EBMUD Water Supply Management Program 2040

Agenda

WSMP 2040
Board of Directors' Workshop #8

April 22, 2008
8:30 - 11:00 am, Lg. Training Room

1. Project Update
- Workplan
- CLC Meeting Summary: 4/7/08

2. Portfolio Screening & Evaluation
- Building WSMP 2040 Portfolios
- Modeling Results
- Portfolio Evaluation & Recommendations

EBMUD Water Supply Management Program 2040

Board of Directors' Workshop #8

April 22, 2008

Agenda

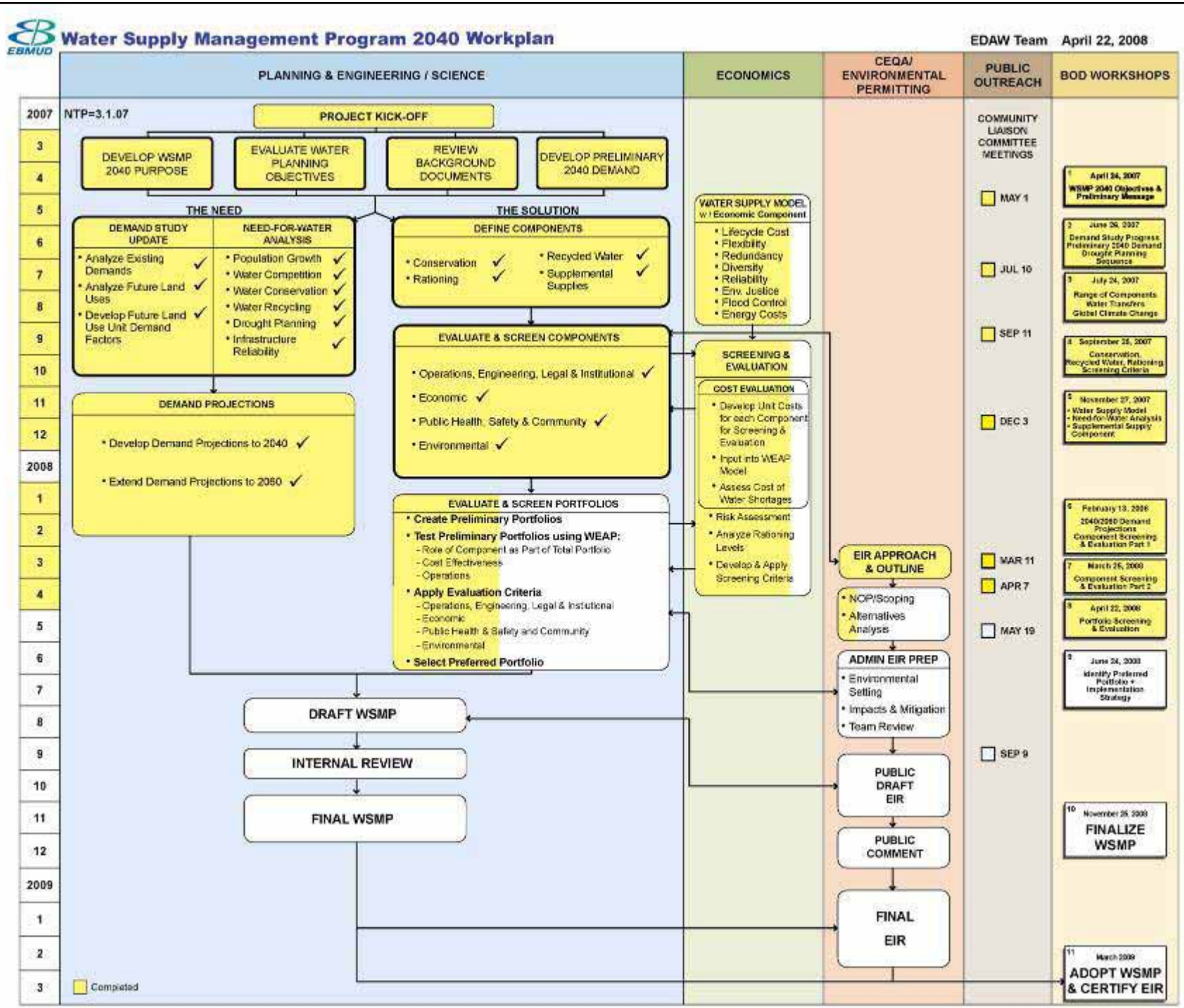
1. Project Update — 30 min
   - Workplan
   - CLC Meeting Summary: 4/7/08

2. Portfolio Screening & Evaluation — 90 min
   - Building WSMP 2040 Portfolios
   - Modeling Results
   - Portfolio Evaluation & Recommendations

Project Update






EBMUD
Water Supply Management Program 2040 Workplan
EDAW Team April 22, 2008
PLANNING & ENGINEERING / SCIENCE
ECONOMICS
CEQA/ ENVIRONMENTAL PERMITTING
PUBLIC OUTREACH
BOD WORKSHOPS
2007
2008
2009
NTP=3.1.07
PROJECT KICK-OFF
DEVELOP WSMP 2040 PURPOSE
EVALUATE WATER PLANNING OBJECTIVES
REVIEW BACKGROUND DOCUMENTS
DEVELOP PRELIMINARY 2040 DEMAND
THE NEED
THE SOLUTION
DEMAND STUDY UPDATE
Analyze Existing Demands
Analyze Future Land Uses
Develop Future Land Use Unit Demand Factors
NEED-FOR-WATER ANALYSIS
Population Growth
Water Competition
Water Conservation
Water Recycling
Drought Planning
Infrastructure Reliability
DEFINE COMPONENTS
Conservation
Rationing
Recycled Water
Supplemental Supplies
DEMAND PROJECTIONS
Develop Demand Projections to 2040
Extend Demand Projections to 2060
EVALUATE & SCREEN COMPONENTS
Operations, Engineering, Legal & Institutional
Economic
Public Health, Safety & Community
Environmental
EVALUATE & SCREEN PORTFOLIOS
Create Preliminary Portfolios
Test Preliminary Portfolios using WEAP:
- Role of Component as Part of Total Portfolio
- Cost Effectiveness
- Operations
Apply Evaluation Criteria
- Operations, Engineering, Legal & Institutional
- Economic
- Public Health & Safety and Community
- Environmental
Select Preferred Portfolio
DRAFT WSMP
INTERNAL REVIEW
FINAL WSMP
WATER SUPPLY MODEL w/ Economic Component
Lifecycle Cost
Flexibility
Redundancy
Diversity
Reliability
Env. Justice
Flood Control
Energy Costs
SCREENING & EVALUATION
COST EVALUATION
Develop Unit Costs for each Component for Screening & Evaluation
Input into WEAP Model
Assess Cost of Water Shortages
Risk Assessment
Analyze Rationing Levels
Develop & Apply Screening Criteria
EIR APPROACH & OUTLINE
NOP/Scoping
Alternatives Analysis
ADMIN EIR PREP
Environmental Setting
Impacts & Mitigation
Team Review
PUBLIC DRAFT EIR
PUBLIC COMMENT
FINAL EIR
COMMUNITY LIAISON COMMITTEE MEETINGS
MAY 1
JUL 10
SEP 11
DEC 3
MAR 11
APR 7
MAY 19
SEP 9
1 April 24, 2007 WSMP 2040 Objectives & Preliminary Message
2 June 26, 2007 Demand Study Progress Preliminary 2040 Demand Drought Planning Sequence
3 July 24, 2007 Range of Components Water Transfers Global Climate Change
4 September 25, 2007 Conservation, Recycled Water, Rationing Screening Criteria
5 November 27, 2007 • Water Supply Model • Need-for-Water Analysis • Supplemental Supply Component
6 February 13, 2008 2040/2060 Demand Projections Component Screening & Evaluation Part 1
7 March 26, 2008 Component Screening & Evaluation Part 2
8 April 22, 2008 Portfolio Screening & Evaluation
9 June 24, 2008 Identify Preferred Portfolio + Implementation Strategy
10 November 25, 2008 FINALIZE WSMP
11 March 2009 ADOPT WSMP & CERTIFY EIR
Completed

Upcoming Workshops

Board Workshop #8: April 22, 2008

- Portfolio Screening & Evaluation

[May 19, 2008 CLC Meeting to follow]

Board Workshop #9: June 24, 2008

- Identify Preferred Portfolio & Implementation Strategy

[CLC Members encouraged to attend]

CLC Meeting Summary

Meeting #6: April 7, 2008





Primary Issues Raised
CLC #5: March 11, 2008

- CLC comfortable with transparency, clarity, and thoroughness of the WSMP 2040 planning process.

Water Shortage Costs

- Customer education regarding landscaping is important. *[A: Key part of EBMUD conservation & will continue].*

- Have market incentives been considered (like PG&E)? *[A: PG&E's pricing incentives address peak loads while EBMUD's challenge is dry-year water shortage. EBMUD currently has incentives & a tiered rate structure - further refinement of these programs would be reserved for use as tools in dry-years].*

- Tiered rates are more effective than water cops or flow restrictors. Santa Barbara's rationing system & pricing may be a good example.

Primary Issues Raised
CLC #6: April 7, 2008

Conservation

- Would like to see more detail on the conservation measures. *[A: Detailed materials available on website].*
- To what extent are disasters or a public health epidemic factored in the evaluation? *[A: The only emergency situation considered is a Delta failure scenario. This is the impetus for 6-month local storage (or equivalent) requirement. This will be reviewed when we evaluate 4-6 portfolios].*

Portfolio #6 – Emergency Reliability

- How long would it take to get the aqueducts back in service after a Delta failure? *[A: min. 6 months].*
- We really need to be prepared for more than 6 months!
- Better to have more storage on the west side.

Primary Issues Raised

CLC #6: April 7, 2008

Portfolios #7- #14

- Portfolio #10 – Low carbon footprint: Recycling level may be too high? *[A: Pardee component has a low carbon footprint due to electricity generation. A modest-sized Recycled Water component (5 MGD), which has a fairly low carbon footprint compared to other supplemental supplies, is included in this Portfolio, along with Enlarge Pardee Reservoir, to meet the need-for-water.*
- Could an aqueduct enlargement reduce the need to pump Pardee water & thus reduce energy use? *[A: Aqueduct replacement could save energy but needs to be cost effective for WSMP 2040 & other district needs to implement].*

Portfolio Modeling

- The most useful portfolio differentiation may be to understand which are high capital costs versus those that are higher operations & maintenance costs.
- Good drought management project is one with high capital cost & low O&M.

Primary Issues Raised

CLC #6: April 7, 2008

- EBMUD covers two different climate zones; need to consider this for effective implementation of portfolios.
- The portfolio with the lowest rationing level has the greatest flexibility.
- Comments from public:
  - The benefits derived from conservation are not getting adequate consideration.

Key Findings & Observation

Preliminary Modeling Results (Round 2)

Water Supply Management Program 2040

WSMP 2040 Portfolios - Preliminary Modeling Results (Round 2)

Portfolio Number	Maximum Rationing Percent	Average Annual Volume of Water (MGD) Over 3-Year Drought Planning Sequence					Rationing Frequency (No. of years in a 10-year period)	Cost[1]				Portfolio Number
		Rationing	Conservation	Recycled	Supplemental Supply	Total System		Cost of Water Shortage (Cost to Customer)		Total Portfolio Cost (Cost to District) $M/Yr	Total Capital Costs $M	
								Avg. Annual Cost $M/Yr[2]	Max Annual Cost $M/Yr			
1	0%	0.0	29.3	5.0	61.5	95.9	0.0	0.0	0.0	16.9	450	1
2	0%	0.0	29.3	5.0	61.5	95.9	0.0	0.0	0.0	16.8	440	2
3	10%	13.7	37.3	0.0	47.2	98.1	1.4	15.3	183	17.7	540	3
4	10%	19.5	39.4	5.0	45.6	109.6	1.8	15.2	182	26.9	670	4
5	10%	19.5	37.3	5.0	48.0	109.8	1.8	15.2	183	23.9	570	5
6	15%	29.4	37.3	5.0	42.0	113.7	1.9	28.0	289	15.9	500	6
7	15%	29.6	39.4	11.0	29.0	109.0	1.8	24.0	288	24.3	610	7
8	15%	29.5	37.3	5.0	39.0	110.9	1.8	24.7	289	16.0	440	8
9	15%	29.6	40.9	11.0	25.5	107.1	1.8	24.3	288	29.2	750	9
10	15%	20.5	37.3	5.0	36.1	98.9	1.4	22.2	289	19.3	590	10
11	25%	52.0	29.3	0.0	28.6	109.9	2.0	78.9	1,131	7.2	130	11
12	10%	19.5	37.3	11.0	41.3	109.1	1.8	14.8	182	24.2	610	12
13	20%	41.1	39.4	11.0	17.1	108.6	1.8	41.2	482	22.1	580	13
14	25%	52.0	37.3	11.0	9.0	109.3	2.0	73.1	1,120	17.2	450	14

Notes:

1. All cost results reflect a fixed level of demand at 2040 and the historical hydrologic sequence during the modeling period. These numbers will change when run for varying demand levels using indexed sequential modeling.
2. No rationing was imposed under Portfolios 1 and 2.

Key Findings & Observations

Conveyance & Treatment Operations

- All portfolios except P-1 & P-2 meet the annual Need-for-Water & satisfy operational constraints.

- P-1 & P-2 do not work because of capacity limitations of the aqueducts & water treatment plants.

Key Findings & Observations

Conveyance & Treatment Operations

- All portfolios except P-6 require upcountry pretreatment.

- In the 3rd year of a drought, sources other than Mokelumne water are required. Not all of these sources can be treated at existing water treatment plants. Therefore, pretreatment is needed before entering the EBMUD aqueduct system.

Key Findings & Observations

Regional Desalination

- Regional Desalination component assumes location in Pittsburg.
- Desalinated water from Pittsburg would be treated a second time at EBMUD treatment plants due to transmission system configuration.
- Water cannot be delivered from Pittsburg to partners during peak summer months.
- Partners would need to fund high-cost transmission/ distribution improvements to obtain peak summer deliveries.

Key Findings & Observations

P-11 & P-14 & Rationing

- P-11 & P-14 have the highest level of rationing at 25%.
- Rationing is triggered more often in these portfolios than others.
- The cost of water shortage for these portfolios is the highest.

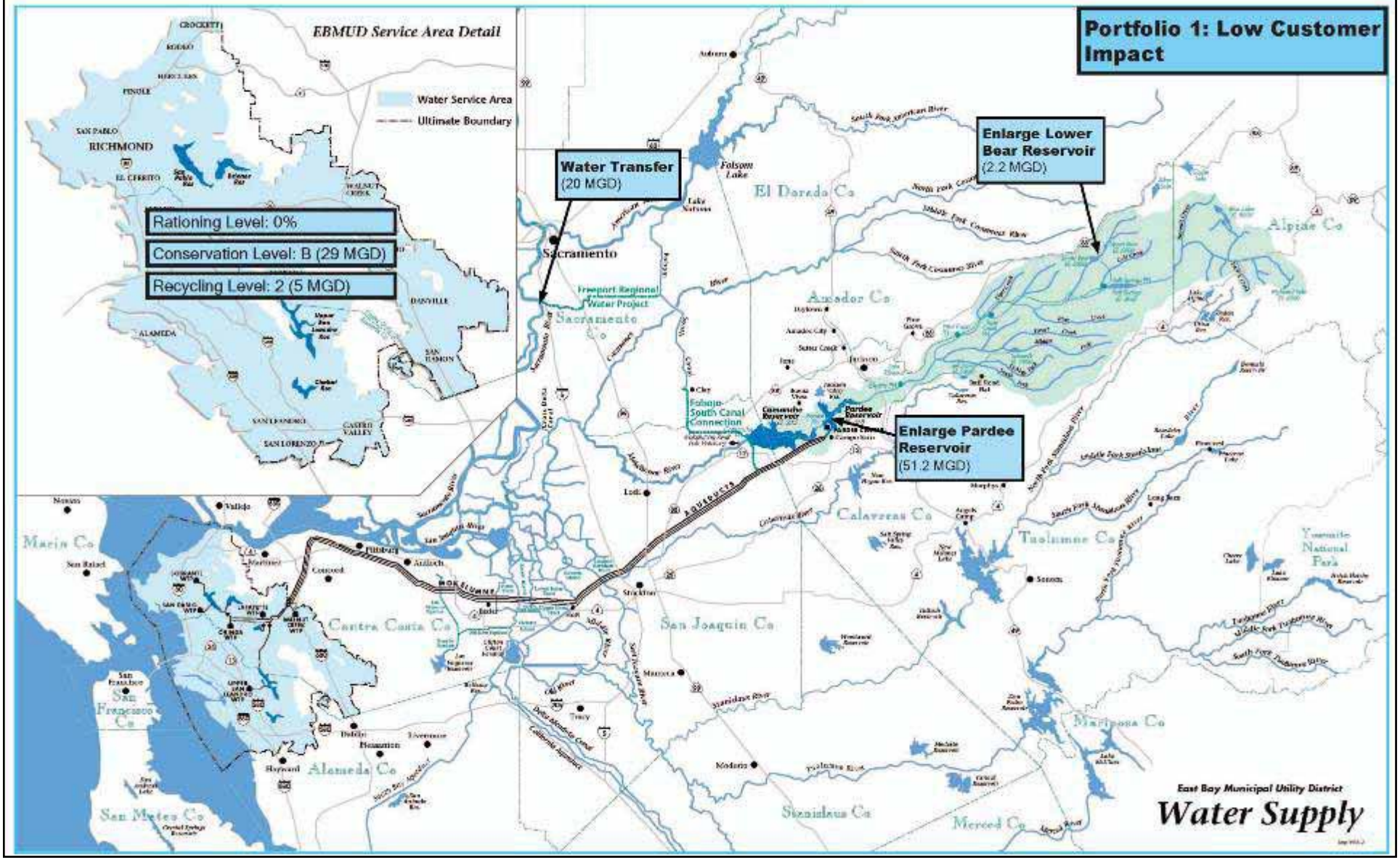
WSMP 2040 Portfolios

Portfolio Screening & Evaluation

WSMP 2040 Portfolios – Criteria Evaluation

Handout

Water Supply Management Program 2040



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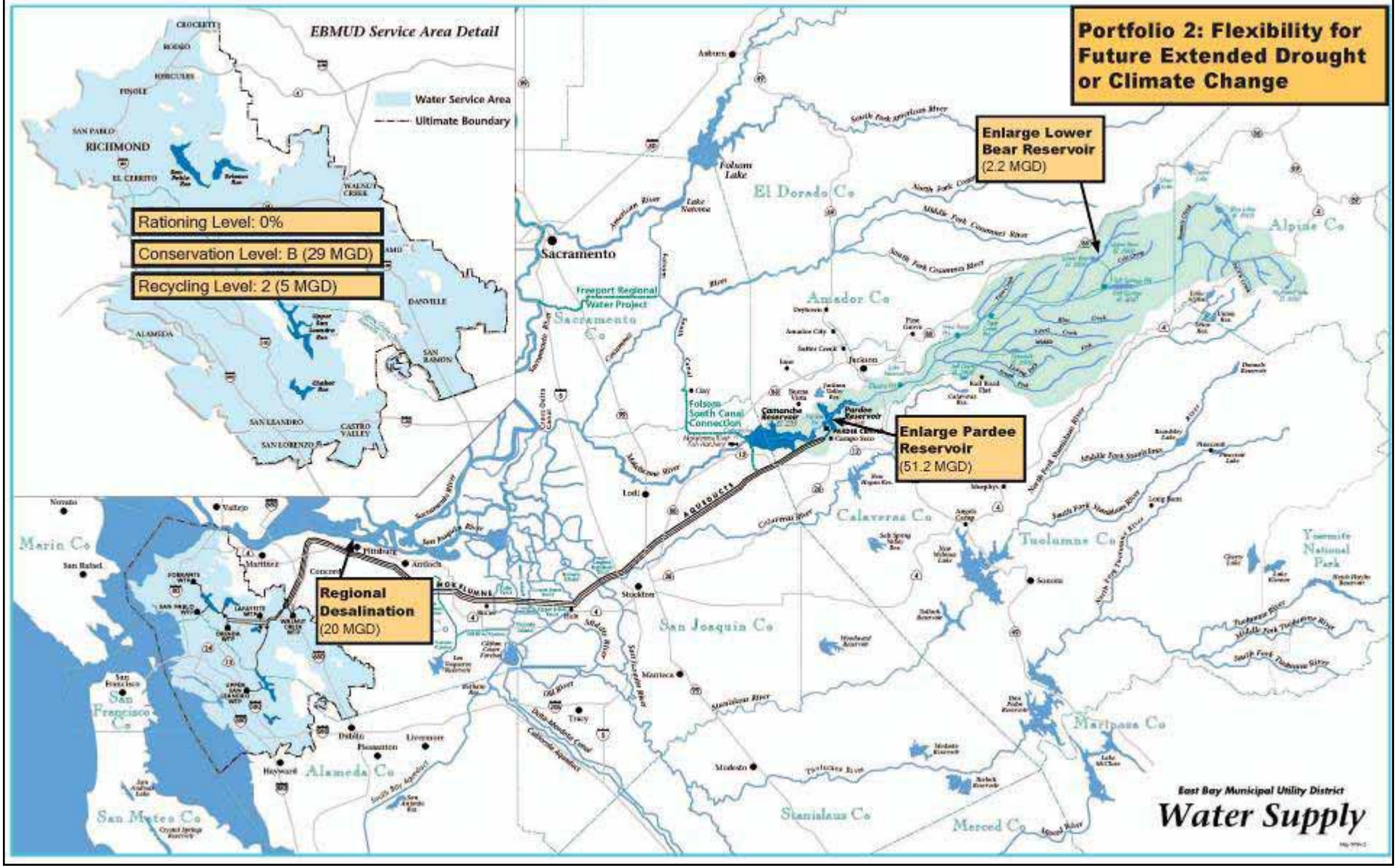

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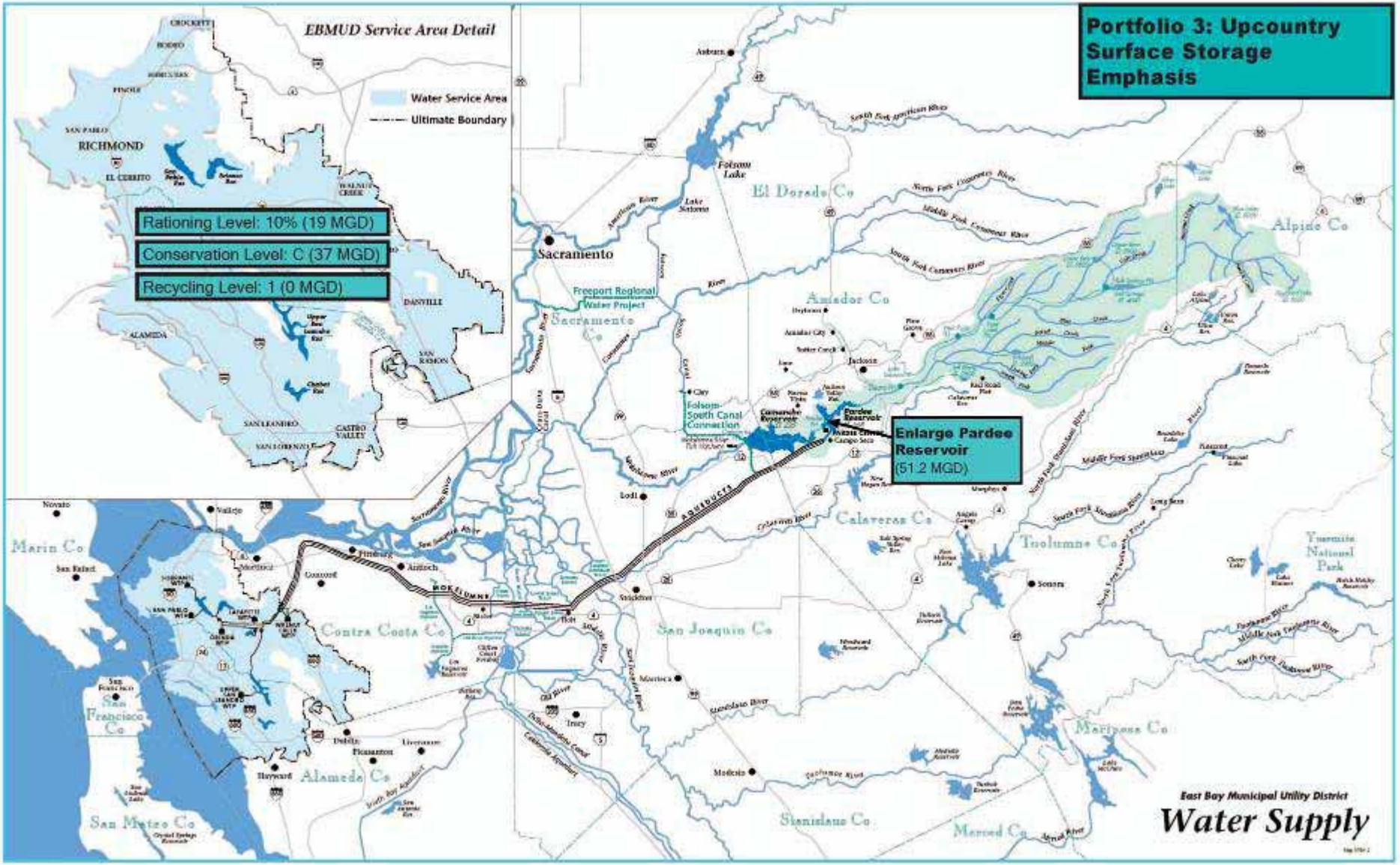

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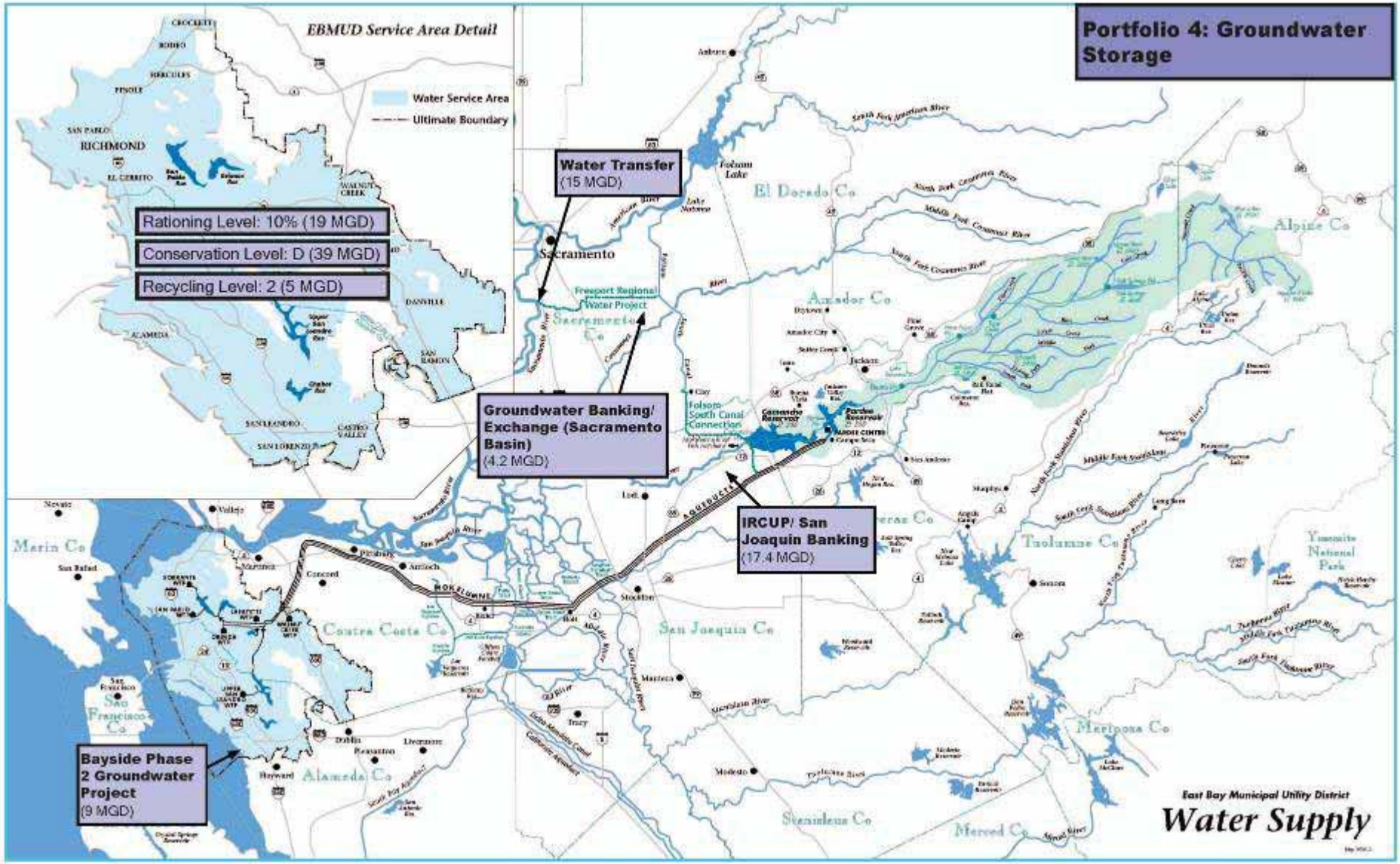

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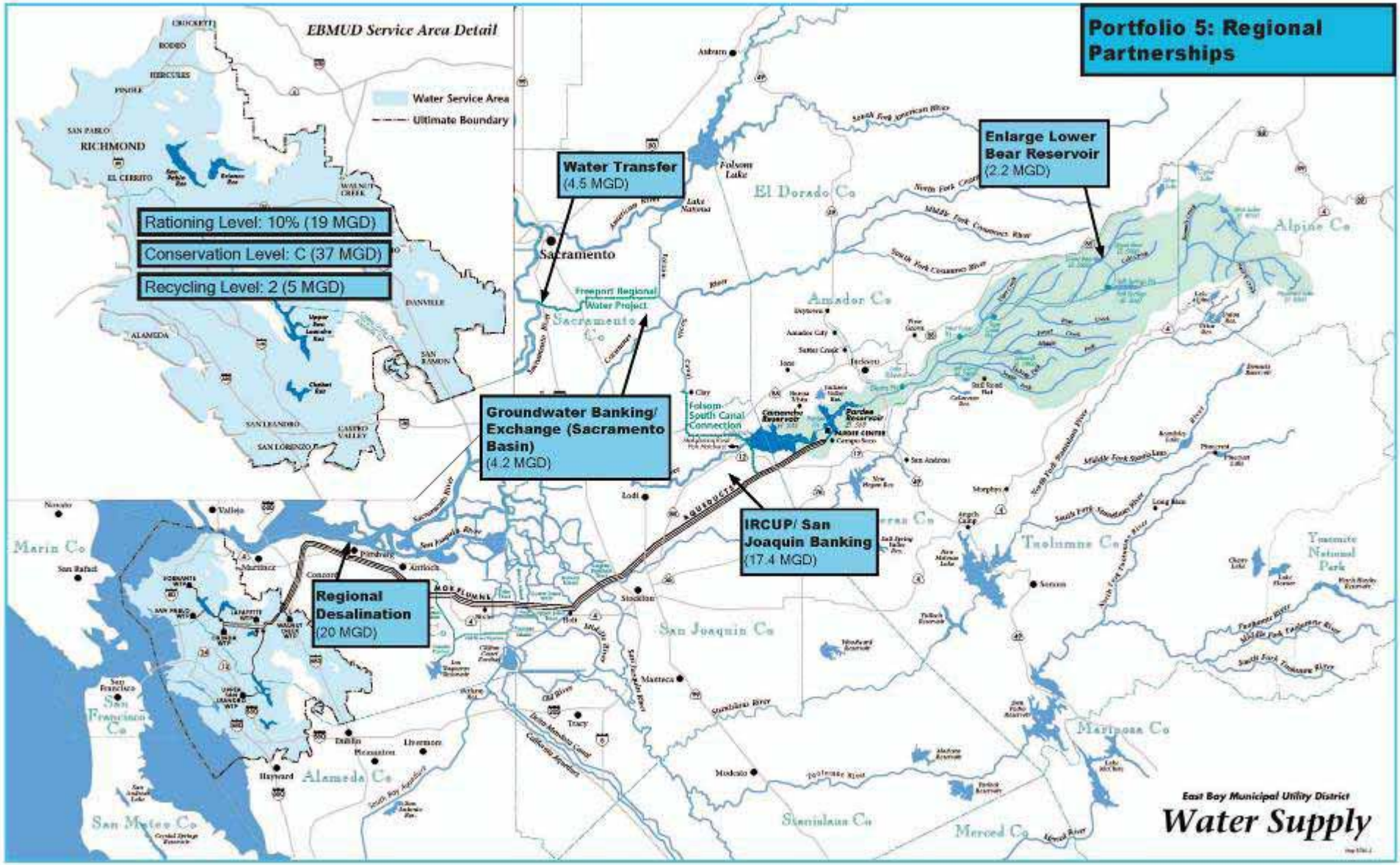

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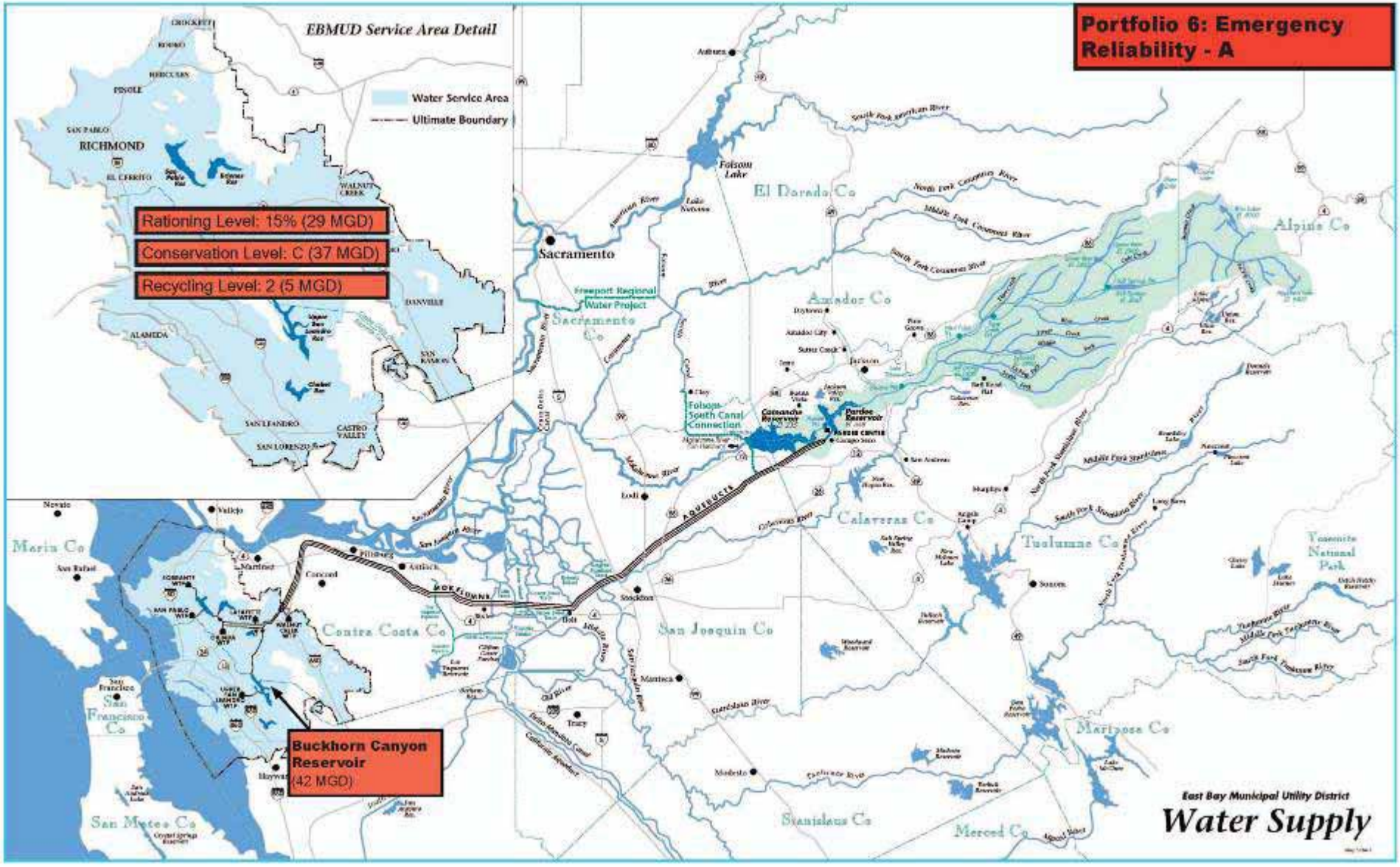

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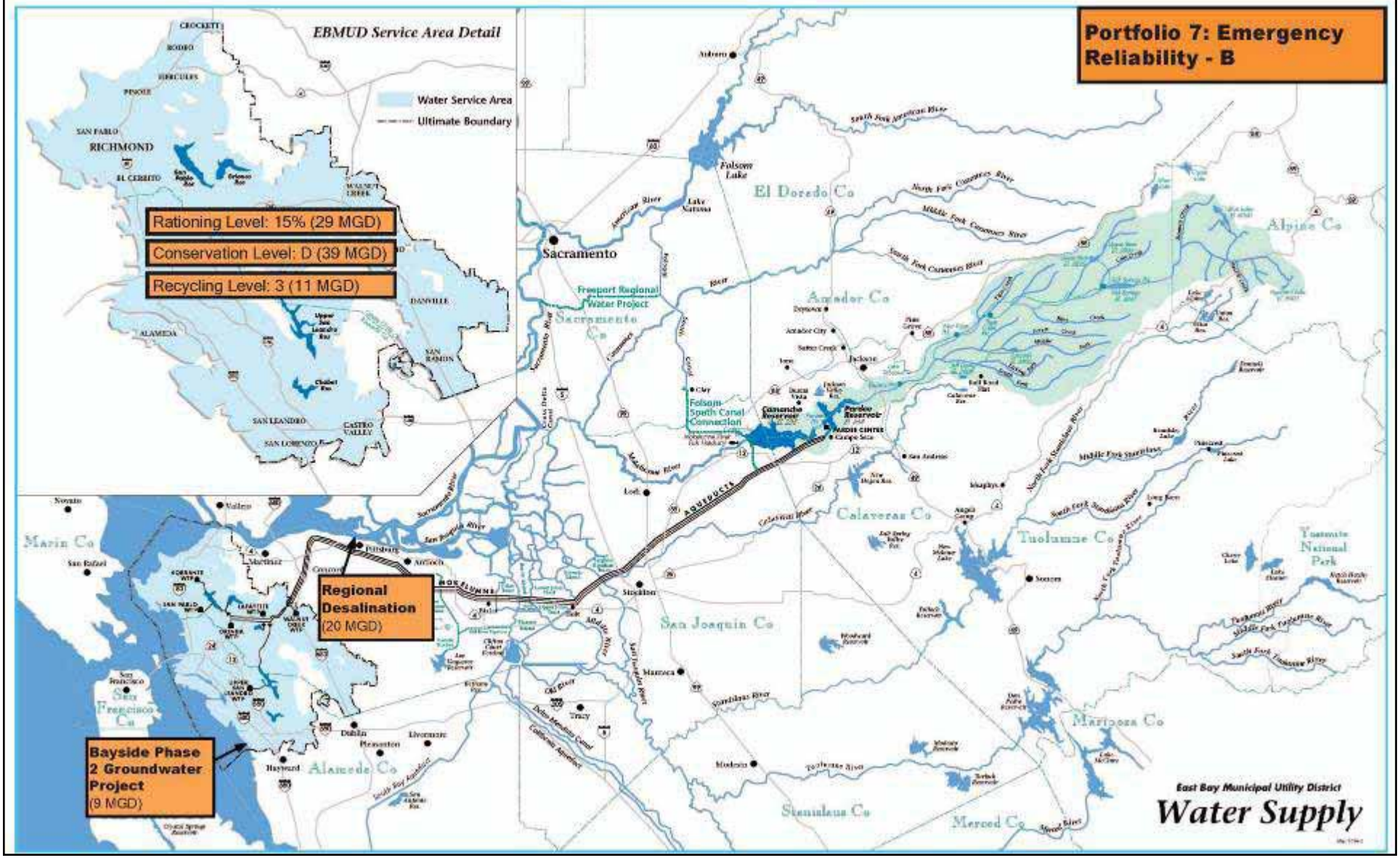

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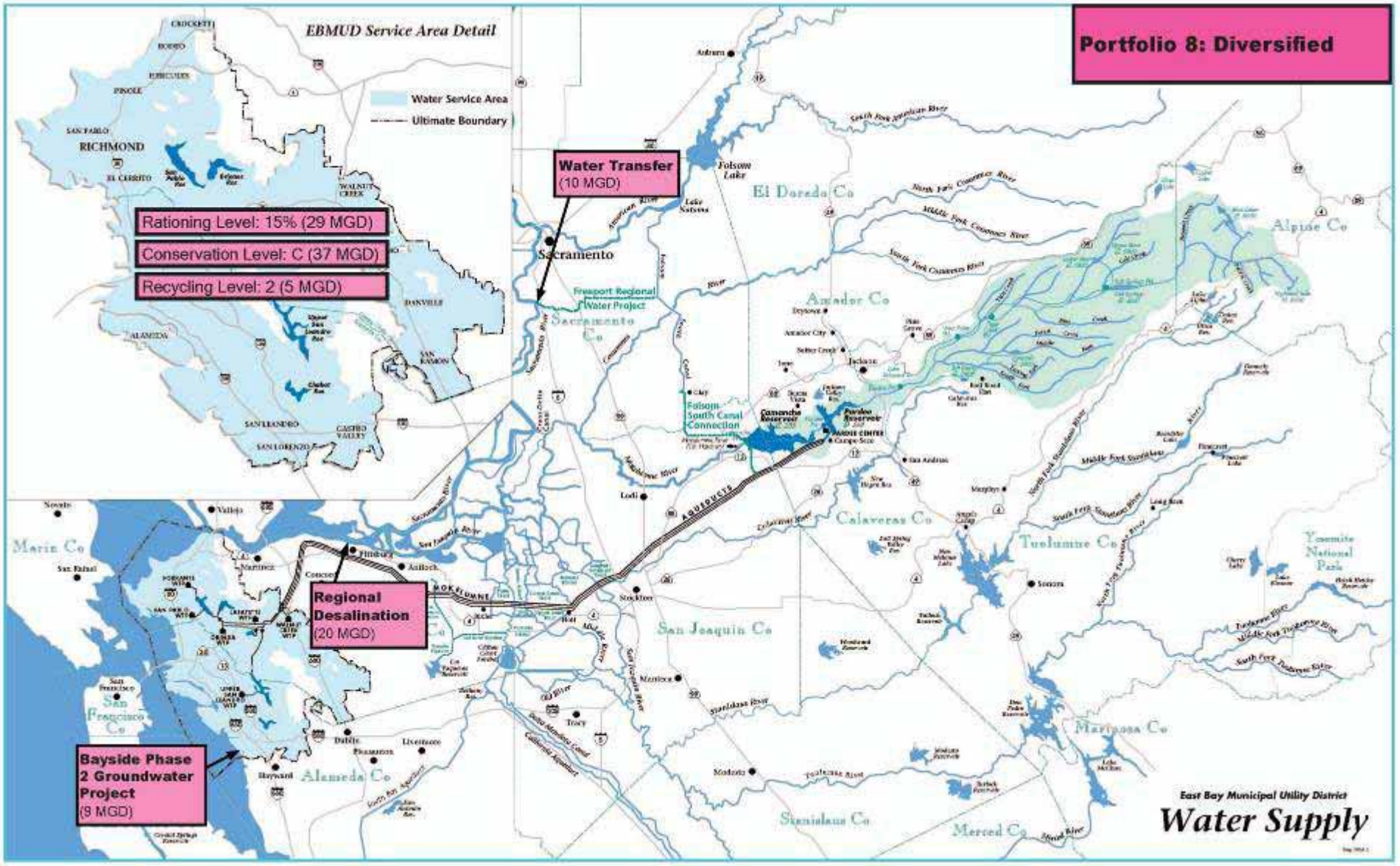

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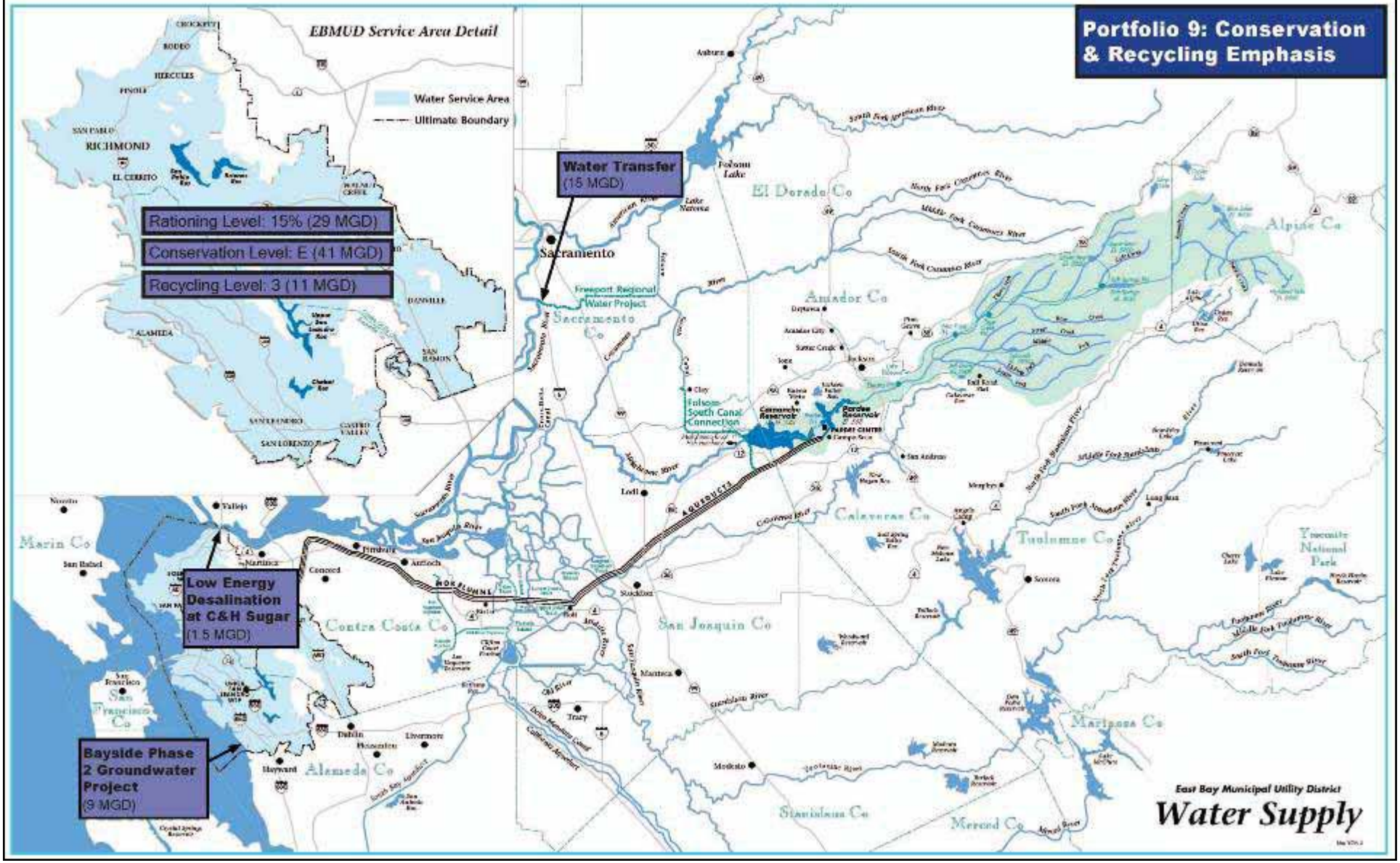

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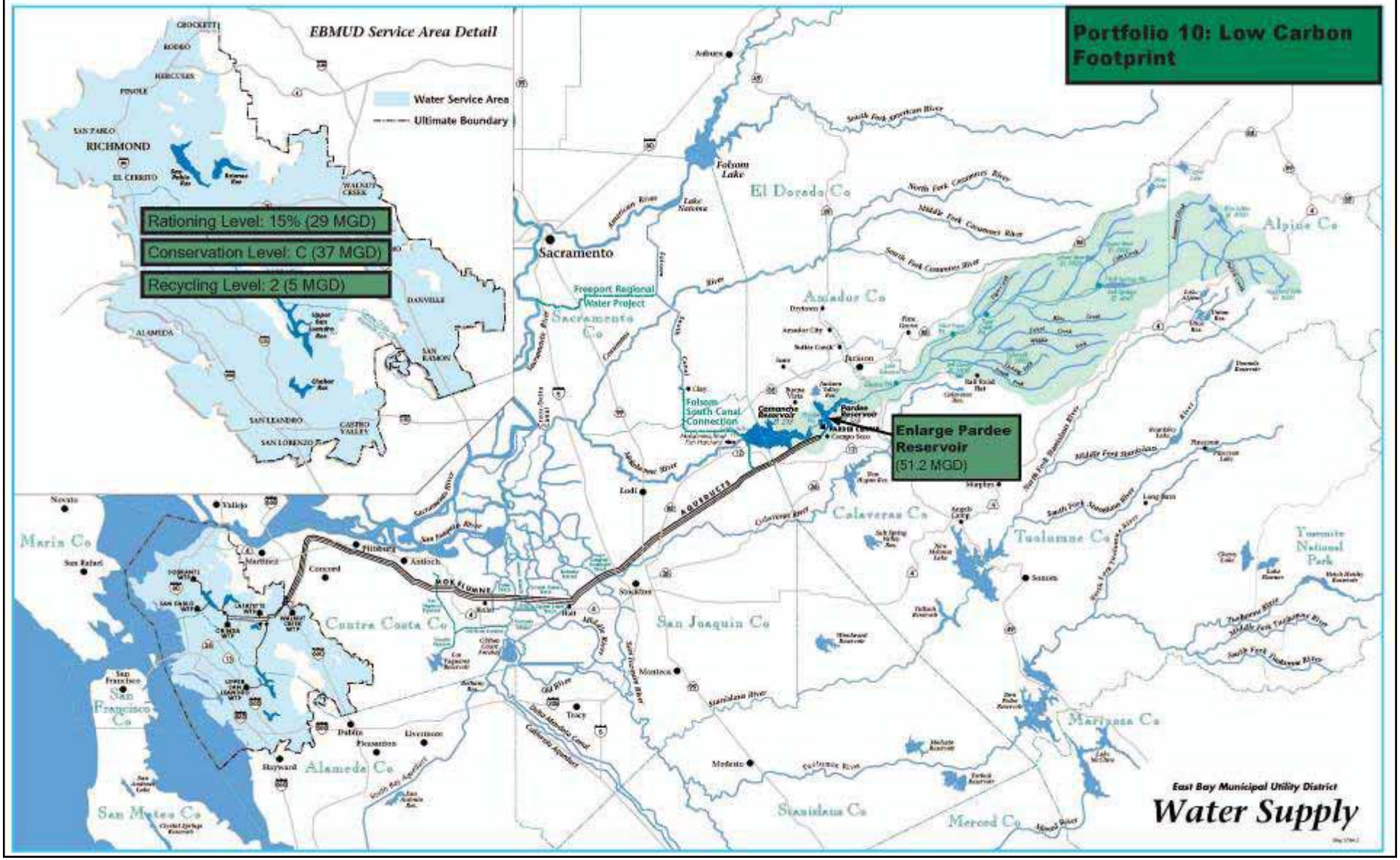

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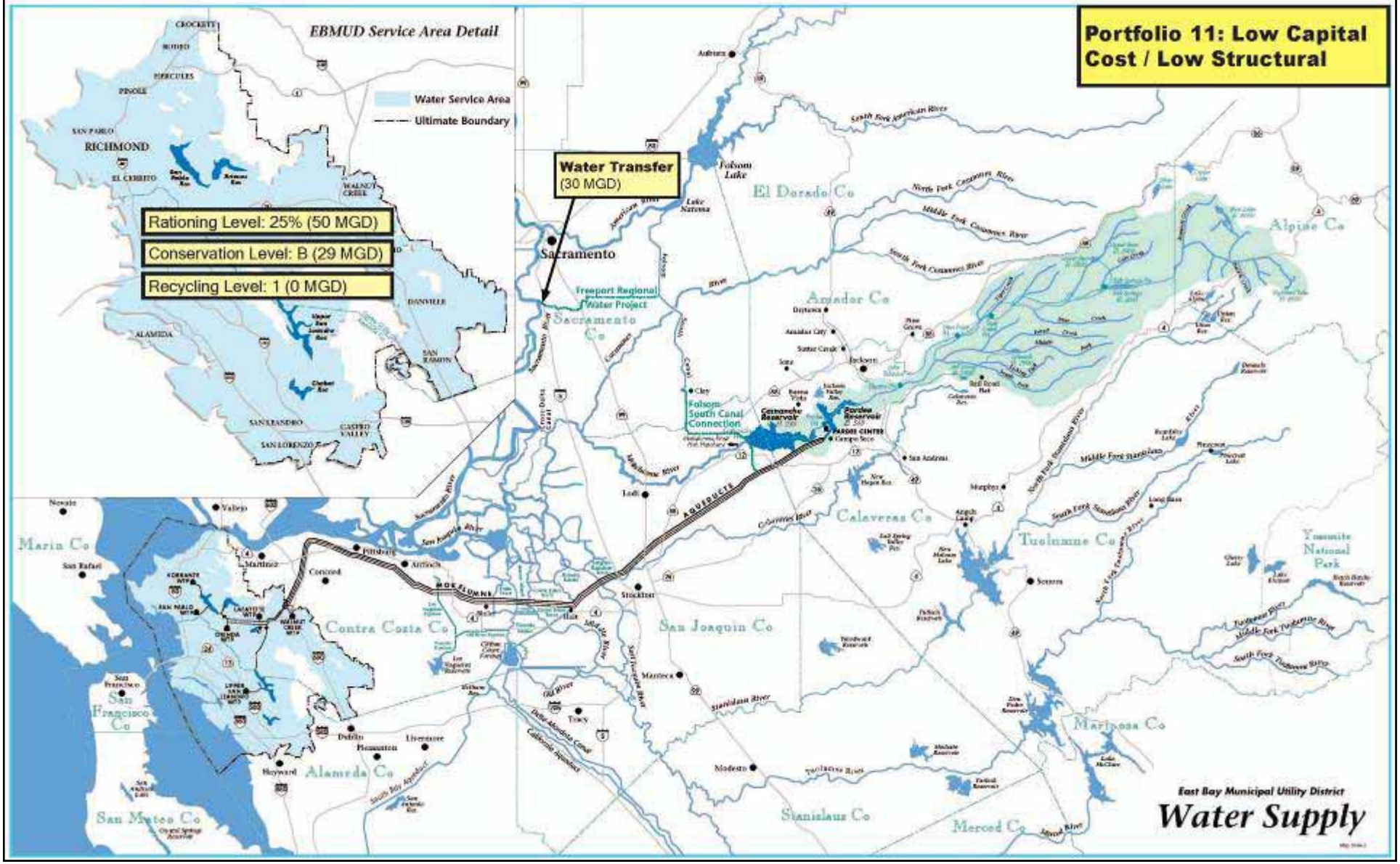

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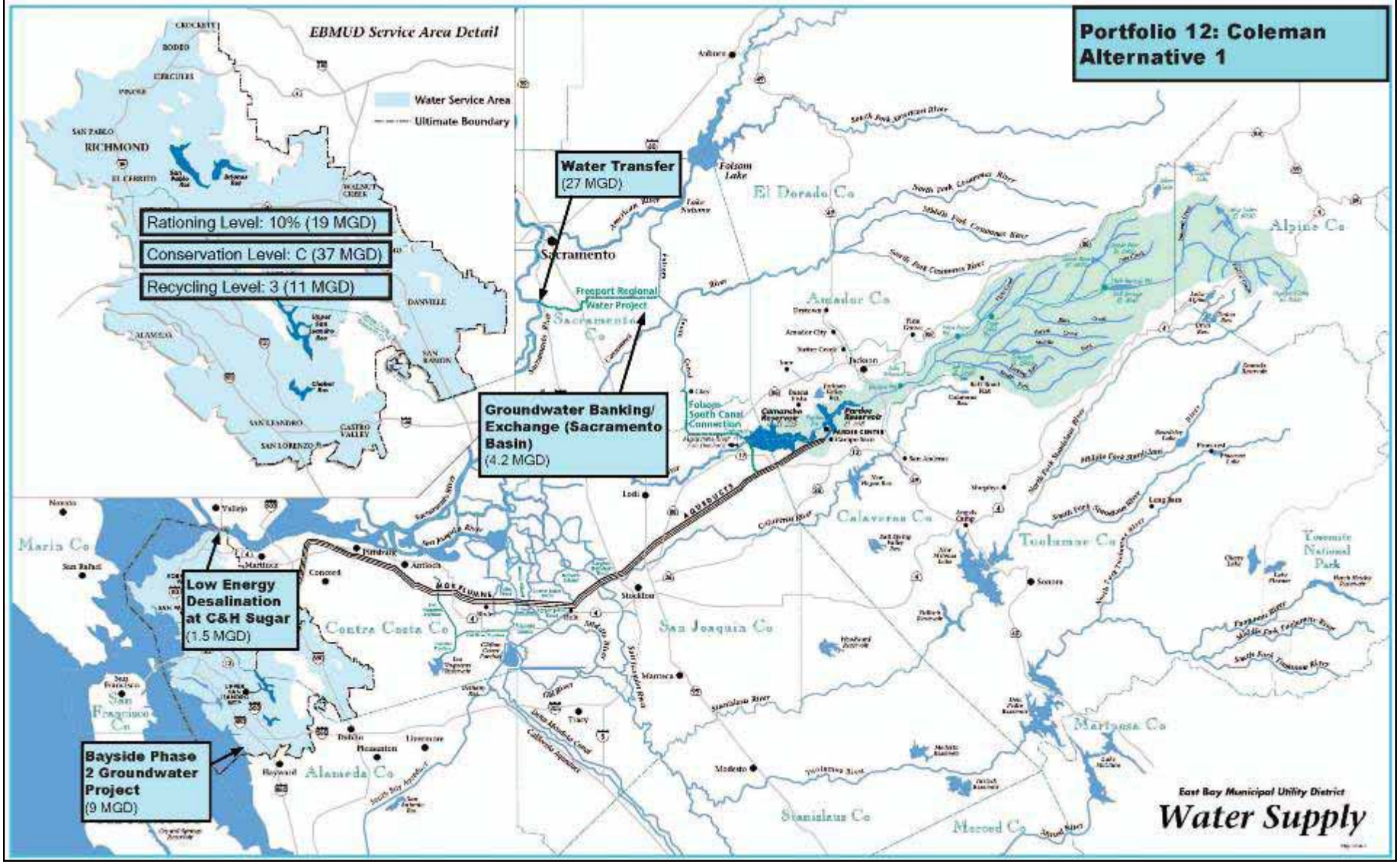

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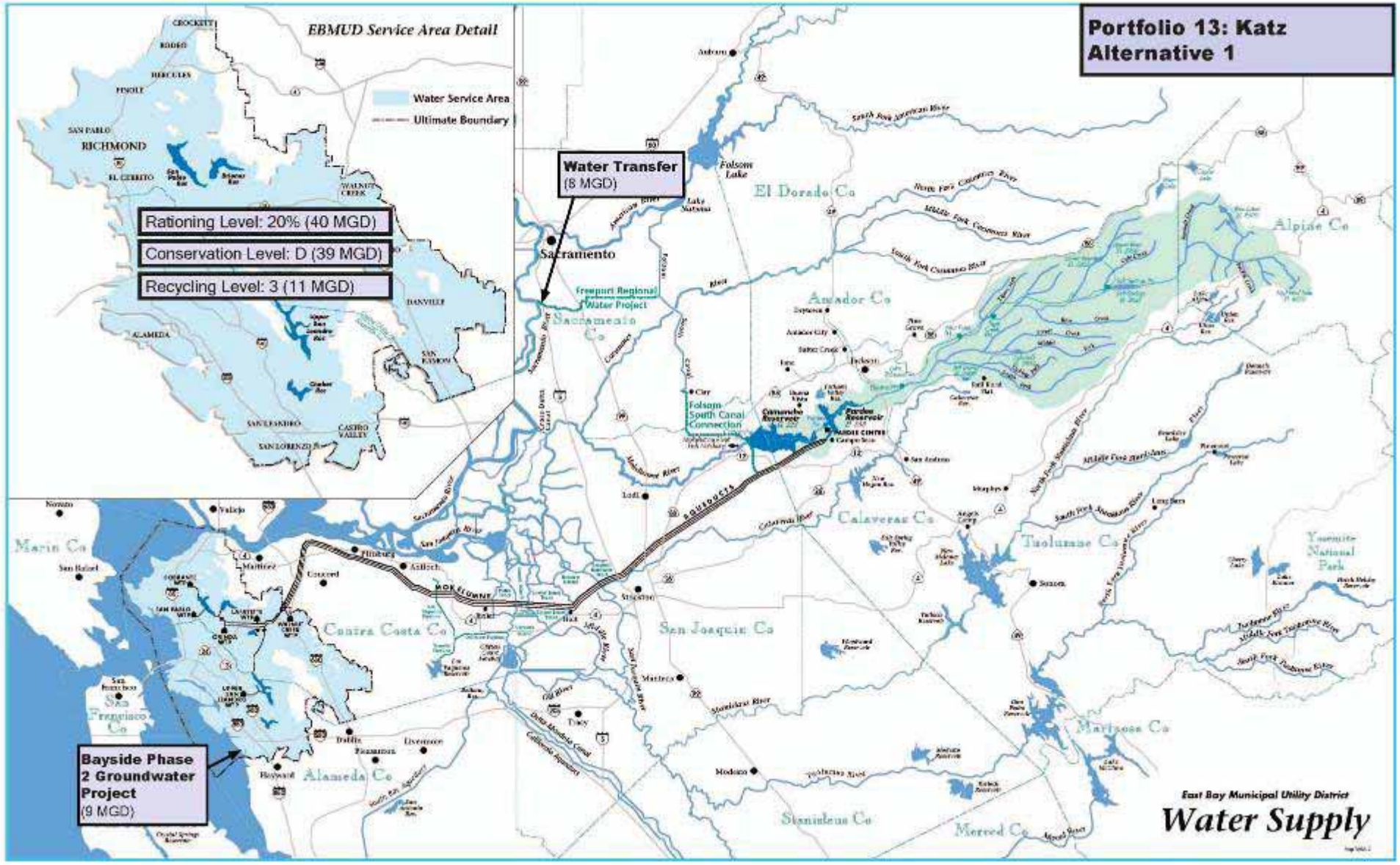

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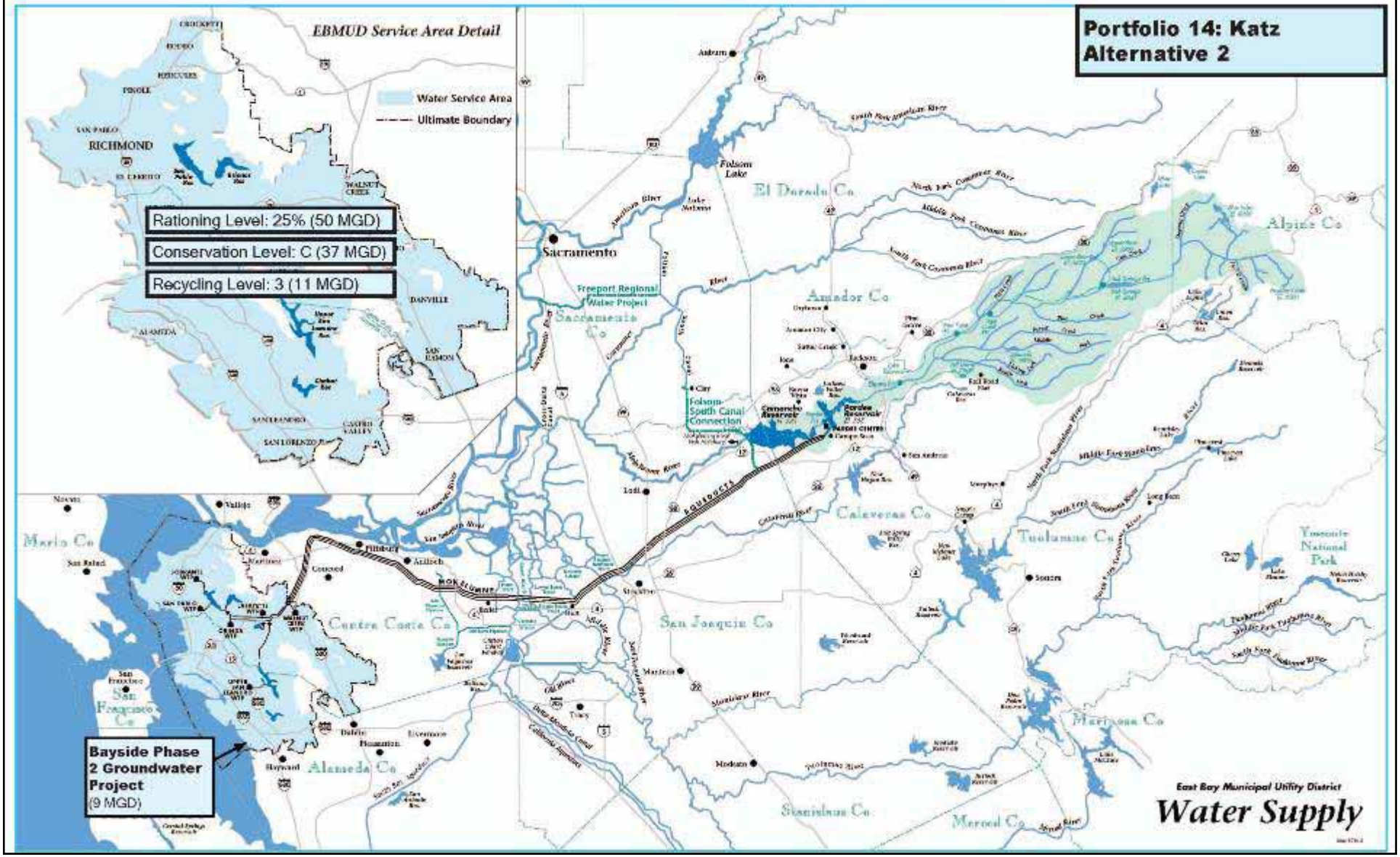

Building WSMP 2040 Portfolios

Portfolio Number	Portfolio Themes	Portfolio Description	Components	Rationing				Conservation				Recycling			Supplemental Supply									Portfolio Yield (MGD) [Conservation + Recycling + Supplemental Supply]	Average Annual Need for Water (MGD) Under the Chosen Rationing Level
				0%	10% (20 mgd)	15% (29 mgd)	25% (50 mgd)	Natural Savings + 10 (B)	Current Program Equivalent (C)	Current Program Equivalent + 2 (D)	Maximum Voluntary Program (E)[3]	Recycling Level 1	Recycling Level 2	Recycling Level 3	Groundwater Banking/Exchange (Sacramento Basin)[2]	Northern California Water Transfers	Bayside Phase 2 Groundwater Project	Buckhorn Canyon Reservoir	LEAD at C&H Sugar	Regional Desalination	IRCUP/San Joaquin Banking[4]	Enlarge Lower Bear Reservoir	Enlarge Pardee Reservoir		
				NFW[1] 107 MGD	NFW[1] 87 MGD	NFW[1] 78 MGD	NFW[1] 57 MGD	29 MGD	37 MGD	39 MGD	41 MGD	0 MGD	5 MGD	11 MGD	4.2 MGD	4.5-44.6 MGD	9 MGD	42 MGD	1.5 MGD	20 MGD	17.4 MGD	2.2 MGD	51.2 MGD		
1	Low Customer Impact	Balance of low rationing, low cost, high water quality.		●				29					5			20							2.2	51.2	107.4	107
2	Flexibility for Future Extended Drought or Climate Change	Keep rationing/conservation & transfers available as short-term response.		●				29					5							20			2.2	51.2	107.4	107
3	Upcountry Surface Storage Emphasis	Portfolio 2 with increased rationing & conservation & no recycling or desal.			●				37			0												51.2	88.2	87
4	Groundwater Storage	Portfolio 3, but replace surface storage with groundwater, & increase conservation, recycling, & transfers.			●					39			5		4.2	15	9				17.4				89.6	87
5	Regional Partnerships	All partnership projects & conservation.			●				37				5		4.2	4.5				20	17.4	2.2			90.3	87
6	Emergency Reliability - A	West of delta surface storage.				●			37				5					42							84.0	77
7	Emergency Reliability - B	West of delta production - desal, recycle, conservation.				●				39				11			9			20					79.0	77
8	Diversified	Balanced levels of conservation & recycling, non-Mokelumne sources - transfers, desal, Bayside.				●			37				5			10	9			20					81.0	77
9	Conservation & Recycling Emphasis	High conservation & recycling with LEAD. Transfers & Bayside to satisfy need for water.				●					41			11		15	9		1.5						77.5	77
10	Low Carbon Footprint	Pardee plus conservation.				●			37				5										51.2		93.2	77
11	Low Capital Cost / Low Structural	25% rationing, conservation, & transfers.					●	29				0				30									59.0	57
12	Coleman Alternative 1				●				37					11	4.2	27	9		1.5						89.7	87
13	Katz Alternative 1					●				39				11		8	9								67.0	67
14	Katz Alternative 2						●		37					11			9								57.0	57

Notes:
[1] Average Annual Need for Water (NFW) Over 3-Year Drought Planning Sequence.
[2] Groundwater Banking/Exchange (Sacramento Basin) component must be coupled with a transfer water component.
[3] If Conservation Level E is chosen for a portfolio, rationing is capped at 15%.
[4] IRCUP includes San Joaquin Basin Groundwater Banking/Exchange.
*** CEQA No Action assumes current programs continue through 2020: Recycling = 14MGD, Conservation = 35 MGD, Supplemental Supply = 50.1 MGD + 5 MGD.

WSMP 2040 Portfolios - Preliminary Modeling Results (Round 2)

Portfolio Number	Maximum Rationing Percent	Average Annual Volume of Water (MGD) Over 3-Year Drought Planning Sequence					Rationing Frequency (No. of years in a 10-year period)	Cost[1]				Portfolio Number
		Rationing	Conservation	Recycled	Supplemental Supply	Total System		Cost of Water Shortage (Cost to Customer)		Total Portfolio Cost (Cost to District) $M/Yr	Total Capital Costs $M	
								Avg. Annual Cost $M/Yr[2]	Max Annual Cost $M/Yr			
1	0%	0.0	29.3	5.0	61.5	95.9	0.0	0.0	0.0	16.9	450	1
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Notes:

1. All cost results reflect a fixed level of demand at 2040 and the historical hydrologic sequence during the modeling period. These numbers will change when run for varying demand levels using indexed sequential modeling.
2. No rationing was imposed under Portfolios 1 and 2.

WSMP 2040: Portfolio Evaluation & Recommendations

Portfolio Number	Portfolio Theme	Operations, Engineering, Legal & Institutional				Economic		Public Health, Safety & Community		Environmental		Portfolio Number	Rationale/Notes
		• Minimize the vulnerability & risk of disruptions (i.e., **reliability**).	• Maximize the system's **operational flexibility**.	• Minimize **institutional & legal complexities** & barriers.	• Maximize **partnerships** & regional solutions.	• Minimize the financial **cost** to the **District** of meeting customer demands for given level of system reliability.	• Minimize **customer** water shortage **costs**.	• Minimize potential adverse impacts to the **public health** of District customers. • Maximize use of water from the **best** available **source**.	• Minimize long-term adverse **community impacts** • Minimize adverse **social effects**. • Minimize conflicts with existing & planned facilities, utilities & transportation facilities.	• Minimize adverse **impacts** on the **environment**. • Minimize construction & operation effects on environmentally **sensitive resources**.	• Minimize short term & long term **greenhouse gas emissions** from construction. • Maximize **energy efficiency** associated with operations & maintenance. • Maximize contributions to **AB 32 goals.**		
1	Low Customer Impact	Failed Modeling Analysis										1	X
2	Flexibility for Future Extended Drought or Climate Change	Failed Modeling Analysis										2	X
3	Upcountry Surface Storage Emphasis		H				H	H+				3	*Combine with P-10*
4	Groundwater Storage		H	L	H	L	H			H		4	*Includes both Sac & SJ Groundwater Banking/Exchange* ➡
5	Regional Partnerships	H		L	H	L	H	L			L	5	*Most robust number of Components, including Desal* ➡
6	Emergency Reliability - A	H+	H+						L	L		6	*Buckhorn storage - Highest Ops & Engineering scores* ➡
7	Emergency Reliability - B	H		L				L			L	7	*Heavy reliance on Desalination ?*
8	Diversified	H		L				L			L	8	*Reliance on Desalination ?*
9	Conservation & Recycling Emphasis		H		L	L						9	*Conservation Level E - Cost Effectiveness?*
10	Low Carbon Footprint		H					H+				10	*P-3 with Rationing at 15% & Recycling Level 2* ➡
11	Low Capital Cost / Low Structural		L			H	L			H		11	*Cost to customer of 25% Rationing is Prohibitive* X
12	Coleman Alternative 1	L	H	L	H		H			H		12	*Heavy reliance on a Water Transfer of 27 MGD in dry years* ➡
13	Katz Alternative 1		L		L					H		13	*20% Rationing can be tested in Portfolios 4 & 12* ⇨
14	Katz Alternative 2	H	L		L	H	L			H		14	*Cost to customer of 25% Rationing is Prohibitive* X

H = High Response to Evaluation Criteria; L = Low Response to Evaluation Criteria; **X** = Hold from Further Consideration; ➡ = Carry Forward as Primary Portfolio for Further Refinement & Testing