APPENDIX 3-2

Project 2: City of Santa Maria, Untreated Water Landscape Irrigation Project

- Account Conversion Tracking Master List – Initial Phase
- Final Design Drawings
- CEQA Categorical Exemption for the Untreated Water Landscape Irrigation Project (formerly titled "Secondary System Extension Project")(Class 3(d) Categorical Exemption, September 23, 2009
- City of Santa Maria, 2005 Urban Water Management Plan – Excerpt regarding Water Quality Goals
- "Water Quality Improvement from Untreated System," Utilities Department, City of Santa Maria
- Long Term Water Management Plan – Executive Summary – A report to the City Council of Santa Maria, entitled "Long Term Water Management Plan," prepared by the Water Advisory Committee in February 1991 (Section 4K, pp. 10).
- Santa Maria Water Treatment Technology Evaluation – Excerpt regarding Demineralization - April 22, 2008, CH2M HILL
- Evaluation of Groundwater Treatment Reverse Osmosis Concentrate Disposal – Excerpt - August 2009, CH2M HILL
- Proposed Santa Barbara County IRWM Data Management System, Application for Prop 84 Planning Grant, Round 1, Santa Barbara County, IRWM Plan 2012, Task 4: Establish Data Management System, pp. 51, September 28, 2010

Secondary System

Name	Address	Account #	Meter Size	Meter #	Start Date	Ant. Annual Use (units)	Converted	Ant. Annual Use (AF)	Subtotals
Civic Center									
Elks Field		20-63-2320-0	3-inch		10/15/2009	3,695	3,695	8.5	Civic Ctr Core
Simas Park		20-63-2330-0	3-inch		10/15/2009	4,966	4,966	11.4	19.9
Police Landscape		20-62-2840-0	2			444		1.0	
Pool-Bowling		20-62-9040-0	2			2,752		6.3	
Pool Landscape		20-63-2370-0	2			1,917		4.4	
City Landscape		20-68-1990-0	2			385		0.9	
City Landscape		20-68-2100-0	2			1,261		2.9	
City Landscape		20-68-3630-0	2			1,876		4.3	
City Landscape		20-68-3650-0	1.5			497		1.1	
City Landscape		20-81-0020-0	2			1,874		4.3	
City Landscape		20-81-0021-0	2			1,555		3.6	
City Landscape		20-81-0090-0	1.5			162		0.4	
City Landscape		20-81-0110-0	2			1,132		2.6	
SM Town Center Landscape		20-81-0230-0				184		0.4	
City Median (100-300 block)		20-81-0240-0	1.5-inch			521		1.2	
City Median		20-81-0250-0	2-inch			344		0.8	
City Landscape		20-81-0280-0	1.5			1,348		3.1	
SM Town Center Assoc Lndscpe		20-81-0290-0				797		1.8	Civic Ctr Periph
City Landscape		20-81-0501-0	1			325		0.7	39.9
Allan Hancock College	800 S College Dr	20-63-9001-0		59530771		13,533		31.1	
Allan Hancock College	801 S College Dr					20,037		46.0	
Alice Trefts						2,962		6.8	
Miller Elementary School						10,019		23.0	
Santa Maria High School						13,939		32.0	
Santa Maria Fairpark						5,663		13.0	
Adam Basin			3			11,761		27.0	Sec. Sys to
Minami Park			4			15,682		36.0	Adam Park
Adam Elementary School	500 Windsor Street		3			4,008		9.2	224.1
Secondary Landscape System									
Sunset Ridge Golf Course	1424 Fairway Ave	20-78-0055-1	1	61265227	1/2/2009	2,959	2,959	6.8	
Hagerman Park North Meter	3300 Skyway Drive	20-78-9075-0	4	59530769	8/19/2009	7,200	7,200	16.5	
Hagerman Park South Meter	3300 Skyway Drive	20-78-9076-0				7,128		16.4	
Microwave Applications	3030 Industrial Pkwy	20-78-0651-0	1.5	1000014	8/19/2009	545	545	1.3	
Primus Group	2810 Industrial Pkwy	20-78-0520-3	1.5	58624602	8/19/2009	3,757	3,757	8.6	
SM Public Airport	3217 Terminal Way	20-78-9063-0	2	60977900		1,966		4.5	
SM Public Airport	3217 Terminal Way	20-78-9064-0	2	10000910	5/12/2010	3,765	3,765	8.6	
SM Public Airport	3217 Terminal Way	20-78-9065-0	2	1000912	5/12/2010	2,110	2,110	4.8	
SM Times	3200 Skyway Dr	20-78-0891-0	3	1000913	5/12/2010	3,170	3,170	7.3	

Secondary System

Name	Address	Account #	Meter Size	Meter #	Start Date	Ant. Annual Use (units)	Converted	Ant. Annual Use (AF)	Subtotals
Okonite								0.0	
C And D Zodiak								0.0	Phase 1
Business Park	3130 Skyway	20-78-0642-1	2	1000017	5/12/2010	2,485	2,485	5.7	80.5
Northwest System									
Preisker Park		1048331000	6	9922221		29000		66.6	Northwest
City Landscaping	2401 Preisker Lane	104833000	5/8	10085886		200		0.5	149.9
Median	2300 Block Johnson Dr	104829652	1.5	60978125		200		0.5	
City NW Landscape	600 Hidden Pines Way	104420901	1.5	16278		600		1.4	
Hidden Pines Estate	500 Block Hawthorne wy	104420800	1.5	2593		1900		4.4	
City Landscaping	541 Poplar Street	104421000	5/8	89112011		500		1.1	
City Landscaping	801 Boxcar Place	105560311	1.5	56732238		1500		3.4	
City Landscaping	901 Boxcar Place	105560330	2	60978169		3400		7.8	
Elementary School Landscaping	930 Hidden Pines Way	105559600	2	60978177		8100		18.6	
Elementary School Landscaping	930 Hidden Pines Way	105559900	2	60978154		2600		6.0	
City Landscaping	835 Atlantic Place	105560001	2	60978235		2500		5.7	
City Landscaping	835 Atlantic Place	105560101	2	60978218		2000		4.6	
City- N Preisker	2209 Canal Dr	105560201	2	60978265		3400		7.8	
City - N Preisker	2315 N Blosser Rd	105560301	5/8	14248980		2200		5.1	
Regency Estates HOA	500 Hidden Pines Way	104900212	1.5	60978127		800		1.8	
Jehovah Witness LNS	333 Hidden Pines Way	104900110	2	7580		2600		6.0	
City Landscaping	2300 Blk N Railroad	104931192	5/8	99135513		2500		5.7	
City Landscaping	2300 Preisker Lane	104829601	5/8	1000371		1300		3.0	
Northeast System									
	600 Seward	105010851				4000		9.2	
	1225 Seward	105016601				2600		6.0	
	Carlotti	105033002				2000		4.6	
	Bayview	105016501				1300		3.0	
Jim May Park	Stanford	105026401				10000		23.0	Northeast
Taylor School	1921 Carlotti					10000		23.0	68.640955

	Total	Converted
Units	253,924	34,652
AF	582.9	**79.6**
MGD	0.520	0.071

PUBLIC IMPROVEMENT PLANS FOR
SECONDARY WATERLINE EXTENSION
CIVIC CENTER TO MILLER SCHOOL
SANTA MARIA, CA.

GENERAL NOTES

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND PLANS OF THE CITY OF SANTA MARIA AND THE STANDARD SPECIFICATIONS OF THE STATE OF CALIFORNIA, BUSINESS AND TRANSPORTATION AGENCY, DEPARTMENT OF TRANSPORTATION, LATEST EDITION, WHERE NOT COVERED BY THE FORMER, AND SHALL BE COMPLETED TO THE SATISFACTION OF THE CITY ENGINEER.
2. ALL PLANS MUST BE SIGNED BY CITY ENGINEER WITHIN THE PAST YEAR AND ALL WORK MUST BE PERFORMED TO THE SATISFACTION OF THE CITY ENGINEER.
3. THE CONTRACTOR SHALL NOTIFY THE PUBLIC WORKS DEPARTMENT AT LEAST ONE WORKING DAY PRIOR TO BEGINNING OF CONSTRUCTION AT 1-805-925-0951, EXT. 225.
4. THE CONTRACTOR SHALL CONTACT UNDERGROUND SERVICE ALERT (U.S.A.) AT LEAST TWO WORKING DAYS PRIOR TO BEGINNING OF CONSTRUCTION AT 1-800-227-2600. (GOVERNMENT CODE SECTION 4216/4217)
5. a. CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL PLAN TO PUBLIC WORKS PRIOR TO ISSUANCE OF ENCROACHMENT PERMIT. (PERMIT WORK ONLY.)

   b. TWO WEEKS PRIOR TO COMMENCEMENT OF WORK, TRAFFIC CONTROL PLANS SHALL BE SUBMITTED TO PUBLIC WORKS.
6. THE CONTRACTOR SHALL PRACTICE SAFETY AT ALL TIMES AND SHALL FURNISH, ERECT AND MAINTAIN SUCH FENCES, BARRICADES, LIGHTS AND SIGNS NECESSARY TO GIVE ADEQUATE PROTECTION TO THE PUBLIC AT ALL TIMES. TEMPORARY TRAFFIC CONTROL SHALL BE APPROVED BY THE CITY ENGINEER.
7. ALL EXCAVATIONS OR TRENCHES IN PAVED AREA SHALL REQUIRE SAWCUTTING IN A NEAT AND UNIFORM MANNER. ALL MATCH OR JOIN LINES TO EXISTING ASPHALTIC CONCRETE PAVING WITHOUT REDWOOD HEADERS SHALL BE SAW CUT.
8. ALL UNDERGROUND UTILITIES SHALL BE INSTALLED PRIOR TO CONSTRUCTION OF STREET IMPROVEMENTS.
9. ALL SEWER LATERAL CROSSINGS OF PUBLIC WATER MAINS SHALL BE IN ACCORDANCE WITH STATE HEALTH SERVICE STANDARDS.
10. A CHISELED "S" SHALL BE INSTALLED IN THE CURB FACE ABOVE ALL SEWER LATERALS. THE AS-BUILT SEWER LATERAL STATIONING SHALL BE SUBMITTED TO THE PUBLIC WORKS DEPARTMENT PRIOR TO FINAL ACCEPTANCE OF PUBLIC IMPROVEMENTS.
11. INFORMATION SHOWN AS EXISTING IMPROVEMENTS ON THESE DRAWINGS ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY.
12. CONTRACTOR TO LOCATE, PROTECT, AND REPAIR AT HIS EXPENSE, ANY UTILITIES DAMAGED BY HIS FORCES.
13. THESE PLANS SHALL INCLUDE ALL AS-BUILT REVISIONS PRIOR TO THE ACCEPTANCE OF IMPROVEMENTS BY THE CITY.
14. BASIS OF BEARINGS:
15. BENCHMARK:
16. ALL STREETS, ALLEY, VEHICULAR WAYS, SIDEWALKS, AND HAUL ROUTES SHALL BE KEPT CLEAN AND CLEAR OF DEBRIS, DIRT AND DUST IN A MANNER ACCEPTABLE TO THE CITY. AT A MINIMUM, THESE AREAS SHALL BE CLEANED AT THE END OF EACH WORKDAY. FAILURE TO DO SO WILL RESULT IN A "STOP WORK" NOTICE. SAID NOTICE WILL NOT BE RELEASED UNTIL THE AREA HAS BEEN ADEQUATELY CLEANED.
17. ALL VALVE AND MANHOLE COVERS TO BE ADJUSTED TO GRADE, TO CITY STANDARDS.
18. "R" VALUE REPORT SHALL BE OBTAINED FROM A CIVIL ENGINEER AND BE PROVIDED TO THE DEPARTMENT OF PUBLIC WORKS PRIOR TO PAVING OF STREETS. IF "R" VALVE IS BELOW 50, THE STRUCTURAL SECTION SHALL BE REVISED AS REQUIRED BY STD. DWG. RD-20, RD-21, RD-22, OR RD-23.
19. CONTRACTOR SHALL INSTALL SURVEY MONUMENTS WITHIN 0.04' OF LOCATIONS SHOWN BY SWING TIES SET BY THE SURVEYOR. THE SURVEYOR SHALL PUNCH CAP.
20. UNLESS OTHERWISE NOTED ON THE PLANS, ALL NEW CITY STANDARD (COBRA-HEAD STYLE) STREET LIGHTS SHALL UTILIZE LOW PRESSURE SODIUM (L.P.S.) LUMINAIRES OF A BRAND APPROVED BY THE CITY ENGINEER. THE CONTRACTOR SHALL SUBMIT ANY CHANGED TO STANDARD DRAWINGS SL-11 THROUGH SL-17 NECESSARY FOR APPROVAL PRIOR TO STARTING WORK. DECORATIVE STYLE STREET LIGHTS SHALL BE OF THE TYPE AND CONSTRUCTION APPROVED BY THE CITY ENGINEER. ALL WORK SHALL SHOW POINT OF SERVICE.
21. THE CONTRACTOR SHALL HAVE COPIES OF THE APPROVED PLANS AND SPECIFICATIONS FOR THIS PROJECT ON THE SITE AT ALL TIMES, AND CONTRACTOR SHALL BE FAMILIAR WITH ALL APPLICABLE STANDARDS AND SPECIFICATIONS.
22. THE CONTRACTOR SHALL EXPOSE AND VERIFY THE LOCATION AND ELEVATION OF ALL EXISTING IMPROVEMENTS PRIOR TO BEGINNING WORK.
23. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF SANTA MARIA STANDARD DRAWING(S) AND STANDARD SPECIFICATIONS LISTED BELOW:

DRAWING NO.	TYPE OF CONSTRUCTION	CITY STD. SPEC.'S
DR-10, DR-11	DROP INLET	
MS-11	STEEL SLEEVE	
RD-11	CURB, GUTTER AND SIDEWALK	S-109
RD-12	DRIVEWAY	S-109
RD-18, RD-19	X-GUTTER AND SPANDREL	S-109
RD-21A	STREET SECTION (RESIDENTIAL)	S-87, S-108B
RD-24	KNUCKLE	
RD-25	CUL DE SAC	
RD-31	UNDERGROUND UTILITIES	
RD-33	TRENCH REPAIR	S-87
RD-34A	BARRICADE OR GATE	S-123
RD-35A	SURVEY MONUMENT	
RD-36	REDWOOD HEADER	
RD-38	CORNER LAYOUT	S-109
RD-39	STREET SIGN	S-107
RD-40	STOP SIGN LOCATION	
SL-11 - SL-13	STREET LIGHTS	S-106
SS-10A	MANHOLE	
SS-12A	SEWER CLEAN OUT	
SS-14	SEWER LATERALS	S-82
WA-10	PLAN SYMBOLS FOR WATER MAINS	S-75
WA-11	WATER MAIN LAYOUT W/FITTINGS	S-75
WA-12	WATER MAIN FITTINGS	S-75
WA-13	THRUST BLOCK AND DETAILS	S-75
WA-14	WATER SERVICE (COPPER ONLY)	S-75
WA-15	WATER SERVICE (FOR LANDSCAPE)	S-75
WA-19	FIRE HYDRANT	S-75
WA-21A	VALVE BOX AND RISER	S-75
WA-22	VALVE STEM EXTENSION	S-75
WA-24A	BLOW OFF VALVE	S-75
* A88A CASE "E"	CAL TRANS. WHEELCHAIR RAMP	S-109

* AS MODIFIED PER THESE PLANS

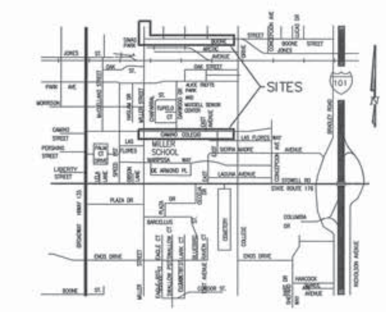
24. CONTRACTOR TO OBTAIN A PERMIT FROM THE DEPARTMENT OF INDUSTRIAL RELATIONS, DIVISION OF OCCUPATIONAL SAFETY & HEALTH. CALL OSHA AT 1-(818)-901-5403 FOR FURTHER INFORMATION.
25. ALL COMPACTION TEST RESULTS WITHIN RIGHT OF WAY AND EASEMENTS SHALL BE SUBMITTED DIRECTLY TO THE PUBLIC WORKS DEPARTMENT ENGINEERING DIVISION BY APPROVED TESTING COMPANY AT THE TIME OF FIRST AVAILABILITY OF RESULTS.
26. ALL TRAFFIC CONTROL DEVICES SHALL BE INSTALLED AND CONFORM TO STATE OF CALIFORNIA "MUTCD."
27. POSTS FOR ALL SIGNING SHALL BE INSTALLED PER CITY STANDARD DRAWING RD-40.

GENERAL NOTES CONTINUED

28. PAVEMENT DELINEATION MATERIAL, MANUFACTURING, PACKAGING, LABELING, AND APPLICATION SHALL CONFORM TO STATE OF CALIFORNIA STANDARD SPECIFICATIONS, LATEST ADDITION. ALL TRAFFIC STRIPES AND PAVEMENT MARKINGS SHALL BE PAINTED, UNLESS OTHERWISE SPECIFIED.
29. MEDIAN NOSINGS SHALL BE PAINTED WITH REFLECTIVE PAINT.
30. CONTRACTOR SHALL OBTAIN AN ENCROACHMENT PERMIT FROM THE CITY OF SANTA MARIA ENGINEERING DIVISION AT 110 S. PINE SUITE 221 PRIOR TO PERFORMING ANY WORK WITHIN PUBLIC RIGHT OF WAY OR EASEMENT.
31. RUBBER GASKET JOINTS SHALL BE USED ON ALL RCP.
32. CONTRACTOR IS RESPONSIBLE FOR PRESERVATION AND/OR PERPETUATION OF ALL EXISTING MONUMENTS WHICH CONTROL SUBDIVISIONS, TRACT BOUNDARIES, EASEMENTS, STREETS, HIGHWAYS, OR OTHER RIGHTS-OF-WAY OR PROVIDE SURVEY CONTROL WHICH WILL BE DISTURBED OR REMOVED DUE TO CONTRACTOR'S WORK. CONTRACTOR SHALL PROVIDE A MINIMUM OF 10 WORKING DAYS NOTICE TO PROJECT ENGINEER/SURVEYOR PRIOR TO DISTURBANCE OR REMOVAL OF EXISTING MONUMENTS. PROJECT ENGINEER/SURVEYOR SHALL COORDINATE WITH CONTRACTOR TO RESET MONUMENTS OR PROVIDE PERMANENT WITNESS MONUMENTS AND FILE THE REQUIRED DOCUMENTATION WITH THE COUNTY SURVEYOR PURSUANT BUSINESS AND PROFESSIONS CODE SECTION 8771.

LEGEND

CENTERLINE
PROPERTY LINE
EXIST. CURB LINE
NEW CURB LINE
EASEMENT LINE
SANITARY SEWER
EXIST. SANITARY SEWER
STORM DRAIN
EXIST. STORM DRAIN
WATER LINE
EXIST. WATER LINE
FUTURE CONST.
CLEAN OUT
EXIST. CLEAN OUT
MANHOLE
EXIST. MANHOLE
STORM DRAIN MANHOLE
EXIST. STORM DRAIN MANHOLE
FIRE HYDRANT
EXIST. FIRE HYDRANT
STREET LIGHT
EXIST. STREET LIGHT
EXIST. MONUMENT
MONUMENT
STOP SIGN
STREET SIGN
POWER POLE
WATER SERVICE
SEWER LATERAL
STREET LIGHT SERVICE POINT
STREET LIGHT PULL BOX
SPOT ELEVATION XXX.XX F.G.
EXIST. SPOT ELEVATION



VICINITY MAP
N.T.S.

INDEX

SHEET #	SHEET DESCRIPTION
1.	TITLE SHEET
2.	CAMINO COLEGIO - UNDERGROUND
3.	BOONE STREET - UNDERGROUND STA. 0+75 - 12+00
4.	BOONE STREET - UNDERGROUND STA. 12+00 - 21+00

VERIFICATION/CERTIFICATES

ENGINEER OF RECORD CERTIFICATE:
THAT THE CONSTRUCTION OF PUBLIC IMPROVEMENTS CONTAINED WITHIN THIS SET OF PLANS WILL BE PERIODICALLY OBSERVED BY STEPHEN SHIVELY, THE CIVIL ENGINEER OF RECORD, AND THAT I, OWNER/DEVELOPER, WILL RETAIN AND BE RESPONSIBLE FOR PAYMENT THEREOF FOR OBSERVATION AND "AS-BUILT" PLAN SUBMITTAL. THE "AS-BUILT" PLANS SHALL BE SUBMITTED TO THE ENGINEERING DIVISION OFFICE AT LEAST TEN (10) WORKING DAYS PRIOR TO REQUEST FOR RELEASE OF SURETY FOR "FAITHFUL PERFORMANCE OF IMPROVEMENTS".

OWNER ____________ DATE ____________

SOILS ENGINEER OF RECORD CERTIFICATE:
I, OWNER/DEVELOPER, WILL RETAIN AND BE RESPONSIBLE FOR PAYMENT THEREOF, THE SOILS ENGINEER OF RECORD,____________ WHO WILL PROVIDE THE OBSERVE-ATION AND TESTING SERVICES OF THIS GRADING, BACK FILL AND PAVEMENT WORK AND SHALL VERIFY THAT TO THE BEST OF HIS KNOWLEDGE THE EARTHWORK/TRENCH BACK FILL AND PAVING OPERATIONS WERE PERFORMED IN SUBSTANTIAL CONFORMANCE WITH THE APPROVED PROJECT PLANS AND SPECIFICATIONS.

THE SOILS WORK VERIFICATION SHALL BE SUBMITTED TO THE ENGINEERING DIVISION OFFICE AT LEAST TEN (10) WORKING DAYS PRIOR TO REQUEST FOR RELEASE OF SURETY FOR "FAITHFUL PERFORMANCE OF IMPROVEMENTS".

OWNER ____________ DATE ____________

SOIL/MATERIAL WORK VERIFICATION:
I, THE UNDERSIGNED, AS THE SOILS ENGINEER OF RECORD, TO THE BEST OF MY KNOWLEDGE DO HEREBY VERIFY THAT THE SITE SOIL WORK WAS COMPLETED IN SUBSTANTIAL CONFORMANCE WITH APPROVED PLANS/SPECIFICATIONS, ADDENDA #____________ AND CHANGE ORDERS #____________ FURTHER, I HAVE BEEN OR SOMEONE UNDER MY RESPONSIBLE CHARGE HAS BEEN, ON-SITE A SUFFICIENT NUMBER OF OCCASIONS DURING THE COURSE OF THE IDENTIFIED EARTHWORK TO VERIFY OVERALL COMPLIANCE WITH APPLICABLE CRITERIA, AS MORE SPECIFICALLY NOTED BELOW.

1. GRADING (ROUGH/FINE) WITHIN THE R/W ASSOCIATED WITH THE APPROVED PLANS____________; AND
2. BACK FILL PLACEMENT/COMPACTION OF UTILITY SYSTEMS FOR IMPROVEMENTS SUCH AS (SEWER), (WATER), (GAS), (ELECTRICAL), (CABLE T.V.), (DRAINAGE), ____________; AND
3. PAVEMENT RELATED WORK, SUCH AS (SUBGRADE), (BASE THICKNESS & COMPACTION), (PAVEMENT THICKNESS & COMPACTION).

FIRM NAME ____________ DATE ____________

BY: ____________ SOILS ENGINEER OF RECORD ____________ RCE No.

UTILITIES

UTILITY	PROVIDER	PHONE NO.	CONTACT
ELECTRIC	P.G. & E.	(805) 346-2250	LIZ MARTINEZ
TELEPHONE	VERIZON	(805) 928-7642	BRYAN DAVIS
CABLE T.V.	COMCAST OF SANTA MARIA	(805) 922-2323	ALAN UPCHURCH
GAS	THE GAS COMPANY	(805) 681-7979	SCOTT STEMLOCK
WATER & SEWER	CITY OF SANTA MARIA DEPT. OF PUBLIC WORKS	(805) 925-0951 EXT. 7270	UTILITIES DIVISION

12/28/10
0939.1PIP.DWG

REGISTERED PROFESSIONAL ENGINEER
LORI M. SPEER
LIC. NO. 68449
CIVIL
STATE OF CALIFORNIA

BETHEL engineering
2624 Airpark Dr., Santa Maria, California 93455 (805) 934-5767

LORI M. SPEER RCE 68449 DATE

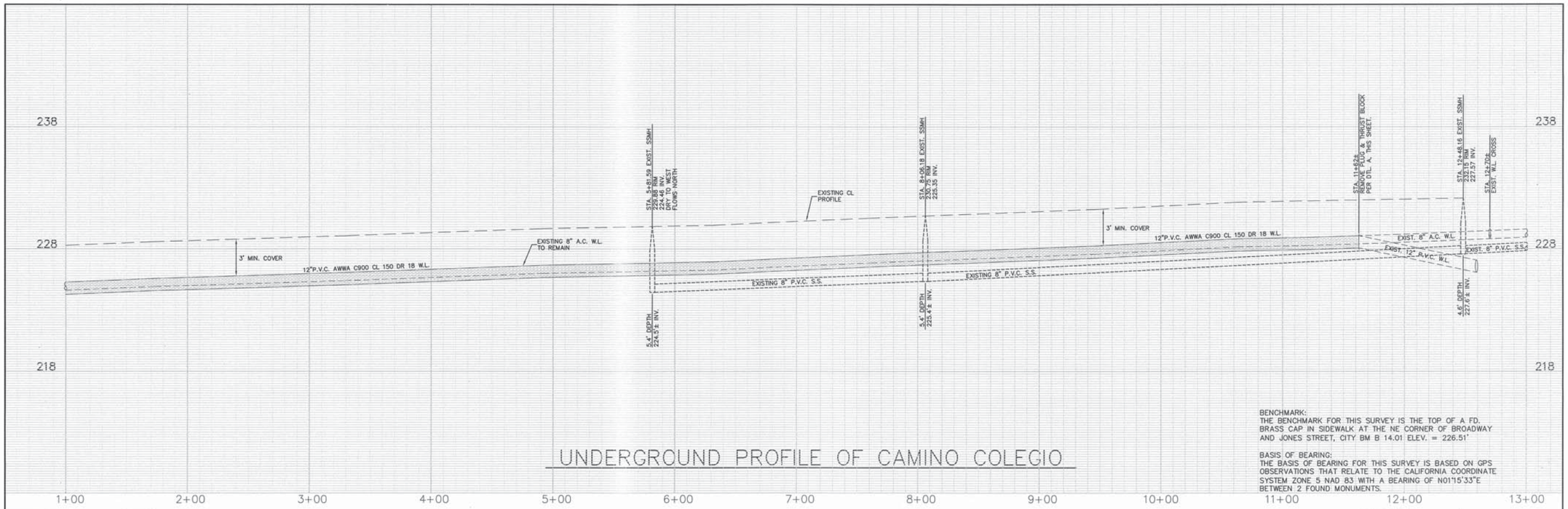
REVISIONS				
LETTER	DATE	BY	APPROVED	REVISION
D				
C				
B				
A				

CITY OF SANTA MARIA
DEPARTMENT OF PUBLIC WORKS

SCALE	DATE	APPROVED:
AS NOTED		DAVID J. WHITEHEAD R.C.E. 47974 EXPIRES: 12/31/11

SECONDARY WATERLINE EXTENSION
CIVIC CENTER TO MILLER SCHOOL
TITLE SHEET

DRAWN BY: L.M.S.
CHECKED BY:
DATE: DECEMBER 2010
SHEET 1 OF 4 SHEETS
REFERENCES
FILE NUMBER

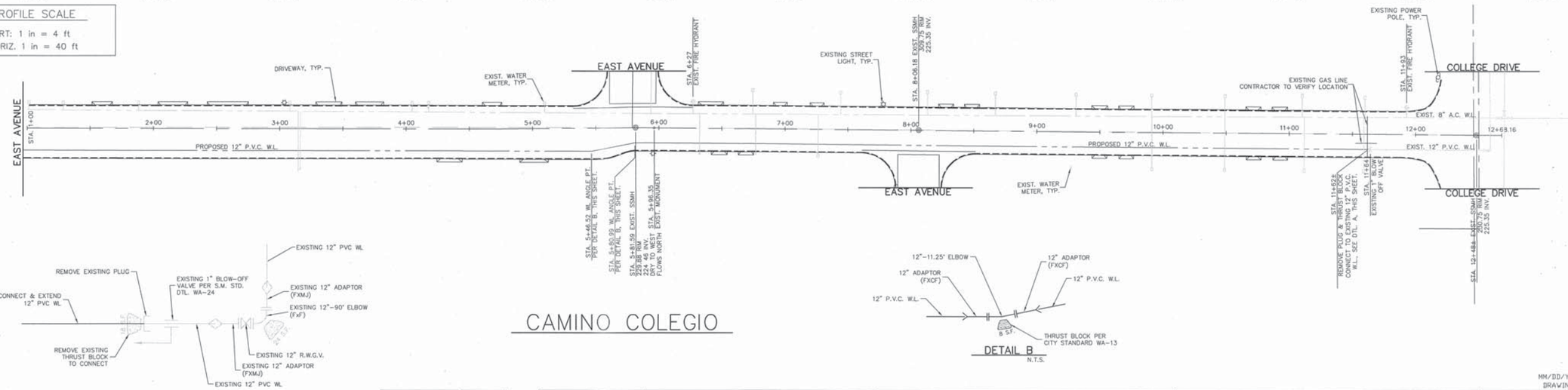


BENCHMARK:
THE BENCHMARK FOR THIS SURVEY IS THE TOP OF A FD. BRASS CAP IN SIDEWALK AT THE NE CORNER OF BROADWAY AND JONES STREET, CITY BM B 14.01 ELEV. = 226.51'

BASIS OF BEARING:
THE BASIS OF BEARING FOR THIS SURVEY IS BASED ON GPS OBSERVATIONS THAT RELATE TO THE CALIFORNIA COORDINATE SYSTEM ZONE 5 NAD 83 WITH A BEARING OF N01°15'33"E BETWEEN 2 FOUND MONUMENTS.

UNDERGROUND PROFILE OF CAMINO COLEGIO

PROFILE SCALE
VERT: 1 in = 4 ft
HORIZ. 1 in = 40 ft



DETAIL A
N.T.S.

CAMINO COLEGIO

DETAIL B
N.T.S.

NOTE: CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT 48 HOURS PRIOR TO START OF WORK BY CALLING 1-800-227-2600.

NOTE: CONTRACTOR SHALL EXPOSE AND VERIFY THE LOCATIONS AND ELEVATIONS OF ALL EXISTING IMPROVEMENTS PRIOR TO BEGINNING OF ALL WORK.

REGISTERED PROFESSIONAL ENGINEER — LORI M. SPEER — LIC. NO. 68449 — CIVIL — STATE OF CALIFORNIA

BETHEL engineering
2624 Airpark Dr., Santa Maria, California 93455 (805) 934-5767
LORI M. SPEER RCE 68449 DATE

REVISIONS

LETTER	DATE	BY	APPROVED	REVISION
D				
C				
B				
A				

CITY OF SANTA MARIA
DEPARTMENT OF PUBLIC WORKS

SCALE: AS NOTED | DATE | APPROVED: DAVID J. WHITEHEAD R.C.E. 47974 EXPIRES: 12/31/11

SECONDARY WATERLINE EXTENSION
CIVIC CENTER TO MILLER SCHOOL
CAMINO COLEGIO – UNDERGROUND

MM/DD/YY
DRAWING

DRAWN BY: LMS
CHECKED BY:
DATE: DECEMBER 2010
SHEET 2 OF 4 SHEETS
REFERENCES
FILE NUMBER

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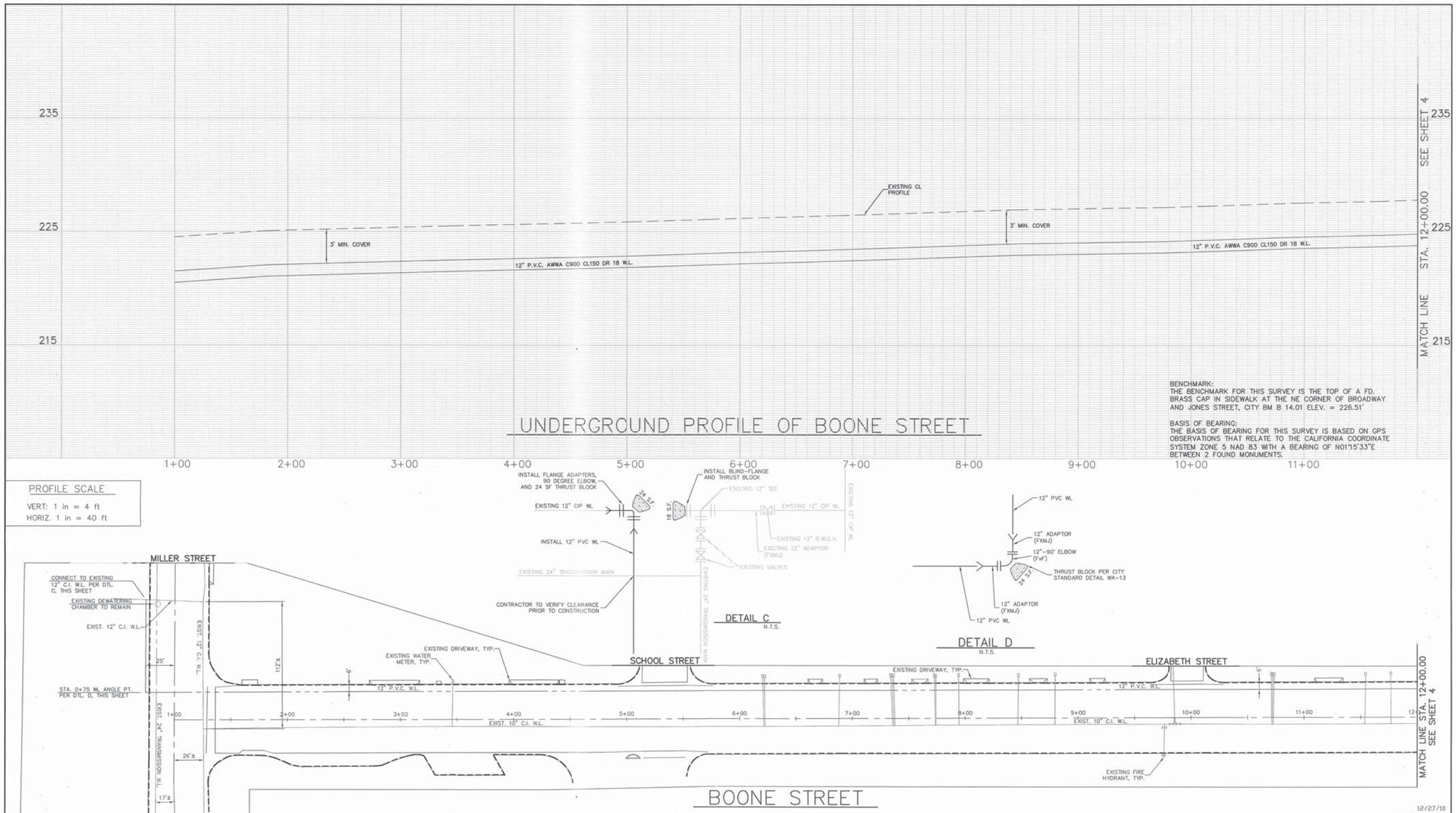

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REGISTERED PROFESSIONAL ENGINEER
LORI M. SPEER
LIC. NO. 68449
CIVIL
STATE OF CALIFORNIA

BETHEL engineering
2624 Airpark Dr., Santa Maria, California 93455 (805) 934-5767

LORI M. SPEER RCE 68449 DATE

REVISIONS

LETTER	DATE	BY	APPROVED	REVISION
D				
C				
B				
A				

CITY OF SANTA MARIA
DEPARTMENT OF PUBLIC WORKS

SCALE: AS NOTED
DATE:
APPROVED:
DAVID J. WHITEHEAD R.C.E. 47974 EXPIRES: 12/31/11

SECONDARY WATERLINE EXTENSION
CIVIC CENTER TO MILLER SCHOOL
BOONE STREET UNDERGROUND

12/27/10
0939.IPIP.DWG

DRAWN BY: LMS
CHECKED BY:
DATE: DECEMBER 2010
SHEET 3 OF 4 SHEETS
REFERENCES
FILE NUMBER

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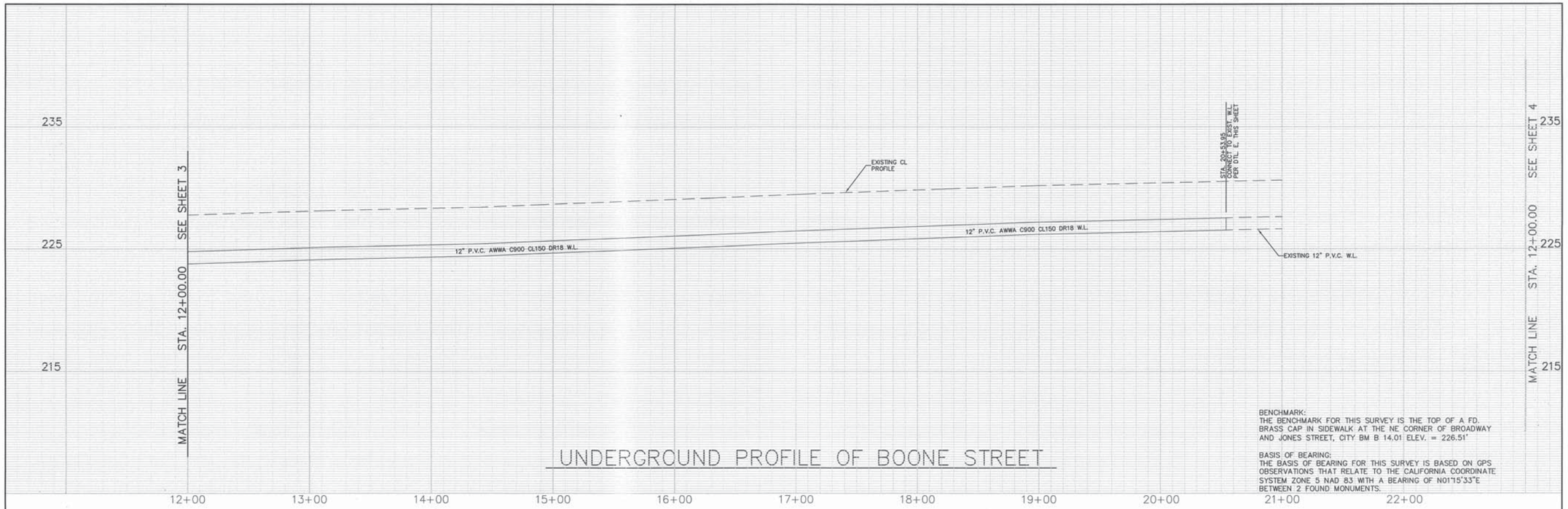
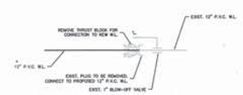


UNDERGROUND PROFILE OF BOONE STREET

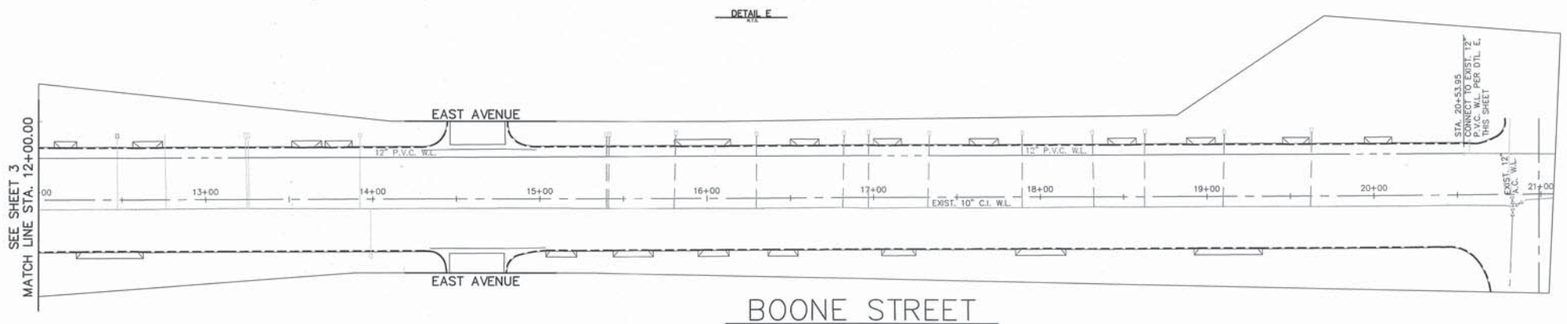
BENCHMARK:
THE BENCHMARK FOR THIS SURVEY IS THE TOP OF A FD. BRASS CAP IN SIDEWALK AT THE NE CORNER OF BROADWAY AND JONES STREET, CITY BM B 14.01 ELEV. = 226.51'

BASIS OF BEARING:
THE BASIS OF BEARING FOR THIS SURVEY IS BASED ON GPS OBSERVATIONS THAT RELATE TO THE CALIFORNIA COORDINATE SYSTEM ZONE 5 NAD 83 WITH A BEARING OF N01°15'33"E BETWEEN 2 FOUND MONUMENTS.

PROFILE SCALE
VERT: 1 in = 4 ft
HORIZ. 1 in = 40 ft



DETAIL E
N.T.S.



BOONE STREET

NOTE: CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT 48 HOURS PRIOR TO START OF WORK BY CALLING 1-800-227-2600.

NOTE: CONTRACTOR SHALL EXPOSE AND VERIFY THE LOCATIONS AND ELEVATIONS OF ALL EXISTING IMPROVEMENTS PRIOR TO BEGINNING OF ALL WORK.

REGISTERED PROFESSIONAL ENGINEER
LORI M. SPEER
LIC. NO. 68449
CIVIL
STATE OF CALIFORNIA

BETHEL engineering
2624 Airpark Dr., Santa Maria, California 93455 (805) 934-5767

LORI M. SPEER RCE 68449 DATE

REVISIONS				
LETTER	DATE	BY	APPROVED	REVISION
D				
C				
B				
A				

CITY OF SANTA MARIA
DEPARTMENT OF PUBLIC WORKS

SCALE AS NOTED | DATE | APPROVED: DAVID J. WHITEHEAD R.C.E. 47974 EXPIRES: 12/31/11

SECONDARY WATERLINE EXTENSION
CIVIC CENTER TO MILLER SCHOOL
BOONE STREET UNDERGROUND

12/27/10
09391PIP.DWG

DRAWN BY: LMS
CHECKED BY:
DATE: DECEMBER 2010
SHEET 4 OF 4 SHEETS
REFERENCES
FILE NUMBER

..PIP SHEET 4 1 PAGE 1.PTR - 12/28/2010 - 18:50

MEMORANDUM
Community Development Department

September 23, 2009

TO: Christopher Retro

FROM: PW Peggy Woods

SUBJECT: 12" Well Water Line – Secondary System Extension Project
Environmental Determination, SP-2009-027, E-2009-042

We have determined that the above mentioned project qualifies for a Class 3 (d) Categorical Exemption. Therefore, no further environmental review is required.

Santa Maria
All-America City

CITY OF SANTA MARIA
COMMUNITY DEVELOPMENT
DEPARTMENT

110 S. PINE STREET #101 (ON HERITAGE WALK) • SANTA MARIA, CALIFORNIA 93458-5082 • 805-925-0951 • TDD 925-4354

September 23, 2009

Russ Barker
Clerk of the Board
105 East Anapamu Street, Room 407
Santa Barbara, CA 93101

SUBJECT: **WELL WATER LINE – SECONDARY SYSTEM EXTENSION PROJECT SP-2009-027, E-2009-042**

Pursuant to the California Environmental Quality Act, we are herewith filing a Notice of Exemption for the above mentioned project.

Please return a stamped copy of the Notice of Exemption in the enclosed, self-addressed envelope for our file.

Peggy Woods

PEGGY WOODS, PLANNING DIVISION MANAGER
COMMUNITY DEVELOPMENT DEPARTMENT

Enclosures

PW/sc

cc: City Clerk
Public Works Department
File
Chron

S:\Community Development\Planning\Special Projects\2009\027 Secondary System Extension\Letter to Clerk.doc

Notice of Exemption

To: [ ] Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814

[X] Clerk of the Board
County of Santa Barbara
105 East Anapamu Street
Room 407
Santa Barbara, CA 93101

From: City of Santa Maria
Community Development Dept.
110 South Pine Street, #101
Santa Maria, CA 93458

12" Well Water Line – Secondary System Extension Project, SP-2009-027
Project Title

Santa Maria, Santa Barbara County
Project Location (City and County)

Installation of approximately two miles of pipeline to irrigate public facility lawns, basins, school-yards and landscaping (elementary schools, Simas, Alice Trefts and Adam Parks, Santa Barbara County Fairgrounds)
Project Description

City of Santa Maria
Public Agency Approving Project

City of Santa Maria
Entity Carrying Out Project

Exempt Status (Check One):

[ ] Ministerial (Sec. 15073
[ ] Declared Emergency (Sec. 15071(a))
[ ] Emergency Project (Sec. 15071(b) and (c))
[X] Categorical Exemption

Class: 3(d) **Sec.:** 15303

Reason why project is exempt:

Project involves the installation of approximately two miles of pipeline to irrigate public facility lawns, basins, school-yards and landscaping (elementary schools, Simas, Alice Trefts and Adam Parks, Santa Barbara County Fairgrounds); point of connection is an existing monitoring well, such as to use welled groundwater.

Contact Person	**Phone Number**
Christopher Petro	805-925-0951, x225

Date Received for Filing: _____

Signature: Peggy Woods
Planning Division Manager
Title: Community Development Department

FILE NUMBER: E- 2009-042

SP-2009-027

CITY OF SANTA MARIA
COMMUNITY DEVELOPMENT DEPARTMENT

ENVIRONMENTAL CLEARANCE APPLICATION

The purpose of this application is to provide sufficient information to the Environmental Officer of the City of Santa Maria as early in the process as possible so that the level of environmental review can be determined pursuant to the California Environmental Quality Act and so the project can be expedited through the planning process. Providing accurate and complete information will assure prompt processing of this application. Use additional sheets of paper if needed to respond fully. Incomplete or inaccurate answers will delay processing of the application. Please contact a planner at the phone number below if you have any questions about this application.

I. INFORMATION TO BE SUBMITTED WITH APPLICATION

Submit the required plans identified below. A Planner will check all applicable boxes. Please note that when submitting an Environmental Clearance Application along with a Conditional Use Permit (CUP) or Planned Development Permit (PD) application, only submit the materials identified on the CUP or PD application.

☐ Seven (7) copies of a Site Plan, folded to an 8½" by 11" size, prepared in accordance with the Basic or Comprehensive Site Plan Guidelines as directed by the Community Development Department.

☐ Four (4) copies of a preliminary drainage plan, folded to an 8½" x 11" size, prepared in accordance with the Preliminary Drainage Plan Guidelines.

II. CONTACT PERSON(S)

A. Agency or individual preparing this application.

Name CHRISTOPHER PETRO

Company CITY OF SANTA MARIA

Address 110 S. PINE STREET, SUITE 101

City SANTA MARIA State CA Zip Code 93458-5082

Phone Number 805 - 925 - 0951 EXT. 225
Area Code Number Extension

B. Property Owner

Name CITY OF SANTA MARIA

Company _____

Address _____

City _____ State _____ Zip Code _____

Phone Number _____
Area Code Number Extension

C. Applicant (if different from property owner)

Name CITY OF SANTA MARIA

Company _____

Address _____

City _____ State _____ Zip Code _____

Phone Number _____
Area Code Number Extension

110 South Pine Street, #101
Santa Maria, CA 93454
Phone: (805) 925-0951, Ext. 244
Fax: (805) 928-7565

FILING FEE: _____

III. GENERAL INFORMATION - COMPLETE FOR ALL PROJECTS

A. Application(s) submitted (i.e. land division, zone change, conditional use permit, etc.).
12" WELL WATERLINE – SECONDARY SYSTEM EXTENSION (FROM ABEL MALDONADO CENTER TO MILLER SCHOOL).

B. Provide an accurate and detailed description of the proposed project. This includes the number and type of residential units or the square footage and type of commercial or industrial activities to be carried out on the property. Use additional sheets if necessary.

THE SECONDARY SYSTEM EXTENSION (FROM ABEL MALDONADO CENTER TO MILLER SCHOOL) CONSISTS OF THE FOLLOWING INSTALLATION: TASK 1A - UNDER CURRENT DESIGN IS APPROXIMATELY 994 LF AND 2 VALVES, TASK 1B - FUTURE CONSTRUCTION FOR THE BASE PROJECT TO GET TO ALLAN HANCOCK COLLEGE IS 2,376 LF AND 4 VALVES, TASK 2 – 1,011 LF OF PIPE AND 1 VALVES, TASK 3 - NO PIPING, JUST WELL IMPROVEMENTS, TASK 4 – 2,376 LF OF PIPE AND 4 VALVES, TASK 5 – 2,510 LF OF PIPE AND 4 VALVES, TASK 6 – 1,422 LF OF PIPE AND 2 VALVES.

POINT OF CONNECTION IS AN EXISTING MONITORING WELL, SUCH AS TO USE WELLED GROUNDWATER TO IRRIGATE PUBLIC FACILITY LAWNS, BASINS, SCHOOLYARDS AND LANDSCAPING (ELEMENTARY SCHOOLS, SIMAS, ALICE TREFTS AND ADAM PARKS, SANTA BARBARA COUNTY FAIRGROUNDS).TRENCHING PER CITY STANDARD DRAWING: RD-33.

C. Project Summary

	SQUARE FOOTAGE of Property Covered by	PERCENTAGE of Property Covered by
Structures		
Parking, paved areas and walkways		
Landscaping		
Open Space/Wasteland/Undeveloped		
TOTALS (Should equal area of parcel)		

D. Project address or cross streets. SEE ATTACHED PLAN SHEETS

E. Assessor's Parcel Number(s). VARIOUS

F. Size of site (acres or square feet). N/A

G. General Plan Land Use Designation CITY STREETS

H. Zoning Classification. N/A

I. Are there existing structures on the project site? Yes ☐ No ☑

If yes, what are/were they used for? _____

When were they built? _____

J. If there are no existing structures, what is/was the property used for?

CITY STREETS

K. What is the estimated water demand of the project in acre-feet per year?

N/A

L. What is the estimated sewage generation of the project in gallons per day?

N/A

M. Describe the existing on-site vegetation.
N/A

N. Describe the surrounding land uses. N/A

North VARIES – RESIDENTIAL, COMMERCIAL, PUBLIC FACILITIES

South VARIES – RESIDENTIAL, COMMERCIAL, PUBLIC FACILITIES

East VARIES – RESIDENTIAL, COMMERCIAL, PUBLIC FACILITIES

West VARIES – RESIDENTIAL, COMMERCIAL, PUBLIC FACILITIES

O. Is the project located on filled land or on a slope of 10 percent or more? N/A
Yes ☐ No X Unknown ☐

P. Are there any cultural, historical or scenic aspects associated with the project site? Yes ☐ No ☐ Unknown ☐

If yes, describe them.
N/A

IV. INFORMATION FOR RESIDENTIAL PROJECTS ONLY

A. Total number of dwelling units. N/A

B. Size of dwelling units.

# of Units	# of Bedrooms	# of Bathrooms

C. Parking.

Number of spaces provided. _____ (_____ covered, _____ uncovered)

Supply computation on separate sheet

V. INFORMATION FOR LAND DIVISION PROJECTS ONLY - N/A

A. Type of land division (check all that apply).

Residential ☐ Commercial ☐ Industrial ☐ Lot Line Adjustment ☐

B. Number of lots proposed.

Residential _____ Commercial _____ Industrial _____

C. Size of lots (indicate range).

Residential _____ square feet to _____ square feet

Commercial _____ square feet to _____ square feet

Industrial _____ square feet to _____ square feet

VI. INFORMATION FOR NON-RESIDENTIAL PROJECTS ONLY - N/A

A. What is the square footage of the:

proposed structures? _____

existing structures? _____
(to remain)

B. What are the days and hours of operation? _____

C. Provide the number of total employees and employees per shift.

_____

D. What is the daily expected patronage or capacity of the use?

_____

E. Describe the basic operations/procedures of the proposed use.

_____

_____

F. Describe the amount and type of materials that will be discharged into the air as a result of the project.

_____

_____

G. Describe the amount and type of waste products (if any) that this project will generate (other than domestic sewage).

_____

_____

H. Describe the amount and type of noise, odor, smoke or vibration (if any) resulting from operation of the project.

_____

_____

I. Describe the materials to be used, manufactured, stored, or sold on the premises.

_____

_____

J. Will the project use or store potentially hazardous materials on-site?

Yes ☐ No ☐

If yes, attach a list of all chemicals or other toxic/hazardous materials and their amounts.

K. What is the estimated number of truck deliveries per day? _____
Expected delivery hours? _____

L. Parking calculations.

Number of spaces provided. _____

Number of standard spaces. _____

Number of compact spaces. _____

Number of handicap spaces. _____

Supply computation on separate sheet.

VII. GENERAL PLAN AMENDMENT/ZONE CHANGE PROJECTS ONLY -N/A

A. What is the proposed zoning classification?_____

B. What is the proposed land use designation?_____

C. What uses are anticipated for the property (if known)?

_____

VIII. RELATIONSHIP TO OTHER PROJECTS

A. Describe this project's relationship (if any) to a larger project or a series of projects (general plan amendments, annexations, land divisions, etc.). Include relevant phasing information.

THIS PROJECT HAS NO RELATIONSHIP TO A LARGER PROJECT OR SERIES OF PROJECTS.

B. Identify any potential future projects which are closely related to or made possible by the proposed project. If these projects, together with the proposed project, could incrementally result in one or more significant environmental impacts, list those impacts.

IX. CERTIFICATION

The City is authorized and directed to revise the project plans or project proposal by the imposition of conditions of approval to mitigate potential significant environmental impacts to a level of insignificance. The applicant also agrees to all proposed revisions to enable the release of any proposed mitigated negative declaration for public review pursuant to Public Resources Code Section 21080(c)(2) and CEQA Guidelines 15070(b)(1). The applicant reserves the right to comment on the substance of the proposed mitigation measures at the public meeting whereby the project is presented to the decision making body for consideration.

I hereby certify that the forgoing information is true and correct to the best of my knowledge.

Signature of Applicant — Date: 9-23-09

Signature of person who prepared this application — Date: 9/23/2009

OFFICE USE ONLY

X. ENVIRONMENTAL DETERMINATION (ENVIRONMENTAL OFFICER)

A. Level of environmental review.

- ☐ Not a Project (15378b)
- ☐ Emergency Project (15269,15359)
- ☐ Ministerial Project (15602(i),15369(l),15268)
- ☒ Categorical Exemption (Go to Section XI) Class 3(d)
- ☐ Project adequately reviewed in previous environmental document list _____
- ☐ Initial Study
  - Short Form ☐
  - Long Form ☐
- ☐ Environmental Impact Report
  - Type _____

B. Approvals required.

- ☐ Conditional Use Permit — File Number _____
  - Zoning Administrator ☐
  - Planning Commission ☐
- ☐ Planned Development Permit — File Number _____
- ☐ Zone Change — File Number _____
- ☐ General Plan Amendment — File Number _____
- ☐ Tentative Map — File Number _____
- ☐ Lot Line Adjustment — File Number _____
- ☐ Other _____ — File Number _____

Peggy Woods — 9-23-09

Signature of person conducting Lead Agency verification — Date

OFFICE USE ONLY

XI. CATEGORICAL EXEMPTION DETERMINATION

This section must be completed if the environmental determination in Section X is a categorical exemption. Attach additional sheets if necessary.

A. For Classes 3, 4, 5, 6, and 11, is the exemption inapplicable because the project may impact an environmental resource or hazardous or critical concern which is designated, precisely mapped and legally adopted by a governmental agency?
Yes ☐ No ☐

Discussion
No known environmental resource or hazardous or critical concern designated, precisely mapped or legally adopted

B. Is the exemption inapplicable because the cumulative impact of successive projects of the same type in the same place, over time is significant?
Yes ☐ No ☑

Discussion

No known cumulative impacts

C. Is the exemption inapplicable because there is a reasonable possibility that the activity will have a significant effect on the environment due to unusual circumstances? Yes ☐ No ☑

Discussion

No known unusual circumstances

I hereby certify that I have reviewed the information submitted by the applicant and it is true and correct to the best of my knowledge which is based on project application, plans and specification

Peggy Worth
Signature of staff reviewer

9-23-09
Date

OFFICE USE ONLY

XII. CONGESTION MANAGEMENT PROGRAM (CMP) DETERMINATION

Per State Law, a CMP traffic study is required if a project will generate 500 or more average daily trips or 50 or more P.M. peak hour trips. Trip rates are based on the latest edition of the Institute of Transportation Engineers Trip Generation Manual.

A. Trip generation calculations

1. Residential

a. Number of units _____ Type _____

Trip rate: ADT = _____/unit P.M. peak = _____/unit
ITE Land Use Code _____

ADT = _____ trips P.M. peak trips = _____

b. Number of units _____ Type _____

Trip rate: ADT = _____/unit P.M. peak = _____/unit
ITE Land Use Code _____

ADT = _____ trips P.M. peak trips = _____

2. Non-residential

a. Square feet/acres _____ Type _____

Trip rate: ADT = _____/_____ P.M. peak = _____/_____
ITE Land Use Code _____

ADT = _____ trips P.M. peak trips = _____

b. Square feet/acres _____ Type _____

Trip rate: ADT = _____/_____ P.M. peak = _____/_____
ITE Land Use Code _____

ADT = _____ trips P.M. peak trips = _____

3. Existing on-site uses

a. Square feet/acres _____ Type _____

Trip rate: ADT = _____/_____ P.M. peak = _____/_____
ITE Land Use Code _____

ADT = _____ trips P.M. peak trips = _____

b. Number of units _____ Type_____

Trip rate:ADT = _____/unit P.M. peak = _____/unit
ITE Land Use Code _____

ADT = _____ trips P.M. peak trips = _____

B. CMP determination

Does proposed number of trips minus existing trips exceed 500 ADT or 50 P.M. peak hour trips?
Yes _____ No _____

If yes, a CMP traffic study is required. If no, no further CMP review is required.

Final Report

2005 Urban Water Management Plan - City of Santa Maria

Prepared for

City of Santa Maria

2065 East Main Street
Santa Maria, CA 93454

April 2007

CH2MHILL
325 E. Hillcrest Drive
Suite 125
Thousand Oaks, CA 91360

Final Report

2005 Urban Water Management Plan – City of Santa Maria

Submitted to

City of Santa Maria

April 2007

CH2MHILL

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Table 9-2
Current Federal Drinking Water Standards

Parameter	mg/L (except as noted)
Giardia lamblia	Treatment Tech (99.9% removal/inactivation)
Heterotrophic Bacteria	Treatment Tech (500 cfu/mL at end of distribution system or measurable chlorine residual)
Legionella	Treatment Tech
Total Coliforms	5% (presence/absence)
Turbidity	Performance Std (0.3 Nephelometric turbidity units (NTU), 95%)
Viruses	Treatment Tech (99.99% removal/inactivation)
Radionuclides	**MCL**
Beta-particle and photon emitters	4 mrem
Alpha emitters	15 pCi/L
Radium 226 + 228	5 pCi/L
Uranium	0.030

Notes
1. Arsenic has been proposed at 10 µg/L in the new rule that is currently being reviewed.

Table 9-3
Current State Secondary Drinking Water Regulations

Parameter	mg/L (except as noted)		
Contaminants	**SMCL or SMCL Ranges**		
Aluminum	0.2		
Color	15 Color Units		
Copper	1.0		
Corrosivity	Noncorrosive		
Foaming Agents (MBAs)	0.5		
Iron	0.3		
Manganese	0.05		
Methyl tertiary butyl ether (MTBE)	0.005		
Odor	3 Threshold Odor Number		
Silver	0.1		
Thiobencarb (Bolero)	0.001		
Turbidity	5 units		
Zinc	5		
	Recommended	**Upper**	**Short Term**
Total Dissolved Solids	500	1,000	1,500
Specific Conductance, micromhos	900	1,600	2,200
Chloride	250	500	600
Sulfate	250	500	600

Water Quality Improvement from Untreated System

Long Term SWP Yield	0.6	
Worst Case Dry Year	0.07	
Multi Year Drought	0.34	
Multi Year Wet	0.71	
City's allocation	17,820	AF
State Water TDS	362	mg/L
Well Water TDS	650	mg/L
Demand Reduction	107	AFY

Year	Expected Demand	Nipomo Demand	Total Demand
2011	14,300		14,300
2012	14,443	2,000	16,443
2013	14,587	2,000	16,587
2014	14,733	2,000	16,733
2015	14,881	2,000	16,881

Assume Expected Demand to increase by 1% each year.

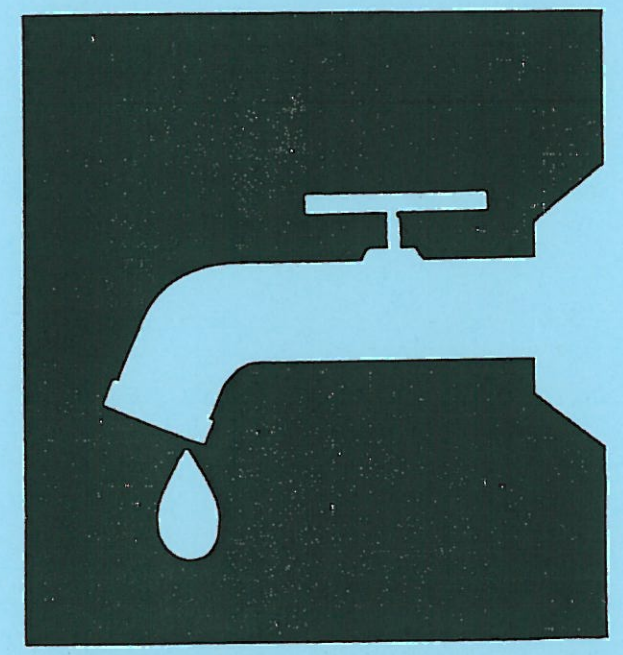
Multi-year Wet Year	Demand	CSM Available	Well Water Needed	**Expected TDS Before**	Diverted to Sec Sys	**Expected TDS after**
2011	14,300	12,652	1,648	395		
2012	16,443	12,652	3,791	428		
2013	16,587	12,652	3,935	**430**	107	**429**
2014	16,733	12,652	4,081	**432**	107	**431**
2015	16,881	12,652	4,228	**434**	107	**433**

Average Long Term Yield Year	Demand	CSM Available	Difference	**Expected TDS Before**	Diverted to Sec Sys	**Expected TDS after**
2011	14,300	10,692	3,608	435		
2012	16,443	10,692	5,751	463		
2013	16,587	10,692	5,895	**464**	107	**463**
2014	16,733	10,692	6,041	**466**	107	**465**
2015	16,881	10,692	6,189	**468**	107	**466**

Multi-year Dry Year	Demand	CSM Available	Difference	**Expected TDS Before**	Diverted to Sec Sys	**Expected TDS after**
2011	14,300	6,059	8,241	528		
2012	16,443	6,059	10,384	544		
2013	16,587	6,059	10,529	**545**	107	**544**
2014	16,733	6,059	10,675	**546**	107	**545**
2015	16,881	6,059	10,822	**547**	107	**546**

Report to the

CITY COUNCIL
OF THE
CITY OF SANTA MARIA



LONG-TERM WATER MANAGEMENT PLAN

Water Advisory Committee

FEBRUARY 1991

W-104

I. EXECUTIVE SUMMARY

A. Introduction

On February 6, 1990, the Santa Maria City Council established a Water Management Advisory Committee. Each Council member appointed a person from the community to serve on the advisory committee. Mayor George Hobbs appointed Toru Miyoshi, who was then serving as Fifth District County Supervisor. Council Member Curtis Tunnell appointed Herb Gerfen, a civil engineer and co-chair of the Joint Water Committee of the Chamber of Commerce and Economic Development Association. Council Member Tom Urbanske appointed Charles Varni, sociology instructor at Allan Hancock College and member of the Santa Maria Earth Day Coalition. Council Member Bob Orach appointed Richard Quandt, President of the Grower-Shipper Vegetable Association and current Fifth District representative to the County Planning Commission. Council Member Dan Firth appointed Maurice Twitchell, private attorney and Secretary of the Santa Maria Valley Water Conservation District.

The charge of the committee was to prepare a long-term water management plan as well as to advise the City Council on matters concerning water resource management.

The City Council asked the committee to report on the following topics:

1. City contribution toward replenishing or "healing" the Santa Maria Valley groundwater basin;

2. Prevention of future degradation of the groundwater in the Santa Maria Valley, with particular emphasis on water softener salt disposal;

3. Management and use of supplemental water from the State Water Project, if obtained;

4. Review of present water conservation efforts, and recommendations on the development of new programs to improve water conservation, including landscape guidelines and water pricing structures;

5. Recommendations on establishing a cooperative effort with other water users in the Santa Maria Valley to develop a plan for the reduction or elimination of groundwater overdraft in the Santa Maria Valley;

6. Reconciliation of total water resources with the densities found in the Land Use Element of the General Plan.

The purpose of a Long-Term Water Management Plan is to help guide the Council in its decision-making process regarding water issues. This report will provide information and recommendations which the Council can refer to when making water policy decisions.

SEA-WATER INTRUSION MONITORING WELLS

Wells are monitored on a yearly basis by the United States Geological Survey, Water Resources Division, California District which is responsible for gathering the data and publishing the water quality data. The Santa Barbara County Water Agency receives copies of the reports and tracks this data along with other well-monitoring duties countywide. The contact person for information on the sea-water intrusion monitoring program is Chuck Lamb at U.S.G.S. in Sacramento. The phone number and address are as follows: (916) 978-5445 Room W-2239
Federal Building,
2800 Cottage Way
Sacramento, CA. 95825

Two monitoring wells are located west of the city of Guadalupe, Ca. and are on-shore. Each well is fitted with four piezometers at varying depths to monitor the different aquifers. The well descriptions are as follows:

1) 010N036W02Q01S
02Q03S
02Q04S
02Q07S

2) 011N036W35J02S
35J03S
35J04S
35J05S

1,000 ppm. The American Water Works Association recommended quality goal for total dissolved solids is less than 200 ppm.

While the overdraft of the basin is serious and a threat to agriculture and the basin economy, a more serious threat to urban users is the local pumping depression of the Orcutt sub-basin, which supplies water to the City of Santa Maria and the Orcutt area. The overdraft in the Orcutt sub-basin is at least four times as severe as that in the basin as a whole. Urban and agricultural pumpage of water from the sub-unit is about 28,240 acre feet per year while the safe yield is 9,670 acre feet, resulting in an annual gross overdraft of about 18,570 acre feet. This overdraft is more than 200 percent of the safe yield of the sub-basin compared to 40 percent for the basin as a whole.

This overdraft has resulted in a pumping depression in the Orcutt sub-basin of 60 to 80 feet. This depression draws poor quality water into the area of pumpage from adjacent areas, degrading the urban water. The overdraft also increases the threat of subsidence, which would permanently destroy or reduce the capacity of the sub-basin to store water. This source of urban water is thus threatened to a much greater extent than the basin as a whole.

Continued overdrafting will cause both the Orcutt sub-basin and the basin as a whole to become unreliable, both as to the quality of the water and as a reliable source of water. When this occurs, the City will either have to demineralize groundwater or obtain other high-quality water to solve the quality problem. As the available storage declines, the City will have to either obtain supplemental water or take water from agricultural users by condemnation or other means.

Most of the local sources of supplemental water, such as demineralizaton of oilfield brine or sea water, watershed management, a dam on the Sisquoc River and spreading grounds in the Santa Maria River Bed, are more costly than the State Water Project. All of the local sources, other than demineralizing sea water or oilfield brine, would recharge the groundwater basin but do not involve substantial increases in water quality. These local sources of supplemental water would thus principally benefit agriculture rather than urban users.

* The City is also under pressure from the Regional Water Quality Control Board to reduce the amount of minerals discharged into the groundwater basin at the City wastewater treatment plant on Black Road. This can be accomplished by either demineralizing the wastewater or by improving the City's water source. Either alternative is costly.

The City must solve both the long-term supply and quality problems. Imported State Water Project water is presently the lowest cost solution.

It is desirable that the City should plan to keep the quality of its water at or below the federal goal of 500 parts per million total dissolved solids

total dissolved solids. This would necessitate importing the City's current State Water Project allotment of 11,300 acre feet per year for current needs and relying upon groundwater or other sources of supplemental water for future growth. The blending of poor quality groundwater with high quality State Water will result in reduced water quality of 500 ppm TDS/300 ppm TH when the City's population increases to 92,000. At current consumption and growth rates, this will probably occur by the year 2000.

Groundwater will have to be demineralized if water quality rises above this limit of 500 TDS. Thus, the City should acquire additional State Water, if available, sufficient to supply its needs at the time State Water is delivered and, if feasible, beyond that time.

The cost of State Water for future growth beyond 1991 should not be borne by current city users. Current users will probably experience a doubling of their water costs as the price of cleaning up the current water supply by using State Water. Such costs will probably quadruple if demineralization, rather than State Water, is used. Current users should not have to pay the substantial additional State Water costs to supply future needs. These costs should be paid by future users.

Water conservation is required by state law and thus should be an important element of the City's long-term water management plan. The City can achieve a 10 percent reduction in water demand through the continued implementation of recently adopted voluntary water conservation measures. An additional 10 percent can be achieved through other measures, such as installation of water saving fixtures, irrigation hardware, review of rate structures, and retrofitting of existing homes. Additionally, educational programs can create a "conservation ethic" in water users. A successful water conservation program may reduce revenues from water sales which may result in a need to increase rates in order to cover costs.

C. Committee Recommendations

Several of the topics that the City Council asked the committee to consider involve the procurement and use of supplemental water. We, therefore, first offer our recommendations on the State Water Project and follow with our general recommendations on the other topics.

1. State Water Project. Our primary recommendation is that the City should obtain as much water from the State Water Project as is economically feasible to help solve both the water quality and quantity problems, as well as to help reduce or eliminate the overdraft. Over the long term, the City should plan to rely upon State Water as its primary source and rely upon groundwater as a supplementary source. This will improve the long-term reliability of the supply and improve the quality of water delivered to city users. State Water is the most economical solution to the City's present water quality problem that will otherwise require

demineralization of groundwater within a few years. It is also the most effective way to solve or reduce the basin overdraft and the severe pumping depression in the Orcutt sub-unit. It is the best way to prevent significant increases in the cost of water to city users in the long run. Water needed for future growth under this overall plan should be paid for by future users. We therefore recommend:

A. The City should obtain and utilize its present State Water allotment of 11,300 acre feet as its primary source of supply in place of the groundwater basin.

B. The City should also seek to obtain additional State Water allotments, if available, in an amount needed to supply the City's entire needs in 1997 or 1998 when we estimate State Water will be delivered. This additional amount should be about 5,000 acre feet per year.

C. If additional State Water is available beyond that which would be needed in 1997-1998, additional allotments should be obtained to provide for future growth. We would estimate that growth for an additional five years would be all that could be financed.

D. The cost of State Water needed for future growth beyond 1991 should be paid for by future users through development fees or other appropriate means.

2. **Water Quality and Degradation.** The quality of groundwater will remain important to the City and all other users in the Santa Maria Valley even if the City utilizes high quality State Water as its primary source of supply. Groundwater will be needed in times of shortage and will be blended with State Water to serve future growth. The quality of the groundwater also affects agriculture, which provides a substantial part of the area economy. It is therefore in the City's interest to assist in preventing further degradation of the groundwater, particularly in the Orcutt sub-basin.

We therefore generally recommend that the City should continue to work closely with and support the governmental agencies having responsibility for preventing groundwater degradation, such as the Regional Water Quality Control Board, Santa Barbara County Health Department, and the Santa Barbara County Water Agency. In this regard, we specifically recommend:

A. Groundwater should be used to supplement State Water during times of need and if needed for future growth. The blend of State and groundwater should not exceed 500 ppm/TDS and 300 ppm total hardness. Even with the City's full allotment of State Water, at present rates of water consumption and population growth, water quality will exceed federal standards by the year 2000. If future growth should cause the blended State and groundwater to exceed these standards, the cost of demineralizing groundwater or obtaining alternative water should be paid by future users.

B. The City should urge the County of Santa Barbara and California Cities Water Company to cooperate in obtaining an increased entitlement to State Water sufficient to meet customer demand at the expected time of delivery. Such high quality water could alleviate the waste water discharge problems of the Laguna Sanitation District as well as significantly reduce overdraft in the Orcutt sub-unit. We believe this is also the most cost effective option when compared to other methods which focus on waste water treatment.

@ 200 TDS

C. The City should continue to pursue the development of an injection well or other suitable alternative for disposal of water softener brines. Restricting the use of new or replacement water softeners to the canister type should be required (for new developments or replacements of existing softeners). Existing home regeneration water softeners more than seven years old should be eliminated or converted to canister type units upon the sale of the property. Rebates or other financial incentives to encourage such a transition could also be explored.

D. The City should require all major brine dischargers to the City sewer system to submit plans to catch and transport brine effluent to an alternate approved disposal facility.

E. The City should continue to fund and vigorously support a household hazardous waste collection program.

do we recieve these reports?

F. The City should urge the regulatory agencies to give close attention to the U.S.G.S. salt water intrusion monitoring wells, the landfill monitoring wells, sewer discharge requirements and chemical sources of groundwater contamination.

G. The Water Division of the Public Works Department of the City of Santa Maria should include in its annual report on water quality the following information: a summary of the test results for the City landfill monitoring wells; State Department of Health-required water quality monitoring test results--similar to that required for dissemination to water users; continued use of graphs to show total dissolved solids and total hardness levels; and other water quality information the superintendent feels is important. The report should highlight any anomalies or test results which indicate concern or possible contamination.

3. **Overdraft Reduction.** The health of the Santa Maria groundwater basin is important to all urban and agricultural water users in the valley. Agriculture is the backbone of the area economy. It is to everyone's benefit that the overdraft be eliminated so that groundwater can become an effective long-term resource supporting the area economy and environment.

The City's proportionate share of the overdraft is small. It is difficult to justify the City's subsidizing the use of groundwater by agriculture and other urban users by reducing the overdraft beyond the City's proportionate share if substantial cost to the City will result. Conversely, given the seriousness of the overdraft, it is desirable, if not necessary, that the

City contribute to reducing the overdraft if little or no cost is involved.

It is fortunate that the City can do more than eliminate its proportionate share of the overdraft by utilizing State Water as its primary source of supply. We believe that utilizing State Water will involve no long-term cost to the City; it will involve cost savings since the cost of State Water is less than demineralization of groundwater.

Even if the City contributes substantially more than its proportionate share of the overdraft reduction by utilizing State Water, it is still in the City's interest to assist further in reducing the remaining overdraft. We therefore, in addition to our conservation recommendations set forth on the following page, further recommend:

A. The City should support reduction of overdraft in the basin and Orcutt sub-unit to the point where average pumpage equals the safe yield.

B. As a long-term solution to overdraft problems in the Orcutt sub-unit, as mentioned earlier, the City should seek to obtain as much water from the State Water Project as is economically feasible in order to reduce its reliance on the basin. We recommend that, in addition to the City's present allotment of 11,300 acre feet (which would be inadequate to supply the City's needs in 1997 or 1998 when we estimate State Water would be available), the City should obtain additional allotments to provide for future growth.

C. The City should urge the County of Santa Barbara, Laguna Sanitation District and Cal Cities Water Company to consider additional State Water as the best long-term solution to the quantity and sewer treatment problems of the Orcutt sub-area. We believe that, if State Water were used as the primary source of supply to the Orcutt area, the overall combined cost of sewer treatment and water supplied to the users would be lower in the long run (as is the case with the City).

D. The City should also continue to support additional measures that increase the yield of the groundwater basin, such as participating in the joint cloud seeding program administered by the Santa Barbara County Water Agency and Flood Control District and encouraging the continuation and expansion of the range management programs and practices of the U. S. Forest Service and the Range Improvement Association.

E. We urge and support the coordination of effort and measures by all basin water users and regulators toward reducing the basin overdraft and maintaining basin water quality. This primarily involves the exchange of knowledge and information about and coordination of the programs, practices and future plans of the various governmental agencies, water purveyors, technical advisors and users. In this regard, we therefore specifically recommend that:

1. The City should ~~encourage the Santa Barbara County Water Agency to create or~~ participate in the creation of a water advisory committee for the Santa Maria Valley groundwater basin to include representatives from the various users and regulators of the water source, both private and public.

2. The City, in cooperation with other interested agencies, should undertake a comprehensive review of the current and long-term water quantity and quality of the Santa Maria groundwater basin, with particular attention to the Orcutt subunit.

3. The City, in cooperation with other interested agencies, should create a system of groundwater basin monitoring based on semi-annual well level and water quality measurements. Such a system should include computer modeling of basin water levels and could possibly be funded through a grant from the Department of Water Resources.

4. Conservation. Urban water conservation is mandated by state law. The development and implementation of conservation plans is left to the local purveyors, such as the City.

In general, conservation programs involving the modification of the behavior and use habits of water users tend to be effective in times of crisis (such as drought) and become less effective as the crisis passes. Conservation programs that involve structural changes are more effective in the long term.

The primary effect of conservation in the City would be to help reduce the overdraft. If the City utilizes State Water as its primary source of supply, the conservation benefit to the City, compared to the other users of the Orcutt sub-basin, would be small. This should be kept in mind in considering conservation programs that involve substantial cost or inconvenience to water users.

Conservation programs that eliminate waste and inefficiency are obviously desirable. In addition to reducing the overdraft, such conservation measures save money and resources that can be put to better use. We believe that the following recommendations will help reduce waste and inefficiency at little or no cost or inconvenience:

A. The current water conservation program, including the public information and education program, should be maintained.

B. Automatic landscape irrigation systems, incorporating time clocks and/or soil moisture sensors, should be required for commercial development and common areas of new residential development and encouraged for single family residential development.

C. A residential water audit program should be developed by the City Water Division.

D. The City should contract with a consulting firm specializing in system water audits and leak detection surveys to perform a leak detection survey of the City water main transmission lines.

E. The City should continue to encourage and require the placement of retention/recharge basins. Where appropriate, mitigations could be provided for unique systems or ways to enhance the recharging process. Especially valuable would be areas of high permeability to the east which will provide the most benefit to the Orcutt sub-unit.

F. An ordinance should be developed and implemented which amends the building code to require ultra-low flow fixtures in all new construction. This change is mandated by state law, effective January 1992.

Additional conservation measures involve more cost and the interference with the lifestyle of consumers. Yet, in certain situations these are justified in order to preserve water quality and/or quantity. We feel this may be the current situation in the Orcutt sub-basin; and, in the intervening years before supplemental water is delivered, water conservation by municipal, industrial, and agricultural users offers the only reasonable alternative. Believing that the City should take a leadership role in this regard, while at the same time encouraging other sub-basin users to reduce pumpage, the committee offers the following additional water conservation recommendations which involve structural changes that should be considered if cost effective and justified under the circumstances:

G. The City should pursue a pricing policy which will result in the efficient use of water, such as increasing block, sliding scale, or other scarcity pricing structures. This will probably require an overall increase in rates as conservation results in reduced demand and income, with a resulting need for water rate increases.

H. An ordinance should be developed which requires a water use offset program for new development projects. A condition of approval for new development projects would be to make retrofit changes in existing residences which will offset the new water demands at a ratio of one-to-one. Such changes could include, for example, the installation of ultra-low flow toilets (1.6 gallons per flush) and showerheads using 2.75 gallons per minute, or other effective water reducing measures such as contributions toward replacement of inefficient irrigation systems.

I. The City should examine the feasibility of a rebate program to replace inefficient fixtures.

J. The City should consider requiring efficiency standards for reverse osmosis units that reduce or eliminate water waste.

K. The City should consider utilizing water from its downtown wells at Simas Park rather than the Orcutt sub-basin to provide irrigation for nearby City landscaping, such as at Simas Park, Eastside and Westside Mall, City Hall and Library complex, County complex, Broadway and Main Street medians, and Street Tree water trucks. It should also require contractors to obtain water from that source for construction within a reasonable area of access and perhaps offer a price inducement to offset transportation costs.

L. The City should consider drilling wells for irrigation water at the City Dump, Preisker Park, and any other feasible sites rather than drawing water from the Orcutt sub-basin.

M. The City should investigate equipping each of its water wells with a storage and reinjection pump system to recover the startup water which is currently wasted.

The effect of our recommendations is that the City, over the long term, should plan to rely upon State Water as its primary source of water and rely upon groundwater as a supplementary source. This will improve the long-term reliability of the supply and improve the quality of water delivered to state users. Under this overall plan, water needed for future growth should be paid for by future users.

The recommendations in this section are designed to help implement this overall management plan and increase its effectiveness and benefit. They can be considered individually or collectively depending on the costs and benefits.

Santa Maria Water Treatment Technology Evaluation

PREPARED FOR: Teresa Reyburn, City of Santa Maria

PREPARED BY: CH2M HILL

DATE: April 22, 2008

Background

Water supplies for the City of Santa Maria water system consist of six groundwater wells and imported State Water Project (SWP) water purchased from the Central Coast Water Authority (CCWA). Currently, the City's water quality goals (shown in Table 1) for total dissolved solids (TDS) and hardness are achieved by limiting the use of groundwater and blending of SWP water at the City's Blending and Disinfection Facility (BDF).

TABLE 1
City of Santa Maria TDS and Hardness Removal Goals and Not-to-Exceed Values*
Santa Maria Water Treatment Technology Evaluation

Parameter	Goal	Not to Exceed
TDS	300 mg/L	500 mg/L
Hardness	200 mg/L	300 mg/L

*The City has determined that these water quality criteria are needed to allow compliance with effluent requirements of the City's wastewater treatment plant.

TDS and hardness removal are the primary objectives for selecting an acceptable treatment technology. The not-to-exceed value for TDS corresponds with the secondary maximum contaminant level (MCL) set by the U.S. Environmental Protection Agency (EPA). Hardness does not have an MCL; however, the goal of 200 mg/L will produce moderately hard finished water. The review provided here is based on reaching the goals for both of these parameters. As can be seen in the flow diagrams contained in Appendixes 1A and 1B, the water quality goals are met by blending SWP water with bypassed well water and treated well water in the appropriate quantities. Appendix 2 contains tabulated accounts of current and future use of well and SWP water.

Long-term City plans include the cost effective utilization of local groundwater, variable supplies of State water, and planning for water needs associated with an expanding population. Working toward this goal, the City desires to make an initial determination of the treatment system requirements for inclusion in capital planning.

Selection of Appropriate Technologies

The treatment technologies evaluated included ion exchange, reverse osmosis, nanofiltration, and electrodialysis reversal. Each of these treatment methods generates a waste, the disposal of which must be considered in the overall project feasibility. A number

of options for disposal exist. Initially this report considers sewer flow to existing wastewater treatment facilities (not applicable for ion exchange) and deep well injection to a location at least 2 miles away from the treatment facility.

Table 2 provides an overview of each of the treatment technologies considered in this evaluation. It includes positive and negative benefits for each technology considered and a conclusion regarding the suitability of each technology for removing hardness and total dissolved solids. Ion exchange and nanofiltration (NF) are not suitable technologies for removing TDS and will not be considered further in this memorandum. Electrodialysis reversal (EDR) and reverse osmosis (RO) will be considered in greater detail in the next section.

Development of Water Treatment Alternatives

Initial screening described in the previous section identified EDR and RO as appropriate technologies for further consideration. The efficiency and cost of these two technologies depends in large part on the composition of the water to be treated. The results of water testing provided by the City for their various wells are provided in Table 3. The characteristics of the water in these tests were considered relative to typical vendor recommendations for EDR and RO treatment, and both were initially determined to be acceptable candidates. RO treatment is somewhat more susceptible to membrane fouling due to source water characteristics, so it is often used in conjunction with pretreatment, such as microfiltration. Initially, this study considered both RO with and without microfiltration to represent the range of potential costs.

Two vendors for RO and one for EDR were contacted to provide project specific information based on the known water quality parameters and current and future water demands. The vendors provided estimates for required footprint, capital costs, typical recovery rates (and resulting brine stream for disposal), chemical usage, power consumption, long-term reserves, and the staffing levels sufficient to treat the maximum day demand. These are summarized in Table 4. The order-of-magnitude costs shown in Table 3 are given for comparison purposes only and are valid within the range of +50 percent/-30 percent of the probable capital costs for these items. For a more complete cost estimate, refer to the Class 5 cost estimate in Appendix 3.

At the current demand, the new treatment facility would operate continuously and produce the required quantities of potable water for blending with SWP and bypassed well water. The flow diagrams in Appendices 1A and 1B provide an aid to visualizing these quantities.

For each technology considered, removal of TDS controls the quality of finished water for hardness at the lower goal levels; at this level, when the TDS goal is met, hardness levels will be below the hardness goal. Similarly, removal of hardness controls the quality of the finished water for TDS at the not-to-exceed level. When the hardness not-to-exceed level is met, TDS levels will be below the TDS not-to-exceed level. In other words, when the lower concentration water quality goal level is achieved, TDS controls the process, and at the higher concentration not-to-exceed water quality level, hardness controls the process.

TABLE 2
Technology Overview
Santa Maria Water Treatment Technology Evaluation

Technology	Technology Description	Positive Benefits	Negative Benefits	Conclusion
Ion Exchange	Ion exchange is excellent for reducing hardness for potable water supplies. Hardness may be removed from water using ion exchange with resins or by adsorption onto hydrous metal oxides such as activated alumina granules. Ion exchange with synthetic resins and adsorption onto activated alumina are treatment processes in which unwanted ions (target) in the water are exchanged for a presaturant ion on the solid phase, adsorbent. The process is accomplished with a packed bed of ion-exchange resin beads or alumina granules. Source water is continually passed through the bed in a downflow or upflow mode until the adsorbent is depleted. The best ion-exchange reactions are reversible. This means that the exhausted bed is regenerated using an excess of the presaturant ion. Typically, with a regenerative ion exchange process, the medium can be reused several times before it must be replaced because of irreversible fouling or in the case of alumina, excessive attrition.	Excellent for reducing hardness. Simpler to operate than NF, EDR, and RO. Extensively tested. Lower equipment cost.	Unable to reduce total dissolved salts; Costs for spent media disposal. Water quality and disposal costs for pre-saturation solution that produces waste brine.	Although ion exchange can reduce hardness to the desired levels, it is not capable of reducing total dissolved salts and thus will not be considered further in this memorandum.
Nanofiltration	Nanofiltration is a pressure driven process in which water is forced through a membrane under pressure while a large percentage of the suspended solids and hardness remain behind in a concentrated stream. Nanofiltration membranes tend to be susceptible to biological and iron fouling on the membrane surface; thus the feed water may require pretreatment.	Excellent for reducing hardness. Extensively tested.	Unable to effectively remove TDS. Fouling of membranes. High operating pressures are required. Brine waste stream.	Nanofiltration is not capable of effectively removing total dissolved salts and thus will not be considered further in this memorandum.

TABLE 2
Technology Overview
Santa Maria Water Treatment Technology Evaluation

Technology	Technology Description	Positive Benefits	Negative Benefits	Conclusion
Electrodialysis Reversal (A flow diagram of this technology is contained in Appendix 1a)	Electrodialysis is an electrically driven process that uses a voltage potential to force charged ions thorough a semi-permeable membrane, thus reducing the TDS and hardness in the source water. The typical process uses alternating, semi-permeable cation and anion transfer membranes in a direct current (DC) potential field. The source water flows between the anion and cation membranes. The DC voltage potential induces the anions to travel toward the cathode through the anion membrane, and cations to travel to the anode through the cation membrane. Low TDS and low hardness water is produced on the dilute side of the membranes, while the cations and anions amass in the reject water side of the membranes. This is the basis of electrodialysis. The "reversal" has been developed to help flush scale forming ions off the membranes and minimize membrane cleaning. This is accomplished by periodically reversing the polarity of the electric field and consequently the dilute and concentrates compartments. During this "reversal" the ions are forced off the membranes and the compartments are flushed.	Excellent for reducing hardness and TDS. Smaller footprint than conventional plants. Capable of removing nitrates. Redundancy maximizes uptime. Long-term reliable operation. Tolerant of poor quality water. Lower operating pressure than reverse osmosis. Can operate with colloidal silica. Smaller waste stream volume than RO.	High energy costs. Unable to remove organics. Feed channel becomes the treated water channel. Larger footprint than RO. Continuous waste stream with peak flows. All treated water from unit goes to waste when it is reversed for cleaning, generating a brine waste stream.	Electrodialysis reversal is a viable treatment option for the City of Santa Maria. Additional water quality testing will provide a more definitive conclusion as to whether EDR is the superior alternative.
Reverse Osmosis (A flow diagram of this technology is contained in Appendix 1b)	Reverse Osmosis is a pressure driven process in which water is forced through a membrane while the majority of the suspended solids, TDS, and hardness remain in a concentrated stream. RO membranes tend to be susceptible to biological and fouling compounds on the membrane surface such as iron, calcium carbonate and other constituents in the water; thus, the feed water may require pretreatment. Typical RO membranes are destroyed by oxidizing agents; therefore, pretreatment is accomplished using microfiltration (MF). MF improves the overall system performance by providing low turbidity, low microbial feed water to the RO units.	Excellent for reducing hardness and TDS. Smaller footprint than conventional plants and EDR. Capable of removing nitrates and pesticides. Redundancy maximizes uptime. Long-term reliable operation. Potentially lower energy requirements than EDR.	Operating pressures are higher than EDR (90-125 psi). Larger waste stream volume than EDR. Higher potential for membrane fouling than EDR. Moderate concentrations of colloidal silica will limit process recovery. Continuous brine waste stream volume.	Reverse osmosis is a viable treatment option for the City of Santa Maria. Additional water quality testing will provide a more definitive conclusion as to whether RO is the superior alternative.

TABLE 3
Additional Water Quality Data[a]
Santa Maria Water Treatment Technology Evaluation

Well	SDI15[b]	Phosphate[c] (mg/L)	Silica[d] (mg/L)	Total Sulfide[e] (mg/L)	Strontium[f] (µg/L)
Well 9	0.494	ND	37	ND	724
Well 10	0.556	0.3	39	ND	559
Well 11	1.667	ND	38	ND	528
Well 12	0.800	0.4	38	ND	712
Well 13	0.580	ND	38	ND	564
Well 14	0.606	ND	39	ND	770

[a] The data in this table are from samples collected and analyzed by the City of Santa Maria.

[b] The Silt Density Index (SDI) is a measurement of submicron particles and their tendency to block membranes. Flowing water at specific pressure is filtered through a membrane disc and collected for a fixed period of time. The speed of water flow and total volume collected determines the index value. SDI15 is a 15-minute test. The results are all below a value of 2, which indicate that these waters are suitable for RO without pretreatment.

[c] Phosphates at the low to non-detect levels do not present a problem for RO without pretreatment.

[d] The silica numbers are high and since the samples are from a well water source the silica is presumed to be in dissolved form. As a next step, it will be prudent to check for colloidal and total silica. The silica concentration goal for the treated water needs to be identified in order to determine the type of RO membrane and RO system recovery required by the treatment system. This information will also help determine the RO recovery rate, which can be reduced by silica.

[e] Total sulfide at the low to non-detect levels does not present a problem for RO without pretreatment.

[f] Strontium can be handled with an anti-scalant at the levels shown in the Table and should not be a problem for the RO system. As a next step, it will be prudent to check for barium as it is also a potential RO membrane foulant.

TABLE 4
Cost Comparison for EDR & RO Treatment Systems (See Appendix 3 for the Class 5 Cost Estimate for the selected treatment option).
Santa Maria Water Treatment Technology Evaluation

	RO without MF		**RO with MF**		**EDR**	
Capital Cost – Building	Current Demand (2007)	Future Demand (2025)	Current Demand (2007)	Future Demand (2025)	Current Demand (2007)	Future Demand (2025)
Footprint						
Process Area	4300	8000	7,500	13,800	11,500	18,000
Electrical Room	600	800	600	800	400	600
Chemical Room	900	1,400	900	1,400	1,000	1,000
Pump/Filter Area	900	1,400	1,200	1,500	1,000	1,400
Total Footprint	6,700	11,600	10,200	17,500	13,900	21,000
Sub Total Capital Cost - Building (@ $150/ft2)	**$1,005,000**	**$1,740,000**	**$1,530,000**	**$2,625,000**	**$2,085,000**	**$3,150,000**
Capital Cost – Treatment						
Number of Units (including redundancy)	3	5	3	5	5	10
Cost Per Unit	$950,000	$950,000	$2,300,000	$2,300,000	$1,100,000	$1,000,000
Sub Total Unit Cost	$2,850,000	$4,750,000	$6,900,000	$11,500,000	$6,600,000	$11,000,000
Installation	$920,000	$1,300,000	$1,150,000	$1,600,000	$1,600,000	$2,600,000
Misc	$100,000	$125,000	$100,000	$125,000	$125,000	$125,000
Sub Total Capital Cost – (Treatment)	**$3,870,000**	**$6,175,000**	**$8,150,000**	**$13,225,000**	**$8,325,000**	**$13,725,000**
TOTAL CAPITAL COST (Building + Treatment)	**$4,875,000**	**$7,915,000**	**$9,680,000**	**$15,850,500**	**$10,410,000**	**$16,875,000**

Cost Comparison of Water Treatment Alternatives

Two of the four technologies considered in this evaluation are suitable for the purpose of reducing TDS and hardness to desirable levels at current and future demand levels. The cost comparison uses City supplied raw water data and manufacturer supplied information on the technologies to determine a concept level cost for each one. The basis of design is contained in Appendix 4. Labor cost estimates can be found in Appendix 5; operations and maintenance costs can be found in Appendix 6. Appendix 2 contains tabulated accounts of current and future use of well and SWP water.

Review of the initial source water characterization provided by the City, as summarized in Table 3, seems to indicate that RO treatment without pretreatment may be a viable alternative. This would result in significant capital cost savings for the treatment facilities over the other alternatives. However, recovery rates typical of RO treatment would result in significantly larger quantities of waste brine for disposal, the potential impact of which is considered under the section describing disposal options below. There are several alternatives for further concentrating RO brine. Initial inquiries with RO vendors indicate that there may be potential to further concentrate the brine associated with a Santa Maria project, potentially to the extent that the volume would be similar to the EDR alternative. Further testing and investigations are required to validate this assumption and provide a final recommendation for a preferred treatment technology.

Land Required for the Treatment Facility

Land area required for a future treatment facility would depend on the treatment technology selected. For initial consideration, an RO process with no pretreatment was considered to determine the minimum area likely to be required. For this alternative it is estimated that a minimum of 1 acre of flat, usable land adjacent to the blending station would be required for the building, piping, and access.

Disposal Options

Both EDR and RO treatment of groundwater result in a concentrate (brine) that must be disposed of properly. Several alternatives exist for brine disposal. This section considers the feasibility of two disposal alternatives: discharge via the sewer to existing wastewater treatment facilities and deep well injection. Disposal to the sewer depends on use of the unutilized capacity in existing wastewater facilities, and is limited by the potential impact on those facilities to maintain compliance with regulatory requirements when receiving these additional flows. Disposal by deep well injection requires a major capital investment for construction of new facilities and operating costs that would contribute significantly to life-cycle costs. The consideration of either or both of these options is very preliminary and should only be used as a basis for directing further, more detailed evaluations.

Santa Maria Wastewater Treatment Plant Disposal

Evaluation of the sewer discharge option is based on average likely effects such a discharge would have on the wastewater effluent quality relative to local and regional water quality

requirements defined by the Central Valley Regional Water Quality Control Board (RWQCB). The analysis assumed that the brine would be conveyed to the City of Santa Maria Wastewater Treatment Plant (WWTP) through the existing sewer conveyance system.

The City of Santa Maria WWTP has an average monthly flow (1999 to 2006 data) of 7.97 million gallons per day (mgd) and is permitted to receive a total of 9.5 mgd by the RWQCB through Waste Discharge Requirements (WDR) Order No. R3-2002-0111 (Order) dated December 13, 2002. The WWTP is located at 601 Black Road, in section 18, T10N, R34W, in Santa Barbara County and is considered a secondary wastewater treatment and disposal facility. Currently, the wastewater treatment system collects and transports wastewater flows from the City of Santa Maria, Santa Maria Airport District, and part of the Laguna County Sanitation District and then treats these flows at the WWTP. The facility consists of headworks (comminutor and flow monitor), grit chamber, primary clarifier and trickling filter, intermediate clarifier, secondary trickling filter and clarifier, gravity sludge thickener, anaerobic digesters, and sludge drying beds. Wastewater effluent is discharged to 17 infiltration ponds on 123.4 acres for disposal consistent with effluent water quality criteria provided below in Table 5.

TABLE 5
Permitted WWTP Effluent Water Quality Criteria[a]
Santa Maria Water Treatment Technology Evaluation

Constituent	Units	Monthly Mean	Daily Maximum
Soluble Biochemical Oxygen Demand	mg/L	60	100
Total Suspended Solids	mg/L	60	100
Settleable Solids	mg/L	0.1	0.4
Grease and Oil	mg/L	20	30
Total Dissolved Solids[b]	mg/L	1,000	---
Sodium[b]	mg/L	180	---
Chloride[b]	mg/L	180	---

[a] Effluent discharge to the disposal ponds is limited to a pH range of ≥ 6.5 and ≤ 8.4.
[b] Compliance is based on a 3-year running mean.

Current WWTP effluent concentrations for TDS are approximately 711 mg/L on average (1999 to 2006 data). Proposed concentrations for EDR processing are anticipated to be a maximum of around 7,750 mg/L at a flow of 1.3 mgd and 4,090 mg/L at a flow of 2.75 mgd for RO processing. Using standard mass balance equations and assuming effluent flow from the WWTP is about 7.97 mgd at a concentration of 711 mg/L, additional flow that can be diverted to the WWTP would be 344 gallons per minute (gpm) (0.50 mgd) from EDR and 651 gpm (0.94 mgd) from RO processing. Note also that effluent criteria can change at any time and WWTP upgrades are anticipated in the future relative to TDS.

Deep Well Injection Disposal

Brine generated from EDR or RO processing in excess of capacity for sewer discharge are estimated to be 0.81 mgd (559 gpm) for EDR and 1.81 mgd (1,259 gpm) for RO. The disposal option considered here is deep well injection into the shale Monterey Formation. The depth of this formation is approximately 6,000 feet below ground surface (bgs), and injection is assumed to be accomplished in Class I Injection Wells with a capacity of 50 gpm. Well design will include multiple strings of casing with cemented annuli. Injection will likely be through a tubing and packer system. It is assumed that wellhead pressures up to 1,000 pounds per square inch (psi) will be required. Brine will be pumped to the well sites by a pump station located at the WWTP through a 6-inch low-pressure pipeline. High pressure injection pumps and brine storage facilities will be located at each well site; additionally access roads constructed to all wells along pipeline easements, with monitoring wells installed at each site for short-term testing and long-term monitoring purposes.

Based upon the above assumptions, and in order to reach full project capacity, it is estimated that 12 injection wells sites would be needed for the EDR option, and 28 for the RO option. While planning, design, and construction costs for such facilities would be highly dependent on the configuration determined to be required based on actual field testing, they may be similar or greater than the capital costs for treatment facilities estimated by this report. Therefore; it is clear that further consideration and validation of these costs should be a part of overall project consideration.

Conclusions

Initial evaluation source water quality data indicate that either RO without significant pretreatment, or EDR may be feasible treatment methods to achieve the City's water quality goals. Preliminary cost estimates for both these alternatives indicate that for larger scale facilities, costs associated with brine disposal may be a major portion of capital and operating costs. For well disposal, this cost is likely linked most closely to the volume of brine (rather than concentration). Therefore; it is recommended that future efforts be focused on the potential to reduce brine flows from potential treatment processes. This may include additional consideration of EDR or processes that may optimize RO recovery rates. A summary of projected capital costs (without disposal facilities) is included in Table 8.

Reduction in the anticipated cost of water treatment may also be identified by additional investigation of initial estimates for the efficiency of well disposal, and/or other brine disposal alternatives. Injection rates assumed in this report are anticipated to be conservative estimates of likely injection rates. Additional research and/or testing may justify adjustment of these rates upward, directly impacting the associated cost.

While disposal options are considered further, it was identified that an average disposal of up to 651 gpm of brine generated by RO treatment could potentially be disposed to the existing City wastewater treatment facilities. This disposal rate corresponds with treated water production of 8.2 mgd and is based on the mass of solids in the brine stream, not volume. This may offer a means to provide initial testing of various treatment and disposal systems including:

- Effectiveness of RO without microfiltration pretreatment on the source water produced by the various source wells,
- Blending of treated water, untreated groundwater, and State water,
- Impact of brine disposal on wastewater facilities,
- Evaluation of alternatives to increase RO recovery rates, and
- Initial test of a pilot brine disposal well.

TABLE 8
Project Capital Cost Summary
Santa Maria Water Treatment Technology Evaluation

	2007	2025	Comments
RO Treatment Cost	$4,875,000	$7,915,000	Need to evaluate the potential to increase recovery rates similar to EDR while maintaining capital cost advantage
EDR Treatment Cost	$10,410,000	$16,875,000	

Next Steps

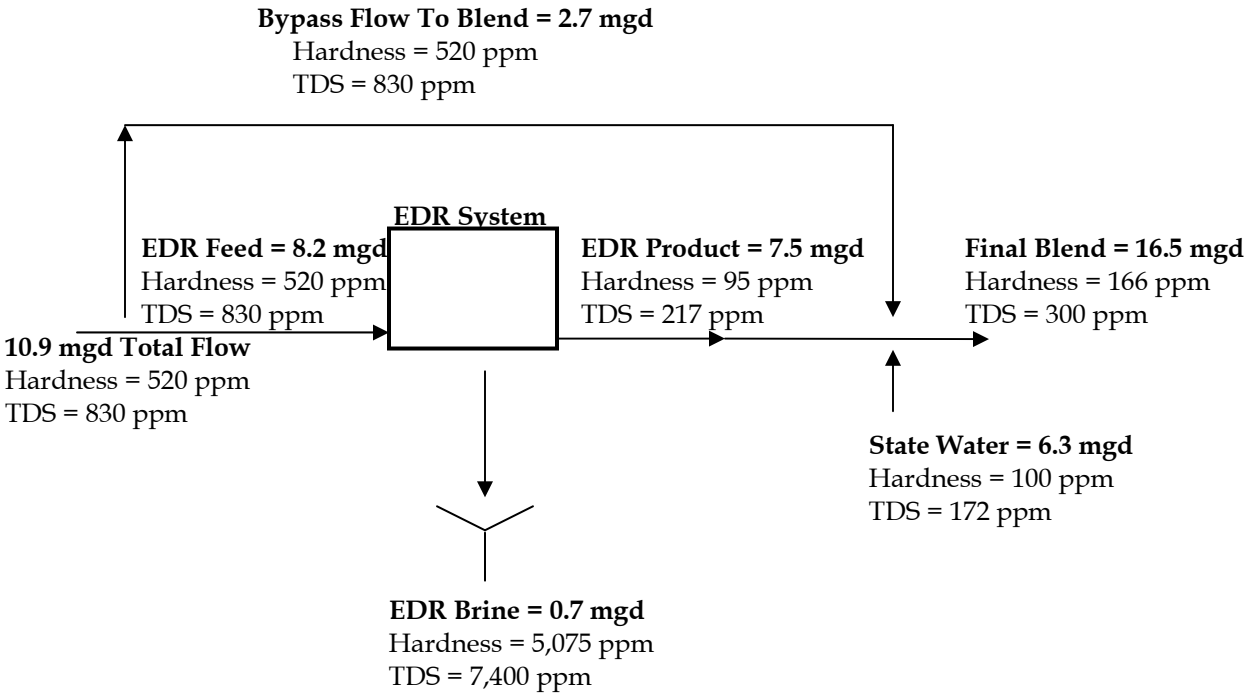
The results of this conceptual study indicate that disposal of brine will be a major portion of the overall cost of potential future groundwater treatment projects. Therefore, it is recommended that future work be concentrated on mitigating these costs, including:

- Further investigation of RO alternatives which may increase anticipated recovery rates to those similar to EDR, at a lower cost,
- Additional and more detailed water quality analyses to more fully validate the process selection, particularly higher recovery RO options,
- Evaluation of specific potential impacts of brine disposal to the wastewater system including conveyance capacity, impacts on existing treatment systems, and seasonal availability of unutilized capacity, and
- Evaluation of available data on existing oil production and/or injection wells to more firmly establish likely capacity, identify potential factors for success, and potential candidate wells for future testing.

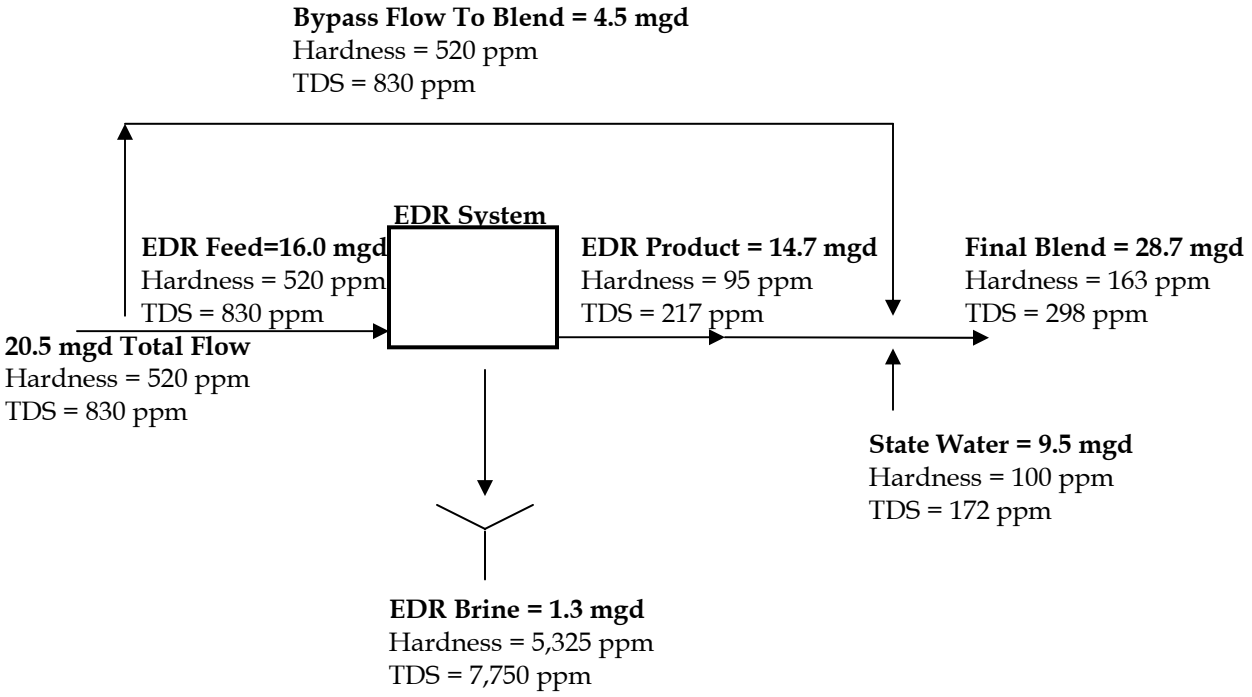
APPENDIX 1A

EDR Blending Schematic

Current



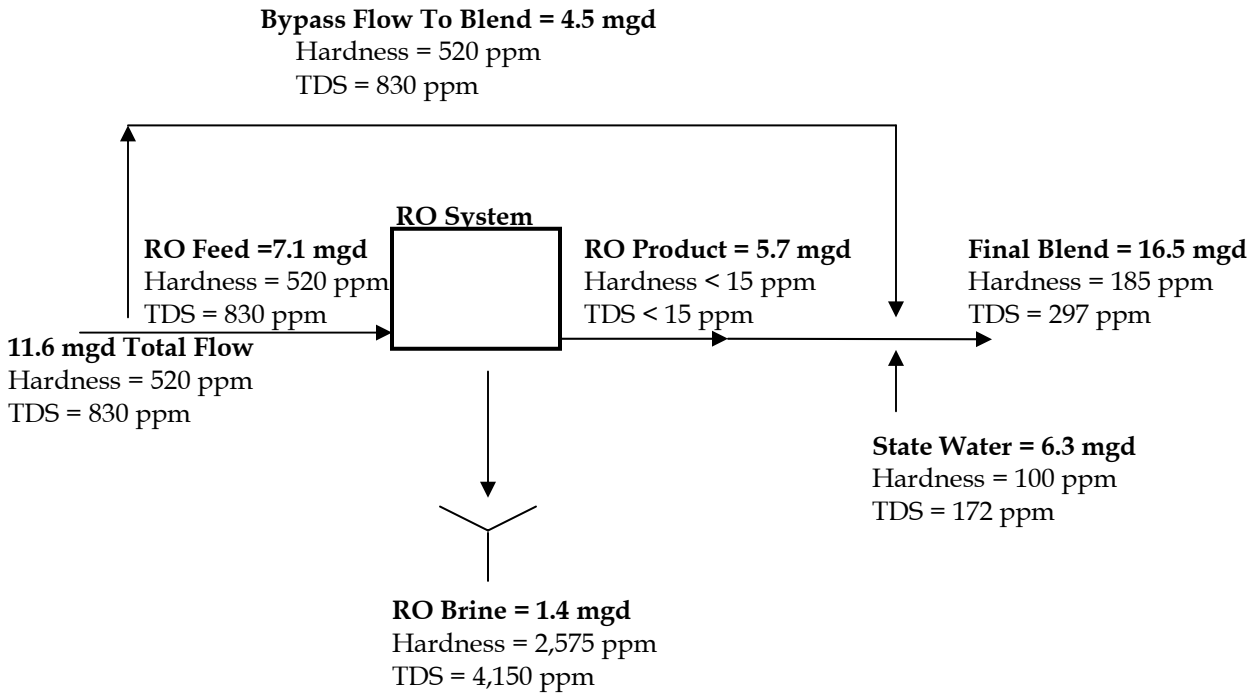
Future



APPENDIX 1B

RO Blending Schematic

Current



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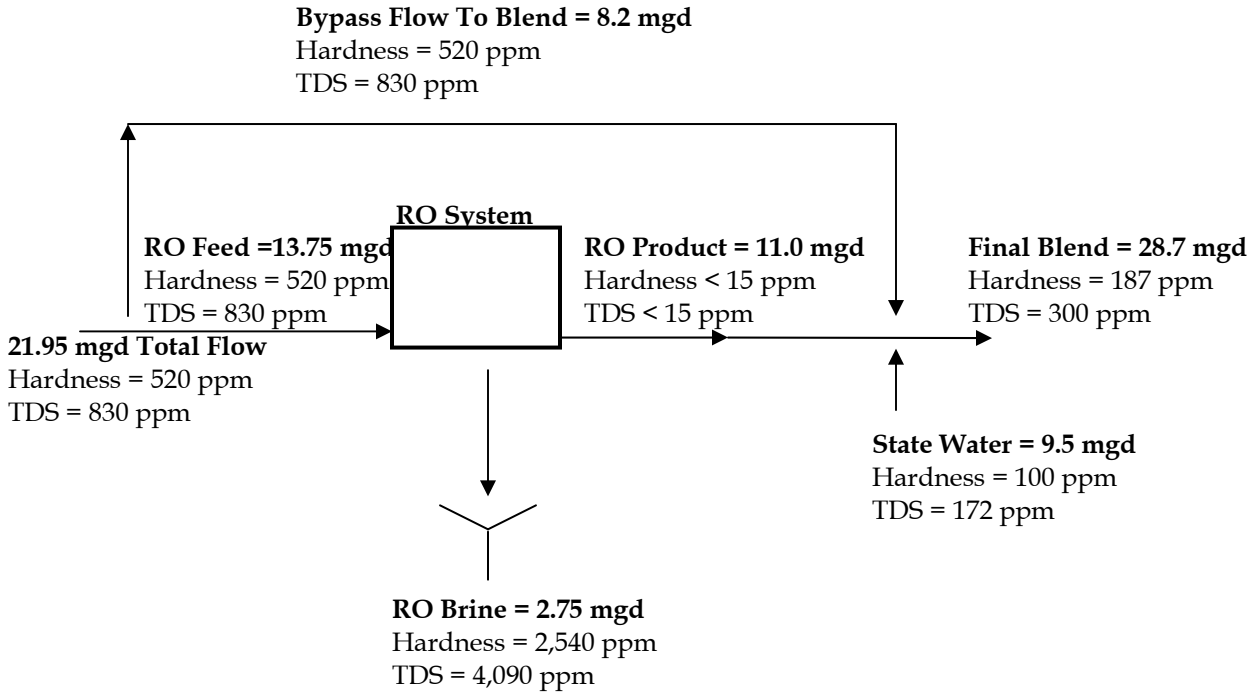

APPENDIX 2

Well Water Use

The following tables represent treated well water and SWP water supplies to meet current and future demands. These tables were used as an aid in sizing the treatment systems and do not detail the actual operating flow streams shown in Appendices 2A and 2B.

CURRENT DEMAND: The City uses all of the state minimum allocation (4,500 AFY) during the year and supplements the remaining demand with well water, using the best quality well water first. This scenario may lead to a design in which the well water is used 100% during low flow months and the state water is used to supplement well water flows during peak/higher demand months. Use of 100% well water will produce the greatest treatment demand.

	DEMANDS		SUPPLY WELL AND STATE WATER									
	Current		State		9	10	11	12	13	14	Subtotal	Total
	AFY	mgd	AFM	mgd	mgd	mgd	mgd	mgd	mgd	mgd	Wells	
MAX Flow Rate			1866	20.27	2.6	2.9	3.4	3.5	3.5	3.3		
Jan	946	9.9	295	3.1					3.5	3.3	6.8	**9.9**
Feb	793	9.2	206	2.4					3.5	3.3	6.8	**9.2**
Mar	1065	11.2	95	1.0			3.4		3.5	3.3	10.2	**11.2**
Apr	1185	12.9	249	2.7			3.4		3.5	3.3	10.2	**12.9**
May	1446	15.2	476	5.0			3.4		3.5	3.3	10.2	**15.2**
Jun	1491	16.2	552	6.0			3.4		3.5	3.3	10.2	**16.2**
Jul	1571	16.5	599	6.3			3.4		3.5	3.3	10.2	**16.5**
Aug	1568	16.5	599	6.3			3.4		3.5	3.3	10.2	**16.5**
Sep	1430	15.5	488	5.3			3.4		3.5	3.3	10.2	**15.5**
Oct	1308	13.7	333	3.5			3.4		3.5	3.3	10.2	**13.7**
Nov	632	6.9	331	3.6						3.3	3.3	**6.9**
Dec	982	10.3	333	3.5					3.5	3.3	6.8	**10.3**
Total:	14,417		4,557									
NITRATE					57	28	2.8	29	16	42		
HARDNESS (mg/L)				100	710	610	450	560	420	420		
TDS (mg/L)				172	1100	950	730	930	650	590		

FUTURE DEMAND: The City uses all of the state minimum allocation (4,500 AFY) during the year and supplements the remaining demand with well water, using the best quality well water first. This scenario may lead to a design in which the well water is used 100% during low flow months and the state water is used to supplement flow during peak/higher demand months. Use of 100% well water will produce the greatest treatment demand.

	DEMANDS		SUPPLY WELL AND STATE									
	Future		State		9	10	11	12	13	14	Sub Total	Total
	AFY	mgd	AFM	mgd	mgd	mgd	mgd	mgd	mgd	mgd	Wells	
MAX Flow Rate			1866	20.27	2.6	2.9	3.4	3.5	3.5	3.3		
Jan	1,641.3	17.3	67	0.7		2.9	3.4	3.5	3.5	3.3	16.6	**17.3**
Feb	1,375.9	16.0	0	0.0		2.3	3.4	3.5	3.5	3.3	16.0	**16.0**
Mar	1,847.8	19.4	19	0.2	2.6	2.9	3.4	3.5	3.5	3.3	19.2	**19.4**
Apr	2,056.0	22.3	285	3.1	2.6	2.9	3.4	3.5	3.5	3.3	19.2	**22.3**
May	2,508.8	26.4	685	7.2	2.6	2.9	3.4	3.5	3.5	3.3	19.2	**26.4**
Jun	2,586.9	28.1	819	8.9	2.6	2.9	3.4	3.5	3.5	3.3	19.2	**28.1**
Jul	2,725.7	28.7	904	9.5	2.6	2.9	3.4	3.5	3.5	3.3	19.2	**28.7**
Aug	2,720.5	28.6	894	9.4	2.6	2.9	3.4	3.5	3.5	3.3	19.2	**28.6**
Sep	2,481.1	26.9	709	7.7	2.6	2.9	3.4	3.5	3.5	3.3	19.2	**26.9**
Oct	2,269.4	23.9	447	4.7	2.6	2.9	3.4	3.5	3.5	3.3	19.2	**23.9**
Nov	1,096.5	11.9	0				3.4	1.7	3.5	3.3	11.9	**11.9**
Dec	1,703.8	17.9	0				3.4	3.5	3.5	3.3	13.7	**13.7**
Total	25,013.5		4,830									
NITRATE (mg/L)					57	28	2.8	29	16	42		
HARDNESS (mg/L)				100	710	610	450	560	420	420		
TDS (mg/L)				172	1100	950	730	930	650	590		

APPENDIX 3

Class 5 Cost Estimate for RO without Pretreatment

City of Santa Maria, CA Water System Upgrades
Class 5 Order of Magnitude Construction Cost Estimate
Project No. April 9, 2008

Item Description	Quantity		Materials Unit	Materials Total	Labor Unit	Labor Total	Unit Price	Line Total	Costing Assumptions
RO without MF Alternative									
General Conditions	**$390,000**								
General Conditions	1	LS	$0	$0	$0	$0	$155,000	$155,000	Allow 10% of Total Contract Amount
Profit Margin	1	LS	$0	$0	$0	$0	$124,000	124,000	Allow 8% of Total Contract Amount
Bonds/Insurance	1	LS	0	0	0	0	31,000	31,000	Allow 2% of Total Contract Amount
Mobilization/Demobilization/Site Facilities	1	LS	0	0	0	0	80,000	80,000	Allow 5% of Total Contract Amount
Sitework	**$40,000**								
Purchase Price of Farm Land	1	AC	0	0	0	0	0	0	Not Included in Scope of Cost Estimate
Perimeter Chain Link Fencing/Gates	800	LF	30	24,000	0	0	30	24,000	
Paving Access Road/Turnaround/Parking	900	SY	10	9,000	0	0	10	9,000	
Minimum Landscaping Allowance	0.58	AC	12,000	7,000	0	0	12,000	7,000	
Building	**$570,000**								
Metal Building--Assumed 145'x80'x14' eave	11,600	SF	15	174,000	0	0	15	174,000	Means 07 BCCD
Metal Building Foundation	11,600	SF	10	116,000	0	0	10	116,000	Means 07 BCCD
Skylights--4' x 4'	8	EA	400	3,200	100	800	500	4,000	Means 07 BCCD
Rollup Doors--12' x 12'	1	EA	2,000	2,000	500	500	2,500	2,500	Means 07 BCCD
Man Doors--3' x 7'	1	EA	800	800	300	300	1,100	1,100	Means 07 BCCD
Drop Ceiling	11,600	SF	2	23,200	0	0	2	23,200	Means 07 BCCD
Chemical Storage Containment Walls	600	SF	6	3,600	4	2,400	10	6,000	Means 07 BCCD
Chemical Storage Segregation Walls	1,400	SF	3	4,200	2	2,800	5	7,000	Means 07 BCCD
Chemical Storage Containment Ceilings	1,400	SF	3	4,200	2	2,800	5	7,000	Means 07 BCCD
Bathroom--2 fixture w/Hot & Cold Water	1	LS	3,000	3,000	1,500	1,500	4,500	4,500	Means 07 BCCD
Eyewash/Safety Shower	1	LS	1,000	1,000	500	500	1,500	1,500	Means 07 BCCD
Vent fans & Louvers	2	EA	250	500	150	300	400	800	Means 07 BCCD
Water Main--2" Pipe	500	LF	10	5,000	10	5,000	20	10,000	Means 07 BCCD
Sewer Line--4" Pipe	500	LF	20	10,000	20	10,000	40	20,000	Means 07 BCCD
Gas Main--2" Pipe	500	LF	15	7,500	15	7,500	30	15,000	Means 07 BCCD
HVAC Allowance	11,600	SF	6	69,600	0	0	6	69,600	Means 07 BCCD
Electrical Allowance	11,600	SF	8	92,800	0	0	8	92,800	Means 07 BCCD
Phone Service Allowance	1	LS	5,000	5,000	0	0	5,000	5,000	
SCADA Service Allowance	1	LS	10,000	10,000	0	0	10,000	10,000	
Process Utilities	**$550,000**								
Finished Water Pipe									
36" Dia Class 52 CLDI Pipe	500	LF	250	125,000	100	50,000	350	175,000	Means 07 BCCD
36" Dia Gate Valves	2	EA	15,000	30,000	3,000	6,000	18,000	36,000	Means 07 BCCD
Raw Well Water Pipe									
36" Dia Class 52 CLDI Pipe	500	LF	250	125,000	100	50,000	350	175,000	Means 07 BCCD
36" Dia CLDI Tees	2	EA	1,500	3,000	1,000	2,000	2,500	5,000	Means 07 BCCD
Concrete Vault--10'x8'x4'	1	EA	3,000	3,000	3,000	3,000	6,000	6,000	Means 07 BCCD
36" Dia Gate Valves	3	EA	15,000	45,000	3,000	9,000	18,000	54,000	Means 07 BCCD

City of Santa Maria, CA Water System Upgrades
Class 5 Order of Magnitude Construction Cost Estimate
Project No. April 9, 2008

Item Description	Quantity		Materials Unit	Materials Total	Labor Unit	Labor Total	Unit Price	Line Total	Costing Assumptions
Brine Pipe									
12" Dia Class 52 CLDI Pipe	500	LF	75	37,500	45	22,500	120	60,000	Means 07 BCCD
12" Dia Gate Valves	2	EA	3,500	7,000	1,000	2,000	4,500	9,000	Means 07 BCCD
Electric Service									
Underground 460V Electric Service	500	LF	40	20,000	10	5,000	50	25,000	Means 07 BCCD
Transformer--460V to 120V	1	EA	3,000	3,000	2,000	2,000	5,000	5,000	Means 07 BCCD
Treatment Process									
Treatment Process Cost Installed from Tech Memo Exhibit 2								6,175,000	NOTE: Gen Cond's not applied to this cost.
Subtotal RO without MF Alternative								$7,725,000	
+ Contingency on Treatment Process @ 10%								620,000	
+ Contingency on All Other Components @ 30%								465,000	
Total RO without MF Alternative								**$8,810,000**	

The cost estimates shown have been prepared for guidance in project evaluation and implementation from the information available at the time of the estimate. The final costs of the project will depend on actual labor and material costs, competitive market conditions final project scope, implementation schedule and other variable factors. As a result, the final project costs will vary from the estimates presented herein. Because of this, project feasibility and funding needs must be carefully reviewed prior to making specific financial decisions to help ensure proper project evaluation and adequate funding.

The cost estimates shown have been prepared for guidance in project evaluation and implementation from the information available at the time of the estimate. The final costs of the project will depend on actual labor and material costs, competitive market conditions, final project scope, implementation schedule and other variable factors. As a result, the final project costs will vary from the estimates presented herein. Because of this, project feasibility and funding needs must be carefully reviewed prior to making specific financial decisions to help ensure proper project evaluation and adequate funding.

APPENDIX 4

BASIS OF DESIGN DATA

GIVEN

Acre Feet = 325,851 gallons
Current Demand: 13.5 mgd (15,100 AFY; State and Wells)
Current Maximum Well Production: 17.8 mgd (19.9 AFY)
Maximum Well Production Capacity: 19.9 mgd (22,300 AFY)
Total Future Demand: 22.3 mgd (25,000 AFY)
Minimum State Water Allocation: 4 mgd (4,500 AFY)
Monthly Maximum State Water Limitation (summer): 20.3 mgd (1,866 AFM)
Maximum Day Demand: 28.7 mgd

ASSUMPTIONS

1. Water is low in total silica and colloidal silica, which are potential fouling agents for Electrodialysis Reversal (EDR) and Reverse Osmosis (RO) treatment processes. Silica fouling will not be a problem.
2. Other fouling compounds are assumed to be at concentrations which will not interfere with either EDR or RO. See Testing Required.
3. Develop the following operational scenario. The City uses all of the state minimum allocation (4,500 AFY) during the year and supplements the remaining demand with well water, using the best quality well water first. This scenario may lead to a design in which the well water is used 100% during low flow months and imported state water is used to supplement flow during peak and higher demand months.
4. Treatment system will be sized for present and future flows as described above.
5. Size the treatment system for both winter and summer operation with redundancy.
6. The building footprint will be sized for future demands.
7. The rate schedule for Power is assumed to be Tariff E-20 COMMERCIAL/INDUSTRIAL/GENERAL Service to Customers with Max Demands of 1,000 kWh or more.
8. We are only evaluating EDR and RO in greater detail because nanofiltration and ion exchange do not remove TDS effectively.
9. EDR and RO treatment processes are rather close in O&M costs. We have developed treatment O&M cost comparisons for these treatment alternatives (RO and EDR), including energy, chemical and labor costs. To this will be added capital costs.
10. The concept design is based on RO without pretreatment because it is a strong candidate for this application at about half the cost of RO with pretreatment and EDR.
11. We are not doing life cycle analyses for the two leading treatment technologies.

KNOWN WATER WELL CHARACTERISTICS:

	WELL NUMBER							
PARAMETER	**State**	**9**	**10**	**11**	**12**	**13**	**14**	**Combined**
Alkalinity mg/l	-	210	200	230	190	220	210	
pH	-	7.6	7.6	7.7	7.6	7.2	7.4	
Turbidity (NTU)	-	0.1	0.1	0.1	0.1	0.2	0.3	
Iron mg/l	-	ND	ND	ND	ND	ND	ND	
Manganese mg/l	-	ND	ND	ND	ND	ND	ND	
Arsenic mg/l	-	ND	ND	ND	ND	ND	ND	
Color	-	ND	ND	ND	ND	ND	ND	
Hardness mg/l $CaCO_3$	100	710	610	450	560	420	420	518
TDS mg/l	172	1100	950	730	930	650	590	830
SOC mg/l	-	ND*	ND*	ND*	ND*	ND*	ND*	
Nitrates mg/l	-	57	28	2.8	29	16	42	
Strontium		724	559	528	712	564	770	
SDI 15 mg/l		0.494	0.556	1.667	0.800	0.580	0.606	
Phosphate mg/l		ND	0.3	ND	0.4	ND	ND	
Silica mg/l		37	39	38	38	38	39	
Sulfide mg/l		ND	ND	ND	ND	ND	ND	
Flow Rate (mgd)	varies	2.6	2.9	3.4	3.5	3.5	3.3	19.2
The data contained in this table of known well characteristics were provided by the City of Santa Maria.								

TARGET LEVELS

PARAMETER	GOAL	NOT TO EXCEED
TDS	300 MG/L	500 MG/L
HARDNESS	200 MG/L	300 MG/L
The target levels contained in this table were provided by the City of Santa Maria.		

SIDE STREAMS QUANTITY AND CHARACTERISTICS AT DESIGN FLOWS (MAXIMUM DAILY FLOW 28.7 mgd)

Calculation of side streams for future demand is based on 4 mgd from State water and the remainder made up from all wells pumping equally at approximately 90% of their capacity.

EDR Waste Stream

1) Flow 1.3 mgd: Continuous waste flow = 700 gpm; Peak = 950 gpm (for 30 min. every hour)
2) Hardness = 5,325 mg/l
3) TDS = 7,750 mg/l

RO Waste Stream

1) Flow 2.75 mgd: Continuous waste flow = 1,910 gpm
2) Hardness = 2,540 mg/l
3) TDS = 4,090 mg/l

EFFICIENCY

EDR = 92% Efficient
RO = 80% Efficient

TESTING REQUIRED

The following water quality data are required to properly select, design and size the treatment alternative. A large number of these analytes were collected and analyzed by the City of Santa Maria. These results are reported in Table 3. Depending on the outcome of these tests, one treatment alternative may be determined superior.

Source Water Scan:

1. RO and EDR

A. Raw Water Analysis (include quantity for each well):

Average TDS	_____	(mg/l)	SiO_2	_____	(mg/l)	Fe	_____	(mg/l)
Max TDS	_____	(mg/l)	Ca^{2+}	_____	(mg/l)	Mn	_____	(mg/l)
Min TDS		(mg/l)	Mg^{2+}		(mg/l)	SO_4^2		(mg/l)
Total Hardness	_____	(mg/l)	Na^+	_____	_____ (MG/L)	HCO^3	_____	(mg/l)
Turbidity	_____	(NTU)	K^+	_____	(mg/l)	CO_3^{2-}	_____	(mg/l)
SDI_{15}			Ba^{2+}		(mg/l)	Cl^-		(mg/l)
pH	_____		Sr^{2+}	_____	(mg/l)	NO_3^-	_____	(mg/l)
H_2S	_____	(mg/l)				F^-	_____	(mg/l)
Avg. Cond.		µS/cm				PO_4		(MG/L)
Max. Cond.	_____	µS/cm				TOC	_____	_____ (MG/L)
Min. Cond.	_____	µS/cm						
Perchlorate		µS/cm						

2. RO Additional Testing

B. Raw Water Analysis (include quantity for each well):

Aluminum		(mg/l)
Colloidal Silica	____	(mg/l)
Arsenic	_____	(mg/l)

APPENDIX 5

Labor Estimates

Basis for Selection of Number of Units

The number of EDR and RO units necessary to meet the treatment targets is based on several factors.

- First, the annual state minimum allocation (4500 AFY) is used to supplement the municipal well water.
- A second constraining factor is that no month may consume more than the maximum monthly allocation (1,866AFM) of State water that could be imposed by the State. Therefore the state minimum allocation is spread over 12 months while limiting the number of wells in operation.
- The best performing wells are to be bought online first, and the wells are to be used at maximum production when brought online. For the current condition this leads to running three wells (11, 13, and 14) during the highest demand months and two wells (13 and 14) during low demand months. Total state water consumption is 4,557 AFY. This is slightly above the minimum allocation, but the additional cost for an additional 57 AF should be offset by operating one less well.
- For future demand, a 73.5% increase was added to each current monthly demand; this led to a future annual demand of 25,000 AFY and a Maximum Daily Demand of 28.7 mgd. To meet future demand during peak months (March through October) all well pumps will need to be operated with state water supplementing the rest.
- The number of process units was determined by a mass balance approach considering the hardness and TDS targets, treatment efficiency, percent removal of TDS and hardness, quality and quantity of state water to be blended, and the quantity and quality of the well water to be bypassed.

Labor Requirements:

Typically maintenance is broken down into daily, weekly, monthly tasks while other tasks are periodic. At certain times during a yearly operating cycle more manpower will be needed for occasional membrane stack teardown, valve repair, and an EDR or RO system CIP (clean in place) process. During these times more staff may be required to perform focused maintenance as needs may warrant. The following table contains typical manpower requirements for daily maintenance and CIP. The occasional membrane stack teardown, valve repair, etc are not considered. Since a complete water analysis has not been done, it is difficult to predict CIP schedules; therefore, these should be considered rough estimates of actual labor requirements.

	REVERSE OSMOSIS							EDR			
	RO without MF				RO with MF			Without Pre-treatment			
	Units	Days/YR	HRS/Unit	Total HRS	Days/YR	HRS/Unit	Total HRS	Units	Days/YR	HRS/Unit	Total HRS
Current											
Day Shift	3	365	1.00	1095	365	1.90	2080.5	5	365	1.00	1825
Night Shift	3	365	0.50	548	365	0.90	985.5	5	365	0.45	821.25
Graveyard Shift	3	365	0.50	548	365	0.90	985.5	5	365	0.45	821.25
Clean in Place	3	4	8.00	96	4	16.00	192	5	8.0	8.00	320
Total FTE[1] - Current				**1.1**			**2.1**				**1.9**
Future											
Day shift	5	365	0.80	1460	365	1.55	2829	9	365	0.80	2,628
Night Shift	5	365	0.40	730	365	0.75	1368.75	9	365	0.30	986
Graveyard Shift	5	365	0.40	730	365	0.75	1368.75	9	365	0.30	986
Clean in Place	5	4	8.00	160	4	16.00	320	9	8.0	8.00	576
Total FTE[1] - Future				**1.5**			**2.9**				**2.6**

[1] 1 FTE = 2000 hr/yr

APPENDIX 6

O & M Costs

The O&M costs include consumables, long term reserves (membranes and appurtenances), manpower, and it also accounts for the blending factor. The cost is lowered as the bypass water is not treated. For both EDR and RO without MF the O&M costs are equal as the difference is within the margin of error.

RO without MF: O&M Costs

Electrical Rate	$0.10	/KWH
Total Power	3	/kWH/kGal

O&M ($/1000 Gallons Final Product Water)		
Consumable Costs		
Electrical Power	$0.300	
Chemical Costs	$0.030	
Replace Filter Cart	$0.045	
Sub Total Consumables		$0.375
Long Term Reserves		
Membranes	$0.075	
Other RO Parts	$0.045	
Sub Total Reserves		$0.120
Sub Total EDR O&M Costs		$0.495
(no blending)		
With Blending Factor Used		
200 ppm TH @ 65%		$0.322
Estimated Labor Costs		$0.028
Overall O&M Costs		
200 ppm TH @ 65%		**$0.349**

EDR O&M Costs

Electrical Rate	$0.10	/KWH
Pumping Power	1.3	/kWH/kGal
DC Power	1.2	/kWH/kGal
Total Power	2.5	/kWH/kGal

O&M ($/1000 Gallons Final Product Water)		
Consumable Costs		
Electrical Power	$0.250	
Chemical Costs	$0.025	
Replace Filter Cart	$0.040	
Sub Total Consumables		$0.315
Long Term Reserves		
Membranes	$0.050	
Other EDR Parts	$0.045	
Sub Total Reserves		$0.095
Sub Total EDR O&M Costs		$0.410
(no blending)		
With Blending Factor Used		
200 ppm TH @ 75%		$0.308
(75% of Sub Total EDR O&M)		
Estimated Labor Costs		$0.050
Overall O&M Costs		
200 ppm TH @ 75%		**$0.358**

Final

Evaluation of Groundwater Treatment Reverse Osmosis Concentrate Disposal

Prepared for
City of Santa Maria Utilities Department

August 2009

CH2MHILL

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Executive Summary

The City of Santa Maria (City) relies on groundwater and State Water Project (SWP) water to serve its customers. As buildout occurs, the City must rely more on groundwater supplies to meet customers' needs. This increased reliance on groundwater is changing the City's water quality. The change in groundwater quality is an issue because increased levels of total dissolved solids (TDS) and hardness found in the groundwater are affecting the City's ability to comply with the Waste Discharge Requirements (WDR) permit at the City of Santa Maria Wastewater Treatment Plant (WWTP).

For this reason, the City undertook the Santa Maria Water Treatment Technology Evaluation Study in 2008. This study identified reverse osmosis (RO) and electrodialysis reversal (EDR) as the most viable options for achieving the City's water quality goals using groundwater treatment. Both of these technologies produce a concentrate waste stream that requires proper disposal.

Based on 35 percent reliability of SWP, the amount of concentrate generated from advanced treatment of groundwater is estimated to be 0.39 to 0.44 million gallons per day (mgd) based on a current water demand of 13.4 mgd, and 0.88 to 1.39 mgd based on a future water demand of 22.1 mgd.

The objective of this study is to identify one technology or some combination of technologies that provides the City with the best solutions to manage concentrate disposal while achieving water quality objectives. To accomplish this objective, a number of different concentrate management alternatives were evaluated including volume reduction, zero liquid discharge, and final disposal technologies. Concentrate management alternatives were evaluated to develop a portfolio management approach for the City that:

- Maximizes water recovery
- Minimizes project cost
- Maximizes project revenue

The concentrate management evaluation examined the following technologies:

- Electrodialysis reversal (EDR)
- Vibratory Shear Enhanced Processing (VSEP)
- Conventional RO
- Precipitative Softening (PS)/RO
- Natural Treatment Systems (NTS) (halophytes and constructed wetlands)
- Evaporation Ponds
- Wastewater Treatment Plant (WWTP) Blending
- WWTP Hauling
- Deep Well Injection (DWI)
- Ocean Outfall

These technologies were evaluated using the Concentrate Management Tool (CMT), which is a spreadsheet-based model that was developed to assist with determining the best approach for concentrate management. The CMT eliminated VSEP, EDR, and Conventional RO based on water quality constraints. The remaining technologies after the CMT analysis were:

- Effluent blending
- PS/RO
- Enhanced Membrane System (EMS)
- Evaporation ponds
- Wetlands
- DWI

In addition to these technologies, ocean outfall, blending of concentrate with wastewater influent, and hauling of waste to the South San Luis Obispo County Sanitation District (SSLOCSD) Brine Disposal Station were included in the analysis.

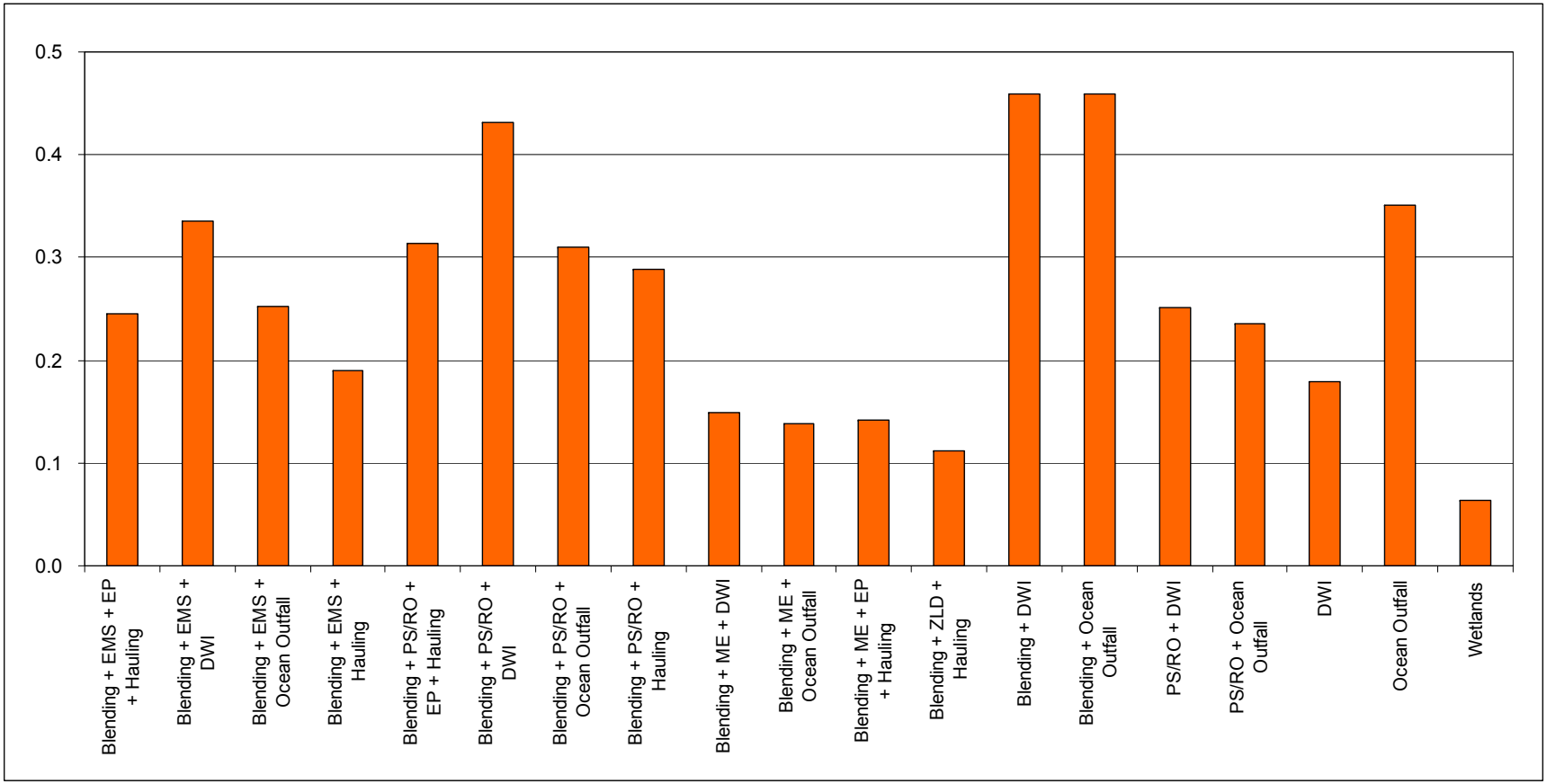
Technology alternatives were then further evaluated using a multi-criteria analysis (MCA) approach that included a cost-benefit analysis. The results of this screening are shown in Figure ES.1. From this cost-benefit score, the best option(s) for additional study were identified by priority, and the top four were selected for additional study. These options are:

- Blending + Ocean Outfall
- Blending + PS/RO + DWI
- Blending + DWI
- Blending + PS/RO + Hauling

Blending, PS/RO, and hauling provide only partial treatment or disposal and require coupling with another concentrate management option for final disposal. The evaluation of concentrate management alternatives resulted in a number of technologies being deemed unfeasible for the City. The eliminated technologies—and rationale for elimination—included:

- Conventional RO - Eliminated due to super-saturation limits for silica
- EDR - Eliminated due to super-saturation limits for barium sulfate
- VSEP - Eliminated due to super-saturation limits for barium sulfate and silica
- Wetlands – Eliminated due to land requirements, cost, and need for additional final disposal method
- Evaporation Ponds - Eliminated due to land requirements, cost, and need for additional final disposal method
- Mechanical and Thermal Evaporation (MTE) - Eliminated based on low cost-benefit ratio
- EMS – Eliminated based on low cost-benefit ratio
- Conventional Zero Liquid Discharge (ZLD) - Eliminated based on low cost-benefit ratio

FIGURE ES.1
COST-BENEFIT SCORES FOR CONCENTRATE MANAGEMENT OPTIONS MCA EVALUATION



Note: The Scenario Cost-Benefit Score displayed on the y-axis is equal to the Scenario Decision Score divided by the Scenario Life Cycle Cost ($Million). The Scenario Decision Score ranges from 1 to 10 and is based on the decision science criteria established in Section 4 of this report. A larger value on the y-axis translates into a higher Cost-Benefit Score. Scenarios with the four highest Cost-Benefit Scores were further evaluated.

Blending provides the best cost-to-benefit ratio for concentrate management; therefore, it was included in each option. Tables ES.1 and ES.2 present Class-5 cost estimates for current and future scenarios of the projects, respectively. Estimates were based on standards of the Association for the Advancement of Cost Estimating (AACE). As shown in Table ES.1, the best potential concentrate management options for the current scenario of the project are:

- Blending
- Blending (followed by emergency hauling, current scenario only)

For the future scenario of the project, the best potential concentrate management options (Table ES.2) are:

- Blending followed by DWI (new or retrofit abandoned wells)
- Blending followed ocean outfall (new outfall or ConocoPhillips)
- Blending followed by PS/RO with final disposal via DWI (new or retrofit abandoned wells)

For the future scenario, the best option based on LCC is blending followed by construction of a new ocean outfall. This option has higher costs in the current scenario because most of the infrastructure required is sized for the ultimate concentrate flow. For example, the largest components of the capital costs for this option are construction of a new brine line and ocean outfall, which were sized based on a flow of 1.85 mgd for the future scenarios. In addition, other agencies in the Santa Maria area might want to cost share in an ocean outfall (Laguna County Sanitation District, for instance). If an ocean outfall is used, then the City should compare the LCC of enlarging the conveyance facilities for discharge of WWTP effluent to the LCC of implementing groundwater treatment.

DWI is another viable alternative for concentrate management. DWI cost estimates were based on conservative assumptions including a well capacity of 50 gallons per minute (gpm) and 1,000 pounds per square inch (psi) pressure head. If these assumptions are changed to 100 gpm and 500 psi, then the LCC for the DWI options are reduced from $44.5 million to $22 million, a savings of $22.2 million, which constitutes a reduction of approximately 50 percent. Also, DWI is a proven technology in the Santa Maria area.

For any concentrate management option, blending should be incorporated as part of the option. A conceptual design with a refined cost estimate should be developed for the blending alternative. The City should conduct further evaluation of DWI and construction of a new ocean outfall.

TABLE ES.1
Cost Summary for Concentrate Disposal Alternatives – Current Scenario of the Project

Concentrate Disposal Alternatives	Capital, $	O&M Cost, $/year
Blending	263,000	2,000
Blending + Emergency Hauling	576,000	1,319,000

TABLE ES.2
Cost Summary for Concentrate Disposal Alternatives – Future Scenario of the Project

Concentrate Disposal Alternatives	Capital ($)	O&M Cost ($/year)	Life Cycle Cost ($)
Blending + Ocean Outfall (ConocoPhillips Outfall)	13,140,000	3,155,000	$49,328,000
Blending + Ocean Outfall (New Outfall)	20,168,000	224,000	$22,737,000
Blending + DWI (Retrofit Abandoned Wells)	34,103,000	915,000	$44,598,000
Blending + DWI (New Wells)	56,103,000	1,135,000	$69,121,000
Blending + PS/RO + DWI (Retrofit Abandoned Wells)	22,846,000	1,349,000	$38,319,000
Blending + PS/RO + DWI (New Wells)	26,971,000	1,390,000	$42,914,000

A conceptual study should be performed on the viability of an ocean outfall that includes identification of other interested agency partners, a routing study to identify if any existing infrastructure is available for use, desktop evaluation of water quality and dilution ratios in the ocean, and an introductory workshop with regulators to review the potential project.

A detailed analysis of DWI in the Santa Maria area and preparation of a testing plan should be undertaken. The detailed analysis would include a geologic characterization of the area, a hydraulic analysis of DWI based on injection rates and formation pressures, review of data on existing wells that could be used for DWI, an introductory workshop with regulators to review the potential project, and refinement of DWI cost estimates. The testing plan should include criteria for selecting and re-entering an existing well that is suitable for conversion to a test injection well. Data collected during the testing phase should be used to refine cost estimates and for development of a conceptual system design.

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Appendices

Appendix

Appendix A *EDR versus RO Mass Balances*
Appendix B *ROSA Projections*
Appendix C *RO Concentrate Projections at 35% SWP Reliability –Current, Intermediate, and Future Scenarios*

Acronyms and Abbreviations

µg/L	microgram per liter
µS/cm	micro Siemens per centimeter
AACE	Association for the Advancement of Cost Estimating
afy	acre-feet per year
Basin	Santa Maria Groundwater Basin
bgs	below ground surface
BOD	biochemical oxygen demand
$CaCO_3$	calcium carbonate
CCC	California Coastal Commission
CCR	California Code of Regulations
CCWA	Central Coast Water Authority
CDFG	California Department of Fish and Game
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CIP	clean in place
City	City of Santa Maria
Cl-	chloride
cm/d	centimeters per day
CMT	Concentrate Management Tool
COD	chemical oxygen demand
CPES	CH2M HILL Parametric Estimating System
CW	constructed wetlands
CZMA	Coastal Zone Management Act
Delta	San Francisco Bay/Sacramento San Joaquin River Delta
dS/m	deciSiemens per meter

DWI	deep well injection
ECE	salinity in soil
ED	electrodialysis
EDR	electrodialysis reversal
EMS	enhanced membrane system
ET	evapotranspiration
FCC	forced circulation crystallizer
gpd	gallons per day
gpm	gallons per minute
HDPE	high-density polyethylene
HERO	High-Efficiency Reverse Osmosis
HMI	human-machine interface
hp	horsepower
IX	ion exchange
kW	kilowatt
kWh	kilowatt-hour
LCC	life-cycle cost
MCA	multi-criteria analysis
mg/L	milligram per liter
mgd	million gallons per day
MPA	Marine Protected Area
MTE	mechanical and thermal evaporation
MWD	Municipal Water District
NA+	sodium
NF	nanofiltration
NOAA fisheries	National Marine Service Fisheries, a division of the Department of Commerce
NPDES	National Pollutant Discharge Elimination System
NTS	natural treatment systems
NTU	Nephelometric turbidity unit

O&M	operations and maintenance
PLC	programmable logic controller
ppb	parts per billion
ppm	parts per million
PS	precipitative softening
psi	pounds per square inch
RO	reverse osmosis
RWQCB	Regional Water Quality Control Board
SARI	Santa Ana Regional Interceptor
SAV	submerged aquatic vegetation
SF	surface flow
SLC	State Lands Commission
SMP	salt management project
SSLO	South San Luis Obispo
SSLOCSD	South San Luis Obispo County Sanitation District
STLC	soluble threshold-limit concentration
SWAT	Strategic Water Analysis Team
SWP	state project water
SWQPA	State Water Quality Protection Area
SWRCB	State Water Resources Control Board
TCLP	toxicity characteristic leaching procedure
TDH	total dynamic head
TDS	total dissolved solids
TSS	total suspended solids
TTLC	total threshold-limit concentration
TUc	Chronic Toxicity Unit
UIC	underground injection control
USA	United States of America
USACE	United States Army Corps of Engineers

USDW	underground source of drinking water
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VF	peat-based vertical flow
VFD	variable frequency drive
VSEP	Vibratory Shear-Enhanced Processing
WDR	Waste Discharge Requirements
WWTP	wastewater treatment plan
ZLD	zero liquid discharge

Santa Barbara County

Application
for
Proposition 84
Planning Grant
Round 1

Santa Barbara County
IRWM Plan 2012

Santa Barbara County Water Agency

Prepared by

CH2MHILL®

September 28, 2010

Task 4: Establish Data Management System

Introduction

The objective of this task is to establish a DMS, which will set up a process of data collection, storage, and dissemination to IRWM participants, stakeholders, the public, and the State. The type of data that will be included for dissemination may include technical information such as designs, feasibility studies, reports, and information gathered for a specific project in any phase of development including the planning, design, construction, operation, and monitoring of a project. This task will also include cross referencing of existing data in various databases such as:

The WDL that DWR maintains for the state, which stores data from various monitoring stations, including groundwater level wells, water quality stations, surface water stage and flow sites, rainfall/climate observers, and water well logs (http://wdl.water.ca.gov/).

The SWAMP created by SWRCB has standards required for any group collecting or monitoring surface water quality data, using funds from Propositions 13, 40, 50, and 84 (http://www.swrcb.ca.gov/water_issues/programs/swamp).

The GAMA program is maintained by the SWRCB and provides a comprehensive assessment of water quality in water wells throughout the State. GAMA has two main components, the California Aquifer Susceptibility (CAS) assessment and the Voluntary Domestic Well Assessment Project. The CAS combines age dating of water and sampling for low-level volatile organic compounds to assess the relative susceptibility of public supply wells throughout the State. Because water quality in individual domestic wells is unregulated, the program is voluntary and will focus, as resources permit, on specific areas of the State. Constituents to be analyzed include nitrate, total and fecal coliform bacteria, methyl tert-butyl ether, and minerals (http://www.swrcb.ca.gov/gama).

DWR maintains the Integrated Water Resources Information System (IWRIS), which is a data management tool for water resources data and not a database. IWRIS is a web based GIS application that allows entities to access, integrate, query, and visualize multiple sets of data simultaneously (http://www.water.ca.gov/iwris/).

California Environmental Resources Evaluation System (CERES) is an information system developed and maintained by the California Natural Resources Agency to facilitate access to a variety of electronic data describing California's rich and diverse environments.

The DMS as proposed in the 2007 Santa Barbara IRWM Plan needs improvements to include or better provide access to more local water-related information. Currently, Santa Barbara County maintains existing water resources-related and IRWM-related data on the Santa Barbara County Water Agency website located at: http://www.countyofsb.org/pwd/water/index.htm. This site also provides the forum for sharing of reports, public meeting dates, agendas, meeting minutes, and annual reports. In-depth data are not currently stored on the website and the GIS capabilities are not explored extensively.

The objective of the DMS for IRWM Plan 2012 is to store project related data and make it publicly available, is to ensure efficient use of available data, stakeholder access to data, and to ensure the data generated by IRWM implementation activities can be

integrated into existing State databases. A part of the effort of this task will be to explore financial and staff resources to implement the scope under this task.

Task 4.1 Review the Existing Data within the IRWM Region and Identify Data Needs

This task includes identifying and analyzing documents and data that are pertinent to updating the IRWM Plan. The principal task will be to conduct review of previous studies, e.g., City of Santa Barbara's Water Supply Planning Study; SMVWCD annual report, Reports of Santa Barbara County, monitoring reports required by adjudicator. The data gaps/data needs within the IRWM region will be identified from the existing documents.

Where appropriate, data management will be coordinated with State and Federal databases in a format consistent with SWAMP and GAMA.

Task 4.2: Develop a Web-based DMS

One of the objectives of the DMS is to make the data publicly available. This task includes development of a web-based DMS with easy access to the participating agencies including stakeholders. The DMS will serve as a data repository for various types of data (for example, project related data, water quality data). Depending on the type of data, the components and protocols for data assimilation from various sources into the DMS will be developed. For example, a library of information for spatial data can be complied into a Geographic Information System (GIS) on a project by project basis and shared with the stakeholders.

The RWMG will decide on the use of an appropriate website for developing the DMS. The existing system on the website management will be explored at the time of implementation of DMS. For example, the existing Santa Barbara County Water Agency website located at: http://www.countyofsb.org/pwd/water/index.htm also may serve as a resource for the development of the DMS. This site may also be continued to provide the forum for sharing of reports, public meeting dates, agendas, meeting minutes, and annual reports. All data used to support development of the IRWM will be outlined in a database and available for review on the website, which will provide links to information available on partner agency websites. Any required documentation of Proposition 50 will be made available on the DMS website by appropriate project administrators.

Task 4.3 Establish Typical Data Collection Technique

For data gathering a common data collection protocol will be developed to keep the web-based DMS up-to-date. The protocol will describe the use of common and compatible methods for data gathering, analysis, monitoring, and reporting formats. The data collection technique will be developed in such a way that any update on the website will be notified automatically to all the participating stakeholders to bring their attention on the changes made on the data bank.

Task 4.4 Develop Procedure for Adding Data to the DMS

Separate account login information and the website links will be set up to provide access to the DMS for all the stakeholders. Guidelines for uploading the information to the DMS will be developed. Stakeholders will access the website to retrieve information and/or contribute data to the DMS using their account login information.

Task 4.5 Maintain the DMS

The responsibilities for maintenance of the DMS will be explored by the RWMG. The RWMG will select the best approach for maintaining the DMS. This task will include the following:

Develop guidelines for maintaining the DMS system

Update information as it becomes available

Update calendar of meetings and workshops to inform the stakeholders for the upcoming events

Encourage participation from various stakeholders

Resolve any data management related issues

Task 4.6 Data Quality Assurance/Quality Control

Quality assurance/quality control (QA/QC) of data is a major task that involves reviewing the quality of data. This task includes description of the validation or quality assurance/quality control measures that will be implemented by the RWMG for data generated and submitted for inclusion into the DMS.

Under the QA/QC task an effort will be taken to update the datasets and to prepare a consistent format for all types of data.

Task 4.7 Data Sharing

This task includes a protocol preparation on how data collected for IRWM project implementation will be transferred or shared between members of the RWMG and other interested parties throughout the IRWM region, including local, State, and federal agencies. The data saved in the DMS will be distributed to the stakeholders. Efforts will be made to keep compatibility with the State databases including SWAMP, WDL, GAMA program, CEIC, and the CERES.

RWMG and public workshops will serve as the primary venue for information sharing. Other settings where information can be shared include quarterly project progress meetings, monthly agency coordination meetings, e-mail subscription lists, and monthly e-mail newsletters. These forums will serve to continue to facilitate the ongoing data sharing between stakeholders as well as the expansion of the existing Water Agency data warehousing activities.