, IEUA owns and operates four regional water recycling plants that produce recycled water including: RP-1, located in the city of Ontario; RP-4, located in the city of Rancho Cucamonga; CCWRF, located in the city of Chino; and RP-5, located in the city of Chino (Figure 2-3). In addition to these five plants, IEUA also owns and operates RP-2, located in the city of Chino, though it does not produce recycled water. In conjunction with these facilities, IEUA maintains and operates a desalter facility, Chino I Desalter, in the city of Chino and a biosolids composting facility, Inland Empire Composting Facility, in the city of Rancho Cucamonga on behalf of the Chino Basin Desalter Authority and Inland Empire Regional Composting Authority, respectively. The treated wastewater effluent from the regional wastewater recycling plants delivers the reuse supply to the member agencies and customers via six pressures zones, several hundred miles of pipelines, several booster pump stations and storage reservoirs, and four pressure regulating stations. These facilities are also shown in Figure 2-3.

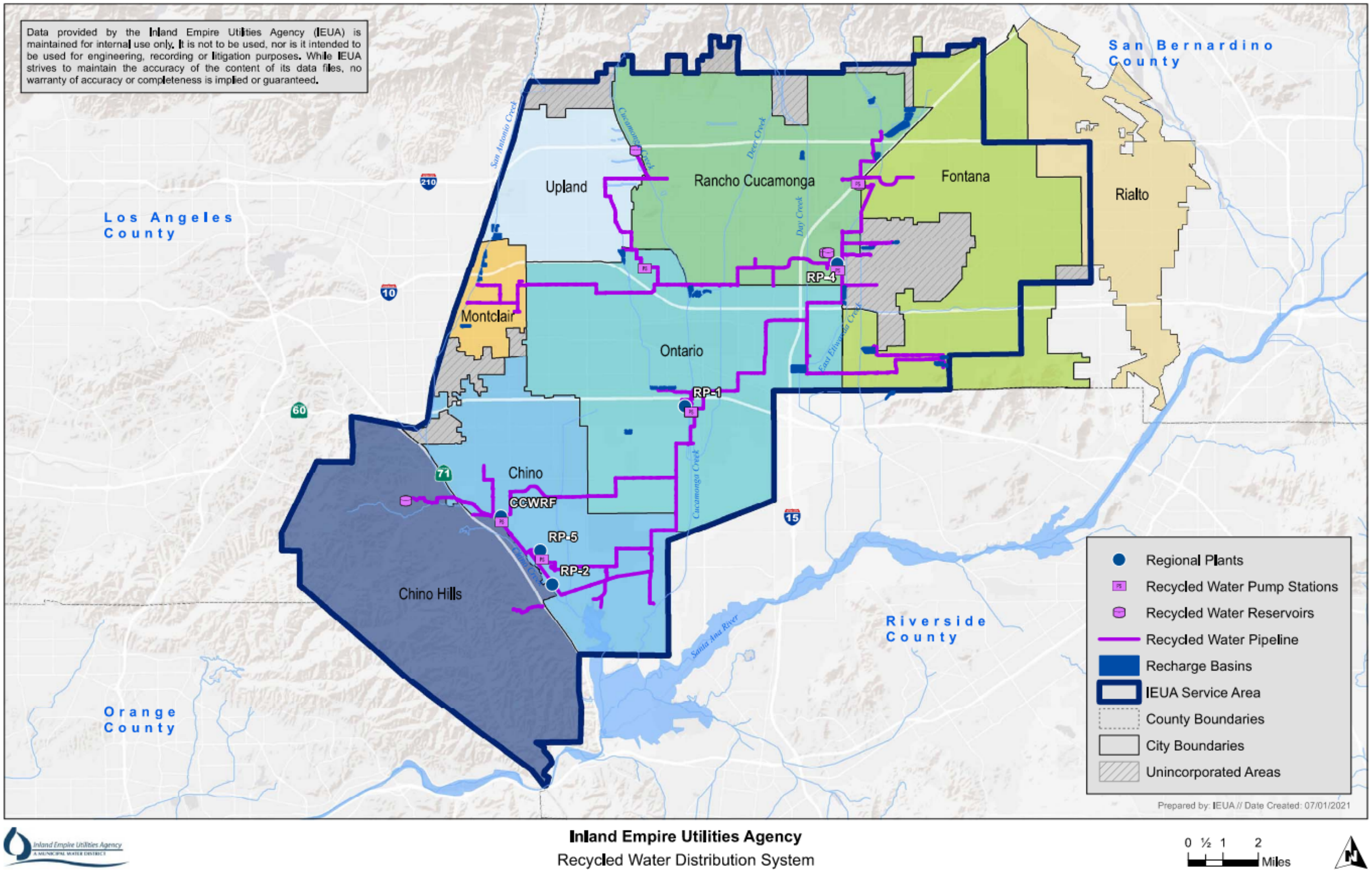


**Figure 2-3: IEUA Regional Recycling Plants and Related Infrastructure**

### 2.3.2 Groundwater

IEUA operates 10 existing recharge basins that are currently connected to the recycled water system (i.e., currently receiving recycled water for recharge). IEUA operates several other groundwater recharge basins that are currently configured to only accept storm water, local runoff, and/or imported water. The basins that are currently receiving recycled water for recharge are depicted in Figure 2-3. A complete inventory of all 18 existing recharge basins with associated supply sources is provided in Table 2-5.

**Table 2-5: IEUA Existing Groundwater Recharge Basins and Supply Source**

| Basin/Site | Supply Source | | |
|---|---|---|---|
| | Stormwater/ Local Runoff | Imported Water | Recycled Water |
| 7th/8th Street | ✓ | ✓ | ✓ |
| Banana | ✓ | ✓ | ✓ |
| Brooks | ✓ | ✓ | ✓ |
| College Heights | ✓ | ✓ | |
| Declez | ✓ | ✓ | ✓ |
| Ely (1-3) | ✓ | ✓ | ✓ |
| Etiwanda Debris | ✓ | ✓ | |
| Grove | ✓ | | |
| Hickory | ✓ | ✓ | ✓ |
| Lower Day | ✓ | ✓ | |
| Montclair (1-4) | ✓ | ✓ | |
| RP-3 (1,3,4) | ✓ | ✓ | ✓ |
| RP-3 (2) | ✓ | ✓ | |
| San Sevaine 5 | ✓ | ✓ | ✓ |
| San Sevaine (1-4) | ✓ | ✓ | |
| Turner (1-4) | ✓ | ✓ | ✓ |
| Upland | ✓ | ✓ | |
| Victoria | ✓ | ✓ | ✓ |

As of FY 17/18, 432 groundwater production wells were active in the Chino Basin:

- Agricultural Pool – 276 wells
- Overlying Non-Agricultural Pool – 13 wells
- Appropriative Pool – 143 wells

IEUA maintains and operates the Chino Basin Desalters. The Chino Basin Desalters provide a local source of potable water supply through treatment of unusable groundwater. They also provide hydraulic control of the lower Chino Groundwater Basin. These facilities are critical to the continued use of recycled water in the region as well as the improvement of groundwater quality and yield in the Chino Basin. IEUA operates one of the facilities (Chino I Desalter) under contract with the Chino Basin Desalter Authority (CDA). The cities of Chino, Chino Hills, and Ontario purchase water from the CDA.

The Chino I Desalter was constructed in 2000 through a Joint Participation Agreement among five agencies: Santa Ana Watershed Project Authority, Western Municipal Water District, Orange County Water District, Metropolitan, and IEUA. The Chino II Desalter was constructed in 2007 and provides a supplemental supply to the Cities of Chino, Chino Hills, and Ontario located within IEUA's service area as well as to the Jurupa Community Services District, city of Norco and the Santa Ana River Water Company located outside of IEUA's service area. The treatment processes at the Chino I and Chino II Desalters include reverse osmosis and ion exchange for the removal of nitrate and TDS. The treatment processes at Chino I Desalter also includes air stripping for the removal of VOCs.

These facilities serve three purposes. First, they convert unusable groundwater into a reliable potable water supply for the region and are part of a long-term pollution cleanup strategy for the Chino Basin. Second, they provide hydraulic control over the lower Chino Basin, which prevents the migration of poor-quality water into the Santa Ana River as well as downstream impacts on groundwater basins in Orange County. Third, they maintain and enhance groundwater yield for the Chino Basin.

Currently, there are 31 Chino Desalter wells with the capacity to pump about 37,600 AFY of groundwater from the southern portion of the Chino Basin, but not all wells are in operation. Over the last five years, the Chino I and Chino II Desalters have produced between 28,100 and 30,000 AFY, averaging 29,200 AFY of treated groundwater combined. IEUA retail agencies who receive water from the Desalter facilities as part of their water supply portfolios include the cities of Chino, Chino Hills, and Ontario. The Phase III expansion of the program was completed in 2016, which provided an additional 10,000 AFY of capacity. This final expansion of the system allows the Desalters to meet the 40,000 AFY pumping per the OBMP Peace Agreements.

### 2.3.3 Imported Water

As previously discussed, IEUA is a member of Metropolitan and thus acts as a supplemental water provider. Water purchased from Metropolitan is provided to seven retail agencies: the cities of Chino, Chino Hills, Ontario, Upland, CVWD in the city of Rancho Cucamonga, Fontana Water Company in the city of Fontana, and MVWD in the city of Montclair. Silverwood Lake is the region's primary imported water storage reservoir for SWP supplies from Metropolitan's Rialto Pipeline and IEUA's service area. IEUA only takes SWP water from Metropolitan due to salinity management concerns. Imported water purchased from Metropolitan is limited by a purchase order agreement. The agreement allows the region to purchase up to a total of 93,283 AFY of imported water from Metropolitan at the Tier 1 rate. This limit is based on historical imported water purchases for municipal use by the member agencies and for regional groundwater recharge. There are four water treatment plants that treat imported water purchased form Metropolitan. These treatment facilities include:

- WFA's Agua de Lejos Treatment Plant (81 mgd capacity)
- FWC's Sandhill Surface Water Treatment Plant (WTP) (29 mgd capacity)
- CVWD's Lloyd W. Michael WTP (60 mgd capacity)
- CVWD's Royer-Nesbit WTP (11 mgd capacity)

Each agency is allocated an annual portion of Metropolitan's available Tier 1 water supply. The allocations do not confer a contractual right to Metropolitan imported water but are used to determine the price paid for water. Purchases in excess of the Tier 1 allocation are assessed by Metropolitan at a higher Tier 2 rate.

### 2.3.4 Local Surface Water

Several of the retail agencies within the northern part of IEUA's service area have long-standing legal rights to divert and treat water supplies from local surface sources in the Santa Ana River watershed. These sources include San Antonio Canyon, Cucamonga Canyon, Day Creek, Deer Creek, Lytle Creek, and several smaller surface streams. IEUA does not provide local surface water directly to its retail agencies, although it does participate in the capture and recharge of stormwater caused by surface water runoff.

IEUA does not provide stormwater directly to its retail agencies. The stormwater primarily comes from surface water runoff from rain and snow that falls in the San Gabriel Mountains and moves down through the Santa Ana watershed. In undeveloped areas, the soil absorbs much of the runoff and helps retain the water within the Basin. However, developed areas with a significant amount of impermeable surfaces tend to accumulate runoff in large quantities in a relatively short amount of time. Stormwater runs off roofs, through streets, and into regional storm drains, which are largely diverted into the region's flood control channels. There are six major flood control channels spread throughout the Chino Basin region. These channels collect and manage the stormwater generated within the watershed. Major flood control channels that convey stormwater within IEUA's service area include:

- San Sevaine Creek
- Day Creek
- Deer Creek
- Cucamonga Creek
- West Cucamonga Creek
- San Antonio Creek

Located adjacent to the channels are detention basins that are operated regionally under a multiple-use agreement for both flood control and groundwater recharge operations. IEUA, the Chino Basin Watermaster, the Chino Basin Water Conservation District, and others work closely with the San Bernardino Flood Control District to maximize the amount of stormwater that can be captured and recharged into the Chino Groundwater Basin. These channels also carry dry weather runoff from excessive outdoor irrigation. Stormwater percolates to groundwater and is not utilized directly as a supply type but is counted in the volume of annual groundwater supply. Runoff that is not captured by detention basins ultimately flows to the Santa Ana River. While there are efforts by agencies further downstream to capture these flows, large amounts of water discharge into the ocean during storm events.

## 2.4 Likely Future Conditions

This section provides an overview of likely future conditions within the Chino Basin and IEUA's service area with respect to population growth; water supply and demand; climate change and its impacts to groundwater, imported water, and surface water; and water supply reliability.

### 2.4.1 Population Growth

As described in IEUA's 2020 UWMP, IEUA's service area has an expected growth rate of approximately 0.90 percent per year. With this growth rate, IEUA's service area is expected to reach a population of 1,119,568 in 2045. Table 2-6 below provides the projected population within the IEUA service area for every five years from 2020 through 2045.

**Table 2-6: IEUA Service Area Current and Projected Population**

| | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Population Served | 906,046 | 945,849 | 987,401 | 1,031,771 | 1,074,773 | 1,119,568 |

Population growth within IEUA's service area creates new demand for water supplies, but regional planning efforts such as IEUA's 2015 IRP and IEUA's 2018 Climate Change Action Plan provide a path forward that strives to decrease demands and optimize resource allocations. Through thoughtful planning and development, sustainable growth within IEUA is a probable outcome. In the 2015 IRP demand analysis, it was found that per capita water usage decreases as development trends shift toward higher density and smaller landscaped areas. Also, the public has shown a willingness to reduce total water usage in response to statewide calls for conservation. Both factors suggest that increases in population do not necessarily constitute substantial increase in water use.

### 2.4.2 Water Demand Projections

While IEUA anticipates a slight increase in water usage in the future due to the growing population in the region and the projected temperature increases, long-term demands are not expected to exceed the peak 10-year demand of 227,586 AF reached during the FY 13/14 drought. The 2015 IRP demand modeling found that new developments in the region are more efficient due to changes in the plumbing code, higher density developments with less landscaping, and compliance with landscape ordinance requirements set forth in

Assembly Bill 1881. A continued focus on water use efficiency and per capita reductions, as required in Senate Bill X7-7, Assembly Bill 1668, and Senate Bill 606, is anticipated to continue reducing overall water demands.

Table 2-7 identifies IEUA's projected demand for imported water, which is the maximum volume its retail agencies are contracted to purchase within a given year. As discussed, imported water purchased from Metropolitan is limited by a purchase order agreement. The purchase order agreement establishes the allocations for the purchase of imported water from IEUA by WFA, CVWD, and FWC for a volume less than or equal to 69,572 AFY. Under the IEUA-Metropolitan contract, IEUA is able to purchase up to 93,283 AFY of imported water from Metropolitan at the Tier 1 rate. The quantity of imported water available may be less than the contract amount during drought years. In FY 19/20, IEUA's service area purchased 66,438 AF of imported water from Metropolitan, which met 35 percent of the region's total water use. IEUA and its retail agencies aim to decrease their reliance on imported water by pursuing a variety of water use efficiency and conservation strategies, along with maximizing the recycled water use within the region. While efforts are being made to reduce IEUA's imported water demand to less than its contract amount with the retail agencies in the future, conservative planning assumptions are being made by retail agencies regarding imported water needs in case projects are delayed and/or savings are not realized. This conservative planning approach, and the relatively low imported water use compared to historical use in FY 19/20, accounts for the increase in potable and raw water demand between 2020 and 2025 in Table 2-8.

Table 2-8 identifies IEUA's total water demands, which includes the imported water demand projections and the recycled water demand projections. Recycled water demand is projected to increase over the planning horizon. Recycled water is currently 8 percent of the total demand within the region and is projected to increase to 9 percent of total demands by 2045. IEUA currently meets a third of total water demands within the region with imported water; this percentage is expected to decrease to 30 percent of total demands within the service area by 2045.

**Table 2-7: Projected Demand for Potable and Raw Water within the IEUA Service Area**

| | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|
| Volume (AF) | 77,416 | 79,630 | 81,974 | 84,021 | 84,065 |

**Note:** Values from retail agency projections for use of imported water from Metropolitan through IEUA.

**Table 2-8: Projected Demand for Potable and Non-Potable Water within the IEUA Service Area**

| | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Potable and Raw Water | 66,438 | 77,416 | 79,630 | 81,974 | 84,021 | 84,065 |
| Recycled Water Demand | 30,496 | 39,300 | 41,297 | 42,162 | 44,191 | 44,691 |
| **TOTAL** | **96,934** | **116,716** | **120,927** | **124,136** | **128,212** | **128,756** |

**Note:** 2020 Values from FY 19/20 Recycled Water Annual Report and Annual Water Use Database. Projected potable and raw water volumes is the sum of each retail agency's expected use of imported water from Metropolitan through IEUA. Recycled water direct use projections from retail agencies and groundwater recharge projections from IEUA.

Table 2-9 presents the water demands for the IEUA service area by retail agency for the years 2025 to 2045. These demands include imported water, surface water, groundwater, desalinated water, and recycled water.

**Table 2-9: Projected Water Demand by Retail Agency**

| Retail Agency | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|
| City of Chino | 20,843 | 22,310 | 23,087 | 23,963 | 25,108 |
| City of Chino Hills | 17,120 | 17,334 | 17,678 | 17,725 | 17,769 |
| Cucamonga Valley Water District | 53,369 | 58,092 | 59,650 | 60,949 | 60,949 |
| Fontana Water Company | 45,593 | 46,909 | 47,665 | 50,442 | 51,943 |
| Monte Vista Water District | 14,232 | 14,564 | 15,175 | 15,437 | 15,706 |
| City of Ontario | 52,550 | 58,513 | 63,406 | 73,668 | 73,668 |
| City of Upland | 25,328 | 25,328 | 25,328 | 25,328 | 25,328 |
| **TOTAL** | **229,035** | **243,050** | **251,989** | **267,512** | **270,471** |

### 2.4.3 Water Supply Projections

As previously described in Section 2.2.1.4, IEUA's service area relies on a variety of supply types. Water supply projections for the entire IEUA region by source type are provided in Table 2-10 below. The imported water supply type is broken into imported water to be supplied by IEUA via Metropolitan and imported water delivered to IEUA retail agencies from other wholesale agencies.

**Table 2-10: Projected Regional Baseline Water Supply Sources**

| Supply Type | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 |
|---|---|---|---|---|---|---|
| Imported Water – IEUA | 66,438 | 92,928 | 94,928 | 96,928 | 98,928 | 98,928 |
| Imported Water – Other | 17,667 | 10,728 | 10,728 | 10,728 | 10,728 | 10,728 |
| Chino Basin Groundwater | 51,749 | 63,129 | 72,822 | 78,441 | 89,776 | 92,080 |
| Other Groundwater | 26,436 | 27,060 | 27,171 | 27,282 | 27,394 | 27,505 |
| Surface Water | 16,652 | 10,089 | 10,089 | 10,089 | 10,089 | 10,089 |
| Recycled Water - Direct Use | 16,278 | 23,932 | 25,929 | 26,794 | 28,823 | 29,323 |
| Recycled Water - Groundwater Recharge | 13,381 | 16,420 | 16,420 | 16,420 | 16,420 | 16,420 |
| Chino Basin Desalter | 14,649 | 17,733 | 17,733 | 17,733 | 17,733 | 17,733 |
| Water Use Efficiency | 3,292 | 9,788 | 11,984 | 17,257 | 22,570 | 27,802 |
| **TOTAL** | **226,542** | **271,807** | **287,804** | **301,672** | **322,461** | **330,608** |

As described in IEUA's 2020 UWMP, IEUA is projected to have adequate supplies to meet demands during normal, single dry, and multiple dry years through 2045.

### 2.4.4 Climate Change

Climate analysis conducted for the 2015 IRP suggests that temperatures within the IEUA service area will rise over the coming decades and that precipitation will continue to be highly variable, with no consensus on a trend towards wetter or drier conditions. It is therefore important to identify water management options that will ensure future demand can be met under a variety of different hydrologic circumstances. Despite uncertainty over the specific effect of climate change on IEUA's water supply, the various projections showed an overall tendency of future decreases in supply sources. The largest potential impact on supply is the vulnerability of imported water from the SWP, indicating a need to improve regional sustainability and decrease dependency on the SWP supply. The 2015 IRP analysis identified recycled water supplies as a critical asset in bolstering a flexible management portfolio since these supplies are generated locally and not impacted by climate. In conjunction with maximizing recycled water supplies, the 2015 IRP also found that the implementation of additional water use efficiency programs would bolster the resiliency of IEUA's water portfolio against climate impacts.

The 2020 Regional DCP also assessed climate change vulnerabilities within the region's water supply sources. The DCP found that while precipitation variability is expected to align with historical trends, the wet years will likely be wetter and the dry years drier, exacerbating an already highly variable water supply reliability factor. A summary of this assessment is provided for each supply source in the sub-sections below.

#### *2.4.4.1 Impacts to Groundwater*

It is anticipated that groundwater supply will likely be adversely impacted by climate change-induced temperature increases and drought. Impacts of climate change for the Los Angeles/San Bernardino region are likely to include increased temperatures and more extreme precipitation events. Groundwater elevation and water quality within the region are both dependent upon rainfall and supplemental sources of recharge. Although the effect of climate change on precipitation in California is still unclear, more frequent occurrences of extreme events similar to the 2011 to 2017 drought could significantly decrease natural groundwater recharge. In addition, as other supplies become constrained in a drought situation, there is potential for less water availability for groundwater recharge purposes. Current supplies utilized for groundwater recharge include surface water, imported water, and recycled water. The 2015 IRP showed that natural groundwater recharge would decrease by 0.44 percent for each 1 percent decline in long-term precipitation. A key conclusion drawn from the simulations is that it is important to secure supplemental water when available to recharge the Chino Basin (through direct or in lieu practices) to enable increased groundwater production during droughts and emergencies.

Groundwater quality is susceptible to climate change because as other sources become less available, groundwater will likely be more heavily relied upon, and if, in addition to those stresses, recharge is also reduced, the groundwater quality issues in the Basin may be exacerbated.

#### *2.4.4.2 Impacts to Imported Water*

The largest potential climate change impact on supply is the effect of shifting snowmelt and resulting runoff patterns on the SWP. The SWP's infrastructure was designed to capture snowmelt from the Sierra Nevada snowpack, and when snow melts during the spring and summer months, a combination of reservoirs and conveyance facilities provide a steady water supply throughout the year. The reservoirs were sized based on historical precipitation patterns, so with more precipitation falling as rain instead of snow in the winter months, more water will be required to be released from reservoirs and will not be available during the higher summer demand periods. The reliability of imported SWP water is expected to decrease as the changes in precipitation caused by climate change continue. This decrease in reliability indicates a need to improve regional sustainability and decrease dependency on the SWP supply.

#### *2.4.4.3 Impacts to Local Surface Water*

Local surface supplies are dependent on precipitation and temperature, and each of these factors is predicted to be influenced by climate change, creating uncertainty from year to year. The predictions for precipitation in the Los Angeles/San Bernardino region, as discussed above, are still uncertain but it is expected that the extremes will be more severe, and temperatures are expected to increase.

Extreme precipitation events can result in short periods with high volumes of runoff that will be difficult to capture. Conversely, extended droughts and dry years will result in long periods without available local surface water supplies, which will increase demands on other supply types.

Higher temperatures also impact local surface water. Warmer temperatures cause more evaporation and transpiration, reducing the amount of soil moisture. This means that the soil may absorb and hold more water when rain occurs, and this can reduce the amount of water flowing into creeks and streams.

### 2.4.5 Water Supply Reliability

The future reliability for IEUA's water resources is dependent upon climate conditions (both local and at the source of supplies), environmental and political drivers, and growth. Climate change-induced temperature increases, changes in runoff patterns, and drought are some of the key factors that will have a substantial impact on regional water supplies.

As the availability of imported water becomes less reliable in the future, it will be more important to continue to invest in all forms of local water supplies, including groundwater and surface water, which are also impacted by climate change as discussed above, and recycled water. As previously discussed, recycled water is an increasingly essential asset to the region and is the region's most climate resilient water supply. Under future without project conditions, future use of recycled water would be constrained or halted if IEUA exceeds their NPDES TDS permit limits for recycled water, resulting in stranded assets and further dependence on more expensive/less reliable supply sources.

Further discussion on water supply reliability under future without project conditions is provided in Section 3.2.

# 3 Formulation of Alternatives

This chapter describes the alternatives that have been developed to address the region's regulatory challenges and long-term water supply reliability needs. In addition to the No Action alternative, which represents a projection of reasonably foreseeable future conditions that could occur if no project alternatives are implemented, three other alternatives have been identified:

- Alternative 1: Baseline Compliance Plan Alternative
- Alternative 2: Regional Water Quality and Reliability Plan Alternative
- Alternative 3: Chino Basin Program Alternative

## 3.1 Alternatives Formulation Process

IEUA and its partners explored different alternatives to address the region's regulatory challenges and long-term water supply reliability needs while meeting the region's overarching objectives. Alternatives have been refined through extensive engagement with IEUA member agencies, Metropolitan, and state agencies. This refinement has produced three project alternatives that address one or more of the region's objectives previously discussed (Table 3-1). The project alternatives, along with the No Action alternative, are described below. Each of the alternatives were developed in a progressive manner. The Baseline Compliance Plan was developed to address regional water quality challenges. The Regional Water Quality and Reliability Plan builds upon the Baseline Compliance Plan to address regional water quality and water supply challenges. Finally, the CBP further builds upon the Regional Water Quality and Reliability Plan to address regional water quality, water supply challenges, provide additional flexibility for groundwater management in the Chino Basin, and provide statewide benefits through a water exchange with the SWP. A brief summary of the progression of each of the alternatives is further summarized in each of the subsections below.

**Table 3-1: Summary of Alternatives with Respect to Water Quality and Water Supply Infrastructure**

| | Infrastructure | No Action | Alternative 1: Baseline Compliance Plan | Alternative 2: Regional Water Quality and Reliability Plan | Alternative 3: CBP |
|---|---|---|---|---|---|
| **Water Quality** | AWPF & Injection Wells | - | 15 TAFY[1] | 15 TAFY | 15 TAFY |
| **Water Supply** | Imported Recycled Water Supplies | - | 6 TAFY | 6 TAFY | 6 TAFY |
| | Regional Water Pipeline | - | - | ✔ | ✔ |
| | Exchange with SWP | - | - | - | ✔ |
| | Groundwater Storage | - | - | ✔ | ✔ |
| | Groundwater Extraction | - | - | 15 TAFY | 40 TAFY |

**Note:**
[1] Phased with 9 TAFY online by 2030 and the remaining 6 TAFY by 2040; no injection wells

The feasibility-level design of the facilities for the CBP (Alternative 3) is detailed in Appendix D and a high-level overview of how these facilities were developed is provided in Section 3.5. These facilities are depicted below in Figure 3-1 and Figure 3-2. This combination of facilities includes PUT facilities and TAKE facilities. PUT facilities are those that are associated with the recharge of purified water into the Chino Basin and include:

- 15 TAFY AWPF at RP-4 and accompanying pump station to pump water from the AWPF
- Purified water conveyance
- Brine conveyance
- 6 TAFY of imported recycled water supplies

Figure 3-1 shows the location of the AWPF at RP-4, which is common to all three alternatives. The selection of the location of the AWPF at RP-4 is summarized in Section 3.3.1.1. The purified water conveyance pipelines and injection wells common to the Regional Water Quality and Reliability Plan (Alternative 2) and the CBP (Alternative 3) are also shown in Figure 3-1.

TAKE facilities are those that are associated with the extraction of groundwater from the Chino Basin and the conveyance of potable water supply and include:

- Turnouts and connections
- Collector pipelines and a potable pipeline network
- Extraction wells
- Pump stations
- Water storage tanks

Of these facilities, Figure 3-2 depicts the potential location(s) of the pipelines, extraction wells, pump stations, and water storage tanks. These facilities are common to the Regional Water Quality and Reliability Plan and the CBP (there are no TAKE facilities associated with the Baseline Compliance Plan). The number of extraction wells and the size/length of pipelines represents the CBP alternative with an extraction capacity of 40 TAFY to support the delivered water capacity needed to provide the benefit of added flexibility for groundwater management in the Chino Basin, and to provide for statewide benefits. For the Regional Water Quality and Reliability Plan alternative, an extraction capacity of 15 TAFY supports the delivered water capacity needed to provide the benefit addressing water supply challenges in the region, with the added flexibility afforded by the CBP. For the purposes of this feasibility study, these extraction facilities are assumed to be represented by a subset of extraction wells identified for the CBP alternative. The CBP also includes additional facilities to connect its pipeline distribution network to Metropolitan's water distribution system, which is not included as part of the Regional Water Quality and Reliability Plan. A further discussion of these facilities and scaling is provided in Section 3.4.2.

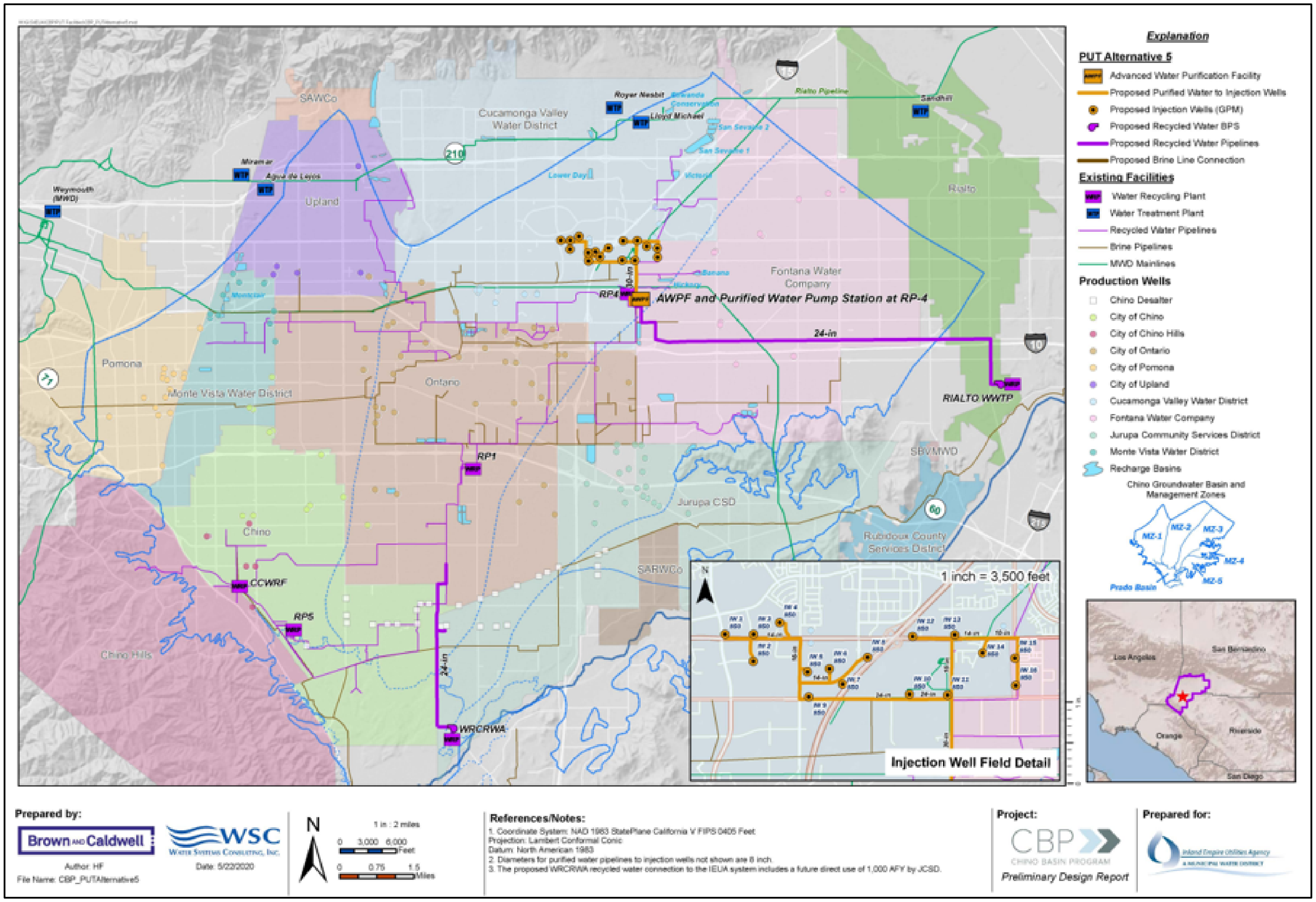

**Figure 3-1: Location of Potential PUT Facilities Associated with Alternatives 1-3**

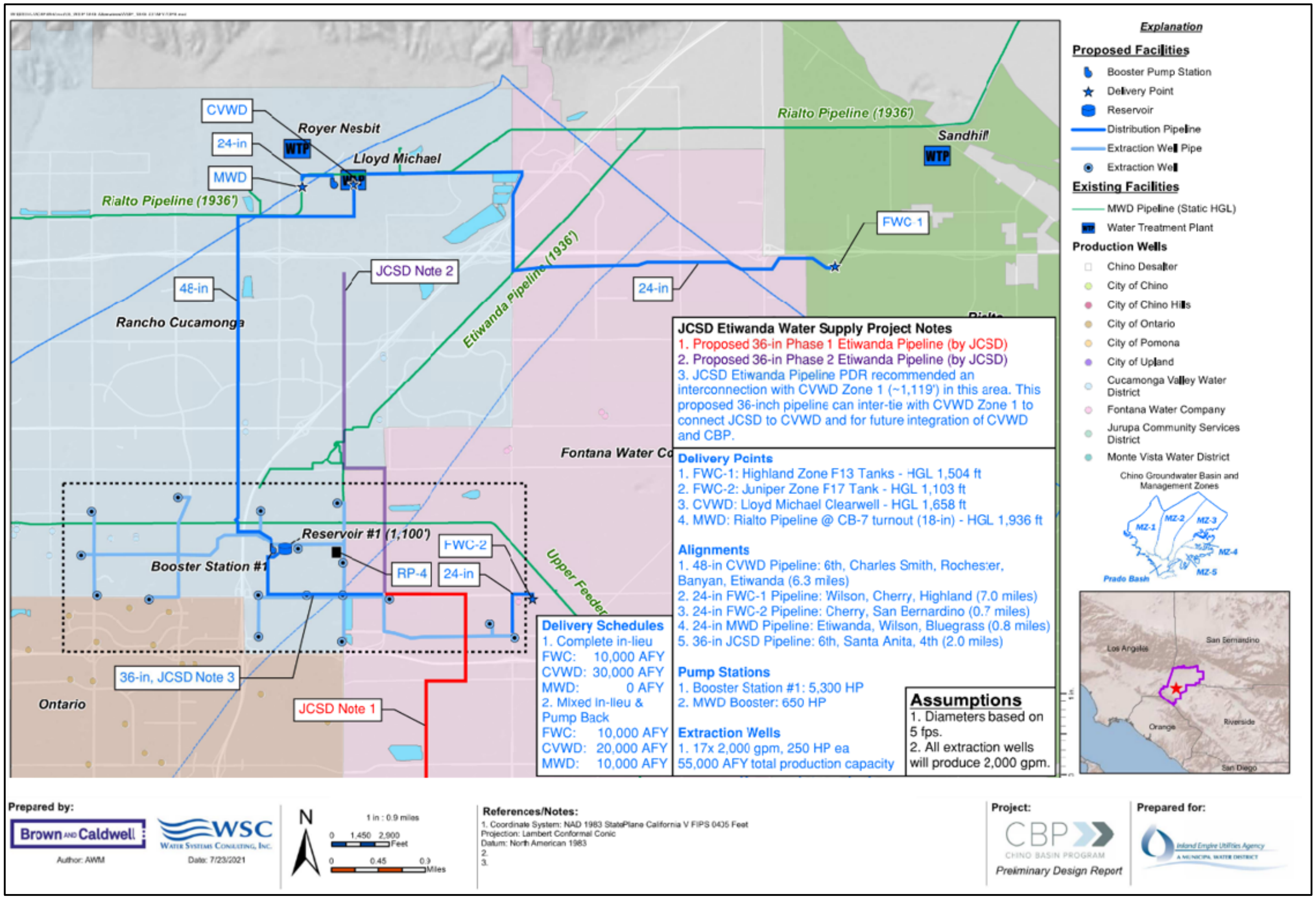


**Figure 3-2: Location of Potential TAKE Facilities Associated with Alternatives 1 and 2**

## 3.2 No Action Alternative

As one of the stewards responsible for managing water and wastewater in the region, IEUA continuously evaluates challenges and develops solutions to address them, all with the goal of securing a reliable, high-quality water supply in a cost-effective manner. This goal involves the use of various water sources, including imported water, stormwater, groundwater, and recycled water.

Recycled water is an increasingly essential asset to the region particularly with the uncertain future of imported water supplies due to climate change and environmental factors. Recycled water is the region's most climate resilient water supply because the amount of water available is not affected by dry years. Today, recycled water makes up approximately 20 percent of IEUA's water supply portfolio and hundreds of millions of dollars have been invested into the regional recycled water program. It is critical for IEUA to maintain this resource within the region.

As previously discussed, the Basin Plan sets regulatory limitations for recycled water TDS and continued use of recycled water within the region depends on compliance with these limits. Increasing TDS levels in recycled water have been exacerbated by climate change, conservation, and episodic periods of drought over the last 20 years. Recent evaluations by IEUA have demonstrated that TDS concentrations in water and wastewater supplies, and therefore recycled water, are steadily increasing, and drought conditions and conservation exacerbate TDS concentrations in both. Based on these evaluations, IEUA has concluded that implementation of AWPF will be needed at some point to address increasing salinity. Furthermore, postponing treatment poses risks to maintaining the region's maximum benefit objectives associated with the Basin Plan, and consequently IEUA's compliance for its wastewater treatment.

Under a No Action Alternative, there would be no expansion of existing recycled water systems or groundwater by member agencies of IEUA. Anticipated future growth would generally be served with imported potable water and local agencies would need to increase their water purchases or implement more restrictive conservation programs to satisfy potable water demand. Costs associated with the No Action alternative were estimated by assuming recycled water supplies would have to be replaced by new Metropolitan imported supplies beginning in 2031. The annual quantities of required water supply were taken from IEUA's 2020 UWMP, which projects 30.5 TAFY of recycled water used in 2020 would increase to 44.7 TAFY by 2045. These UWMP projections were interpolated to estimate quantities for each year beginning in 2031 over the project life cycle. These annual quantities were valued at Metropolitan's Tier 1 Untreated Water Rate together with proportional Ready-to-Serve and Capacity Charges.

The total life cycle water supply cost of the No Action alternative is calculated as the present worth of the annual costs associated with replacing recycled water supplies over the project life, discounted at the assumed annual economic growth rate (2.5 percent per year in this evaluation) accounting for the assumed escalation in Metropolitan water supply rates. The total present value cost of the No Action alternative is $1,058.2 million.

### 3.2.1 Consequences of No Action

Analysis performed to date indicates that IEUA could exceed the NPDES TDS permit limits for recycled water within the next 10 years, and possibly the groundwater recharge permit limit in the near future if no actions are taken. Maintaining permit compliance is critical for IEUA. There are strict consequences associated with non-compliance with the maximum benefit commitments (i.e., failure to develop the required mitigation plans when the action limits are triggered) that could lead to recycled water and groundwater recharge program interruption and/or retroactive activities. If the NPDES permit limit is exceeded, IEUA will be in violation of its NPDES permit and if a plan to address it is not submitted to the RWQCB in a timely manner, this could result in the halting of all use of recycled water. Consequently, all effluent from IEUA's water recycling facilities will need to be discharged to the Santa Ana River. Discharge to the Santa Ana River above 550 mg/L will also be above the discharge limitation, which is also 550 mg/L. The Basin Plan also states that "The Regional Board will also require mitigation of any adverse effects on water quality downstream of the Chino Basin that result from failure to implement the 'maximum benefit' commitments." Non-compliance could result in permit modification with more stringent recycled water and groundwater recharge limits, severely impacting both the operability of the programs as well as the costs.

Unmitigated use and recharge of recycled water in the Chino Basin is contingent upon compliance with the maximum benefit objectives established by the RWQCB and agreed to by IEUA. If compliance is not demonstrated, lower, more stringent limits consistent with the state and federal anti-degradation objectives would apply. These lower limits effectively prohibit use of recycled water at worst or require a combination of purchase of dedicated SWP supplies with low TDS from Metropolitan and treatment to reduce TDS concentrations at best. TDS management within Chino Basin is thus critical to ensure continued use of recycled water and reduce reliance on imported water within IEUA's service area.

During 2019, recycled water used for groundwater recharge exceeded the 1,2,3-Trichloropropane (1,2,3-TCP) maximum contaminant level and perfluorooctanoic acid (PFOA) Notification Level and went into an accelerated monitoring schedule for 16 consecutive weeks. Corrective action reports were submitted to the Division of Drinking Water and RWQCB in February 2020 in accordance with §60320.112.(d)(2)(A) for 1,2,3-TCP and §60320.120.(b)(1) for PFOA. Source evaluation for both compounds is ongoing.

The Division of Drinking Water established a Notification Level of 5.1 nanograms per liter on August 23, 2019. PFOA is no longer a commonly manufactured substance. However, it is still present in consumer products and is entering the regional water recycling facilities that were not designed to remove PFOA. Similar to 1,2,3-TCP, advanced treatment may be required to address impending/future regulations. There are other contaminants of emerging concern, such as microplastics, that are likely to emerge over the next 10 years and could also require advanced treatment to continue recharge of recycled water. Even if these facilities are not required to maintain compliance with the Basin Plan, they may be needed to treat recycled water to continue current and for future groundwater recharge.

There is little flexibility to respond and manage changes in TDS concentration due to drought conditions, and the timeframe by which drought conditions can impact recycled water TDS concentration is short. Expected recycled water TDS concentration is 500 mg/L, considering contributions from household use and treatment processes and imported water. In periods of drought, recycled water TDS concentration is susceptible to increases, with imported water TDS concentration reaching up to 400 mg/L, and the desalter operating at 350 mg/L. Although statistical models considered long-term trends based on data sets of 20+ years and historical drought patterns, significant potential drivers, such as climate change, are not evaluated in these projections. These potential drivers further support the need for salinity management within the next 10 years.

If the ambient water quality in the Basin is not maintained per the RWQCB's TDS limit, there will be greater dependence on imported water and local stormwater supplies, which are highly volatile and impacted by climate change. Since the Basin only receives imported water from one regional pipeline that is owned and operated by Metropolitan, an unplanned or catastrophic occurrence could cut off 25 percent of the Basin's water supply. A No Action approach results in the Chino Basin being out of regulatory compliance, threatens water supply, and does not meet IEUA's objectives. Therefore, No Action is not considered to be a feasible alternative and is not considered further in this feasibility study.

## 3.3 Alternative 1: Baseline Compliance Plan Alternative

As discussed, issues of rising TDS concentrations in recycled water nearing compliance levels and other regulatory challenges associated with contaminants of emerging concern puts the region at great risk. IEUA and its partners have invested significant time and money to identify solutions to address these challenges. A number of options have been considered:

- Since groundwater recharge is a blend of imported water, recycled water, and stormwater, IEUA could purchase more low-TDS imported SWP water to offset the high TDS concentration in recycled water, bringing the groundwater recharge into compliance. This solution does not help achieve IEUA and the region's goal of reducing dependence on imported water supplies that are expensive and vulnerable to drought and climate change.
- Another option is a reduction in recycled water that is recharged. This is not a prudent option since recycled water is a secure water supply and imported water supplies are expensive and vulnerable to drought and climate change.
- A third option is to increase the recharge of stormwater, which is also low in TDS in comparison to recycled water. However, this is not a viable option since stormwater is a variable and unreliable water supply.
- A fourth option would be to pursue a permit modification with the RWQCB. Though this option doesn't directly control TDS concentration in groundwater recharge or recycled water, it might provide some temporary relief in terms of exceeding recycled water TDS concentration limits but does not address contaminants of emerging concern in groundwater recharge of recycled water.
- Finally, advanced water purification as a solution would address rising TDS levels and contaminants of emerging concern.

Though there are a number of solutions that IEUA could implement to address the groundwater recharge challenges associated with TDS and contaminants of emerging concern, none are as optimal as implementation of advanced water purification. This solution would address TDS levels for both direct use of recycled water and groundwater recharge and could also help address the challenges associated with Title 22 regulations. The advanced water purification solution can be implemented as satellite facilities for specific recycled water recharge compliance. However, a centrally located advanced water purification system can be linked with the existing distribution system providing greater flexibility for use of the advanced treated water, providing greater benefit to the region as an available supply and solutions for brine discharge that are more economically feasible.  Also, it has the potential to be integrated in the future as direct potable reuse when such regulations are adopted.

As previously discussed, IEUA provides sewage utility services to seven contracting agencies under the Chino Basin Regional Sewage Service Contract. All the wastewater collected is treated at IEUA's RPs, which provide recycled water supply to IEUA's recycled water program. Recycled water in the region is managed to first meet the Santa Ana River discharge obligation of approximately 17 TAFY, followed by member agency direct use demands. The remaining recycled water supply is generally used for groundwater recharge into IEUA's existing basins that are currently connected to the recycled water system as previously shown in Figure 2-3.

Under Alternative 1, centrally located advanced water purification facilities will be used with IEUA's existing conveyance system to help address the region's regulatory compliance challenges. The expected effluent TDS concentration from the AWPF is 100 mg/L. The AWPF would be sized and located at RP-4 as discussed further in Section 3.3.1.1 below (*see* Figure 3-1). This low-TDS recycled water could be used to meet discharge obligations to the Santa Ana River, or for blending into IEUA's existing recycled water distribution system using existing conveyance, significantly reducing recycled water TDS concentrations. Once blended into IEUA's recycled water distribution system, the augmented recycled water supply could be used for groundwater recharge or for indirect potable use.

Further details of the AWPF design and associated assumptions are provided in PDR TM1 (Appendix C) and PDR TM2 (Appendix D).

### 3.3.1 AWPF Facilities

A summary of Alternative 1's facilities is provided in Table 3-2 and described further in the subsequent sub-sections.

**Table 3-2: Alternative 1: Baseline Compliance Plan Facilities**

| Parameter | Description |
|---|---|
| AWPF | |
| Location | RP-4 |
| Process | MF/RO/UV-AOP |
| Capacity (AFY) | 15,000[1] |
| Purified water conveyance | |
| Pump station | |
| Location | RP-4 |
| Size | 1,500 HP |
| Brine conveyance | |
| Disposal system | NRWS |
| Pipeline | 1,400 feet (8-inch) |

**Notes:**
[1] Phased with 9 TAFY online by 2030 and the remaining 6 TAFY by 2040
HP: horsepower
MF: membrane filtration
RO: reverse osmosis
UV-AOP: ultraviolet advanced oxidation process

#### *3.3.1.1 AWPF*

IEUA owns and operates five regional water recycling plants as previously shown in Figure 2-3, including RP-1, RP-2, RP-4, RP-5, and CCWRF (though RP-2 does not produce recycled water).

Recycled water supplies are used for direct non-potable uses and groundwater recharge with unused recycled water discharged to the Santa Ana River. IEUA completed its Wastewater Facilities Master Plan Update Report in 2015 to identify capital improvement plans for these recycling plants. RP-1 and RP-4 were identified to meet projected capacity goals within the region in support of investing in infrastructure to support long term Chino Basin needs. For the CBP, RP-1 and RP-4 were identified as preferred options for expansion to include advanced water purification because of their advantages relative to operational flexibility and compatible future expansion plans. RP-5 was also considered because of an ongoing expansion project. However, because RP-5 is situated hydraulically low in the IEUA recycled water distribution system, the use of its advanced treated water would not be maximized since the primary uses of the recycled water in the southern service area are non-potable reuse or discharge to the Santa Ana River. This location would not provide the same operational flexibility and benefits that RP-1 and RP-4 offer, which provide the water for the groundwater recharge program to ideal recharge locations in the northern service area. Significant piping and pumping infrastructure would be required to get this high-quality water to these same locations. The Chino Basin Watermaster's 2018 Storage Framework Investigation prioritized recharge ("PUTS") to occur in the north eastern portion of the Chino Basin to minimize pumping sustainability challenges, minimize impacts of storage and recovery, preserve the current state of hydraulic control, and to take advantage of the larger and more useful groundwater storage space in that area. RP-4 was ultimately selected as a preferred location for AWPF over RP-1 due to its closer proximity to recharge basins, its greater capacity to pump to these basins, proximity to surface water treatment facilities, and overall operational flexibility.  For these reasons, RP-4 is the assumed location for the AWPF for Alternative 1 (and Alternatives 2 and 3).

Under Alternative 1, a 15 TAFY AWPF located at RP-4 would be constructed in two phases. Phase 1 includes construction of a 9 TAFY AWPF facility which would be on-line by 2030 to maintain compliance with IEUA's NPDES TDS permit limit for recycled water. Phase 2, which would be constructed in the subsequent years and on-line by 2040, would expand the AWPF by 6 TAFY to ultimately treat up to 15 TAFY of advanced treated water. Approximately 2 TAFY of water will be lost through the AWPF process, requiring that 17 TAFY of source water supply to the AWPF be made available for treatment. To supplement sources available within IEUA, the Baseline Compliance Plan also includes projects that would provide 6 TAFY of additional external supplies obtained from neighboring agencies and imported to the region as a new supply to be online by 2040. A 1,500 horsepower (HP) pump station would also be located at RP-4 to pump water from the AWPF to IEUA's existing recycled water distribution system. For the purposes of this feasibility study, it is assumed that the pump station would be constructed during Phase 1.

##### *3.3.1.2 Brine Conveyance*

IEUA operates the Non-Reclaimable Wastewater System (NRWS), which is infrastructure for brine disposal and other, non-reclaimable high-strength wastewater. The NRWS is comprised of three pipelines: the NRWS pipeline, the Etiwanda Wastewater Line (EWL), and the Inland Empire Brine Line (IEBL). The NRWS is split into two service areas within IEUA's jurisdiction, the North NRWS, which is comprised of the NRWS pipeline and EWL, and the South NRWS. Brine from the AWPF will be pumped into the NRWS pipeline using a 1,400-foot (8-inch) pipeline and conveyed to Los Angeles County Sanitation District (LACSD) for disposal. For the purposes of this feasibility study, it is assumed that brine conveyance pipelines would be constructed during Phase 1.

#### 3.3.2 TAKE Facilities

TAKE facilities are those that are associated with the extraction of groundwater from the Chino Basin and the conveyance of potable water supply. Alternative 1 does not include any TAKE facilities.

#### 3.3.3 Benefits

Alternative 1 is only designed to meet water quality related regulatory challenges and does not include infrastructure to enhance regional water supply. As a result, Alternative 1 provides water quality benefits to IEUA and the region, but no water supply, ecosystem, or emergency supply benefits are realized through Alternative 1.

### 3.4 Alternative 2: Regional Water Quality and Reliability Plan Alternative

As previously discussed, the Regional Water Quality and Reliability Plan builds upon the Baseline Compliance Plan to address regional water quality and water supply challenges. A summary of Alternative 2's PUT and TAKE facilities are described below.

#### 3.4.1 AWPF and PUT Facilities

PUT facilities for the Regional Water Quality and Reliability Plan Alternative are summarized in Table 3-3. PUT facilities for the Regional Water Quality and Reliability Plan includes the AWPF, injection wells, purified water conveyance facilities, and brine conveyance. The Regional Water Quality and Reliability Plan alternative includes the same AWPF, pump station, 6 TAFY of additional external supplies, and brine conveyance pipelines as the Baseline Compliance Plan Alternative. Similar to the Baseline Compliance Plan, approximately 2 TAFY of water will be lost through the AWPF process, requiring that 17 TAFY of supply be made available for treatment. However, these facilities would not be phased, and the full capacity would be on-line by 2030. Additionally, the Regional Water Quality and Reliability Plan differs from the Baseline Compliance Plan with the introduction of purified water pipelines, and groundwater injection facilities, including 16 injection wells.

**Table 3-3: AWPF and PUT Facilities for Alternative 2: Regional Water Quality and Reliability Plan**

| Parameter | Description |
|---|---|
| Recharge Locations | MZ-2 |
| AWPF | |
| Location | RP-4 |
| Process | MF/RO/UV-AOP |
| Capacity (AFY) | 15,000 |
| Purified water conveyance | |
| Pipelines | 7.1 miles (8-inch to 30-inch) |
| Pump station | |
| Location | RP-4 |
| Size | 1,500 HP |
| Number of injection wells | 16 (12 duty, 4 standby) |
| Brine conveyance | |
| Disposal system | NRWS |
| Pipeline | 1,400 feet (8-inch) |

**Notes:**
MF: membrane filtration
RO: reverse osmosis
UV-AOP: ultraviolet advanced oxidation process

### 3.4.2 TAKE Facilities

The Regional Water Quality and Reliability Plan also differs from the Baseline Compliance Plan with the introduction of TAKE facilities, including extraction wells, groundwater treatment facilities, pipelines, and connections that are integrated with the AWPF and injection well system. As previously discussed, these facilities would collectively provide an extraction capacity of 15 TAFY to support a delivered water capacity used to help address water supply challenges in the region. The extraction wells needed to support this capacity are assumed to be a subset of the extraction wells identified for the CBP (designed for 40 TAFY, discussed further in Section 3.5.2). Furthermore, this alternative does not require connections to Metropolitan's water distribution system as is the case for the CBP alternative.

For the purposes of this feasibility study, the estimated costs associated with the TAKE facilities for the Regional Water Quality and Reliability Plan were developed using the "0.6 rule," which assigns a value of $\alpha$=0.6 in the following relationship between equipment cost (C) and capacity (V):

$$C1/C2=(V1/V2)^{\alpha}$$

where

C1 = cost associated with the CBP

C2 = cost associated with the Regional Water Quality and Reliability Plan

V1 = TAKE capacity of the CBP (40 TAFY)

V2 = TAKE capacity of the Regional Water Quality and Reliability Plan (15 TAFY)

### 3.4.3 Benefits

The Regional Water Quality and Reliability Plan would collectively treat and store up to 15 TAFY of advanced treated water in the Chino Groundwater Basin, creating a new local water supply. This water will be available for local use for the 50-year project life of the alternative, therefore reducing dependence on imported water, improving water quality, and providing a new local water supply for the Basin. The Regional Water Quality and Reliability Plan would include a network of regional pipelines that would provide the ability for IEUA and its member agencies to access stored water in the Chino Groundwater Basin, connecting these new potable water supplies for use in lieu of planned water deliveries from Metropolitan. These new water conveyance and water system interconnections also provide an important alternative source of water supply to IEUA and its member agencies during any required shutdown of Metropolitan's major pipelines delivering water to the region, such as the Rialto Pipeline, which is planned for rehabilitation as part of a larger rehabilitation plan of Metropolitan's pipelines within their service area.

Similar to the Baseline Compliance Plan, the production of high-quality water in the Chino Groundwater Basin will deliver regional benefits in the form of enhanced water quality. The Regional Water Quality and Reliability Plan will also deliver regional benefits in the form of local water supply benefits available annually to offset the need for imported water from Metropolitan as well as to reduce the economic impact of supply shortages when Metropolitan is unable to deliver full water supplies.

In addition, the Regional Water Quality and Reliability Plan provides local emergency supply benefits in years when planned or unplanned service disruptions occur, and land subsidence mitigation benefits are achieved through new operational flexibility that will allow using recharged supplies to better manage groundwater pumping in areas sensitive to subsidence. These benefits are discussed further and compared with those provided by the other alternatives in subsequent sections.

## 3.5 Alternative 3: Chino Basin Program

In August 2017, IEUA submitted a WSIP application for the CBP. In July 2018, the CWC approved maximum conditional funding for the proposal in the amount of $206.9 million. In January 2021, the CWC increased this maximum conditional funding to $212 million. In return for this funding, the CBP will provide water supplies for public benefits as defined by WSIP, including ecosystem improvement, water quality improvement, and emergency response benefits.

In early 2019, IEUA initiated the CBP Preliminary Design Report (PDR) study to refine the components of the CBP in collaboration with local partnering agencies. The CBP includes two main categories of facilities: PUT, the components to recharge purified water to the Chino Basin, and TAKE, the components to extract groundwater and convey potable water supply. Under this study, an alternatives analysis was completed in two main steps as detailed in the PDR Technical Memorandum (TM) 1: Chino Basin Program Assumptions (Appendix C):

1. PUT and TAKE alternatives were separately identified, developed, and evaluated to identify the preferred PUT and TAKE components to build the overall program alternatives
2. Once the component alternatives evaluations were completed, the preferred PUT and TAKE alternatives were combined to develop the overall program alternatives.

The background assumptions and information necessary to formulate the PUT and TAKE alternatives are provided in the PDR TM1 (Appendix C), while further information surrounding the development and evaluation of the alternatives and identification of the recommended program alternative is provided in the PDR TM2: Chino Basin Program PUT, TAKE, and Program Alternatives Evaluation (Appendix D).

Overall, the various program alternatives considered:

- Location of the AWPF
- Location and number of injection wells and/or recharge basins
- Location and number of extraction wells
- The external sources of recycled water supply
- Connections for pump-in to Metropolitan's water distribution system
- Ratio of direct pump-in to Metropolitan versus in-lieu (local groundwater extraction in lieu of receiving Metropolitan supply)

The infrastructure details were evaluated based on the project objectives. The preferred infrastructure design that best met the objectives defines the CBP, which is the recommended alternative for addressing the region's regulatory challenges and long-term water supply reliability needs.

Similar to the Regional Water Quality and Reliability Plan, the CBP will consist of AWPF, injection wells, extraction wells, groundwater treatment facilities, external recycled water supplies, and a pipeline distribution network connecting the facilities to local agencies (*see* Figure 3-1 and Figure 3-2). The CBP differs from the Regional Water Quality and Reliability Plan by increasing total extraction capacity from 15 TAFY to 40 TAFY and with the introduction of facilities connecting the CBP pipeline distribution network to Metropolitan's water distribution system to allow for a portion of the water supply developed by the CBP to be pumped to Metropolitan to offset SWP Table A water supplies that would instead be released from Lake Oroville to create pulse flows in the Feather River for ecosystem benefit.

### 3.5.1 AWPF and PUT Facilities

The CBP alternative includes the same AWPF, injection wells, purified water pipelines, and brine conveyance pipelines as the Regional Water Quality and Reliability Plan alternative. A summary of the CBP PUT facilities is provided in Table 3-4 below.

**Table 3-4: AWPF and PUT Facilities for Alternative 3: Chino Basin Program**

| Parameter | Description |
|---|---|
| Recharge Locations | MZ-2 |
| AWPF | |
| Location | RP-4 |
| Process | MF/RO/UV-AOP |
| Capacity (AFY) | 15,000 |
| Purified water conveyance | |
| Pipelines | 7.1 miles (8-inch to 30-inch) |
| Pump station | |
| Location | RP-4 |
| Size | 1,500 HP |
| Number of injection wells | 16 (12 duty, 4 standby) |
| Brine conveyance | |
| Disposal system | NRWS |
| Pipeline | 1,400 feet (8-inch) |

**Notes:**
MF: membrane filtration
RO: reverse osmosis
UV-AOP: ultraviolet advanced oxidation process

#### *3.5.1.1 AWPF*

Under the CBP, a 15 TAFY AWPF would be located at RP-4. Similar to the other alternatives, approximately 2 TAFY of water will be lost through the AWPF process, requiring that 17 TAFY of source water supply to the AWPF be made available for treatment. At RP-4, the proposed treatment processes consist of membrane filtration (MF), reverse osmosis (RO), and ultraviolet advanced oxidation process (UV-AOP). IEUA is planning to upgrade and expand the secondary treatment process at RP-4 to a membrane bioreactor (MBR) around year 2040 as detailed in IEUA's Ten Year Forecast. Since the AWPF would be online by 2028, a conceptual MBR layout was developed in conjunction with the AWPF layout to avoid conflicts between the future facilities. Further details are provided in the PDR TM2 (Appendix D).

#### *3.5.1.2 Purified Water Conveyance*

All purified water will be pumped from the AWPF to the injection well sites in MZ-2. Purified water will be routed via 7.1 miles of 8-inch to 30-inch pipelines from the AWPF to injection wells located within the Chino Basin (*see* Figure 3-1). These conveyance routings will also require a pump station (1,500 HP) at RP-4 to pump water from the AWPF to the conveyance pipeline to the injection wells. The recommended redundancy for injection wells is one standby well for every three active wells, and as such, 16 injection wells (12 active, 4 on standby) will be used to recharge purified water to the Chino Basin. While injection well capacities are dependent on well maintenance and other operational assumptions, the injections wells are expected to have a capacity of 775 gallons per minute (gpm) up to a maximum of 830 gpm.

#### *3.5.1.3 Brine Conveyance*

IEUA operates the NRWS, which is infrastructure for brine disposal and other, non-reclaimable high-strength wastewater. The NRWS is comprised of three pipelines: the NRWS pipeline, the EWL, and the IEBL. The NRWS is split into two service areas within IEUA's jurisdiction, the North NRWS, which is comprised of the NRWS pipeline and EWL, and the South NRWS. Brine from the AWPF will be pumped into the NRWS pipeline using a 1,400-foot (8-inch) pipeline and conveyed to LACSD for disposal.

### 3.5.2 TAKE Facilities

A summary of the CBP TAKE facilities that will be constructed is provided below.  These facilities provide capacity to deliver up to 40 TAFY of CBP water supplies during call years, allocated as 30 TAFY to FWC and CVWD as in lieu deliveries and 10 TAFY to Metropolitan at the Rialto Pipeline as pump in delivery.  After completion of the WSIP water exchange commitment, these facilities will also accommodate a full 40 TAFY delivery to FWC and CVWD.

#### *3.5.2.1 Turnouts and Connections*

New turnouts will need to be constructed from the regional CBP pipeline into the Rialto Pipeline. The proposed turnouts would consist of:

- 24-inch turnout to FWC Highland Zone (FWC F13 tanks)
- 24-inch turnout to FWC Juniper Zone (FWC F17 tank)
- 48-inch turnout to CVWD at the Lloyd W. Michael WTP
- 24-inch turnout to Metropolitan at the Rialto Pipeline

#### *3.5.2.2 Pipelines*

The collector pipeline diameters would range from 12- to 48-inch. In addition, a potable pipeline network will deliver water to the agency turnouts. As shown in Figure 3-2, the pipelines would consist of:

- 12 miles of 12- to 48-inch collector pipelines
- 6.3 miles of 48-inch pipeline to deliver to CVWD
- 7.0 miles of 24-inch pipeline to deliver to FWC F13 tanks
- 0.7 miles of 24-inch pipeline to delivery to FWC F17 tank
- 0.8 miles of 24-inch pipeline to deliver to Metropolitan

#### *3.5.2.3 Extraction Wells*

Alternative 3 will include the construction or use of 17 extraction wells (*see* Figure 3-2). The field of extraction wells will be located in the general area north of the I-15/I-10 interchange to produce the CBP water for Metropolitan pump-in and/or in-lieu CBP use.

#### *3.5.2.4 Pump Stations*

Alternative 3 will include the construction or use of two potable water pump stations (*see* Figure 3-2):

- Potable Water Pump Station #1 – Reservoir to Lloyd Michael clearwell (CVWD Zone III): 5,300 HP
- Potable Water Pump Station #2 – Lloyd Michael clearwell to the Rialto Pipeline: 650 HP

#### *3.5.2.5 Water Storage Tanks*

One 5.0 million-gallon (MG) storage tank would serve as a forebay for Potable Water Pump Station #1.

### 3.5.3 Benefits

Similar to the Regional Water Quality and Reliability Plan, the CBP would collectively treat and store up to 15 TAFY of advanced treated water in the Chino Basin, creating a new local water supply. The CBP would also include a regional pipeline connecting CBP potable water facilities to the region to provide for up to 30 TAFY of in lieu use of CBP supplies, as well as connections to Metropolitan with the ability to pump up to 10 TAFY of CBP potable supplies into Metropolitan's water distribution system. This in-lieu and direct pump-in use of CBP water supplies would allow the CBP to make 40 TAFY available to Metropolitan in drier years in exchange for the same amount of supply delivered by the SWP. In return, 40 TAFY that would otherwise have been exported to Metropolitan would be stored in Lake Oroville and used together with Delta carriage water savings to enhance instream flows in the Feather River.

Delta carriage water savings is an additional benefit of the Proposition 1 WSIP water exchange. SWP operations that transfer water across the Delta from upstream storage facilities to Delta export pumps under balanced conditions require additional upstream releases to maintain water quality in the Delta. This additional flow, known as "carriage water," is generally estimated by DWR to be between 20 and 30 percent of the amount of water exported. Under Proposition 1 WSIP water exchange operations, SWP releases from Lake Oroville and Delta export pumping would be reduced compared to planned operations, and a carriage water savings would accrue in Lake Oroville. IEUA has proposed that 20 percent of pulse flow releases be accounted for as carriage water savings and applied towards the total pulse flow quantity. Any additional carriage water savings would accrue to the SWP for other purposes as a hedge against possible operational impacts caused by the exchanges. This proposal would reduce the required capacity and capital cost of the extraction facilities to be constructed be IEUA for the CBP, allow 20 percent of new CBP AWPF supplies to be used locally, and increase total maximum environmental pulse flows from Lake Oroville to 50 TAFY.

This exchange element would be in operation during the first 25 years of the CBP, administered through agreements with DWR, CDFW, and Metropolitan. The total production of CBP water supplies over 25 years is 375 TAF. Of this sum, 75 TAF is assumed to be available for local use and emergency response. The remaining 300 TAF would be used for in lieu and pump in water deliveries to Metropolitan. Together with projected Delta carriage water savings, a total of 375 TAF would be available in Lake Oroville over the 25-year period for ecosystem improvement in the Feather River. After the 25-year period, the full 15 TAFY of CBP supply would be available for local use, further reducing dependence on imported water, improving water quality, and providing a new local water supply for the region.

In addition to the ecosystem improvement benefits provided by this dedicated water supply, the production of high-quality water in the Chino Groundwater Basin will deliver benefits in the form of enhanced water quality (similar to the Baseline Compliance Plan and Regional Water Quality and Reliability Plan) and local water supply available to offset the need for imported water from Metropolitan and to reduce the economic impact of water supply shortages.

The CBP also provides emergency supply benefits in years when planned or unplanned service disruptions occur, and land subsidence mitigation benefits are achieved through new operational flexibility that will allow using recharged supplies to better manage groundwater pumping in areas sensitive to subsidence. These benefits are discussed further and compared with those provided by the other alternatives in subsequent sections.

# 4 Evaluation and Comparison of Alternatives

This chapter provides a feasibility-level evaluation and comparison of each of the alternatives previously presented with respect to IEUA's objectives, economic, technical, environmental, and financial feasibility, along with constructability. A summary of this evaluation is provided at the conclusion of this chapter.

## 4.1 Evaluation Approach and Assumptions

An economic analysis was performed for the purposes of this feasibility study to evaluate the economic feasibility of each of the project alternatives. This analysis involved the development of a tool to estimate the benefits and costs of each alternative. The assumptions and methodology are detailed in IEUA's CBP Economic Analysis TM (Appendix E). The evaluation and comparison of alternatives will be primarily performed using results from this analysis. The alternatives will also be compared against the project objectives and other feasibility considerations including:

- Technical feasibility
- Environmental feasibility
- Financial feasibility
- Constructability

## 4.2 Alternatives Evaluation

An evaluation of the project alternatives with respect to economics and other considerations is provided below. This evaluation was used to select the recommended alternative as described in Chapter 5. As previously stated, three alternatives are analyzed herein, Alternative 1: Baseline Water Quality Compliance Plan Alternative, Alternative 2: Regional Water Quality and Reliability Plan Alternative, and Alternative 3: Chino Basin Program. Alternative 1 would include the development of an AWPF, with minimal other facilities. Alternative 2 would include the same AWPF as Alternative 2, along with groundwater injection facilities, extraction wells, groundwater treatment facilities, pipelines, and connections that are integrated with the AWPF and injection well system. The CBP (Alternative 3) includes the same infrastructure as Alternative 2 but increases total extraction capacity from 15 TAFY to 40 TAFY, and includes facilities connecting the CBP pipeline distribution network to Metropolitan's water distribution system.

### 4.2.1 Economic Feasibility

An enhanced decision-support tool was developed for the purposes of this feasibility study to estimate the economic value of the benefits associated with each alternative and provide a comprehensive evaluation of the regional benefits of the proposed alternatives relative to their costs.  The tool aggregates assumptions to calculate the present value (PV) of the costs and benefits over a 50-year lifecycle for each alternative, as presented in the previous section. The PV cost and benefit are then used to calculate the benefit-cost (BC) ratio and the net present value (NPV) for each alternative, which helped guide the selection of the proposed project as further described in Chapter 5.

Note that the costs and benefits for the CBP are only tabulated from a statewide perspective that considers comprehensive costs and benefits accruing to the state or nation as a whole. Under this approach, not all costs and benefits would accrue to IEUA or its member agencies; therefore, this evaluation does not specifically address investment decisions by these agencies.  Rather, this evaluation is intended to support a finding by the CWC that the CBP is economically feasible and qualified to receive WSIP funding.

The methodology for the economic analysis is described in greater detail in IEUA's CBP Economic Analysis TM (Appendix E). Assumptions used for the economic analysis are also detailed in Appendix E and in PDR TM1 (Appendix C).

#### *4.2.1.1 Cost Comparison of Alternatives*

Capital and PV costs for each of the alternatives are summarized in Table 4-1 below.

Because the Baseline Compliance Plan alternative only addresses water quality improvement project purposes and does not include the infrastructure necessary for water supply improvement and other project purposes, its capital cost of $355.8 million is considerably less than both the Regional Water Quality and Reliability Plan and the CBP, which have capital costs of $538.9 million and $665.9 million, respectively. Similarly, the total present value cost of the Baseline Compliance Program is $593.8 million, considerably less than total present value costs for the Regional Water Quality and Reliability Plan and CBP at $972.2 and $1,171.0 million, respectively.  The greater total present value cost of the CBP, 20 percent greater than the Regional Water Quality and Reliability Plan, provides significantly increased groundwater extraction capacity and improved water management operational flexibility.

**Table 4-1: Cost Comparison of Alternatives**

| | Alternative 1: Baseline Compliance Plan | Alternative 2: Regional Water Quality and Reliability Plan | Alternative 3: CBP |
|---|---|---|---|
| **Total Capital Cost (2019 $ million)** | $355.8 | $538.9 | $665.9 |
| **PV Cost (2019 $ million)[1]** | $593.8 | $972.2 | $1,171.0 |
| ***Capital and Replacement Cost*** | *$246.2* | *$441.2* | *$589.2* |
| **- Loan Payment** | $191.6 | $349.8 | $299.6 |
| **- Replacement Cost** | $54.6 | $91.4 | $120.2 |
| ***Annual Costs*** | *$196.4* | *$351.8* | *$393.5* |
| **- O&M Cost** | $171.1 | $324.1 | $364.4 |
| **- NRW Cost** | $25.3 | $27.7 | $29.1 |
| ***Recycled Water Import Cost*** | *$151.2* | *$179.2* | *$188.3* |

**Note:** [1] Present value: capital and O&M costs evaluated for 50 years and discounted to 2019 dollars

#### 4.2.1.2 *Benefits Comparison of Alternatives*

The following benefits were monetized as part of the economic analysis:

- Water supply benefits
- Water quality benefits
- Emergency response water supply benefits
- Ecosystem benefits

A summary of these benefits for each of the alternatives is provided in Table 4-2 below. As described earlier, the Baseline Compliance Plan is assumed in this evaluation to represent the least cost alternative for achieving IEUA's single-purpose water quality improvement objectives and its total present value cost is used as an estimate of present value water quality benefits for all project alternatives. The Baseline Compliance Plan does not contribute to other project purposes and includes no other monetized benefits in the analysis.

Water supply benefits are provided by the Regional Water Quality and Reliability Plan through Metropolitan Demand Offset and Shortage Avoidance water supply improvements. The present value of these water supply benefits totals $529.1 million over the 50-year project life cycle. Water supply benefits for the CBP during the first 25 years of the project life cycle (while the Proposition 1 WSIP water exchange commitment is fulfilled) are provided by cost offsets associated with pump in of new AWPF water supplies to Metropolitan to replace a portion of Metropolitan's SWP Table A delivery, local use of new AWPF supplies in lieu of deliveries from Metropolitan to replace the remainder of Metropolitan's SWP Table A delivery, Metropolitan demand offset for the portion of new AWPF supplies that are not committed to the Proposition 1 WSIP exchange, and by avoiding shortages in Metropolitan deliveries during severe drought. During the second 25 years of the CBP project life cycle (after fulfillment of the Proposition 1 WSIP exchange commitment) water supply benefits are marginally increased due to the ability to use all new AWPF supplies for Metropolitan Demand Offset and Shortage Avoidance water supply improvements. The total present value of these water supply benefits is $380.8 million. This value is 28 percent less than the total present value of the water supply benefit for the Regional Water Quality and Reliability Plan, due to the commitment of water supply for the Proposition 1 WSIP exchange.

The present value of emergency supply benefits for the Regional Water Quality and Reliability Plan and the CBP are $59.9 and $165.4 million, respectively. The difference in magnitude of these benefits is driven by the greater groundwater extraction capacity of the CBP compared to the Regional Water Quality and Reliability Plan.

The CBP also provides $119.7 million in ecosystem benefits through the WSIP water exchange. If that value is added to other CBP water supply benefits and emergency supply benefits, the total present value is $665.9 million, compared to the total present value of water supply benefits and emergency supply benefits of $589.1 million provided by the Regional Water Quality and Reliability Plan.

In summary, the total present value benefit of the Baseline Compliance Plan, the Regional Water Quality and Reliability Plan, and the CBP are $593.8 million, $1,182.9 million, and $1,259.8 million. As expected, total benefits are significantly lower for the Baseline Compliance Plan because it only addresses water quality improvement benefits.  The total present value of benefits for the CBP is about six percent greater than that of the Regional Water Quality and Reliability Plan.

**Table 4-2: Benefits Comparison of Alternatives**

| | Alternative 1: Baseline Compliance Plan | Alternative 2: Regional Water Quality and Reliability Plan | Alternative 3: CBP |
|---|---|---|---|
| **PV Benefit ($ million)** | $593.8 | $1,182.9 | $1,259.8 |
| ***Water Supply Benefits*** | - | *$529.1* | *$380.8* |
| **- Pump-In Benefit** | - | - | $10.0 |
| **- In-Lieu Benefit** | - | - | $62.5 |
| **- Metropolitan Demand Offset** | - | $469.9 | $249.5 |
| **- Shortage Avoidance Benefit** | - | $59.2 | $58.8 |
| ***Water Quality Benefits*** | *$593.8* | *$593.8* | *$593.8* |
| ***Emergency Supply Benefits*** | - | *$59.9* | *$165.4* |
| ***Ecosystem Benefits*** | - | - | *$119.7* |

#### *4.2.1.3 Net Present Value Comparison of Alternatives*

A comparison of total life cycle benefits and costs and benefit-cost ratios for each of the alternatives is shown in Table 4-3 and provided graphically in Figure 4-1. NPV is calculated as the total present value benefits less the total present value costs and represents the total value of investment over the life cycle for each alternative. The BC ratio for each alternative is calculated as the total present value benefits divided by the total present value costs. Alternatives with positive NPV and BC ratios greater than 1.0 are deemed economically feasible, in consideration of the assumptions inherent to the analysis. In this economic analysis, the Baseline Compliance Plan has a BC ratio of 1.00 due to the assumption that this alternative represents the least cost plan for achieving the water quality improvement purposes of the project and its present value costs are used to monetize the water quality improvement benefits of all project alternates. The NPV and BC ratios for the Regional Water Quality and Reliability Plan and the CBP are positive and greater than 1.00, respectively, indicating both alternatives are economically feasible. The Regional Water Quality and Reliability Plan provides a NPV of $210.7 million and BC ratio of 1.22, while the CBP provides a NPV of $88.7 million and a BC ratio of 1.08.

**Table 4-3: Life Cycle Net Present Value Benefits and Costs of Alternatives**

| | Alternative 1: Baseline Compliance Plan | Alternative 2: Regional Water Quality and Reliability Plan | Alternative 3: CBP |
|---|---|---|---|
| **Total Capital Cost (2019 $ million)** | $355.8 | $538.9 | $665.9 |
| **PV Cost (2019 $ million)[1]** | **$593.8** | **$972.2** | **$1,171.0** |
| ***Capital and Replacement Cost*** | *$246.2* | *$441.2* | *$589.2* |
| **- Loan Payment** | $191.6 | $349.8 | $469.0 |
| **- Replacement Cost** | $54.6 | $91.4 | $120.2 |
| ***Annual Costs*** | *$196.4* | *$351.8* | *$393.5* |
| **- O&M Cost** | $171.1 | $324.1 | $364.4 |
| **- NRW Cost** | $25.3 | $27.7 | $29.1 |
| ***Recycled Water Import Cost*** | *$151.2* | *$179.2* | *$188.3* |
| **PV Benefit** | **$593.8** | **$1,182.9** | **$1,259.8** |
| **Water Supply Benefits** | - | *$529.1* | *$380.8* |
| **Water Quality Benefits** | *$593.8* | *$593.8* | *$593.8* |
| **Emergency Supply Benefits** | - | *$59.9* | *$165.4* |
| **Ecosystem Benefits** | - | - | *$119.7* |
| **Net Present Value** | **-** | **$210.7** | **$88.7** |
| **Benefit – Cost Ratio** | **1.00** | **1.22** | **1.08** |

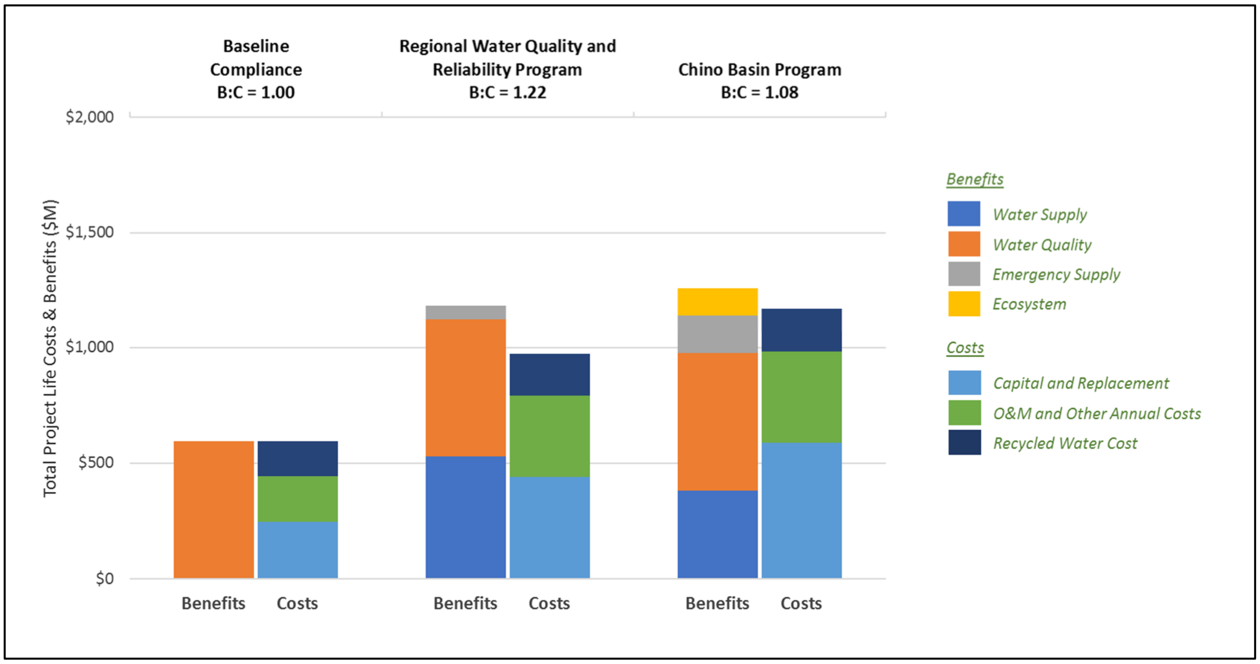


**Figure 4-1: Life Cycle Benefits and Costs Analysis of Alternatives**

### 4.2.2 Other Considerations

#### *4.2.2.1 Planning Objectives*

A comparison of the feasible alternatives with respect to IEUA's objectives of protecting and enhancing water quality, improving regional water supply reliability and resiliency, and developing an integrated solution to produce ecosystem benefits is provided in Table 4-4.

As previously discussed, the Baseline Compliance Plan (Alternative 1) includes a phased 15 TAFY AWPF that would help meet IEUA's objective of protecting and enhancing regional water quality. No other regional objectives are met with Alternative 1.

The Regional Water Quality and Reliability Plan (Alternative 2) and the CBP (Alternative 3) both include advanced water treatment and groundwater injection and water supply infrastructure, including extraction wells, groundwater treatment facilities, pipelines, and connections that are integrated with the AWPF and injection well system, as well as 17 TAFY of additional external supplies. The infrastructure associated with both alternatives would collectively help IEUA meet its objectives of protecting and enhancing water quality and improving regional water supply reliability and resiliency.

The CBP would also include a regional pipeline connecting CBP potable water facilities to the region, as well as connections to Metropolitan with the ability to pump CBP potable supplies into Metropolitan's water distribution system. As previously discussed, this connection would allow the CBP to make 40 TAFY available to Metropolitan in dry or critical years in exchange for the same amount of supply delivered by the SWP. In return, 40 TAFY that would otherwise have been exported to Metropolitan would be stored in Lake Oroville and used to enhance instream flows in the Feather River.

With this additional infrastructure, in addition to meeting water quality objectives, the CBP also allows the region to meet its objectives of developing an integrated solution to produce ecosystem benefits.

**Table 4-4: Comparison of Alternatives with Respect to IEUA Objectives**

| Objectives | | Alternative 1: Baseline Compliance Plan | Alternative 2: Regional Water Quality and Reliability Plan | Alternative 3: CBP |
|---|---|---|---|---|
| Protect and Enhance Regional Water Quality | Meet Permit Compliance for Continued Use of Recycled Water | ✓ | ✓ | ✓ |
| | Maintain Commitments for Salt Management | ✓ | ✓ | ✓ |
| Improve Regional Water Supply Reliability and Resiliency | Develop Infrastructure to Address Vulnerabilities | | ✓ | ✓ |
| | Provide Source for Emergency Response | | ✓ | ✓ |
| | Enhance Recharge | | ✓ | ✓ |
| Develop an Integrated Solution to Produce Ecosystem Benefits | | | | ✓ |

### *4.2.2.2 Technical Feasibility*

The Baseline Compliance Plan (Alternative 1) consists of PUT facilities including a phased 15 TAFY AWPF at RP-4, a pump station, and brine conveyance facilities. The Regional Water Quality and Reliability Plan (Alternative 2) and the CBP (Alternative 3) also include construction of a 15 TAFY at RP-4 (not phased), along with a pump station, purified water and brine conveyance facilities, injection wells, and the TAKE facilities described in Sections 3.3.2 and 3.5.2, respectively. IEUA has significant prior experience designing and constructing these types of facilities. Experience includes environmental review and permitting, design, construction, equipping, and operation of treatment works, recharge basins, conveyance facilities, turnout structures, and multiple water supply sources including imported water, recycled water, and groundwater. Project facilities for the three alternatives evaluated in this feasibility study would be located, designed, and constructed to minimize potential impacts to adjacent users; would be constructed using existing, well-established, efficient, and reliable engineering, design and construction standards; and would be operated using existing, well established procedures and practices by certified operators.

A detailed discussion of the configuration of the CBP facilities, including how the proposed facilities will be planned, constructed and operated is provided in the CBP Draft PEIR (Appendix B). Also, conceptual design reports were prepared (Appendix C and Appendix D), providing a detailed description of planning and conceptual design assumptions; description of the alternatives and associated facilities, and how the facilities would be integrated with existing IEUA and Metropolitan facilities (for the CBP alternative); how the alternatives were formulated and analyzed; and the design methods, capital and operations cost estimates, and replacement cost estimates for the alternatives.

The CBP will produce 15 TAFY of new water supply to support the State exchange required to deliver public benefits including a highly reliable, dedicated environmental water supply to benefit Bay-Delta instream flows, as well as enhance water supply reliability and improve water quality for water users in Southern California. This exchange will be facilitated by increasing additional available groundwater supplies in the adjudicated Chino Basin via 15 TAFY of purified water supply generated through the AWPF and through groundwater storage and operation of new injections wells. CBP groundwater storage and extraction operations have been evaluated in consultation with the Chino Basin Watermaster. Storage in Chino Basin will be authorized through a dedicated storage and recovery application with the Chino Basin Watermaster. IEUA's partner and SWP Contractor, Metropolitan, would support this exchange with the SWP. For every acre-foot of water requested for north of the Delta ecosystem benefits, IEUA would pump locally stored groundwater and deliver it directly to Metropolitan or use the water locally instead of taking raw imported water from Metropolitan (referred to as in-lieu). Metropolitan would then leave behind an equivalent amount of water in Lake Oroville to be dedicated and released for the requested ecosystem benefit. The exchange would be administered through agreements with the DWR, the CDFW, Metropolitan, and other project partners.

IEUA is working closely with local agencies within the Chino Basin to define sources of wastewater effluent to serve as the supply source for the AWPF. IEUA has developed draft arrangements with these local agencies that are based on shared benefits of advancing the region's long-term water recycling goals, optimizing integration with planned AWPF facilities and groundwater recharge facilities, and meeting existing and anticipated flow requirements in the Santa Ana River. Additional information regarding water supply sources is available in a separate External Supply Sources White Paper (Appendix G).

A fundamental tenet of the CBP is to not impinge on existing local agency operations. To that end, IEUA has worked collaboratively with its member agencies and other Chino Basin agencies over the last two years to refine the facilities and terms of operations that would support the CBP, including the proposed water exchange. The CBP has been optimized to reflect many of the issues raised. Ultimately, local performance commitments for the water exchange will be negotiated and documented in a future agreement and term sheet.

Similarly, an underlying principle for implementing the CBP alternative is that no adverse impacts should occur to Metropolitan or other Metropolitan member agencies due to CBP operations, and that no adverse impacts should occur to the SWP or SWP Water Supply Contract holders. Early in the CBP formulation process, IEUA developed an operations analysis model, referred to as the "CBP WSIP Ops Model," to explore potential operational requirements that could help ensure that the proposed water exchange included as a feature of the CBP could be implemented without significant risk of impacts to Metropolitan or the SWP under various hydrologic conditions. This model was used to demonstrate proof of concept, show that it is technically feasible to operate the CBP alternative as it has been defined in this feasibility study, and help inform more in-depth evaluation of operational protocols for WSIP exchanges by DWR and other participants. An overview of the CBP WSIP Ops Model and summary findings from its application are provided in Appendix F. Based in part on this work, more specific rules are currently being developed to prevent potential adverse impacts that have yet to be identified. IEUA, Metropolitan, DWR, and CDFW are developing operational terms, conditions, and supporting agreements.

In summary, based on analyses performed to date, the alternatives, including the CBP alternative, are considered to be technically feasible, constructible and can be cost-effectively operated and maintained.

#### *4.2.2.3 Environmental Feasibility*

A detailed discussion of the impacts associated with the three alternatives is provided in the CBP Draft PEIR (Appendix B).

The CBP Alternative (Alternative 3) could result in significant impacts to the following environmental resource issues: air quality, greenhouse gases, and utilities and service systems. Alternative 1 (Baseline Water Quality Compliance Plan) and Alternative 2 (Regional Water Quality and Reliability Plan) would have comparable, if reduced, environmental impacts for all of the resource issues, although they would not avoid any significant environmental impacts caused by the CBP. Additionally, Alternative 3 would result in ecosystem benefits by way of pulse flows in the Feather River to improve habitat conditions for native salmonids and achieve environmental benefits that are not realized by Alternatives 1 and 2. Furthermore, hydrologically, the CBP Alternative (Alternative 3) would address vulnerabilities through infrastructure development and provide a source for emergency response thus providing greater hydrological benefits than Alternative 1.

#### *4.2.2.4 Financial Feasibility*

The capital and NPV costs associated with each of the alternatives are presented in Table 4-1. IEUA has the economic capacity to construct and maintain any of the alternatives identified through existing rate structures. IEUA anticipates that approximately 70 percent of costs of total life cycle project costs would be recovered through local Chino Basin water rates and/or connection fees, and 30 percent of costs would be recovered through local Chino Basin wastewater rates and/or connection fees.

#### *4.2.2.5 Constructability*

The Baseline Compliance Plan (Alternative 1) consists of PUT facilities including a phased 15 TAFY AWPF at RP-4, a pump station, and brine conveyance facilities. The Regional Water Quality and Reliability Plan (Alternative 2) and the CBP (Alternative 3) also include construction of a 15 TAFY at RP-4 (not phased) along with a pump station, purified water and brine conveyance facilities, injection wells, and the TAKE facilities described in Sections 3.3.2 and 3.5.2, respectively.

A detailed discussion of the construction of the CBP PUT and TAKE facilities, including how the proposed facilities will be installed and the amount of time required for their construction, is provided in the CBP Draft PEIR (Appendix B). The discussion related to the AWPF applies to all the alternatives (although the AWPF under Alternative 1 will be constructed in two phases over time). Supporting discussion related to the other PUT facilities only applies to Alternatives 2 and 3, since the Baseline Compliance Plan does not include any infrastructure to recharge purified water into the Chino Basin. The discussion related to the TAKE facilities largely applies to both Alternatives 2 and 3 but does not apply to Alternative 1 since the Baseline Compliance Plan does not include any TAKE facilities. A summary of this discussion is provided below.

Non-complex design and construction techniques will be used to construct the AWPF for each of the alternatives and the PUT facilities associated with Alternatives 2 and 3. The sequenced construction activities associated with the construction of the AWPF is likely to include site clearing, grading, construction of facilities, installation of equipment, and site completion. Installation of the injection wells is likely to be performed using direct rotary or fluid reverse circulation rotary drilling methods. Purified water pipelines are likely to be installed into a trench excavated from the ground surface using standard construction techniques.

Construction of the TAKE facilities for Alternatives 2 and 3 are also likely to be completed using non-complex design and construction techniques. Techniques to install the turnouts and connections are likely to be similar to that described above for pipelines. Construction of the pump stations is likely to involve installation of piping and electrical equipment, excavation and structural foundation installation, pump house construction, pump and motor installation, and final site completion. Finally, the water storage tank associated with Alternatives 2 and 3 will be designed in accordance with all applicable codes and design standards and is likely to be constructed in the following fashion: site preparation and grading; floor, walls and columns, roof, and appurtenances.

Various construction materials that are reasonably available will be used to construct the AWPF associated with all alternatives and the remaining PUT and TAKE facilities associated with Alternatives 2 and 3.

Various types of skilled craftsmen and laborers will be used to construct the facilities associated with each of the alternatives. For the CBP, a significant workforce would be needed to construct the PUT and TAKE facilities over the estimated five years of construction. The different types and associated number of skilled craftsmen and laborers necessary to construct these facilities will be needed at different times over the duration of construction depending on the final design and construction schedule. The number of skilled craftsmen and laborers for the Regional Water Quality and Reliability Plan (Alternative 2) is likely to be similar to the CBP, but the Baseline Compliance Plan (Alternative 1) will require less personnel since the alternative only includes a phased 15 TAFY AWPF, pump station, and brine conveyance facilities. The work force for Alternative 1 will largely be needed during Phase 1 when the AWPF and initial facilities are constructed, with a percentage needed during Phase 2 when the AWPF is expanded from 9 TAFY to 15 TAFY.

Standard construction equipment will be used to construct the facilities associated with each of the alternatives, including bull dozers, backhoes, loaders, excavators, dump trucks, water trucks, compactors, cranes, rollers, grinders, paving machines, and rollers/vibrators.

In summary, all alternatives are expected to be able to be constructed with existing technology and available construction materials, work force, and equipment.

# 5 Selection of the Preferred Alternative

Based on the evaluation and comparison of alternatives provided described in Chapter 4, the CBP (Alternative 3) is the preferred alternative. While the Baseline Compliance Plan (Alternative 1) may represent the minimum required action by IEUA, the economic analysis performed as part of this feasibility study (Appendix E) demonstrates that considerable additional value can be secured by IEUA by pursing either multi-purpose project alternative, the Regional Water Quality and Reliability Plan (Alternative 2) with a BC ratio of 1.22, or the CBP with a BC ratio of 1.08. The Proposition 1 WSIP funding available for the CBP results in lower costs to IEUA over the 50-year project life but provides marginally reduced water supply benefits over the first 25 years of implementation compared to the Regional Water Quality and Reliability Plan. If the additional water supply provided by the Regional Water Quality and Reliability Plan for these first 25 years of the project life is not required, the CBP offers a lower cost approach to securing significant value and a greater level of benefits as provided by the Regional Water Quality and Reliability Plan over the second 25 years of the project life.

This chapter provides the feasibility-level conceptual design of the CBP and an overview of project operations and beneficiaries, summarizes results from the economic analysis, and provides a feasibility determination with respect to technical, environmental, economic, and financial feasibility, along with constructability.

## 5.1 Description of the Preferred Alternative

### 5.1.1 Conceptual Design

The background assumptions and information necessary to formulate the preferred combination of PUT and TAKE facilities for the CBP are provided in the PDR TM1 (Appendix C). The feasibility-level conceptual design for this combination of facilities is provided in the PDR TM2 (Appendix D).

The major components of the preferred combination of PUT and TAKE facilities for the CBP include the following facilities as shown in

Figure 5-1 and Figure 5-2:

- PUT facilities
    - 15 TAFY AWPF located at RP-4
    - 7.1 miles of 8-inch to 30-inch pipelines from the AWPF to the injection wells
    - One pump station at RP-4 to pump water from the AWPF to the conveyance pipeline to the injection wells
    - 16 injection wells (12 active, 4 on standby)
    - 1,400 feet (8-inch) pipeline for brine conveyance
    - 16.1 miles of 24-inch pipeline and two pump stations ranging from 430 HP to 670 HP to produce 6 TAFY of external supplies
- TAKE facilities
    - 24- to 48-inch turnouts and connections including:
        - 24-inch turnout to FWC F13 tanks
        - 24-inch turnout to FWC Juniper Zone FWC F17 tank

        - 48-inch turnout to CVWD at the Lloyd W. Michael WTP
        - 24-inch turnout to Metropolitan at the Rialto Pipeline
    - 12 miles of 12- to 48-inch extraction well collector pipelines
    - Potable pipeline network to deliver water to agency turnouts including:
        - 6.3 miles of 48-inch pipeline to deliver to CVWD
        - 7.0 miles of 24-inch pipeline to deliver to FWC F13 tanks
        - 0.7 miles of 24-inch pipeline to delivery to FWC F17 tank
        - 0.8 miles of 24-inch pipeline to deliver to Metropolitan
    - 17 extraction wells
    - Two potable water pump stations
        - Potable Water Pump Station #1 – Reservoir to Lloyd Michael clearwell (CVWD Zone III): 5,300 HP
        - Potable Water Pump Station #2 – Lloyd Michael clearwell to the Rialto Pipeline: 650 HP
    - One 5.0 MG storage tank that would serve as a forebay for Potable Water Pump Station #1

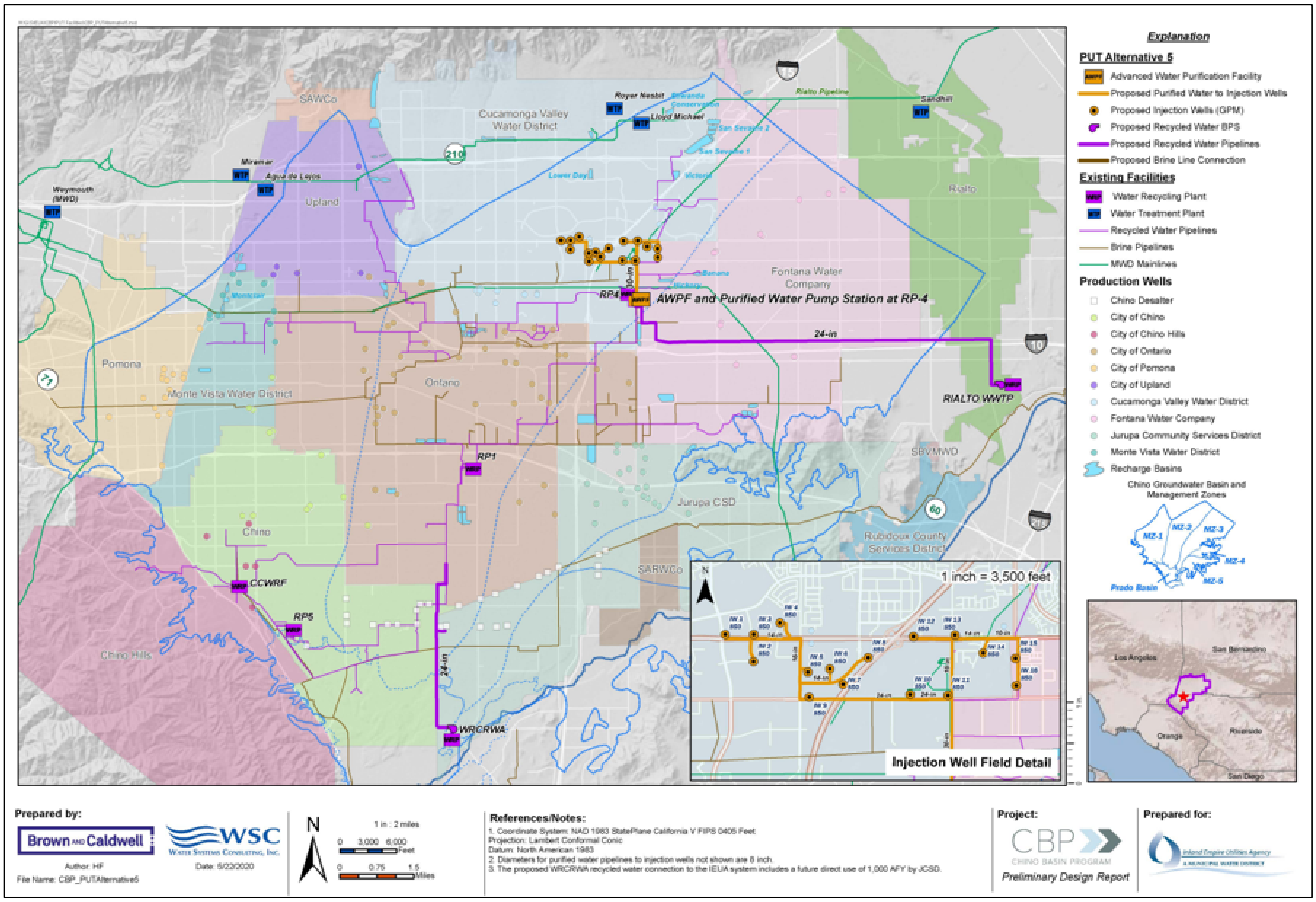


**Figure 5-1: Preliminary Configuration of CBP PUT Facilities**

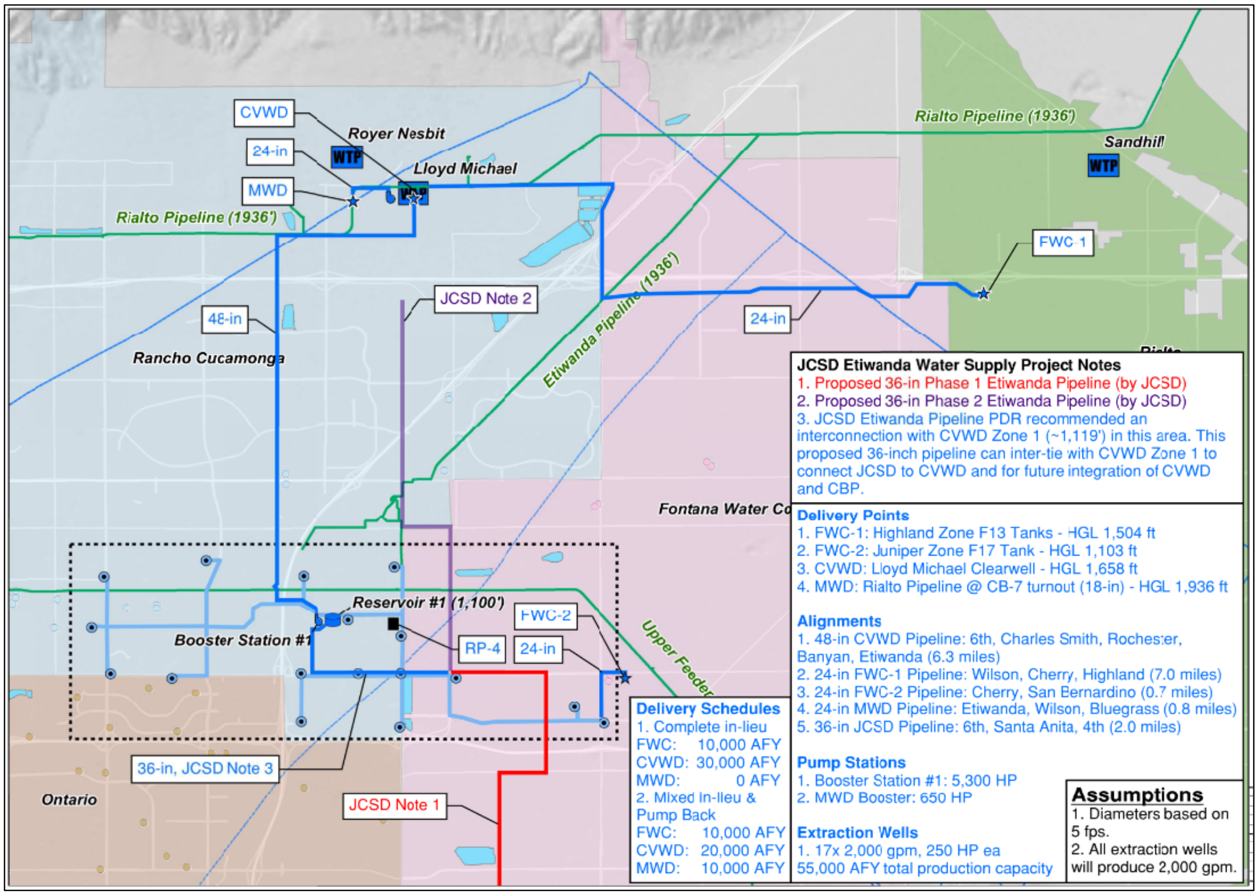


**Figure 5-2: Preliminary Configuration of CBP TAKE Facilities**

### 5.1.2 Project Operations

The CBP is a conjunctive use project that proposes to use advanced water purification to treat and store up to 15,000 AFY of recycled water in the Chino Basin for later extraction in "call" years, which will likely be in dry seasons, to deliver public benefits including a highly reliable, dedicated environmental water supply to benefit Bay-Delta instream flows, as well as enhance water supply reliability and improve water quality for water users in Southern California.

**Local CBP Operations Plan.** The most cost-effective approach for facilitating the CBP water exchange is to maximize in-lieu use of CBP water supplies by IEUA member agencies in place of Metropolitan deliveries. To provide the ability to deliver a portion of CBP water supplies directly to Metropolitan as a backup provision or in the extent that the full amount of any exchange cannot be accommodated by in-lieu use by IEUA member agencies, conveyance capacity and an interconnection that could deliver 10,000 acre-feet per year from the Chino Basin to the Rialto Feeder will be included as a CBP element. A more detailed plan for IEUA member agencies' participation in the CBP is under development.

**Metropolitan CBP Operations Plan**. Metropolitan is a vital partner in implementing the CBP. As a SWP Water Supply Contract holder, Metropolitan would serve as a fundamental party in completing proposed water exchanges between supplies stored locally in the Chino Basin and SWP supplies stored in Lake Oroville.

A principle for implementing the CBP is that no adverse impacts should occur to Metropolitan or other Metropolitan member agencies due to CBP operations. Because real-time extraction capacity from the Chino Basin will be limited in comparison to SWP delivery capability to Metropolitan, some reoperation of the Metropolitan distribution system will be necessary. Rules will be developed to minimize the potential for reoperations that result in adverse impacts and provide for potential augmentation of the flexibility of Metropolitan's water supply portfolio.

Metropolitan has noted the importance of maintaining SWP delivery reliability to member agencies served by the West Branch of the California Aqueduct, due to more limited options for providing supplies in that portion of its water distribution system. Calls for any CBP water exchange will be limited under conditions when planned SWP deliveries to Metropolitan from the West Branch of the California Aqueduct would be affected.

Metropolitan is currently developing and implementing a Prestressed Concrete Cylinder Pipe (PCCP) Rehabilitation Program to assess and plan for needed repairs to its subsurface water distribution pipelines (also known as feeders) that are deemed to be of high risk of failure. Metropolitan is proposing to rehabilitate the PCCP portions of five pipelines within its service area, including the Rialto Pipeline that serves IEUA and its member agencies. This rehabilitation could require a shutdown of the Rialto Pipeline for up to 18 months, limiting delivery capability. The new water conveyance and water system interconnections planned as part of the CBP could offer an important alternative source of water supply to IEUA and its member agencies during any required shutdown of the Rialto Pipeline. As a consideration as CBP agreements are being developed, Metropolitan and IEUA propose providing a priority for local use of CBP facilities to provide alternative water supplies during repair of the Rialto Pipeline. While CBP in-lieu use by IEUA member agencies could likely simultaneously provide for both the CBP water exchange and an alternative water source during a Rialto Pipeline shutdown, a priority for use of facilities to maintain local water supply during the Rialto Pipeline shutdown would be acknowledged should there be any conflict with executing the CBP water exchange. Under those conditions, the CBP water exchange would be deferred for an agreed upon window of time.

**SWP CBP Operations Plan.** While it is expected that CDFW will administer the CBP's ecosystem water supplies and benefits alongside assets provided by other WSIP projects, DWR's SWP infrastructure provides the basis for the CBP water exchange. Water supplies for Feather River Pulse flows would be released by DWR from Lake Oroville, under terms of agreements with CDFW, Metropolitan, and other interests. Coupled with delivery of exchange of water in the Chino Basin to Metropolitan, DWR would subsequently forego a like quantity of releases from Lake Oroville, export from the Delta, and delivery of water through the California Aqueduct and other south-of-Delta SWP facilities to Metropolitan.

A principle for implementing the CBP is that no adverse impacts should occur to the SWP or SWP Water Supply Contract holders due to CBP operations. Pulse flow releases are expected to occur in spring months while recovery of Lake Oroville supplies by reducing planned releases for Delta export would likely occur in summer months, requiring some reoperation of SWP facilities. DWR is developing guidelines to minimize the potential for SWP reoperations that result in adverse impacts to other SWP purposes, including water deliveries to SWP water supply contract holders.

DWR has noted that a key principle to minimizing the risk of impacts to other SWP purposes is to limit calls for any water exchanges under conditions when there is significant risk of not recovering storage in Lake Oroville by the end water year in which the pulse flow occurred. To safeguard against this risk, DWR is developing a forecasting procedure like that currently used to implement annual allocations for SWP Table A deliveries. Each winter, current reservoir storage and other SWP operations metrics will be used in combination with forecasts for inflow into Lake Oroville to conservatively estimate the maximum amount of exchange that can be accommodated without unintended impacts, applying a 90-percent exceedance level. As the water year advances and uncertainty diminishes, these estimates will be refined. CDFW can then use DWR's maximum allowable exchange quantity, together with an assessment of Feather River fishery conditions, to schedule an exchange.

IEUA has conducted preliminary SWP operations analyses to identify risks of not refilling Lake Oroville storage. Conceptually, the basis of the reoperations necessary to provide the storage recovery involve virtually moving exchanged water up the SWP system from southern California to Lake Oroville, including several critical steps, as follows:

- A pulse flow event would trigger the beginning of a water exchange.
- DWR would reduce deliveries to Metropolitan by the amount of the pulse flow release, less consideration for carriage water savings. These reductions would occur over the calendar year of the pulse flow.
- Metropolitan will receive rights to CBP water stored in the Chino Basin as SWP deliveries are curtailed. Metropolitan and IEUA will have an agreement that provides for timing and methods for Metropolitan to take delivery of the CBP supplies, through in-lieu use by IEUA member agencies or pump-in to Metropolitans' distribution system.
- As SWP deliveries to Metropolitan are curtailed, less water will be released from San Luis reservoir for conveyance through the California Aqueduct to Metropolitan's SWP turnouts, resulting in an accumulation of additional water in the reservoir compared to baseline operations.
- This exchanged water would be stored in San Luis Reservoir, until the opportunity to virtually transfer it further upstream in the SWP system becomes available. These reoperations could marginally increase San Luis Reservoir storage in months immediately following the pulse flow, prior to planned summer month SWP dry year deliveries typical in drier years. DWR will implement rules to avoid spills from the San Luis Reservoir or exacerbate "low point" conditions that impact water quality.
- To virtually transfer exchange water that is accumulated in San Luis Reservoir to Lake Oroville, planned releases from Lake Oroville and exports from the Delta must be curtailed. To ensure that these reoperations do not impact other SWP operations, IEUA has conservatively assumed that the curtailments would only occur in the summer months of July, August, and September. During this period, the Delta is typically in balanced conditions, meaning that upstream reservoir releases and

exports from the Delta are planned to meet Bay-Delta Water Quality Control Plan requirements, and there are no opportunities to conserve unregulated flows in the Delta. Therefore, releases from Lake Oroville and exports from the Delta at Banks Pumping Plant during this time can be considered discretionary. If discretionary releases from Lake Oroville and Delta exports are curtailed to match the exchange water committed to Metropolitan from the Chino Basin, the SWP system will be made whole, including storage recovery in Lake Oroville, without impacts to other SWP operations.

The preliminary operations analysis conducted by IEUA indicates that these reoperations could be successfully completed under most hydrologic conditions. However, in extremely dry conditions (such as those that occurred in 2014 or will likely occur in 2021), when baseline SWP operations do not include enough discretionary releases from Lake Oroville and Delta exports at Banks Pumping Plant to match the quantity of water that would be used to support the CBP water exchange, it is impossible to impose curtailments that would fully recover storage in Lake Oroville.

**CDFW Adaptive Management and Monitoring Operations Plan**

Pulse flow releases will be monitored utilizing instream flow gages to ensure compliance with agreed upon release criteria. Pulse flow releases will be monitored at Oroville Dam as reservoir outflow. Downstream monitoring will be conducted near the outlet of Thermalito Afterbay near the town of Gridley in the high flow channel. Both of these gages are currently in place and maintained by DWR. Should more gages be determined to be necessary IEUA is prepared to work with resource agencies. Data from these gages are uploaded in real time and available at the California Data Exchange Center website. Stage discharge relationships will be utilized to determine if flows released from Oroville reach downstream areas of the river.

IEUA has the funding sources and financial commitments (Appendix A) to support the management of the program during its operations. IEUA anticipates that the majority of total life cycle project costs will be recovered through local Chino Basin water rates and/or connection fees, with the remainder recovered through local Chino Basin wastewater rates and/or connection fees. Through the partnership agreements, IEUA, Metropolitan, DWR and CDFW will identify specific measures for adaptively managing the program to best achieve the intended public benefits.

## 5.2 Economics

### 5.2.1 Benefits

The present value benefit of the CBP is $1,259.8 million, which includes $380.8 million in water supply benefits, $593.8 million in water quality benefits, $165.4 million in emergency supply benefits, and $119.7 million in ecosystem benefits (Table 5-1).

**Table 5-1: Alternative 3: CBP Benefits Summary**

| | Alternative 3: CBP |
|---|---|
| **PV Benefit ($ million)** | $1,259.8 |
| ***Water Supply Benefits*** | *$380.8* |
| **- Pump-In Benefit** | $10.0 |
| **- In-Lieu Benefit** | $62.5 |
| **- Metropolitan Demand Offset** | $249.5 |
| **- Shortage Avoidance Benefit** | $58.8 |
| ***Water Quality Benefits*** | *$593.8* |
| ***Emergency Supply Benefits*** | *$165.4* |
| ***Ecosystem Benefits*** | *$119.7* |

### 5.2.2 Cost

The total present value cost of the CBP is $1,171.0 million (Table 5-2). This includes capital and replacement costs of $589.2 million, annual costs of $393.5 million, and recycled water import cost of $188.3 million.

**Table 5-2: Alternative 3: CBP Cost Summary**

| | Alternative 3: CBP |
|---|---|
| **Total Capital Cost (2019 $ million)** | $665.9 |
| **PV Cost (2019 $ million)[1]** | $1,171.0 |
| ***Capital and Replacement Cost*** | *$589.2* |
| **- Loan Payment** | $299.6 |
| **- Replacement Cost** | $120.2 |
| ***Annual Costs*** | *$393.5* |
| **- O&M Cost** | $364.4 |
| **- NRW Cost** | $29.1 |
| ***Recycled Water Import Cost*** | *$188.3* |

**Note:** [1] Present value: capital and O&M costs evaluated for 50 years and discounted to 2019 dollars

### 5.2.3 NPV

With a present value cost of $1,171.0 million and present value benefits totaling $1,259.8, the CBP has a net present value of $88.7 million and a BC ratio of 1.08 (Table 5-3).

**Table 5-3: Alternative 3: CBP NPV Summary**

| | Alternative 3: CBP |
|---|---|
| **PV Cost ($ million)** | $1,171.0 |
| **PV Benefit ($ million)** | $1,259.8 |
| **Net Present Value ($ million)** | $88.7 |
| **Benefit – Cost Ratio** | 1.08 |

### 5.2.4 Cost Allocation

An initial cost allocation analysis was conducted to derive an equitable distribution of costs among the project purposes. This analysis is intended to support evaluation of the financial feasibility of the project and potentially serve as a starting place for a more formal cost allocation. The Separable Costs – Remaining Benefits (SCRB) method, a widely used approach for cost allocation in federal water resources projects, was applied using the previously developed detailed project cost information and estimates of monetized benefits for four project purposes: water supply reliability, water quality improvement, emergency water supply, and subsidence avoidance for each alternative.

The SCRB method distributes costs among the project purposes by identifying separable costs and allocating joint costs in proportion to each purpose's remaining benefits. Separable costs for a project purpose are estimated as the incremental reduction in project costs that would result if that purpose is excluded from the multi-purpose project. Joint costs are the remaining project costs after all separable costs are subtracted.

The SCRB method starts by identifying the separable costs for each project purpose. Separable costs are subtracted from the lesser of benefits or single-purpose alternative project costs to derive remaining benefits. Next, joint costs are allocated in proportion to the distribution of remaining benefits. Joint project costs are then assigned to a project purpose based on the proportion of their remaining benefits (i.e., total benefits less the separable costs of each project purpose). Total cost allocated to a project purpose is the sum of its separable and apportioned joint costs.

The results of the cost allocation analysis are delineated in Table 5-4. The CBP is a multi-purpose project with water supply reliability and water quality improvement primary project purposes, and subsidence avoidance and emergency water supply secondary project purposes. The cost allocation analysis, which considers separable costs assignable to single purposes and allocates remaining joint costs in recognition of monetized benefits for each project purpose, results in the largest assigned portion of project costs to water quality improvement purposes for the CBP (58 percent). Water supply reliability is assigned the next greatest portion of project costs at 36 percent. Finally, emergency water supply and environmental improvements are allocated relatively minor amounts of total project costs.

**Table 5-4: Allocated Annualized Life Cycle Costs by Project Purpose ($ million)**

| | Alternative 3: CBP | |
|---|---|---|
| **Project Purpose** | Annualized Cost | Percent of Total |
| **Water Supply** | $12.6 | 36% |
| **Water Quality** | $20.4 | 58% |
| **Emergency Supply** | $1.3 | 4% |
| **Environmental** | $1.0 | 3% |
| **Total** | $35.3 | |

## 5.3 Determination of Feasibility

The feasibility of the CBP as largely described in Chapter 4 is summarized below with respect to technical feasibility, environmental feasibility, economic feasibility, financial feasibility, and constructability.

### 5.3.1 Technical Feasibility

IEUA has significant prior experience designing and constructing recycled water treatment facilities, groundwater recharge and recovery facilities, and associated pipeline and pumping distribution facilities. Experience includes environmental review and permitting, design, construction, equipping, and operation of treatment works, recharge basins, conveyance facilities, and turnout structures. Project facilities would be designed, located, and constructed to minimize potential impacts to adjacent users and would be constructed using existing, well-established, efficient, and reliable engineering and design standards, and construction standards.

Preliminary design reports were prepared (Appendix C and Appendix D) which provides a description of planning and design assumptions, an analysis of project alternatives, a description of the proposed facilities, how the facilities would be integrated with existing IEUA facilities, construction methods, capital and operations cost estimates, and replacement cost estimates.

Based on the analyses performed to date, the CBP alternative is considered to be technically feasible, constructible and can be cost-effectively operated and maintained.

### 5.3.2 Environmental Feasibility

The proposed CBP could result in significant impacts related to the construction-related greenhouse gas (GHG) emissions that would result from the extension of water-related infrastructure. As such, though mitigation measures identified under air quality could reduce emissions from construction equipment, and could ensure minimization of fugitive dust during construction of CBP facilities, project-related GHG emissions and air quality emissions are anticipated to exceed the South Coast Air Quality Management District (SCAQMD) thresholds, and therefore the proposed CBP could result in significant and unavoidable impacts related to construction or new or expansion or modifications to existing water facilities.

Given the above, a statement of overriding considerations is anticipated to be required. It will address why the project benefits outweigh the project impacts.

A description of the potential significant impacts related to air quality, greenhouse gas emissions, and utilities and service systems and associated mitigation measures are described below.

Air Quality: It is assumed that construction and operation of the proposed CBP facilities may have a potential to exceed SCAQMD significance thresholds. The CBP may not be consistent with the SCAQMD Consistency Criterion No. 1 and No. 2, and as such would not result in or cause National Ambient Air Quality Standards and California Ambient Air Quality Standards violations. After implementation of mitigation measures, construction-source emissions may still exceed the applicable SCAQMD Localized Significance Thresholds. Mitigation measures would minimize the horsepower of construction equipment, ensure that off-road diesel construction equipment conforms to Tier 4 standards, ensure that all construction equipment is tuned and maintained in accordance with manufacturer specifications, and, ensure that all graded areas within future CBP Project sites are watered at 2.1-hour watering intervals or otherwise ensure a soil moisture of 12 percent. No feasible mitigation measures have been identified that would reduce these emissions to levels that are less than significant. Thus, exceedances of applicable SCAQMD regional thresholds are considered significant and unavoidable, and the CBP would result in significant air quality emissions and impacts.

Greenhouse Gas: The proposed project may generate emissions beyond the SCAQMD 3,000 metric tons per year of $CO_2$ equivalents ($MTCO_2e$) and 10,000 $MTCO_2e$ thresholds, and as such, will have a significant and unavoidable adverse impact under Greenhouse Gas. Therefore, the project's GHG emissions are anticipated to be an unavoidable adverse significant impact. No feasible mitigation measures have been identified that would reduce these emissions to levels that are less than significant. Thus, exceedances of applicable SCAQMD regional thresholds are considered significant and unavoidable, and the construction of the proposed project would create a significant cumulative impact to global climate change.

Utilities and Service Systems: Implementation is not anticipated to significantly impact wastewater, stormwater drainage, telecommunications, or solid waste. Mitigation is required to minimize impacts related to the extension of wastewater and brine conveyance associated with the proposed project through requirement of subsequent California Environmental Quality Act (CEQA) documentation for water treatment facilities. Additionally, mitigation is required to minimize impacts related to stormwater through implementation of a drainage plan to reduce downstream flows for future CBP projects. Mitigation is required to address potential impacts related to solid waste including those that would ensure that construction and demolition materials that are salvageable are recycled and thereby diverted from the local landfill, which will minimize the potential for CBP projects to generate waste in excess of local landfill capacities; and ensure that soils that would generally be exported from a given construction site are salvaged where possible for recycling and reuse, thereby diverting this waste stream from the local landfill.

The construction of infrastructure related to energy and natural gas is anticipated to be less than significant with the implementation of mitigation. This mitigation would ensure that CBP projects not located in an area containing electricity and natural gas infrastructure would require subsequent CEQA documentation. With implementation of this mitigation the proposed Project will not cause unavoidable significant adverse impacts to energy or natural gas.

While the extension of water-related infrastructure is anticipated to be significant, the provision of sufficient water supply within the Chino Basin is anticipated to be less than significant. Mitigation is required to minimize impacts related to pumping sustainability, net recharge and safe yield, hydraulic control, and overall basin management. These mitigation measures will ensure that sufficient water supplies continue to be available to serve the agencies and individuals within the Chino Basin, and include:

- Ensuring that IEUA gathers the appropriate data to (1) determine whether future CBP projects would result in loss of pumping sustainability, result in potential reduction in net recharge and impacts to Safe Yield, result in new subsidence, result in potential adverse impacts to Hydraulic Control, or result in potential degradation of water quality; and (2) respond with appropriate mitigation to minimize the potential adverse hydrological impacts that may occur from a project or, where mitigation is not feasible, reject the project
- Addressing the plan of response by Watermaster/IEUA should the Basin conditions vary from the projections that have been modeled as part of the CBP (and all supporting documentation)
- Requiring implementation of BMPs for projects of less than one acre in size that would be comparable to the requirements of the Construction General Permit and Stormwater Pollution Prevention Plan, which are required for larger projects
- Ensuring that drainage is managed through either runoff collection or development of a drainage plan for a given CBP Project
- Requiring CBP projects at existing well sites to remain within disturbed areas wherever feasible to minimize the potential for further ground disturbance at these sites
- Requiring all disturbed areas that are not covered in hardscape or vegetation are revegetated or landscaped at future CBP facility sites
- Ensuring that brine generated by water treatment systems is disposed of in a manner that would minimize the potential for release of polluted runoff.

These mitigations would create a hierarchy of checks and balances as part of the sustainable management of the Basin through continuous monitoring of known issues within the Basin and a comparable mitigative response to ensure that these issues do not result in a significant impact.

### 5.3.3 Economic Feasibility

The CBP is projected to be economically feasible. With an estimated present value benefit of $1,259.8 and a present value cost of $1,171.0, the net present value is $88.7 million, resulting in a BC ratio of 1.08.

The CBP is a multi-purpose project with water supply reliability and water quality improvement primary project purposes, and subsidence avoidance and emergency water supply secondary project purposes. The cost allocation analysis, which considers separable costs assignable to single purposes and allocates remaining joint costs in recognition of monetized benefits for each project purpose, results in the largest assigned portion of project costs to water quality improvement purposes for the CBP (58 percent). Water supply reliability is assigned the next greatest portion of project costs at 36 percent. Finally, emergency water supply and environmental improvements are allocated relatively minor amounts of total project costs.

### 5.3.4 Financial Feasibility

IEUA will continue to pursue additional WSIP funding if it becomes available, as well as other State and Federal funding opportunities to offset remaining capital costs. The remaining balance of capital and operating costs will be financed by IEUA with cost recovery through:

1. IEUA wastewater rates under the Chino Basin Regional Sewage Service Contract which includes the following contracting agencies: the cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Upland, and Cucamonga Valley Water District in the city of Rancho Cucamonga (estimated at 30 percent of total life cycle project costs), and
2. Agreements with local participating agencies that will use a portion of CBP water supplies in lieu of water deliveries from Metropolitan (estimated at 70 percent of total life cycle project costs)

Specific funding plans for capital and continuing annual costs will be refined and presented through a Cost of Service (COS) study that is underway. The COS will describe the specific means for collecting revenue required for financing the program.

### 5.3.5 Constructability

A detailed discussion of how the proposed facilities will be installed and the amount of time required for their construction is provided in the CBP Draft PEIR (Appendix B). Non-complex design and construction techniques and various types of construction materials that are reasonably available will be used to construct the PUT and TAKE facilities associated with the CBP. Various types of skilled craftsmen and laborers will be used to construct the facilities associated with the CBP, with a significant workforce expected to be needed over the estimated five years of construction. The different types and associated number of skilled craftsmen and laborers needed to construct these facilities will be needed at different times over the duration of construction depending on the final design and construction schedule. Standard construction equipment will be used to construct the facilities associated with the CBP including bull dozers, backhoes, loaders, excavators, dump trucks, water trucks, compactors, cranes, rollers, grinders, paving machines, and rollers/vibrators. In summary, the CBP is expected to be able to be constructed with existing technology and available construction materials, work force, and equipment.

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# Appendix A: 75 Percent Commitment for Non-Public Benefits

# Appendix B: Chino Basin Program Draft Program Environmental Impact Report

# Appendix C: Preliminary Design Report Technical Memorandum (TM) 1: Chino Basin Program Assumptions

# Appendix D: Preliminary Design Report Technical Memorandum (TM) 2: Chino Basin Program PUT, TAKE, and Program Alternatives Evaluation

# Appendix E: Chino Basin Program Economic Analysis Technical Memorandum

# Appendix F: CBP Water Supply Investment Program Water Exchange Operations Analysis

# Appendix G: City of Rialto and Western Riverside County Regional Wastewater Authority External Supply Sources White Paper