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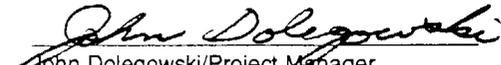
CLEAN TRANSMITTAL/DELIVERABLE RECEIPT

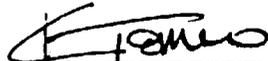
CONTRACT N68711-89-D-9296

Doc. Control Number: CLE-C01-01F145-I2-0099

TO: Southwest Division
Ms. Gena McClain, Code 0232
Head, Environmental ACO I Branch
Naval Facilities Engineering Command
Contracts Department, Building 131
1220 Pacific Highway
San Diego, California 92132-5187

DATE: 17 Mar 1995
CTO#: 145
LOCATION: MCAS El Toro
TASK/WORK ELEMENT: _____


John Dolegowski/Project Manager


Ken Tomeo/Resource Center Manager

DESCRIPTION: Project Note No. PN-0145-165, Contract Task Order (CTO) No. 145, OU-1 IAFS Progress Update Meeting,
Date of Meeting 17 February 1995

TYPE: Contract Deliverable CTO Deliverable Request for Change/Project Note

REVISION: _____ REVISION #: _____
(e.g., Draft, Draft Final, Final, etc.)

ADMIN RECORD Yes No Category _____ Confidential _____
(PjM to identify)

NEGOTIATED DELIVERY DATE: _____ ACTUAL DELIVERY DATE: _____

Number of Copies Submitted to Navy: _____

Copies To:	<u>J. Rogers - Code 18C1 w/attach</u>	<u>M. Huddleston - CH2M HILL w/o attach</u>
	<u>A. Piszkin - Code 1831.AP w/attach</u>	<u>Mike Bitner - CH2M HILL/ABQ w/attach</u>
	<u>J. Joyce - Code 1832.JJ w/attach</u>	<u>File - PMO w/attach</u>
	<u>V. Parpiani - MCAS El Toro w/attach</u>	<u>File - CH2M HILL w/attach</u>
	<u>K. Tomeo - CH2M HILL w/attach</u>	

Delivered To: Contracting Officer _____ RPM/EIC _____

Name: _____

Date/Time Received

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MAR 18 1995
NAVY

PROJECT NOTE NO. PN-0145-165 CLE-C01-01F145-I2-0099	PROJECT NO. 01-F145-H6
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CONFIRMATION OF:	CONFERENCE TELECOM OTHER X	DATE HELD 17 February 1995 DATE ISSUED 07 March 1995 RECORDED BY John Dolegowski/CH2M HILL PLACE Santa Ana, California
SUBJECT	Contract Task Order (CTO) No. 0145 Remedial Investigation/Feasibility Study OU-1 IAFS Progress Update Meeting Marine Corps Air Station (MCAS) El Toro	

PARTICIPANTS: (* DENOTES PART-TIME ATTENDANCE)

See Page 6

ACTION REQ'D. BY	ITEM
	<p>A progress update meeting on the Operable Unit 1 (OU-1) Interim-Action Feasibility Study (IAFS) for the Marine Corps Air Station (MCAS) El Toro Remedial Investigation/Feasibility (RI/FS) was held on 17 February 1995 at the CH2M HILL Santa Ana office. Participants represented the following organizations: the Naval Facilities Engineering Command, Southwest Division (SWDIV); MCAS El Toro; Orange County Water District (OCWD); U.S. Environmental Protection Agency (USEPA); California Environmental Protection Agency (Cal-EPA), Department of Toxic Substances Control (DTSC); California Regional Water Quality Control Board, Santa Ana Region (RWQCB); Bechtel National, Inc. (Bechtel) and CH2M HILL.</p> <p>The main purpose of the meeting was to discuss the progress made on the additional alternatives evaluation for the OU-1 IAFS. Topics discussed included: (1) Current status of the IAFS and revised list of alternatives for the IAFS; (2) Modifications to and proposed new work using the Irvine Subbasin Groundwater Model; and (3) Discharge options for the new alternatives. In addition to the progress update for the OU-1 IAFS, related topics discussed included: (1) Major findings of the evaluation of background concentrations of inorganic constituents in groundwater at MCAS El Toro; and (2) Resolution of agency comments on the <i>Draft Groundwater Monitoring Plan (GWMP)</i>. These meeting minutes list the action items and summarize the most important issues discussed at the meeting. The agenda is attached (Attachment No. 1).</p> <p style="text-align: center;">LIST OF ACTION ITEMS</p> <ul style="list-style-type: none"> o CH2M HILL will publish a draft technical memorandum on the evaluation of background concentrations of inorganic constituents in groundwater for agency review after Navy comments are incorporated.

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- o CH2M HILL will publish the Final Draft Groundwater Monitoring Plan 30 days after the Base Realignment and Closure (BRAC) Cleanup Team (BCT) issues an official comment resolutions letter.
- o CH2M HILL will send literature on evaluations of pump types on sampling results to USEPA, DTSC, and Bechtel.

MEETING SCHEDULE

The dates and locations of the next two OU-1 IAFS progress update meetings are tentatively set for:

- 1) 21 March 1995 at USEPA, San Francisco, CA.
- 2) 13 April 1995 at CH2M HILL, Santa Ana, CA.

OU-1 INTERIM-ACTION FEASIBILITY STUDY

Davi Richards/CH2M HILL gave a presentation on the status of the IAFS. Copies of the handouts used in the presentation are attached (Attachment No. 2). Her first overhead was a draft box-flow diagram showing the groundwater operable units at MCAS El Toro. Bonnie Arthur/USEPA requested that further discussion of the diagram be made an agenda item for the next Remedial Project Managers'(RPM) meeting.

A tentative schedule showing current and upcoming tasks was presented. John Dolegowski/CH2M HILL said that the IAFS would not be ready for agency review before August. Andy Piszkin/Code 1831.AP said that the issue of simultaneous review by the Department of Navy (DON) and the agencies is still under consideration by DON.

Larry Vitale/RWQCB asked whether negotiations between DON and OCWD are suspended. A. Piszkin said that negotiations are on hold while DON develops additional alternatives for the IAFS. OCWD has expressed its willingness to cooperate during development of these alternatives.

L. Vitale pointed out that the correct term is "discharge options" rather than "disposal options" when referring to treated groundwater. D. Richards said the change would be made in the documents under development.

Virginia Garelick/Code 1852.VG asked whether volatile organic compound (VOC) removal technologies other than air stripping will be evaluated in the revised IAFS. D. Richards said that, as in the previous draft, she anticipates doing a simple cost comparison of air stripping and activated carbon, based on flow and VOC concentration estimates.

D. Richards presented the list of alternatives from the previous draft followed by the draft list of alternatives for the revised draft. Although a "Navy stand-alone" alternative appears as Alternative 2 in both places, J. Dolegowski emphasized that in the previous draft, this alternative was screened out early in the IAFS and was not carried through the full analysis. This was because the OCWD Desalter Project was considered to be a baseline condition for the earlier draft.

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	<p>Juan Jimenez/DTSC asked when the Navy would be requesting applicable or relevant and appropriate requirements (ARARs) from the state. A. Piszkin replied that a letter would be sent to DTSC within the next 2 or 3 days, asking that state ARARs be identified. According to the National Contingency Plan (NCP), the state will have 30 days to respond.</p> <p>D. Richards said that the level of detail for evaluations and costing of treatment, conveyance, and discharge options will be the same as in the previous draft.</p> <p style="text-align: center;">IRVINE SUBBASIN GROUNDWATER MODEL</p> <p>Hooshang Nezafati/CH2M HILL gave a presentation on the progress made to date on the groundwater modeling task for the OU-1 IAFS (see Attachment No. 3). He said that the model finite element grid has been refined and digitized to create input data files for simulation of the new alternatives. He added that a review of additional water level data, including the recently collected monthly data in 1994, was performed to evaluate the need for a transient calibration of the groundwater flow in the Irvine Subbasin. He said that overall, the observed fluctuation of water levels in the Subbasin is small and does not justify a transient calibration. Therefore, a steady state calibration is adopted as the calibration method that is consistent with the method used before and that of OCWD. H. Nezafati said a verification was performed of the calculation of the source term that was used in the solute transport portion of the groundwater modeling task as requested by the agencies. He said the result of the verification did not change the mass calculations that were done before so there are still some technical issues on the solute transport modeling remaining to be addressed. H. Nezafati asked for input on discussing these technical issues with the agency modelers over a conference call to reach a consensus with the solute transport modeling runs. The Navy and the agencies seemed to agree with this approach.</p> <p>Natasha Raykhman/CH2M HILL presented a conceptual preliminary plan of the extraction/reinjection groundwater modeling scenarios for Alternatives 2 and 5 of the new FS. She used a map showing the potential location(s) of the extraction and reinjection wells for each Alternative and emphasized that the injection of extracted groundwater is best to be located upgradient of TCE plume and within the "clean" portion of groundwater rather than the "contaminated" portion. N. Raykhman added that this approach is preferred because it minimizes the spread of contaminated plume to the "clean" portion of groundwater and helps with the "flushing" of the contaminants to enhance remediation. She added that, however, downgradient locations are also being considered. Everybody seemed to be agreeing with the approach, understanding that the reinjection to groundwater is an ARARs issue and will be included in the ARARs request from the state.</p> <p style="text-align: center;">GROUNDWATER DISCHARGE ALTERNATIVES</p> <p>Kimo Look/CH2M HILL gave a presentation of the discharge options for the new alternatives. He discussed the screening procedure and categorized the discharge options between those to be kept for further evaluation and those screened out. Overheads of the discharge options and screening results are included (Attachment No. 4).</p>

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	<p>Sherrill Beard/DTSC asked why on-Station land is not being considered for the evaporation pond option. K. Look answered that the real estate value is very high at approximately \$500/acre. Dante Tedaldi/Bechtel felt that \$500/acre is too high for some Station lands. Dennis Askvig/Code 1852.DA suggested performing the evaluation using a range of costs for land.</p> <p>Roy Herndon/OCWD indicated the price of land is not the only cost consideration; there is a cost associated with not putting the groundwater to beneficial use. He indicated that OCWD would levy a "fine" worth the full replenishment cost if the extracted groundwater is not recharged. A. Piszkin stated the DON attorney is currently evaluating these issues.</p> <p style="text-align: center;">EVALUATION OF INORGANIC BACKGROUND CONCENTRATIONS</p> <p>Yueh Chuang/CH2M HILL gave a presentation on the major findings of the evaluation of background concentrations of inorganic constituents in groundwater at MCAS El Toro. The findings were submitted as a technical memorandum to the Navy for internal review on 16 December 1994. Overheads of the presentation are attached (Attachment No. 5).</p> <p>The following summarizes the discussions during and after the presentation.</p> <ul style="list-style-type: none"> o L. Vitale asked whether each groundwater population defined by PROBLOT analysis would correspond to a separate aquifer. Y. Chuang replied no and stated that the evaluation did not assume the traditional hydrogeochemical facies model. o D. Tedaldi asked why the 99th-percentile was used for calculation of soils background concentrations, but the 95th-percentile was used for groundwater. Y. Chuang answered that the 95th-percentile is a good compromise between 90th- (would result in lower background concentrations) and 99th-percentiles (would result in higher background concentrations). In addition, the data appear to fit the definition well; with the exception of a few inorganic analytes (e.g., sodium, nitrate), more than 95 percent of the data fell below the concentrations defined as background using the 95th-percentile. o S. Beard asked whether the exceedances of background concentrations at Site 2 (Magazine Road Landfill) were due to leachate from the landfill. Y. Chuang answered that it is possible. L. Vitale requested further evaluations on the effects of landfill leachate. J. Dolegowski indicated additional site-specific evaluations of background exceedances are planned. <p style="text-align: center;">GROUNDWATER MONITORING PLAN</p> <p>A. Piszkin stated at the start of the meeting that the scope of work of the GWMP will be addressed at a Preproposal Conference (PPC) to be held on 14 March. B. Arthur indicated a letter providing the BCT's responses and concerns to the eight issues/action items first raised at a meeting held on 14 September 1994 has been drafted. The following summarizes discussions and <i>verbal consensus</i> reached on</p>

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	<p>each of the eight issues. The Draft Final GWMP Report will be published 30 days after the BCT issues an official letter in which <i>written responses</i> are provided.</p> <ol style="list-style-type: none"> 1) Due to the length of time to complete each sampling event, the 4-month period proposed for each sampling round is acceptable. 2) The letter will state the appropriate guidance document(s) to be used in the preparation of the quarterly monitoring reports. 3) DTSC raised the issue of air entrainment observed in samples collected during the second sampling round using 4-inch-diameter submersible pumps (see Attachment 6 for CH2M HILL's recommendations to the Navy). After extensive discussions on the causes of the air entrainment and the appropriate actions to address the apparent problem, the Project Team agreed to the following: <ul style="list-style-type: none"> - The Navy will not be required to replace the 4-inch pumps prior to the start of the next sampling event. - As part of the upcoming sampling event, CLEAN II will prioritized sample collection starting with wells installed with 4-inch pumps. By doing so, the pumps can be evaluated and problem pumps can be replaced in time to be sampled within the 4-month sampling period. - The GWMP will state the objective(s) of the field study and include recommendations for the field study. However, the scope of the study will be described in general terms; specifics of the field study, such as SOPs, will be deferred to CLEAN II. 4) Although a stand-alone document is preferred, the GWMP will state the planning documents (e.g., Quality Assurance Project Plan [QAAP], Sampling and Analysis Plan [SAP]) cited in the plan will be prepared by CLEAN II. 5) Y. Chuang asked for a confirmation on the format/frequency of reporting monthly "water level" data; B. Arthur answered that all data (i.e., monthly) should be tabulated in each of the quarterly monitoring reports. However, only quarterly data (corresponding approximately to the four major seasons) need to be displayed on the "water level" maps (contoured with equipotential lines) in each of the reports. 6) B. Arthur indicated the BCT letter will address the level of detail to be included in the GWMP. 7) B. Arthur indicated the BCT letter will respond to USEPA's request for rearranging Tables 3-1 and 3-4. Y. Chuang stated available well completion data (e.g., screen interval and total depth of well) for RI/FS and existing wells are already provided in the two tables; he also indicated the tables have been modified to become more user-friendly. 8) The USEPA requested that unfiltered samples be collected for metals analysis in future sampling events. The regulatory agencies suggested only select wells

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require dual sampling (collection of filtered and unfiltered samples). A. Piszkin stated it would be in the Navy's best interest to sample all the wells once in order to perform a complete and unbiased evaluation. After extensive discussions on the percentage of wells to sample and the procedure to select wells requiring dual sampling, the Team tentatively agreed to the following:

- o Dual-sampling should be done for all wells during the next sampling event.
- o The need for dual sampling in future sampling events will depend on the findings of the evaluation.
- o A final decision will be postponed until the regulatory agency risk assessors/toxicologists have a chance to discuss the implications of analytical results from unfiltered versus filtered samples.

Attachments

Participants

John Dolegowski/CH2M HILL
 Dante Tedaldi/Bechtel
 Andy Piszkin/Code 1831.AP
 Joseph Joyce/Code 1832.JJ
 Ginny Garelick/Navy
 Larry Vitale/RWACB
 Sherrill Beard/DTSC
 Juan Jimenez/DTSC

Bonnie Arthur/EPA
 Roy Herndon/OCWD
 Natasha Raykhman/CH2M HILL
 Davi Richards/CH2M HILL
 Hooshang Nezafati/CH2M HILL
 Yueh Chuang/CH2M HILL
 Dennis Askvig/Navy
 Kimo Look/CH2M HILL

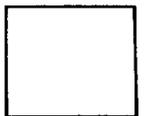
AGENDA

**MCAS EL TORO
OU-1 INTERIM ACTION FEASIBILITY STUDY (IAFS)
REMEDIAL PROJECT MANAGERS MEETING
FRIDAY, 17 FEBRUARY 1995
0930 - 1600**

CH2M HILL, SANTA ANA, CALIFORNIA

- | | |
|-------------|--|
| 0930 - 0945 | Review of agenda and schedule - Andy Piszkin |
| 0945 - 1115 | Progress update for OU-1 IAFS - Davi Richards,
Hooshang Nezafati |
| 1115 - 1130 | Break |
| 1130 - 1215 | Summary of screening of treated groundwater disposal options
for IAFS - Kimo Look |
| 1215 - 1315 | Lunch |
| 1315 - 1430 | Background concentrations of inorganics in groundwater -
Yueh Chuang |
| 1430 - 1530 | Final resolution of agency comments on Groundwater Monitoring
Plan |
| 1530 - 1600 | El Toro funding issues - Andy Piszkin |

***EVALUATION OF
BACKGROUND CONCENTRATIONS
OF INORGANIC CONSTITUENTS
IN GROUNDWATER***



Inorganic Constituents in Groundwater Exceed Drinking Water Standards

- **Major Ions Include:**
 - Total Dissolved Solids (TDS)
 - Sulfate
 - Nitrate
 - Chloride
- **Trace Metals Include:**
 - Antimony
 - Manganese
 - Nickel
 - Selenium



Question to Answer:

Have *Previous* or *Current* Activities at the Station Impacted the Inorganic Groundwater Quality?



Inorganics in Groundwater Thought To Be Naturally Occurring, and Result of Agricultural Activities

Supporting Evidence Includes:

- 1. Previous Land Use – Agricultural**
- 2. Orange County Water District (OCWD)
Documented Widespread Inorganics
Problems in Irvine Subbasin**



Statistical Methods Were Used to Separate Groundwater Populations

Possible Populations Include:

- 1. Background – Natural Mineralogical Interactions**
- 2. Anthropogenic – Due to Past Activities**
- 3. Anthropogenic – Potential Releases of Contamination Sources**



Three Statistical Methods Were Employed to Distinguish Groundwater Populations

- 1. Summary Statistics and Least-Square-Fit Correlation Coefficients**
- 2. Statistical Evaluation of Ranked Normalized Groundwater Concentrations**
- 3. Cumulative Frequency-Probability Plots (PROBPLOT)**



Conceptual Model of Groundwater Geochemistry Will Be Tested and Refined

Current Interpretation Based on:

- 1. Two Complete Sampling Rounds of Groundwater**
- 2. Well Boring Logs**
- 3. Understanding of Local Geology**



Conceptual Model (Abbreviated Version):

- **Active and Progressive Oxidation of Previously Reduced Sediments Occurring**
- **Enhanced Oxidation a Result of Groundwater Withdrawal**
- **Infiltrating Groundwater Oxidizes Iron Sulfide Minerals (e.g., Pyrite), Produces Sulfuric Acid**



Conceptual Model (Continued):

- **Iron and Other Metals in the Sulfides are Dissolved in, and Mobilized by Groundwater**
- **Sulfuric Acid Reacts with Surrounding Minerals, Thereby Increasing TDS and Trace Metals Associated with the Iron and Manganese Oxyhydroxide Precipitates**
- **Weathering of Minerals Also Results in Release of Additional Inorganics**



Conceptual Model (Continued):

- **As Oxygen Is Consumed, The Metals Can Remain Mobile in Groundwater Under Reducing Conditions**
- **Oxidizing Conditions Exist in Shallow Groundwater, but Subsurface Environment More Reducing With Depth**



Background Populations Were Estimated by Statistically Separating Populations of Constituents Using PROBPLOT

- **Background Concentrations Are Defined as *95th-Percentile* Concentrations**
- **Therefore,**
 - **5 Percent of Concentrations Exceed Background Even Under Natural Groundwater Conditions**
 - **Isolated Exceedances of Background *Do Not Equal* Contamination**



Conclusions:

1. Only One Groundwater Population Was identified for All Constituents

This Supports the Conclusion that MCAS El Toro is not a source of Regional Contamination

2. The Majority of Observed Trace Metals Concentrations Represent Background Concentrations

Since the Background Exceedances Were Sporadic and Randomly Distributed, they do not Indicate the Presence of Localized Sources

3. Background Concentrations of Four Major Ions and Seven Trace Metals Exceed Their Drinking Water Standards

This Means Exceedances of Drinking Water Standards Would Occur in the Absence of MCAS El Toro



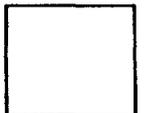
Conclusions (Continued):

- 4. The Distribution of Nitrate, TDS and Selenium Exceedances Is Consistent With Problem Areas Previously Reported by OCWD**
- 5. There is no Substantive Evidence to Suggest the Four Landfills Are Contributing Contaminants to Groundwater Due to Leachate**
- 6. The Elevated Inorganics Concentrations Observed at the Sites 13 and 15 Area Are Likely Due to Naturally Occurring Conditions and Agricultural Activities**



Conclusions (Continued):

- 7. The Two Exceedances of Mercury Background are not Likely the Results of On-Station Sources**
- 8. The Two Exceedances of Cyanide Background may be Caused by Localized Sources. However, Additional Work Is Necessary for a More Definitive Evaluation**

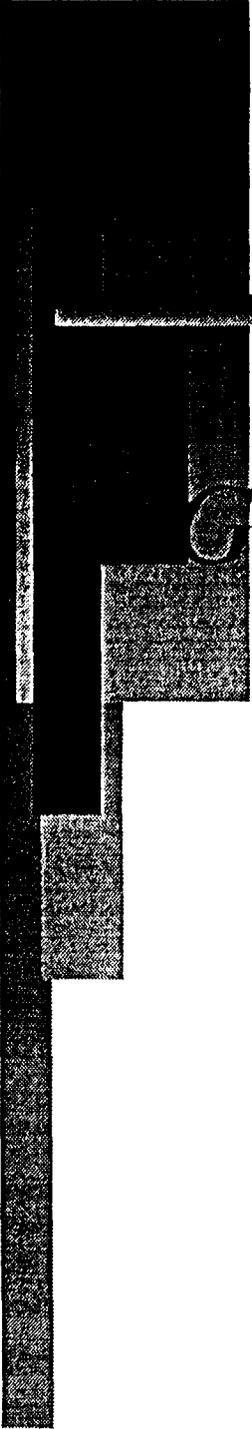


Additional Work is Required to Test and to Refine Conceptual Model

Recommendations:

- 1. Collect Field Data – Eh and DO**
- 2. Conduct Laboratory Analysis of
Soil/Rock Samples**
- 3. Run Geochemical Specification Model
(e.g., WATEQ)**





*Groundwater Disposal Options
for AIFS*

Kimo Look

CH2M HILL

Disposal Options Considered

Disposal Options Kept for Further Evaluation

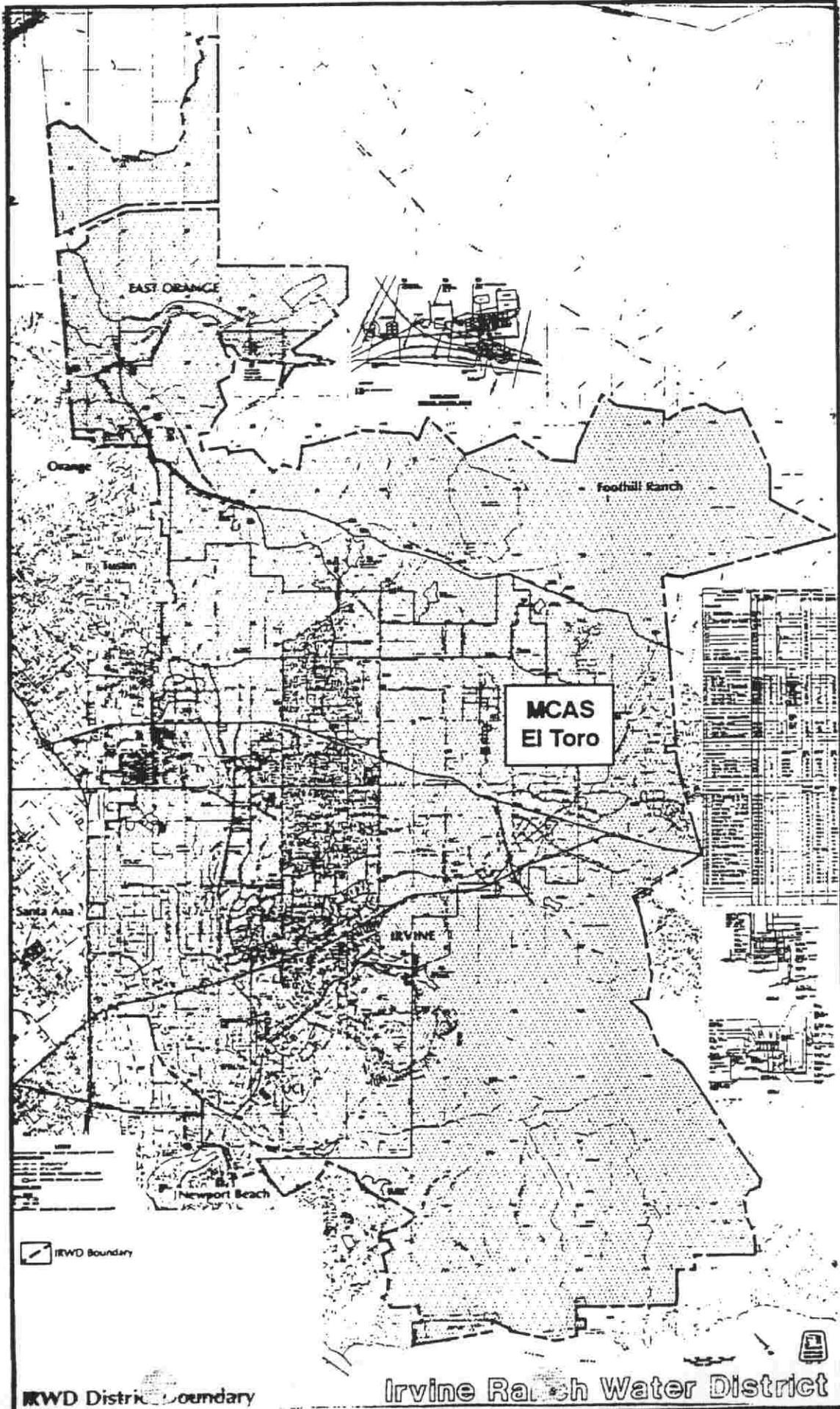
- *Delivery to Purveyor for Potable Use*
- *Reinjection*
- *Agricultural Use*
- *Reclaimed Use*

■ *Disposal Options Screened out from Further Evaluation*

- *Spreading Basins recharge*
- *Brine Line Disposal*
- *POTW Disposal*
- *Discharge to Local Washes*
- *Evaporation*

Discharge to Purveyor for Potable Use

- *Would result in beneficial use of water*
- *IRWD is likely purveyor*
- *Will require agreement with IRWD*
- *IRWD would consider cost relative to other supply options*

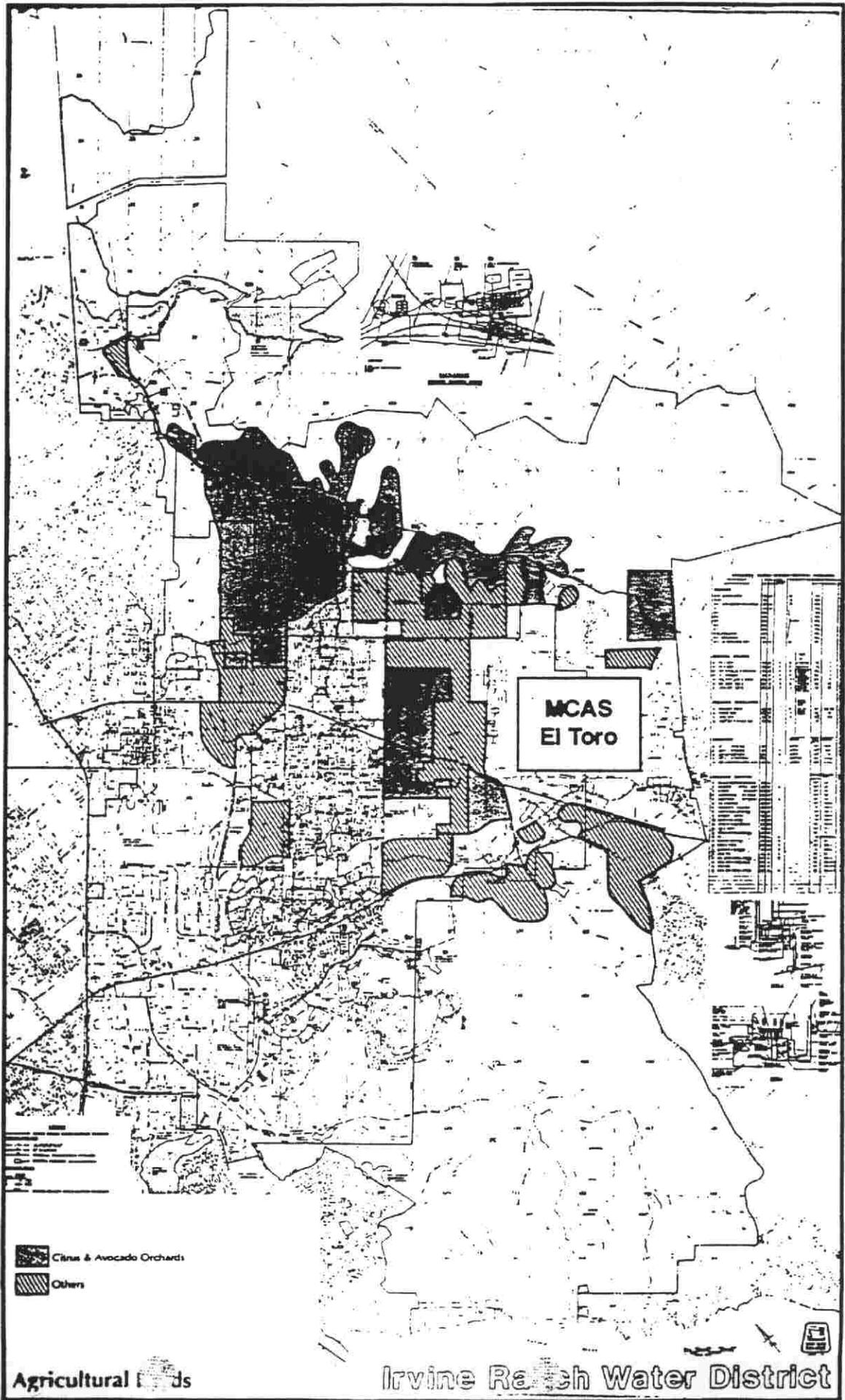


Injection to Groundwater

- *Preserves Groundwater for Beneficial Use*
- *Technically Implementable but Requires RWQCB Approval*
- *RWQCB will consider properly designed system*
- *Proposed as backup in all alternatives*

Delivery for Agricultural Use

- *Results in Beneficial Use*
- *There is a projected long term annual demand for water (12,000 ac-ft)*

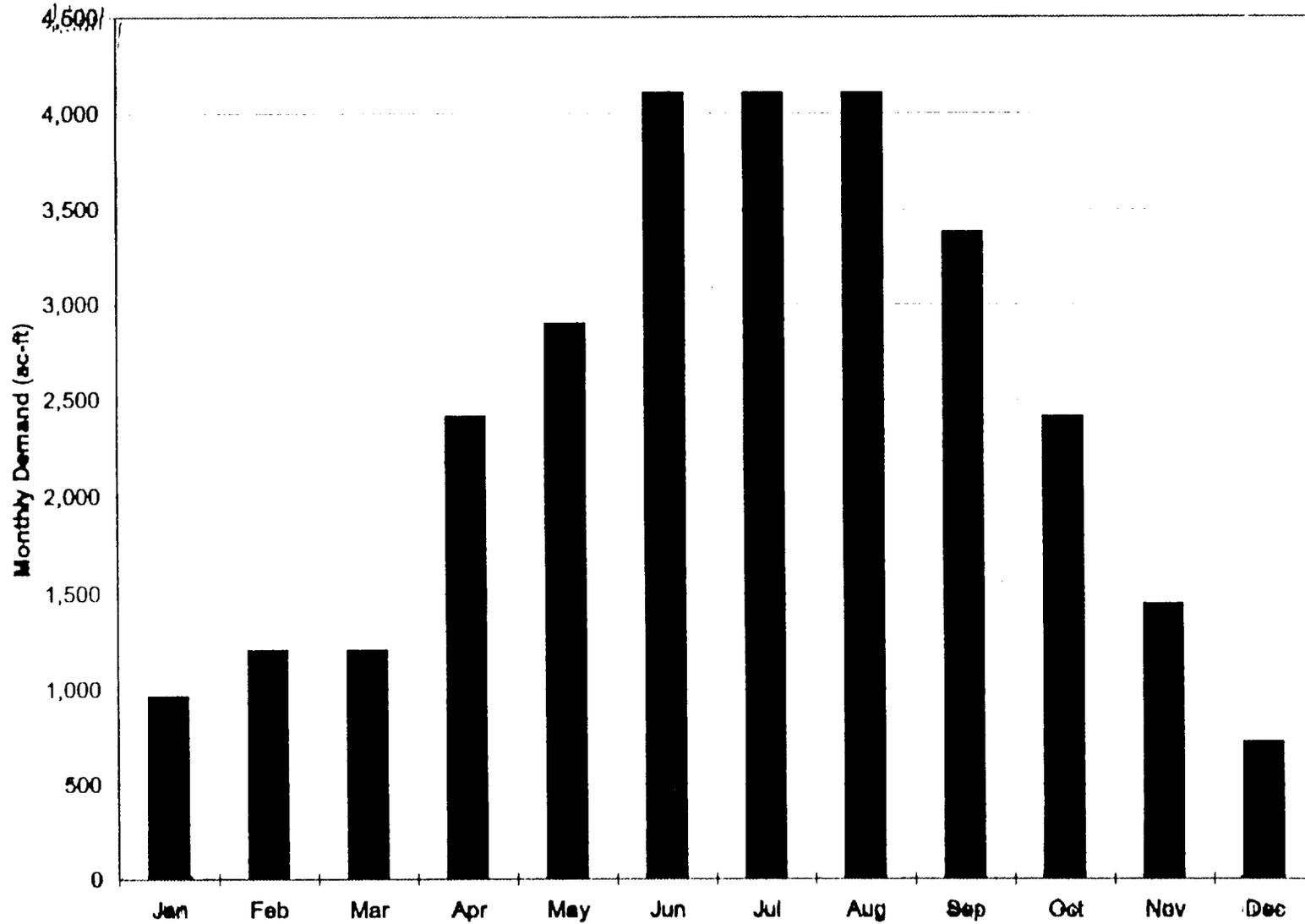


 Citrus & Avocado Orchards
 Others

Agricultural Lands

Irvine Ranch Water District

Agricultural Water Demand by Month



Discharge to Reclaimed Water

- *IRWD has major transmission lines in vicinity*
- *Demand is Seasonal*
- *RWQCB has set TDS Limits of 720 mg/l in Reclaimed water*

Reading Basin Recharge

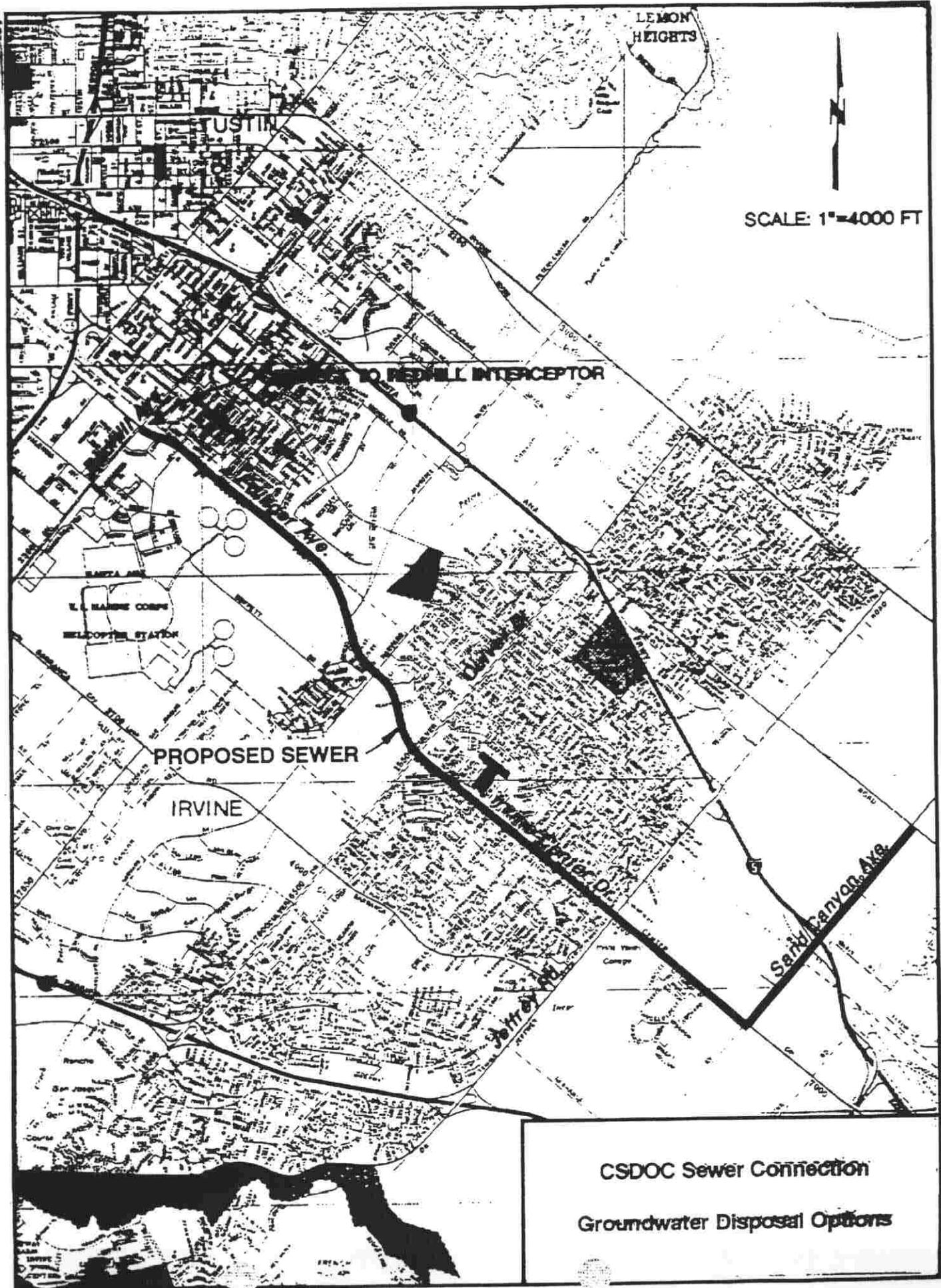
- *High clay content in soils limits infiltration capacity*
- *Would require significant land area to be effective*
- *Basin Plan may limit area of recharge due to TDS and Nitrate Concerns*

Brine Line Disposal

- *Delivery to CSDOC's Santa Ana River Interceptor line (Brine Line)*
- *Will require construction of 9 miles of pipeline*
- *Ocean outfall will remove water from beneficial use*
- *Likely difficult to obtain a permit*

WD Sewer Disposal

- *Limited treatment capacity*
- *Diverts surplus waste streams to CSDOC*
- *Connection permit difficult to secure*
- *Likely impose very high fees for connection*



LEMON HEIGHTS

JUSTIN

SCALE: 1"=4000 FT

TO REDWELL INTERCEPTOR

U.S. MARINE CORPS
HELICOPTER STATION

PROPOSED SEWER

IRVINE

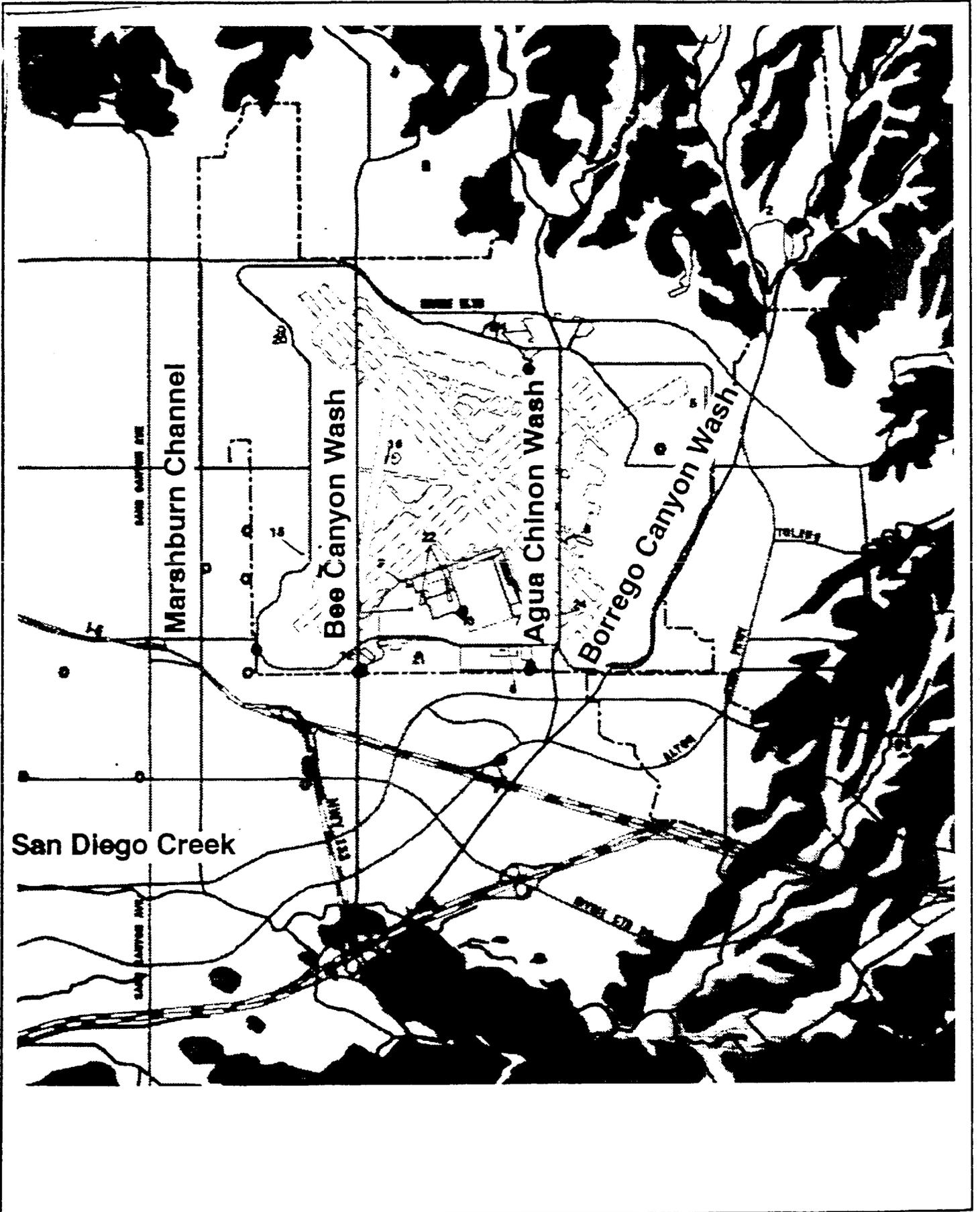
Sandy Canyon Ave.

Johnston Ave.

CSDOC Sewer Connection
Groundwater Disposal Options

Disposal to Local Washes

- *Surface Water Disposal*
- *Recharge of shallow groundwater through wash bottom*



Evaporation

- *Winter Evaporation limiting factor (2.4 inches/month average)*
- *will require significant land area due to low evaporation rate (400-600 acres)*
- *Land is limited and expensive (\$500,000/acre)*

**MCAS EL TORO
OU-1 IAFS RPM MEETING
February 17, 1995
CH2M HILL Santa Ana Office**

GROUNDWATER MODELING TASK UPDATE

MODEL MODIFICATIONS

- Refined the model finite-element grid
 - /3,000 nodes up from 5000
(5 layers)
- Digitized the new grid
- Generated new input data files for the model
- Performed QC on the new input data files
- Recompiled CFEST code to accommodate up to 13000 nodes

MODEL CALIBRATION

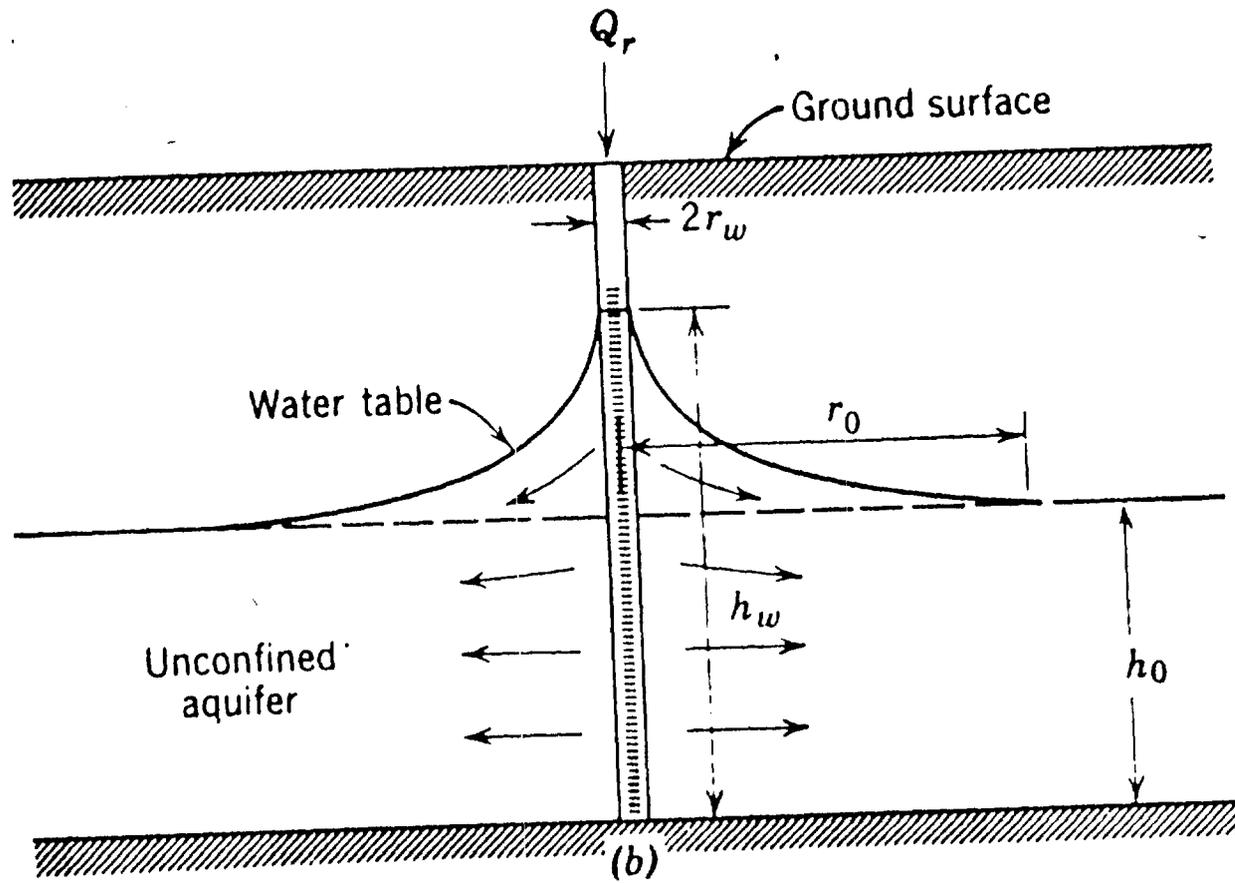
- Evaluated Seasonal Water Level Fluctuations and Need for Transient Calibration - *not needed, very few seasonal fluctuations.*
- Performed Steady-State Flow Calibration
- Verified and evaluated the Source Terms for Solute Transport Simulations
- Started Solute Transport Simulations
- Started Developing The OU-1 IAFS Alternatives

PLANS

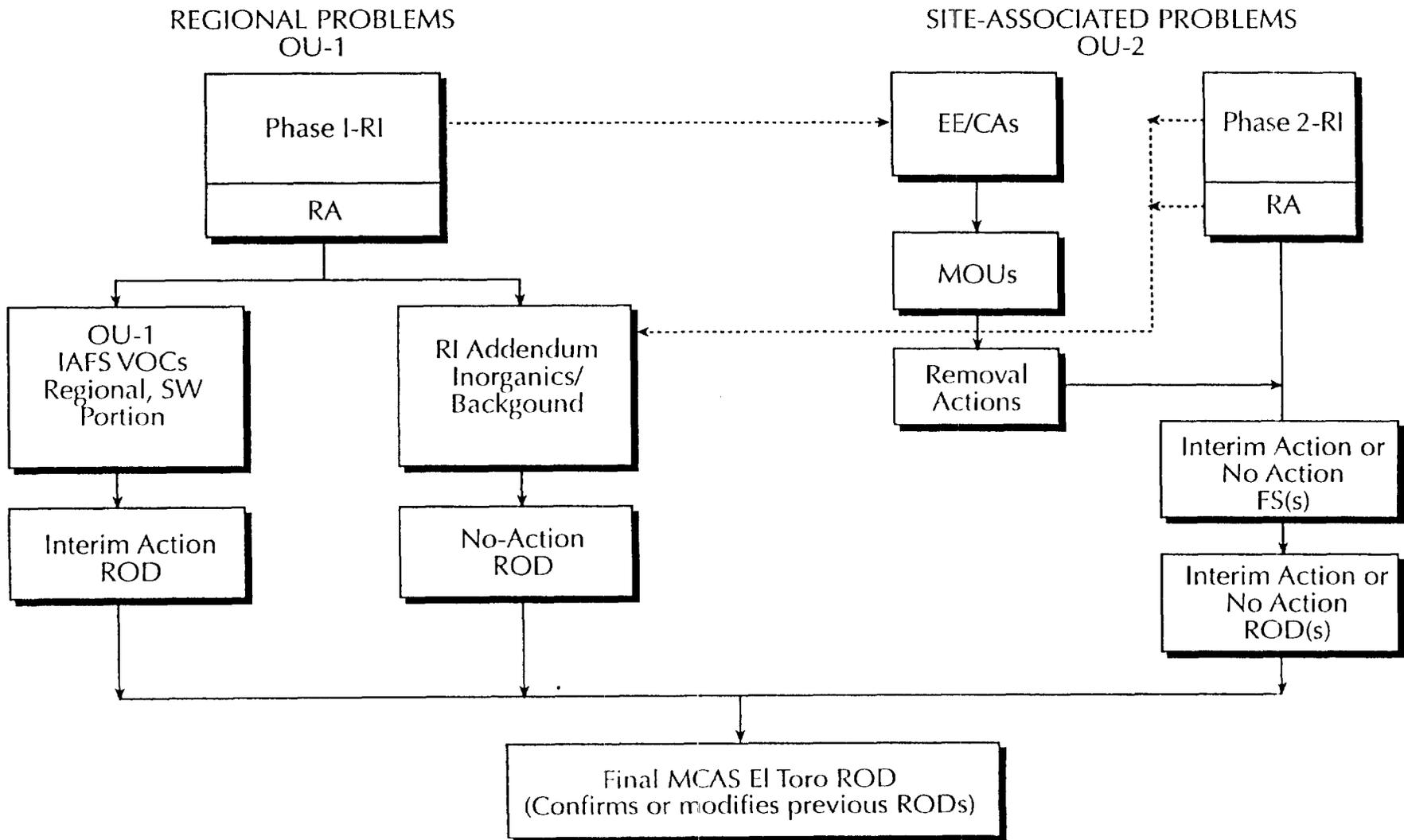
- Finalize Developing Groundwater Modeling Scenarios
- Simulate the OU-1 IAFS Scenarios

ISSUES FOR DISCUSSION

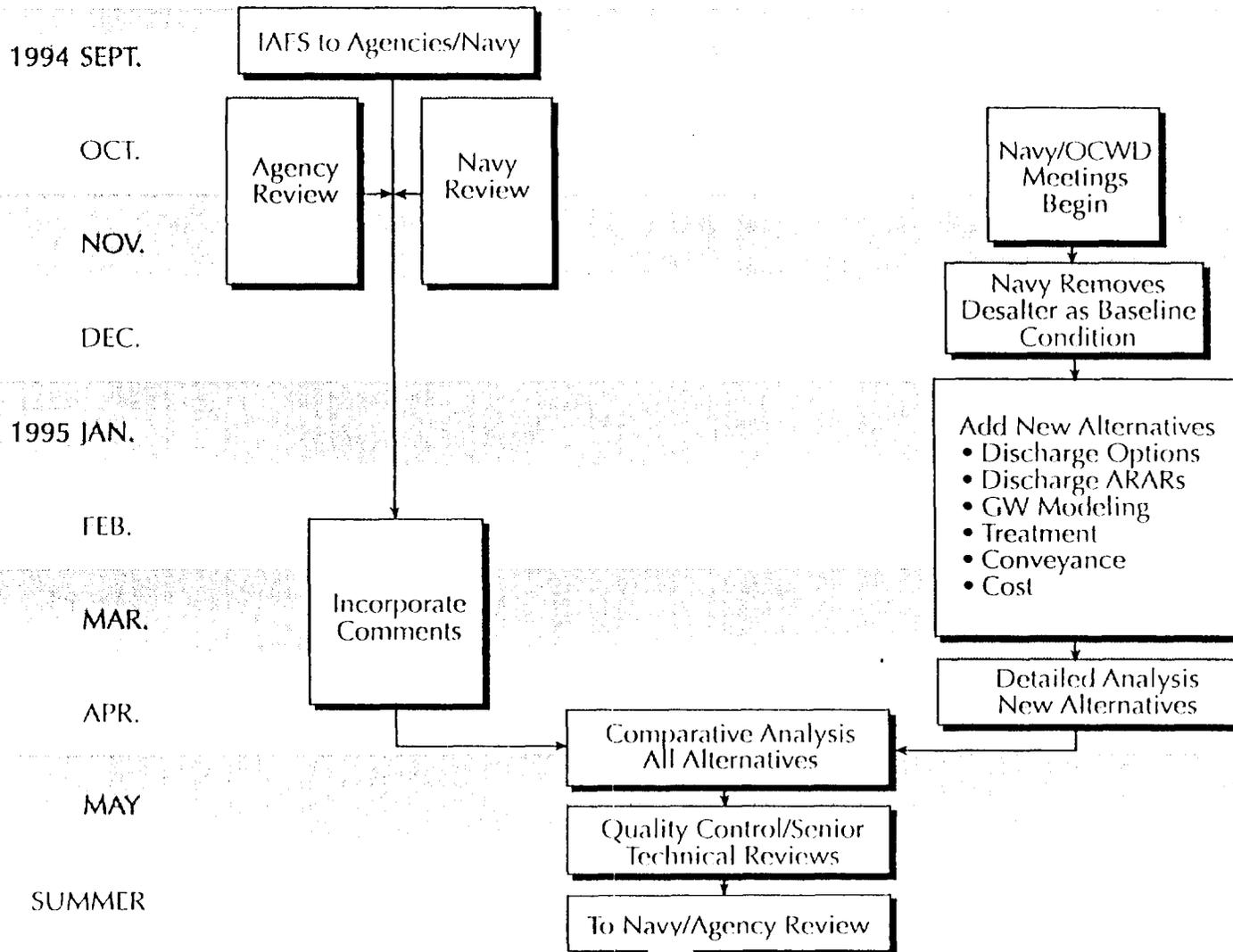
- Development of Scenarios
 - Extraction Well Locations in Shallow Groundwater *- thinks it is best to reinject just outside contaminated area.*
 - Injection Well Locations in Shallow Groundwater
 - Extraction Well Locations in Principal Aquifer
 - Injection Well Locations in Principal Aquifer



MCAS El Toro Groundwater RI/FS Process Draft Logic Flow Chart

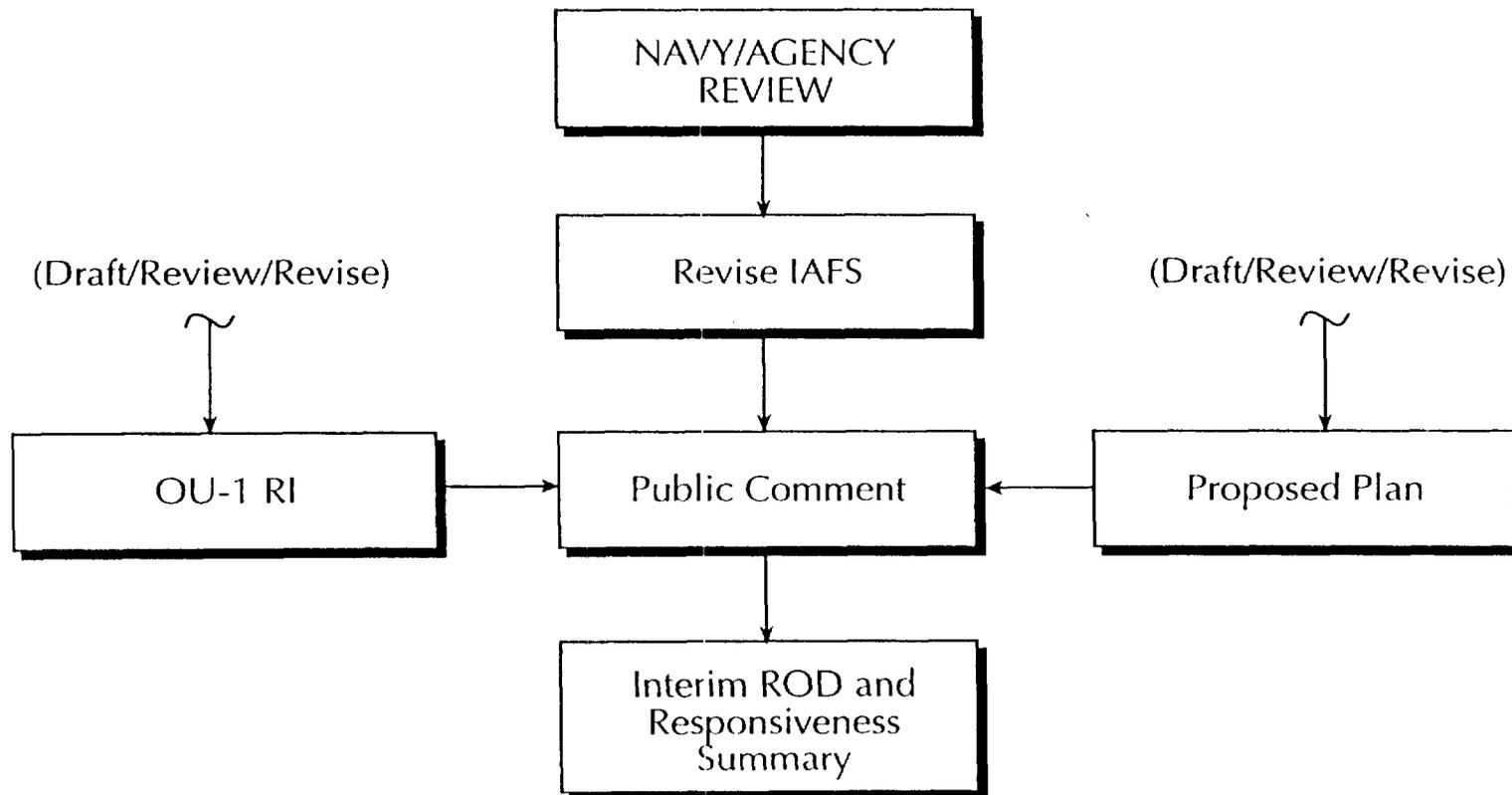


MCAS El Toro OU-1 IAFS



MCAS El Toro OU-1 IAFS

Further Steps to Interim ROD



Current Tasks

- Screening of discharge options
- Identifying ARARs for discharge options
- Revising groundwater model
- Conceptualizing alternatives
- Reviewing/incorporating agency comments

Remedial Alternatives– Previous List

1. No Action *
2. MCAS El Toro Extraction/Treatment
[screened out early]
3. Desalter Only*
4. Desalter/Additional Extraction*

*Carried through detailed analysis.

Remedial Alternatives– Current List

1. No Action
2. MCAS El Toro Extraction/Treatment/Discharges
3. Desalter Only
4. Desalter/Additional Extraction; Discharge from on-Station Extraction to Desalter
5. Desalter; Independent Shallow Groundwater Extraction with Discharge to ReInjection

Discharge ARARs

- Screen discharge options, identify ARARs
- Dialog with RWQCB about injection/anti-degradation
- Request State ARARs

Treatment, Conveyance, Cost

- Functions of extraction/water quality/disposal
- Iterations some times required
- Same level of detail and development as earlier IAFS

Remedial Action Objectives (RAO'S)

- Continuing review
- Three subjects:
 1. Minimizing migration
 2. Reducing concentrations
 3. Preventing exposure

RAO'S - Subject #1: Minimizing Migration

IAFS: Minimize further migration of groundwater containing VOCs that have emanated from sites at El Toro

CURRENT:

- Contain VOCs in the source areas in the southwest portion of MCAS El Toro to control migration pending further action by OU-2; for TCE the source area in question is in the vicinity of Site 24; for benzene it is in the vicinity of Sites 23, 24, and 15.
- Minimize migration of VOCs in the Principal Aquifer.

RAO'S–Subject #2: Reducing Concentrations

- IAFS:** Reduce concentrations of VOCs in the groundwater in the AOC to federal or state MCLs, whichever are more stringent, non zero MCLGs, or RBCs for compounds that have no promulgated MCLs.
- CURRENT:** Reduce concentrations of VOCs in the shallow groundwater downgradient of the source areas and in the Principal Aquifer in the AOC to federal or state ... [same language].

RAO'S–Subject #3: Preventing Exposure

- IAFS:** Prevent human exposure to groundwater containing levels of VOCs above MCLs, nonzero MCLGs, or RBCs.
- CURRENT:** Prevent use of groundwater containing VOCs above MCLs/ MCLGs/RBCs for domestic use.

Remedial Alternatives– Previous List

1. No Action *
2. MCAS El Toro Extraction/Treatment
[screened out early]
3. Desalter Only*
4. Desalter/Additional Extraction*

*Carried through detailed analysis.

Remedial Alternatives– Current List

1. No Action
2. MCAS El Toro Extraction/Treatment/Discharges
3. Desalter Only
4. Desalter/Additional Extraction; Discharge from on-Station Extraction to Desalter
5. Desalter; Independent On-Station Extraction with Discharge to ReInjection