FINAL
MITIGATED NEGATIVE DECLARATION / INITIAL STUDY

FOR THE

SAN SEVAINE BASINS DEVELOPMENT PROJECT

Prepared for:

Inland Empire Utilities Agency
6075 Kimball Avenue
Chino, California 91708
(909) 993-1600

Prepared by:

Tom Dodson & Associates
2150 North Arrowhead Avenue
San Bernardino, California 92405
(909) 882-3612

December 2015

(This page is left intentionally blank)

Conformed
Notice of Determination

(This page is left intentionally blank)

State of California - Department of Fish and Wildlife

2016 ENVIRONMENTAL FILING FEE CASH RECEIPT

DFW 753.5a (Rev. 12/15/15) Previously DFG 753.5a

RECEIPT NUMBER:
36 — 01212016 — 29

STATE CLEARINGHOUSE NUMBER *(If applicable)*
2015101054

SEE INSTRUCTIONS ON REVERSE. TYPE OR PRINT CLEARLY.

LEAD AGENCY Inland Empire Utilities Agency	LEADAGENCY EMAIL N/A	DATE 01/21/2016
COUNTY/STATE AGENCY OF FILING San Bernardino		DOCUMENT NUMBER N/A

PROJECT TITLE
San Sevaine Basin Development Project

PROJECT APPLICANT NAME Inland Empire Utilities Agency	PROJECT APPLICANT EMAIL N/A		PHONE NUMBER (909) 993-1913
PROJECT APPLICANT ADDRESS 6075 Kimball Ave	CITY Chino	STATE CA	ZIP CODE 91708

PROJECT APPLICANT *(Check appropriate box)*

☐ Local Public Agency ☐ School District ☑ Other Special District ☐ State Agency ☐ Private Entity

CHECK APPLICABLE FEES:

☐ Environmental Impact Report (EIR)	$3,070.00	$	0.00
☑ Mitigated/Negative Declaration (MND)(ND)	$2,210.25	$	2,210.25
☐ Certified Regulatory Program document (CRP)	$1,043.75	$	0.00

☐ Exempt from fee
- ☐ Notice of Exemption (attach)
- ☐ CDFW No Effect Determination (attach)

☐ Fee previously paid (attach previously issued cash receipt copy)

☐ Water Right Application or Petition Fee *(State Water Resources Control Board only)*	$850.00	$	0.00
☑ County documentary handling fee		$	50.00
☐ Other		$	

PAYMENT METHOD: #9382

☐ Cash ☐ Credit ☑ Check ☐ Other

TOTAL RECEIVED $ 2,260.25

SIGNATURE X Melissa Crowell	AGENCY OF FILING PRINTED NAME AND TITLE Melissa Crowell, Deputy Clerk

Governor's Office of Planning & Research

JAN 22 2016

STATE CLEARINGHOUSE

NOTICE OF DETERMINATION

To: Office of Planning and Research
1400 Tenth Street, Room 121
Sacramento, CA 95814

and

San Bernardino County
Clerk of the Board of Supervisors
385 N. Arrowhead Avenue, 2nd Floor
San Bernardino, CA 92415

From: Inland Empire Utilities Agency
6075 Kimball Avenue
Chino, CA 91708

Subject: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

SAN SEVAINE BASIN DEVELOPMENT PROJECT
Project Title

SCH #2015101054	Joel Ignacio, P.E.	(909) 993-1913
State Clearinghouse Number	**Lead Agency Contact Person**	**Area Code/Telephone/Extension**

Project Location:
The proposed project is located in the City of Rancho Cucamonga, San Bernardino County, California. The proposed project sites are existing, south of Wilson Avenue; west of Interstate 15; and northwest of the Interstate 210 and Interstate 15 interchange. The project is located within Section 26 and 27, Township 1 North, Range 6 West, San Bernardino Baseline and Meridian, as depicted on the USGS – Devore Quadrangle, 7.5 Minute Series topographic map.

Project Description:
The Inland Empire Utilities Agency (IEUA) and the Chino Basin Watermaster (CBWM) are proposing the San Sevaine Basin Improvements Project (proposed project). The objective of this project is to increase the amount of recycled water (RW) and stormwater recharged into the Chino Groundwater Basin, specifically at the San Sevaine Basins located immediately north and west of the Interstate 210 and Interstate 15 interchange in the City of Rancho Cucamonga, San Bernardino County.

The existing San Sevaine Basins (Basins) consist of five individual basins covering approximately 130 acres. The Basins consist of five, soft-bottomed basins along San Sevaine Creek. Each basin has inlet and outlet structures that allow the capture and recharge of various types of water sources. The primary mode of conveyance between Basins is surface transfer, which restricts the operational flexibility of the system. These Basins are dual-use facilities which serve flood control and groundwater recharge functions. Currently, a total of 500 acre-feet per year (AFY) of RW and 300 AFY of stormwater (on average) is infiltrated into the groundwater basins at this location. The recommended Basins improvements will allow up to an estimated 8,100 AFY of additional RW, and up to an additional 2,700 AF of stormwater to be recharged at this location.

The Basins are owned by the San Bernardino County Flood Control District (SBCFCD). They were originally constructed for flood control mitigation to attenuate peak storm flows, but are now operated as multipurpose basins under a Four Party Agreement between SBCFCD, IEUA, CBWM, and the Chino Basin Water Conservation District (CBWCD) (stakeholders). The stakeholders previously invested in improvements of the Basins to allow them to be used for groundwater recharge. They were modified to allow the capture and recharge of stormwater and supplemental water (supplemental water consists of imported water and recycled water) in a conjunctive use program.

Governor's Office of Planning & Research

JAN 22 2016

STATE CLEARINGHOUSE

DATE FILED & POSTED
Posted On: 1/21/16
Removed On: 3/4/16
Receipt No: 36-01212016-029

Notice of Determination
Page 2 of 2

This is to advise that the Inland Empire Utilities Agency has approved the above described

■ Lead Agency ☐ Responsible Agency

project on Jan. 20, 2016 (Date) and has made the following determination regarding the project:

1. The project [☐ will ■ will not] have a significant effect on the environment.
2. ☐ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
   ■ A Mitigated Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures [■ were ☐ were not] made a condition of the approval of the project and a Mitigation Monitoring and Reporting Plan was adopted.
4. A Statement of Overriding Considerations [☐ was ■ was not] adopted for this project.

This is to certify that the Mitigated Negative Declaration/Initial Study and record of project approval is available to the general public at:

Inland Empire Utilities Agency located at 6075 Kimball Avenue, Chino, CA 91708

Signature	General Manager Title	1/20/16 Date

P. Joseph Grindstaff

Governor's Office of Planning & Research

JAN 22 2016

STATE CLEARINGHOUSE

MITIGATED NEGATIVE DECLARATION

Lead Agency: Inland Empire Utilities Agency
6075 Kimball Avenue
Chino, CA 91708

Contact: Joel Ignacio, P.E.
Phone: (909) 993-1913
Email: jignacio@ieua.org

Project Title: SAN SEVAINE BASIN DEVELOPMENT PROJECT

State Clearinghouse Number: SCH#2015101054

Project Location: The proposed project is located in the City of Rancho Cucamonga, San Bernardino County, California. The proposed project sites are existing, south of Wilson Avenue; west of Interstate 15; and northwest of the Interstate 210 and Interstate 15 interchange. The project is located within Section 26 and 27, Township 1 North, Range 6 West, San Bernardino Baseline and Meridian, as depicted on the USGS – Devore Quadrangle, 7.5 Minute Series topographic map.

Project Description: The Inland Empire Utilities Agency (IEUA) and the Chino Basin Watermaster (CBWM) are proposing the San Sevaine Basin Improvements Project (proposed project). The objective of this project is to increase the amount of recycled water (RW) and stormwater recharged into the Chino Groundwater Basin, specifically at the San Sevaine Basins located immediately north and west of the Interstate 210 and Interstate 15 interchange in the City of Rancho Cucamonga, San Bernardino County.

The existing San Sevaine Basins (Basins) consist of five individual basins covering approximately 130 acres. The Basins consist of five, soft-bottomed basins along San Sevaine Creek. Each basin has inlet and outlet structures that allow the capture and recharge of various types of water sources. The primary mode of conveyance between Basins is surface transfer, which restricts the operational flexibility of the system. These Basins are dual-use facilities which serve flood control and groundwater recharge functions. Currently, a total of 500 acre-feet per year (AFY) of RW and 300 AFY of stormwater (on average) is infiltrated into the groundwater basins at this location. The recommended Basins improvements will allow up to an estimated 8,100 AFY of additional RW, and up to an additional 2,700 AF of stormwater to be recharged at this location.

Finding: Inland Empire Utilities Agency's (IEUA) decision to implement this proposed project is a discretionary decision or "project" that requires evaluation under the California Environmental Quality Act (CEQA). Based on the information in the project Initial Study, LACSD has made a *preliminary* determination that a Mitigated Negative Declaration will be the appropriate environmental determination for this project to comply with CEQA.

Initial Study: Copies of the Mitigated Negative Declaration/Initial Study are available for public review at the Copies of the Mitigated Negative Declaration/Initial Study are available for review at the IEUA's office located at 6075 Kimball Avenue, Chino, CA 91708. The proposed Mitigated Negative Declaration was available for public review and comment from October 16, 2015 to November 16, 2015.

Mitigation Measures: All mitigation measures identified in the Initial Study are summarized on pages 53-55 and are proposed for adoption as conditions of the project. These measures will be implemented through a mitigation monitoring and reporting program if the Mitigated Negative Declaration is adopted.

Signature	General Manager Title	1/20/16 Date

TOM DODSON & ASSOCIATES
2150 N. ARROWHEAD AVENUE
SAN BERNARDINO, CA 92405
TEL (909) 882-3612 • FAX (909) 882-7015
E-MAIL tda@tdaenv.com

February 11, 2016

Clerk of the Board of Supervisors
County Government Center
385 North Arrowhead Avenue, 2nd Floor
San Bernardino, CA 92415-0130

Attention: Lynna Monell

On behalf of our client, Inland Empire Utilities Agency, we need to get confirmation about the following Notice of Determination that was filed with your office:

1. Notice of Determine filed 1-21-2016
   Receipt #36-01212016-29
   Lead Agency: Inland Empire Utilities Agency
   Project Title: "San Sevaine Basin Development Project"

This notice was filed and stamped with the "DATE FILE & POSTED" stamp; however, the second stamp "CLERK OF THE BOARD OF SUPERVISORS, *specific date* & COUNTY OF SAN BERNARDINO CALIFORNIA" stamp was not used. This notice was forwarded to the Office of Planning & Research, State Clearinghouse which accepted it; however, the project has applied for some State-funding and the State Water Board is requiring confirmation of this filing.

My office called earlier and spoke with Melissa who indicated that the"DATE FILE & POSTED" stamp accompanied by the "2016 ENVIRONMENTAL FILING FEE CASH RECEIPT" is official.

We need a confirmation signature of the above statement. Thank you.

Sincerely,

Tom Dodson

Tom Dodson

Attachments:
   Notice of Determination "San Sevaine Basin"
   Previous Confirmation Letter 12-2-15

CONFIRMATION:

San Bernardino County, California "CLERK OF THE BOARD OF SUPERVISOR" stamp is not required on environmental notices and that the "DATE FILE & POSTED" stamp accompanied by the "2016 ENVIRONMENTAL FILING FEE CASH RECEIPT" is official.

Notice of Determine filed 1-21-2016
Receipt #36-01212016-29
Lead Agency: Inland Empire Utilities Agency
Project Title: "San Sevaine Basin Development Project"

Confirmation Signature: L Monell

Print Name and Date: Lynna Monell 2/12/16

SAN BERNARDINO COUNTY

Clerk of the Board of Supervisors

LYNNA MONELL
Chief Deputy Clerk of the Board

385 North Arrowhead Avenue, 2nd Floor
San Bernardino, CA 92415-0130
email: lmonell@cob.sbcounty.gov
Office: 909.387.3842 | Fax: 909.387.4554

www.SBCounty.gov

(This page is left intentionally blank)

Comment Letters and Responses to Comments

(This page is left intentionally blank)

TOM DODSON & ASSOCIATES
2150 N. ARROWHEAD AVENUE
SAN BERNARDINO, CA 92405
TEL (909) 882-3612 • FAX (909) 882-7015
E-MAIL tda@tdaenv.com

MEMORANDUM

November 28, 2015

From: Tom Dodson

To: Mr. Joel Ignacio

Subj: Completion of the Mitigated Negative Declaration for the **San Sevaine Basin Development Project (SCH#2015101054)**

The Inland Empire Utilities Agency (IEUA or Agency) received five written comments on the proposed Mitigated Negative Declaration (MND) for the San Sevaine Basin Development Project (SCH#2015101054). CEQA requires a Negative Declaration, in this case with mitigation measures, to consist of the Initial Study, copies of the comments, any responses to comments as compiled on the following pages; and any other project related material prepared to address issues evaluated in the Initial Study or prepared as part of the planning review of the project.

For this project, the original Initial Study will be utilized as one component of the final MND package. The attached responses to comments, combined with the Initial Study and the Mitigation Monitoring and Reporting Program, constitute the final MND package that will be used by IEUA to consider the environmental effects of implementing the proposed project. The following parties submitted comments. These letters are addressed in the attached Responses to Comments:

1. State Office of Planning and Research, State Clearinghouse
2. City of Rancho Cucamonga
3. California Department of Fish and Wildlife
4. California Department of Transportation, District 8
5. San Bernardino County Department of Public Works

Because mitigation measures are required for this project to reduce potentially significant impacts to a less than significant level, the Mitigation Monitoring and Reporting Program (MMRP) attached to this package is required to be adopted as part of this final MND package by the Agency Board. Tom Dodson will be attending the public meeting on this project to address any questions that the Agency Board members may have regarding the adoption of the MND for the proposed project. This Initial Study/Mitigated Negative Declaration and the San Sevaine Basin Development Project will be considered by the Agency Board it its meeting on January 20, 2016. Do not hesitate to give me a call if you have any questions regarding the contents of this package.

Tom Dodson
Attachments

COMMENT LETTER #1

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

November 17, 2015

Joel Ignacio
Inland Empire Utility Agency
6075 Kimball Avenue
Chino, CA 91708

Subject: San Sevaine Basin Development Project
SCH#: 2015101054

Dear Joel Ignacio:

The State Clearinghouse submitted the above named Mitigated Negative Declaration to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on November 16, 2015, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

1-1

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

RESPONSES TO COMMENTS
LETTER #1
OFFICE OF PLANNING AND RESEARCH, STATE CLEARINGHOUSE

1-1 This is an acknowledgment letter verifying that the State Clearinghouse submitted the Initial Study and the Notice of Intent to Adopt a Mitigated Negative Declaration to selected state agencies for review, and that one state agency (California Department of Fish and Wildlife) submitted comments through the Clearinghouse by the close of the review period, which occurred on November 16, 2015. The State assigned this project the following tracking number, SCH #2015101054. This letter is for information only and does not require additional formal response.

Document Details Report
State Clearinghouse Data Base

SCH# **2015101054**
Project Title San Sevaine Basin Development Project
Lead Agency Inland Empire Utilities Agency

Type **MND** Mitigated Negative Declaration

Description The Inland Empire Utilities Agency and the Chino Basin Watermaster are proposing the San Sevaine Basin Improvements Project. The objective of this project is to increase the amount of recycled water and stormwater recharged into the Chino Groundwater Basin, specifically at the San Sevaine Basins located immediately north and west of the I-210 and I-15 interchange in the City of Rancho Cucamonga, San Bernardino County.

Lead Agency Contact

Name Joel Ignacio
Agency Inland Empire Utility Agency
Phone 909 993 1913 ***Fax***
email
Address 6075 Kimball Avenue
City Chino ***State*** CA ***Zip*** 91708

Project Location

County San Bernardino
City Rancho Cucamonga
Region
Lat / Long 34° 8' 6.5" N / 117° 29' 47" W
Cross Streets Wilson Avenue / I-15 & I-210
Parcel No.
Township 1N ***Range*** 6W ***Section*** 26/27 ***Base*** SBB&M

Proximity to:

Highways I-15 and 210
Airports
Railways
Waterways
Schools
Land Use

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Coastal Zone; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Noise; Public Services; Recreation/Parks; Soil Erosion/Compaction/Grading; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Supply; Wetland/Riparian; Wildlife; Landuse

Reviewing Agencies Resources Agency; Department of Fish and Wildlife, Region 6; Department of Parks and Recreation; Department of Water Resources; Office of Emergency Services, California; Resources, Recycling and Recovery; California Highway Patrol; Caltrans, District 8; Air Resources Board; State Water Resources Control Board, Division of Drinking Water; State Water Resources Control Board, Divison of Financial Assistance; State Water Resources Control Board, Division of Water Rights; Regional Water Quality Control Board, Region 8; Native American Heritage Commission; State Lands Commission

Date Received 10/16/2015 ***Start of Review*** 10/16/2015 ***End of Review*** 11/16/2015

Note: Blanks in data fields result from insufficient information provided by lead agency.

COMMENT LETTER #2

Mayor L. DENNIS MICHAEL • *Mayor Pro Tem* SAM SPAGNOLO
Council Members WILLIAM J. ALEXANDER, LYNNE B. KENNEDY, DIANE WILLIAMS
City Manager JOHN R. GILLISON

THE CITY OF RANCHO CUCAMONGA

RANCHO CUCAMONGA

November 12, 2015

Joel Ignacio, P.E.
Inland Empire Utilities Agency
6075 Kimball Avenue
Chino, CA 91708

SUBJECT: San Sevaine Basin Development Project – Notice of Intent to Adopt a Mitigated Negative Declaration in compliance with Section 21092.3 of Public Resources Code (NOI) SCH# 2015101054

Dear Mr. Ignacio:

2-1 The City of Rancho Cucamonga appreciates the opportunity to comment on the proposed Mitigated Negative Declaration (MND) for the San Sevaine Basin Development Project. This project proposes to construct and extend pipelines, and construct a pumping station to assist in managing recharge and water flows in the San Sevaine drainage basins.

2-2 As IEUA staff are aware, there has been a long standing and persistent problem with managing midge fly infestations and their impact on residential neighborhoods adjoining the project site. This has necessitated spraying and draining of the basins to keep the fly populations under control so as to not create a nuisance for people living next to the basin. This has been both costly, and a detriment to managing recharge in the basins. While the City understands that this project will move water to the upper basins and allow for faster recharge, it is unclear how exactly this will affect the managing of this important vector issue. In fact, nowhere in the document are the midge fly issues acknowledged, let alone an analysis of how this problem will be affected by the changes in recharge and standing water within the basins. The City has no way to explain to its residents whether this project will have positive or negative affect on this problem. The Mitigated Negative Declaration does not adequately address the impact on public services or the impact on environmentally based public nuisances resulting from the proposed project on the midge fly management problems.

In previous discussions with staff of IEUA, the depth of standing water and grading design of shallows in the basin bottoms were identified as contributors to the problem, and possible methods of mitigation. The Mitigated Negative Declaration does not adequately describe how the new management of flows, and any grading of the basins would affect midge fly populations. The public is left to hope that the greater infiltration rates will help the problem. There should be a careful analysis on the impacts of standing waters on midge fly populations associated with the new management plans resulting from the pipeline and pumping project.

2-3 The project proposes to construct a pumping facility and attendant electrical service. The exhibits in the MND do not clearly indicate the distance of the pumping from adjacent homes. It also does not appear to identify the noise impacts to these homes associated with running the electric pump motors. Reference is made to the construction related impacts on the homes from construction activity, but not the pump station itself. It could be that we simply could not find these references as a result of the

RESPONSES TO COMMENTS
LETTER #2
CITY OF RANCHO CUCAMONGA

2-1 Your comment is noted and will be retained in the project file that is made available to the Agency decision-makers prior to a decision on the proposed project.

2-2 Inland Empire Utilities Agency envisioned the proposed project as one of the solutions to the insect breeding (midge) issue encountered at San Sevaine Basin. According to discussions with the San Bernardino County Environmental Health Department Vector Control staff, a key to minimizing midge infestations is to minimize the time that standing water exists within the basins. Basin No. 5 has slower percolation than Basins 1, 2 and 3 and the higher percolation rate in these three basins will allow water recharge operations to be managed in a manner to minimize or eliminate the potential for insect breeding, particularly midges. Based on this comment, IEUA conferred with County Vector Control staff on the available management options for midges at the San Sevaine Basins. The following mitigation measure was developed for implementation to ensure that adequate attention and resources would be made available to prevent the midge problem from causing significant nuisance to nearby residential areas.

VIII-2 IEUA shall cooperate with the San Bernardino County Department of Environmental Health-Vector Control to develop a strategy to use recharge basins in a manner that minimizes occurrence of insect breeding, such as midges and mosquitos. Based on discussions with Vector Control professionals, the strategy shall include monitoring for presence of insect breeding and shall consider the following range of control measures for implementation: (a); water or pest management actions to minimize potential for insect breeding populations to grow into a public nuisance to nearby sensitive receptors (such as using basins with higher rates of percolation or using lights to attract and keep the midges at the basin) (b) use of short-lived, non-water polluting pesticides to control outbreaks of midges when necessary or pre-treatment of the basin floors prior to filling the basin; (c) using mechanical means (for example sprinklers) to maintain a disruptive surface of the water stored in a basin to discourage oviposition; and (d) use of water recharge management options developed based on past experience, such as operation in seasonally cooler weather. The strategy may be general (applying to all basins) or basin-specific and the strategy shall be compiled and available for implementation prior to initiating the additional groundwater recharge at the San Sevaine Basins.

This measure incorporates IEUA commitment of sufficient resources to manage the insect breeding issue to a less than significant impact level where sensitive populations occur adjacent to IEUA-operated recharge basins. IEUA will also engage an entomologist or comparable professional to specifically address the midge issue to assist in developing the midge control strategy.

2-3 A recycled water turnout system currently exists between San Sevaine Basin 5 and the 210 Freeway. When in use the system's operating noise levels which are within local ordinance limits are masked by the freeway's traffic noise. The new pump station is shown to be located below the line of sight of nearby residents and commuters at the bottom of San Sevaine Basin 5 (Figure 5) where the limited amount of pump noise will be attenuated both by distance/depth to nearby residents, the surrounding Basin 5 walls, and the submergence of the pumping system. Elevation difference is about 60 feet and the slope of the Basin 5 wall is covered by vegetation that will absorb any noise that propagates from the pump. The type of pump recently specified will be a submersible pump which is designed to be placed below the basin's water level. This will further mitigate any noise produced by the system.

2-3 cont. compressed timeline to review the document, but we conclude that the MND is inadequate if it fails to model the noise profile of the pump station and propose mitigation necessary to reduce the noise levels consistent with City ordinances and the Rancho Cucamonga General Plan. Figure 6 identifying the conceptual design of the pump system does not indicate whether it is below grade or designed in a manner which would mitigate any noise impacts. The MND is not adequate in that it does not completely and clearly identify impacts and mitigation of noise associated with the pumping station.

2-4 Based on the representations in the MND all construction access will occur from San Bernardino County Flood Control property. Since the precise access points are not clearly identified, it is not possible to determine if the construction activity will affect City streets or require hauling permits or access control during the course of construction. If permits are required pursuant to the Rancho Cucamonga Municipal Code, then the City of Rancho Cucamonga should be identified as a responsible agency and consultation and permitting should occur in connection with the preparation of the MND and the construction of the project.

2-5 The City appreciates the opportunity to review and comment on the MND for the project and requests to be notified of any proposed action by the IEUA Board to approve the San Sevaine Basin Development Project.

If you have any questions, please contact Jeff Bloom, Deputy City Manager, by phone at (909) 477-2750, ext. 4301, Monday through Thursday from 7:00 a.m. to 6:00 p.m., or e-mail at Jeff.Bloom@CityofRC.us at your convenience.

Sincerely,

John Gillison
City Manager

JG:JAB/ls

cc: City Council
Jeff Bloom, Deputy City Manager

2-4 There are three access points to the San Sevaine Basins: Wilson Avenue from the north; Cherry Avenue from the east; and East Avenue and the Basin access road located just north of Interstate 210. Since no construction will be conducted within any of these road rights-of-way, based on the proposed construction improvement where a new pipeline will be placed near the basin's surrounding access road and the placement of a pump station is below Basin 5 the project will not require any City encroachment permits. All construction activities, including staging areas, will occur within the boundary of the basins which is a part of the San Bernardino County's right-of-way. Hauling of material on or off-site will comply with all local municipal codes.

2-5 Your comment is noted and will be retained in the project file that is made available to the Agency decision-makers prior to a decision on the proposed project.

COMMENT LETTER #3

State of California - Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Inland Deserts Region
3602 Inland Empire Blvd., Suite C-220
Ontario, CA 91764
(909) 484-0459
www.wildlife.ca.gov

EDMUND G. BROWN, Jr., Governor
CHARLTON H. BONHAM, Director

November 16, 2015

Mr. Joel Ignacio
Inland Empire Utilities Agency
6075 Kimball Avenue
Chino, CA 91708

Subject: Initial Study and Proposed Mitigated Negative Declaration for the San Sevaine Basin Development Project
State Clearinghouse No. 2015101054

Dear Mr. Ignacio:

3-1 The Department of Fish and Wildlife (Department) appreciates the opportunity to comment on the Initial Study (IS) with Proposed Mitigated Negative Declaration (MND) for the San Sevaine Development Project (Project) [State Clearinghouse No. 2015101054]. The Department is responding to the IS and proposed MND as a Trustee Agency for fish and wildlife resources (California Fish and Game Code Sections 711.7 and 1802, and the California Environmental Quality Act [CEQA] Guidelines Section 15386), and as a Responsible Agency regarding any discretionary actions (CEQA Guidelines Section 15381), such as the issuance of a Lake or Streambed Alteration Agreement (California Fish and Game Code Sections 1600 *et seq.*) and/or a California Endangered Species Act (CESA) Permit for Incidental Take of Endangered, Threatened, and/or Candidate species (California Fish and Game Code Sections 2080 and 2080.1).

Project Description

3-2 The Project is located within the San Sevaine Basins 1-5, south of Wilson Avenue, west of Interstate 15, northeast of the Interstate 210 and Interstate 15 interchange, in the City of Rancho Cucamonga, San Bernardino County. The objective of this project is to increase the amount of recycled water and stormwater recharged into the San Sevaine Basins. A total of six alternatives are described and evaluated within Appendix 1 of the Initial Study. The Inland Empire Utilities Agency's (IEUA) preferred alternative (Alternative 5-A) proposes to increase the amount of recycled water and stormwater recharge through the expansion of recycled water recharge capability in Basins 1, 2, and 3. Proposed changes to the basins would allow up to an estimated 8,100 acre feet per year (AFY) of additional recycled water and 2,700 AFYof stormwater to be recharged in San Sevaine Basins.

RESPONSES TO COMMENTS
LETTER #3
CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

3-1 Your comment is noted and will be retained in the project file that is made available to the Agency decision-makers prior to a decision on the proposed project.

3-2 This is an accurate summary description of the proposed project.

Department Comments

Following review of the project description, biological resources section and Appendices 1 and 3 of the IS, the Department requests the following comments be addressed prior to the adoption of the proposed MND:

3-3

1. For any activity that will divert or obstruct the natural flow, or change the bed, channel, or bank (which may include associated riparian resources) of a river or stream or use material from a streambed, the project applicant (or "entity") must provide written notification to the Department pursuant to Section 1602 of the Fish and Game Code. Based on this notification and other information, the Department then determines whether a Lake and Streambed Alteration (LSA) Agreement is required. The Department's issuance of an LSA Agreement is a "project" subject to CEQA (see Pub. Resources Code 21065).

   Based on the information provided in the project description, the Department agrees that there are likely permanent and temporary impacts to areas subject to Fish and Game Code section 1602. The Department recommends early consultation and a site visit to determine if a notification is required for the impacts resulting from the installation of the inlets, pump station, and electrical support equipment within San Sevaine Basins, and considering appropriate mitigation options to offset potential impacts to these facilities. In addition, the Department recommends IEUA submit for an amendment to SAA No. 1600-2009-0072-R6 if the proposed project results in any changes to the activities covered under this existing routine maintenance Agreement. To obtain a Lake or Streambed Alteration notification package, please go to http://www.dfg.ca.gov/habcon/1600/forms.html.

3-4

2. The Department requests a description of all sources and corresponding outlets of recycled water and stormwater to be reclaimed within San Sevaine Basins, and the potential offsite impacts resulting from the diversion of this water. The description should include, at a minimum: 1) all locations likely to experience a decrease in water table or surface flows, 2) the estimated decrease in AFY at each location, 3) a description of the biological resources at each location, and 4) potential changes to the biological resources that may result from a reduction in water outputs. The CEQA document should contain sufficient, specific, and current biological information on the existing habitat and species at areas affected by the proposed project; measures to minimize and avoid sensitive biological resources; and mitigation measures to offset the loss of native flora and fauna and State waters.

3-3 As noted in the comment, IEUA already has a Streambed Alteration Agreement (SAA No. 1600-2009-0072-R6) for its operations and maintenance activities at 19 recharge basins within the Chino Groundwater Basin, including the San Sevaine Basins. Based on the proposed new facilities and revision in operations and maintenance activities (refer to responses to comments for Letter #2), IEUA will be in contact with the Department regarding the amendments to the existing SAA.

3-4 As indicated in the project description, IEUA's goal is to recharge additional recycled water and storm water into the San Sevaine Basins. Stormwater enters into Basins 1, 2, & 3 from the adjacent Flood Control channel diversion points and local storm drains. These conveyances collect stormwater flows from adjacent tributary areas and delivers them to the Basin during storm events. Basin 4 which is located south of Basin 3 has no subsurface inlet structures and only receives water when surface transferred from Basin 3. Basin 5 which is located downstream to the south-east of Basin 4 has local storm drains at three locations, one at the corner of the south and east basin walls and two on the north basin wall. The recycled water is provided by existing IEUA water reclamation facilities (Regional Plant No. 4, RP-4) and this water is delivered via an existing stormwater distribution system with outlets into Basin 5. The proposed project will install new outlets into Basins 1, 2 and 3 at the west basin walls below the basin floor. These new outlets will allow recycled water to be received directly from the existing recycled water turnout near Basin 5. The outlets will also share the same conveyance piping that will allow captured stormwater from Basin 5 to be pumped up to Basins 1, 2, and 3. The new pump station will be placed within Basin 5 at the corner of north basin wall and the existing conservation berm. The conveyance piping from the pump station will cross over the berm and be placed over the access roads. All stormwater that is locally detained by the conservation berm in Basin 5 can be transferred to Basins 1, 2, and 3 at the proposed rate of 7,400 gallon per minute. This rate is based on dewatering the basin at the height of the conservation berm within a 9 to 10 day period after a storm event.

3-5 The Department appreciates the opportunity to comment on the Initial Study (IS) with Proposed Mitigated Negative Declaration (MND) for the San Sevaine Development Project (Project) [State Clearinghouse No. 2015101054] and requests that the comments be addressed prior to the adoption of the MND. If you should have any comments pertaining to this letter, please contact Claire Ingel at claire.ingel@wildlife.ca.gov or by phone at 909-484-3979.

Sincerely,

for

Leslie MacNair
Regional Manager
Inland Deserts Region

cc: State Clearinghouse, Sacramento

3-5 Your comment is noted and will be retained in the project file that is made available to the Agency decision-makers prior to a decision on the proposed project.

DEPARTMENT OF TRANSPORTATION
DISTRICT 8
PLANNING (MS 725)
464 WEST 4th STREET, 6th FLOOR
SAN BERNARDINO, CA 92401-1400
PHONE (909) 388-7017
FAX (909) 383-5936
TTY 711
www.dot.ca.gov/dist8

COMMENT LETTER #4

Serious Drought.
Help save water!

November 16, 2015

File: 08-SBd-210-PM 11.049
08-SBd-15-PM 8.871

Joel Ignacio, P.E.
Inland Empire Utilities Agency
6075 Kimball Avenue
Chino, CA 91708

San Sevaine Basin Development Project – Initial Study

Dear Mr. Ignacio:

Thank you for providing the California Department of Transportation (Department) the opportunity to review and comment on the Initial Study for the San Sevaine Basin Development Project (Project). The proposed project located at the northwest quadrant of State Route 210 and Interstate 15 interchange in the City of Rancho Cucamonga. The project proposes the inclusion of additional San Sevaine flood control basins, the construction of new delivery pipelines, and improvement of inlet facilities covering approximately 130 acres.

4-1

As the owner and operator of the State Highway System (SHS), it is our responsibility to coordinate and consult with local jurisdictions when proposed development may impact our facilities. As the responsible agency under the California Environmental Quality Act, it is also our responsibility to make recommendations to offset associated impacts with the proposed project. Although the project is under the jurisdiction of San Bernardino County, due to the project's potential impact to State facilities, it is also subject to the policies and regulations that govern the SHS. We offer the following comments:

- To ensure that proposed site grading and drainage design does not result in an adverse impact to State Right-of-Way, we ask that a requirement to review plans and provide written construction clearance be included among the project conditions of approval. Submit two hard and electronic copies of site grading and drainage plans, prior to issuance of construction permits.

4-2

The Department has the discretionary authority to issue special permits for the movement of vehicles/loads exceeding statutory limitations on the size, weight, and loading of vehicles contained in Division 15 of the California Vehicle Code. Requests for such special permits require the completion of a Transportation Permit.

RESPONSES TO COMMENTS
LETTER #4
CALIFORNIA DEPARTMENT OF TRANSPORTATION
DISTRICT 8 (CALTRANS)

4-1 Your comment is noted and will be retained in the project file that is made available to the Agency decision-makers prior to a decision on the proposed project.

4-2 All aspects of the proposed project will be conducted within the existing fenced boundary of the San Sevaine Basins. Regardless, once the engineering drawings are finalized, a copy of these drawings will be provided to Caltrans for review and comment as requested.

For information regarding Transportation Permit application for travel within the State of California contact:

Transportation Permits Office
P.O. Box 942874, MS #41
Sacramento, CA 94274-0001
4-3 Main number: (916) 322-1297
http://www.dot.ca.gov/hq/traffops/permits/contact.htm

These recommendations are preliminary and summarize our review of materials provided for our evaluation. Please continue to keep us informed of this project and other future updates, which could potentially impact the SHS and interfacing transportation facilities. If you have any questions or need to contact us, please do not hesitate to contact Adrineh Melkonian at (909) 806-3928 or myself at (909) 383-4557.

Sincerely,

Mark Roberts

MARK ROBERTS
Office Chief
Intergovernmental Review, Community and Regional Planning

4-3 Your comment is noted and will be retained in the project file that is made available to the Agency decision-makers prior to a decision on the proposed project.

COMMENT LETTER #5

825 East Third Street, San Bernardino, CA 92415-0835 | Phone: 909.387.8109 Fax: 909.387.7876

www.SBCounty.gov

SAN BERNARDINO COUNTY

Department of Public Works

- Environmental & Construction • Flood Control
- Operations • Solid Waste Management
- Surveyor • Transportation

Gerry Newcombe
Director

November 17, 2015

File: 10(ENV)-4.01

Inland Empire Utilities Agency
Joel Ignacio, P.E.
PO Box 9020
Chino Hills, CA. 91709
jignacio@ieua.org
tda@tdaenv.com

RE: CEQA – NOTICE OF AVAILABILITY OF A MITIGATED NEGATIVE DECLARATION FOR THE SAN SEVAINE BASIN DEVELOPMENT PROJECT FOR THE INLAND EMPIRE UTILITIES AGENCY

Dear Mr. Ignacio:

5-1 Thank you for giving the San Bernardino County Department of Public Works the opportunity to comment on the above-referenced project. We received this request on October 19, 2015, and pursuant to our review, the following comments are provided:

Water Resources Division (Mary Lou Mermilliod, PWE III, 909-387-8213):

5-2

1. It appears encroachment onto Flood Control District Right-of-Way is anticipated. Prior to construction, a permit shall be obtained from the Flood Control Permits/Operations Support Division.

2. We recommend that the most current Division of Safety of Dams guidelines for construction within the basin be followed and enforced by the City.

Environmental Management Division (Marc Rodabaugh, Stormwater Program Manager, 909-387-8112):

5-3

1. Page 54, Item IX-1: Please revise the previous out of date permit with the current MS4 Permit (R8-2010-0036).

Environmental Management Division (Brandy Wood, Ecological Resource Specialist, 909-387-7971):

5-4

1. San Sevaine Basins 2 and 3, including the bottoms of the basins, are currently vegetated with Riversidean alluvial fan sage scrub (RAFSS). The proposed additional water spreading would have an impact to this vegetation and should be addressed in the IS.

5-5

2. The District requests all areas disturbed during the grading, trenching of pipeline, installation of inlet and outlet structures, installation of the pump station, and installation of flow control valves

RESPONSES TO COMMENTS
LETTER #5
SAN BERNARDINO COUNTY
DEPARTMENT OF PUBLIC WORKS

5-1 Your comment is noted and will be retained in the project file that is made available to the Agency decision-makers prior to a decision on the proposed project.

5-2 IEUA works closely with County Flood Control at many of its basins in the west valley, including the San Sevaine Basins. We will contact the County to obtain any required permits for the project activities identified in the Initial Study/Mitigated Negative Declaration within San Sevaine Basins. IEUA will also follow current Division of Safety of Dams guidelines for construction within the basins.

5-3 Your comment is noted and will be retained in the project file that is made available to the Agency decision-makers prior to a decision on the proposed project. Based on this comment, the current MS4 Permit number is hereby incorporated into the Initial Study.

5-4 The existence of the RAFSS is identified within the biology discussion of the Initial Study (Section V) and in Appendix 3. Since the function of the basins is to receive diverted stormwater to reduce downstream flood hazards, the RAFSS occupying the bottom of Basins 2 and 3 is not a permanent habitat. Further, the RAFSS on the upper slopes will not be inundated in either Basin. Should the RAFSS habitat still occupy Basins 2 and 3 when this project is implemented, a few acres of this habitat will be eliminated and replaced by aquatic habitat from use of the basins for groundwater recharge.

5-5 Most of the project areas will be located at the bottom of basins or within existing roadways maintained to support functioning of all the basins. However, where ground is disturbed in conjunction with this project that is to remain undisturbed in the future, IEUA will revegetate these areas with RAFSS seed. This will be coordinated with County staff.

5-5 cont. and gates and any facility maintenance, be revegetated by hydroseeding with RAFSS seed mixture and appropriate mulch and soil stabilizer.

5-6

3. Page 22 of the Initial Study, section b, discusses mitigation measures incorporated to lessen the impact of the proposed project. It states "To offset the impact to this jurisdictional area by the proposed project, IEUA concludes that the additional aquatic habitat created within the Basins by the proposed project fully offsets the small loss of habitat lost to the inlets, pump station and electrical support equipment." San Bernardino County Flood Control District land cannot be used as mitigation unless first authorized by the District.

5-7

4. Page 22 of the Initial Study, section c states "The proposed project will not directly alter any of these wetland areas, and with greater recharge activities following completion of the proposed project, additional wetlands may be created within the Basins. Thus, the proposed project's potential effects to such resources are considered to be less than significant." The District has a responsibility to maintain these basins as flood control basins. Wetland vegetation is a sensitive habitat, regulated by several state and federal agencies, and impacts to this vegetation community should be addressed in the IS. The District requests that proposed mitigation be changed as the creation of wetland habitat to mitigate for the proposed project would pass the mitigation requirement on to the District.

If you have any questions, please contact the individuals who provided the specific comment, as listed above.

Sincerely,

NIDHAM ARAM ALRAYES, MSCE, PE, QSD/P
Public Works Engineer III
Environmental Management

NAA:PE:nh

5-6 IEUA understands that County property cannot be offered as mitigation without County permission. However, that is not what is being identified to offset project impacts to the floor of the basins. IEUA does have permission to use the basins for groundwater recharge purposes and this often results in standing water in a basin for short periods. It is this use of the basins for recharge, which results in creating temporary aquatic habitat that IEUA finds sufficient to offset to disturbing areas under the jurisdiction of the regulatory agencies.

5-7 This comment raises an interesting issue. But first as noted, there are no wetlands affected by this project. However, one of the issues of which Flood Control is well aware is that when water is applied to the basin floors (from flooding or from recharging) wetland vegetation grows rapidly and it is this growth that requires maintenance. This inevitably results in temporary wetland habitat occurring at basins used for groundwater recharge. This is why IEUA implements maintenance activities within the basins, such as those proposed, to remove such vegetation on a periodic basis (for which we have permits from all the regulatory agencies. Thus, an untended, and positive, impact is the creation of some temporary wetland vegetation for which IEUA is responsible to maintain on a periodic basis. It is this temporary creation and removal of wetland habitat that is being referenced in the comment cited.

Mitigation Monitoring and Reporting Plan

(This page is left intentionally blank)

INLAND EMPIRE UTILITIES AGENCY
SAN SEVAINE BASINS DEVELOPMENT PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementation Schedule	Verification
Air Quality III-1 Use best available control measures during soil disturbance. The menu of enhanced dust control measures includes the following: • Limit the disturbance "footprint" to as small an area as practical. • Water all active construction areas at least twice daily. • Cover all off-site haul trucks or maintain at least 2 feet of freeboard. • Pave or apply water four times daily to all unpaved parking or staging areas. • Sweep or wash any site access points daily of any visible dirt deposition on any public roadway. • Cover or water twice daily any on-site stockpiles of debris, dirt or other dusty material. • Suspend all operations on any unpaved surface if winds exceed 25 mph.	This measure shall be incorporated into the construction contract when it is prepared. This measure shall be implemented and monitored by the Contractor during construction. Field notes documenting implementation shall be maintained onsite by the Contractor.	A copy of the construction contract shall be retained in the project file. Verification of implementation shall be based on field inspections by Agency inspection personnel during construction. Field notes documenting verification shall be retained in the project file.

Source	Responsible Party	Status / Date / Initials
Initial Study	IEUA/Contractor	

Mitigation Measure	Implementation Schedule	Verification
Air Quality III-2 Limit allowable idling to 5 minutes for trucks and heavy equipment before shutting the equipment down.	This measure shall be incorporated into the construction contract when it is prepared. This measure shall be implemented and monitored by the Contractor during construction. Field notes documenting implementation shall be maintained onsite by the Contractor.	A copy of the construction contract shall be retained in the project file. Verification of implementation shall be based on field inspections by Agency inspection personnel during construction. Field notes documenting verification shall be retained in the project file.

Source	Responsible Party	Status / Date / Initials
Initial Study	IEUA/Contractor	

INLAND EMPIRE UTILITIES AGENCY
SAN SEVAINE BASINS DEVELOPMENT PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementation Schedule		Verification	
Air Quality III-3 Utilize Tier 3 rated diesel engines for off-road construction equipment.	This measure shall be incorporated into the construction contract when it is prepared. This measure shall be implemented and monitored by the Contractor during construction. Field notes documenting implementation shall be maintained onsite by the Contractor.		A copy of the construction contract shall be retained in the project file. Verification of implementation shall be based on field inspections by Agency inspection personnel during construction. Field notes documenting verification shall be retained in the project file.	
	Source	**Responsible Party**		**Status / Date / Initials**
	Initial Study	IEUA/Contractor		

Mitigation Measure	Implementation Schedule		Verification	
Air Quality III-4 In order to keep NOx emissions below the significance threshold, the following construction sequencing shall be implemented. Basin three and four piping and diversion structure construction and basin five excavation may overlap. Also, basin three and four piping and basin eight grading and excavation may also overlap. Basin five and Basin eight construction activities must occur in sequence and not overlap.	This measure shall be incorporated into the construction contract when it is prepared. This measure shall be implemented and monitored by the Contractor during construction.		Verification of implementation shall be based on field inspections by Agency inspection personnel that verify the measure is being implemented during construction. Field notes documenting verification shall be retained in the project file.	
	Source	**Responsible Party**		**Status / Date / Initials**
	Initial Study	IEUA / Contractor		

INLAND EMPIRE UTILITIES AGENCY
SAN SEVAINE BASINS DEVELOPMENT PROJECT
MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure	Implementation Schedule	Verification
Biological Resources IV-1 Burrowing Owl. In compliance with the CDFW Staff Report on Burrowing Owl Mitigation (CDFW 2012) the Project proponent shall ensure that a pre-construction burrowing owl survey is conducted at least 30 days prior to construction activities. A qualified Biologist shall conduct the survey to determine if there are any active burrowing owl burrows within or adjacent to (within 300 feet) the impact area. If an active burrow is observed outside the nesting season (September 1 to January 31) and the burrow is within the impact area, a Burrowing Owl Exclusion Plan shall be prepared and submitted to CDFW for approval, outlining standard burrowing owl burrow closing procedures used to exclude burrowing owls (e.g., using passive relocation with one-way doors). The loss of any active burrowing owl burrow territory shall be mitigated through replacement of habitat and burrows at no less than a 1:1 ratio. If an active burrow is observed outside the nesting season (i.e., between September 1 and January 31) and the burrow is not within the impact area, construction work shall be restricted within 160 to 1,605 feet of the burrow depending on the time of year and level of disturbance near the site in accordance with guidelines specified by the CDFW.	Construction shall occur outside of the burrowing owl nesting season or a copy of the field survey documenting no nesting owls shall be completed prior to initiating construction within the nesting season.	Agency personnel shall document the dates of construction. If construction is proposed to occur within the owl nesting season, a copy of the field survey documenting the absence of nesting owls shall be retained in the project file.

Source	Responsible Party	Status / Date / Initials
Initial Study	IEUA	

Mitigation Measure	Implementation Schedule	Verification
Biological Resources IV-2 Nesting Birds. A migratory nesting bird survey of the Project's impact footprint shall be conducted by a qualified biologist within 2 weeks and 3 days prior to initiating vegetation clearing or ground disturbance. If active nests are found during the pre-construction nesting bird surveys, a Nesting Bird Plan (NBP) will be prepared and implemented. At a minimum the NBP will include guidelines for addressing active nests, establishing buffers, monitoring, and reporting. The NBP will include a copy of maps showing the location of all nests and an appropriate buffer zone around each nest sufficient to protect the nest from direct and indirect impact. The size and location of all buffer zones, if required, shall be determined by the biologist in consultation with the CDFW, and shall be based on the nesting species, its sensitivity to disturbance, and expected types of disturbance. The nests and buffer zones shall be field checked weekly by a qualified biological monitor. The approved buffer zone shall be visually marked in the field, which no vegetation clearing or ground disturbance shall commence until the qualified biologist has determined the nest in question has become inactive (failed or successful with fledged young birds) and a monitoring report has been submitted to the CDFW for review and approval. Construction within the designated buffer area shall not proceed until approved by the site biologist.	Construction shall occur outside of the nesting season or a copy of the field survey documenting no nesting birds shall be completed prior to initiating construction within the nesting season.	Agency personnel shall document the dates of construction. If construction is proposed to occur within the nesting season, a copy of the field survey documenting the absence of nesting birds shall be retained in the project file.

Source	Responsible Party	Status / Date / Initials
Initial Study	IEUA	

Mitigation Measure	Implementation Schedule	Verification
Geology and Soils VI-1 The SWPPP will include appropriate best management practices (BMPs) to prevent surface runoff with excessive sediment from leaving the project site and to address the potential for remediating any accidental spills of petroleum products that occur during construction activities. The final SWPPP shall be compiled prior to initiating construction. BMPs to be implemented in the SWPPP may include but not be limited to: • The use of silt fences; • The use of temporary stormwater desilting or retention basins; • The use of water bars to reduce the velocity of stormwater runoff; • The use of wheel washers on construction equipment leaving the site • The washing or sweeping of silt from public roads at the access point to the site to prevent the tracking of silt and other pollutants from the site onto public roads. • The storage of excavated material shall be kept to the minimum necessary to efficiently perform the construction activities required. Excavated or stockpiled material shall not be stored in water courses or other areas subject to the flow of surface water. • Where feasible, stockpiled material shall be covered with water proof material during rain events to control erosion of soil from the stockpiles.	The SWPPP shall be completed by the Contractor prior to initiating construction and provided to the Agency. The SWPPP shall be implemented during construction.	A copy of the SWPPP shall be retained in the project file and at the construction job site. Field inspections shall verify that the best management practices required by a project specific SWPPP are effective in controlling erosion and water quality degradation, and a copy of inspection notes shall be retained in the project file.

Source	Responsible Party	Status / Date / Initials
Initial Study	IEUA/Contractor	

Mitigation Measure	Implementation Schedule	Verification
Geology and Soils VI-2 Prior to completing the proposed project, project-related disturbed areas shall be stabilized to prevent the discharge of runoff from the project sites in a manner that could initiate erosion or sedimentation. A variety of stabilization measures may be used including: grading the site so all runoff is delivered to the basins, chemical stabilizers, gravel cover, mulch or other means to prevent the site from becoming a source of polluted surface runoff shall be installed.	This measure shall be incorporated into the project final design and the construction contract. These stabilization measures shall be implemented during construction before it is complete.	A copy of the construction contract shall be retained in the project file. Verification of implementation shall be based on field inspections by Agency inspection personnel that verify the measure is being implemented during construction. Field notes documenting verification shall be retained in the project file.

Source	Responsible Party	Status / Date / Initials
Initial Study	IEUA/Contractor	

Mitigation Measure	Implementation Schedule	Verification
Hazards and Hazardous Materials VIII-1 If petroleum products are accidentally released to the environment during any phase of construction, the Agency shall require the area of contamination to be defined; shall require the removal of any contaminated soil or material from the contaminated area; and ensure that any area exposed to accidentally released contaminants are remediated to a threshold that meets regulatory requirements established by law or agencies overseeing the remediation.	This measure shall be incorporated into the construction contract. This measure shall be implemented by the Contractor during construction when contamination is encountered within the construction area.	Verification of implementation shall be based on field inspections by Agency inspection personnel during construction. A record of findings at any contaminated site shall be developed and retained in the Agency project file. Documentation of all remediation actions, including ultimate disposal or treatment, shall be included in the Agency project file.

Source	Responsible Party	Status / Date / Initials
Initial Study	Contractor / IEUA	

Mitigation Measure	Implementation Schedule	Verification
Hydrology and Water Quality IX-1 The construction contractor shall prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) which specifies Best Management Practices that will be implemented to prevent construction pollutants from contacting stormwater with the intent of keeping all products of erosion from moving offsite. The SWPPP shall be developed with the goal of achieving a reduction in pollutants both during and following construction to control storm water runoff to the maximum extent practicable based on available, feasible best management practices. The SWPPP and the monitoring program for the construction project shall be consistent with the requirements of the latest version of the Santa Ana Regional Board's NPDES Permit No. CAS618036, Order No. R8-2002-0012 for San Bernardino County. The following items should be included in the SWPPP: • Stockpiled material should not be stored in areas which are subject to the erosive flows of water. • Measures such as the use of straw bales, sandbags, silt fencing or detention basins shall be used to capture and hold eroded material for future cleanup. • Rainfall will be prevented from entering material and waste storage areas and pollution-laden surfaces.	The SWPPP shall be completed by the Contractor prior to initiating construction and provided to the Agency. The SWPPP shall be incorporated into the construction contract and implemented by the Contractor during construction.	A copy of the SWPPP shall be retained in the project file and at the construction job site. Field inspections by the Contractor shall verify that the best management practices required by the SWPPP are effective in controlling erosion and water quality degradation, and a copy of inspection notes shall be retained in the project file. Agency inspectors will verify that the Contractor is complying with the requirement to implement the SWPPP.

Mitigation Measure	Implementation Schedule		Verification	
IX-1 (cont.) • Construction-related contaminants will be prevented from leaving the site and polluting waterways. • A spill prevention control and remediation plan to control release of hazardous substances.				
	Source	**Responsible Party**		**Status / Date / Initials**
	Initial Study	IEUA/Contractor		

Mitigation Measure	Implementation Schedule		Verification	
Noise XII-1 All construction vehicles and fixed or mobile equipment shall be equipped with properly operating and maintained mufflers.	This measure shall be incorporated into the construction contract. This measure shall be implemented and monitored by the Contractor during construction. Field notes documenting implementation shall be maintained onsite by the Contractor.		Verification of implementation shall be based on field inspections by Agency inspection personnel during construction. Field notes documenting verification shall be retained in the project file.	
	Source	**Responsible Party**		**Status / Date / Initials**
	Initial Study	IEUA/Contractor		

Mitigation Measure	Implementation Schedule		Verification	
Noise XII-2 All employees that will be exposed to noise levels greater than 75 dB over an 8-hour period shall be provided with adequate hearing protection devices to ensure no hearing damage will result from construction activities.	This measure shall be incorporated into the construction contract when it is prepared. This measure shall be implemented and monitored by the Contractor during construction. Field notes documenting implementation shall be maintained onsite by the Contractor.		Verification of implementation shall be based on field inspections by Agency inspection personnel during construction. Field notes documenting verification shall be retained in the project file.	
	Source	**Responsible Party**		**Status / Date / Initials**
	Initial Study	IEUA/Contractor		

Mitigation Measure	Implementation Schedule	Verification
Noise XII-3 If equipment is being used that can cause hearing damage at adjacent noise receptor locations (distance attenuation shall be taken into account), portable noise barriers shall be installed that are demonstrated to be adequate to reduce noise levels at receptor locations below hearing damage thresholds.	This measure shall be incorporated into the construction contract when it is prepared. This measure shall be implemented and monitored by the Contractor during construction. Field notes documenting implementation shall be maintained onsite by the Contractor.	Verification of implementation shall be based on field inspections by Agency inspection personnel during construction. Field notes documenting verification shall be retained in the project file.

Source	Responsible Party	Status / Date / Initials
Initial Study	IEUA/Contractor	

Mitigation Measure	Implementation Schedule	Verification
Noise XII-4 Construction staging areas shall be located as far from adjacent sensitive receptor locations as possible at each facility, for example adjacent to the southern end of Basin 5.	This measure shall be incorporated into the construction contract when it is prepared. This measure shall be implemented and monitored by the Contractor during construction. Field notes documenting implementation shall be maintained onsite by the Contractor.	Verification of implementation shall be based on field inspections by Agency inspection personnel during construction. Field notes documenting verification shall be retained in the project file.

Source	Responsible Party	Status / Date / Initials
Initial Study	IEUA/Contractor	

Mitigation Measure	Implementation Schedule	Verification
Noise XII-5 Good relations with the local community shall be maintained where construction is scheduled, such as by keeping the community informed of the schedule, duration, and progress of the construction to minimize the public objections of unavoidable noise. Communities (City of Rancho Cucamonga and San Bernardino County) should be notified in advance of the construction and the expected temporary and intermittent noise increases during the construction period.	This measure shall be incorporated into the construction contract when it is prepared. This measure shall be implemented and monitored by the Contractor during construction. Field notes documenting implementation shall be maintained onsite by the Contractor.	Verification of implementation shall be based on field inspections by Agency inspection personnel during construction. Field notes documenting verification shall be retained in the project file.

Source	Responsible Party	Status / Date / Initials
Initial Study	IEUA / Contractor	

Mitigation Measure		Implementation Schedule	Verification
Noise			
XII-6	The IEUA will establish a noise complaint/response program and will respond to any noise complaints received for this project by measuring noise levels at the affected receptor. A sign shall be placed where nearby residents can read it and identify a point of contact at IEUA to make a noise complaint. If the noise level exceeds an Ldn of 65 dBA exterior or an Ldn of 45 dBA interior at the receptor, IEUA will implement adequate measures to reduce noise levels to the acceptable thresholds, including scheduling specific construction activities to avoid conflict with adjacent sensitive receptors.	This measure shall be incorporated into the construction contract when it is prepared. This measure shall be implemented and monitored by the Contractor during construction. Field notes documenting implementation shall be maintained onsite by the Contractor.	Verification of implementation shall be based on field inspections by Agency inspection personnel during construction. Field notes documenting verification shall be retained in the project file.

Source	Responsible Party	Status / Date / Initials
Initial Study	IEUA/Contractor	

Mitigation Measure		Implementation Schedule	Verification
Additional mitigation measure developed as a response to comments.			
VIII-2	IEUA shall cooperate with the San Bernardino County Department of Environmental Health-Vector Control to develop a strategy to use recharge basins in a manner that minimizes occurrence of insect breeding, such as midges and mosquitos. Based on discussions with Vector Control professionals, the strategy shall include monitoring for presence of insect breeding and shall consider the following range of control measures for implementation: (a); water or pest management actions to minimize potential for insect breeding populations to grow into a public nuisance to nearby sensitive receptors (such as using basins with higher rates of percolation or using lights to attract and keep the midges at the basin) (b) use of short-lived, non-water polluting pesticides to control outbreaks of midges when necessary or pre-treatment of the basin floors prior to filling the basin; (c) using mechanical means (for example sprinklers) to maintain a disruptive surface of the water stored in a basin to discourage oviposition; and (d) use of water recharge management options developed based on past experience, such as operation in seasonally cooler weather. The strategy may be general (applying to all basins) or basin-specific and the strategy shall be compiled and available for implementation prior to initiating the additional groundwater recharge at the San Sevaine Basins.	The strategy shall be completed prior to initiating construction on the San Sevaine Development Project. The vector control strategies shall be implemented concurrent with water recharge activities at these basins if or when vector populations are anticipated or detected..	A copy of the strategy shall be retained by IEUA within the project file. Implementation of any of the control strategies shall be documented by IEUA basin management personnel. The documentation shall be maintained in the project file.

Source	Responsible Party	Status / Date / Initials
Initial Study	IEUA/Contractor	

(This page is left intentionally blank)

Draft MND and Initial Study for San Sevaine Basin Development Project

(This page is left intentionally blank)

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

To: San Bernardino County Clerk of the Board 385 North Arrowhead Avenue San Bernardino, CA 92415 and Office of Planning and Research State Clearinghouse 1400 Tenth Street Sacramento, CA 95814	From: Inland Empire Utilities Agency 6075 Kimball Avenue Chino, CA 91708

Subject: Filing of Notice of Intent to Adopt a Mitigated Negative Declaration in compliance with Section 21092.3 of the Public Resources Code.

Project Title

San Sevaine Basin Development Project

Not Yet Assigned	Joel Ignacio, P.E.	(909) 993-1913
State Clearinghouse Number	**Lead Agency Contact Person**	**Telephone Number**

Project Location

The proposed project is located in the City of Rancho Cucamonga, San Bernardino County, California. The proposed project sites are existing, south of Wilson Avenue; west of Interstate 15; and northwest of the Interstate 210 and Interstate 15 interchange. The project is located within Section 26 and 27, Township 1 North, Range 6 West, San Bernardino Baseline and Meridian, as depicted on the USGS – Devore Quadrangle, 7.5 Minute Series topographic map.

Project Description

The Inland Empire Utilities Agency (IEUA) and the Chino Basin Watermaster (CBWM) are proposing the San Sevaine Basin Improvements Project (proposed project). The objective of this project is to increase the amount of recycled water (RW) and stormwater recharged into the Chino Groundwater Basin, specifically at the San Sevaine Basins located immediately north and west of the Interstate 210 and Interstate 15 interchange in the City of Rancho Cucamonga, San Bernardino County.

The existing San Sevaine Basins (Basins) consist of five individual basins covering approximately 130 acres. The Basins consist of five, soft-bottomed basins along San Sevaine Creek. Each basin has inlet and outlet structures that allow the capture and recharge of various types of water sources. The primary mode of conveyance between Basins is surface transfer, which restricts the operational flexibility of the system. These Basins are dual-use facilities which serve flood control and groundwater recharge functions. Currently, a total of 500 acre-feet per year (AFY) of RW and 300 AFY of stormwater (on average) is infiltrated into the groundwater basins at this location. The recommended Basins improvements will allow up to an estimated 8,100 AFY of additional RW, and up to an additional 2,700 AF of stormwater to be recharged at this location.

The Basins are owned by the San Bernardino County Flood Control District (SBCFCD). They were originally constructed for flood control mitigation to attenuate peak storm flows, but are now operated as multipurpose basins under a Four Party Agreement between SBCFCD, IEUA, CBWM, and the Chino Basin Water Conservation District (CBWCD) (stakeholders). The stakeholders previously invested in improvements of the Basins to allow them to be used for groundwater recharge. They were modified to allow the capture and recharge of stormwater and supplemental water (supplemental water consists of imported water and recycled water) in a conjunctive use program.

<u>Proposed Review Process</u>

A capital improvement project such as the proposed project is a discretionary decision or "project" that requires evaluation under the California Environmental Quality Act (CEQA). This Mitigated Negative Declaration is the proposed CEQA determination for this project. Inland Empire Utilities Agency acting as the CEQA lead agency for this project will consider adoption of this Mitigated Negative Declaration at a future scheduled public meeting.

After public review of the Initial Study is completed, IEUA proposes to adopt a Mitigated Negative Declaration in accordance with CEQA and the State CEQA Guidelines. Any parties that comment on this proposed Mitigated Negative Declaration will be notified of the meeting date where adoption of the Mitigated Negative Declaration will be considered. Copies of the Mitigated Negative Declaration/Initial Study are available for review at the IEUA's office located at 6075 Kimball Avenue, Chino, CA 91708. The proposed Mitigated Negative Declaration will be available for public review and comment from October 16, 2015 to November 16, 2015. Any comments you have must be submitted in writing no later than November 16, 2015.

[signature]	Mgr of Planning	10.13.2015
Signature	Titlte	Date

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814 — 916/445-0613

SCH #________________

Project Title: SAN SEVAINE BASIN DEVELOPMENT PROJECT
Lead Agency: Inland Empire Utilities Agency
Contact Person: Joel Ignacio, P.E.
Mailing Address: 6075 Kimball Avenue
Phone: (909) 993-1913
City: Chino
Zip: 91708
County: San Bernardino County

Project Location: County: San Bernardino County
City/Nearest Community: Rancho Cucamonga
Cross Streets: Wilson Avenue / I-15 & I-210
Zip Code: ________
Lat. / Long.: general area 34° 8' 65" N / 117° 29' 47" W
Total Acres: 130 acres
Assessor's Parcel No: N/A
Sections: 26 & 27, T1N, R6W SBBM
Within 2 miles: State Hwy #: I-15 and I-210
Waterways: ________
Airports: N/A
Railways: N/A
Schools: N/A

Document Type:
CEQA: ☐ NOP ☐ Early Cons ☐ Neg Dec ■ Mit Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) ________ ☐ Other ________
NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI
Other: ☐ Joint Document ☐ Final Document ☐ Other ________

Local Action Type:
☐ General Plan Update
☐ General Plan Amendment
☐ General Plan Element
☐ Community Plan
☐ Specific Plan
☐ Master Plan
☐ Planned Unit Development
☐ Site Plan
☐ Rezone
☐ Prezone
☐ Use Permit
☐ Land Division (Subdivision, etc.)
☐ Annexation
☐ Redevelopment
☐ Coastal Permit
■ Other Basin Improvements

Development Type:
☐ Residential: Units ____ Acres ____
☐ Office: *Sq.ft.* ____ *Acres* ____ *Employees* ____
☐ Commercial: *Sq.ft.* ____ *Acres* ____ *Employees* ____
☐ Industrial: *Sq.ft.* ____ *Acres* ____ *Employees* ____
☐ Education ________
☐ Recreational ________
■ Water Facilities: *Type* ____ *MGD* ____
☐ Transportation: *Type* ____
☐ Mining: *Mineral* ____
☐ Power: *Type* ____ *Watts* ____
☐ Waste Treatment: *Type* ____ *MGD* ____
☐ Hazardous Waste: *Type* ____
☐ Other: ________

Project Issues Discussed in Document:
■ Aesthetics / Visual
■ Agricultural Land
■ Air Quality
■ Archaeological / Historical
■ Biological Resources
■ Coastal Zone
☐ Drainage / Absorption
☐ Economic / Jobs
☐ Fiscal
■ Floodplain / Flooding
■ Forest Land / Fire Hazard
■ Geologic / Seismic
☐ Minerals
■ Noise
☐ Population / Housing Balance
■ Public Services / Facilities
■ Recreation / Parks
☐ Schools / Universities
☐ Septic Systems
☐ Sewer Capacity
■ Soil Erosion / Compaction / Grading
☐ Solid Waste
■ Toxic / Hazards
■ Traffic / Circulation
■ Vegetation
☐ Water Quality
■ Water Supply / Groundwater
■ Wetland/Riparian
■ Wildlife
☐ Growth Inducing
■ Land Use
☐ Cumulative Effects
☐ Other ________

Present Land Use / Zoning / General Plan Designation:

Project Description: The Inland Empire Utilities Agency (IEUA) and the Chino Basin Watermaster (CBWM) are proposing the San Sevaine Basin Improvements Project (proposed project). The objective of this project is to increase the amount of recycled water (RW) and stormwater recharged into the Chino Groundwater Basin, specifically at the San Sevaine Basins located immediately north and west of the Interstate 210 and Interstate 15 interchange in the City of Rancho Cucamonga, San Bernardino County.

The existing San Sevaine Basins (Basins) consist of five individual basins covering approximately 130-acres. The Basins consist of five, soft-bottomed basins along San Sevaine Creek. Each basin has inlet and outlet structures that allow the capture and recharge of various types of water sources. The primary mode of conveyance between Basins is surface transfer, which restricts the operational flexibility of the system. These Basins are dual-use facilities which serve flood control and groundwater recharge functions. Currently, a total of 500 acre-feet per year (AFY) of RW and 300 AFY of stormwater (on average) is infiltrated into the groundwater basins at this location. The recommended Basins improvements will allow up to an estimated 8,100 AFY of additional RW, and up to an additional 2,700 AF of stormwater to be recharged at this location.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with an **"X"**.
If you have already sent your document to the agency please denote that with an **"S"**.

______	Air Resources Board	______	Office of Historic Preservation
______	Boating / Waterways, Department of	______	Office of Public School Construction
______	California Highway Patrol	______	Parks & Recreation
X	Caltrans District # 8	______	Pesticide Regulation, Department of
______	Caltrans Division of Aeronautics	______	Public Utilities Commission
______	Caltrans Planning (Headquarters)	______	Reclamation Board
______	Coachella Valley Mountain Conservancy	X	Regional WQCB, # 8, Santa Ana
______	Coastal Commission	______	Resources Agency
______	Colorado River Board	______	S.F. Bay Conservation & Development Commission
______	Conservation, Department of	______	San Gabriel & Lower L.A. Rivers & Mtns Conservancy
______	Corrections, Department of	______	San Joaquin River Conservancy
______	Delta Protection Commission	______	Santa Monica Mountains Conservancy
______	Education, Department of	______	State Lands Commission
______	Energy Commission	X	SWRCB: Clean Water Grants
X	Fish & Wildlife, Region # 6	______	SWRCB: Water Quality
______	Food & Agriculture, Department of	______	SWRCB: Water Rights
______	Forestry & Fire Protection	______	Tahoe Regional Planning Agency
______	General Services, Department of	______	Toxic Substances Control, Department of
______	Health Services, Department of	X	Water Resources, Department of
______	Housing & Community Development		
______	Integrated Waste Management Board	______	Other ______
______	Native American Heritage Commission	______	Other ______
______	Office of Emergency Services		

Local Public Review Period (to be filled in by lead agency)

Starting Date October 16, 2015 Ending Date November 16, 2015

Lead Agency (complete if applicable)

Consulting Firm:	Tom Dodson & Associates	Applicant:	Inland Empire Utilities Agency
Address:	2150 N. Arrowhead Avenue	Address:	6075 Kimball Avenue
City/State/Zip:	San Bernardino, CA 92405	City/State/Zip:	Chino, CA 91708
Contact:	Tom Dodson	Contact:	Joel Ignacio, P.E.
Phone:	(909) 882-3612	Phone:	(909) 993-1913

Signature of Lead Agency Representative:

[signature] Mgr of Planning 10.13.15

Signature Title Date

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

DRAFT MITIGATED NEGATIVE DECLARATION

Lead Agency: Inland Empire Utilities Agency
6075 Kimball Avenue
Chino, CA 91708

Contact: Joel Ignacio, P.E.
Phone: (909) 993-1913
Email: jignacio@ieua.org

Project Title: SAN SEVAINE BASIN DEVELOPMENT PROJECT

State Clearinghouse Number: Not yet assigned

Project Location: The proposed project is located in the City of Rancho Cucamonga, San Bernardino County, California. The proposed project sites are existing, south of Wilson Avenue; west of Interstate 15; and northwest of the Interstate 210 and Interstate 15 interchange. The project is located within Section 26 and 27, Township 1 North, Range 6 West, San Bernardino Baseline and Meridian, as depicted on the USGS – Devore Quadrangle, 7.5 Minute Series topographic map.

Project Description: The Inland Empire Utilities Agency (IEUA) and the Chino Basin Watermaster (CBWM) are proposing the San Sevaine Basin Improvements Project (proposed project). The objective of this project is to increase the amount of recycled water (RW) and stormwater recharged into the Chino Groundwater Basin, specifically at the San Sevaine Basins located immediately north and west of the Interstate 210 and Interstate 15 interchange in the City of Rancho Cucamonga, San Bernardino County.

The existing San Sevaine Basins (Basins) consist of five individual basins covering approximately 130 acres. The Basins consist of five, soft-bottomed basins along San Sevaine Creek. Each basin has inlet and outlet structures that allow the capture and recharge of various types of water sources. The primary mode of conveyance between Basins is surface transfer, which restricts the operational flexibility of the system. These Basins are dual-use facilities which serve flood control and groundwater recharge functions. Currently, a total of 500 acre-feet per year (AFY) of RW and 300 AFY of stormwater (on average) is infiltrated into the groundwater basins at this location. The recommended Basins improvements will allow up to an estimated 8,100 AFY of additional RW, and up to an additional 2,700 AF of stormwater to be recharged at this location.

Finding: Inland Empire Utilities Agency's (IEUA) decision to implement this proposed project is a discretionary decision or “project” that requires evaluation under the California Environmental Quality Act (CEQA). Based on the information in the project Initial Study, LACSD has made a *preliminary* determination that a Mitigated Negative Declaration will be the appropriate environmental determination for this project to comply with CEQA.

Initial Study: Copies of the Mitigated Negative Declaration/Initial Study are available for public review at the Copies of the Mitigated Negative Declaration/Initial Study are available for review at the IEUA's office located at 6075 Kimball Avenue, Chino, CA 91708. The proposed Mitigated Negative Declaration will be available for public review and comment from October 16, 2015 to November 16, 2015. Any comments you have must be submitted in writing no later than November 16, 2015.

Mitigation Measures: All mitigation measures identified in the Initial Study are summarized on pages 53-55 and are proposed for adoption as conditions of the project. These measures will be implemented through a mitigation monitoring and reporting program if the Mitigated Negative Declaration is adopted.

DRAFT

Signature	*Title*	*Date*

INITIAL STUDY

FOR THE

SAN SEVAINE BASINS DEVELOPMENT PROJECT

Prepared for:

Inland Empire Utilities Agency
6075 Kimball Avenue
Chino, California 91708
(909) 993-1600

Prepared by:

Tom Dodson & Associates
2150 North Arrowhead Avenue
San Bernardino, California 92405
(909) 882-3612

October 2015

TABLE OF CONTENTS

APPENDICES

TABLE OF CONTENTS (continued)

TABLES

FIGURES

TABLE OF CONTENTS (continued)

ACROYNMS AND ABBREVIATIONS

AAQS	ambient air quality standards
APE	Area of Potential Effect
AQMP	Air Quality Management Plan
ARA	Aggregate Resources Areas
BACM	Best Available Control Measures
BMP	Best Management Practices
CAA	Clean Air Act
CARB	California Air Resources Board
CCAA	California Clean Air Act
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
Corps	U.S. Army Corps of Engineers
CRM	CRM TECH
dB	decibel
dBA	A-weighted decibel
EPA	U.S. Environmental Protection Agency
FCD	Flood Control District
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GHG	Greenhouse Gas
IEUA	Inland Empire Utilities Agency
MRZ	Mineral Resource Significance
MT	metric ton
MWD	Metropolitan Water District of Southern California
NPDES	National Pollutant Discharge Elimination System
RWQCB	Regional Water Quality Control Board
SCAQMD	South Coast Air Quality Management District
SoCAB	South Coast Air Basin
SWPPP	Storm Water Pollution Prevention Plan
TDA	Tom Dodson & Associates
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

PROJECT DESCRIPTION

Introduction

The Inland Empire Utilities Agency (IEUA) was formed by popular vote of its residents in June of 1950, for the purpose of importing supplemental water supplies from Metropolitan Water District of Southern California (MWD). IEUA, as a member of the MWD, distributes imported water, and provides municipal and industrial wastewater collection and treatment services and other related utility services for the mid-portion of the Upper Santa Ana River watershed in the southwestern-most portion of San Bernardino County, California. In its wastewater management role, the IEUA serves the cities of Chino, Chino Hills, Fontana, Montclair, Ontario and Upland, and the Cucamonga Valley Water District (which generally encompasses the City of Rancho Cucamonga as well as some unincorporated areas of San Bernardino County). Approximately 800,000 people are currently estimated to reside in the IEUA service area, which encompasses approximately 242 square miles.

The proposed project includes the expansion of delivery of recycled water produced by IEUA Water Reclamation Facilities (WRFs) and of stormwater capture to the existing San Sevaine Basins located just north of the Interstate 15 and Interstate 210 interchange in the City of Rancho Cucamonga. This will include inclusion of additional San Sevaine flood control basins and the construction of new delivery pipelines and improvement of inlet facilities to increase the maximum operational volume of both stormwater and recycled water that can be delivered to these basins. The purpose of the proposed basin modifications is to increase the Agency's groundwater recharge capacity as part of a comprehensive effort to reverse the groundwater overdraft condition in the Chino Basin and to support the groundwater demands (potable water supply) of the population within the District's service area.

Location

The proposed project is located in the City of Rancho Cucamonga, San Bernardino County, California. The proposed project sites are existing, south of Wilson Avenue; west of Interstate 15; and northwest of the Interstate 210 and Interstate 15 interchange. Figure 1 shows the regional location of the project site and Figure 2 shows the project location on the USGS Devore 7.5' Topographic Quadrangle map. Specifically, the project is located within Section 26 and 27, Township 1 North, Range 6 West, San Bernardino Baseline and Meridian, as depicted on the USGS – Devore Quadrangle, 7.5 Minute Series topographic maps. Figure 3 shows the project vicinity on an aerial photograph.

The proposed new groundwater infrastructure improvement is shown on Figures 4 through 7.

Project Description

The Inland Empire Utilities Agency (IEUA) and the Chino Basin Watermaster (CBWM) are proposing the San Sevaine Basin Improvements Project (proposed project). The objective of this project is to increase the amount of recycled water (RW) and stormwater (SW) recharged into the Chino Groundwater Basin, specifically at the San Sevaine Basins located immediately north and west of the Interstate 210 and Interstate 15 interchange in the City of Rancho Cucamonga, San Bernardino County.

The existing San Sevaine Basins (Basins) consist of five individual basins covering approximately 130 acres as shown on Figures 2 and 3. Figure 4 show the current configuration of the Basins. The Basins consist of five, soft-bottomed basins along San Sevaine Creek. Each basin has inlet and outlet structures that allow the capture and recharge of various water sources. The primary mode of conveyance between Basins is surface transfer, which restricts the operational flexibility of the system. These Basins are dual-use facilities which serve flood control and groundwater recharge functions. Currently, a total of 500 acre-feet per year (AFY) of RW and 300 AFY of stormwater (on average) is infiltrated into the groundwater basin at this location. The recommended Basin improvements will allow up to an estimated 8,100 AFY of additional RW, and up to an additional 2,700 AF of stormwater to be recharge at this location. For a detailed description of each basin refer to Appendix 1, which contains the San Sevaine Basin Improvements Project Development Report," (PDR) April 6, 2015 (Final), authored on behalf of IEUA and CBWM staff by Scheevel Engineering, LLC. However, the following conservative recharge rates were considered instead, an additional 642 AFY of stormwater and 4,100 AFY of recycled water. These projections were initially proposed from the 2013 Amendment to the 2010 Recharge Master Plan Update which was prepared by Wildermuth Environmental Inc. on behalf of Chino Basin Watermaster.

The Basins are owned by the San Bernardino County Flood Control District (SBCFCD). They were originally constructed for flood control mitigation to attenuate peak storm flows, but are now operated as multipurpose basins under a Four Party Agreement between SBCFCD, IEUA, CBWM, and the Chino Basin Water Conservation District (CBWCD) (stakeholders). The stakeholders previously invested in improvements of the Basins to allow them to be used for groundwater recharge. They were modified to allow the capture and recharge of stormwater and supplemental water (supplemental water consists of imported water and recycled water) in a conjunctive use program.

IEUA presently performs the actual operation and maintenance of the Basins for recharge purposes in cooperation with CBWM and SBCFCD. Through recent operations and data collection afforded by the initial improvement project, IEUA and CBWM have identified several possible opportunities to further enhance and optimize the use of this facility for additional groundwater recharge. In order to fully utilize the recharge potential of the Basins, improvements should be implemented to either improve the infiltration rate of Basin 5, or have the ability to deliver RW and/or additional stormwater to Basins 1-3 which have higher infiltration rates.

The PDR considered a range of alternative improvements to meet the recharge objectives. The alternatives evaluation considered the following selection criteria:

- Increasing capture and recharge of RW and stormwater
- Maximizing infiltration rates
- Minimizing environmental impacts
- Reducing construction costs
- Enhancing operational flexibility

In addition to the items identified above, the alternatives will be analyzed to verify consistency with future RW expansion objectives proposed for the Agency's northeastern region.

The preferred alternative is Alternative 5-A. This alternative is a hybrid alternative which includes Alternatives 1-A and 3-A. Alternative 5-A was selected because it provides a significant increase to both RW and stormwater recharge at the San Sevaine Basins. It was also selected because it provides the lowest overall groundwater recharge unit cost (approximately $56/AF). However, from a conservative perspective the unit cost of $97/AF was agreed to because this was based on the RMPU's projected recharge increase of 642 AFY for stormwater and 4 1000 AFY for recycled water. The physical facilities proposed by Alternative 5-A are shown on Figure 5 and are described in the following text.

<u>Preferred Alternative: Alternative 5-A</u>

Alternative 5-A includes the extension of the Segment A RW pipeline to Basins 1-3. The pipeline alignment is shown on Figure 5. This new pipeline would extend from the existing RW pipeline located adjacent to the Etiwanda Channel along existing maintenance roads to the north side of Basin 1, which is located just south of Wilson Avenue. Three turnouts (inlet/outlet structures) would be provided, one into each of Basins 1, 2 and 3. The new pipeline would be a 30-inch (30") diameter pipeline from the existing turnout to the Basins. Pipeline length is estimated to be approximately 4,600 lineal feet and an additional 300 lineal feet of 24" pipeline would also need to be installed.

In addition to the proposed pipeline (Segment A) this alternative includes a new Basin 5 Pump Station. This pump station creates operational flexibility that will allow for increased stormwater capture and recharge. It will be installed with a capacity to move 7,400 gallons per minute (gpm). Basin 5 is the largest of the five Basins which provides the greatest opportunity to capture storm flows. The proposed pump station would allow for stormwater to be pumped from Basin 5 to the other Basins with higher infiltration rats, thereby draining Basin 5 faster during the storm season, which would result in more available storage space for subsequent stormwater inflow. This operational scenario would allow Basin 5 to be used as a settling basin to remove clogging sediments from stormwater prior to delivery of the captured stormwater to higher performing (infiltration) Basins. Figure 6 and 7 show a conceptual design for a pump station and the inlet/outlet structures, respectively.

Other design criteria for Alternative 5-A include the construction of a new electrical service to power the pump(s); construction of a wet well/intake structures, and a control system to operate the facility. Implementation of this alternative could also be performed in phases. Phase 1 could be construction of the pipeline and turnout structures, which would achieve the objective of delivering RW to Basins 1-3. Phase 2, construction of the pump station, would meet the objective of achieving additional stormwater capture and recharge. Additional stormwater capture and recharge would also assist to increase the diluents water contribution to the basin, thereby allowing more RW to be recharged at the Basins.

<u>Construction Activities</u>

Construction activities will consist of the following activities:

- Limited grading activities along the pipeline alignment, pump station location and electrical connection
- Installing the trench along the pipeline alignment shown, approximately 5,000 feet
- Installing the inlet/outlet structures (3)

- Installing the wet well for the pump station
- Installing the pump station
- Installing an estimated five flow control valves/gates

Operational Activities

- Periodic facility maintenance, which can be incorporated with existing maintenance activities
- Electricity consumption by the pump station (annual estimate of 106,940 kW-hr)

Other Agency Permits

The San Sevaine Basins property is owned by San Bernardino County and managed by the SBCFCD and IEUA. FCD has authorized IEUA to act as the CEQA lead agency for this proposed project. If approved by IEUA, the County will act as a CEQA responsible agency when it considers whether to issue an encroachment permit to allow the contractor to carry out the proposed project construction activities.

In addition to the County permit, the project exceeds the threshold for a General Construction National Pollutant Discharge Elimination System (NPDES) permit. This requires notification to the State Water Board and preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP). Also, the acreage of the project will require the preparation of a dust management plan to comply with South Coast Air Quality Management District (SCAQMD) Rule 403. The proposed basin modifications occur within water recharge basins that are isolated from any stream and therefore do not receive inflows unless water is diverted from adjacent stream channels. Therefore, it is not clear whether any permits from regulatory agencies (Corps, Regional Board or Department of Fish and Game) will be required to conduct the proposed modifications and to maintain these basins over the long-term. This environmental review process addresses the possible requirement to obtain regulatory permits, but it is anticipated that comments from regulatory agencies will indicate whether they believe such permits are required. No other permits are known to be required. Since State responsible or trustee agencies have been identified for this project, IEUA will implement a 30-day review period for this Initial Study and proposed Mitigated Negative Declaration.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that requires mitigation as indicated by the checklist on the following pages. After implementation of mitigation, no "Potentially Significant Impact" has been identified for this project based on the detailed evaluation contained in this Initial Study.

❑ Aesthetics	❑ Agriculture and Forestry Resources	■ Air Quality
■ Biological Resources	❑ Cultural Resources	■ Geology / Soils
❑ Greenhouse Gas Emissions	■ Hazards & Hazardous Materials	■ Hydrology & Water Quality
❑ Land Use / Planning	❑ Mineral Resources	■ Noise
❑ Population / Housing	❑ Public Services	❑ Recreation
❑ Transportation / Traffic	❑ Utilities / Service Systems	❑ Mandatory Findings of Significance

DETERMINATION (To be completed by the Lead Agency)

On the basis of this initial evaluation, the following finding is made:

	The proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
X	Although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
	The proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
	The proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
	Although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Tom Dodson & Associates
Signature (prepared by)

October 13, 2015
Date

Signature

10.13.2015
Date

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
I. AESTHETICS – Would the project:				
a) Have a substantial adverse effect on a scenic vista?			X	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?			X	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			X	

SUBSTANTIATION:

a&c. *Less Than Significant Impact* – The proposed project site is currently developed with existing water recharge basins and adjacent access roadways. The project site is surrounded by residential development to the north and west; Interstate 210 on the south; and Interstate 15 on the east. Open space and vacant lands are interspersed with the primary uses to the west, north and east. The proposed project consists of the construction of low profile facilities—many of them within the basins themselves—and include pipelines, lysimeters, monitoring well(s), a pump station and individual turnouts into Basins 1, 2 and 3. Once installed these new facilities will not impact scenic vistas or affect visual resources. During the short term, small piles of excavated soil material may be established in conjunction with pipeline installation. Once installed, the proposed facilities will exist below grade or near the existing ground-surface elevation of the site. Due to the lack of any facilities above ground at the project site and the existing basins that already occur on the site, it is concluded that the proposed project will not have the potential to significantly obstruct scenic views or vistas available to the public. Also, with no important visual qualities on the project site, the proposed project does not have a potential to substantially degrade the visual character or quality of the site or its surroundings.

b. *No Impact* – The project basins are already developed as water recharge basins and the proposed project will make modifications to make them to facilitate more efficient recharging of recycled water. Due to the past and existing uses, the proposed project site does not contain any native trees, rock outcroppings, other scenic resources, or historic buildings within the project footprint. In addition, there are no designated scenic highways or corridors located within the project vicinity. No scenic resources were identified for the project site and no adverse impact to such resources can occur. No mitigation is required.

d. *Less Than Significant Impact* – Because construction activities are limited to daylight hours and the amount of security lighting needed during construction will be limited, potential impacts are considered to be less than significant. The security and operational lighting for the proposed water recharge basins will be minor compared to the existing lighting generated from the adjacent freeways and within the surrounding residential land uses. Therefore, no potential exists for significant lighting effects and no mitigation is proposed or required.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
II. AGRICULTURE AND FORESTRY RESOURCES – In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b) Conflict with existing zoning for agricultural use or a Williamson Act contract?				X
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				X
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?				X

SUBSTANTIATION:

a-e. *No Impact* – According to the City of Rancho Cucamonga General Plan, the proposed project sites are located on lands designated as public facilities and used for flood control purposes, such as the existing flood control/water recharge basins. Further, no agricultural activities or lands designated for agricultural use exist near the project sites. Also, no known Williamson Act contract lands exist on or near the project sites. No forest land or timberland exists on or near the project sites. Therefore, the proposed project has no potential to convert Farmland to non-agricultural use or forest land to non-forest use.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
III. AIR QUALITY – Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?			X	
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?		X		
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?		X		
d) Expose sensitive receptors to substantial pollutant concentrations?			X	
e) Create objectionable odors affecting a substantial number of people?			X	

SUBSTANTIATION: The following data was compiled by ESA Water and see Appendix 2 for CalEEMod project-related air emission output.

<u>Background</u>

The project is located entirely within the South Coast Air Basin (SoCAB) which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The air quality regulatory jurisdictions within the project area include the U.S. Environmental Protection Agency (EPA), the California EPA, and the SCAQMD. The SCAQMD has jurisdiction over the air basin in which the proposed project is located and is responsible for regulating stationary source emissions. The District has also been given the authority to regulate mobile emissions as an indirect source. The federal Clean Air Act (CAA), the California Clean Air Act (CCAA), and the Air Quality Management Plan (AQMP), prepared and adopted by the SCAQMD, regulate air quality in the air basin. Federal and State ambient air quality standards are summarized in Table III-1.

Ambient air quality standards (AAQS) are the levels of air quality considered safe, with an adequate margin of safety, to protect the public health and safety. They are designed to protect those people most susceptible to respiratory distress, such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and people engaged in strenuous work or exercise, called "sensitive receptors." Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed. Recent research suggests, however, that long-term exposure to air pollution at levels that meet air quality standards may nevertheless have adverse health effects. For example, ozone exposure even at levels close to the ambient standard may lead to adverse respiratory health. Health effects from air pollutants are summarized in Table III-2.

All areas that have not attained ambient air quality standards are designated or classified based on the severity of their non-attainment problem. These classifications determine the extent to which remedial actions must be taken within a given air quality planning area. The SoCAB is an air quality planning area designated non-attainment by federal and state standards for ozone (O_3) and particulate matter ($PM_{2.5}$ and PM_{10}).

The CCAA, passed by the California Legislature and signed into law by the Governor in 1988, is a comprehensive air pollution control agenda for the state of California. State standards are, in most cases, more stringent than federal standards; however the state standards do not have a specific attainment deadline but rather require air quality jurisdictions to make steady progress towards the standards. The goal of the CCAA is to attain state air quality standards by the earliest practical date. Because California established AAQS several years before the federal action and because of unique air quality problems introduced by the restrictive dispersion meteorology in much of California, there is a considerable difference between state and national clean air standards. Those standards currently in effect in California are shown on Table III-1.

Baseline Regional Air Quality

Monitoring of air quality in the project area is the responsibility of the SCAQMD. Existing and probable future levels of air quality around the San Sevaine Basin's project area can best be best inferred from ambient air quality measurements conducted by the SCAQMD at the Upland monitoring station.

Pollutant concentrations exceed the federal and State standards for ozone and particulate matter. Consequently, the SoCAB is in exceedance of standards for ozone, PM_{10} and $PM_{2.5}$. More localized pollutants such as carbon monoxide, nitrogen oxides, etc. are very low near the project site because background levels never exceed allowable levels. There is excess dispersive capacity to accommodate localized vehicular air pollutants such as NOx or CO without any threat of violating applicable AAQS. With implementation of the federal 1-hour NO_2 standard of 0.10 ppm, the Rancho Cucamonga area may be only marginally in attainment of the standard.

The SoCAB air quality problems are caused by a combination of factors including: its location in a large urban area where substantial air pollutant emissions are generated on a daily basis; meteorological conditions and topographical constraints that slow down dispersal of pollutants out of the basin; a low ability to disperse pollutants vertically in the atmosphere; and a sunny climate that provides the photochemical energy that increases creation of ozone and other pollutants. Though there has been overall improvement in the SoCAB during the last several decades, it still has some of the poorest air quality in the nation.

Table III-1
AMBIENT AIR QUALITY STANDARDS

Pollutant	Average Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O3)	1 Hour	0.09 ppm (180 µg/m3)	Ultraviolet Photometry	–	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m3)		0.075 ppm (147 µg/m3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m3	Gravimetric or Beta Attenuation	150 µg/m3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m3		–		
Fine Particulate Matter (PM2.5)	24 Hour	–	–	35 µg/m3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m3	Gravimetric or Beta Attenuation	15 µg/m3		
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m3)	–	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9 ppm (10 mg/m3)		9 ppm (10 mg/m3)	–	
	8 Hour (Lake Tahoe)	6 ppm (7 g/m3)		–	–	
Nitrogen Dioxide (NO2) [8]	1 Hour	0.18 ppm (339 µg/m3)	Gas Phase Chemiluminescence	100 ppb (118 pg/m3)	–	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)		0.053 ppm (100 µg/m3)	Same as Primary Standard	
Sulfur Dioxide (SO2) [9]	1 Hour	0.25 ppm (655 µg/m3)	Ultraviolet Fluorescence	75 ppb (196 pg/m3)	–	Ultraviolet Flourescense; Spectrophotometry (Paraosaniline Method)
	3 Hour	–		–	0.5 ppm (1300 µg/m3)	
	24 Hour	0.04 ppm (105 µg/m3)		0.14 ppm (for certain areas) [9]	–	
	Annual Arithmetic Mean	–		0.030 ppm (for certain areas) [9]	–	
Lead 8 [10,11]	30-Day Average	1.5 µg/m3	Atomic Absorption	–	–	–
	Calendar Quarter	–		1.5 µg/m3 (for certain areas) [11]	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Avg	–		0.15 µg/m3)		
Visibility Reducing Particles [12]	8 Hour	See footnote 12	Beta Attenuation and Transmittance through Filter Tape	**No Federal Standards**		
Sulfates	24 Hour	25 µg/m3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m3)	Ultraviolet Fluorescence			
Vinyl Chloride [10]	24 Hour	0.01 ppm (26 µg/m3)	Gas Chromatography			

Footnotes

1 California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter – PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2 National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year, with a 24-hour average concentration above 150 µg/m3, is equal to or less than one. For PM2.5, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.

3 Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25̊C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25̊C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4 Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5 National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6 National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7 Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.

8 To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

9 On June 2, 2010, a new 1-hour SO2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

10 The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

11 The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 j.tg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

12 In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Source: California Air Resources Board (6/4/13)

Table III-2
HEALTH EFFECTS OF MAJOR CRITERIA POLLUTANTS

Pollutants	Sources	Primary Effects
Carbon Monoxide (CO)	• Incomplete combustion of fuels and other carbon-containing substances, such as motor exhaust. • Natural events, such as decomposition of organic matter.	• Reduced tolerance for exercise. • Impairment of mental function. • Impairment of fetal development. • Death at high levels of exposure. • Aggravation of some heart diseases (angina).
Nitrogen Dioxide (NO_2)	• Motor vehicle exhaust. • High temperature stationary combustion. • Atmospheric reactions.	• Aggravation of respiratory illness. • Reduced visibility. • Reduced plant growth. • Formation of acid rain.
Ozone (O_3)	• Atmospheric reaction of organic gases with nitrogen oxides in sunlight.	• Aggravation of respiratory and cardiovascular diseases. • Irritation of eyes. • Impairment of cardiopulmonary function. • Plant leaf injury.
Lead (Pb)	• Contaminated soil.	• Impairment of blood function and nerve construction. • Behavioral and hearing problems in children.
Fine Particulate Matter (PM-10)	• Stationary combustion of solid fuels. • Construction activities. • Industrial processes. • Atmospheric chemical reactions.	• Reduced lung function. • Aggravation of the effects of gaseous pollutants. • Aggravation of respiratory and cardio respiratory diseases. • Increased cough and chest discomfort. • Soiling. • Reduced visibility.
Fine Particulate Matter (PM-2.5)	• Fuel combustion in motor vehicles, equipment, and industrial sources. • Residential and agricultural burning. • Industrial processes. • Also, formed from photochemical reactions of other pollutants, including NOx, sulfur oxides, and organics.	• Increases respiratory disease. • Lung damage. • Cancer and premature death. • Reduces visibility and results in surface soiling.
Sulfur Dioxide (SO_2)	• Combustion of sulfur-containing fossil fuels. • Smelting of sulfur-bearing metal ores. • Industrial processes.	• Aggravation of respiratory diseases (asthma, emphysema). • Reduced lung function. • Irritation of eyes. • Reduced visibility. • Plant injury. • Deterioration of metals, textiles, leather, finishes, coatings, etc.

Source: California Air Resources Board, 2002.

Table III-3
PROJECT AREA AIR QUALITY MONITORING SUMMARY (2008-2012)
(Days Standards Were Exceeded and Maximum Observed Levels)

Pollutant/Standard	2008	2009	2010	2011	2012
Ozone					
1-Hour > 0.09 ppm (S)	51	51	31	36	42
8-Hour > 0.07 ppm (S)	65	70	54	45	66
8- Hour > 0.075 ppm (F)	50	48	39	36	45
Max. 1-Hour Conc. (ppm)	0.155	0.146	0.131	0.145	0.136
Max. 8-Hour Conc. (ppm)	0.123	0.121	0.098	0.122	0.111
Carbon Monoxide					
1-Hour > 20. ppm (S)	0	0	0	0	0
1-Hour > 9. ppm (S, F)	0	0	0	0	0
Max 1-Hour Conc. (ppm)	2.1	1.7	2.3	1.8	xx
Max 8-Hour Conc. (ppm)	1.6	1.6	1.5	1.3	0.9
Nitrogen Dioxide					
1-Hour > 0.18 ppm (S)	0	0	0	0	0
Max. 1-Hour Conc. (ppm)	0.094	0.096	0.079	0.069	0.063
Inhalable Particulates (PM-10)					
24-Hour > 50 $\mu g/m^3$ (S)	13/62	6/60	4/60	3/60	4/ xx
24-Hour > 150 $\mu g/m^3$ (F)	0/62	0/60	0/60	0/60	0/xx
Max. 24-Hr. Conc. ($\mu g/m^3$)	87.	68.	86.	68.	57.
Ultra-Fine Particulates (PM-2.5)					
24-Hour > 35 $\mu g/m^3$ (F)	6/113	3/114	1/112	2/120	0/xx
Max. 24-Hr. Conc. ($\mu g/m^3$)	54.2	46.9	46.1	52.9	35.2

S=State Standard F=Federal Standard xx= data not available

Source: South Coast AQMD
Upland Monitoring Station (Ozone, CO, NOx)
Ontario Monitoring Station (PM-10, PM-2.5)
Data: www.arb.ca.gov/adam/

Projects with daily emissions that exceed any of the emission thresholds identified in Table III-4 are recommended by the SCAQMD to be considered significant under CEQA guidelines.

Table III-4
SCAQMD LEVELS OF SIGNIFICANCE

Pollutant	Construction	Operations
ROG	75	55
NOX	100	55
CO	550	550
PM10	150	150
PM2.5	55	55
SOX	150	150
Lead	3	3

Source: SCAQMD CEQA Air Quality Handbook, November, 1993 Rev.

a. *Less Than Significant Impact* – The San Sevaine Basin Improvements Project is a regional infrastructure improvement project that does not directly relate specifically to the AQMP in that there are no specific air quality programs or regulations governing water projects. A significant air quality impact may occur if a project is not consistent with the applicable Air Quality Management Plan (AQMP) or would in some way obstruct the implementation of the policies or obtainment of the goals of that plan. The proposed project is located within the City of Rancho Cucamonga (City) in San Bernardino County, California. This City is located in the SoCAB, which is within the jurisdiction of the SCAQMD. The SCAQMD is the agency principally responsible for comprehensive air pollution control in the SoCAB. To that end, the SCAQMD, a regional agency, works directly with the Southern California Association of Governments (SCAG), county transportation commissions, local governments, and cooperates actively with all state and federal government agencies. The SCAQMD develops rules and regulations, establishes permitting requirements, inspects emissions sources, and enforces such measures though educational programs or fines, when necessary. SCAQMD and SCAG are responsible for preparing the AQMP, which addresses federal and state Clean Air Act (CAA) requirements. Pursuant to these requirements, the SCAQMD is required to reduce emissions of criteria pollutants for which the Basin is in non-attainment. The AQMP details goals, policies, and programs for improving air quality in the Basin.

Since the forecasted growth in SCAQMD's AQMP for the SoCAB relies on SCAG's regional growth forecasts, and because SCAG's growth forecasts are based upon, among other things, land uses specified in city general plans, a project that is consistent with the land use designated in a city's general plan would also be consistent with the AQMP growth projections. The proposed project would increase the recharge capabilities of the San Sevaine Basins. Implementation of the proposed project would not result in any additional population, housing or employment growth in the project area that has not been accounted for in the city of Rancho Cucamonga's General Plan. Consequently, as no growth-inducing development or land use would occur under the project, implementation of the project would not conflict with or obstruct the implementation of SCAQMD's AQMP. Therefore, the proposed project would result in a less-than-significant impact related to the AQMP.

b&c. *Less Than Significant With Mitigation Incorporated* –

Construction Emissions

A project may have a significant impact where project-related emissions would exceed federal, state, or regional standards or thresholds, or where project-related emissions would substantially contribute to an existing or projected air quality violation. As the proposed project consists of the installation of a pipeline conveyance system, turnout structures and a pump station in the City of Rancho Cucamonga along the San Sevaine Basin, potential air quality impacts associated with the project would mostly occur during the construction phase as the operation of construction equipment would result in additional air emissions in the region. Once construction activities have been completed, operation of the proposed project would not involve any direct pollutant emissions sources onsite. The operation of the diversion pumps would be powered through electricity obtained from the regional grid, and would not result in any direct pollutant emissions. In addition, while vehicle emissions would be generated by worker trips to and from the project area for routine maintenance of the diversion structures and pumps, these trips would be comparable to existing maintenance trips by IEUA personnel. As such, the mobile emissions generated during project operations would be negligible and would not exceed SCAQMD's applicable regional thresholds. Thus, this analysis focuses on the potential air quality impacts that could result from construction of the proposed project.

Construction of the proposed project's pipeline conveyance system would occur in multiple pipeline segments spanning a length of approximately 4,900 lineal feet. Construction of the pipeline would involve the open-trench construction method. Construction activities at each open-trench would generate pollutant emissions from the following construction activities: (1) site preparation, excavation, and pipe installation; (2) construction workers traveling to and from the construction site; (3) delivery and hauling of construction supplies and debris to and from the construction site; (4) the fuel combustion by onsite construction equipment; and (5) restoration of the work site.

The analysis of daily construction emissions has been prepared utilizing the California Emissions Estimator Model (CalEEMod). CalEEMod was used to determine whether short-term construction-related emissions of criteria air pollutants associated with the proposed project would exceed SCAQMD's applicable regional thresholds and where mitigation would be required. Modeling was based on project-specific data, when available. Where project-specific information was not available, default model settings were used to estimate criteria air pollutant and ozone precursor emissions. For the purpose of this analysis, the construction emissions occurring on a peak (worst-case) day over the entire project construction period were estimated and evaluated against the applicable SCAQMD significance thresholds. It is estimated that none of the construction phases would overlap during construction. Therefore each individual phase is compared to the regulatory thresholds.

The estimated daily emissions during peak construction days for the proposed project are shown in Table III-5. These calculations take into account that appropriate dust control measures under SCAQMD Rule 403 would be implemented by the project during each phase of construction. These measures are summarized below as mitigation measures.

Table III-5
PROJECT PEAK DAY CONSTRUCTION EMISSIONS

Emissions Source	Pounds Per Day					
	ROG	**NO_X**	**CO**	**SO_X**	**PM_{10}[a]**	**$PM_{2.5}$[a]**
2015						
Site Preparation						
Fugitive Dust	--	--	--	--	6.69	1.06
Off-Road Equipment	1.78	17.73	9.83	0.01	19.21	10.99
On-Road Vehicles	0.04	0.05	0.53	0.001	0.09	0.02
Total Emissions	**1.82**	**17.78**	**10.36**	**0.011**	**25.99**	**12.07**
Regional Significance Threshold	75	100	550	150	150	55
Significant Impact?	No	No	No	No	No	No
Excavation/Pipe Installation and Backfilling						
Fugitive Dust	--	--	--	--	2.25	1.23
Off-Road Equipment	6.70	61.53	34.84	0.05	9.66	6.67
On-Road Vehicles	0.16	0.30	2.36	0.005	0.40	0.11
Total Emissions	**6.86**	**61.83**	**37.20**	**0.055**	**12.31**	**8.01**
Regional Significance Threshold	75	100	550	150	150	55
Significant Impact?	No	No	No	No	No	No
2016						
Excavation/Pipe Installation and Backfilling						
Fugitive Dust	--	--	--	--	2.25	1.23
Off-Road Equipment	6.26	57.81	34.26	0.05	9.41	6.43
On-Road Vehicles	0.15	0.27	2.11	0.005	0.40	0.11
Total Emissions	**6.41**	**58.08**	**36.37**	**0.055**	**12.06**	**7.77**
Regional Significance Threshold	75	100	550	150	150	55
Significant Impact?	No	No	No	No	No	No
Work Site Restoration						
Fugitive Dust	--	--	--	--	--	--
Off-Road Equipment	1.27	10.31	8.21	0.01	0.76	0.74
On-Road Vehicles	0.17	1.01	2.32	0.005	0.30	0.09
Total Emissions	**1.44**	**11.32**	**10.53**	**0.015**	**1.06**	**0.83**
Regional Significance Threshold	75	100	550	150	150	55
Significant Impact?	No	No	No	No	No	No

[a] Emissions shown accounts for the implementation of mandatory dust control measures as required by SCAQMD Rule 403—Fugitive Dust.

Note: See **Appendix 2** for CalEEMod output.

As shown in Table III-5, the peak daily regional emissions generated during project construction would not exceed the SCAQMD daily significance thresholds for ROG, NO_X, CO, SOx, $PM_{2.5}$ and PM_{10}. Since construction emissions would not exceed the SCAQMD thresholds, the regional impacts related to air quality during project construction activities would be less than significant.

With respect to air quality, a significant impact may occur if the project would add a considerable cumulative contribution to federal or state non-attainment pollutants. Because the SoCAB is currently classified as a state nonattainment area for ozone, PM10, and PM2.5, cumulative development consisting of the project along with other reasonably foreseeable future projects in the SCAB as a whole could violate an air quality standard or contribute to an existing or projected air quality violation. However, based on SCAQMD's cumulative air quality impact methodology, SCAQMD recommends that if an individual project results in air emissions of criteria pollutants (ROG, CO, NOx, SOx, PM10, and PM2.5) that exceed the SCAQMD's recommended daily thresholds for project-specific impacts, then it would also result in a cumulatively considerable net increase of these criteria pollutants for which the project region is in non-attainment under an applicable federal or state ambient air quality standard.

As discussed above, the proposed project would not generate construction emissions that would exceed the SCAQMD's recommended thresholds. Once construction activities have been completed, operation of the proposed project would not involve any direct pollutant emissions sources onsite as the new diversion pumps would be powered through electricity obtained from the regional grid. In addition, because mobile emissions generated from worker trips to and from the project area for routine maintenance of the diversion structures and pumps are anticipated to only occur approximately once a month, the mobile emissions generated would be negligible. As such, project operations would not generate substantial pollutant emissions that would exceed SCAQMD's applicable regional thresholds. Therefore, the proposed project would not generate a cumulatively considerable increase in emissions of the pollutants for which the Basin is in non-attainment, and impacts would be less than significant. However, because of ozone and particulate non-attainment for the SoCAB, mitigation is provided to reduce project construction-related emissions based on available Best Available Control Measures (BACMs).

A significant impact may occur if a project were to generate pollutant concentrations to a degree that would significantly affect sensitive receptors. Sensitive receptors are populations that are more susceptible to the effects of air pollution than are the population at large. The SCAQMD identifies the following as sensitive receptors: long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, child care centers, and athletic facilities. The nearest and most notable off-site sensitive receptors to the project would be the existing residential uses that are currently located 154.50 feet northwest of the San Sevaine Basins.

Emissions from construction activities have the potential to generate localized emissions that may expose sensitive receptors to harmful pollutant concentrations. The SCAQMD has developed localized significance thresholds (LSTs) that are based on the amount of pounds of emissions per day that can be generated by a project that would cause or contribute to adverse localized air quality impacts. These localized thresholds, which are found in the mass rate look-up tables in the *Final Localized Significance Threshold Methodology* document prepared by the SCAQMD, apply to projects that are less than or equal to five acres in size and are only applicable to a project's on-site emissions for the following criteria pollutants: NOx, CO, PM_{10}, and $PM_{2.5}$. LSTs represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standards, and are developed based on the ambient concentrations of that pollutant for each source receptor area (SRA) within the SoCAB. The project area consists of an approximately 1-mile stretch along the San Sevaine Basins in the City of Rancho Cucamonga (SRA 33).

The LSTs developed by SCAQMD are provided for the following distances from the source of emissions: 25 meters, 50 meters, 100 meters, 200 meters, and 500 meters. Additionally, the LSTs at these distances also vary based on the size of the project site. The SCAQMD has provided LSTs for sites that are 1-acre, 2-acre, and 5-acre in size. As the total construction work area for the open-trench site would be approximately 1.12 acres, the LSTs for a 1-acre site is used for this analysis. The nearest and most notable off-site sensitive receptors that could potentially be subject to localized air quality impacts associated with construction of the proposed project would be the existing residential uses located 154.50 feet northwest from the San Sevaine Basins. Given the proximity of these sensitive uses to the construction areas where the proposed conveyance pipeline would be installed, the LSTs for a one-acre site with receptors located within 50 meters (164.04 feet) are used to address the potential localized air quality impacts associated with the project's construction-related NOx, CO, PM_{10}, and $PM_{2.5}$ emissions.

Whereas the construction emissions analysis conducted under Question III(b) pertained to the project's total daily mass emissions, the LST analysis is concerned with a project's localized air quality impacts. As such, the LST analysis for the proposed project evaluates the construction emissions generated at a single open-trench site.

The peak daily emissions generated at an open-trench site during construction activities were estimated using CalEEMod and are shown in Table III-6**.** As LSTs are only concerned with a project's on-site emissions, the emissions shown in Table III-6 only account for off-road equipment operating at an open-trench site.

Table III-6
LOCALIZED CONSTRUCTION POLLUTANT EMISSIONS

Construction phase	**Pounds Per Day**			
	NO_X	**CO**	**PM_{10}**	**$PM_{2.5}$**
2015				
Site Preparation	17.73	9.83	6.69	1.06
Excavation and Pipeline Installation	61.53	34.84	2.25	1.23
2016				
Excavation and Pipeline Installation	57.81	34.26	2.25	1.23
Work Site Restoration	10.31	8.21	0.76	0.74
Peak Day Localized Emissions	**61.53**	**34.84**	**6.69**	**1.23**
City of Ranch Cucamonga Localized Significance Threshold [a]	148	1,328	14	6
Exceed City of Rancho Cucamonga Threshold?	No	No	No	No

See **Appendix 2** for CalEEMod output.
[a] LSTs for a 1-acre site located in SRA 33.

As shown in Table III-6, the peak daily emissions generated an open-trench site during project construction activities would not exceed the applicable construction LSTs. Therefore, localized air quality impacts from the project's construction activities on the surrounding off-site sensitive receptors would be less than significant.

To minimize air emissions in accordance with the BACMs for this project the following mitigation measures will be implemented.

III-1 ***Using best available control measures during soil disturbance. The menu of enhanced dust control measures includes the following:***

- ***Limit the disturbance "footprint" to as small an area as practical.***
- ***Water all active construction areas at least twice daily.***
- ***Cover all off-site haul trucks or maintain at least 2 feet of freeboard.***
- ***Pave or apply water four times daily to all unpaved parking or staging areas.***
- ***Sweep or wash any site access points within 30 minutes of any visible dirt deposition on any public roadway.***
- ***Cover or water twice daily any on-site stockpiles of debris, dirt or other dusty material.***
- ***Suspend all operations on any unpaved surface if winds exceed 25 mph.***

III-2 ***Limit allowable idling to 5 minutes for trucks and heavy equipment before shutting the equipment down.***

III-3 ***Utilize Tier 3 rated diesel engines for off-road construction equipment.***

III-4 ***In order to keep NOx emissions below the significance threshold, the following construction sequencing shall be implemented. Basin three and four piping and diversion structure construction and basin five excavation may overlap. Also, basin three and four piping and basin eight grading and excavation may also overlap. Basin five and Basin eight construction activities must occur in sequence and not overlap.***

d. *Less Than Significant Impact* – A substance is considered toxic if it has the potential to cause adverse health effects in humans. A toxic substance released into the air is considered a toxic air contaminant (TAC). TACs are identified by state and federal agencies based on a review of available scientific evidence. In the State of California, TACs are identified through a two-step process that was established in 1983 under the Toxic Air Contaminant Identification and Control Act. This two-step process of risk identification and risk management was designed to protect residents from the health effects of toxic substances in the air. Diesel exhaust is considered a TAC. Construction would result in the generation of diesel exhaust emissions from the use of off-road diesel equipment required for site preparation and excavation, and other construction activities.

The dose to which sensitive receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the proposed project. Although construction of the entire project would occur over approximately a six month period, the project's construction activities during that time would be separated into different open-trench sites located along the proposed pipeline alignment. As such, the project's construction activities would not be permanently stationed at any one location but instead would occur in a linear fashion along the proposed pipeline alignment. Once the construction activities at an active site are completed, the construction activities would move to another location along the approximately one-mile pipeline alignment. Thus, the duration of the proposed construction activities at any one open-trench would only constitute a small percentage of the total 70-year exposure period. Thus, diesel particulates from construction activities would not be anticipated to result in the exposure of sensitive receptors to levels that exceed applicable standards, and impacts would be less than significant.

Additionally, operation of the proposed project, which consists of a pipeline conveyance system, turnout structures and pump station, would not result in release of any TAC emissions. As such, no impacts related to TAC emissions would occur during project operations.

e. *Less Than Significant Impact* – A significant impact may occur if objectionable odors occur which would adversely impact sensitive receptors. According to the SCAQMD *CEQA Air Quality Handbook*, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. As the proposed project consists of the installation of infrastructure in order to increase the amount of recycled water and stormwater recharge into the Chino Groundwater Basin, the proposed project is not a type of use identified by the SCAQMD as being associated with odors. Thus, the proposed project would not result in objectionable odors during operations, and this impact would be less than significant.

During construction of the proposed project, exhaust from equipment may produce discernible odors typical of most construction sites. Such odors would be a temporary source of nuisance to adjacent uses, but would not affect a substantial number of people. As odors associated with project construction would be temporary and intermittent in nature, the odors would not be considered to be a significant environmental impact. Therefore, impacts associated with objectionable odors would be less than significant.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
IV. BIOLOGICAL RESOURCES – Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		X		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?			X	
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			X	
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X

SUBSTANTIATION: The data in the following text is abstracted from a site specific biology report, “Biological Resources Report for San Sevaine Basins Development Project.” This document is provided as Appendix 3 to this Initial Study.

a. *Less Than Significant With Mitigation Incorporated* – The basins proposed for modification contain a mixture of non-native and native vegetation and all of the basins undergo maintenance, some on a routine basis and others on a non-routine basis. A field review of the biology in each of the basins was compiled by biologist, Ms. Lisa Patterson. A report of findings from this field evaluation is provided as Appendix 3 to this document. No sensitive or special status species were identified within any of the basins proposed for modification (including protocol surveys for coastal California gnatcatchers and San Bernardino kangaroo rat). Therefore, no substantial potential exists to cause a substantial adverse effect, directly or indirectly, on sensitive, special status, and/or listed species. Although burrowing owls were determined to not occupy the project site, this mobile species can occupy the project area in the future due to presence of suitable habitat. Therefore, the following contingency mitigation measure will be implemented to ensure that no burrowing owl will be adversely impacted by project implementation.

IV-1 ***Burrowing Owl. In compliance with the CDFW Staff Report on Burrowing Owl Mitigation (CDFW 2012) the Project proponent shall ensure that a pre-construction burrowing owl survey is conducted at least 30 days prior to construction activities. A qualified Biologist shall conduct the survey to determine if there are any active burrowing owl burrows within or adjacent to (within 300 feet) the impact area. If an active burrow is observed outside the nesting season (September 1 to January 31) and the burrow is within the impact area, a Burrowing Owl Exclusion Plan shall be prepared and submitted to CDFW for approval, outlining standard burrowing owl burrow closing procedures used to exclude burrowing owls (e.g., using passive relocation with one-way doors). The loss of any active burrowing owl burrow territory shall be mitigated through replacement of habitat and burrows at no less than a 1:1 ratio. If an active burrow is observed outside the nesting season (i.e., between September 1 and January 31) and the burrow is not within the impact area, construction work shall be restricted within 160 to 1,605 feet of the burrow depending on the time of year and level of disturbance near the site in accordance with guidelines specified by the CDFW.***

b. *Less Than Significant With Mitigation Incorporated* – Appendix 3 contains a preliminary jurisdictional delineation for the basins. Two components of the proposed project, the pump station in Basin 5, including the electrical connections; and the turnouts into Basins 1, 2 and 3 appear to be located within jurisdictional waters of the United States and State of California. The estimated area of disturbance within waters is 0.12 acres for temporary impacts and 0.12 acres for permanent impacts. The preliminary jurisdictional delineation was compiled using the current federal and state guidelines in order to determine what areas on the project site will likely be subject to regulatory jurisdiction. To offset the impact to this jurisdictional area by the proposed project, IEUA concludes that the additional aquatic habitat created within the Basins by the proposed project fully offsets the small loss of habitat lost to the inlets, pump station and electrical support equipment. Therefore, the following mitigation measure is provided to address the potential impacts to Basins 4b, 5 and 8 as possible jurisdictional areas under CDFW. Thus, with implementation of the proposed project the amount of water that can be delivered and percolated is estimated to increase from about 800 acre-feet per year to greater than 4,000 acre-feet per year. This increase in aquatic habitat over the current situation is deemed to fully offset small loss of jurisdictional waters associated with the proposed project and reduce adverse impact to a less than significant level.

c. *Less Than Significant Impact* – A minimal amount of federally protected wetlands occur within the Basins as discussed in Appendix 3. The proposed project will not directly alter any of these wetland areas, and with greater recharge activities following completion of the proposed project, additional wetlands may be created within the Basins. Thus, the proposed project's potential effects to such resources are considered to be a less than significant adverse impact.

d. *Less Than Significant With Mitigation Incorporated* – The San Sevaine Basins may support a wildlife movement corridor from the I-210 Freeway north to the San Gabriel Mountains. However, the proposed project will not eliminate the Basins' potential to conflict with wildlife movement over the long-term. Once the new facilities are installed the Basin's will continue to function for both flood control and regional water management. Minimal loss of habitat, less than one acre permanently, will be affected by the proposed project. Once returned to operation the presence of water over longer periods will support wildlife migration. Thus, the proposed project modification will not cause a significant conflict with wildlife movements through the Basins in the future and the impact is considered to be less than significant. The Basins are not known to support any native wildlife nursery sites other than nesting birds. To ensure that nesting birds will not experience a significant adverse impact during construction, the following mitigation measure will be implemented.

IV-2 ***<u>Nesting Birds</u>. A migratory nesting bird survey of the Project's impact footprint shall be conducted by a qualified biologist within 2 weeks and 3 days prior to initiating vegetation clearing or ground disturbance. If active nests are found during the pre-construction nesting bird surveys, a Nesting Bird Plan (NBP) will be prepared and implemented. At a minimum the NBP will include guidelines for addressing active nests, establishing buffers, monitoring, and reporting. The NBP will include a copy of maps showing the location of all nests and an appropriate buffer zone around each nest sufficient to protect the nest from direct and indirect impact. The size and location of all buffer zones, if required, shall be determined by the biologist in consultation with the CDFW, and shall be based on the nesting species, its sensitivity to disturbance, and expected types of disturbance. The nests and buffer zones shall be field checked weekly by a qualified biological monitor. The approved buffer zone shall be visually marked in the field, which no vegetation clearing or ground disturbance shall commence until the qualified biologist has determined the nest in question has become inactive (failed or successful with fledged young birds) and a monitoring report has been submitted to the CDFW for review and approval. Construction within the designated buffer area shall not proceed until approved by the site biologist.***

e. *No Impact* – Based on the field survey, the basins do not contain any biological resources, such as trees, that might be protected by local policies or ordinances. Past grading and maintenance activities in the Basins have eliminated any trees or other biological resources that might be protected. With no potential for conflicts with local policies or ordinances, no mitigation is required.

f. *No Impact* – The project area is not subject to any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Therefore, no potential exists to conflict with such plans. With no potential for conflicts with such plans, no mitigation is required.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
V. CULTURAL RESOURCES – Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in '15064.5?				X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to '15064.5?				X
c) Directly or indirectly destroy a unique paleon-tological resource or site or unique geologic feature?				X
d) Disturb any human remains, including those interred outside of formal cemeteries?				X

SUBSTANTIATION: A cultural resources report has been prepared to evaluate the potential for cultural resources to occur within the project area of potential effect. This report is titled: "San Sevaine Basin Development Project Cultural Resources Survey Report (Confidential – Not for Public Distribution)." It was prepared by ESA Water and is dated May 2015. A copy of this report will provided *only upon request* as Appendix 4 of this Initial Study.

<u>Background</u>

ESA Water prepared a Phase 1 Cultural Resources Study for the San Sevaine Basins Improvements Project. The project proposed the expansion of facilities to deliver additional recycled water to several of the San Sevaine Basins located in Rancho Cucamonga. The new facilities include a new recycled water pipeline, three inlet/outlet structures into Basins 1, 2 and 3, and a new pump station in Basin 5.

A records search for the project was conducted on May 7, 2015 at the South Central Coastal Information Center (SCCIC). The records search indicated that 13 cultural resources studies have been previously conducted within one-half mile of the project area. Approximately 75 percent of the search radius and 100 percent of the project area have been previously surveyed for cultural resources. Of the 13 studies, two overlapped with the project area. A total of nine archaeological resources, including seven historic-period archaeological sites, one pending historic-period archaeological site, and one prehistoric isolated, have been previously recorded within a ¼ mile radius of the project area. No archaeological or historic-period built resources have been previously recorded within the project area.

The Native American Heritage Commission (NAHC) was contacted on May 6, 2015 to request a search of the Sacred Land File (SLF) for the project area. To date, no response has been received.

On May 7, 2015, ESA cultural resources specialist Matthew Gonzalez conducted a pedestrian cultural resources survey of the project area. The entire project area was systematically surveyed using transects spaced at intervals of ten meters (approximately 32 feet) or less. The pipeline portion of the project area consists primarily of an access road and adjacent concrete drainage ditch with no visible ground surface. The inlets/outlets for Basins 1-3 and the pump station location extend into currently undeveloped area with visible ground surface varying from 50-70 percent. Modern trash and Debris, consisting primarily of glass bottles, game balls (golf, tennis and baseballs), were noted throughout the project area.

No archaeological resources were identified within the project area as a result of this study; the nearest documented archaeological resource is located approximately 0.25 miles to the west of the project area. One historic-period built resource, San Sevaine Basins 1-3, was identified within the project area. San Sevaine Basins 1-3 appear to be of sufficient age to be formally documented on California Department of Parks and Recreation (DPR) 523 forms and considered for listing in the California Register of Historical Resources, and could warrant further consideration under the California Environmental Quality Act (CEQA).

a-d *No Impact* – The whole of the project area consists of highly disturbed, man-made landscapes that were constructed for flood control purposes, apparently in the 1960's. Because of this past disturbance and the ongoing maintenance of the Basins, including installation of pipelines, concrete overflow pads and other operational features, the potential for encountering subsurface cultural resources does not exist. These basins have been excavated from the natural landscape. Within the project area of potential effect (APE) there are no natural landscapes that could support cultural resources of any type with any contextual integrity. With no potential for impact, no mitigation is required.

However, the age of Basins 1, 2 and 3 (approximately 50 years old) may qualify them for listing in the California Register of Historical Resources. IEUA will oversee preparation of a DPR 523 form for the site and submit it to the State Office of Historic Preservation for consideration.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
VI. GEOLOGY AND SOILS – Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
• Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				X
• Strong seismic ground shaking?				X
• Seismic-related ground failure, including liquefaction?				X
• Landslides?				X
b) Result in substantial soil erosion or the loss of topsoil?		X		
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse?				X
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				X
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				X

SUBSTANTIATION:

a. *No Impact* – The proposed project sites are located in a developed urban area. Habitable structures are not part of the proposed project. The project will not subject populations to potential substantial adverse geologic constraints/effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure, including liquefaction; or landslides.

The proposed infrastructure improvements are located within a seismically active area. Although no active faults occur within the project area, it is surrounded by several active faults: the Chino-Central Avenue Fault is located approximately 13 miles southwest of the City's boundaries; the San

Jose Fault is located to the west of the City of Upland; the Cucamonga Fault extends in an east-west direction north of the City of Rancho Cucamonga; and the San Andreas Fault, the San Bernardino segment, is located about 14 miles east of the City boundaries.

The proposed project sites are not located within or adjacent to an Alquist-Priolo Earthquake Fault Zone. The nearest Zone is located about two miles north at the base of the San Gabriel Mountains. The entire IEUA service area is generally within an area potentially subject to strong ground-shaking, such that the most stringent building code seismic standards and safety requirements apply to all projects within the service area. Regardless, the proposed basin modifications will not create substantial hazards to humans or to any structures. The proposed project is not located on steep slopes and is also not subject to landslides.

b. *Less Than Significant With Mitigation Incorporated* – Project excavation activities will involve ground disturbance which will expose the soil to wind and water erosive forces. Use of BACMs to control fugitive dust will fully mitigate wind erosion. Potential water erosion impacts to soils include accelerated erosion and down slope deposition and increased potential for surficial sliding and slumping. Compaction of soils by heavy equipment may reduce the infiltration capacity of onsite soils and deprive the onsite soil of water, thereby increasing the potential for runoff and erosion. The project basins are essentially excavated holes in the ground with shallow side slopes. Any erosion or runoff from these slopes is captured in the basins, and annual maintenance activities remove such sediment and remediate eroded slopes.

Construction activities in and out of the basins must be conducted in a manner that will provide the maximum feasible sediment control. Sediment control is important for a variety of reasons, including (1) eroded soils can enter water bodies and channels, raising water levels and blocking culverts, and increasing the chances for flooding of surrounding properties; (2) sediment can get deposited onto streets and roadways by vehicles leaving the site or by stormwater runoff, thereby making travel on these roadways more dangerous; (3) sediment carries petroleum and other pollutants into streams, lakes and other water bodies, thereby affecting water quality; and (4) sediment reduce light penetration into aquatic areas, making photosynthesis more difficult for water plants and affecting other forms of aquatic life.

An NPDES General Construction Permit must be obtained prior to the commencement of grading and a Storm Water Pollution Prevention Plan (SWPPP) compiled and implemented with best management practices for erosion control. Long-term erosion impacts for disturbed areas will be controlled by directing any flows from disturbed areas into the basins to capture sediment, and adequate drainage control devices. Compliance with local and state regulations in conjunction with the following mitigation measures is considered adequate to control potential erosion impacts.

VI-1 ***The SWPPP will include appropriate best management practices (BMPs) to prevent surface runoff with excessive sediment from leaving the project site and to address the potential for remediating any accidental spills of petroleum products that occur during construction activities. The final SWPPP shall be compiled prior to initiating construction. BMPs to be implemented in the SWPPP may include but not be limited to:***

- ***The use of silt fences;***
- ***The use of temporary stormwater desilting or retention basins;***
- ***The use of water bars to reduce the velocity of stormwater runoff;***
- ***The use of wheel washers on construction equipment leaving the site***
- ***The washing or sweeping of silt from public roads at the access point to the site to prevent the tracking of silt and other pollutants from the site onto public roads.***

- ***The storage of excavated material shall be kept to the minimum necessary to efficiently perform the construction activities required. Excavated or stockpiled material shall not be stored in water courses or other areas subject to the flow of surface water.***
- ***Where feasible, stockpiled material shall be covered with water proof material during rain events to control erosion of soil from the stockpiles.***

VI-2 ***Prior to completing the proposed project, project-related disturbed areas shall be stabilized to prevent the discharge of runoff from the project sites in a manner that could initiate erosion or sedimentation. A variety of stabilization measures may be used including: grading the site so all runoff is delivered to the basins, chemical stabilizers, gravel cover, mulch or other means to prevent the site from becoming a source of polluted surface runoff shall be installed.***

With implementation of these measures the potential for degradation of surface runoff water quality can be controlled to a less than significant impact level.

c. *No Impact* – The proposed project is not located on geologic units or soils that are unstable, or soils that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse.

d. *No Impact* – The proposed facilities are not located on expansive soils, as defined in Table 18 1B of the Uniform Building Code (1994), and will not create substantial risks to life or property. The soils at this location are coarse to fine alluvial deposits with no clays or other materials that would be considered expansive.

e. *No Impact* – The proposed project does not include the use of septic tanks or alternative waste water disposal systems. No potential for any impacts to such facilities exists from implementing the proposed project.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
VII. GREENHOUSE GAS EMISSIONS – Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			X	

SUBSTANTIATION: The following data was compiled by ESA Water and see Appendix 2 for CalEEMod project-related GHG emission output.

Background

Gases that trap heat in the atmosphere are referred to as greenhouse gases (GHGs) because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. The accumulation of GHGs has been implicated as a driving force for global climate change. Definitions of climate change vary between and across regulatory authorities and the scientific community, but in general can be described as the changing of the earth's climate caused by natural fluctuations and anthropogenic activities, which alter the composition of the global atmosphere.

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), chlorofluorocarbons (CFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Carbon dioxide is the "reference gas" for climate change, meaning that emissions of GHGs are typically reported in "carbon dioxide-equivalent" (CO_2e) measures. There is international scientific consensus that human-caused increases in GHGs have and will continue to contribute to global warming, although there is uncertainty concerning the magnitude and rate of the warming. Potential global warming impacts in California may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are likely to include global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.

In 2006, California passed the California Global Warming Solutions Act of 2006 (Assembly Bill No. 32; California Health and Safety Code Division 25.5, Sections 38500, et seq., or AB 32), which requires CARB to design and implement emission limits, regulations, and other measures, such that feasible and cost-effective statewide GHG emissions are reduced to 1990 levels by 2020.

On March 18, 2010, the California Office of Planning and Research (OPR) submitted amendments to the *CEQA Guidelines* for GHG emissions, as required by Public Resources Code section 21083.05. These *CEQA Guideline* amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents. The amendments are relatively modest changes to various portions of the existing *CEQA Guideline*.

a. *Less Than Significant Impact* – The proposed project would contribute to global climate change as a result of emissions of GHGs, primarily CO_2, emitted during construction activities associated with the installation of a pipeline conveyance system and turnout structures. Once construction activities have been completed, operation of the proposed project would generate minimal new vehicle trips associated with routine maintenance of the turnout structures and pumps. These trips would only occur approximately once a week, therefore these GHG emissions would be negligible. Operation of the newly installed diversion pumps would be powered through electricity obtained from the regional grid distributed by Southern California Edison (SCE). The consumption of electricity for operation of the diversion pumps would represent an indirect source of GHG emissions that would be generated offsite.

GHG impacts are considered to be exclusively cumulative impacts (CAPCOA, 2008), thus the purpose of this GHG analysis is to determine whether the contribution of GHG emissions by the proposed project would be cumulatively considerable.

The Inland Empire Utilities Agency has not adopted any significance criteria or guidelines for GHG analysis. While SCAQMD has issued proposed standards and guidelines, there is no adopted state or local standard for determining the cumulative significance of the proposed project's GHG emissions on global climate change.

In the absence of an adopted threshold that is applicable to the proposed project, which is a water conveyance infrastructure project that would primarily generate GHG emissions during construction, the use of a screening threshold would be appropriate to determine whether the project would require further analysis and mitigation with regard to climate change. The California Air Pollution Control Officers Association (CAPCOA) has recommended a conservative screening criterion of 900 MT/year CO_2e for determining which projects would require further analysis and mitigation with regard to climate change. For the purpose of this analysis, the project's total annual GHG emissions resulting from construction activities and electricity consumption to power the newly installed diversion pumps have been quantified and evaluated against the 900 MT/year CO_2e screening criteria.

As was conducted for the proposed project's air quality analysis in Question 3 (Air Quality), the project's construction-related GHG emissions were estimated for equipment exhaust, truck trips, and worker commute trips using CalEEMod. The construction of the entire project is anticipated to occur over approximately a six month period. During this construction period, installation of the proposed pipeline and ancillary support infrastructure would proceed in a linear fashion along the approximately 1-mile proposed pipeline alignment.

With respect to operational emissions, the indirect GHG emissions generated by the proposed project as a result of electricity consumption to power the newly installed diversion pumps were estimated in this analysis by determining the amount of electrical power required to operate the pumps and then applying SCE emissions factors for the GHG components (i.e., CO_2, CH_4, and N_2O) obtained from the CalEEMod model. CO_2, CH_4, and N_2O, were multiplied by their global warming potentials; 1, 25 and 298 respectfully to get CO_2e. Once all three values were obtained, they were added together and converted to metric tons.

The project's estimated annual GHG emissions during are shown in Table VII-1. With respect to construction GHG emissions, SCAQMD recommends that the total emissions for a project be amortized over a 30-year period and added to its operational emission estimates (SCAQMD, 2008). Total construction-related GHG emissions was calculated to be 242.19 CO_2e MT/yr. Amortized over 30 years, the proposed project construction-related GHG emissions would be 8.07 CO_2e MT/yr. Based on information provided by Inland Empire Utilities Agency, the proposed project would require a maximum annual electricity use of 125,731 kilowatt hours (KWh) (Based on the information provided in the project description, and the equipment to be used, it was assumed that the units was KWh rather than KW).

Table VII-1
ESTIMATED PROJECT CONSTRUCTION GHG EMISSIONS

Emission Source	Proposed Project EmissionsCO_2e (MT/yr)
Construction	
Annual Project Construction (Amortized over 30 yrs)[a]	8.07
Operation	
Energy Consumption	36.13
Total Annual Emissions	44.20
CAPCOA Screening Threshold	900
Significant Impact?	No

Notes: CO_2e= carbon dioxide equivalent; MT/yr = metric tons per year; see Appendix 2 for CalEEMod model outputs.

As shown in Table VII-1, the proposed project's total annual GHG emissions resulting from construction activities and project operation would be approximately 44.20 MT CO_2e per year. Thus, the project's total annual GHG emissions would not exceed the 900 MT of CO_2e per year screening threshold recommended by CAPCOA. Therefore, the proposed project would not result in the generation of substantial levels of GHG emissions and would not result in emissions that would adversely affect the statewide attainment of GHG emission reduction goals of AB 32. This impact would be less than significant.

b. *Less Than Significant Impact* – The proposed project would generate temporary construction-related GHG emissions and minimal GHG emissions during operations. As the proposed project only involves the installation of water conveyance infrastructure, implementation of the project would not result in a land use that would contribute to greenhouse gas emissions (such as residential or commercial development). . In addition, the proposed project would use recycled water as a way to further the water usage within the City and comply with the city CAP. The proposed project would not conflict with any adopted plan's goals of reducing GHG emissions.

Overall, implementation of the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Therefore, this impact would be less than significant.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
VIII. HAZARDS AND HAZARDOUS MATERIALS – Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?				X
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?		X		
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				X
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X	
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?			X	

SUBSTANTIATION:

a&b. *No Impact / Less Than Significant With Mitigation* Incorporated – The proposed project will not involve the use of hazardous substances, except during construction. Over the long-term there will be no routine transport of hazardous materials or wastes. In the short term, petroleum products will be used onsite by powered construction equipment. Unmanaged releases of such materials during construction are readily controlled to a less than significant level of hazard through control or remediation of accidental releases. The following mitigation measure will be implemented to prevent any significant hazard through the "routine transport, use or disposal" of petroleum products during construction.

VIII-1 If petroleum products or other hazardous materials are accidentally released to the environment during any phase of construction, IEUA shall require the area of contamination to be defined; shall require the removal of any contaminated soil or material from the contaminated area; and ensure that any area exposed to accidentally released contaminants are remediated to a threshold that meets regulatory requirements established by law or agencies overseeing the remediation.

c. *No Impact* – The proposed basin modifications are located within the San Sevaine Basins which comprise a totally modified environment. The surrounding land uses include a mix of residential, transportation and open space areas. The proposed project has no potential to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. No schools exist within one-fourth mile of the project site.

d. *No Impact* – The proposed project site is located within completely disturbed and developed areas that were excavated and re-contoured within the past 50 years. The project will not be located on a site which is included on a list of hazardous materials sites. The Geotracker records were reviewed (consistent with Government Code Section 65962.5) and no contaminated sites are located within the San Sevaine Basins boundary. The nearest contaminated sites are the Kaiser Steel and the Verizon/Etiwanda C O sites located approximately four miles south of the Basins. Also, the proposed improvements have no potential to create a significant hazard to the public or the environment from their implementation.

e. *No Impact* – The proposed project is located approximately five miles north of Ontario International Airport. The project site is located well north of the Ontario Airport Influence Area and it is also not located within an airport operation zone. Only random overflights can occur over the project area, as the sites are not located with an approach or departure zone to the airport. No routine or substantial adverse impact from exposure to airport operations is forecast to occur from implementing the proposed project.

f. *No Impact* – The proposed project is not located within the vicinity of private air strips. No potential exists to expose facilities or humans to any private air strip operational impacts.

g. *Less than Significant Impact* – The proposed project will be confined to the project site and is not anticipated to impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Ingress and egress of trucks onto the site will come from either Wilson or Cherry Avenues and daily construction traffic is estimated to be about 50 trips per day. This volume of traffic on these local roadways is not forecast to cause any interference with emergency plans.

h. *Less Than Significant Impact* – The proposed project does not include habitable structures, and is not located in or near a wildland fire hazard area. The project site does contain a mix of vegetation and disturbed areas, but the fuel load is limited and does not pose a significant wildland fire hazard. No potential exists for this project to be exposed to significant wildland fire hazards or to cause any such hazards.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
IX. HYDROLOGY AND WATER QUALITY – Would the project:				
a) Violate any water quality standards or waste discharge requirements?		X		
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?			X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite?			X	
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite?			X	
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?			X	
f) Otherwise substantially degrade water quality?			X	
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				X
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X
j) Inundation by seiche, tsunami, or mudflow?				X

SUBSTANTIATION:

a. *Less Than Significant With Mitigation Incorporated* – The process of installing improvements at the San Sevaine Basins will result in construction activities that could result in erosion and sedimentation impacts due to future runoff from the disturbed areas. Compliance with the following mitigation measure will control future pollutant discharges from the project site. Implementation of this measure in conjunction with the State Water Resources Control Board and National Pollutant Discharge Elimination System program would reduce the impact to this issue to less than significant. The most critical component of the Storm Water Pollution Prevention Plan (SWPPP) that will be implemented is to control all runoff during construction and operation to ensure that no sediment or any pollutant discharges are released into the general environment. The following measure shall be implemented in conjunction with the mitigation identified in the Geology/Soil Section, Measure VI-1. These measures are intended to be complementary, not incremental.

IX-1 The construction contractor shall prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) which specifies Best Management Practices that will be implemented to prevent construction pollutants from contacting stormwater with the intent of keeping all products of erosion from moving offsite. The SWPPP shall be developed with the goal of achieving a reduction in pollutants both during and following construction to control storm water runoff to the maximum extent practicable based on available, feasible best management practices. The SWPPP and the monitoring program for the construction project shall be consistent with the requirements of the latest version of the Santa Ana Regional Board's NPDES Permit No. CAS618036, Order No. R8-2002-0012 for San Bernardino County.

The following items should be included in the SWPPP:

- ***Stockpiled material should not be stored in areas which are subject to the erosive flows of water.***
- ***Measures such as the use of straw bales, sandbags, silt fencing or detention basins shall be used to capture and hold eroded material for future cleanup.***
- ***Rainfall will be prevented from entering material and waste storage areas and pollution-laden surfaces.***
- ***Construction-related contaminants will be prevented from leaving the site and polluting waterways.***
- ***A spill prevention control and remediation plan to control release of hazardous substances.***

With implementation of the preceding measure, the proposed project will not cause any violation of a water quality standard or waste discharge requirements.

b. *Less Than Significant Impact* – The proposed project will not adversely impact groundwater resources. Excavation will require small quantities of water to control fugitive dust and this can be provided from recycled water sources available at the southern end of San Sevaine Basin 5. In the short term if any potable water must be used it will be such a small quantity (5,000 to 10,000 gallons per day) that no significant effect on the Chino Groundwater Basin will occur. In the long term, the proposed Basin improvements would be a benefit to groundwater resources as the modified basins will deliver more recycled and imported water for groundwater recharge at the five basins. The quality of the water recharged at these basins must meet the Regional Board's maximum Total Dissolved Solids (TDS) and nitrate requirements for this portion of the Chino Groundwater Basin and the recharged groundwater must also meet the California Department of Public Health's detention and distance requirements for recharge of the Basin using recycled water. By meeting these requirements the proposed increase in recharge at the San Sevaine Basins will not cause significant degradation of groundwater quality, nor will it result in premature extraction of the recycled water from the Basin. Impacts to groundwater are considered less than significant.

c. *Less Than Significant Impact* – The proposed project will not substantially alter the existing drainage patterns of the project site in a manner which could result in substantial erosion or siltation onsite or downstream. As previously noted, construction of the project would require compliance with the California State Water Resources Board General Construction Permit. Commencement of construction activities would require the implementation of an effective combination of erosion and sediment control BMPs through the development of a Storm Water Pollution Prevention Plan (SWPPP). BMP implementation would maintain soil stability and potential water quality of any storm water discharges from the project site. Further, the drainage pattern through the basins proposed for modification will remain essentially the same as at present, which consists of discharge into the basins from the surrounding roadways. Therefore, with implementation of the SWPPP, impacts from erosion are considered less than significant.

d. *Less Than Significant Impact* – Please refer to issue c above.

e. *Less Than Significant Impact* – The proposed project will capture additional runoff by diversion from the adjacent stream channels to facilitate recharge in the basins. Based on the design of the basins, the proposed project would not create or contribute additional runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Please refer to a, c, d and h.

f. *Less Than Significant Impact* – Please refer to IX.a above. There are no other activities associated with the proposed project that should contribute to degradation of future surface runoff water quality. The required mitigation will ensure that both short- and long-term water quality can be enhanced or not substantially degraded within the project area.

g. *No Impact* – The project sites are located within FEMA Flood Insurance Rate Map (FIRM) Panels 7895J and 7915H (Appendix 5). According to the FIRM Panels, the project basins are not located within a 100-year flood hazard zone; they are located in Zone X which has a 0.02% chance of experiencing flooding per yare. Thus, no potential exists to expose the proposed facility improvements to significant flood hazards and there is no housing included in this project, so no adverse impact can occur.

h. *No Impact* – There are no 100-year flood hazard area structures included within this project's boundaries, so no adverse impact can occur.

i. *No Impact* – The proposed project does not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam. This is because there are no upstream bodies of water that could generate such a flood hazard.

j. *No Impact* – The proposed project is not exposed to any inundation by seiche, tsunami, or mudflow at the proposed basin sites. There is no source of water to support inundation by any of these mechanisms.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
X. LAND USE AND PLANNING – Would the project:				
a) Physically divide an established community?				X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				X

SUBSTANTIATION:

a. *No Impact* – The proposed basin improvements will be placed on property owned by the County of San Bernardino and currently managed by the County Flood Control District and IEUA. The whole of the project footprint is already developed with flood control and water recharge facilities, including support facilities such as access roadways. The proposed project consists of improvements in the basins that will allow more recycled water and imported water to be recharged at the existing basins. The project site is designated for public facility/open space uses. Since the proposed project facilitates the expansion of the existing water recharge facilities within the San Sevaine Basins, no potential exists for the proposed facilities to physically divide an existing community. No impact will result and no mitigation is required.

b. *No Impact* – The City of Rancho Cucamonga General Plan land use designation for the project site is Public Facility/Open Space. Such designations are intended to accommodate public facilities, including the existing flood control/recharge basins. The basin modifications proposed by the project are consistent with existing facilities and future uses envisioned by the General Plan for such land use designations. No adverse impacts will result and no mitigation is required.

c. *No Impact* – Please refer to the discussion under issue IV – Biological Resources. There are no habitat conservation or natural community conservation plans that encompass the project area.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XI. MINERAL RESOURCES – Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X

SUBSTANTIATION:

a&b. *No Impact* – The California Mineral Land Classification System identifies four major mineral land classifications: (1) Areas of Identified Mineral Resource Significance (MRZ-1); (2) Areas of Undetermined Mineral Resource Significance (MRZ-2); (3) Areas of Unknown Mineral Resource Significance (MRZ-3); and (4) Areas of No Mineral Resource Significance (MRZ-4). In addition, Aggregate Resources Areas (ARAs) are areas classified as MRZ-2 for construction aggregate that have current land uses which are similar to those areas which have been mined in the past.

The proposed project sites are classified as MRZ-2 and are located just south and west of ARA designated areas. Classification of a mineral resource as MRZ-2 by the State Geologist will ordinarily "constitute adequate evidence that an area contains significant mineral deposits."

The project site is designated for the existing flood control/recharge open space and is already developed with existing water recharge facilities. The proposed project consists of the improvement of existing water recharge basins. Implementation of the proposed project will allow the expansion of the existing uses, particularly for recycled water. The proposed project is not anticipated to result in any new impacts to mineral resources or affect the availability of such resources locally.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XII. NOISE – Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		X		
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?			X	
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				X
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		X		
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?			X	
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X

SUBSTANTIATION:

a. *Less Than Significant With Mitigation Incorporated* – The Noise Element of the City of Rancho Cucamonga General Plan establishes noise quality standards for land use categories based on the State of California Office of Noise Control land use compatibility recommendations. The Noise Element shows the community noise exposure recommended as normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable for various classes of land use sensitivity. The City of Rancho Cucamonga guidelines recommend an exterior noise exposure of 65–85 dB CNEL for residential and commercial uses between the hours of 7:00am and 10:00pm. The noise at the project site is dominated by the two freeways (I-210 and I-15) and the interchange. The project site is not currently a source of any man-made noise except when it is being maintained. Even the recharge activities are relative quiet. Table XII-1 provide noise compatibility for the City.

Short-term construction noise impacts associated with the proposed project will occur in phases dominated by large pipeline trenching equipment and dirt haul trucks. The earth-moving sources are the noisiest with equipment noise typically ranging from 75 to 90 dB at 50 feet from the source. Table XII-2 shows the range of noise emissions for various pieces of construction equipment.

The closest noise-sensitive land uses to the project site include residences to the west and north of the San Sevaine Basins. Discretionary scheduling of noisiest activities may be required to minimize possible construction noise intrusion. Noise can also be mitigated by locating all stationary noise generating construction equipment as far as practical from occupied residences or other noise-sensitive uses.

The noise generated by the proposed project would be limited to construction activities, and would not result in any new, substantial long term noise source associated with the proposed water recharge basins. The City of Rancho Cucamonga Development Code restricts construction activities to the weekday hours of 7:00 AM to 6:00 PM and 9: 00 AM to 6:00 PM on Saturday and Sunday. The proposed project would be constructed in compliance with the City's noise ordinance, and, therefore would result in a less than significant impact. However, to minimize noise generated on the site to the extent feasible, the following mitigation measures will be implemented.

XII-1 ***All construction vehicles and fixed or mobile equipment shall be equipped with properly operating and maintained mufflers.***

XII-2 ***All employees that will be exposed to noise levels greater than 75 dB over an 8-hour period shall be provided with adequate hearing protection devices to ensure no hearing damage will result from construction activities.***

XII-3 ***If equipment is being used that can cause hearing damage at adjacent noise receptor locations (distance attenuation shall be taken into account), portable noise barriers shall be installed that are demonstrated to be adequate to reduce noise levels at receptor locations below hearing damage thresholds.***

XII-4 ***Construction staging areas shall be located as far from adjacent sensitive receptor locations as possible at each facility, for example adjacent to the southern end of Basin 5.***

XII-5 ***Good relations with the local community shall be maintained where construction is scheduled, such as by keeping the community informed of the schedule, duration, and progress of the construction to minimize the public objections of unavoidable noise. Communities (City of Rancho Cucamonga and San Bernardino County) should be notified in advance of the construction and the expected temporary and intermittent noise increases during the construction period.***

XII-6 ***IEUA will establish a noise complaint/response program and will respond to any noise complaints received for this project by measuring noise levels at the affected receptor. A sign shall be placed where nearby residents can read it and identify a point of contact at IEUA to make a noise complaint. If the noise level exceeds an Ldn of 65 dBA exterior or an Ldn of 45 dBA interior at the receptor, IEUA will implement adequate measures to reduce noise levels to the acceptable thresholds, including scheduling specific construction activities to avoid conflict with adjacent sensitive receptors.***

b. *Less Than Significant Impact* – Due to the type of construction proposed (no use of pile driving activities or explosives), it is anticipated that the construction equipment to be utilized during project construction activities will not result in excessive groundborne vibration or noise. In addition, operational activities would not generate excessive groundborne vibration or noise.

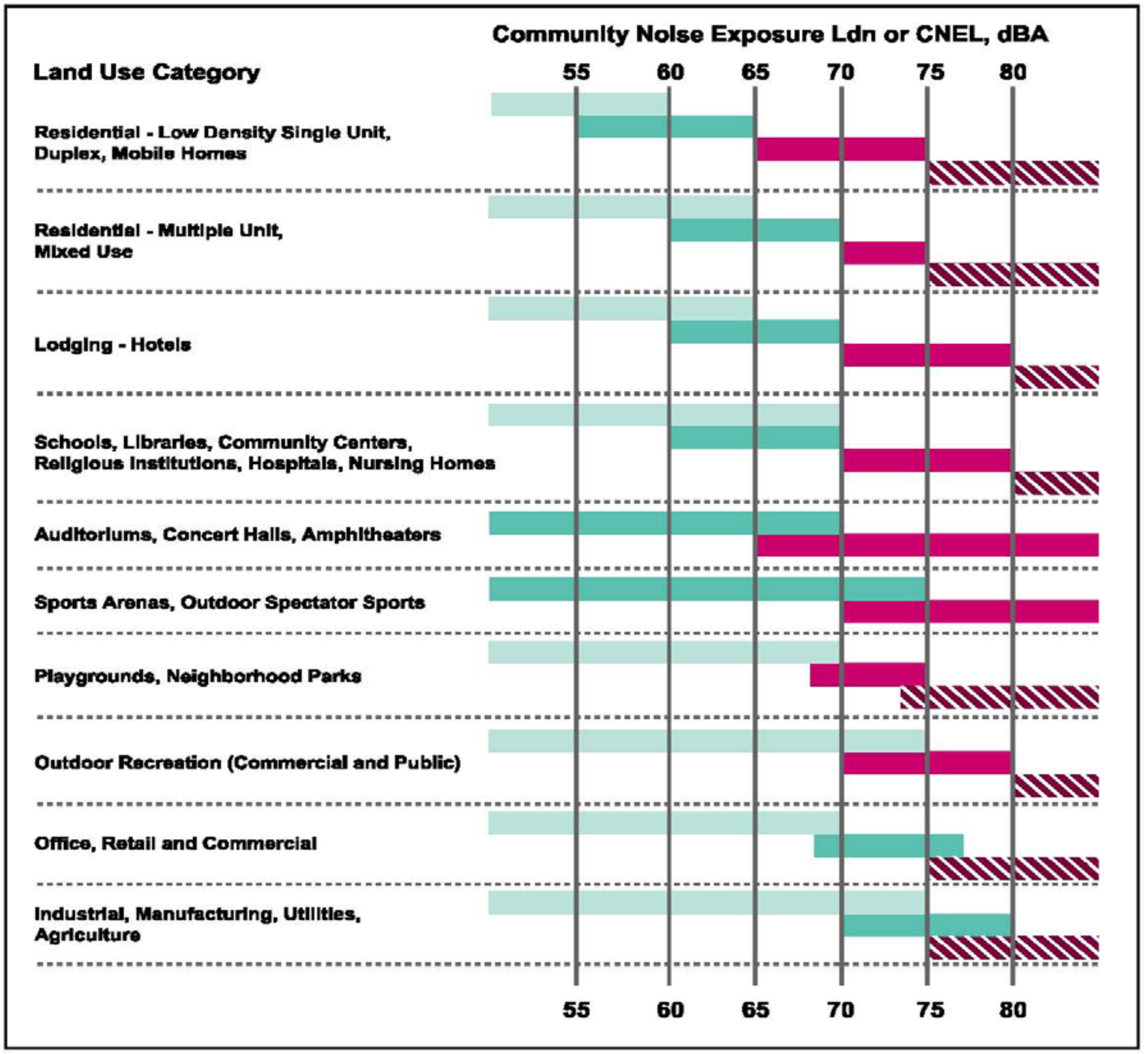
c. *No Impact* – The proposed project will not cause any permanent increase in ambient noise levels in the vicinity of the project above levels existing without the project. Existing noise onsite is dominated by traffic noise generated by the interstate freeways. The project would not result in any new stationary noise sources adjacent to sensitive receptors, nor any other noise sources when the excavation activities are completed. No mitigation is required.

d. *Less Than Significant With Mitigation Incorporated* – During construction, the proposed project would cause a temporary increase in ambient noise levels in the project vicinity. Refer to the discussion under XII.a above. Peak short-term construction noise levels for construction equipment to be used during project construction would range from 70 to 90 dBA at a distance of 50 feet from the source. Sensitive noise receptors, residential development, exist in the vicinity of the project site. As the proposed project would be constructed in compliance with the City's noise ordinance and mitigation will be implemented as outlined under XII.a above, the impacts to this issue are considered less than significant.

e. *No Impact* – The proposed project is located more than five miles north of Ontario International Airport. Due to distance from the Airport the project site will not be exposed to any substantial airport noise. Therefore, the project's forecast impacts due to airport background noise is no impact.

f. *No Impact* – The proposed project site is not within the vicinity of a private airstrip. No potential for exposure to any noise impacts from such airport operations exists at the project location.

Table XII-1
NOISE COMPATIBILITY MATRIX



Normally Acceptable
Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

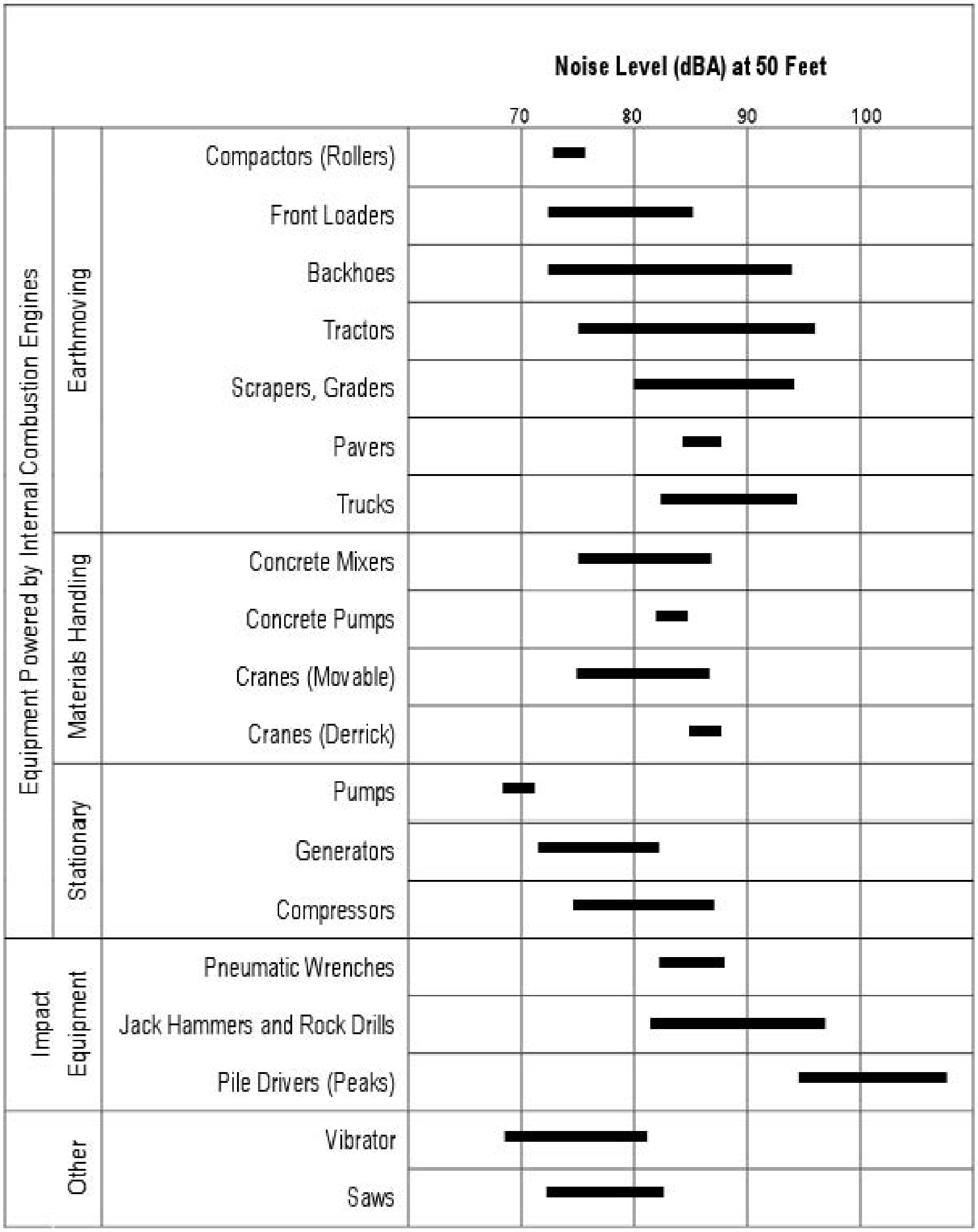
Conditionally Acceptable
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction but with closed windows and fresh air supply systems or air conditioning will normally suffice. Outdoor environment will seem noisy.

Normally Unacceptable
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made with needed noise insulation features included in the design. Outdoor areas must be shielded.

Clearly Unacceptable
New construction or development should generally not be undertaken. Construction costs to make the indoor environment acceptable would be prohibitive and the outdoor environment would not be usable.

Source: City of Rancho Cucamonga General Plan

Table XII-2
TYPICAL CONSTRUCTION EQUIPMENT
NOISE GENERATION LEVELS



Source: EPA PB 206717, Environmental Protection Agency, December 31, 1971, "Noise from Construction Equipment and Operations."

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XIII. POPULATION AND HOUSING – Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X

SUBSTANTIATION:

a. *No Impact* – The proposed improvements to the basins will not induce substantial population growth. The purpose of the basin improvements is to increase the groundwater recharge capacity in the Chino Basin as part of a comprehensive effort to reverse the groundwater overdraft condition in the Chino Basin and to support the groundwater demands of the population within the Agency's service area. The proposed project is considered an essential infrastructure improvement and is considered growth "facilitating," rather than growth "inducing."

b&c. *No Impact* – No housing exists within the proposed project site. Implementation of the proposed project would not displace any housing or people such that construction of replacement housing elsewhere would be necessary. No impact can be identified, and no mitigation is required.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XIV. PUBLIC SERVICES – Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire protection?			X	
b) Police protection?			X	
c) Schools?				X
d) Recreation/Parks?				X
e) Other public facilities?				X

SUBSTANTIATION:

a. *Less Than Significant Impact* – The proposed basins improvement project would not substantially increase the demand for fire protection or emergency services at the project site. Because construction activities will occur on the project site, a random potential exists for accidents and random demand for emergency services. As indicated, such demand is random and not forecast to be significant in the overall context of demand for fire and emergency protection services within the community. Project implementation over the long term would not result in additional people onsite, so the long-term demand for is forecast to be less than significant impact.

b. *Less Than Significant Impact* – The proposed project is not the kind of use that would likely attract criminal activity, except for random trespass and theft. The proposed facilities would not be readily accessible to the public as the project sites is fenced, but a less than significant potential exists for demand for police protection or expansion of police infrastructure. Due to the project's location at already existing water recharge facilities (basins) and the lack of new people associated with operation of the proposed facility, implementation of the proposed project would not substantially increase the demand for law enforcement services beyond that already existing at the project site.

c-e. *No Impact* – The proposed basin modifications would not increase population on the site nor result directly in additional people in the area which could create demand for schools, parks, or other public services. No impact is forecast to occur and no mitigation is required.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XV. RECREATION –				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X

SUBSTANTIATION:

a&b. *No Impact* – The proposed project will not result in direct impacts to recreational facilities as none occur within the project area and no indirect effects on recreational facilities will be generated because the proposed project will not increase population or general demand for such facilities. Implementation of the proposed project will not induce population growth; therefore, it will not increase the demand for recreational facilities beyond that already allowed by current planning. The proposed project sites are currently designated for non-recreational open space use; however, the basins are presently used for flood control and water recharge. Implementation of the proposed project is intended to support provision of an adequate supply of water to meet water demands in the Chino Basin, including future water demands for recreation facilities.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XVI. TRANSPORTATION / TRAFFIC – Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?			X	
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?			X	
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
e) Result in inadequate emergency access?		X		
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?				X

SUBSTANTIATION:

a&b. *Less Than Significant Impact* – During the excavation phase of construction activities, the proposed project is forecast to generate a maximum of 50 temporary truck trips per day over a period of about 120 working days. Once constructed, the only traffic that would be generated by this project would be the continued occasional visits to the project site by IEUA personnel to inspect and maintain the facilities. Construction equipment, material and employee access can be taken off of Wilson Avenue, Cherry Avenue and an access road north of I-210 extending west to East Avenue. Based on the range of available local roadways accessing the project site, the proposed project has no potential to cause a direct or cumulative significant effect on the local and regional circulation system

c. *No Impact* – The proposed project site is located approximately five miles north of the Ontario International Airport. It does not involve the use of aircraft nor will it have an effect on traffic or air traffic patterns.

d&e. *Less Than Significant With Mitigation Incorporated* – The proposed project will occur entirely within the project site boundaries. Construction activities will not occur within the roadways adjacent to the project site. Large trucks delivering equipment or removing small quantities of excavated dirt can enter the site without major conflicts with the flow of traffic on the identified access roadways. Therefore, it will not be necessary for the contractor shall implement a traffic management plan, including flagpersons or other features to control the interaction of the truck traffic and the flow of vehicles on these roadways. No mitigation is required.

f. *No Impact* – This temporary construction project will not generate a substantial amount of new traffic and will not conflict with any adopted plans, policies or programs supporting alternative transportation. No impact to such plans will result and no mitigation required.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XVII. UTILITIES AND SERVICE SYSTEMS – Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?			X	
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X
c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				X
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				X
f) Be served by a landfill(s) with sufficient permitted capacity to accommodate the project's solid waste disposal needs?			X	
g) Comply with federal, state, and local statutes and regulations related to solid waste?			X	

SUBSTANTIATION:

a. *Less Than Significant Impact* – No discharge that could exceed treatment requirements of the Santa Ana Regional Water Quality Control Board (RWQCB) is associated with the proposed project. Mitigation Measures VI-1, VIII-1 and IX-1 identify specific requirements to ensure that any discharged storm water will meet water quality standards of the RWQCB during construction and that no significant degradation of surface water quality will result from the proposed project in the short- or long-term. Use of recycled water for recharge is authorized by the Santa Ana Regional Water Quality Control Board under Permit No. CAS618036, Order No. R8-2002-0012.

b. *No Impact* – This project consists of the improvement of existing water recharge basins. The proposed project will result in the expansion of water recharge facilities; however, the project will not result in the construction of other new facilities or expansion of existing water or wastewater facilities which could cause significant adverse environmental impacts on their own. No mitigation is required.

c. *No Impact* – The proposed project will generate surface runoff but it will be captured within the existing storm runoff system into the basins. With the basin modifications more surface runoff can be diverted from the Etiwanda Creek channel which can actually reduce downstream flows more than can occur at present in these off-channel basins. No off-site or downstream increases in surface runoff are forecast to occur from implementing the proposed project.

d. *No Impact* – Implementation of the proposed project will be conducted within the existing entitlements to water of the involved agencies. The proposed project is designed to optimize future availability of water supplies within the Chino Basin. The expansion and improvement of the basins is considered to be a beneficial impact, not an adverse impact.

e. *No Impact* – This project has no potential to adversely impact any wastewater facility. The proposed project will be served by portable toilets during construction. The project does not include any substantial wastewater generation that would require expansion of any existing wastewater treatment plant. No mitigation is required.

f&g *Less Than Significant Impact* – The proposed project consists of the expansion and improvement of existing water recharge basins. Excavated material will be transported off-site. The proposed project is not forecast to generate substantial solid waste requiring management (except trash generated by onsite employees), but some quantity of green waste (estimated to be about 250 cubic yards) that will be generated and require disposal in accordance with current recycling/ composting requirements. No significant adverse impacts to the solid waste system are forecast to result from project implementation.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact or Does Not Apply
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE –				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		X		
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?		X		
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?		X		

SUBSTANTIATION:

The analysis in this Initial Study and the findings reached indicate that the proposed project can be implemented without causing any new project specific or cumulative unavoidable significant adverse environmental impacts. Mitigation is required to control potential environmental impacts of the proposed project to a less than significant impact level. The following findings are based on the detailed analysis in the Initial Study of all environmental topics and the implementation of the mitigation measures identified in the previous text and summarized following this section.

a. *Less Than Significant With Mitigation Incorporated* – This project has no potential to adversely impact any cultural resources. No mitigation was identified or required. There are no sensitive species located within the project area, but a preliminary jurisdictional delineation indicates that the California Department of Fish and Wildlife, Corps of Engineers and Regional Board may regulate these basins as waters of the State of California. Mitigation is provided to address this issue if these agencies assume jurisdiction and require the acquisition of regulatory permits. Additional measures are required to protect nesting birds and burrowing owls, if necessary.

b. *Less than Significant With Mitigation Incorporation* – Based on the analysis in this Initial Study, the Basins modifications and overall recycled water system improvements have a potential to cause impacts that are individually or cumulatively considerable. The issues of air quality, hydrology and water quality, noise, and transportation and traffic require the implementation of mitigation measures to reduce impacts to a less than significant level and ensure that cumulative effects are not cumulatively considerable. All other environmental issues were found to have no significant impacts without implementation of mitigation. The potential cumulative environmental effects of implementing the proposed project have been determined to be less than considerable and, thus, less than significant impacts.

c. *Less than Significant With Mitigation Implementation* – The proposed project includes activities that have a potential to cause direct substantial adverse effects on human beings. The issues of air quality, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, and transportation and traffic require the implementation of mitigation measures to reduce human impacts to a less than significant level. All other environmental issues were found to have no significant impacts on humans without implementation of mitigation. The potential for direct human effects from implementing the proposed project have been determined to be less than significant impacts.

Conclusion

This document evaluated all CEQA issues contained in the latest Initial Study Checklist form. The evaluation determined that either no impact or less than significant impacts would be associated with the issues of aesthetics, agriculture, land use and planning, mineral resources, population and housing, recreation and utilities and services. The issues of air quality, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, and transportation and traffic require the implementation of mitigation measures to reduce impacts to a less than significant level. The required mitigation has been proposed in this Initial Study to reduce impacts for these issues to a less than significant impact level.

Based on the findings in this Initial Study, the Inland Empire Utilities Agency (IEUA) proposes to adopt a Mitigated Negative Declaration (MND) for the San Sevaine Basins Development Project. A Notice of Intent to Adopt a Mitigation Negative Declaration (NOI) will be issued for this project by IEUA. The Initial Study and NOI will be circulated for 30 days of public comment because of potential future permits that may have to be obtained from the California Department of Fish and Wildlife. At the end of the 30-day review period, a final MND package will be prepared and it will be reviewed by the IEUA for possible adoption at a future Board meeting, the date for which has yet to be determined. If you or your agency comment on the MND/NOI for this project, you will be notified about the meeting date in accordance with the requirements in Section 21092.5 of CEQA (statute).

SUMMARY OF MITIGATION MEASURES

Air Quality

III-1 Using best available control measures during soil disturbance. The menu of enhanced dust control measures includes the following:

- Limit the disturbance "footprint" to as small an area as practical.
- Water all active construction areas at least twice daily.
- Cover all off-site haul trucks or maintain at least 2 feet of freeboard.
- Pave or apply water four times daily to all unpaved parking or staging areas.
- Sweep or wash any site access points within 30 minutes of any visible dirt deposition on any public roadway.
- Cover or water twice daily any on-site stockpiles of debris, dirt or other dusty material.
- Suspend all operations on any unpaved surface if winds exceed 25 mph.

III-2 Limit allowable idling to 5 minutes for trucks and heavy equipment before shutting the equipment down.

III-3 Utilize Tier 3 rated diesel engines for off-road construction equipment.

III-4 In order to keep NOx emissions below the significance threshold, the following construction sequencing shall be implemented. Basin three and four piping and diversion structure construction and basin five excavation may overlap. Also, basin three and four piping and basin eight grading and excavation may also overlap. Basin five and Basin eight construction activities must occur in sequence and not overlap.

Biological Resources

IV-1 Burrowing Owl. In compliance with the CDFW Staff Report on Burrowing Owl Mitigation (CDFW 2012) the Project proponent shall ensure that a pre-construction burrowing owl survey is conducted at least 30 days prior to construction activities. A qualified Biologist shall conduct the survey to determine if there are any active burrowing owl burrows within or adjacent to (within 300 feet) the impact area. If an active burrow is observed outside the nesting season (September 1 to January 31) and the burrow is within the impact area, a Burrowing Owl Exclusion Plan shall be prepared and submitted to CDFW for approval, outlining standard burrowing owl burrow closing procedures used to exclude burrowing owls (e.g., using passive relocation with one-way doors). The loss of any active burrowing owl burrow territory shall be mitigated through replacement of habitat and burrows at no less than a 1:1 ratio. If an active burrow is observed outside the nesting season (i.e., between September 1 and January 31) and the burrow is not within the impact area, construction work shall be restricted within 160 to 1,605 feet of the burrow depending on the time of year and level of disturbance near the site in accordance with guidelines specified by the CDFW.

IV-2 Nesting Birds. A migratory nesting bird survey of the Project's impact footprint shall be conducted by a qualified biologist within 2 weeks and 3 days prior to initiating vegetation clearing or ground disturbance. If active nests are found during the pre-construction nesting bird surveys, a Nesting Bird Plan (NBP) will be prepared and implemented. At a minimum the NBP will include guidelines for addressing active nests, establishing buffers, monitoring, and reporting. The NBP will include a copy of maps showing the location of all nests and an appropriate buffer zone around each nest sufficient to protect the nest from direct and indirect impact. The size and location of all buffer zones, if required, shall be determined by the biologist in consultation with the CDFW, and shall be based on the nesting species, its sensitivity to disturbance, and expected types of disturbance. The nests and buffer zones shall be field checked weekly by a qualified biological monitor. The approved buffer zone shall be visually marked in the field, which no vegetation clearing or ground disturbance shall commence until the qualified biologist has determined the nest in question has become inactive (failed or successful with fledged young birds) and a monitoring report has been submitted to the CDFW for review and approval. Construction within the designated buffer area shall not proceed until approved by the site biologist.

Geology and Soils

VI-1 The SWPPP will include appropriate best management practices (BMPs) to prevent surface runoff with excessive sediment from leaving the project site and to address the potential for remediating any accidental spills of petroleum products that occur during construction activities. The final SWPPP shall be compiled prior to initiating construction. BMPs to be implemented in the SWPPP may include but not be limited to:

- The use of silt fences;
- The use of temporary stormwater desilting or retention basins;
- The use of water bars to reduce the velocity of stormwater runoff;
- The use of wheel washers on construction equipment leaving the site
- The washing or sweeping of silt from public roads at the access point to the site to prevent the tracking of silt and other pollutants from the site onto public roads.
- The storage of excavated material shall be kept to the minimum necessary to efficiently perform the construction activities required. Excavated or stockpiled material shall not be stored in water courses or other areas subject to the flow of surface water.
- Where feasible, stockpiled material shall be covered with water proof material during rain events to control erosion of soil from the stockpiles.

VI-2 Prior to completing the proposed project, project-related disturbed areas shall be stabilized to prevent the discharge of runoff from the project sites in a manner that could initiate erosion or sedimentation. A variety of stabilization measures may be used including: grading the site so all runoff is delivered to the basins, chemical stabilizers, gravel cover, mulch or other means to prevent the site from becoming a source of polluted surface runoff shall be installed.

Hazards and Hazardous Materials

VIII-1 If petroleum products or other hazardous materials are accidentally released to the environment during any phase of construction, IEUA shall require the area of contamination to be defined; shall require the removal of any contaminated soil or material from the contaminated area; and ensure that any area exposed to accidentally released contaminants are remediated to a threshold that meets regulatory requirements established by law or agencies overseeing the remediation.

Hydrology and Water Quality

IX-1 The construction contractor shall prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) which specifies Best Management Practices that will be implemented to prevent construction pollutants from contacting stormwater with the intent of keeping all products of erosion from moving offsite. The SWPPP shall be developed with the goal of achieving a reduction in pollutants both during and following construction to control storm water runoff to the maximum extent practicable based on available, feasible best management practices. The SWPPP and the monitoring program for the construction project shall be consistent with the requirements of the latest version of the Santa Ana Regional Board's NPDES Permit No. CAS618036, Order No. R8-2002-0012 for San Bernardino County.

The following items should be included in the SWPPP:

- Stockpiled material should not be stored in areas which are subject to the erosive flows of water.
- Measures such as the use of straw bales, sandbags, silt fencing or detention basins shall be used to capture and hold eroded material for future cleanup.
- Rainfall will be prevented from entering material and waste storage areas and pollution-laden surfaces.
- Construction-related contaminants will be prevented from leaving the site and polluting waterways.
- A spill prevention control and remediation plan to control release of hazardous substances.

Noise

XII-1 All construction vehicles and fixed or mobile equipment shall be equipped with properly operating and maintained mufflers.

XII-2 All employees that will be exposed to noise levels greater than 75 dB over an 8-hour period shall be provided with adequate hearing protection devices to ensure no hearing damage will result from construction activities.

XII-3 If equipment is being used that can cause hearing damage at adjacent noise receptor locations (distance attenuation shall be taken into account), portable noise barriers shall be installed that are demonstrated to be adequate to reduce noise levels at receptor locations below hearing damage thresholds.

XII-4 Construction staging areas shall be located as far from adjacent sensitive receptor locations as possible at each facility, for example adjacent to the southern end of Basin 5.

XII-5 Good relations with the local community shall be maintained where construction is scheduled, such as by keeping the community informed of the schedule, duration, and progress of the construction to minimize the public objections of unavoidable noise. Communities (City of Rancho Cucamonga and San Bernardino County) should be notified in advance of the construction and the expected temporary and intermittent noise increases during the construction period.

XII-6 The IEUA will establish a noise complaint/response program and will respond to any noise complaints received for this project by measuring noise levels at the affected receptor. A sign shall be placed where nearby residents can read it and identify a point of contact at IEUA to make a noise complaint. If the noise level exceeds an Ldn of 65 dBA exterior or an Ldn of 45 dBA interior at the receptor, IEUA will implement adequate measures to reduce noise levels to the acceptable thresholds, including scheduling specific construction activities to avoid conflict with adjacent sensitive receptors.

REFERENCES

California Department of Conservation, Farmland Mapping and Monitoring Program, San Bernardino County Important Farmland 2008 Map, www.conservation.ca.gov

California Department of Conservation, Williamson Act Program-Farmland Security Zones, San Bernardino County Williamson Act Lands 2006 Map, www.conservation.ca.gov

California Department of Toxic Substances Control, EnviroStor Database, www.envirostor.dtsc.ca.gov

California Department of Transportation, California Scenic Highway Mapping System, www.dot.ca.gov

Chino Basin Water Master and Inland Empire Utilities Agency, San Sevaine Basin Improvements Project Development Report (FINAL) dated April 6, 2015

ESA, Cultural Resources Survey Report (Confidential – Not for Public Distribution) for San Sevaine Basin Development Project, Rancho Cucamonga, California dated May 2015

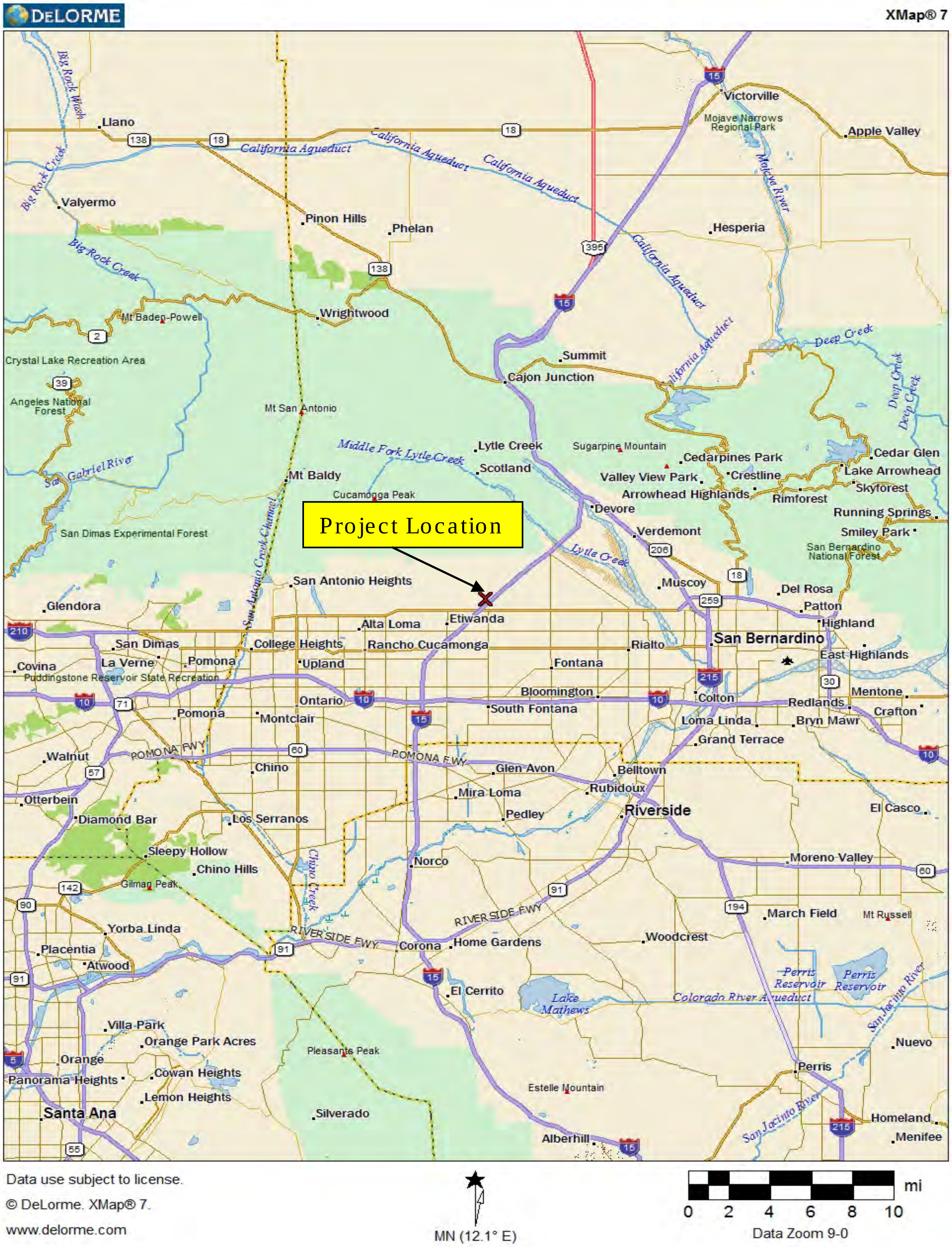
Federal Emergency Management Agency, National Flood Insurance Program, Flood Insurance Rate Maps (FIRM) for San Bernardino County, California, Maps #06071C7895J and 06071C7915H

Rancho Cucamonga General Plan, Adopted May 19, 2010

Uniform Building Code, 1994

FIGURES

FIGURE 1
Regional Location



Tom Dodson & Associates
Environmental Consultants

FIGURE 2
Site Location

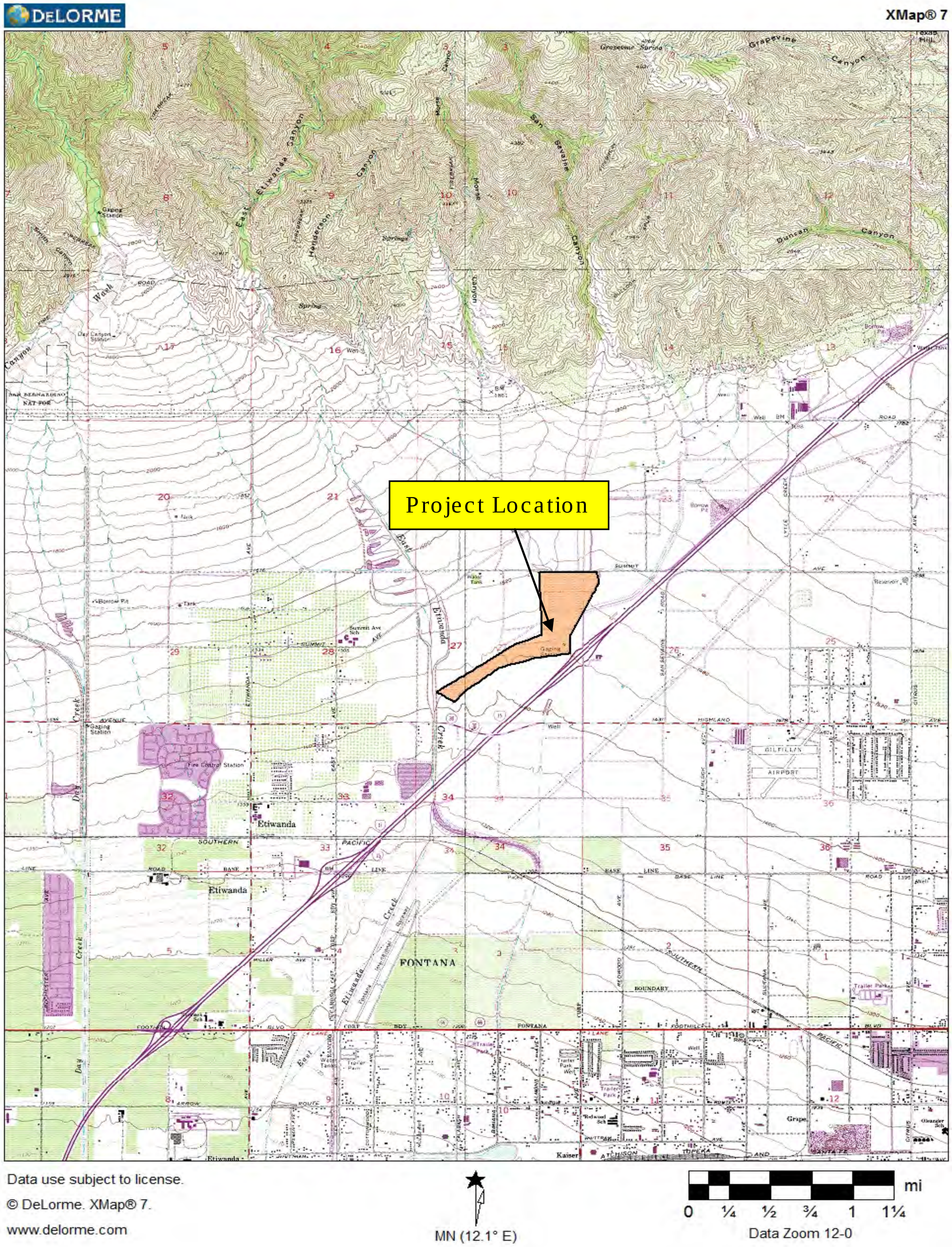
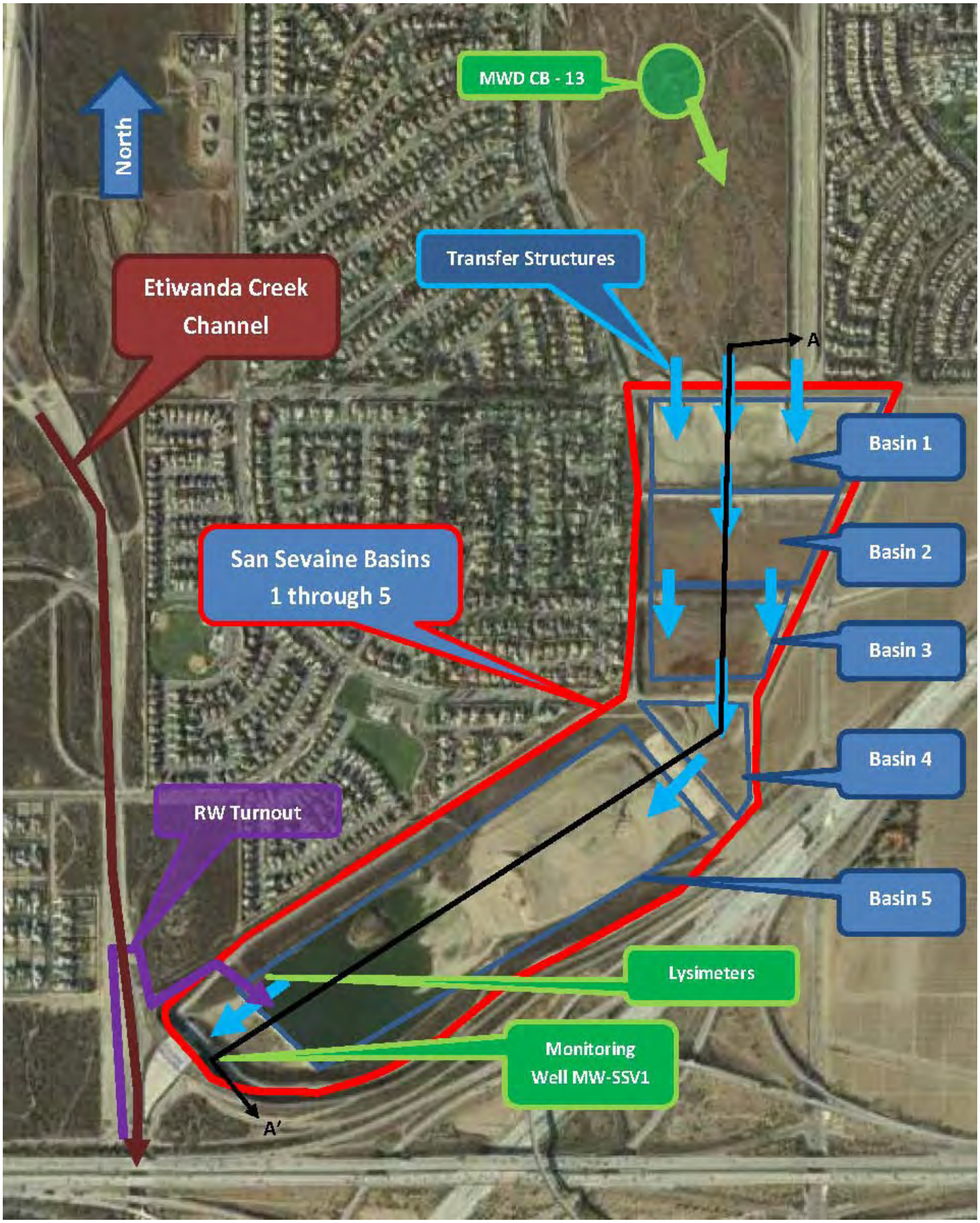


FIGURE 3
Project Area Map

Source: San Sevaine Basin Improvements Project Development Report (Draft), 9/27/14

FIGURE 4
Basin Map

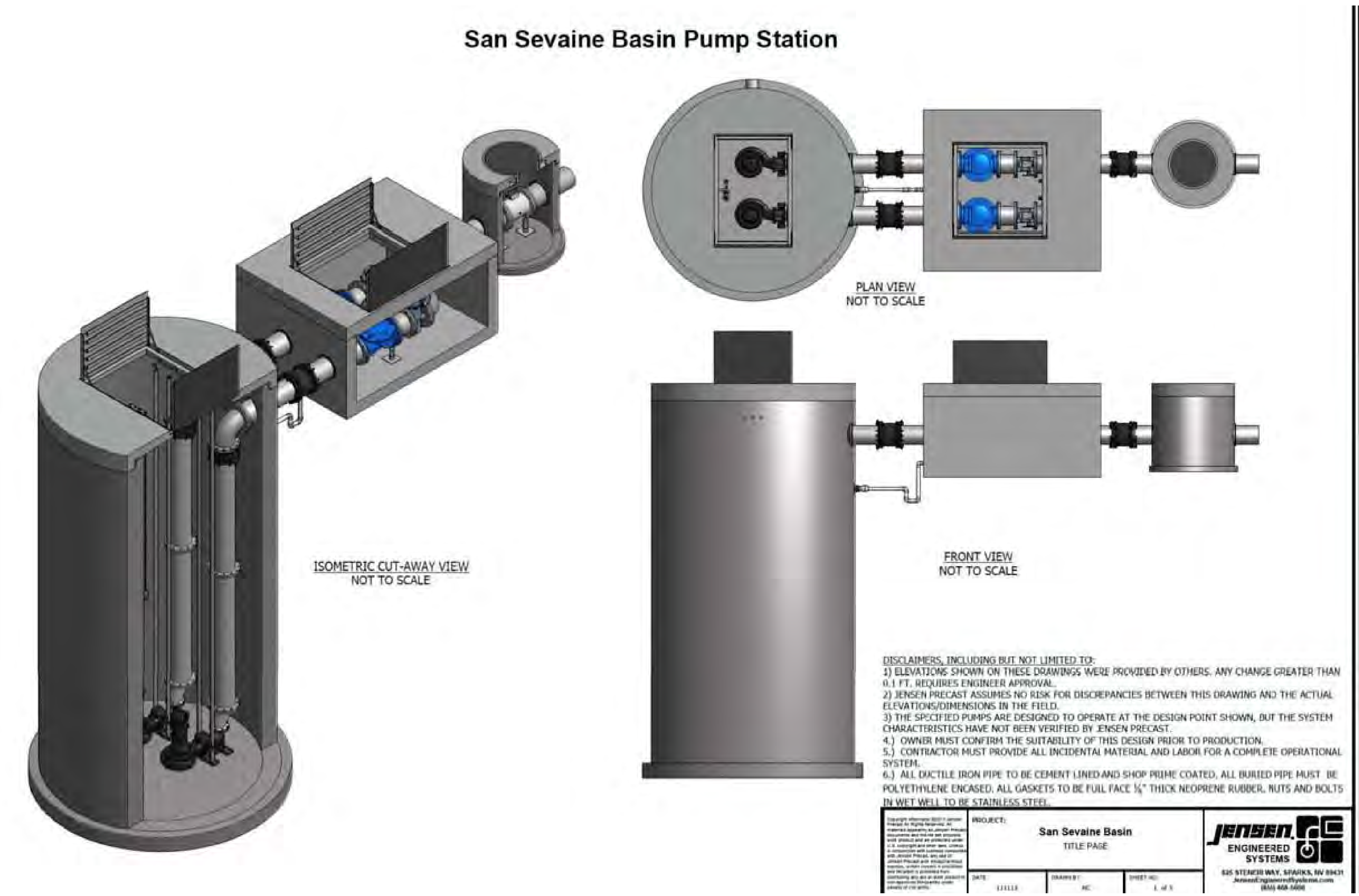


Source: San Sevaine Basin Improvements Project Development Report (Draft), 9/27/14

FIGURE 5
Regional Location

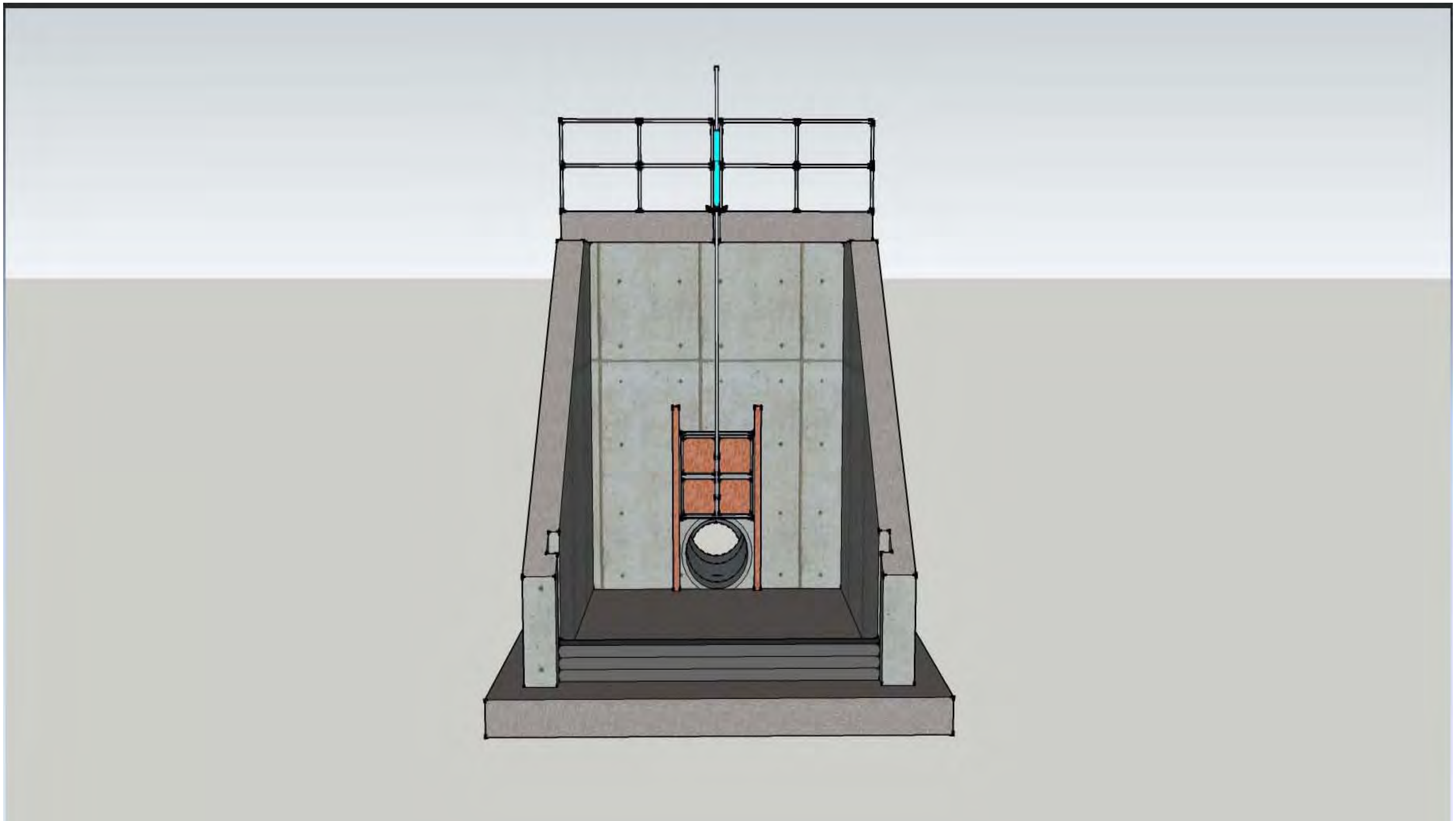
Source: San Sevaine Basin Improvements Project Development Report (Draft), 9/27/14

FIGURE 6
Pump Station Conceptual Design



Source: San Sevaine Basin Improvements Project Development Report (Draft), 9/27/14

FIGURE 7
Inlet / Outlet Structure Conceptual Design



Source: San Sevaine Basin Improvements Project Development Report (Draft), 9/27/14

APPENDIX 1

San Sevaine Basin Improvements Project Development Report

CHINO BASIN WATERMASTER

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Final Report

April 6, 2015

Contents

LICENSED PROFESSIONAL ENGINEER
NATHAN A. SCHEEVEL
C 80056
EXP. 9/30/16
CIVIL
STATE OF CALIFORNIA

Figures

Tables

I. Executive Summary

The Inland Empire Utilities Agency (IEUA) and the Chino Basin Watermaster (CBWM) have prepared this Project Development Report (PDR) to determine the engineering, environmental and economic effects of the proposed San Sevaine Basin Improvements Project. This project would increase the amount of recycled water (RW) and stormwater recharged into the Chino Groundwater Basin. Additional imported water (MW) may also be recharge when available. The existing San Sevaine Basins (Basins) are made up of five individual basins covering approximately 130 acres. These basins are dual-use facilities which serve flood control and groundwater recharge functions. Currently on average, a total of 500 acre-feet per year (AFY) of RW and 300 AFY of stormwater is infiltrated into the groundwater basin at this location. The recommended Basin improvements will allow an estimated 1,900 to 8,100 AFY of additional RW/MW, and an additional 650 to 2,700 AFY of stormwater to be recharged at this location.

For comparison purposes, a range of RW and stormwater recharge estimates have been provide in this report. The lower bound of the estimates have been taken from the 2013 Amendment to the 2010 Recharge Master Plan Update. The upper bound of the estimates have been developed through the analysis presented in this report. A range recharge estimates are necessary in order to provide a basis of design to adequately size and cost the proposed project improvements and provide a comprehensive business case evaluation. The lower and upper ranges of recharge yield estimates are referred to as "Low Range" and "High Range" throughout this report.

A number of alternatives exist which would help IEUA and CBWM increase the annual recharge volume of the currently under-utilized Basins. In order to effectively plan and implement the project an engineering and environmental analysis was performed to compare an array of alternatives. A total of 17 alternatives were considered initially with a total of 5 alternatives selected for further evaluation. Through detailed analysis it was determined that the preferred alternative is to extend the Segment A recycled water pipeline from Etiwanda Creek Channel to Basins 1-3 along an alignment within an existing maintenance road immediately north of the Basins, and to construct a stormwater pump-station in Basin 5 and connect it to the proposed RW pipeline extension. The preferred alternative will allow additional RW and stormwater to be infiltrated in the Basins by optimizing the storage volume of Basins 1-3 and 5 while delivering RW and additional stormwater to higher performing Basins 1-3 (Basins 1-3 have shown to have greater infiltration rates than Basin 5).

The capital cost of the preferred alternative is expected to be $5,940,000. The annual debt service cost of the project is approximately $387,000 per year. With an estimated annual operation and maintenance cost ranging from $140,000 to $345,000 per year, the total annual cost of the project ranges from $896,000 to $3,280,000 over the next 30 years. With an expected benefit ranging from 1,900 to 8,100 AFY of additional supplemental water and 650 to 2,700 AFY of stormwater recharged at the Basins, the total unit cost to recharge the additional water ranges from $351/AF to $304/AF (Table 1). The 2005 Ten-Year Capital Improvement Plan and the 2006 Phase II Chino Basin Recycled Water Groundwater Recharge Project – Title 22 Engineering Report had previously estimated the RW recharge potential at the Basins at 4,100 AFY. This PDR considers historical performance of the Basins and uses the maximum potential of the Basins as the basis of design for Basin improvements and infrastructure design, thereby avoiding recharge constraints should future supply conditions change.

Table 1: Preferred Alternative Summary

Alternative Description	Extend RW pipeline to Basins 1–3, and add a Basin 5 pump station.
Estimated Benefit	2,550 to 10,800 AFY
Estimated Capital Cost	$5,940,000
Unit Cost	$351/AF to $304/AF

II. Introduction

A. Report Purpose

The purpose of this PDR is to present the evaluation of several alternatives that would achieve the objective of increasing groundwater recharge at San Sevaine Basins. The criteria used to identify, evaluate and determine the recommended basin improvements are presented here. The report will provide analysis to assist in reaching a decision for the improvement type, location and conceptual design of the preferred alternative for maximizing recharge of water at the Basins.

The report will also present the criteria used to evaluate the various improvement alternatives. The comparison of the improvements considered was based upon a set of assumptions and a number of parameters utilizing a matrix format. This process was used to equitably compare alternatives, and identify the preferred alternative for the San Sevaine Basin Improvements Project.

The findings in this report will provide the baseline budget, schedule and preliminary design concepts for project implementation.

B. Project Overview

The Basins are owned by the San Bernardino County Flood Control District (SBCFCD). The Basins were originally constructed for flood control mitigation to attenuate peak storm flows, but are now operated as multipurpose basins under a Four Party Agreement between SBCFCD, IEUA, CBWM, and the Chino Basin Water Conservation District (CBWCD). The Four Parties previously invested in improvements of the Basins to allow them to be used for groundwater recharge. The Basins were modified to allow the capture and recharge of stormwater and supplemental water (supplemental water consists of imported water and recycled water). IEUA performs the actual operation and maintenance of the Basins for recharge purposes in cooperation with CBWM and SBCFCD. Through recent operations and data collection afforded by the initial improvement project, IEUA and CBWM have identified several possible opportunities to further enhance and optimize the use of this facility for additional groundwater recharge.

The Basins encompass approximately 130 acres. Recycled water that is delivered to the Basin undergoes Soil Aquifer Treatment (SAT). The SAT process is utilized in the Basins to allow the RW to undergo further physical, biological and chemical purification as it percolates through the soil prior to reaching the groundwater table. The initial improvements to the Basins allowed RW to be delivered to Basin 5 only. The recharge of stormwater and imported water in San Sevaine Basins 1 through 3 have revealed that a much higher infiltration rate potential exists in the area. San Seviane 5 has the lowest infiltration rate as compared to the other Basins. This has limited the current RW recharge to approximately 500 AFY. The low infiltration rate in Basin 5 may be explained by several factors 1) Approximately 50% of Basin 5 is un-usable for recharge operations because SBCFCD utilizes the Basin as a fill stockpile area and the stockpile area also has the potential to introduce a large amount of clogging materials into the recharge area during storm events, 2) Layers of fine grained soils may exist on the Basin bottom, or deeper under the Basin, which may impede infiltration rates, 3) High infiltration rates of adjacent Basins may create groundwater mounding under the San Sevaine Basin System. Due to the relatively limited amount of time that Basin 5 has been used for groundwater recharge the cause of its low performance is not yet fully understood.

In order to fully utilize the recharge potential of the Basins, improvements should be implemented to either improve the infiltration rate at Basin 5, or have the ability to deliver RW and/or additional stormwater to Basins 1-3 which have higher infiltration rates.

C. Existing Facilities

In an effort to increase stormwater and supplemental water recharge, IEUA and CBWM are exploring opportunities to enhance its artificial groundwater recharge capabilities at the Basins. The Basins consist of five, soft-bottomed basins along San Sevaine Creek. Each basin has inlet and outlet structures that allow the capture and recharge of the various water sources. The primary mode of conveyance between Basins is surface transfer, which restricts the operational flexibility of the system. The Basins are located northwest of the Interstate I-15 and State Highway 210 (Figure 1) interchange. Land use surrounding the Basins is primarily residential to the west, agricultural to the east and undeveloped land to the north and south of the Basins. The general land surface contours in this area slope from the north to the south.

Figure 1: Project Area Map

SAN SEVAINE BASINS 1 THRU 3

San Sevaine Basins 1 through 3 are located at the northern extent of the five Basin system (Figure 2). Currently, Basins 1-3 have the ability to capture and recharge imported water and stormwater only. Imported water is delivered to the Basins by a turnout facility, CB-13, owned by the Metropolitan Water District (MWD). CB-13 is located north of Basin 1 and discharges imported water upstream of the basins into the San Sevaine Channel. Depending upon the quantity of imported water, Basin 1 will fill and spill into the donwstream Basins 2 and/or 3. Typically, imported water is only recharged at Basins 1 and 2 due to the high infiltration rates and close proximity to the turnout.

Stormwater is delivered to each basin by concrete flood control channels and local storm drains. These conveyances collect stormwater flows from the adjacent tributary areas and deliver them to the Basins during storm events. Basin 3 receives additional storm flow from Hawker Crawford Channel which is drains Rich Basin located approximately one mile to the north-east. These storm flows are unmetered and uncontrolled.

Currently, Basins 1 through 3 do not have the infrastructure to receive RW.

Basin 1 has a bottom invert elevation of 1,485 feet mean sea level (ft msl) and an overflow spillway elevation of approximately 1,494 ft msl for a depth of 9 feet. Basin 2 has a bottom invert elevation of 1,467 ft msl and an overflow spillway elevation of approximately 1,477 ft msl for a depth of 10 feet. Basin 3 has a bottom invert elevation of 1,455 ft msl and an overflow spillway elevation of approximately 1,462 ft msl for a depth of 7 feet. Figure 4 illustrates the approximate elevations of each Basin.

SAN SEVAINE BASIN 4

San Sevaine Basin 4 is located directly south of Basin 3 and to the north-east of Basin 5 as shown in Figure 2. This basin currently has no sub-surface inlet structures and only receives water when surface transferred from the upstream Basin 3.

Basin 4 is the smallest of the five Basins in the system and has an average bottom elevation of 1,437 ft msl and a spillway elevation of 1,442 ft msl, for a depth of 5 feet (Figure 4). Due to the Basin's relatively small area, shallow depth, and lack of inlets/outlets it has yet to be utilized for groundwater recharge purposes. Once groundwater recharge in Basins 1-3 and 5 has been optimized, then resources may be directed to further develop this Basin. Incidental stormwater recharge occurs in this Basin when adequate storm flow is present.

SAN SEVAINE BASIN 5

Basin 5 is the largest of the Basins and is located downstream to the south-west, of Basin 4 as shown in Figure 2. The Basin has the ability to capture and recharge stormwater and

RW. Stormwater is delivered to the basin in a similar manner as Basins 1 through 3. Recycled water is delivered to the Basin via a turnout facility constructed under the Agency's 1630 East Recycled Water Pipeline – Segment A Project. The RW turnout facility is located in the southwest corner of Basin 5. As shown in Figure 3, the RW turnout facility delivers RW to Basin 5 via the existing stormwater diversion pipeline. The existing pipeline connects to a diversion box located at the Etiwanda Creek Channel and discharges into Basin 5. The spillway structure downstream of Basin 5 has the ability to discharge water back into the Etiwanda Creek Channel when water levels are sufficiently high. Basin 5 also has an existing monitoring well located in the lower access road along the south west end of the Basin which provides groundwater level data. An existing lysimeter system located near the RW turnout allows monitoring of water quality as it percolates through the soil in the southwest end of Basin 5 (Figure 2).

Figure 2: Basin Map

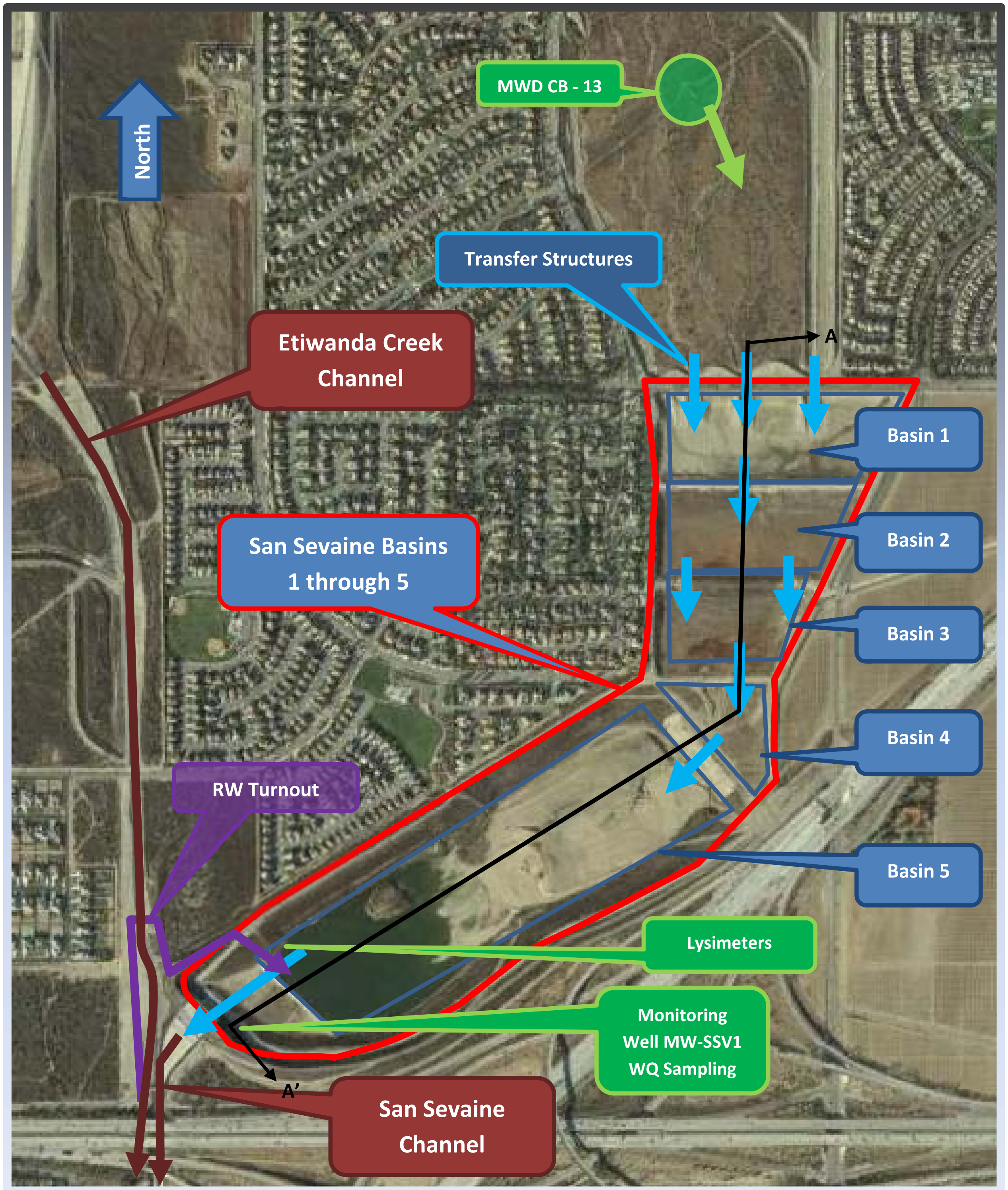


Figure 3: Basin 5 Schematic - Existing Recycled Water Turnout

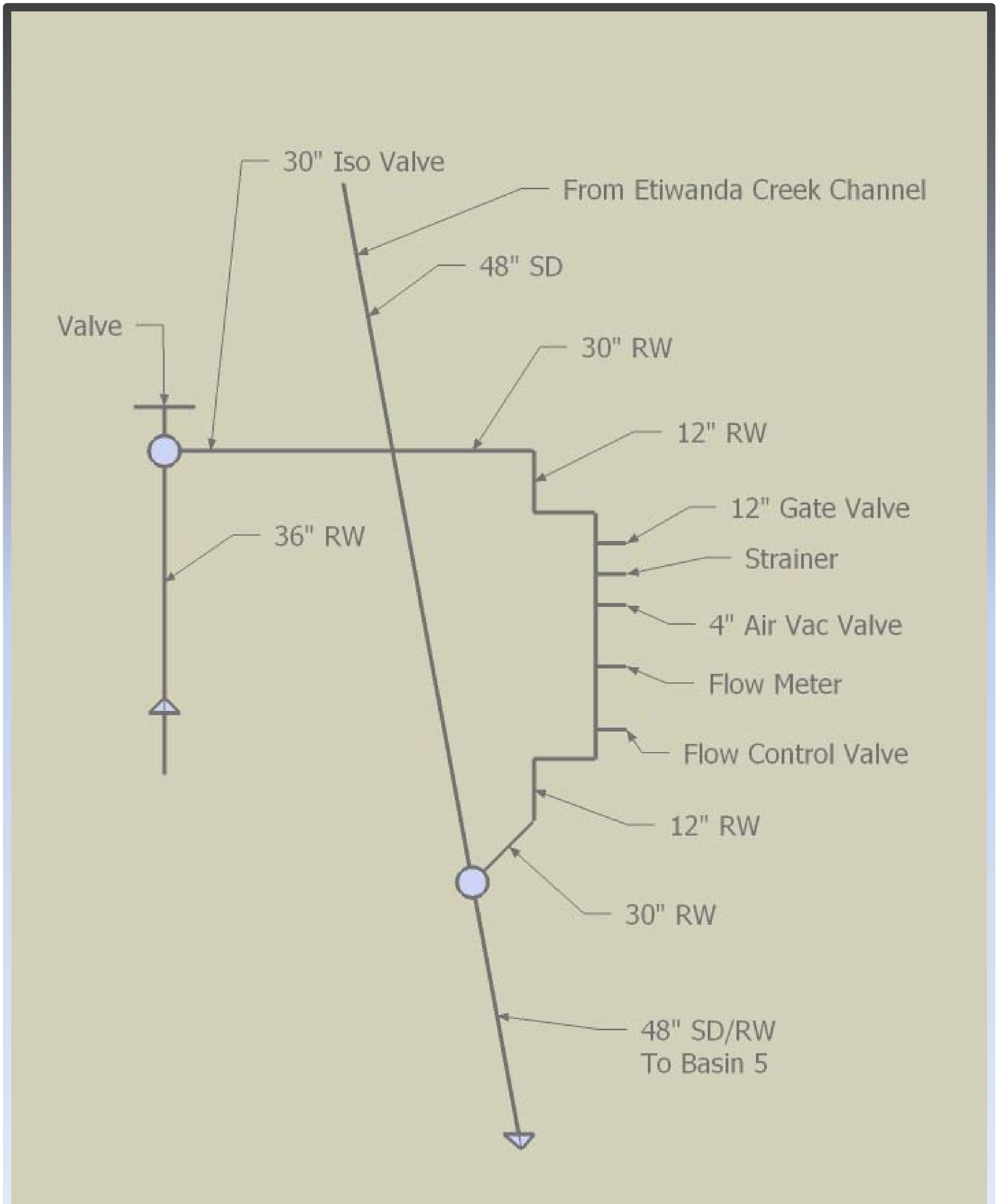
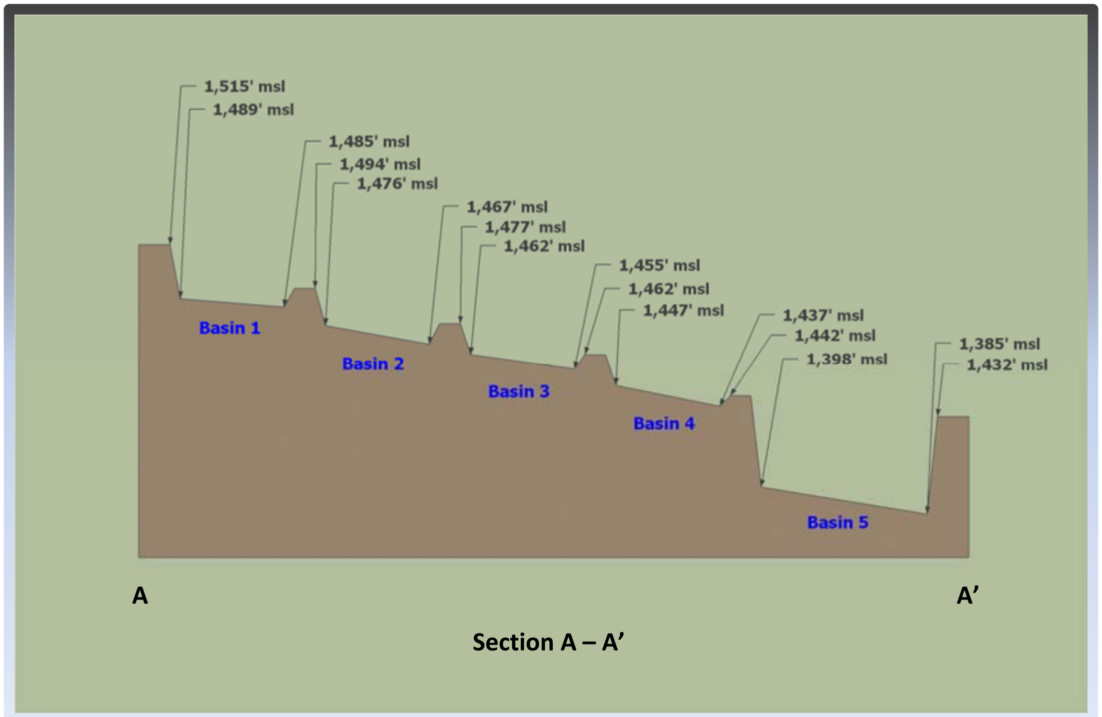


Figure 4: San Sevaine Basin Cross Section



EXISTING BASIN PERFORMANCE

The infiltration rates for each Basin were derived from historical Basin data and actual observed infiltration rates. Below in Table 2 are observed infiltration rates for the Basins. Basin 5 is currently the only Basin to receive RW. Basin 5 averages 0.15 feet per day of RW infiltration over approximately 35 acres (50% of Basin area).

Table 2: San Sevaine Basin Characteristics

	Basin 1	Basin 2	Basin 3	Basin 4	Basin 5	Total
Surface Area (acres)	20	18	12	6	73.5	130
Recharge Surface Area (acres)	12.2	8	9.9	NA	35	65
Infiltration Rate, MW or RW (cfs),(ft/day)	11 cfs 1.8 ft/day	8.4 cfs 2.1 ft/day	8.4 cfs 1.7 ft/day	NA	2.6 cfs 0.15 ft/day	NA
Basin Volume (acre-feet)	80	100	80	NA	300	560
Average Annual Yield (AFY) 2011 - 2013	3,000 (MW 2011 Only) 180 (SW)			NA	500 (RW) 120 (SW)	3,500 (SupW) 300 (SW)

MW = Imported Water, RW = Recycled Water, SupW = MW+RW, SW = Stormwater
Infiltration Rates were calculated from raw data supplied by IEUA and the Basin 5 Startup Report

The total average annual yield is calculated based on a given number of days the Basins are in service with each type of water. The number of days the Basins are in service will vary from year to year depending on MW availability, storm frequency and intensity, flood control operations and groundwater recharge operations and maintenance.

PROJECTED BASIN PERFORMANCE

The following analysis assumes that the infiltration rate of Basin 5 can be improved by 30%. An increase of 30% was chosen because the area of Basin 5 could be increased by 30% with relative ease. This increase in area would leave the majority of the SBCFCD stockpile in place and require only minor grading and the construction of small (<5 feet tall) isolation berm. The re-grading and isolation berms would allow the low laying areas around the existing stockpile to be used for groundwater recharge. This scenario also assumes that the new recharge area would perform as good as the existing Basin 5 recharge area.

Another way to achieve the 30% estimate is to increase the infiltration rate of the existing recharge area from 0.15 feet per day to 0.20 feet per day. Achieving the increase through an improved infiltration rate is possible in a variety of ways. Improvements that could result in an infiltration rate increase are outlined in Alternative 4 later in this report. The 30% increase would be achieved by scaling (up or down) one of the methods outlined in Alternative 4. The preferred method, and scale of the method, for this alternative would be selected through additional geotechnical analysis and final design efforts.

An improvement (due to increased area or an increase in infiltration rate) that results in a 30% increase in RW recharge would equate to an additional 50 acre-feet per month. In addition, if the recycled water pipeline is extended to Basin 1 - 3, an additional 1,350 acre-feet per month of RW/MW recharge can be achieved, increasing the total RW/MW recharge capacity by 1,400 acre-feet per month when the Basins and RW/MW is available.

Additional stormwater capture and recharge may also result from an improvement project. If infiltration can be enhanced in Basin 5, or if a transfer pump station is constructed in Basin 5, then additional stormwater will be captured and recharged. A total of 3,200 AFY is possible if Basin 5 is improved and a transfer pump station is constructed.

The additional stormwater recharge due only to a Basin 5 pump station was estimated to be 2,700 AFY (Appendix B). This was estimated by considering the availability of stormwater during an average year (*2010 Recharge Master Plan Update Final Report: Table 6-2)*. On average there are 18 storm events per year producing approximately 18 inches of rain. Scheevel Engineering estimates that ½ of those storm events occur during the 5 month storm season and occur at an intensity (> 0.70 inches per day) which would fill the water conservation pool volume of Basin 5 (approx. 350 AF). The frequency of the storm events is highly variable during any given month, however, if the storm events were spaced at least 9 days apart, and Basins 1-3 operate at an average infiltration rate of 1.1 ft/day, then the Basin 5 pump station could evacuate the Basin 5 pool in preparation for subsequent storm events. This would result in a total of approximately 8 pool volumes of 350 AF each of stormwater capture, or 2,800 AFY. Currently, approximately 100 AF of stormwater is captured in Basin 5. The new stormwater recharge benefit resulting from a Basin 5 pump station is approximately 2,700 AFY.

The average infiltration rate in Basins 1-3 has been observed to be approximately 1.9 ft/day for imported water. This was calculated from raw data supplied to Scheevel Engineering from IEUA. Infiltration rates from periods of time in which only imported water was delivered to the Basins were used to develop the average value. A similar infiltration rate for RW should be achievable if it is conveyed to Basins 1-3. However, due to the relatively limited amount time that imported water has been delivered to Basins 1-3, the sustainable, long-term, infiltration rate should be reduced to account for basin clogging, groundwater mounding and operational constraints. A 20% reduction factor has been applied to the historical inflation rate resulting in a projected infiltration rate for RW and imported water of approximately 1.5 ft/day.

Groundwater mounding may or may not be a factor in long term Basin performance and can only be entirely identified by long-term operation. The 20% reduction factor assumes that the Basins are operated continuously for 6 months. The total suspended solids (TSS) in RW is typically low (generally less than 10 mg/L), however, due to the TSS in nuisance flows and wind generated TSS, infiltration rates will inevitably decay as the Basin floor clogs with fine grained sediments. This infiltration rate decay will vary depending on TSS concentrations, particle size distribution and Basin operations, including any up-stream activities that result in suspended solids release in nuisance flows. The TSS value used to estimate the reduction factor was set at 15 mg/L for the Basins.

In order to estimate the reduction factor, other groundwater recharge basins in the region with similar attributes were analyzed. Two basins in the lower Santa Ana River Watershed, which receive stormwater and recycled water (similar to San Sevaine Basins) were considered. Previous, detailed analyses were done to estimate infiltration rate decays of these sample basins. Long term monitoring of the infiltration rates and associated TSS concentrations of these sample basins were used to develop the reduction factor of 20%. For comparison purposes, past analysis on stormwater only recharge basins in the lower Santa Ana River Watershed have exhibited infiltration rate decays of 40% to 60% when operated continuously during the non-storm season for long periods of time (6 months or more).

Stormwater infiltration rates for Basins 1-3 are expected to remain fairly constant given similar operation and maintenance conditions. Therefore, the projected stormwater infiltration rate is the same as the observed historical rate of 1.1 ft/day for Basins 1-3. The projected stormwater infiltration rate was estimated by calculating the long-term average infiltration rates from Basins 1-3 during periods of time when storm events occurred and stormwater was the primary source of water in Basins 1-3. The calculated long-term average includes periods of time with lower infiltration rates due to basin clogging (decay). The overall annual volume of stormwater recharge in Basins 1-3 may increase if new sources of storage and delivery can be developed (i.e. Basin 5 stormwater pump station).

Historical Basin 5 performance has revealed relatively low infiltration rates for both recycled water and stormwater. Increasing the infiltration rate may be possible, however the level of effort and costs associated with increasing the infiltration rate will vary with Basin geology. A conservative projection for the achievable increase in the recycled water infiltration rate has been assumed to be 30%. A subsurface investigation was performed in September of 2014 to gather field data and better identify the factor(s) limiting the infiltration rate in Basin 5, and those findings and recommendations are summarized later in this report. Imported water infiltration rates are expected to be similar to the recycled water rates, should imported water be delivered to Basin 5.

In order to estimate the future average annual recharge for the Basins, the duration of delivery of each water source must be estimated. A primary consideration that must be accounted for when estimating the amount of RW that can be recharged in the Basins, is the number of days the Basins will be available for RW delivery. The primary function of the Basin is flood control, which will limit the number of days the Basins will be available for RW and/or imported water recharge. Table 3 outlines the Basin availability assumptions used in the PDR evaluation.

Table 3: Basin Availability

Description	Time (Months)
Typical Storm Season: November through March	5 Months
Minimum Time Available for RW	4 Months
Average Time Available for RW	7 Months
Maximum Time Available for RW	10 Months
Average Time Basin is Out-Of-Service Due to No Available Water or for Maintenance	3 Months
Durations Used In Analysis	
Time Basin Receives Stormwater	3 Months
Time Basin Receives Supplemental Water	6 Months
Time Basin is Out-Of-Service	3 Months

The overall volume of projected groundwater recharge estimated in Table 4 assumes that recycled water will be available for at least 6 months out of every year and stormwater is available for 3 months out of every year. A total of 3 months per year have been set aside for flood control and groundwater recharge maintenance activities. This time allotment allows for Basin cleanings, infrastructure maintenance/repair, weed abatement and pre/post-storm Basin grading. For this analysis, it has been assumed that no significant quantities of imported water will be recharged at the San Sevaine Basins on a regular basis. The projected rates also assume that improvements will occur to deliver recycled water to Basins 1-3 and a 30% increase in the infiltration rate in Basin 5 is realized. Table 4 below summarizes the historical Basin performance, as well as the projected performance given the implementation of an improvement project. Historical rates in Table 4 have been calculated from raw data gathered during periods when the water source was known and infiltration rates were being measured.

Table 4: Basin Infiltration Performance

Basin #	**Historical Infiltration Rates 2011-2013 (ft/day)**			**Projected Infiltration Rates (ft/day)**		
	Recycled Water	Storm Water	Imported Water	Recycled Water	Storm Water	Imported Water
1	NA	1.1	1.9	1.5	1.1	1.5
2						
3						
5	0.15	0.08	NA	0.20	0.08	0.20
Notes: <u>Basins 1-3</u> historical imported water infiltration rate has been reduced by 20% to develop the projected rate. This assumes more regular basin use may result in clogging, groundwater mounding and additional downtime for O&M. <u>Basin 5</u> historical recycled water infiltration rate has been increased by 30% to develop the projected rate. This assumes the recharge area can be increased or subsurface improvements can be implemented to achieve the projected rate.						

Basis of Design

The purpose of this section is to present the design parameters and criteria used for the expansion of the facilities at the Basins. This section serves as a basis for all other sections discussed in the PDR.

The original basis of design for the Basins was established as part of the 2005 Ten-Year Capital Improvement Plan and the 2006 Phase II Chino Basin Recycled Water Groundwater Recharge Project – Title 22 Engineering Report. These reports estimated the potential recycled water (RW) recharge capacity for the San Sevaine Basins to be 4,100 acre-feet per Year (AFY). Based upon actual performance in Basin 5 since January 2011, the RW yield has been approximately 500 AFY. Basins 1 – 3 have been operated with imported water and stormwater only. Observed imported water infiltration rates in Basins 1 – 3 indicate that the annual average RW recharge capacity may be higher than first estimated if Basins 1 – 3 can receive RW. Table 2, Table 3 and Table 4 summarize the Basin characteristics that are the basis for the evaluation and analysis in the PDR.

A number of water quality limits have been established for groundwater recharge of recycled water. Recycled water delivered to the Basins will be Title 22 Effluent. The RW will be further treated as it percolates through the soils under the recharge basin. This purification process is known as Soil-Aquifer Treatment (SAT), and is measured at various depths below the bottom of the basin surface (bbs) by using lysimeters to collect samples for testing. The primary water quality parameters that are measured to determine the effectiveness of the SAT, are pH, TOC and TN. Table 5 provides a summary of the water quality parameters monitored.

Table 5: Recycled Water Recharge Water Quality

Parameter	Value	Notes
General RW Quality	Title 22 Effluent	
pH	6.0 – 8.0	
TOC, mg/L	0.5	Total Organic Carbon at 25-ft bbs
TN, mg/L	5	Total Nitrogen at 20-ft bbs
Notes:		

1. RWC = 0.5 mg/L / TOC (average).
2. TOC (average) based upon reduction process via Soil-Aquifer Treatment (SAT) at each basin. Lysimeter data collected to determine TOC (average) at each basin.
3. bbs = below basin surface

IEUA’s recycled water groundwater recharge permit includes a concept known as the Recycled Water Contribution (RWC). The maximum RWC is the limit of recycled water volume that can be recharged relative to all sources of water recharged. Other recharge sources (example: stormwater, imported water and a fraction of groundwater underflow) are considered Diluent Water. The maximum RWC allowed by IEUA’s permit is 50 percent and is defined by a water-quality driven formula that uses Total Organic Carbon (TOC) as a metric. The formula is:

$$RWC_{\max} = \frac{0.5mg/L}{TOC_{avg}}$$

Average TOC is determined as a 20-sample weekly running average determined from recycled water samples collected prior to the recharge water reaching groundwater. IEUA uses lysimeters at each recharge basin site to collect samples and calculate the average TOC and maximum RWC. These are both determined through a 6-month long start-up period demonstration test. After this period, the volume of recycled water recharged is managed as a 120-month rolling average RWC. In this RWC management plan, monthly data for diluent water and recycled water recharge are compiled and used to calculate the actual RWC based on volume. The volume based RWC is managed to not exceed the maximum RWC.

IEUA's recycled water groundwater recharge permit states that the maximum RWC must be determined separately for each recharge site, thus each recharge site can have a unique maximum RWC that is based on its site-specific properties. Since IEUA uses lysimeters to sample recycled water following infiltration, the biological and physical properties of the soil reduce the TOC of the delivered recycled water. The SAT can vary geographically based on soil grain size, soil chemistry, soil bacterial population, and operational procedures. If IEUA were able to lower its delivered recycled water TOC concentrations to 1.0 mg/L or less, then a 50 percent maximum RWC would be allowable by IEUA's recycled water groundwater recharge permit. IEUA is currently working on a research project under MWDs Foundational Actions Program to further evaluate if degrading impacts to groundwater quality is attributed to increased RW contributions.

During Basin 5's start-up period the 20-sample running average TOC concentration at the 20-foot lysimeter was found to be 1.82 mg/L. This equates to a RWC of approximately 27% for Basin 5. If RW is to be delivered to Basins 1 – 3 the installation of lysimeters and a start-up period may be required to identify the SAT efficiency of these Basins and determine the RWC for Basins 1 – 3. Utilizing the existing Basin 5 lysimeters in lieu of constructing new lysimeters in Basins 1-3 will be further evaluated during the final design and permitting phases of the project.

Victoria Basin (located near San Sevaine Basins) has a RWC of 50% which is likely an attainable goal for San Seviane Basins as well. For the purpose of this report it has been assumed that the future RWC for the Basin is 50%. So for every 1 AF of RW recharged there needs to be 1 AF of diluent water (SW, MW or Basin underflow). As much as 200 AF/month (2,400 AFY) of underflow and 300 AFY of SW occurs at the Basin annually, allowing up to approximately 2,700 AFY of RW recharge at the Basin in its current condition. The current annual average RW recharge is approximately 500 AFY. Therefore, an additional 2,200 AFY of RW water can be recharged at the Basin without additional diluent water.

For this report it has been assumed that the underflow is set at a maximum of 2,400 AFY, which means that any new RW recharge at the Basin above and beyond 2,200 AFY will need to be offset by additional SW recharge or MW purchase and recharge at the Basin site. This additional MW has been included in the costs estimates later in this report where relevant.

III. Alternatives Analysis

The San Sevaine Basin Improvements Project will design and construct improvements to help meet or exceed the RW recharge objective of 4,100 AFY. This section will present the improvements evaluated to achieve the RW recharge objective for the Basins as well as increase stormwater capture and recharge. The alternatives considered in this study were comparatively evaluated with the objective of meeting or exceeding the RW recharge goals, minimizing project costs, optimizing operational flexibility and minimizing environmental impacts. In addition to the project alternatives which include the design and construction of new facilities, a No-Project alternative was considered and included in the analysis below.

Each of the alternatives considered below were evaluated for the following:

- Increasing capture and recharge of RW and stormwater
- Maximizing infiltration rates
- Minimizing environmental impacts
- Reducing construction costs
- Optimizing operational flexibility

In addition to the items identified above, the alternatives will be analyzed to verify consistency with future RW expansion objectives proposed for the Agency's northeastern region.

A. No-Project Alternative

The No-Project alternative would provide no improvements, new facilities or infiltration enhancement. This alternative would leave the Basins in their current configuration with no appreciable increase in RW or stormwater recharge. The primary cost of this alternative is the cost to purchase additional imported water to meet the recharge objective for the Basins. This assumes that current or future local supplies of water (recycled and/or storm) are available and not yet fully utilized for groundwater recharge purposes. If recharged into the groundwater basin, this volume of water would be made available to pump from the groundwater basin thereby reducing the volume of water purchased (imported) from MWD.

The current configuration and operation of the Basins results in approximately 500 AFY of RW recharge. To meet the 4,100 AFY target, the remaining 3,600 AFY of water would need to be purchased, imported, water from MWD. The estimated rate to purchase this water over the next 5 years is approximately $800/af. This equates to an annual cost of $2,880,000. It should also be noted that reliability of imported water is low and the availability of imported water will vary from year to year.

B. Project Alternatives Considered and Dismissed

A number of project alternatives were considered, and dismissed, during the selection of the alternatives analyzed in greater detail later in this report. While these alternatives do have the potential to increase groundwater recharge in the area, they were ruled out for a number of reasons listed below. Preference was given to projects which utilize existing properties, agreements, infrastructure, permits, operational experience and programs to the extent possible. Further development of the projects dismissed in this report may be warranted at a future date once the existing facilities are optimized to the extent practicable. Table 6 below lists each dismissed alternative and provides a brief description of the project concept and why it was excluded from further analysis. The fundamental objective of all alternatives considered, is to increase RW and stormwater recharge.

Table 6: Alternatives Considered and Dismissed

Project Alternative	Description	Advantages	Reason for Dismissal
Construct New Basin(s)	Purchase or lease new property in the vicinity of San Sevaine and construct new recharge basin(s). Construct RW and/or stormwater conveyance to new basin(s).	Additional storage /recharge area that could be designed for, and dedicated to groundwater recharge. Provides ability to isolate storm flows from RW flows when desired. Basin location would be selected based on best location/potential for groundwater recharge objectives.	Expensive and time consuming to purchase, permit and construct new basins.
Acquire Private Wells 4673 and 4674 and Expand Basins 1 – 4 to the East	Acquire wells 4673 and 4674 and modify/convert to transfer/injection wells. Expand higher performing basins 1-4 to the east, or install subsurface recharge galleries to the east.	Utilizes existing stormwater conveyance. Increase surface area for recharge. Eliminates RW recharge constraint due to wells 4673 and 4674 and allows re-purposing of wells. Potentially more favorable geology for recharge in this area based on Basins 1 – 3 historical data.	Requires well/property acquisition. Requires re-design and reconfiguration of flood control channels. Expensive and time consuming to purchase, permit and construct project.
Reconfigure Basin 5 for Stormwater Surface Filtration, Subsurface Collection and Pumping to Higher Performing Basins 1 - 3	Utilize Basin 5 storage volume, remove or reconfigure Basin 5 sediments for surface filtration and subsurface collection gallery, pump filtered water to higher performing basins for recharge.	Delivery of filtered stormwater to higher performing basins will increase stormwater capture/recharge. If Basin 5 infiltration can't be enhanced, this would allow the volume of Basin 5 to better utilized.	Expensive reconfiguration costs and more complex O&M.

C. Project Alternatives Analyzed

The following alternatives were considered as part of the PDR. Each of the alternatives listed below is further detailed in the following sections.

- Extension of the 1630 East RW pipeline segment A to Basins 1, 2 and/or 3 to deliver RW to higher performing Basins (2 alternatives analyzed)
- Construct a new Pump Station and pipeline from Basin 5 to Basins 1, 2 and/or 3 to have the ability to deliver stormwater and RW to higher performing Basins
- Perform improvements in Basin 5 to increase infiltration rates and increase usable surface area for groundwater recharge

- Hybrid Alternative – Extension of 1630 East RW pipeline segment A to Basins 1 – 3 and Basin 5 Pump Station.

Table 7 outlines each alternative's ID number and provides a brief description of the alternative analyzed in the following sections of this PDR.

Table 7: Alternatives Analyzed

Alternative	Description
No Project	Continue to operate Basins in current condition.
1-A	Extend RW pipeline to Basins 1 – 3. Pipeline alignment would be situated within the limits of the existing Basin property.
2-A	Extend RW pipeline to Basin 1 and allow RW to surface transfer to Basins 2 and 3. Pipeline alignment would be situated outside of the limits of the existing Basin property.
3-A	Basin 5 pump station. Basin 5 pump station and pipeline would capture additional stormwater in Basin 5 and deliver it to higher performing Basins 1-3.
4-A	Improve Basin 5 infiltration rate. Improve subsurface geology and/or increase recharge surface area in Basin 5.
5-A	Extend RW pipeline to Basins 1 – 3 inside Basin property and construct Basin 5 pump station. (Hybrid of 1-A and 3-A)

1. Alternatives 1-A and 2-A, 1630 East RW Pipeline Segment A Extension

Basin 5 is currently the only Basin receiving RW. To maximize the recharge of RW, these alternatives will consider an extension of the existing RW pipeline to Basins 1 - 3. Basin 5 is supplied RW by the 1630 East RW Pump Station and Pipeline. As part of the Agency's TYCIP, the 1630 East RW pipeline is planned to be constructed in two phases. Previously constructed Phase 1 Segment A installed a RW pipeline from the 1630 East RWPS to the Basin 5 RW turnout. The future pipeline under Phase II, identified as Segment B, will extend Segment A from near the Basins to the 1630 East reservoir site. The current capacity of the pump station and pipeline is 9,000 GPM. The ultimate build-out capacity of the 1630 East RW system is 15,000 GPM. The costs to upgrade and/or build-out the 1630 East RW pump station have not been included in this report.

a) Layouts

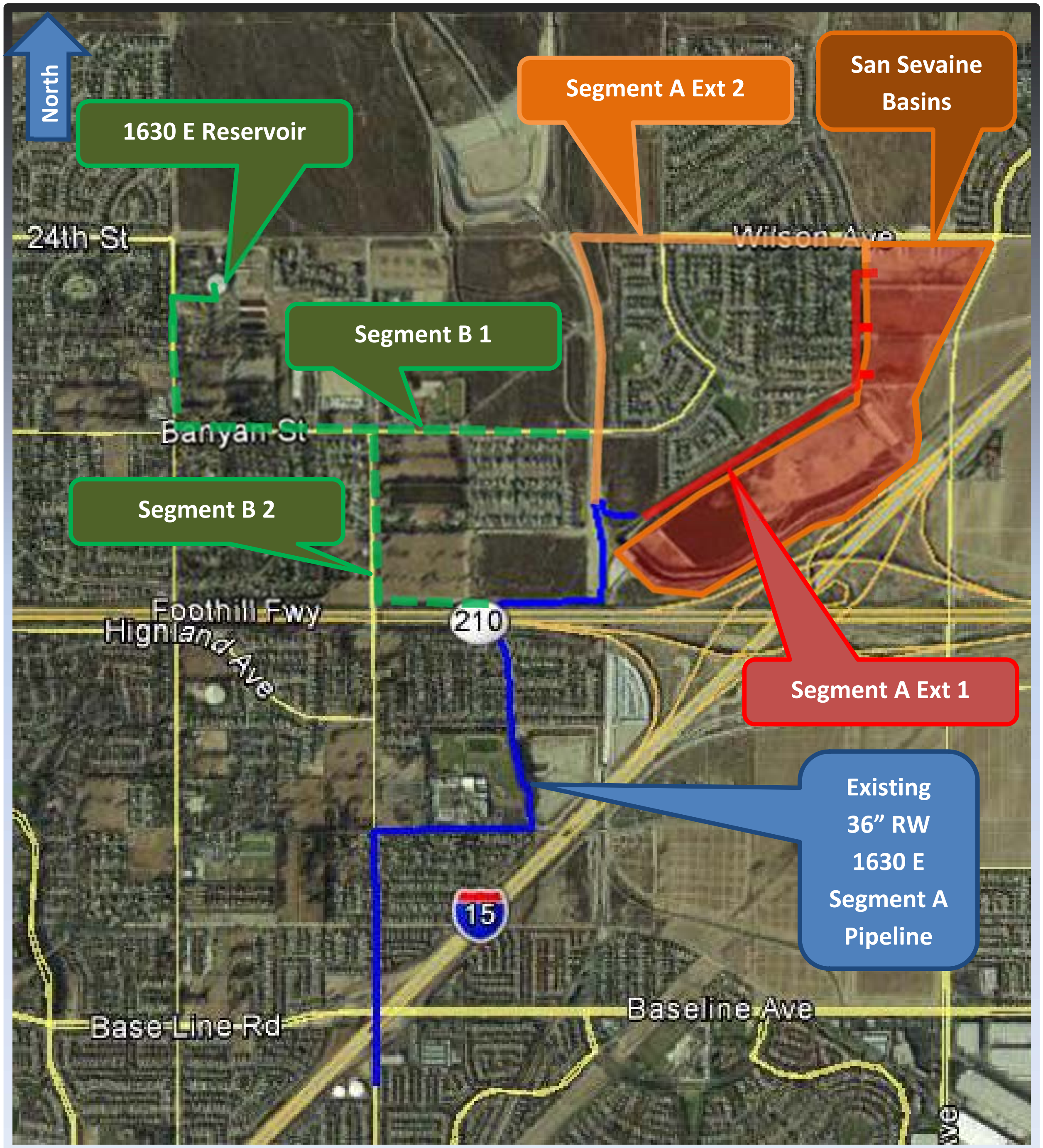
A number of system layout options are feasible which would achieve the objective of delivering RW to Basins 1 – 3. A number of these options were considered prior to detailed analysis of the two alternatives presented later in this report. Each of the layouts considered (Figure 5), but not carried forward, were dismissed based on qualitative information.

Figure 5: Recycled Water Extension Layouts Dismissed

The Segment A extension layouts dismissed from further evaluation were considered to be either more expensive, more difficult to permit, acquire easements and/or more detrimental to natural resources in the Basin than the preferred alignments. If, after further evaluation/design, it is determined that the preferred layout alternative has a fatal flaw (such as existing utility conflicts, easement issues etc…), then the dismissed alternatives may be re-evaluated.

Existing equipment associated with the 1630 East RWPS and Segment A pipeline is outlined in Table 8 below. Figure 6 shows the alignments of the existing Segment A Pipeline, two potential Segment A Extensions, and two potential future Segment B Pipeline alignments. Several potential alignments exist for Segment B. An exhaustive and detailed analysis of all of the Segment B alternatives has not been developed in this report. Rather, consideration has been given to the future delivery of RW to Reservoir 1630 E in the development of the Segment A Extension alignments. Detailed analysis of Segment A Extensions 1 and 2 are presented below.

Figure 6: 1630 East Recycled Water Pipeline



b) Design Criteria

The Design criteria used to extend the delivery of recycled water to Basins 1 – 3 incudes the flow requirements needed to fill and maintain a given water level in Basins 1 – 3, as well as provide capacity for the future connection of the Segment B pipeline. Table 8 outlines the existing pumping capacity and the future build-out capacity once Segment B is complete. The pipelines will be designed for the future build-out condition.

Table 8: Existing 1630 East Recycled Water System

Pump Station	Parameter	Pump Name			Unit
		Pump P-1 and P-2	Pump P-3	Pump P-4 and P-5	
	Type	Vertical Turbine	Vertical Turbine	Vertical Turbine	
	Flow Capacity	750	1500	3000	gpm, each
	Total Dynamic Head	420	420	420	feet, each
	Shutoff Head	550	610	550	feet, each
	Motor Size	100	200	400	hp, each
	Driver	Variable Speed	Constant Speed	Constant Speed	
	Notes:	1. Above is existing Phase I pumping capacity. Upon completion of the future storage reservoir site, existing pumps will be replaced with 3,000 GPM pumps with total pumping capacity of 15,000 GPM.			

Pipeline	Parameter	Value	Unit	
	Segment A (Existing)			
	Diameter	36	inches	
	Length	11,530	Linear feet	
	Pressure Class	200	psi	
	Pipeline Capacity (Phase I)	9,000 / 20 2.9	GPM / CFS ft/sec	
	Pipeline Capacity (Phase II)	15,000 / 33 4.7	GPM / CFS ft/sec	

Basin 5 Turnout	Parameter	Value	Unit	
	Turnout Pipe Diameter	30	inches	
	Turnout Pipe Capacity	13,200 / 29.5 6.0	GPM / CFS ft/sec	
	Flow Control Valve	12	inches	
	Control Valve Capacity (Phase I)	6,700 / 15.0 19.0	GPM / CFS ft/sec	
	Notes:	1. Turnout capacity based upon a maximum of 6.0 feet per second pipeline velocity under peak conditions. 2. For Basin 5 flows greater than Phase I capacity of 6,700 GPM, a second parallel control valve structure will be required. To be constructed as part of the San Sevaine Basin Improvements Project or Phase II of the 1630 East RW pipeline project.			

The expected performance of Basins 1 - 5 (and related pipeline design criteria) have been developed based on historical operational data from those Basins. Additional capacity has also been analyzed to account for Basin filling and increased infiltration rates due to Basin improvements (Table 9). The assumed maximum operating velocity in the pipeline has been set at 6.0 feet per second (ft/sec) and maximum operating pressure set at 200 psi. If needed, these constraints can be re-assessed during final design.

Table 9: Segment A Extension Design Criteria – Basin Infiltration Rates

Parameter	Basin 1	Basin 2	Basin 3	Basin 5	Total	Unit
Existing Infiltration Rate	11.0	8.4	8.4	2.6	30.4	CFS
(No 20% Reduction Included)						
Peaking Factor for Basin Filling						
110% of Infiltration Rate	12.1	9.2	9.2	2.9	33.4	CFS
150% of Infiltration Rate	16.5	12.6	12.6	3.9	45.6	CFS
200% of Infiltration Rate	22.0	16.8	16.8	5.2	60.8	CFS
Notes:	1. Total existing infiltration rate for Basins 1 through 5 is 30.4 CFS (13,650 gpm). 2. Assumed range of peaking factors to allow for a round-robin filling cycle of basins and for future improvements to infiltration rates.					

In order to develop preliminary sizes the proposed improvements a hydraulic model was used to analyze pipeline diameters and lengths. The hydraulic simulation software package chosen for this application was EPANET 2, which is a free public-domain software package available from the United States Environmental Protection Agency. EPANET 2 was developed to simulate water quality in pressurized pipe networks. Models are constructed by inserting a number of nodes, links, and other system specific items such as pumps, tanks, reservoirs, and valves.

A baseline model was developed of the existing pump station and pipeline which currently delivers water to Basin 5. Each alternative was then constructed in the model given the assumed alignments and approximate elevations. A series of model runs were then performed to determine pipeline sizes and operational characteristics (velocity, pressure and head loss).

c) Alternative Alignments

The following pipeline layout options were evaluated for the delivery of RW to Basins 1 - 3:

- Segment A Extension 1 Option: Extension of the existing 30-inch RW turnout pipeline along Basins 1 -5 with turn-outs to Basins 1 – 3.

- Segment A Extension 2 Option: Extension of the existing 36-inch Segment A pipeline along Etiwanda Creek Channel and Wilson Avenue with a turnout into Basin 1. Includes provisions for future connection of 1630 East reservoir pipeline Segment B

ALTERNATIVE 1-A

This option would construct a new 30-inch diameter pipeline from the existing Basin 5 turnout to Basins 1,2 and 3. The proposed pipeline would have the ability to discretely deliver RW to Basins 1 – 3. Future connection to the 1630 E. Reservoir via the segment B pipeline could occur directly off of the existing Segment A pipeline and be routed as desired. The Segment A Ext 1 option would not constrain the final alignment of Segment B. As shown in Figure 7, the proposed alignment would be along the existing west side of the Basins in an existing service road. The 30-inch pipeline would connect to the existing turnout near the existing flow control station along Etiwanda Channel. Table 10 shows a summary of the project costs and benefits.

Table 10: Alternative 1-A Summary

Alternative Description	Inside Basin, 30" dia. pipeline from Basin 5 to Basins 1 – 3
Estimated Benefit	1,900 AFY to 8,100 AFY
Estimated Capital Cost	$6,000,000
Unit Cost (includes annual O&M)	$465/AF to $498/AF

Connection to the existing RW pipeline would occur near the Basin 5 connection (Figure 8). Connecting directly to the existing RW turnout in its current configuration is not advisable as it would restrict flow by the 12-inch flow control/meter system as well as the existing 48-inch storm drain line. The 48-inch storm drain is a reinforced concrete pipe and is not designed for pressurized flows. Evaluation of the use of a structural liner for the 48-inch storm drain may be performed during final design. In order to connect to the downstream side of the existing 12-inch metering section, a similar (larger) section would need to be added in parallel to the 12-inch section. Figure 9 illustrates a conceptual design of an inlet/outlet structure for the Basins.

Figure 7: Alternative 1-A Pipeline Alignment

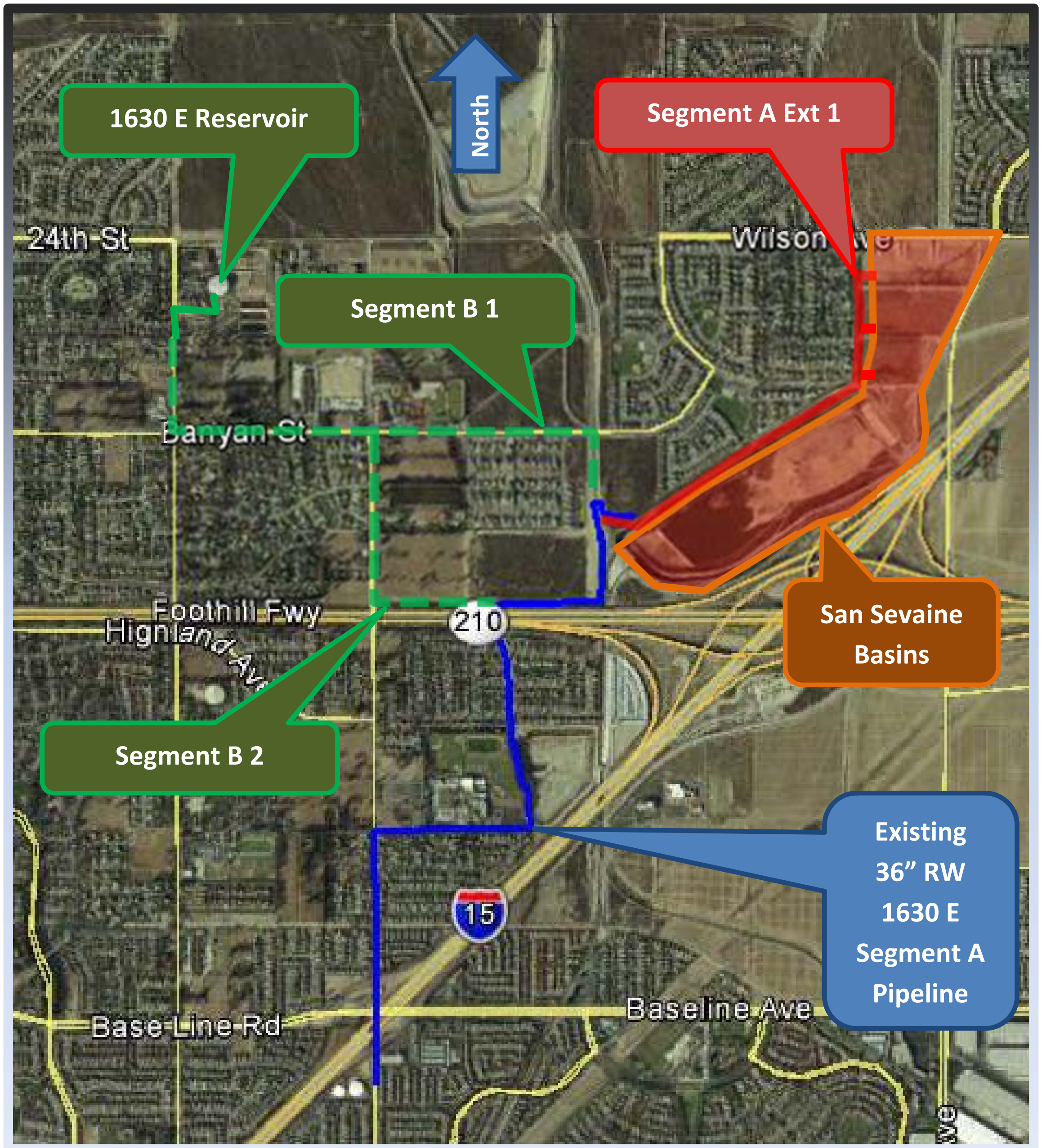


Figure 8: Alternative 1-A Schematic

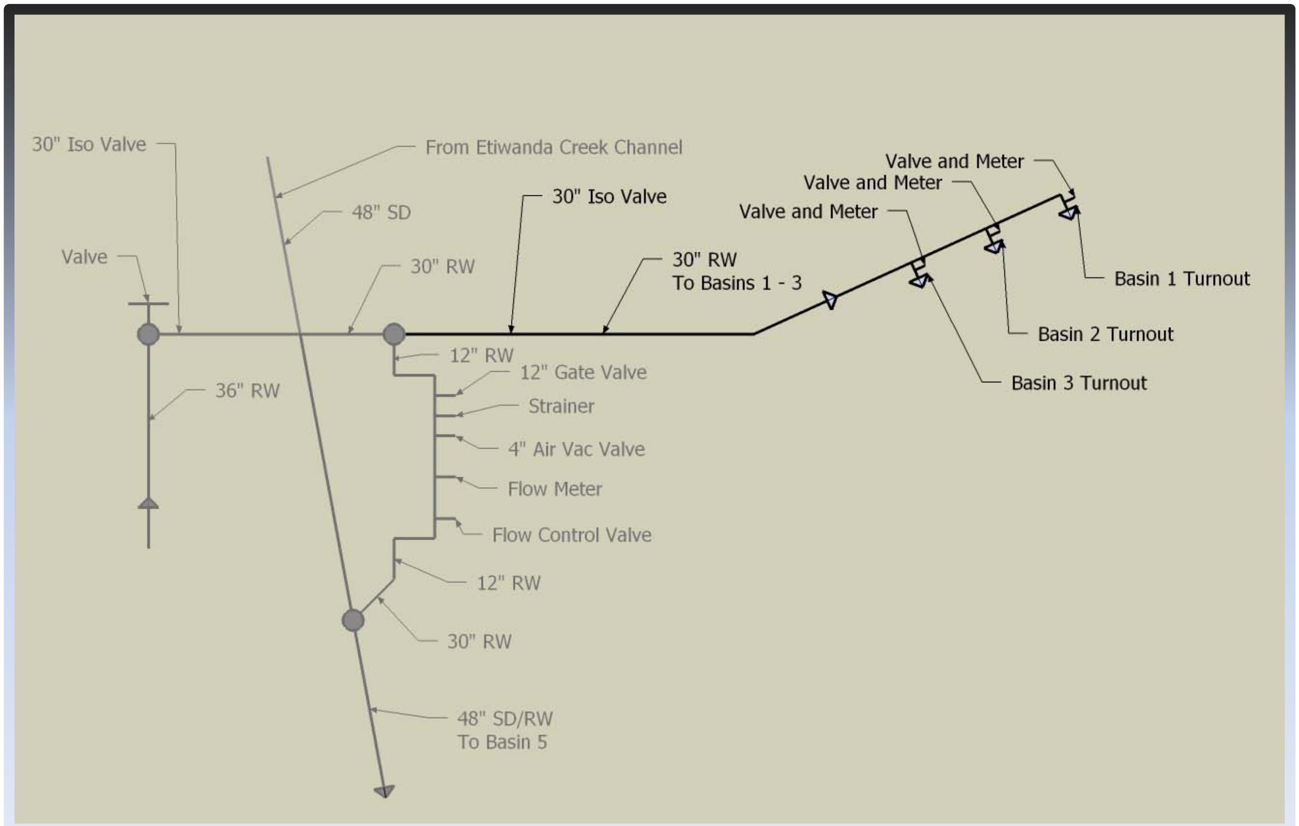
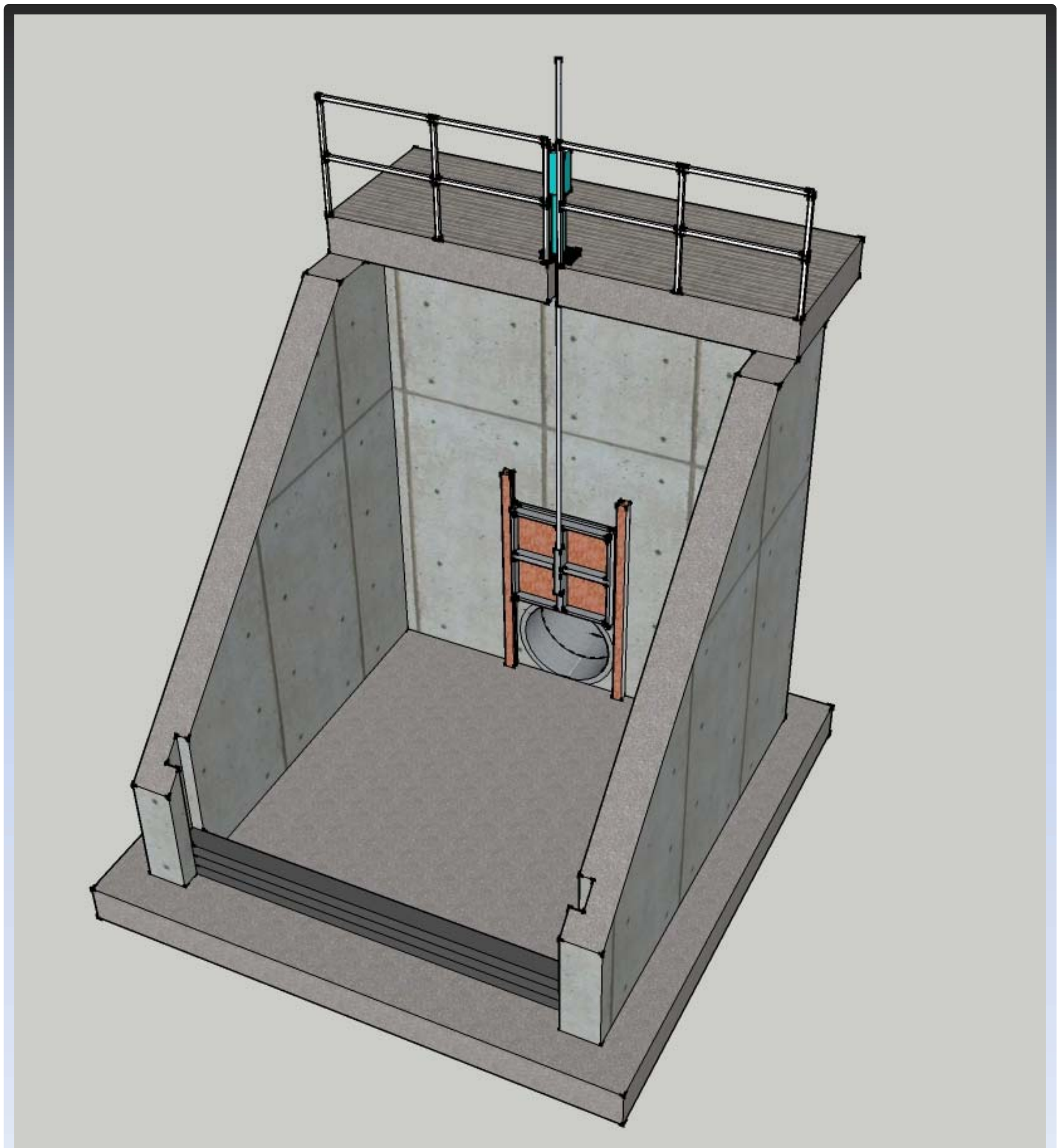


Figure 9: Inlet/Outlet Structure Conceptual Design



Once the 1630 E Pump Station is expanded to its maximum capacity (15,000 GPM) the distribution of the RW will control the amount available for delivery to the Basins.

Table 11 presents a summary of the flow distribution assuming all available future flows are delivered to the Basins. The flow delivered to each Basin assumes Basin 1 is filling while Basins 2, 3 and 5 are operating at their average infiltration rates. Table 12 outlines another possible distribution scenario assuming RW is delivered to other turnouts as well as the Basin turnouts. As displayed in Table 12 the build-out of the 1630 E Pump Station would need to include a total pumping capacity greater than 16,300 GPM in order to accommodate the estimated demands. This scenario also assumes that no flow goes to the 1630 E. Reservoir while flow is delivered to the Basins. The flow available for the Basins will be controlled by how much water is diverted to the other turnouts along the pipeline. At times the amount of water recharged in the Basins may be limited by the pump station capacity and existing distribution system.

Table 11: Alternative 1-A, Recycled Water Distribution – Basin Demands Only

Location	Quantity (cfs/GPM/psi)
Baseline Road Laterals	0 / 0 / 170*
Victoria Turnout	0/ 0 / 135*
1630 E. Reservoir	0 / 0 / 40*
San Sevaine 5	2.6 / 1,167 / 100
San Sevaine 3	8.4 /3,772 / 80
San Sevaine 2	8.4 / 3,772 / 70
San Sevaine 1	12.1 / 5,433 / 60
Total	31.5 / 14,144 / NA

*Approximate static pressure in pipeline at closed valve near that location.

Table 12: Alternative 1-A, Recycled Water Distribution – All Demands

Location	Quantity (cfs/GPM/psi)
Baseline Road Laterals	0.76/ 341 / 155
Victoria Turnout	4.0 / 1,796 / 120
1630 E. Reservoir	0 / 0 / 0
San Sevaine 5	2.6 / 1,167 / 80
San Sevaine 3	8.4 / 3,772 / 60
San Sevaine 2	8.4 / 3,772 / 50
San Sevaine 1	12.1 / 5,433 / 45
Total	36.3 / 16,281 / NA

Table 13 below outlines the approximate diameter and length of the proposed pipeline extension as well as the characteristics of the existing RW pipeline.

Table 13: Alternative 1-A Design Considerations

Proposed Pipeline Characteristics	**Value**	**Unit**
Pipeline Diameter	30	Inches
Pipeline Length	5,600	Linear Feet
Pipe Capacity	14,200 / 31.5 / 6.4	GPM / CFS / ft/sec
Existing Segment A Phase II Characteristics		
Pipeline Diameter	36	Inches
Pipeline Length	11,468	Linear Feet
Pipeline Capacity (Phase II)	15,000 / 33.5 / 4.7	GPM / CFS / ft/sec

a) *Environmental Impacts, Permits and Mitigation*

Environmental issues associated with the proposed project include expanding the quantity of RW recharged at the Basins, construction impacts associated with implementing the project, temporary and permanent impacts to habitat from construction and on-going operation and maintenance of the Basins and the effort and costs associated with obtaining permits to construct the project. This report presents a brief discussion of the relative differences between each of the detailed alternatives. A comprehensive environmental review will be required during final design of the selected alternative.

Alternative 1-A will likely require a start-up period, including the installation of monitoring wells and lysimeters to determine groundwater movement, the recycled water contribution and effectiveness of SAT under Basins 1-3. A minimum of 6 months retention time and a 500 foot horizontal separation distance from any drinking water well will be required.

Construction impacts for Alternative 1-A will include temporary impacts to habitat to construct turnouts into Basins 1-3 and impacts to extend the RW pipeline from Etiwanda Creek Channel to the Basin perimeter access road. Permanent impacts may include longer periods of inundation of some of the Basin acreages. A project constraint may require that construction activities occur outside of bird nesting season. Because the Basins are existing flood control/groundwater recharge Basins, regular maintenance of the Basins for enhanced groundwater recharge should require minimal additional regulatory approval.

d) *Estimated Costs and Schedule*

The estimated construction cost for the project are based on actual bid results from similar pipeline projects in the region as well as cost estimates from material manufacturers and suppliers. The annual O&M costs presented in Table 14 were developed using O&M costs from similar recharge basins and pump stations operating in groundwater recharge basins in the region. The following estimates should be considered preliminary and should be considered to be accurate within + or – 20%. Please note that costs to upgrade and/or build-out the 1630 East RW pump station have not been included in this report.

Table 14: Alternative 1-A Cost Estimate

Item	Quantity	Unit	Unit Price	Total Cost
Capital Costs				
Final Design/Engineering/Admin	10%	% of Const.	$458,850	$458,850
Mitigation	2	Acres	$20,000	$40,000
Construction Management	10%	% of Const.	$458,850	$458,850
			Subtotal	**$957,700**
Mob, DeMob, Sheet, Shore, Brace	5%	% of Const.	$218,500	$218,500
30" Pipeline	5,600	L.F.	$700	$3,920,000
Flow Control Valves & Gates	4	L.S.	$15,000	$60,000
Inlet/Outlet Structures	3	L.S.	$50,000	$150,000
Controls, Electrical and Instrumentation	1	L.S.	$150,000	$150,000
Grading	1	L.S.	$50,000	$50,000
Flow Meters	4	L.S.	$10,000	$40,000
Contingency	10%	% of Const.	$458,850	$458,850
			Subtotal	**$5,047,350**
			Total	**$6,005,050**
Annual Debt Service 30 years @ 5%				$390,629
O&M Costs				
General Maintenance (Low Range)	1,900	A.F.	$25	$47,500
General Maintenance (High Range)	8,100	A.F.	$25	$202,500
Basin Cleanings	1	L.S.	$75,000	$75,000
Total Annual O&M Costs (Low Range)				$122,500
Total Annual O&M Costs (High Range)				$277,500
Recharge Benefit				
Annual RW Benefit (Low Range)	1,900	AFY		
Annual SW Benefit (Low Range)	0	AFY		
Annual MW Benefit (Low Range)	0	AFY		
Annual SupW Benefit (Low Range)	1,900	AFY		
Total Annual Benefit (Low Range)	**1,900**	**AFY**		

Annual RW Benefit (High Range)	5,150	AFY		
Annual SW Benefit (High Range)	0	AFY		
Annual MW Benefit (High Range)	2,950	AFY		
Annual SupW Benefit (High Range)	8,100	AFY		
Total Annual Benefit (High Range)	**8,100**	**AFY**		
Unit Costs				
IEUA RW Unit Cost (Low Range)	1,900	$/AF	$ 195	$370,500
IEUA RW Unit Cost (High Range)	5,150	$/AF	$ 195	$1,004,250
MWD Water Costs RWC (Low Range)	0	$/AF	$ 800	$0
MWD Water Costs RWC (High Range)	2,950	$/AF	$ 800	$2,360,000
Total Annual Cost (Low Range)		$		$883,629
Total Annual Cost (High Range)		$		$4,032,379
Total Unit Cost (Low Range)		**$/AF**		**$465**
Total Unit Cost (High Range)		**$/AF**		**$498**

The project schedule presented in Table 15 was developed assuming that the majority of construction happens outside of bird nesting season, with construction activities in the recharge areas of the Basins occurring prior to storm flows in the Basins. Final design of the project may require a two phase construction approach to work within the constraints of the storm seasons and nesting season.

Table 15: Alternative 1-A Project Schedule

Activity	Duration
Final Design/Permitting	7 Months
Construction In Basins (Inlet/Outlet Structures)	6 Months
Construction Out of Basins (Pipelines)	7 Months
Total Duration	1 Year 8 Months

ALTERNATIVE 2-A

This option would construct a new 30” diameter pipeline as shown in Figure 10 and Figure 11. Alternative 2-A will provide delivery of RW to Basin 1 and then RW would surface transfer through Basin 1 to Basin 2, and Basin 2 to Basin 3. The main advantages of this option are that it keeps nearly all of the construction out of the Basins (which reduces impacts to habitat) and it provides a portion of the future Segment B pipeline. The main disadvantages of this alternative is that it requires additional pipeline length to achieve delivery of water to Basin 1, it also requires pipeline construction within existing city streets and it limits the operational flexibility of the system by forcing Basins 1 – 3 to operate as flow-through Basins. Figure 10 shows the pipeline alignment along the east side of Etiwanda Creek Channel and then continuing east along Wilson Avenue. Table 16 provides a summary of the project benefits and costs.

Table 16: Alternative 2-A Summary

Alternative Description	Outside Basin, 30” dia. pipeline from Basin 5 connection to Basin 1
Estimated Benefit	1,900 AFY to 8,100 AFY
Estimated Capital Cost	$8,500,000
Unit Cost (includes annual O&M)	$550/AF to $518/AF

The pipeline has been sized to provide adequate capacity for the future Segment B connection. Two possible alignments for Segment B have been included for illustration purposes. A conceptual design of the pipeline outlet structure can be seen in Figure 12.

Figure 10: Alternative 2-A Pipeline Alignment

Figure 11: Alternative 2-A Schematic

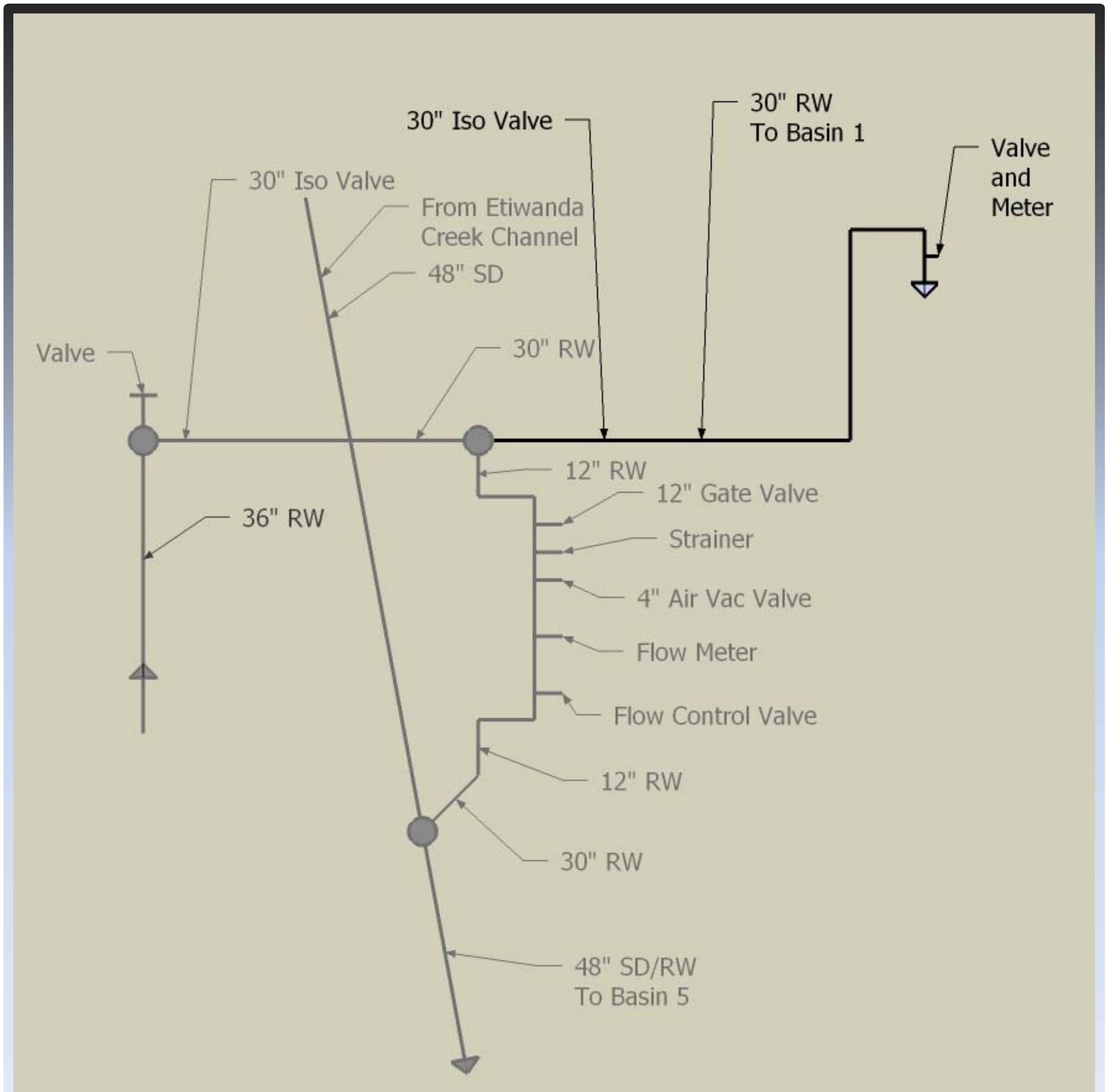
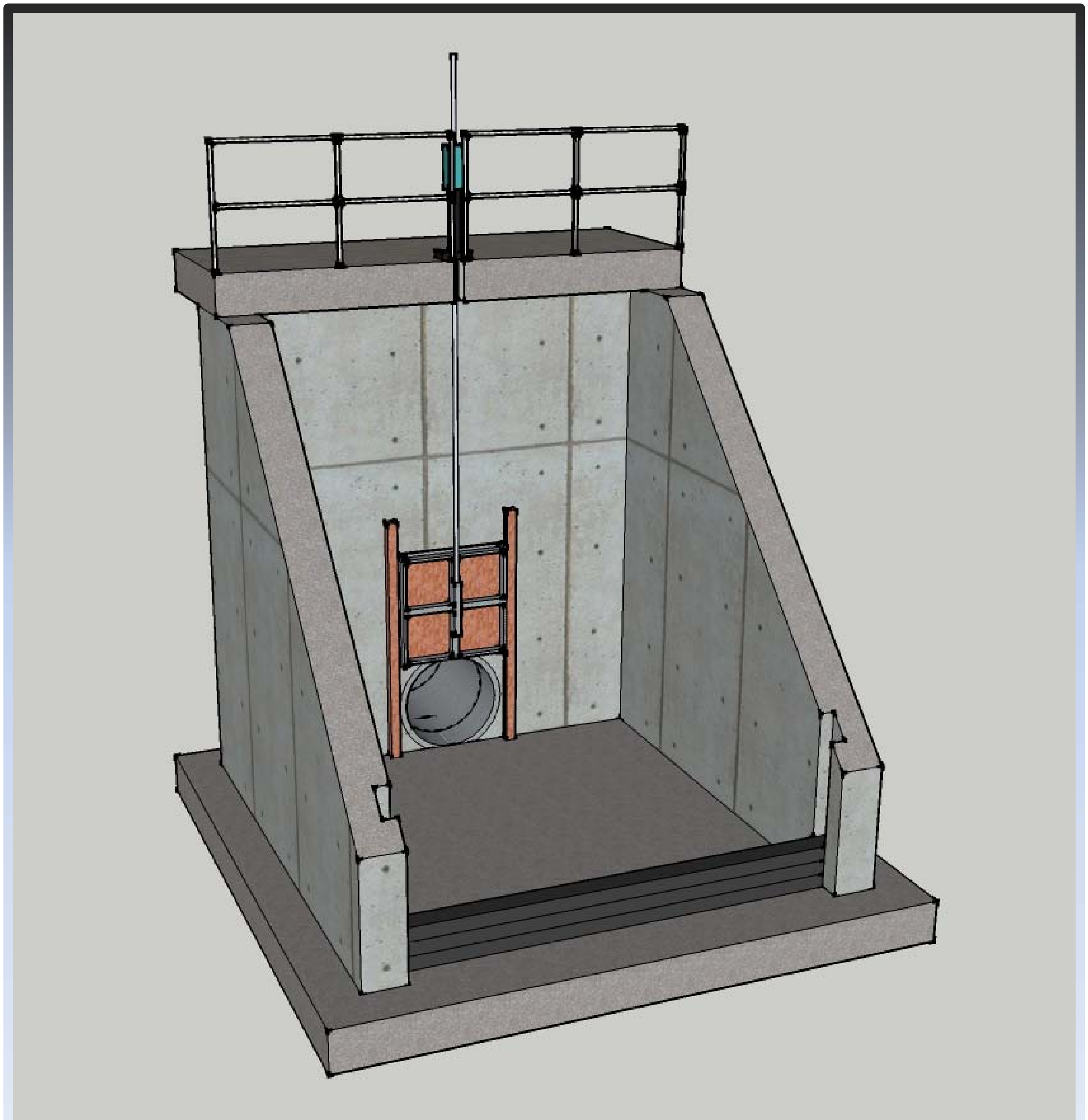


Figure 12: Inlet/Outlet Structure Conceptual Design



Once the 1630 E Pump Station is expanded to its maximum capacity (15,000 GPM) the distribution of the RW will control the amount available for delivery to the Basins. Table 17 and Table 18 outline two sets of assumptions used in the hydraulic model and the resulting quantities of water delivered to each site. As displayed in Table 18 the build-out of the 1630 E Pump Station would need to include a total pumping capacity greater than 15,800 GPM in order to accommodate the estimated demands.

Table 17: Alternative 2-A, Recycled Water Distribution – Basin Demands Only

Location	Quantity (cfs/GPM/psi)
Baseline Road Laterals	0 / 0 / 180*
Victoria Turnout	0/ 0 / 140*
1630 E. Reservoir	0 / 0 / 15*
San Sevaine 5	2.6 / 1,167 / 105
San Sevaine 3	Supplied by Surface Transfer from Basin 2
San Sevaine 2	Supplied by Surface Transfer from Basin 1
San Sevaine 1	27.8 / 12,482 / 65
Total	30.4 / 13,650 / NA

*Approximate static pressure in pipeline at closed valve near that location.

Table 18: Alternative 2-A, Recycled Water Distribution – All Demands

Location	Quantity (cfs/GPM/psi)
Baseline Road Laterals	0.76 / 341 / 160
Victoria Turnout	4.0 / 1,796 / 125
1630 E. Reservoir	0 / 0 / 0
San Sevaine 5	2.6 / 1,167 / 90
San Sevaine 3	Supplied by Surface Transfer from Basin 2
San Sevaine 2	Supplied by Surface Transfer from Basin 1
San Sevaine 1	27.8 / 12,482 / 45
Total	35.2 / 15,786 / NA

Table 19 below outlines the approximate diameter and length of the proposed pipeline extension as well as the characteristics of the existing RW pipeline.

Table 19: Alternative 2-A Design Considerations

Proposed Pipeline Characteristics	**Value**	**Unit**
Pipeline Diameter	30	Inches
Pipeline Length	8,100	Linear Feet
Pipe Capacity	12,500 / 27.8 / 5.7	GPM / CFS / ft/sec
Existing Segment A Phase II Characteristics		
Pipeline Diameter	36	Inches
Pipeline Length	11,468	Linear Feet
Pipeline Capacity (Phase II)	15,000 / 33.5 / 4.7	GPM / CFS / ft/sec

e) Environmental Impacts, Permits and Mitigation

Environmental issues associated with the proposed project include expanding the quantity of RW recharged at the Basins, construction impacts associated with implementing the project, temporary and permanent impacts to habitat from construction and on-going operation and maintenance of the Basins and the effort and costs associated with obtaining permits to construct the project. This report presents a brief discussion of the relative differences between each of the detailed alternatives. A comprehensive environmental review will be required during final design of the selected alternative.

Alternative 2-A will require a start-up period, including the installation of monitoring wells and lysimeters to determine groundwater movement, the recycled water contribution and effectiveness of SAT under Basins 1-3. A minimum of 6 months retention time and a 500 foot horizontal separation distance from any drinking water well will be required.

Construction impacts for Alternative 1-A will include temporary impacts to habitat to construct turnouts into Basin 1 and impacts to extend the RW pipeline north along Etiwanda Creek Channel. Permanent impacts may include longer periods of inundation of some of the Basin acreages. A project constraint may require that construction activities occur outside of bird nesting season. Because the Basins are existing flood control/groundwater recharge Basins, regular maintenance of the Basins for enhanced groundwater recharge should require minimal additional regulatory approval.

f) Estimated Costs and Schedule

The estimated construction cost for the project are based on actual bid results from similar pipeline projects in the region as well as cost estimates from material manufacturers and suppliers. The annual O&M costs presented in Table 20 were developed using O&M costs from similar recharge basins and pump stations operating in groundwater recharge basins in the region. The following estimates should be considered preliminary and should be considered to be accurate within + or – 20%. Please note that costs to upgrade and/or build-out the 1630 East RW pump station have not been included in this report.

Table 20: Alternative 2-A Cost Estimate

Item	Quantity	Unit	Unit Price	Total Cost
Capital Costs				
Final Design/Engineering/Admin	10%	% of Const.	$650,738	$650,738
Mitigation	2	Acres	$20,000	$40,000
Construction Management	10%	% of Const.	$650,738	$650,738
			Subtotal	**$1,341,475**
Mob, DeMob, Sheet, Shore, Brace	5%	% of Const.	$309,875	$309,875
30" Pipeline	8,100	L.F.	$725	$5,872,500
Flow Control Valves & Gates	1	L.S.	$15,000	$15,000
Inlet/Outlet Structures	1	L.S.	$50,000	$50,000
Controls, Electrical and Instrumentation	1	L.S.	$100,000	$100,000
Grading	1	L.S.	$50,000	$50,000
Flow Meters	1	L.S.	$10,000	$10,000
Pavement Repair	20,000	S.F.	$5	$100,000
Contingency	10%	% of Const.	$650,738	$650,738
			Subtotal	**$7,158,113**
			Total	**$8,499,588**
Annual Debt Service 30 years @ 5%				$552,898
O&M Costs				
General Maintenance (Low Range)	1,900	A.F.	$25	$47,500
General Maintenance (High Range)	8,100	A.F.	$25	$202,500
Basin Cleanings	1	L.S.	$75,000	$75,000
Total Annual O&M Costs (Low Range)				$122,500
Total Annual O&M Costs (High Range)				$277,500

Recharge Benefit				
Annual RW Benefit (Low Range)	1,900	AFY		
Annual SW Benefit (Low Range)	0	AFY		
Annual MW Benefit (Low Range)	0	AFY		
Annual SupW Benefit (Low Range)	1,900	AFY		
Total Annual Benefit (Low Range)	**1,900**	**AFY**		
Annual RW Benefit (High Range)	5,150	AFY		
Annual SW Benefit (High Range)	0	AFY		
Annual MW Benefit (High Range)	2,950	AFY		
Annual SupW Benefit (High Range)	8,100	AFY		
Total Annual Benefit (High Range)	**8,100**	**AFY**		
Unit Costs				
IEUA RW Unit Cost (Low Range)	1,900	$/AF	$ 195	$370,500
IEUA RW Unit Cost (High Range)	5,150	$/AF	$ 195	$1,004,250
MWD Water Costs RWC (Low Range)	0	$/AF	$ 800	$0
MWD Water Costs RWC (High Range)	2,950	$/AF	$ 800	$2,360,000
Total Annual Cost (Low Range)		$		$1,045,898
Total Annual Cost (High Range)		$		$4,194,648
Total Unit Cost (Low Range)		**$/AF**		**$550**
Total Unit Cost (High Range)		**$/AF**		**$518**

The project schedule presented in Table 21 was developed assuming that the majority of construction happens outside of bird nesting season, with construction activities within the recharge areas of the Basins occurring prior to storm flows in the Basins. Final design of the project may require a two phase construction approach to work within the constraints of the storm seasons and nesting season.

Table 21: Alternative 2-A Project Schedule

Activity	Duration
Final Design/Permitting	8 Months
Construction In Basins (Inlet/Outlet Structures)	4 Months
Construction Out of Basins (Pipelines)	7 Months
Total Duration	1 Year 7 Months

2. Alternative 3-A, San Sevaine Basin 5 Pump Station

A pump station in Basin 5 would create operational flexibility that will allow for increased stormwater capture and recharge. Basin 5 is the largest of the five Basins which provides the greatest opportunity to capture storm flows. A pump station in the Basin would allow for stormwater to be pumped to the other Basins with higher infiltration rates, thereby draining Basin 5 faster during the storm season, which would result in more available storage space for subsequent stormwater inflow. An additional benefit of pumping stormwater from Basin 5 to Basins 1-3 is that Basin 5 could be used as a settling basin to remove clogging sediments from stormwater prior to delivery of stormwater to higher performing Basins. This will help to maintain higher infiltration rates in the better performing basins, ultimately resulting in an increase of stormwater capture and recharge. Table 22 shows a summary of the project costs and benefits.

Table 22: Alternative 3-A Summary

Alternative Description	Pump station and pipeline from Basin 5 to Basins 1 - 3
Estimated Benefit (SW)	650 AFY to 2,700 AFY
Estimated Capital Cost	$4,580,000
Unit Cost (includes annual O&M)	$599/AF to $163/AF

This alternative assumes there is no connection between the existing RW turnout and the new pump station and pipeline (Figure 13 and Figure 14). The pipeline presented in this alternative would be primarily used to convey stormwater from Basin 5 to Basins 1 – 3. A hybrid alternative is presented later in this report which considers extending the RW pipeline and adding a pump station to Basin 5 (Alternative 5-A). Infrastructure to deliver RW to Basin 5 is existing and operational. A pump station in Basin 5, and distribution pipeline, would provide a means to deliver stormwater to Basins 1-3 allowing operations staff to optimize the efficiency and amount of stormwater recharged at the Basins. A conceptual design of one possible pump station arrangement can be seen in Figure 16. The distribution pipeline could also be design to gravity drain Basins 1 – 3 to any down-stream Basin (Figure 15). This would provide operational flexibility at relatively low capital cost.

Figure 13: Alternative 3-A Pipeline Alignment

Figure 14: Alternative 3-A Schematic

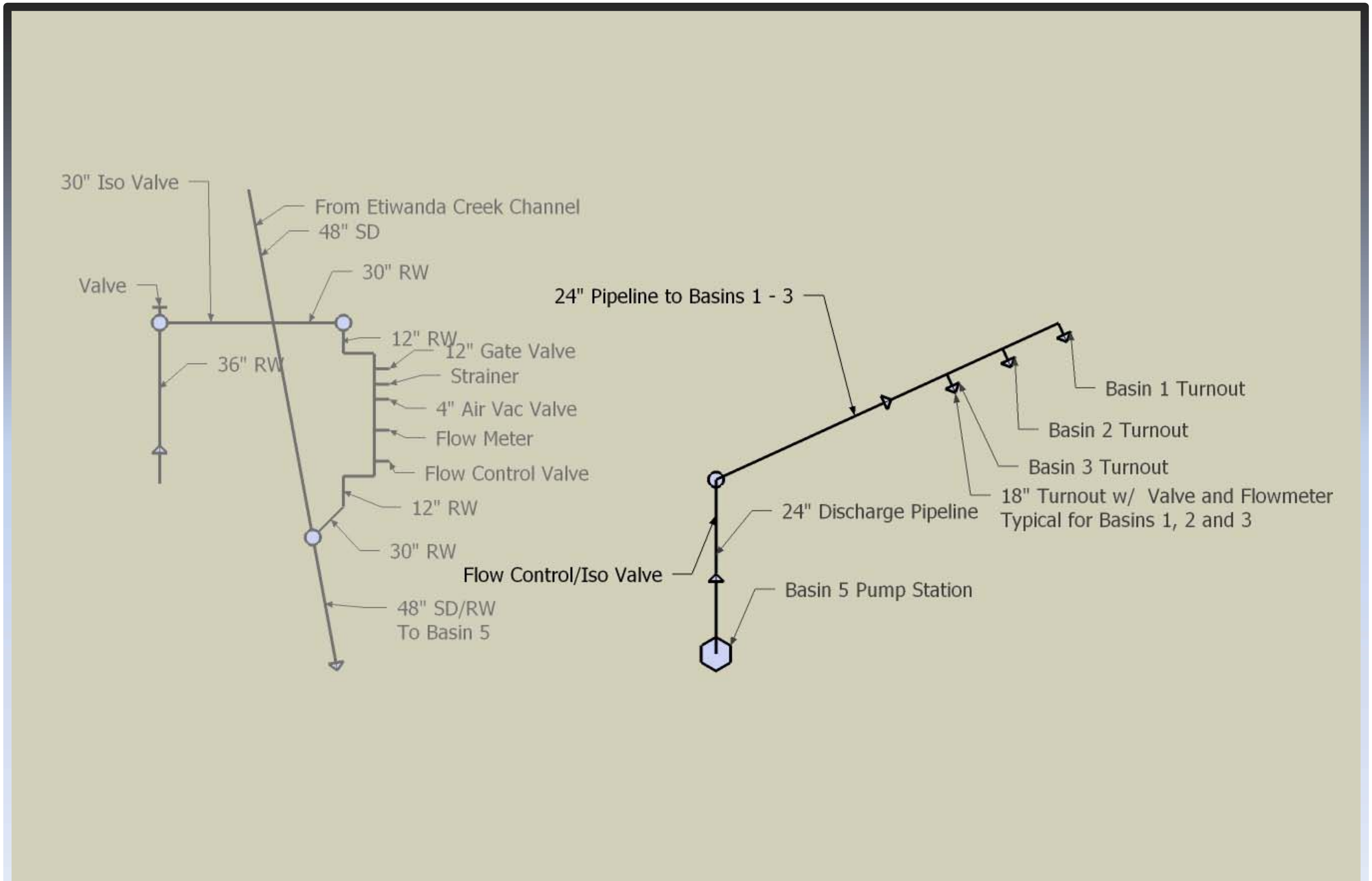


Figure 15: Alternative 3-A Conceptual Design Isometric View

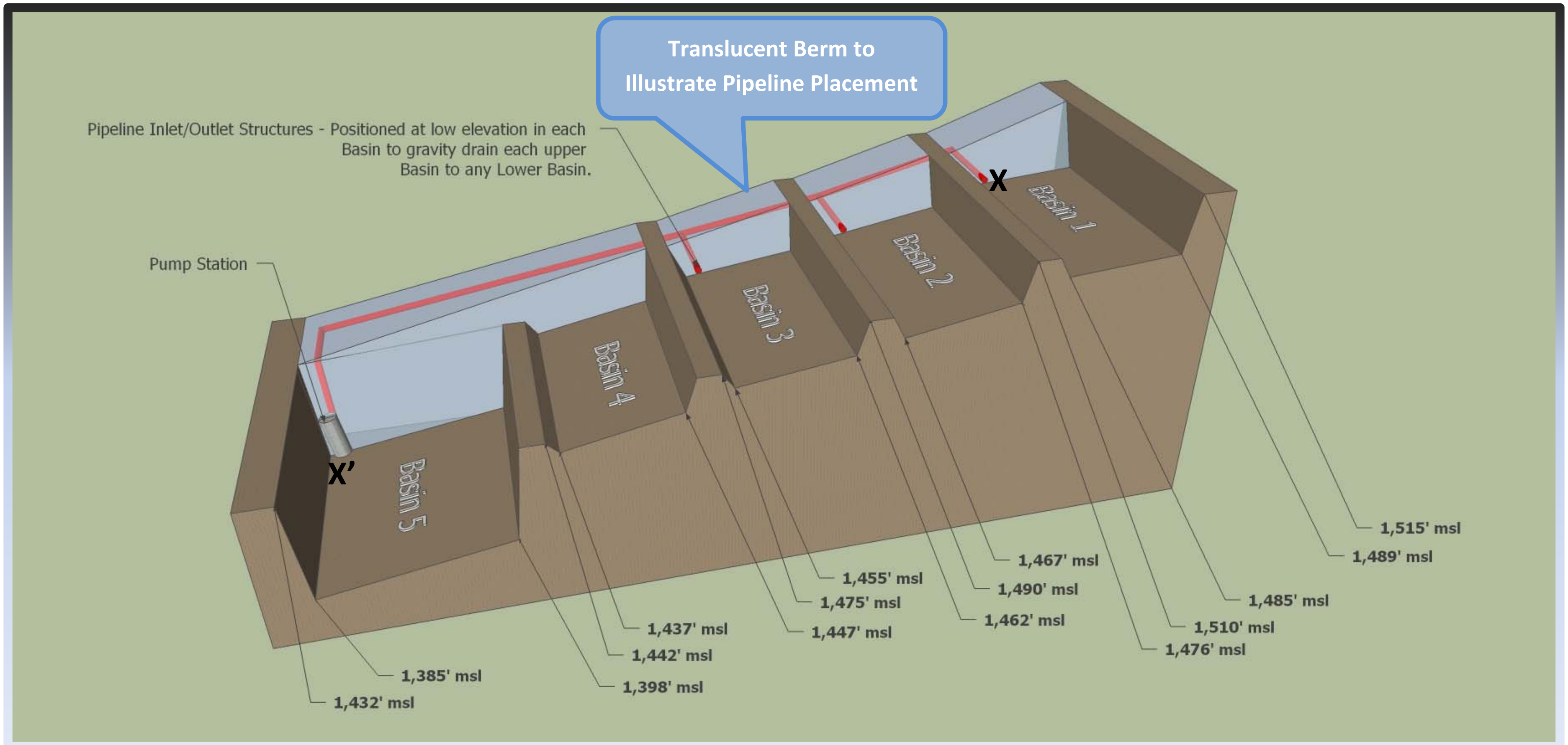


Figure 16: Alternative 3-A Pump Station Conceptual Design

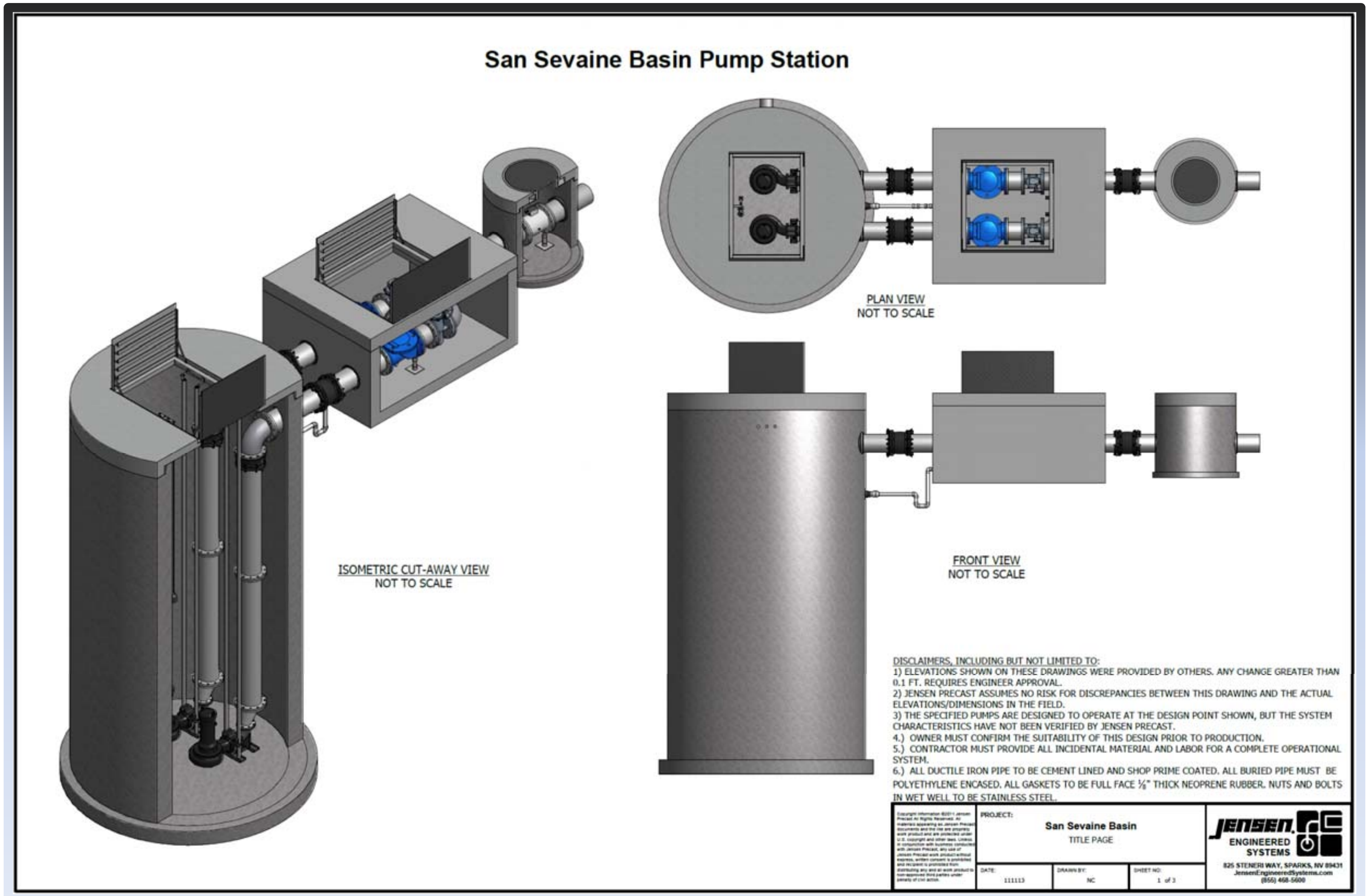
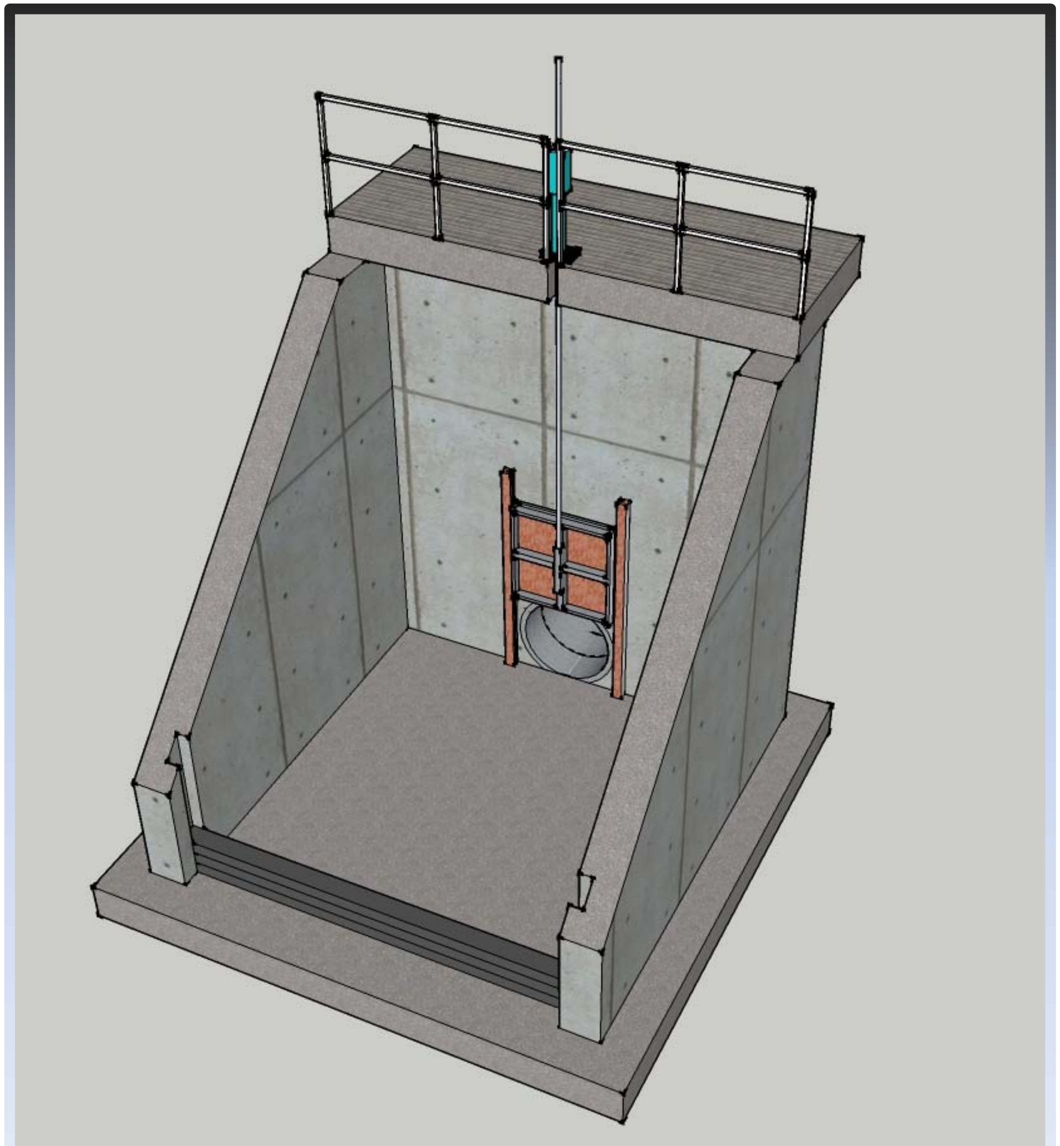


Figure 17: Inlet/Outlet Structure Conceptual Design



a) Design Criteria

The design of the pump station and pipeline should take into consideration the maximum infiltration rates and desired filling rates of Basins 1 through 3, as well as the desired dewatering rate of Basin 5 to maximize stormwater capture. Historical data from Basins 1 - 5 has been used to estimate the desired pumping rate and pipeline size (Table 9). The new facilities should also be designed to account for an increase in infiltration rates in the Basins due to future Basin improvements and efficiencies in operation and maintenance.

The total recharge area of Basins 1-3 is approximately 30 acres and the historical average stormwater infiltration rate in these Basins is 1.1 ft/day. This equates to a demand of approximately 16.5 cfs (7,400 GPM). This pumping rate would drain the approximate 350 acre-foot volume of Basin 5 in 9 to 10 days.

If the Segment A pipeline is not extended to deliver recycled water to Basins 1-3 then a stormwater pump station and pipeline would be required to deliver stormwater to Basins 1-3. A pipeline approximately 24" in diameter would be required to convey the 16.5 cfs to Basins 1-3.

Other design criteria include the construction of a new electrical service to power the pump(s), additional environmental impacts to construct a wet well/intake structure and a more complex control system to operate the facility. This option would complement the Alternative 1-A described previously, and could be constructed to provide water directly to Basin 1 – 3 from the Segment A Pipeline. Later in this report Alternative 5-A examines this option in more detail.

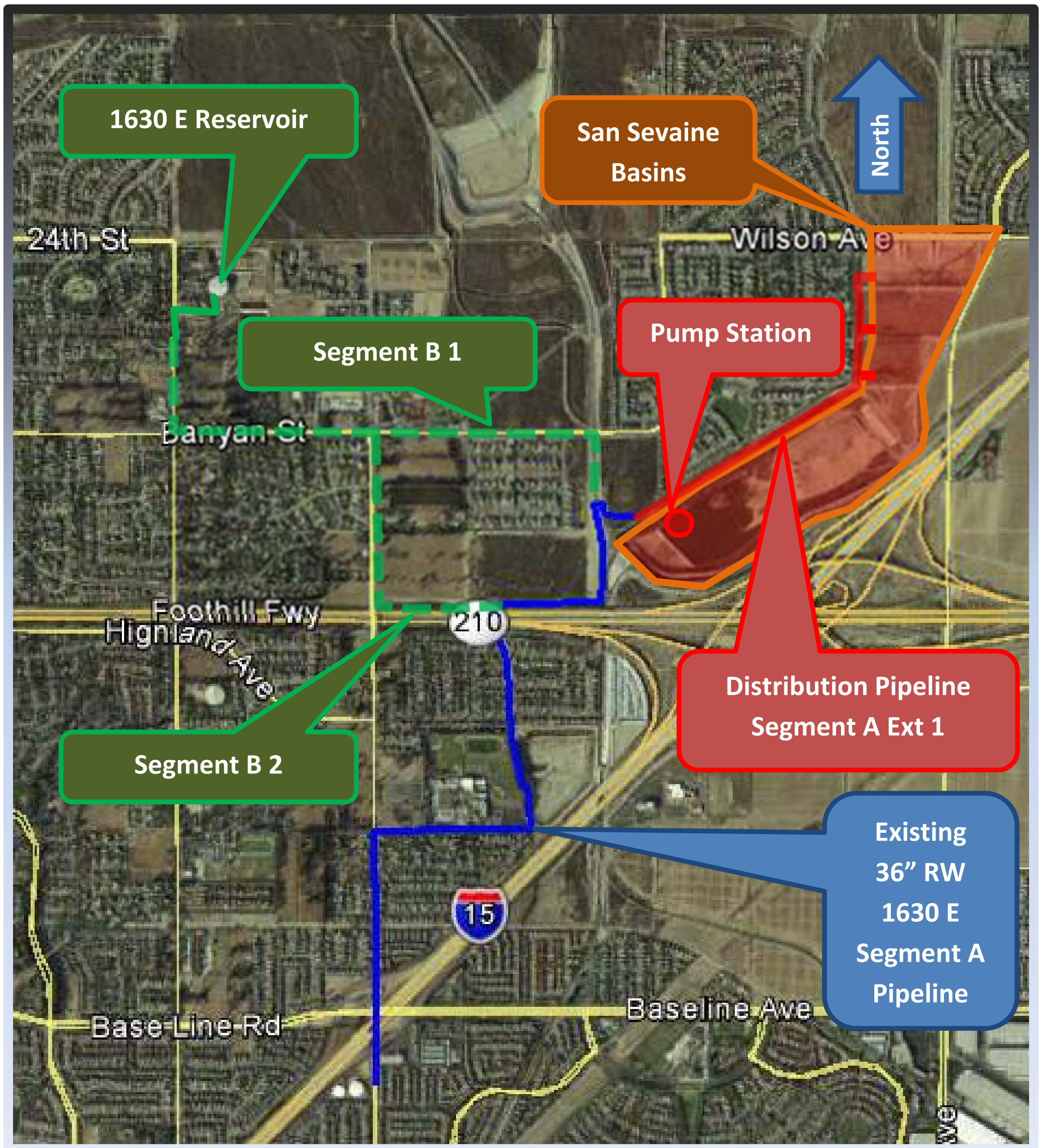
During final design, the size and placement of the pump station should take into account the possibility of increasing the storage volume of Basin 5. Significant, additional, storage volume is available in Basin 5 if several constraints can be overcome. These constraints include, relocating SBCFCD operations, inundating slopes at higher elevations in the Basin, inundating basin inlet structures, gating the Basin mid-level outlet, and developing/modifying an agreement with SBCFCD to hold water levels at a higher elevation during the storm season. If the storage of Basin 5 can be increased then additional pumping capacity from Basin 5 to Basins 1-3 may be prudent and pump and pipe sizes should be increased accordingly.

b) Layouts

Several layout options exist to meet the design criteria listed above. The location of the pump station should provide the opportunity to dewater Basin 5 for maintenance and cleaning as well as minimize construction impacts to wildlife and habitat. Figure 13 shows the preferred alignment of the pump station given the current configuration of Basin 5.

If SBCFCD stockpile operations change, and/or Basin 5 reconfiguration alters the topography of the Basin, then an alternate alignment may warrant additional analysis. This condition may develop if the SBCFCD stockpile is reconfigured (or removed) and it is found that an over-excavation in the north-east portion of Basin 5 would result in higher infiltration rates. Additional subsurface investigation in Basin 5 is planned for late in 2014, which will provide additional data to help determine the optimum configuration of Basin 5 for groundwater recharge purposes. Currently Basin 5 slopes to the south-west, which results in the pump station being positioned in the southern end of the Basin as shown in Figure 18.

Figure 18: Alternative 3-A Overview



c) *Alternative Alignments*

A number of other alignments were considered for this alternative. Several factors were considered when selecting the preferred layout for this option. Table 23 provides a summary of the alternative alignments considered and a brief discussion of the advantages and disadvantages of each.

Table 23: Alternative 3 Alignment Screening

Alternative	Description	Project Components	Advantages	Disadvantages
A	Pump Station at South-West Corner of Basin 5	Pump station and wet-well/inlet structure in south-west corner, pipeline along the north-west service road of Basins 1 – 5.	Utilizes existing topography and disturbed areas for construction, provides connection to existing 30" RW turnout	Long pipeline construction relative to other alignments
B	Pump Station at North-East End of Basin 5	Reconfiguration of Basin 5 topography, pump station and wet-well/inlet structure in north-east end, pipeline along the north-west service road of Basins 1 – 5	Shortest pipeline length, provides dewatering capability of Basin 5 should over excavation occur in the northern end	Does not provide connection to Segment A RW pipeline and requires slope excavation (or jack and bore) up to Basin 3
C	Pipeline Through the Bottom of Basins	Pump station and wet-well/inlet structure in south-west corner, pipeline through the bottom of Basins 5, 3, 2 and 1	No pipeline in the north-west access road, more room for construction of pipeline	Reduces area for infiltration in basin bottoms, requires slope excavation (or jack and bore) up to Basins 3, 2, 1
D	Pipeline Around the South-East Access Road	Pump station and wet-well/inlet structure in south-east corner, pipeline along the south-east service road of Basins 1 – 5	Provides more room for construction, has potential to avoid more habitat	Longest pipeline construction relative to other alignments

Given the current configuration and operation of the Basins, Alternative A in Table 23 is currently considered to be the preferred alignment for the pump station. If easement/land use or habitat impacts require it, more detailed analysis of alternatives B-D may be necessary during CEQA and final design.

d) Environmental Impacts, Permits and Mitigation

Environmental issues associated with the proposed project include expanding the quantity of stormwater recharged at the Basins, construction impacts associated with implementing the project, temporary and permanent impacts to habitat from construction and on-going operation and maintenance of the Basins and the effort and costs associated with obtaining permits to construct the project. This report presents a brief discussion of the relative differences between each of the detailed alternatives. A comprehensive environmental review will be required during final design of the selected alternative.

Alternative 3-A should not require a start-up period because no additional RW will be recharged as a result of the project. This Alternative is focused on the capture and recharge of stormwater which is classified as diluent water.

Construction impacts for Alternative 3-A will include temporary impacts to habitat to construct the pump station, turnouts end electrical infrastructure. Permanent impacts may include longer periods of inundation of some of the Basin acreages. A project constraint may require that construction activities occur outside of bird nesting season. Because the Basins are existing flood control/groundwater recharge Basins, regular maintenance of the Basins for enhanced groundwater recharge should require minimal additional regulatory approval.

e) Estimated Costs and Schedule

The estimated construction cost for the project are based on actual bid results from similar pipeline projects in the region as well as cost estimates from material manufacturers and suppliers. The annual O&M costs presented in Table 24 were developed using O&M costs from similar recharge basins and pump stations operating in groundwater recharge basins in the region. The following estimates should be considered preliminary and should be considered to be accurate within + or – 20%.

Table 24: Alternative 3-A Cost Estimate

Item	Quantity	Unit	Unit Price	Total Cost
Capital Costs				
Final Design/Engineering/Admin	10%	% of Const.	$349,125	$349,125
Mitigation	2	Acres	$20,000	$40,000
Construction Management	10%	% of Const.	$349,125	$349,125
			Subtotal	**$738,250**
Mob, DeMob, Sheet, Shore, Brace	5%	% of Const.	$166,250	$166,250
24" Pipeline	4,800	L.F.	$500	$2,400,000
Flow Control Valves & Gates	3	L.S.	$15,000	$45,000
Inlet/Outlet Structures	3	L.S.	$50,000	$150,000
Controls, Electrical and Instrumentation	1	L.S.	$250,000	$250,000
Grading	1	L.S.	$50,000	$50,000
Flow Meters	3	L.S.	$10,000	$30,000
Pump Station (16.5 cfs, 7,400 GPM)	1	L.S.	$400,000	$400,000
Contingency	10%	% of Const.	$349,125	$349,125
			Subtotal	**$3,840,375**
			Total	**$4,578,625**
Annual Debt Service 30 years @ 5%				$297,840
O&M Costs				
General Maintenance (Low Range)	650	A.F.	$25	$16,250
General Maintenance (High Range)	2,700	A.F.	$25	$67,500
Basin Cleanings	1	L.S.	$75,000	$75,000
Total Annual O&M Costs (Low Range)				$91,250
Total Annual O&M Costs (High Range)				$142,500
Recharge Benefit				
Annual RW Benefit (Low Range)	0	AFY		
Annual SW Benefit (Low Range)	650	AFY		
Annual MW Benefit (Low Range)	0	AFY		
Annual SupW Benefit (Low Range)	0	AFY		
Total Annual Benefit (Low Range)	**650**	**AFY**		
Annual RW Benefit (High Range)	0	AFY		
Annual SW Benefit (High Range)	2,700	AFY		

Annual MW Benefit (High Range)	0	AFY		
Annual SupW Benefit (High Range)	0	AFY		
Total Annual Benefit (High Range)	**2,700**	**AFY**		
Unit Costs				
IEUA RW Unit Cost (Low Range)	0	$/AF	$ 195	$0
IEUA RW Unit Cost (High Range)	0	$/AF	$ 195	$0
MWD Water Costs RWC (Low Range)	0	$/AF	$ 800	$0
MWD Water Costs RWC (High Range)	0	$/AF	$ 800	$0
Total Annual Cost (Low Range)		$		$389,090
Total Annual Cost (High Range)		$		$440,340
Total Unit Cost (Low Range)		**$/AF**		**$599**
Total Unit Cost (High Range)		**$/AF**		**$163**

The project schedule presented in Table 25 was developed assuming that the majority of construction happens outside of bird nesting season, with construction activities within the recharge areas of the Basins occurring prior to storm flows in the Basins. Final design of the project may require a two phase construction approach to work within the constraints of the storm seasons and nesting season.

Table 25: Alternative 3-A Project Schedule

Activity	Duration
Final Design/Permitting	8 Months
Construction In Basins (Pump Station, Inlet/Outlet Structures)	6 Months
Construction Out of Basins (Pipelines)	6 Months
Total Duration	1 Year 8 Months

3. Alternative 4-A, San Sevaine Basin 5 Infiltration Enhancement

Basin 5 has the largest area and storage volume of the five Basins. Basin 5 also has existing infrastructure required to accept delivery of RW. Basin 5 has been in operation and used to recharge RW for approximately 5 years. Infiltration rates in Basin 5 have been relatively low when compared to imported water infiltration rates in Basins 1-3. The low Basin performance may be attributed to several factors, these include;

a. Approximately 50% of Basin 5 is un-usable for recharge operations because SBCFCD utilizes the Basin as a fill stockpile area. The stockpile area also has the potential to introduce a large amount of clogging materials into the recharge area during storm events.

b. Layers of fine grained soils may exist on the Basin bottom, or deeper under the Basin, which may impede infiltration rates.
c. High infiltration rates of adjacent Basins may create groundwater mounding under the San Sevaine Basin System.

Due to the relatively limited amount of time that Basin 5 has been used for groundwater recharge the cause of its low performance is not yet fully understood. A field investigation was performed in September of 2014 to better understand the factors restricting the infiltration rates in Basin 5. The subsurface investigation report has been attached as an appendix to this report. In general the conclusions and recommendations from that effort are:

1) **Conclusion** – Existing recharge data estimates in Basins 1-5 have been based on a relatively small number of historical data points (less than 150 data points over 3 years). These estimates likely do not fully capture the variability in actual infiltration rates for each Basin. Variables that will affect infiltration rates include – water source, water quality (primarily TSS), time since last basin cleaning, time in operation, water level, inflow, outflow, changes in water surface elevation, evaporation, number of storm events, frequency and intensity of storm events, flood control operations, up-gradient watershed fire events, local groundwater pumping, local incidental recharge and groundwater elevations.
   Recommendation – Perform additional, focused, infiltration rate testing to the existing Basins while measuring/documenting as many of the above listed variables as possible. The variables critical to accurate infiltration rate measurement include inflow, outflow and change in water surface elevation over time.

2) **Conclusion** - Basin 3 has a compacted silt/clay surface covering the basin bottom and a near-surface silt/clay layer (from 1 – 4 feet bgs) covering the south-east portion of the Basin. Based on historical infiltration rates it appears that the areas outside of the sub-surface layer in Basin 3 have geotechnical properties which allow the Basin to perform at a rate more than 10 times greater than that of Basin 5.
   Recommendation – After completion of Recommendation #1 above, thoroughly clean Basin 3 (and if possible remove the sub-surface layer in the south-east quadrant) and re-measure infiltration rates to determine if the Basin 3 infiltration rates are controlled by the surface clogging layer or by the subsurface sediments. This data will help determine if the Basin 5 subsurface sediments are the limiting factor in Basin 5's performance. This data will also help quantify the benefit of more frequent cleanings in Basins 1-3.

3) **Conclusion** - The surface (top 6 - 8 inches) of Basin 5 has a relatively high fines content and many areas are highly compacted. Historically, Basin 5 has not exhibited an infiltration rate spike during the initial filling of the Basin after being out of service for long periods of time or after a cleaning event. This indicates that the infiltration rate restriction is occurring at, or very near, the surface of the Basin.

Recommendation – After completion of Recommendation #1 above, closely monitor the next filling event without cleaning Basin 5. Measure water levels several times per hour, measure basin inflow and outflow, and hold water levels as constant as possible to accurately measure the infiltration rate decay curve. Terminate the test after several weeks or months of operation. Thoroughly clean Basin 5 (removing the top 6 – 8 inches of soil) and repeat the infiltration rate test. This data will help determine if the Basin 5 sub-surface sediments are the limiting factor in Basin 5's performance or if the surface sediments have been responsible for the historically low infiltration rates. This data will also help determine if Basin 5's performance can be improved by reconfiguring the SBCFCD stockpile, by increasing the frequency of cleanings or by sub-surface improvements.

4) **Conclusion** - The recharge area of Basin 5 is currently ½ of the bottom surface area of the Basin. SBCFCD utilizes approximately ½ of the Basin bottom for fill stockpile operations. The fill stockpile reduces the available area for groundwater recharge and introduces clogging materials (silt/clay) into the recharge area during storm events. Fill stockpile operations can also result in a highly compacted Basin bottom surface which restricts infiltration rates.
Recommendation – Work with SBCFCD to reduce, reconfigure or remove the fill stockpile to maximize the recharge area in Basin 5, limit the amount of fine grained sediment from entering the recharge area and limit compaction to the Basin 5 bottom wherever possible. This may also include over-excavating the north-east half of Basin 5 to lower the Basin bottom elevation below the existing water conservation spillway elevation.

5) **Conclusion** – Basin 5 has a near-surface clay layer in the south-west 1/3rd of the Basin which will impede infiltration rates. It appears this layer was previously covered with fill material.
Recommendation 5 A – Perform an infiltration rate test to identify the contribution of the southwestern 1/3rd of Basin 5 vs the remaining 2/3rd of the existing Basin 5 recharge area. This can be done by wetting and holding a constant elevation over the southwestern 1/3rd of the Basin for a number of days or weeks and collecting detailed infiltration rate data. Then, increase the water level to wet the remaining 2/3rds of the Basin and hold a constant elevation (while measuring inflow) to measure the sustained rate over the entire Basin. The difference in infiltration rates will help to estimate how much the clay layer affects the overall performance of Basin 5 and whether or not it may be cost effective to remove of the impeding layer.
Recommendation 5 B – Phase 1 - Construct a small test cell (1 acre or less) near the RW inlet to Basin 5 using existing sediments in the Basin. Perform a detailed infiltration rate test to develop an infiltration rate decay curve. Phase 2 – Over excavate the test cell below the clay layer and perform another detailed infiltration rate test to develop a decay curve. Compare decay curves to determine the benefit of removing the impeding layer.

6) **Conclusion** – The Basin 5 lysimeters and recent soil borings indicate an apparent percolation restriction from 15 to 25 feet bgs. This restriction, or other unidentified restrictions, may cause groundwater mounding once surface infiltration rate restrictions are mitigated.

Recommendation – Perform a pilot project to test the feasibility of bypassing the apparent impeding layer (approx. 20 feet bgs). These pilot projects may include transfer wells, subsurface collection galleries to injection wells, basin perforation pits or trenches or large scale over-excavation. Implement any deep Basin improvements in a phased (or demonstration scale) approach to clearly quantify the cost/benefit of the improvements.

7) **Conclusion** – A very small percentage of Basin 5 is currently being utilized for stormwater capture and recharge.
Recommendation – Work with SBCFCD to increase the water conservation pool elevation in Basin 5. This may include re-configuration of the existing stockpile, raising the water conservation berm elevation, re-defining the groundwater recharge/flood control operating rules and/or gating the mid-level Basin 5 outlet.

A summary of potential enhancement projects can be seen in Table 26 below.

Table 26: Alternative 4, Basin 5 Recharge Enhancement Options

Alternative	Description	Project Components	Advantages	Disadvantages	Expected Benefit
A	Utilize a Higher % of Basin Area	Remove or reconfigure the SBCFCD stockpile, re-grade available recharge areas not used by SBCFCD	Creates more available surface area for groundwater recharge, relatively in-expensive	Requires SBCFCD to find alternate location for some or all of current and future stockpiles	To Be Determined Upon Completion of 2014 Subsurface Investigation Recommendations
B	Subgrade Improvement	Identify near-surface impervious subgrade, remove and replace with more permeable material (possibly from deepening of Basins 1 -4)	No long term O&M costs, can improve performance of Basin 5 without increasing footprint of recharge area (less impact to SBCFCD)	Can be very expensive depending on depth to impervious subgrade, may have difficulty finding location for material removed from Basin 5, additional deep impervious areas may ultimately restrict recharge rates	To Be Determined Upon Completion of 2014 Subsurface Investigation Recommendations
C	Transfer Wells	Install subgrade wells to "transfer" perched groundwater past impervious layers to deeper groundwater layers	Very low construction impacts, very little permanent surface disturbance, do not have to be in bottom of Basin, can be constructed around perimeter or wherever perched water is located	Expensive to construct, relatively new technology, long term O&M may be higher than other options	To Be Determined Upon Completion of 2014 Subsurface Investigation Recommendations
D	Perforate Subgrade	Excavate a series of trenches or pits through near surface impervious layers and backfill with pervious material	Much less expensive than large scale over-excavation /backfill (Option B), no long term O&M costs, can improve performance of Basin 5 without increasing footprint of recharge area (less impact to SBCFCD)	Only practical for near surface impervious layers, relatively new technology, additional deep impervious areas may ultimately restrict recharge	To Be Determined Upon Completion of 2014 Subsurface Investigation Recommendations

a) Design Criteria

Basic design criteria have been developed for the above alternatives. The primary objective of this project alternative is to increase the infiltration rate in Basin 5 to fully utilize the existing RW delivery system already in place. The expected benefits for each alternative listed in Table 26 will be estimated at the completion of the subsurface investigation recommendations listed previously. The fundamental criteria used for design include;

a. Maximize the wetted area of the Basin
b. Eliminate, or reduce to the extent possible, impervious fined grained sediments (silts and clays) present in the Basin inflow, on the surface of the Basin bottom and in the subgrade soils.

Completion of the subsurface investigation recommendations will help to determine how to best improve the infiltration rate in Basin 5. This report presents the most basic improvement option (increasing the recharge area) for comparison to the other alternatives detailed in this report.

b) Layouts

A wide variety of Basin layouts and configurations are possible for Basin 5 which would increase the overall Basin performance. For the purposes of this report, the improvement option that is most likely to improve the recharge capacity of the basin at the lowest cost has been carried forward for more detailed analysis. The easiest, and least expensive, way to increase recharge in Basin 5 is to utilize more of the available surface area of the basin (Alternative A from Table 26). Conceptual designs/layouts have been prepared for Alternatives A – D, and a combination of these solutions may be further analyzed upon the completion of the subsurface investigation recommendations (see

Figure 19 through Figure 24).

Increasing the wetted area of the Basin could be achieved by removing some, or all, of the SBCFCD stockpile from the Basin and regarding the Basin bottom to allow it to be used for groundwater recharge. Assuming the existing infiltration rates, this option has the potential to substantially increase the annual volume of groundwater recharge in Basin 5. The removal of the stockpile will also reduce the amount of clogging material available to impeded infiltration at the surface of the Basin bottom.

If stockpile removal is not possible at this time, reconfiguration of the stockpile would make more area available for groundwater recharge. The construction of earthen isolation berms will also help to contain clogging materials and allow the Basin to be operated at a higher water surface elevation, thereby increasing the wetted area in the

Basin. If recharge limiting sediments at the surface of the Basin bottom are found to be present in the existing recharge area, then a surficial over-excavation may prove to be beneficial in conjunction with increasing the wetted area of the Basin.

Figure 19: Alternative 4, Remove Stockpile

Figure 20: Alternative 4, Reconfigure Stockpile

Figure 21: Alternative 4, Surficial Over-Excavation

Figure 22: Alternative 4, Subgrade Over-Excavation

Figure 23: Alternative 4, Transfer Wells

Figure 24: Alternative 4, Subgrade Perforations

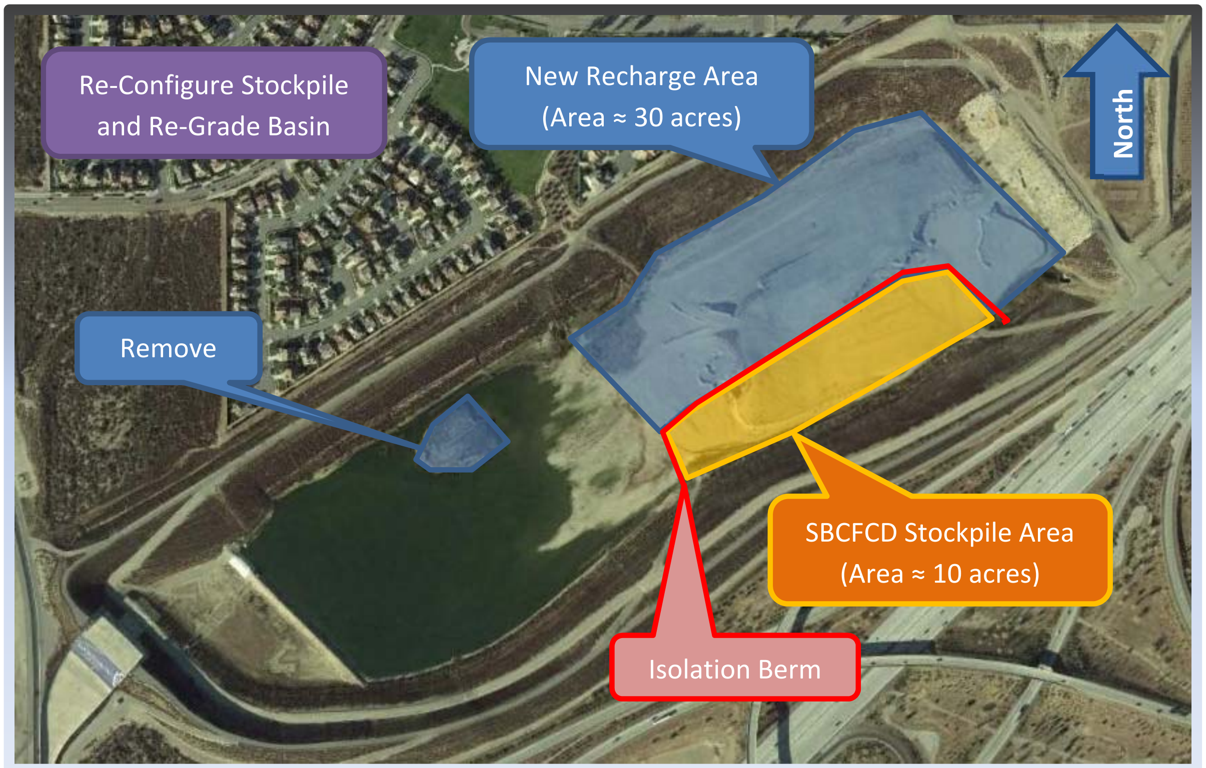
c) *Alternative Alignments*

The layouts described above will have varying degrees of success in increasing infiltration rates, depending upon the subsurface conditions. The option described above that has the highest probability of success, at the least cost, is increasing the surface area of the recharge area. For analysis purposes the assumption has been made that the new area will perform at least as good as the existing area. Therefore the new quantity of recharged RW will be proportional to the new area created.

At the time of this analysis, it was unknown if SBCFCD was willing, or able to completely and indefinitely remove its stockpile operations from Basin 5. Therefore the layout presented below evaluates the partial removal and reconfiguration of the stockpile area. It has been assumed that approximately 30 acres of new recharge area can be created by removing a portion of the stockpile. The project would move the remaining stockpile to the south-east and construct isolation berms around the stockpile to limit the transport of fines into the recharge area and maximize the operating level of Basin 5 (

Figure 25).

Figure 25: Alternative 4-A, Basin 5 Re-Configuration



The new recharge area outlined above in

Figure 25 represents an increase of approximately 85% in area. If the new area performs at the average rates of the existing Basin 5 area, then an additional 800 AFY of RW and approximately 200 AFY of stormwater can be recharged in Basin 5. A summary of this alternative's cost and benefit can be seen in Table 27.

Table 27: Alternative 4-A Summary

Alternative Description	Basin 5 Reconfiguration to Increase Recharge Area
Estimated Benefit	500 AFY to 1,000 AFY
Estimated Capital Cost	$1,400,000

Unit Cost (includes annual O&M)	$614/AF to $397/AF

If no new recharge area is available, then improvements to the subsurface of the existing recharge area may yield up to 315 AFY of additional RW recharge. This assumes that a 30% increase in the infiltration rate is possible pending further subsurface investigation results.

d) Environmental Impacts, Permits and Mitigation

Environmental issues associated with the proposed project include expanding the quantity of RW and stormwater recharged at Basin 5, construction impacts associated with implementing the project, temporary and permanent impacts to habitat from construction and on-going operation and maintenance of the Basin and the effort and costs associated with obtaining permits to construct the project. This report presents a brief discussion of the relative differences between each of the detailed alternatives. A comprehensive environmental review will be required during final design of the selected alternative.

Alternative 4-A should not require a start-up period because RW will not be recharged outside of Basin 5. Basin 5 has already met the requisite start-up period requirements. This Alternative is focused on the capture and recharge of stormwater and the enhancement of RW recharge in Basin 5 only.

Construction impacts for Alternative 4-A will include temporary impacts to habitat to reconfigure/rehabilitate the Basin. Permanent impacts may include longer periods of inundation of some of the Basin acreage. A project constraint may require that construction activities occur outside of bird nesting season. Because the Basin is an existing flood control/groundwater recharge Basins, regular maintenance of the Basins for enhanced groundwater recharge should require minimal additional regulatory approval.

e) Estimated Costs and Schedule

The estimated construction cost for the project are based on actual bid results from similar recharge basin rehabilitation projects in the region. The annual O&M costs presented in Table 28 were developed using O&M costs from similar groundwater recharge basins operating in the region. The following estimates should be considered preliminary and should be considered to be accurate within + or – 20%.

Table 28: Alternative 4-A Cost Estimate

Item	Quantity	Unit	Unit Price	Total Cost
Capital Costs				
Final Design/Engineering/Admin	10%	% of Const.	$105,000	$105,000

Mitigation	2	Acres	$20,000	$40,000
Construction Management	10%	% of Const.	$105,000	$105,000
			Subtotal	**$250,000**
Mob, DeMob, Sheet, Shore, Brace	5%	% of Const.	$50,000	$50,000
Grading	200,000	$/CU YD	$5	$1,000,000
Contingency	10%	% of Const.	$105,000	$105,000
			Subtotal	**$1,155,000**
			Total	**$1,405,000**
Annual Debt Service 30 years @ 5%				$91,395
O&M Costs				
General Maintenance (Low Range)	500	A.F.	$25	$12,500
General Maintenance (High Range)	1,000	A.F.	$25	$25,000
Basin Cleanings	1	L.S.	$125,000	$125,000
Total Annual O&M Costs (Low Range)				$137,500
Total Annual O&M Costs (High Range)				$150,000
Recharge Benefit				
Annual RW Benefit (Low Range)	400	AFY		
Annual SW Benefit (Low Range)	100	AFY		
Annual MW Benefit (Low Range)	0	AFY		
Annual SupW Benefit (Low Range)	500	AFY		
Total Annual Benefit (Low Range)	**500**	**AFY**		
Annual RW Benefit (High Range)	800	AFY		
Annual SW Benefit (High Range)	200	AFY		
Annual MW Benefit (High Range)	0	AFY		
Annual SupW Benefit (High Range)	800	AFY		
Total Annual Benefit (High Range)	**1,000**	**AFY**		
Unit Costs				
IEUA RW Unit Cost (Low Range)	400	$/AF	$ 195	$78,000

IEUA RW Unit Cost (High Range)	800	$/AF	$ 195	$156,000
MWD Water Costs RWC (Low Range)	0	$/AF	$ 800	$0
MWD Water Costs RWC (High Range)	0	$/AF	$ 800	$0
Total Annual Cost (Low Range)		$		$306,895
Total Annual Cost (High Range)		$		$397,395
Total Unit Cost (Low Range)		**$/AF**		**$614**
Total Unit Cost (High Range)		**$/AF**		**$397**

The project schedule presented in Table 29 was developed assuming that the majority of construction happens outside of bird nesting season, with construction activities within the recharge areas of the Basins occurring prior to storm flows in the Basins. Final design of the project may require a two phase construction approach to work within the constraints of the storm seasons and nesting season.

Table 29: Alternative 4-A Project Schedule

Activity	Duration
Final Design/Permitting	7 Months
Construction In Basin	6 Months
Total Duration	1 Year 1 Month

4. Alternative 5-A, Basin 5 Pump Station and RW Pipeline Extension

This alternative includes the extension of the Segment A RW pipeline as described in Alternative 1-A as well as the addition of the Basin 5 Pump Station described in Alternative 3-A. Alternative 1-A provides only a RW benefit while the Alternative 3-A benefit is primarily stormwater capture/recharge. Secondary benefits of Alternative 3-A include using Basin 5 as a settling basin to de-silt stormwater prior to pumping it to Basins 1-3 and this alternative also provides the operational flexibility to move water between Basins for maintenance and environmental benefits. Alternative 5-A would provide the greatest operational flexibility and opportunity to increase both RW and stormwater recharge at the Basins. This option also minimizes the amount of MW required while maximizeing the RW recharge benefit. Table 30 shows a summary of the project costs and benefits.

Table 30: Alternative 5-A Summary

Alternative Description	Basin 5 pump station and RW pipeline extension to Basins 1 - 3
Estimated Benefit	2,550 AFY to 10,800 AFY
Estimated Capital Cost	$5,900,000
Unit Cost (includes annual O&M)	$351/AF to $379/AF

Alternative 3-A, discussed previously in this report, assumes there is no direct connection between the existing RW pipeline and the proposed Basin 5 pump station. Alternative 3-A could deliver RW to Basins 1 – 3 by pumping RW from Basin 5 to Basins 1 – 3. This mode of operation will prove to be inefficient because the available head (approximately 42’) in the RW pipeline would be wasted by allowing the water to first flow down into Basin 5, only to then expend energy to lift the water back out of Basin 5.

Connection of the Basin 5 Pump Station to the RW Pipeline Extension would occur at the existing 30” diameter pipeline between the Etiwanda Channel crossing and the 12” diameter flow control station (Figure 26, Figure 27, Figure 28). This will allow operation of the existing RW turnout in Basin 5 to remain as-is, and no impacts or modifications will be required to the existing 48” diameter storm drain. See Figure 26 - Figure 30 for a conceptual design of Alternative 5-A.

Figure 26: Alternative 5-A Conceptual Design Plan View

Figure 27: Alternative 5-A System Schematic

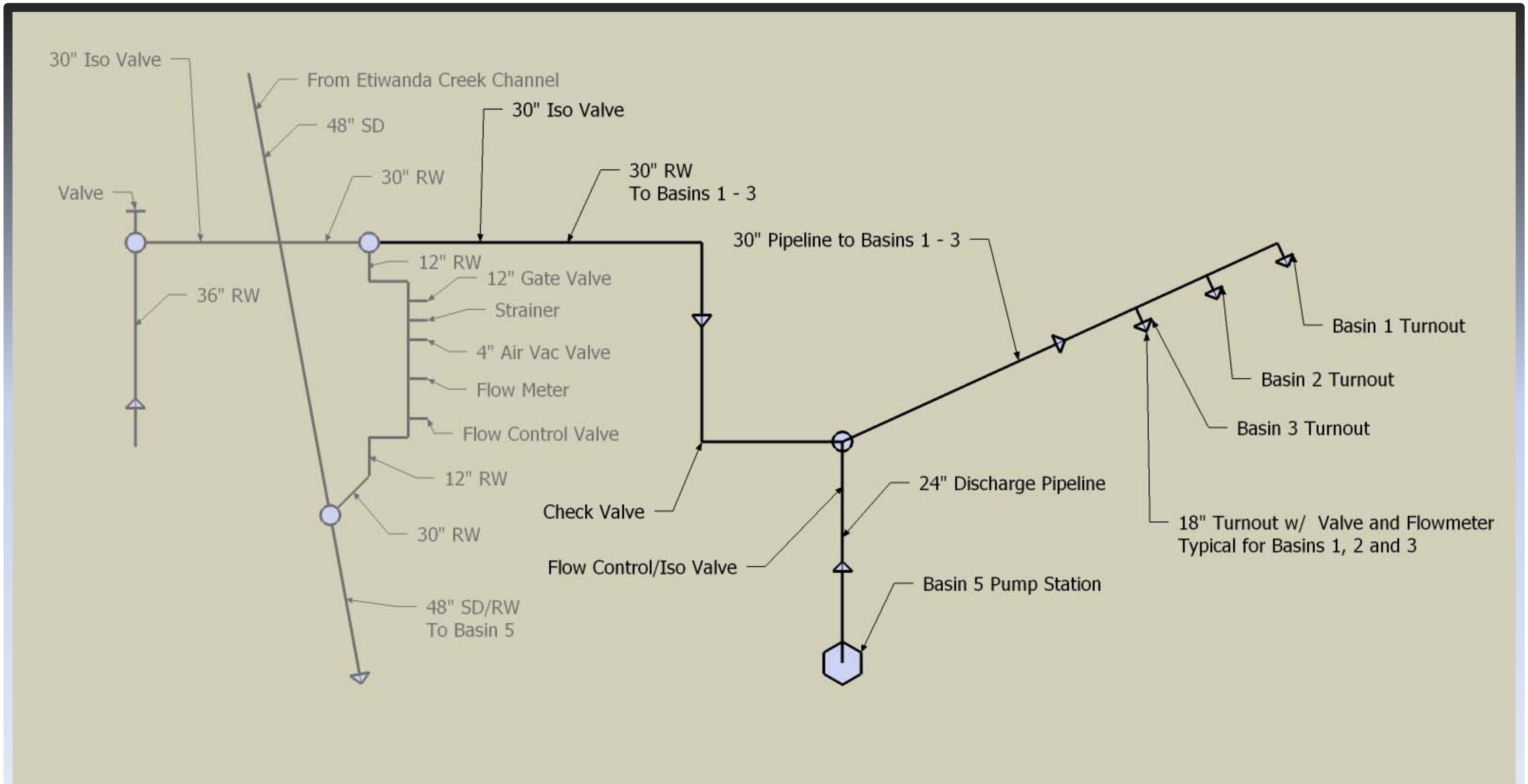


Figure 28: Alternative 5-A Conceptual Design Isometric View

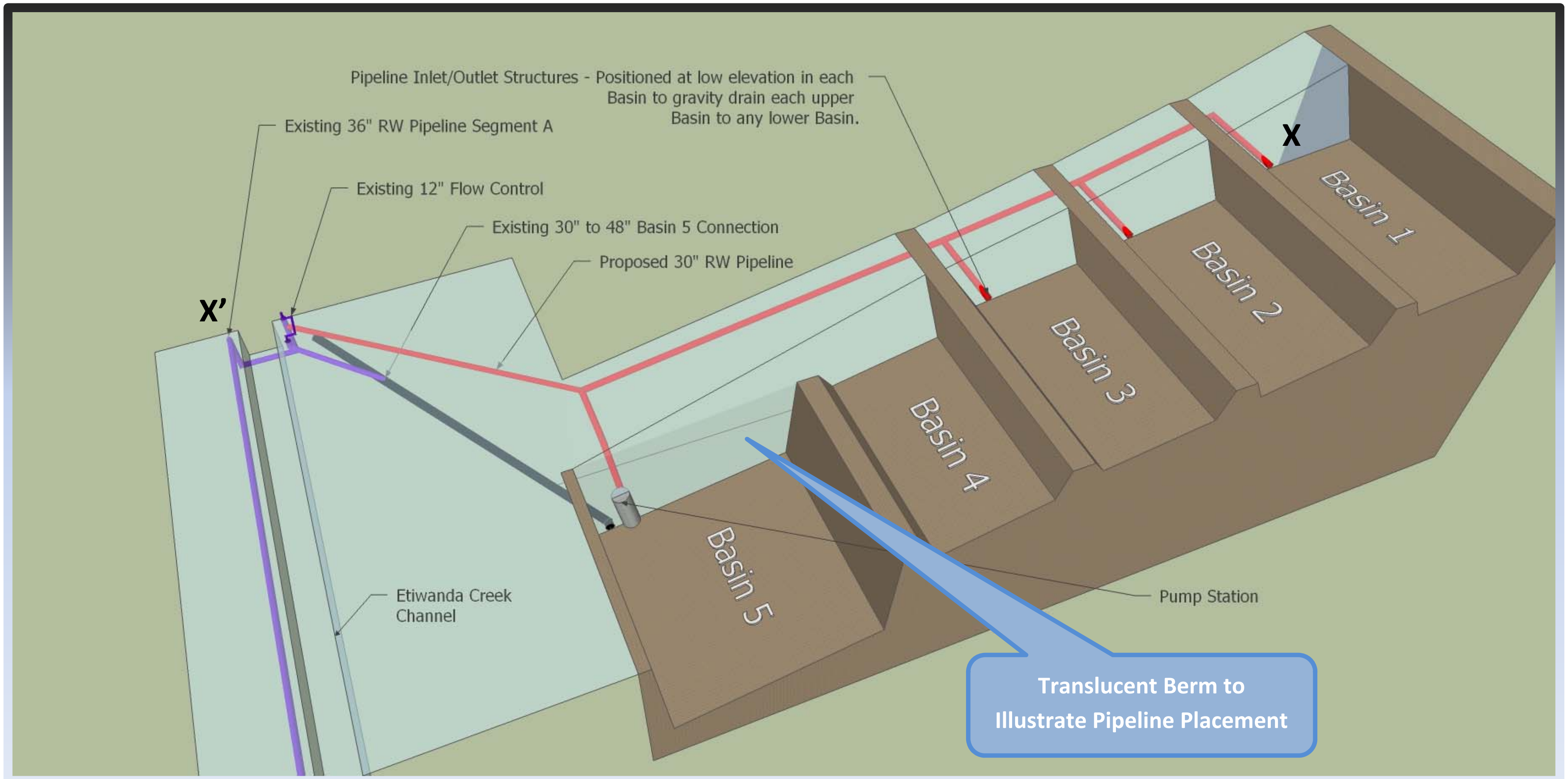


Figure 29: Pump Station Conceptual Design

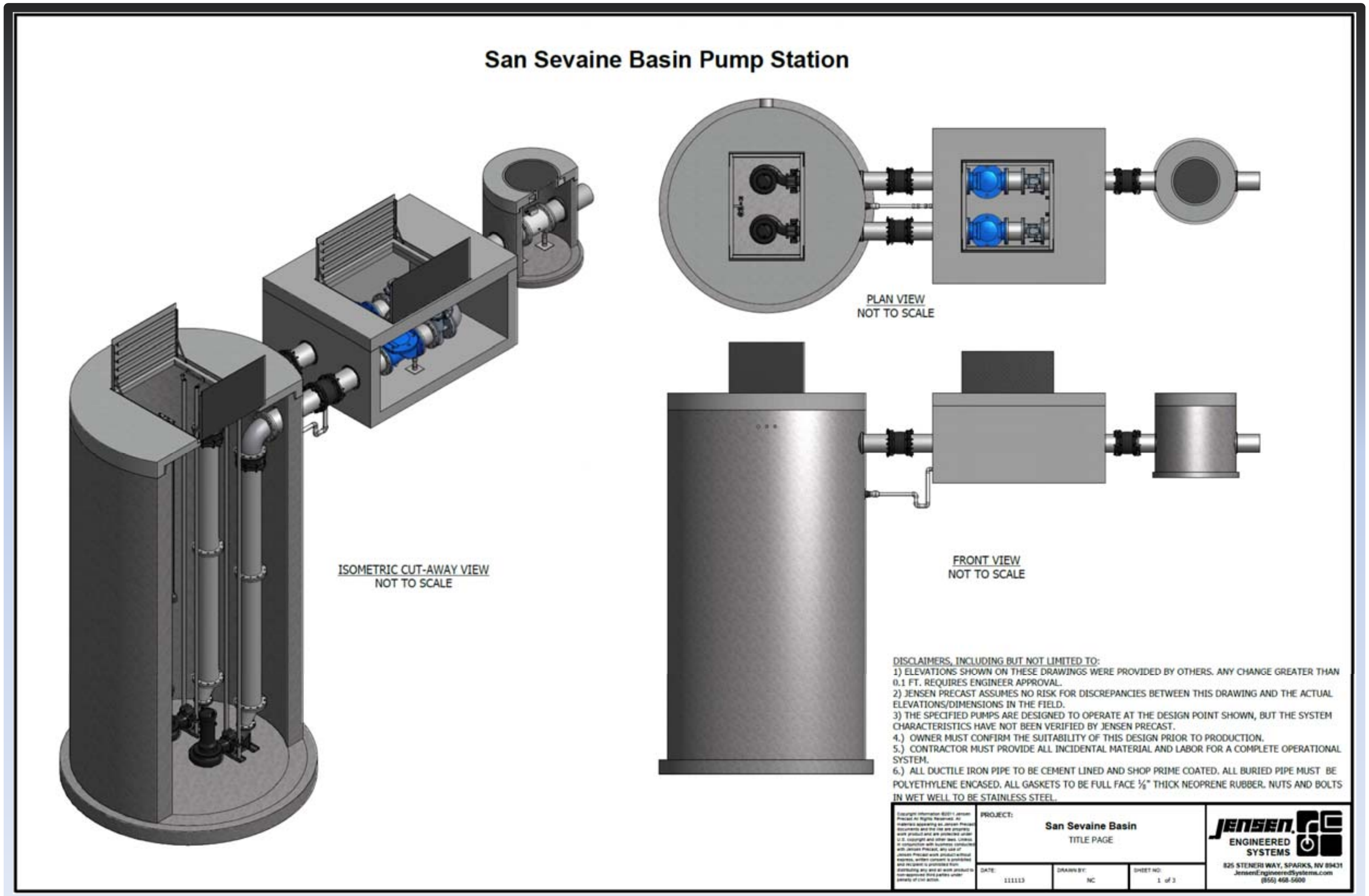
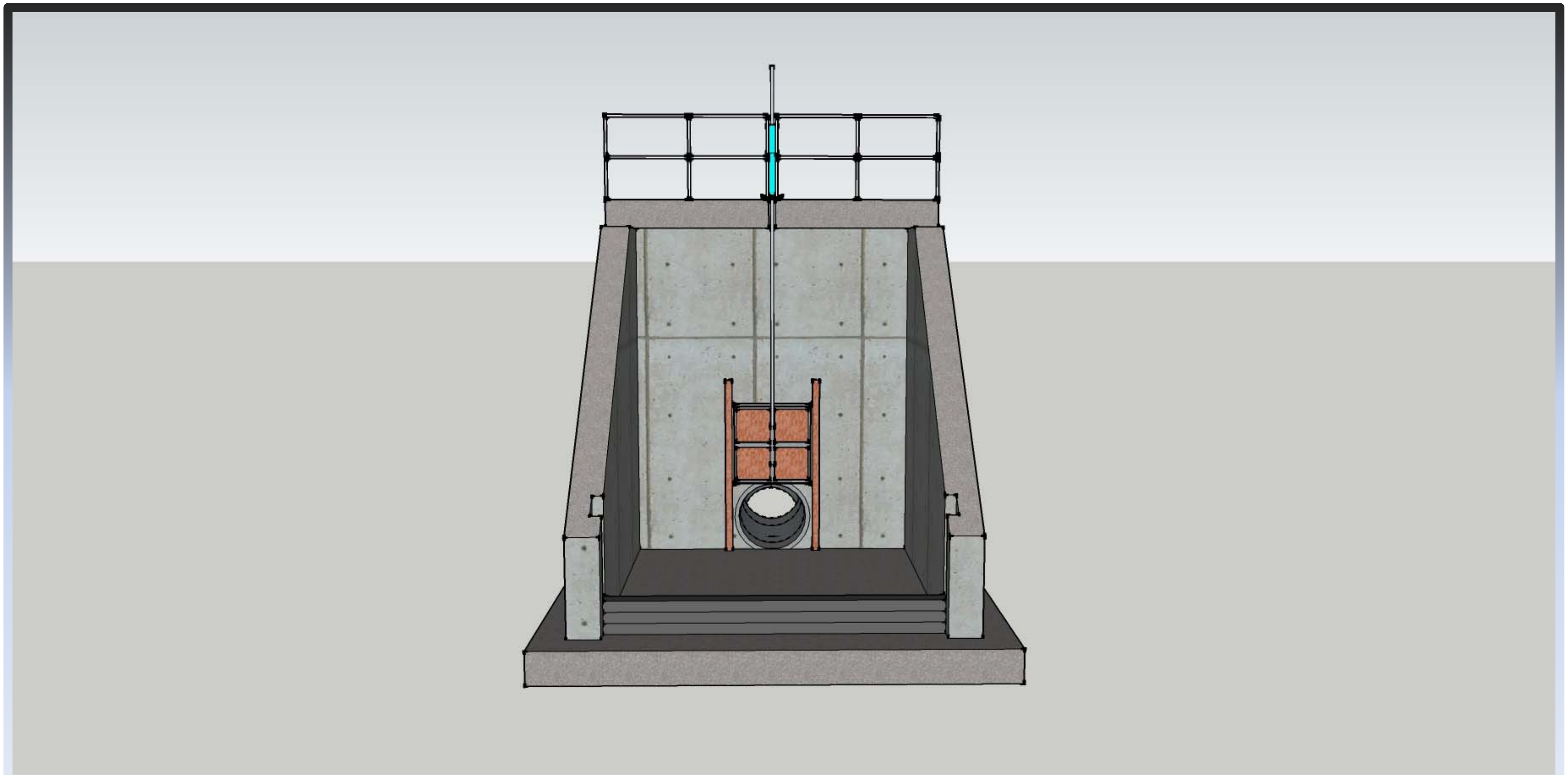


Figure 30: Inlet/Outlet Structure Conceptual Design



a) Design Criteria

The design of the pump station and pipeline should take into consideration the maximum infiltration rates and desired filling rates of Basins 1 through 3 using RW, as well as the desired dewatering rate of Basin 5 to maximize stormwater capture. Historical data from Basins 1 - 5 has been used to estimate the desired pumping rate and pipeline size (Table 9). The new facilities should also be designed to account for an increase in infiltration rates in the Basins due to future Basin improvements and efficiencies in operation and maintenance.

The total recharge area of Basins 1-3 is approximately 30 acres and the historical average stormwater infiltration rate in these Basins is 1.1 ft/day. This equates to a demand of approximately 16.5 cfs (7,400 GPM). This pumping rate would drain the approximate 300 acre-foot volume of Basin 5 in 9 to 10 days. Primary delivery of RW would be provided by the 1630 E Pump Station as previously described in the Alternative 1-A.

The RW pipeline would need to be approximately 30" in diameter from the Etiwanda Creek Channel connection. Other design criteria include the construction of a new electrical service to power the pump(s), construction of a wet well/intake structure and a control system to operate the facility.

Implementation of this alternative could also be performed in phases. Phase 1 could be the construction of Alternative 1-A, which would achieve the objective of delivering RW to Basins 1 – 3. Phase 2, construction of the pump station would meet the objective of achieving additional stormwater capture and recharge. Additional stormwater capture and recharged would also help to increase the diluent water contribution to the basin, thereby allowing more RW to be recharged at the Basins.

b) Layouts/ Alternative Alignments

Alternative layouts and alignments for the RW pipeline and pump station have been previously detailed in sections 1 and 2 of this report.

c) Environmental Impacts, Permits and Mitigation

Environmental issues associated with the proposed project include expanding the quantity of RW and stormwater recharged at the Basins, construction impacts associated with implementing the project, temporary and permanent impacts to habitat from construction and on-going operation and maintenance of the Basins and the effort and costs associated with obtaining permits to construct the project. This report presents a brief discussion of the relative differences between each of the detailed alternatives. A comprehensive environmental review will be required during final design of the selected alternative.

Alternative 5-A may require a start-up period, including the installation of monitoring wells and lysimeters to determine groundwater movement, the recycled water contribution and effectiveness of SAT under Basins 1-3. A minimum of 6 months retention time and a 500 foot horizontal separation distance from any drinking water well would be required.

Construction impacts for Alternative 5-A will include temporary impacts to habitat to construct the pump station, turnouts end electrical infrastructure as well as impacts to extend the RW pipeline from Etiwanda Creek Channel to the Basin perimeter access road. Permanent impacts may include longer periods of inundation of some of the Basin acreages. A project constraint may require that construction activities occur outside of bird nesting season. Because the Basins are existing flood control/groundwater recharge Basins, regular maintenance of the Basins for enhanced groundwater recharge should require minimal additional regulatory approval.

d) Estimated Costs and Schedule

The estimated construction cost for the project are based on actual bid results from similar pump station and pipeline projects in the region as well as cost estimates from material manufacturers and suppliers. The annual O&M costs presented in Table 31 were developed using O&M costs from similar recharge basins and pump stations operating in groundwater recharge basins in the region. The following estimates should be considered preliminary and should be considered to be accurate within + or – 20%. Please note that costs to upgrade and/or build-out the 1630 East RW pump station have not been included in this report.

Table 31: Alternative 5-A Cost Estimate

Item	Quantity	Unit	Unit Price	Total Cost
Capital Costs				
Final Design/Engineering/Admin	10%	% of Const.	$451,133	$451,133
Mitigation	4	Acres	$20,000	$80,000
Construction Management	10%	% of Const.	$451,133	$451,133
			Subtotal	**$982,265**
Mob, DeMob, Sheet, Shore, Brace	5%	% of Const.	$214,825	$214,825
30" Pipeline	4,600	L.F.	$675	$3,105,000
Flow Control Valves & Gates	5	L.S.	$15,000	$75,000
Inlet/Outlet Structures	3	L.S.	$50,000	$150,000
Controls, Electrical and Instrumentation	1	L.S.	$350,000	$350,000
Grading	1	L.S.	$50,000	$50,000
Flow Meters	3	L.S.	$10,000	$30,000
24" Pipeline	300	L.F.	$455	$136,500
Pump Station (16.5 cfs, 7,400 GPM)	1	L.S.	$400,000	$400,000
Contingency	10%	% of Const.	$451,133	$451,133
			Subtotal	**$4,962,458**
			Total	**$5,944,723**
Annual Debt Service 30 years @ 5%				$386,704
O&M Costs				
General Maintenance (Low Range)	2,550	A.F.	$25	$63,750
General Maintenance (High Range)	10,800	A.F.	$25	$270,000
Basin Cleanings	1	L.S.	$75,000	$75,000
Total Annual O&M Costs (Low Range)				$138,750
Total Annual O&M Costs (High Range)				$345,000
Recharge Benefit				
Annual RW Benefit (Low Range)	1,900	AFY		
Annual SW Benefit (Low Range)	650	AFY		
Annual MW Benefit (Low Range)	0	AFY		
Annual SupW Benefit (Low Range)	1,900	AFY		
Total Annual Benefit (Low Range)	**2,550**	**AFY**		

Annual RW Benefit (High Range)	6,500	AFY		
Annual SW Benefit (High Range)	2,700	AFY		
Annual MW Benefit (High Range)	1,600	AFY		
Annual SupW Benefit (High Range)	8,100	AFY		
Total Annual Benefit (High Range)	**10,800**	**AFY**		
Unit Costs				
IEUA RW Unit Cost (Low Range)	1,900	$/AF	$ 195	$370,500
IEUA RW Unit Cost (High Range)	6,500	$/AF	$ 195	$1,267,500
MWD Water Costs RWC (Low Range)	0	$/AF	$ 800	$0
MWD Water Costs RWC (High Range)	1,600	$/AF	$ 800	$1,280,000
Total Annual Cost (Low Range)		$		$895,954
Total Annual Cost (High Range)		$		$3,279,204
Total Unit Cost (Low Range)		**$/AF**		**$351**
Total Unit Cost (High Range)		**$/AF**		**$304**

The project schedule presented in Table 32 was developed assuming that the majority of construction happens outside of bird nesting season, with construction activities within the recharge areas of the Basins occurring prior to storm flows in the Basins. Final design of the project may require a two phase construction approach to work within the constraints of the storm seasons and nesting season.

Table 32: Alternative 5-A Project Schedule

Activity	Duration
Final Design/Permitting	8 Months
Construction In Basins (Pump Station, Inlet/Outlet Structures)	6 Months
Construction Out of Basins (Pipelines)	10 Months
Total Duration	2 Years

D. Alternatives Comparison

In order to equitably compare each alternative discussed above, a set of criteria was developed. The evaluation criteria have been defined below along with a scoring system (Table 34). Only the alternatives that have been analyzed to the budget and schedule level of detail were carried forward through the Alternatives Comparison. A summary of each alternative can be found in Table 33 and the results of the evaluation matrix can be seen in Table 35.

Evaluation Criteria

The definition of each evaluation criteria and its related scoring system is presented below.

a. Ground Water Recharge Yield (GWR) – The amount of expected water recharged into the groundwater basin, measured in acre-feet per year (AFY). Score – Possible scores range between 0 and 2. Projects that have less than 100 AFY will score 0. Projects that are expected to produce more than 1,000 AFY will score up to 2.0.
b. Geology – Surface and subsurface soil types. Soils that have higher hydraulic conductivities are preferred (sand, cobbles and rocks are preferred over silts and clays). The gradation of the soils are also considered if data exists (poorly graded sands are preferred). Projects that have unknown geology will be scored based upon historical data or field observations. Unknown areas of geology will be considered higher risk with lower infiltration potential. Score - Where silts and clays have been found to create mounding a score of 0 will be assigned. Where areas of sands are known to exist a score up to 2.0 may be awarded.
c. Water Unit Costs – The unit cost of the project in dollars per acre-foot of water recharged ($/af). These costs include the planning, design, construction, land acquisition, permitting, O&M, MW water purchase, RW costs and mitigation coasts required to implement the project. Score - Projects with unit costs above $500/af will be awarded a score of 0. Projects with unit costs less than $400/af will be awarded a score of up to 2.0
d. Environmental – The level of effort and time required to achieve environmental compliance (CEQA and possibly NEPA). No costs included, costs are captured in capital unit costs above. Score – Project scores will range between 0 and 2.0 based on level of effort required for similar projects, professional judgment and qualitative analysis.
e. Permitting – The level of effort and time required to obtain all required permits. No costs included, costs are captured in capital unit costs above. Score – Project scores will range between 0 and 2.0 based on level of effort required to permit similar projects, professional judgment and qualitative analysis.
f. Property Ownership – Is property acquisition required or another form of agreement required to use the property. Score – Projects which require

property purchase will receive a score of 0. Projects which require no purchase, easements or agreements will receive a score of up to 2.0.

g. Conveyance – What improvements, if any, are required to deliver water to the Basin, and what is the complexity of the system required, and relative risk associated with operating the system (pipelines, pumps, channels). Score – Projects which require construction of new conveyance systems will receive a score of 0. Projects which require no new conveyance systems will receive a score of up to 2.0

h. Implementation Timeline – The amount of time required to fully implement the project and realize the benefits. Score – Projects which require more than 5 years to become fully operational will receive a score of 0. Projects which require less than 2 years to become fully operational will receive a score of up to 2.0.

i. Reliability – How reliable is the system or source of water to insure that the targeted volume can be achieved each year. Score – Projects that focus on local water sources and systems will receive higher scores than imported water sources.

Table 33: Alternative Comparison
(Table Uses High Yield Range Estimates)

Alternative	Description	New Recycled Water Recharge (AFY)	New Imported Water to Meet RWC (AFY)	New Storm Water Recharge (AFY)	Total New Water Recharge (AFY)	Capital Cost ($)	Annual Debt Service Cost (5% 0ver 30 Years) ($/Year)	Annual O&M Cost ($/Year)	Total Annual Cost (Includes MW Costs) ($/Year)	Water Unit Cost ($/AF)
No Project	Continue to operate Basins in current condition.	0	0	0	0	0	0	0	0	0
1-A	Extend RW pipeline to Basins 1 – 3 inside Basin property.	5,150	2,950	0	8,100	$6,000,000	$390,000	$277,000	$4,032,379	$498
2-A	Extend RW pipeline to Basin 1 outside of Basin property	5,150	2,950	0	8,100	$8,500,000	$550,000	$277,000	$4,194,648	$518
3-A	Basin 5 pump station	0	0	2,700	2,700	$4,580,000	$298,000	$143,000	$440,340	$163
4-A	Improve Basin 5	800	0	200	1,000	$1,405,000	$91,000	$150,000	$397,395	$397
5-A	Extend RW pipeline to Basins 1 – 3 inside Basin property and Basin 5 pump station.	6,500	1,600	2,700	10,800	$5,945,000	$387,000	$345,000	$3,729,204	$304

Table 34: Evaluation Criteria

Criteria Rating	GWR Yield (AFY)	Geology	Unit Cost ($/AFY)	Environmental	Permitting	Property Ownership	Conveyance	Implementation Timeline (Years)	Reliability
Positive 2	>1,000	Course, High Infiltration Potential	<$400	No CEQA (Use Existing)	No Permits (Use Existing)	Current Land	Use Existing (Pipe/RD/DI)	<2	Recycled Water
Neutral 1	100-1,000	Sandy, Medium Infiltration Potential	$400-$500	CE, Addendum or MND	ROW, Easements, Amendments	Amendment or Permission	Minor Improvements Required	2-5	Storm Water
Negative 0	<100	Silt/Clay, Low Infiltration Potential	>$500	Extensive CEQA or EIR	ACOE, F&G, Water Rights	Land Purchase	Major Improvements Required	>5	Imported Water

Table 35: Alternative Evaluation Matrix

Alternative	GWR Yield (AFY)	Geology	Unit Cost ($/AF)	Environmental	Permitting	Property Ownership	Conveyance	Implementation Timeline (Years-Months)	Reliability	Total
No Project	0.0 (0)	0.0	0 (800)	2.0	2.0	2.0	2.0	2.0 (0)	0.0	10.0
1-A	1.7 (8,100)	2.0	0.8 (498)	1.0	0.5	1.3	0.5	1.6 (1-8)	2.0	11.4
2-A	1.7 (8,100)	2.0	0.5 (518)	1.0	0.5	1.3	0.5	1.8 (1-7)	2.0	11.3
3-A	1.5 (2,700)	2.0	1.8 (163)	1.0	0.5	1.3	1.0	1.6 (1-8)	1.0	11.7
4-A	1.0 (1,000)	0.5	1.6 (397)	1.5	0.7	0.5	2.0	1.9 (1-1)	1.5	11.2
5-A	2.0 (10,800)	2.0	1.3 (304)	1.0	0.5	1.3	0.5	1.5 (2-0)	2.0	12.1

IV. Conclusions and Recommendations

The San Sevaine Basin Improvements Project will help to achieve recycled water recharge goals set for the Basins in the 2005 Ten-Year Capital Improvement Plan and the 2006 Phase II Chino Basin Recycled Water Groundwater Recharge Project – Title 22 Engineering Report. A multitude of options exist to improve the existing performance of the Basins. This Project Development Report provides a summary of the alternatives analyzed to provide a planning tool to screen potential alternatives. The assumptions and data presented here should be considered preliminary and are meant to be used for comparative analysis between each alternative and not an absolute determination for final project implementation. Multiple variations of the above alternatives are possible and should be further explored during final design.

Based on the available data, operational experience with the San Sevaine Basins and experience with similar groundwater recharge basins in the region, a total of 6 alternatives (Table 35) were selected for detailed analysis. A "No Project" alternative was included for completeness but provides no benefit and does not help meet the regional objective of reducing dependence on imported water. Project alternatives which maximize the use of recycled water or the capture and recharge of stormwater were selected for detailed analysis. Five alternatives met the project objectives, and of the five alternatives (and the respective assumptions used to develop each alternative), one is being recommended as the preferred alternative. An evaluation matrix approach was used to equitably compare and score each alternative.

The preferred alternative is Alternative 5-A. Alternative 5-A is in fact a hybrid alternative which includes Alternatives 1-A and 3-A. Alternative 5-A was selected because it provides a significant increase to both recycled water and stormwater recharge at the San Sevaine Basins. It was also selected because it provides the 2nd lowest overall groundwater recharge unit cost (approximately $304/AF). The low unit cost is possible by achieving recharge of additional recycled water and stormwater through the shared use of infrastructure (pipeline). The shared pipeline would deliver stormwater to Basins 1-3 during the winter months and recycled water to Basins 1-3 during the summer months, thereby fully utilizing the asset. Alternative 1-A would extend the recycled water pipeline from Etiwanda Creek Channel to Basins 1-3 along an alignment within an existing maintenance road immediately north of the Basins. Alternative 3-A would construct a stormwater pump station in Basin 5 and connect to the new recycled water pipeline proposed in Alternative 1-A. This alternative utilizes the large storage volume in Basin 5 to capture stormwater run-off.

The 2005 Ten-Year Capital Improvement Plan and the 2006 Phase II Chino Basin Recycled Water Groundwater Recharge Project – Title 22 Engineering Report had previously estimated the recharge potential at the Basins at 4,100 AFY. This PDR considers historical performance of the Basins and uses the maximum potential of the Basins as the basis of design for Basin improvements and infrastructure design, thereby avoiding recharge constraints should future supply conditions change. As much as an additional 8,100 AFY of supplemental water and 2,700 AFY of stormwater could be recharged at the Basins. Further analysis may be required to confirm the availability of RW and the distribution capacity of the 1630 East RW Pump Station. Capital costs for this alternative are estimated at $5,945,000 and may be reduced by reducing the pipeline diameter if a lower annual recharge volume is deemed acceptable at Basins 1-3.

Given the combination of the project alternatives, implementing the project in phases would also provide an opportunity to realize project benefits prior to full capital expenditure. Below is one possible combination of the phased approach.

> Phase 1 – Construct 30” RW pipeline from Etiwanda Creek Channel to Basin 1. Install pipeline Tees at locations for the Basin 5 Pump Station and Basin 2 and 3 turnouts.
>
> Phase 2 – Construct Basin 5 Stormwater pump station and connect to Phase 1 pipeline.
>
> Phase 3 – Construct Basin 2 and 3 turnouts to increase operational flexibility.

Additionally, if a Basin 5 Pump Station is selected for implementation, then additional discussion and analysis should be performed to consider increasing the allowable stormwater elevation and storage volume of Basin 5.

V. References

Chino Basin Watermaster, Inland Empire Utilities Agency. (dated February 8, 2012); Start-Up Period Report for San Sevaine 5

Chino Basin Watermaster, Inland Empire Utilities Agency. (dated May 1, 2012); Chino Basin Recycled Water Groundwater Recharge Program, 2011 Annual Report

Chino Basin Watermaster, Inland Empire Utilities Agency. (dated May 1, 2013); Chino Basin Recycled Water Groundwater Recharge Program, 2012 Annual Report

Chino Basin Watermaster, Inland Empire Utilities Agency. (dated May 1, 2013); Chino Basin Recycled Water Groundwater Recharge Program, 2012 Annual Report

Inland Empire Utilities Agency. (dated 2005); Ten-Year Capital Improvement Plan

Inland Empire Utilities Agency. (dated 2006); Phase II Chino Basin Recycled Water Groundwater Recharge Project – Title 22 Engineering Report

Scheevel Engineering, LLC. (dated March 22, 2015); Chino Basin Watermaster, Inland Empire Utilities Agency. San Sevaine Basins Improvements Project Basins 3 & 5 Subsurface Investigation Report

United States Environmental Protection Agency, (dated September 2000); EPANET 2 Users Manual

Wildermuth Environmental Inc., Black and Veatch Corporation, Wagner & Bonsignore, Sierra Water Group. (dated June 2010); *2010 Recharge Master Plan Update Final Report*

Wildermuth Environmental Inc. (dated 2013); 2*013 Amendment to the 2010 Recharge Master Plan Update*

VI. Appendices

Appendix A: Projected Recharge Benefit Calculation

Appendix B: Projected Stormwater Pump Station Recharge Benefit Calculation

Appendix C: San Sevaine Basins Improvements Project Basins 3 & 5 Subsurface Investigation Report

Appendix A: Projected Recharge Benefit Calculation

San Sevaine PDR Recharge Calculation		Basin #1		Basin #2		Basin #3		Basin #4		Basin #5	
		RW	Storm	RW	Storm	RW	Storm	RW	Storm	RW	Storm
Recharge Area (acres)		12.1	12.1	8	8	9.9	9.9			35	35
Infiltration Rate (ft/day)		1.5	1.1	1.5	1.1	1.5	1.1			0.2	0.08
	Days	acre-feet	acre-feet	acre-feet	acre-feet	acre-feet	acre-feet	acre-feet	acre-feet	acre-feet	acre-feet
January	31		412.6		272.8		337.6		0.0		86.8
February	28		372.7		246.4		304.9		0.0		78.4
March	31	562.7		372.0		460.4		0.0		217.0	
April	30	544.5		360.0		445.5		0.0		210.0	
May	31	562.7		372.0		460.4		0.0		217.0	
June	30										
July	31										
August	31										
September	30	544.5		360.0		445.5		0.0		210.0	
October	31	562.7		372.0		460.4		0.0		217.0	
November	30	544.5		360.0		445.5		0.0		210.0	
December	31		412.6		272.8		337.6		0.0		86.8
Total	365	3,321	1,198	2,196	792	2,718	980	0.0	0.0	1,281	252

Total Recharge	RW	Storm	Total	
Basins 1-3	8,235	2,970	11,205	acre-feet
Basin 5	1,281	252	1,533	acre-feet
Total	9,516	3,222		acre-feet
Existing Recharge	RW	Storm	Total	
Basins 1-3	0	180	180	acre-feet
Basin 5	500	120	620	acre-feet
Total	500	300		acre-feet
New Recharge	RW	Storm	Total	
Basins 1-3	8,235	2,790	11,025	acre-feet
Basin 5	781	132	913	acre-feet
Total	9,016	2,922		acre-feet

San Sevaine Stormwater Pump Station

Assumptions

2010 RMPU Table 6-2

18 Avg Storm Events Per Year

1.6 Avg Duration of Event

Nate S.

350 Any event with 0.70 inches/day or more fills Basin 5 (350 AF) and Basins 1-3

Basins 1-3 Recharge Area	Infil Rate	Basin 5 Recharge Area	Infil Rate
acres	ft/day	acres	ft/day
30	1.1	35	0.08

		Precip			Storm That Fills Basin	Storage AF	Basins 1-3 Recharge AF			Basin 5 Recharge AF			Total AF/Day
1-Jan		0.73			350	350	33			2.8			35.8
2-Jan		0.78			350	350	33			2.8			35.8
3-Jan						314.2	33			2.8			35.8
4-Jan						278.4	33			2.8			35.8
5-Jan						242.6	33			2.8			35.8
6-Jan						206.8	33			2.8			35.8
7-Jan						171	33			2.8			35.8
8-Jan						135.2	33			2.8			35.8
9-Jan						99.4	33			2.8			35.8
10-Jan						63.6	33			2.8			35.8
11-Jan						27.8	33			2.8			35.8
12-Jan													0
13-Jan		0.73			350	350	33			2.8			35.8
14-Jan						314.2	33			2.8			35.8

15-Jan						278.4	33			2.8			35.8
16-Jan						242.6	33			2.8			35.8
17-Jan						206.8	33			2.8			35.8
18-Jan						171	33			2.8			35.8
19-Jan						135.2	33			2.8			35.8
20-Jan						99.4	33			2.8			35.8
21-Jan		0.73			350	350	33			2.8			35.8
22-Jan		0.73			350	350	33			2.8			35.8
23-Jan						314.2	33			2.8			35.8
24-Jan						278.4	33			2.8			35.8
25-Jan						242.6	33			2.8			35.8
26-Jan						206.8	33			2.8			35.8
27-Jan						171	33			2.8			35.8
28-Jan						135.2	33			2.8			35.8
29-Jan						99.4	33			2.8			35.8
30-Jan						63.6	33			2.8			35.8
31-Jan			Jan Total	3.7		27.8	33			2.8			35.8
1-Feb													0
2-Feb													0
3-Feb													0
4-Feb													0
5-Feb													0
6-Feb		0.7			350	350	33			2.8			35.8
7-Feb		0.78			350	350	33			2.8			35.8
8-Feb						314.2	33			2.8			35.8
9-Feb						278.4	33			2.8			35.8
10-Feb						242.6	33			2.8			35.8
11-Feb						206.8	33			2.8			35.8
12-Feb						171	33			2.8			35.8
13-Feb						135.2	33			2.8			35.8
14-Feb						99.4	33			2.8			35.8
15-Feb						63.6	33			2.8			35.8
16-Feb						27.8	33			2.8			35.8
17-Feb		0.79			350	350	33			2.8			35.8
18-Feb						314.2	33			2.8			35.8

19-Feb						278.4	33			2.8			35.8
20-Feb						242.6	33			2.8			35.8
21-Feb						206.8	33			2.8			35.8
22-Feb						171	33			2.8			35.8
23-Feb						135.2	33			2.8			35.8
24-Feb						99.4	33			2.8			35.8
25-Feb						63.6	33			2.8			35.8
26-Feb		0.77			350	350	33			2.8			35.8
27-Feb		0.73			350	350	33			2.8			35.8
28-Feb			Feb Total	3.77		314.2	33			2.8			35.8
1-Mar						278.4	33			2.8			35.8
2-Mar		0.64				242.6	33			2.8			35.8
3-Mar		0.62				206.8	33			2.8			35.8
4-Mar						171	33			2.8			35.8
5-Mar						135.2	33			2.8			35.8
6-Mar						99.4	33			2.8			35.8
7-Mar						63.6	33			2.8			35.8
8-Mar						27.8	33			2.8			35.8
9-Mar													0
10-Mar													0
11-Mar													0
12-Mar													0
13-Mar													0
14-Mar													0
15-Mar													0
16-Mar													0
17-Mar		0.65											0
18-Mar		0.66											0
19-Mar													0
20-Mar													0
21-Mar													0
22-Mar													0
23-Mar													0
24-Mar													0
25-Mar		0.65											0

26-Mar													0
27-Mar													0
28-Mar													0
29-Mar													0
30-Mar													0
31-Mar			Mar Total	3.22									0
1-Apr													0
2-Apr													0
3-Apr													0
4-Apr		0.48											0
5-Apr		0.46											0
6-Apr													0
7-Apr													0
8-Apr													0
9-Apr													0
10-Apr													0
11-Apr													0
12-Apr													0
13-Apr													0
14-Apr													0
15-Apr													0
16-Apr													0
17-Apr													0
18-Apr													0
19-Apr													0
20-Apr													0
21-Apr													0
22-Apr													0
23-Apr		0.46											0
24-Apr													0
25-Apr													0
26-Apr													0
27-Apr													0
28-Apr													0
29-Apr													0

30-Apr			Apr Total	1.4									0
1-May													0
2-May													0
3-May													0
4-May													0
5-May													0
6-May													0
7-May													0
8-May													0
9-May													0
10-May		0.33											0
11-May													0
12-May													0
13-May													0
14-May													0
15-May													0
16-May													0
17-May													0
18-May													0
19-May													0
20-May													0
21-May													0
22-May													0
23-May													0
24-May													0
25-May													0
26-May													0
27-May		0.15											0
28-May													0
29-May													0
30-May													0
31-May			May Total	0.48									0
1-Jun													0
2-Jun													0
3-Jun													0

4-Jun													0
5-Jun		0.11											0
6-Jun													0
7-Jun													0
8-Jun													0
9-Jun													0
10-Jun													0
11-Jun													0
12-Jun													0
13-Jun													0
14-Jun													0
15-Jun													0
16-Jun													0
17-Jun													0
18-Jun													0
19-Jun													0
20-Jun													0
21-Jun													0
22-Jun													0
23-Jun													0
24-Jun													0
25-Jun													0
26-Jun													0
27-Jun													0
28-Jun													0
29-Jun													0
30-Jun			Jun Total	0.11									0
1-Jul													0
2-Jul													0
3-Jul													0
4-Jul													0
5-Jul													0
6-Jul													0
7-Jul													0
8-Jul													0

9-Jul													0
10-Jul													0
11-Jul													0
12-Jul													0
13-Jul													0
14-Jul													0
15-Jul													0
16-Jul													0
17-Jul													0
18-Jul													0
19-Jul													0
20-Jul													0
21-Jul													0
22-Jul													0
23-Jul													0
24-Jul		0.03											0
25-Jul													0
26-Jul													0
27-Jul													0
28-Jul													0
29-Jul													0
30-Jul													0
31-Jul			Jul Total	0.03									0
1-Aug													0
2-Aug													0
3-Aug													0
4-Aug													0
5-Aug													0
6-Aug													0
7-Aug													0
8-Aug													0
9-Aug		0.08											0
10-Aug													0
11-Aug													0
12-Aug													0

13-Aug													0
14-Aug													0
15-Aug													0
16-Aug													0
17-Aug													0
18-Aug													0
19-Aug													0
20-Aug													0
21-Aug													0
22-Aug													0
23-Aug													0
24-Aug													0
25-Aug													0
26-Aug													0
27-Aug													0
28-Aug													0
29-Aug													0
30-Aug													0
31-Aug			Aug Total	0.08									0
1-Sep													0
2-Sep													0
3-Sep													0
4-Sep													0
5-Sep													0
6-Sep													0
7-Sep													0
8-Sep													0
9-Sep													0
10-Sep													0
11-Sep													0
12-Sep													0
13-Sep													0
14-Sep													0
15-Sep													0
16-Sep													0

17-Sep													0
18-Sep													0
19-Sep													0
20-Sep													0
21-Sep													0
22-Sep													0
23-Sep													0
24-Sep													0
25-Sep		0.3											0
26-Sep													0
27-Sep													0
28-Sep													0
29-Sep													0
30-Sep			Sep Total	0.3									0
1-Oct													0
2-Oct													0
3-Oct													0
4-Oct		0.45											0
5-Oct		0.22											0
6-Oct													0
7-Oct													0
8-Oct													0
9-Oct													0
10-Oct													0
11-Oct													0
12-Oct													0
13-Oct													0
14-Oct													0
15-Oct													0
16-Oct													0
17-Oct													0
18-Oct													0
19-Oct													0
20-Oct													0
21-Oct													0

22-Oct													0
23-Oct													0
24-Oct													0
25-Oct													0
26-Oct													0
27-Oct													0
28-Oct													0
29-Oct													0
30-Oct													0
31-Oct			Oct Total	0.67									0
1-Nov													0
2-Nov													0
3-Nov		0.38											0
4-Nov		0.66											0
5-Nov													0
6-Nov													0
7-Nov													0
8-Nov													0
9-Nov													0
10-Nov													0
11-Nov													0
12-Nov													0
13-Nov													0
14-Nov													0
15-Nov													0
16-Nov													0
17-Nov													0
18-Nov													0
19-Nov													0
20-Nov													0
21-Nov													0
22-Nov													0
23-Nov													0
24-Nov													0
25-Nov													0

26-Nov													0
27-Nov													0
28-Nov		0.48											0
29-Nov													0
30-Nov			Nov Total	1.52									0
1-Dec													0
2-Dec													0
3-Dec													0
4-Dec													0
5-Dec													0
6-Dec		0.71			350	350	33			2.8			35.8
7-Dec		0.62			350	350	33			2.8			35.8
8-Dec						314.2	33			2.8			35.8
9-Dec						278.4	33			2.8			35.8
10-Dec						242.6	33			2.8			35.8
11-Dec						206.8	33			2.8			35.8
12-Dec						171	33			2.8			35.8
13-Dec						135.2	33			2.8			35.8
14-Dec						99.4	33			2.8			35.8
15-Dec						63.6	33			2.8			35.8
16-Dec		0.44				27.8	33			2.8			35.8
17-Dec													0
18-Dec													0
19-Dec		0.76			350	350	33			2.8			35.8
20-Dec						314.2	33			2.8			35.8
21-Dec						278.4	33			2.8			35.8
22-Dec						242.6	33			2.8			35.8
23-Dec						206.8	33			2.8			35.8
24-Dec						171	33			2.8			35.8
25-Dec						135.2	33			2.8			35.8
26-Dec						99.4	33			2.8			35.8
27-Dec						63.6	33			2.8			35.8
28-Dec						27.8	33			2.8			35.8
29-Dec													0
30-Dec													0

31-Dec			Dec Total	2.53									0
						Total	2,706			230			
	Annual Total		17.81	inches									
						All Basins Total		2,936					

Appendix C: San Sevaine Basins Improvements Project Basins 3 & 5 Subsurface Investigation Report

March 22, 2015

Inland Empire Utilities Agency
Attn: Mr. Jason Pivovaroff P.E.
6075 Kimball Avenue
Chino, CA 91708

Subject: San Sevaine Basins Improvements Project
Basins 3 & 5 Subsurface Investigation Report (Final)

Mr. Pivovaroff:

This report summarizes the findings from the exploratory excavations, geotechnical borings, and basin condition inspection performed in the San Sevaine Basins 3 & 5 (Basins) during the week of September 15, 2014. The basin condition inspection and exploratory excavations were performed to characterize the upper 10 feet of sediment in Basins 3 and 5. The results of the excavations have been used to better understand the low infiltration rates in Basin 5 and develop recommendations for potentially increasing the infiltration rates in Basin 3 and Basin 5.

Background

The Basins are located in San Bernardino County immediately north-west of the Interstate I-15 and State Highway 210 interchange (Figure 1). The Basins are owned by the San Bernardino County Flood Control District (SBCFCD) and were originally constructed for flood control mitigation to attenuate peak storm flows. An agreement between the "Four Parties" of SBCFCD, Inland Empire Utilities Agency (IEUA), Chino Basin Watermaster (CBWM), and the Chino Basin Water Conservation District (CBWCD) allows the Basins to be operated for the dual purposes of flood control and groundwater recharge. The Four Parties previously invested in improvements to the Basins to allow them to be used for groundwater recharge. The Basins have been modified to allow the capture and recharge of stormwater and supplemental water (supplemental water consists of imported water (MW) and recycled water (RW)). The existing Basins are made up of five individual Basins covering approximately 130 acres (
Figure **2**).

The initial improvements to the Basins allowed recycled water (RW) to be delivered to Basin 5 only. The recharge of stormwater and imported water in San Sevaine Basins 1 through 3 have revealed that a much higher infiltration rate potential exists in the area. San Sevaine Basin 5 has the lowest infiltration rate as compared to the other Basins.

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Figure 1: Project Area Map

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Figure 2: San Sevaine Basins

Historical data was used to calculate the average infiltration rates for the Basins.

Table **1** presents a summary of the observed infiltration rates from 2010 through 2012. Basin 5 averages 0.15 feet per day of RW infiltration over approximately 35 acres (approx. 50% of Basin area). The recharge surface areas in Table 1 are based on each Basin spillway elevation minus 2 feet of freeboard, and the basin volumes are based on the total potential volume of that basin up to the top of the lowest berm elevation (assuming the overflow spillways were raised to maximize capacity). The observation of higher infiltration rates in Basins 1-3 has initiated an effort to assess whether or not improvements can be made to Basin 5 to increase its' groundwater recharge capacity.

Table 1: San Sevaine Basin Characteristics

	Basin 1	Basin 2	Basin 3	Basin 4	Basin 5	Total
Surface Area (acres)	20	18	12	6	73.5	130
Recharge Surface Area (acres)	12.2	8	9.9	NA	35	65
Infiltration Rate (cfs),(ft/day)	11 cfs 1.8 ft/day	8.4 cfs 2.1 ft/day	8.4 cfs 1.7 ft/day	NA	2.6 cfs 0.15 ft/day	30.4 cfs
Basin Volume Total (acre-feet)	80	100	80	NA	300	560
Average Annual Yield (AFY) 2011 - 2013	3,000 (MW 2011 Only) 180 (SW)			NA	500 (RW) 120 (SW)	3,500 (SupW) 300 (SW)

MW = Imported Water, RW = Recycled Water, SupW = MW+RW, SW = Stormwater

A field investigation plan was developed to evaluate the variables affecting Basin 5 performance. This investigation included looking at the surface features and operations that may affect Basin 5 performance as well as a subsurface investigation in Basin 3 and Basin 5. The subsurface investigation included a review of existing data from 1 monitoring well located in the south-west access road in Basin 5, as well as the review of lysimeter data, previously constructed in the south-west end of Basin 5.

A subsurface investigation in Basin 3 was performed to help reveal differences between Basin 3 and Basin 5, and understand how those differences may affect the variation in infiltration rates between the two Basins. Basin 3 was chosen for comparison due to its close proximity to Basin 5.

The subsurface investigation included 4 shallow (10 feet deep) exploratory excavations in Basin 3 performed by Scheevel Engineering, and 1 boring to a depth of 100 feet

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

performed by Group Delta Consultants, Inc (GDC). The Basin 5 investigation included 9 shallow exploratory excavations and 2 borings each to a depth of 50 feet. This report presents the results of the exploratory excavations and recommendations from Scheevel Engineering, LLC. The GDC results can be found in Appendix C.

Exploratory Excavations

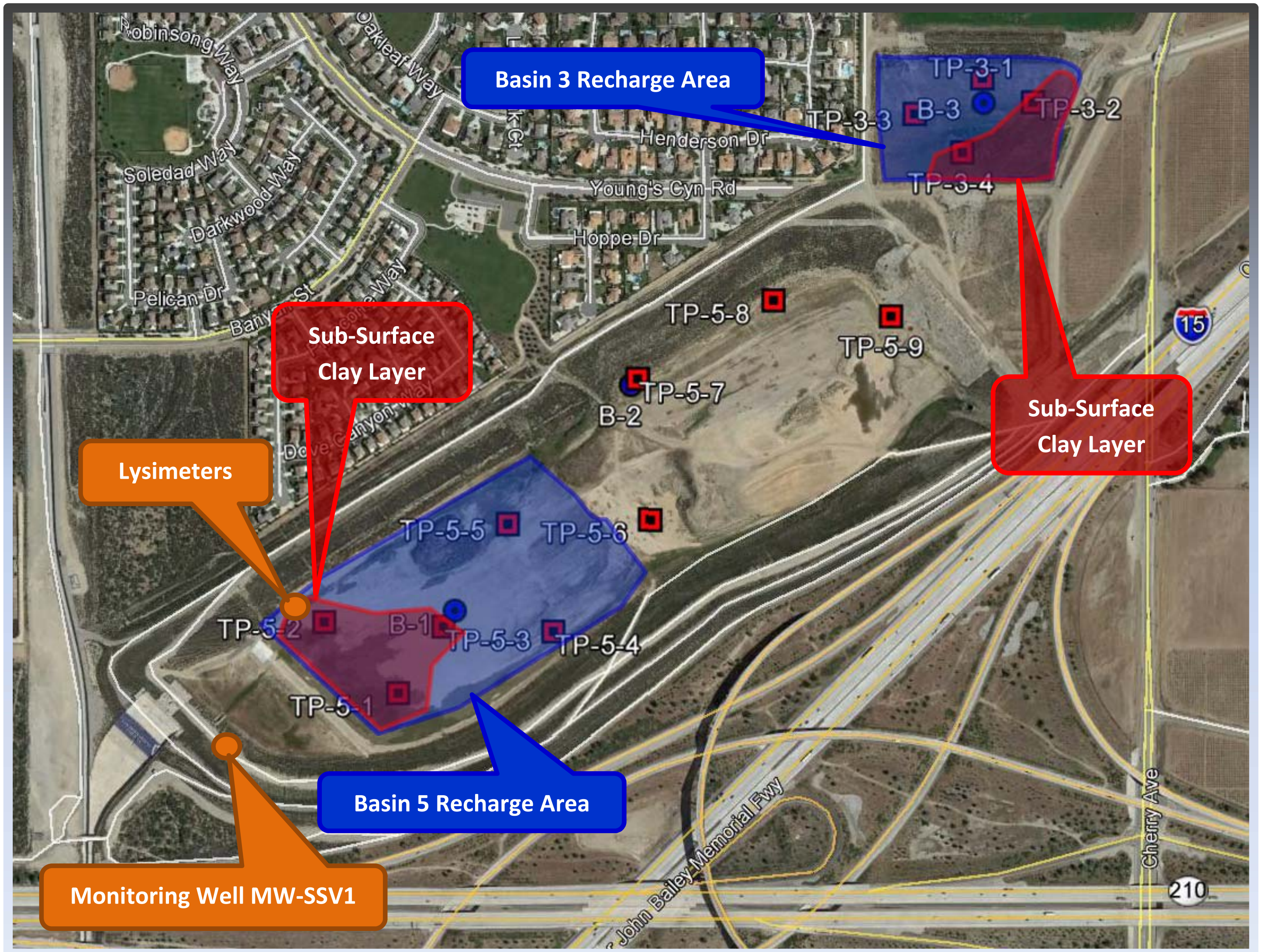
Exploratory excavations are necessary to thoroughly identify the current conditions in the Basin and characterize the near-surface sediments in which infiltration rates are first controlled. The excavations also provide insight as to the sedimentation trends in the basin due to storm events, operations and maintenance. Close investigations of near-surface sediments are important, because it is in this range that it can be cost-effective to remove or modify the Basin sediments to increase infiltration rates.

The locations for the exploratory excavations were chosen based on multiple factors. The locations selected provide a wide sampling of the Basins in an attempt to identify any changes in subsurface conditions. Some of the excavations were purposely done near the boring sites in order to compare results between the excavations and borings. Excavations near the boring sites also provide a cross section view of the in-situ soil properties, this allows viewing of undisturbed soils to compare against the otherwise disturbed boring samples. Four of the excavations in Basin 5 were positioned in areas currently not being used for groundwater recharge. This area is generally located in the north-east half of Basin 5. These excavations were performed to examine the relative difference in soil properties between the recharge and non-recharge areas in Basin 5. These excavations will help to determine the relative recharge potential in this area, and help determine the benefit of expanding the recharge zone in Basin 5.

A total of 13 locations were selected for excavation (Figure 3). Each of the excavations is identified by the nomenclature TP - # - # - #. TP refers to Test Pit, the first # refers to the Basin # (Basin 3 or 5), the second number refers to the excavation number within that Basin, and the last number refers to the depth below ground surface (bgs) the soil sample was taken from. The excavations were performed on September 16, 17 and 18 of 2014. The Basins had been dry for several months prior to performing the excavations and no groundwater was encountered within 10 feet bgs.

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Figure 3: Exploratory Excavation Overview



Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

The excavations were performed using a tracked excavator. Each excavation was completed to a depth of 10 feet and soil samples were collected at one-foot intervals. Each excavation was photographed (Appendix B). Select photos are presented later in the main body of this report to highlight some of the subsurface features found during the excavations. The samples were visually classified and will be held for one year, post collection, for additional inspection and/or lab analysis if required. The soil classification from each of the excavations can be seen in Table 2.

Visual classifications may vary slightly from actual lab analysis. The soil sample classification table (Table 2) includes color coding to aid in the interpretation of each layer of soil as it relates to relative infiltration rate potential. The qualitative interpretation is as follows; green shaded cells indicate "good" infiltration potential (> 1 foot/day); yellow indicates "fair" infiltration potential (0.5 – 1.0 ft/day); and red indicates "poor" infiltration potential (<0.5 ft/day). During classification of the samples, the in-situ properties were taken into consideration as well. For example, highly compacted layers of silty sand (SM) are anticipated to have poor infiltration rates, whereas the same class of soil in a less compacted condition may allow for fair infiltration rates.

It should be noted that laboratory analysis was performed on only one of the soil samples collected from the exploratory excavations (TP-5-3-3). This was done to better identify a silt/clay layer found in the south-west 1/3rd of Basin 5. This layer is likely one of the factors restricting the infiltration rate in Basin 5. This silt/clay layer was found in TP-5-1-4, TP-5-2-2 and TP-5-3-3. Through discussions with Group Delta it was determined that the shallow silt/clay layer was not present in Boring 1 (B-1). Scheevel Engineering performed additional shallow excavations to delineate the extent of the silt/clay layer (Figure 3). These additional excavations were not sampled or logged as they were meant only to determine the extent of the silt/clay layer in that area. Approximately 8 excavations, each 5 feet deep, were performed to determine the extent of the silt/clay layer in Basin 5. The lab analysis of TP-5-3-3 (Grain Size Distribution and Atterberg Limits) revealed that the sample was 61 percent fines and was classified as a sandy silt (ML).

Horizontal positioning of the excavations were determined using a handheld GPS unit with an accuracy of approximately + - 3 feet. Vertical positioning of the excavations were determined using an existing topographic map developed by Cal Vada Surveying, Inc. in 2012. Elevations are based on the NAVD 88 datum and given in feet mean sea level (ft msl).

Table **2** provides the horizontal and vertical locations of each TP.

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Table 2: San Sevaine Soil Sample Classifications

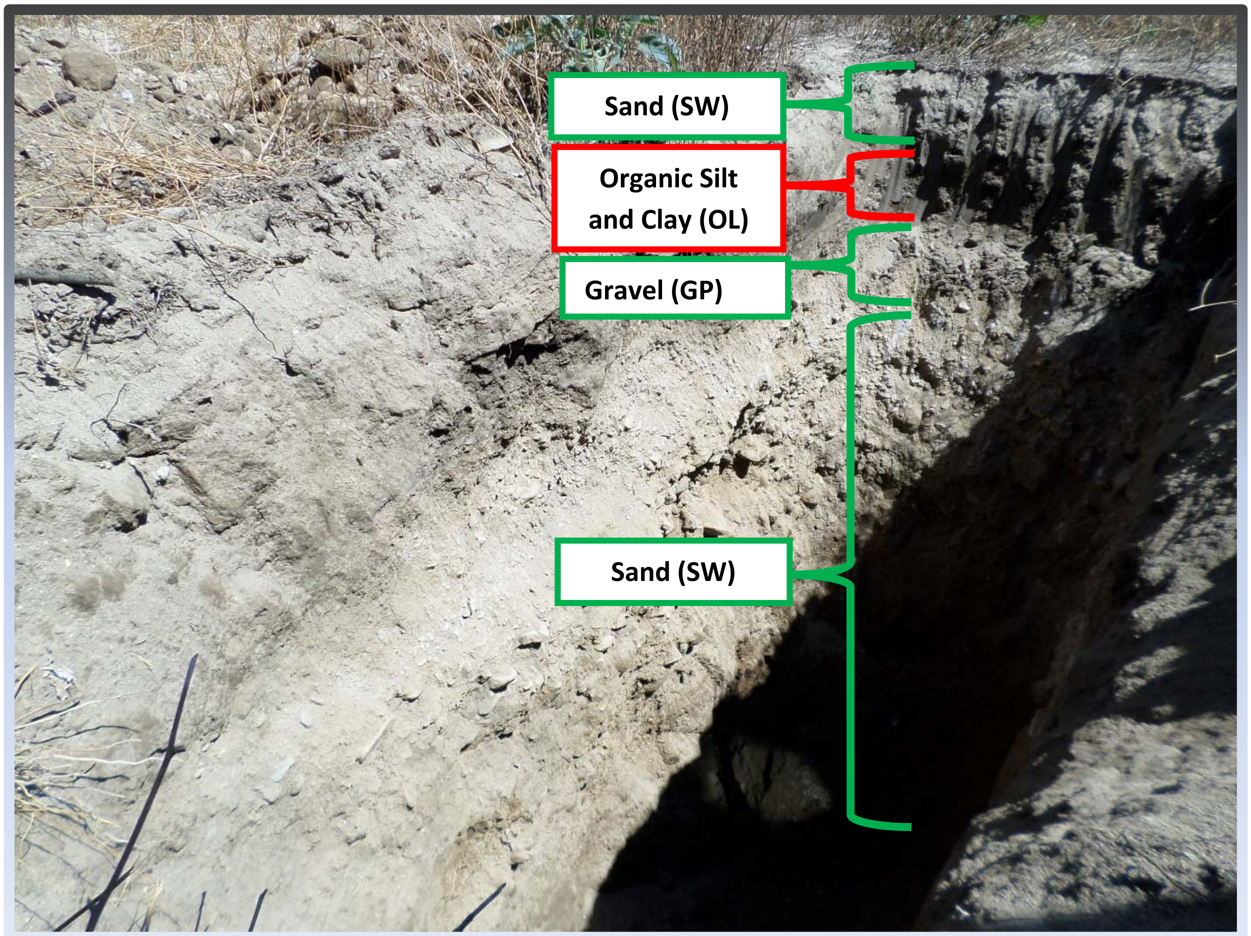
	Basin 3				Basin 5								
	TP-3-1	TP-3-2	TP-3-3	TP-3-4	TP-5-1	TP-5-2	TP-5-3	TP-5-4	TP-5-5	TP-5-6	TP-5-7	TP-5-8	TP-5-9
Lat. N	34˚08'46.9"	34˚08'45.9"	34˚08'45.4"	34˚08'43.7"	34˚08'20.2"	34˚08'23.3"	34˚08'23.1"	34˚08'22.9"	34˚08'27.6"	34˚08'27.8"	34˚08'34.0"	34˚08'37.4"	34˚08'36.7"
Long. W	117˚29'26.9"	117˚29'24.2"	117˚29'30.4"	117˚29'27.9"	117˚29'57.6"	117˚30'01.5"	117˚29'55.2"	117˚29'49.4"	117˚29'51.8"	117˚29'44.3"	117˚29'45.0"	117˚29'37.8"	117˚29'31.5"
Approx. Elevation at GS* NAVD 88 (ft msl)	1,466	1,465	1,462	1,461	1,386	1,385	1,389	1,391	1,390	1,393	1,392	1,394	1,398
Feet Below GS													
1	SM	SW	SC	ML	ML	ML	SM	SM	SM	SM	SM	SW	GW
2	SP	OL	SC	OL	SM	OL	SM	SM	SM	SM	SP	SM	SM
3	SP	GP	SM	OL	SM	SM	OL	SM	SM	SM	SP	ML	SM
4	SW	SW	SM	ML	OL	SM	SP	SW	SM	SM	SW	GW	SM
5	SW	SW	SW	SM	ML	SM	SP	SW	SW	SM	SW	SW	SM
6	SW	SW	SM	SM	ML	SW	SW	SP	SW	SM	SW	SW	SP
7	SP	SW	SP	SM	SM	SW	SW	SP	SW	SM	SW	SW	SP
8	SP	SW	SP	SM	SM	SW	SW	SP	SW	SW	SW	SW	SP
9	SM	SW	SP	SW	SM	SW	SW	SP	SW	SW	SW	SM	SW
10	SM	SW	SP	SM	SM	SW	SW	SM	SW	SW	SW	SM	SW

*Ground Surface (GS) elevations estimated from Cal Vada April 2012 survey

GW = Well Graded Gravel Sand Cobble, GP = Poorly Graded Gravel Sand Cobble, GM = Silty Gravel Some Sand, GC = Clayey Gravel Some Sand, SW = Well Graded Sand Little Fines, SP = Poorly Graded Sand Little Fines, SM = Silty Sand, SC = Clayey Sand, ML = Inorganic Silts Clayey Silt Low Plasticity, MH = Inorganic Silts High Plasticity, CL = Inorganic Clays Sandy Clay Low Plasticity, CH = Inorganic Clay High Plasticity, OL = Organic Silts Clays Low Plasticity, OH = Organic Silts Clays High Plasticity

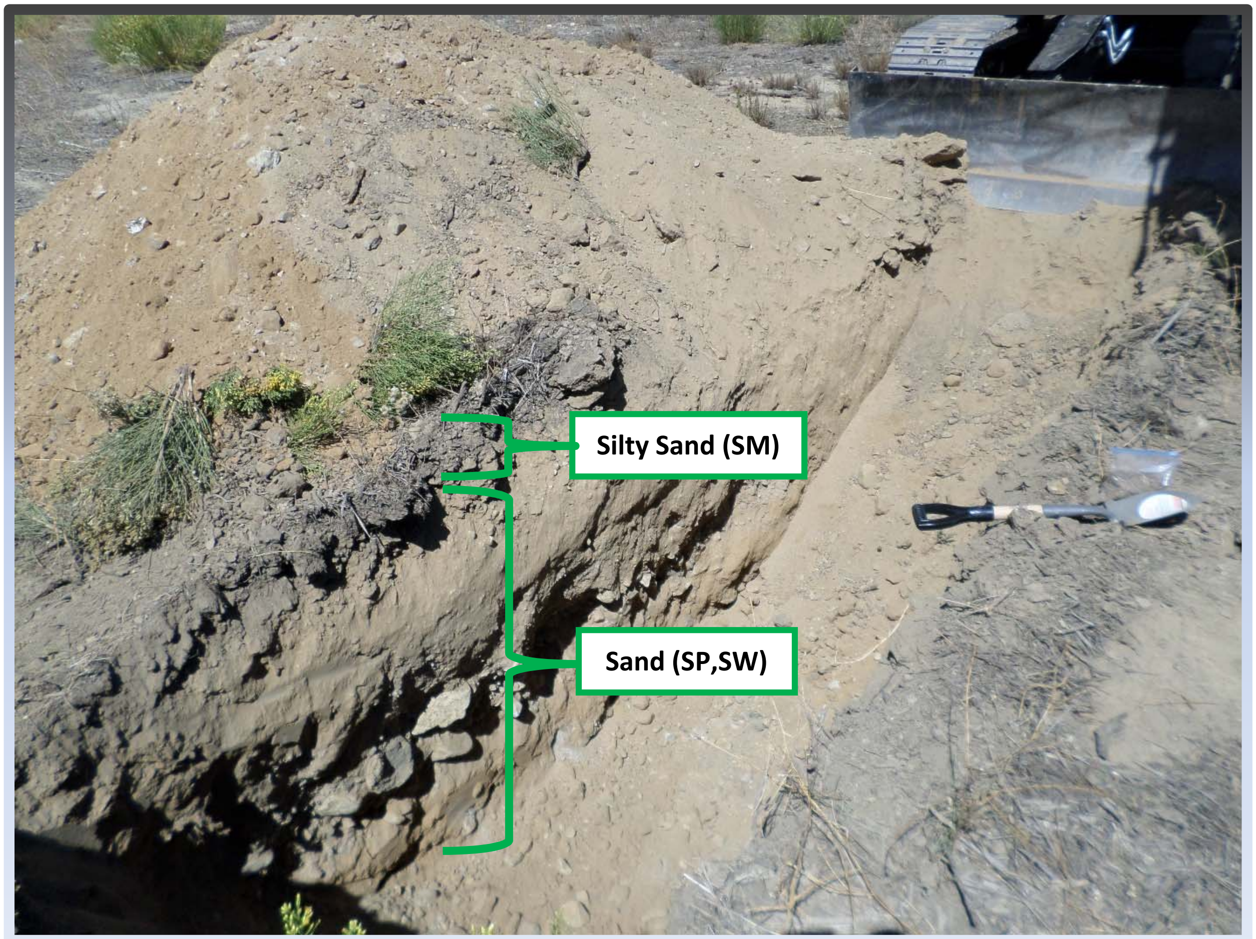
Basin 3 excavations revealed a clay layer in the south-east quadrant of the Basin that restricts the infiltration rates in that area. The eastern most excavation in Basin 3 exhibited the clay layer approximately 2 feet bgs (TP-3-2-2). The clay layer was approximately 1 foot thick with traces of vegetation throughout. Figure 4 shows TP-3-2 with the clay layer highlighted in red and the higher recharge potential soils below it highlighted in green.

Figure 4: Exploratory Excavation TP-3-2



The southern-most Basin 3 excavation (TP-3-4) had a clay layer, with some vegetation, from the ground surfaces down approximately 4 feet. The remaining northern, center and western areas of Basin 3 exhibit fair to good recharge potential within the top 10 feet of the basin bottom with a thin layer (approximately 6 inches thick) of silt and clayey sand at the surface of the Basin bottom. Figure 5 shows exploratory excavation TP-3-1 which highlights the surface conditions found throughout Basin 3.

Figure 5: Exploratory Excavation TP-3-1



Basin 5 excavations revealed a silt/clay layer in the southwest 1/3rd of the Basin that restricts the infiltration rates in that area. The silt/clay layer was very pronounced and was approximately 4 to 8 inches in thickness. This silt/clay layer is identified as an organic silt and clay (OL) in Table 2 (TP-5-1-4, TP-5-2-2 and TP-5-3-3).
Figure **6**, Figure 7 and Figure 8 show the clay layer in Basin 5. The disturbed soils above the silt/clay layer, and the presence of vegetation in the silt/clay layers of TP-5-1 through TP-5-3 indicate that fill material may have been placed in that zone of the Basin.

In general, the surface (top 6 inches) of Basin 5 has a high fines content and the surface and is highly compacted in several areas. These conditions along with the previously discussed sub-surface clay layer will limit infiltration into the Basin 5.

Figure 6: Exploratory Excavation TP-5-1

Figure 7: Exploratory Excavation TP-5-2

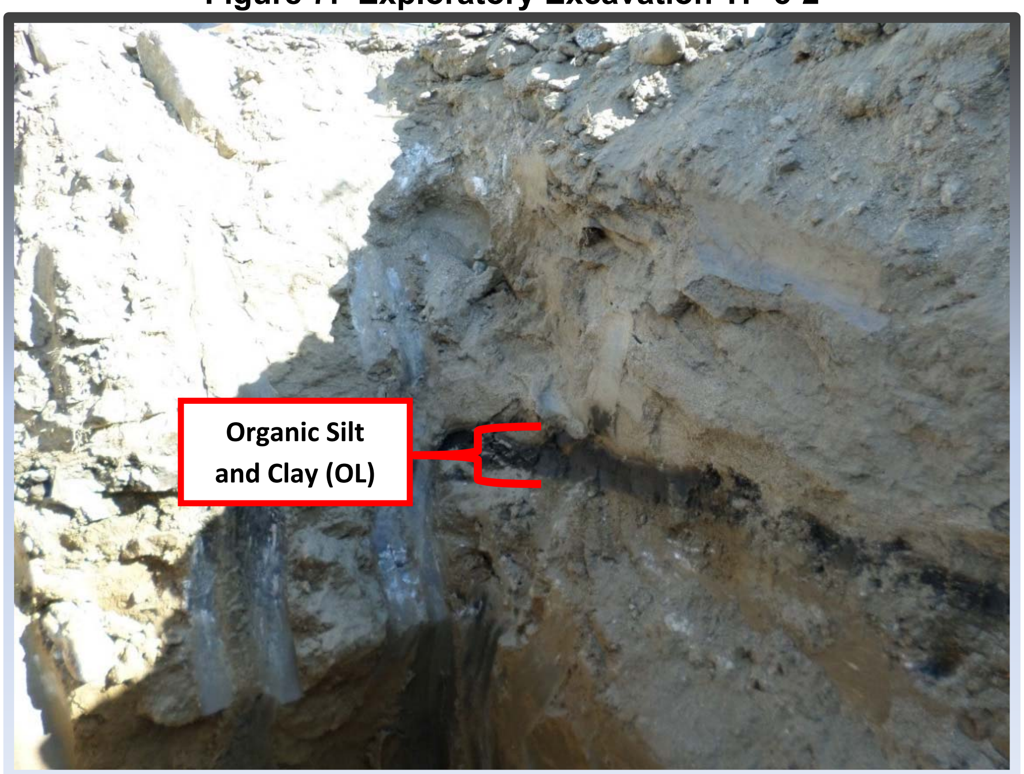
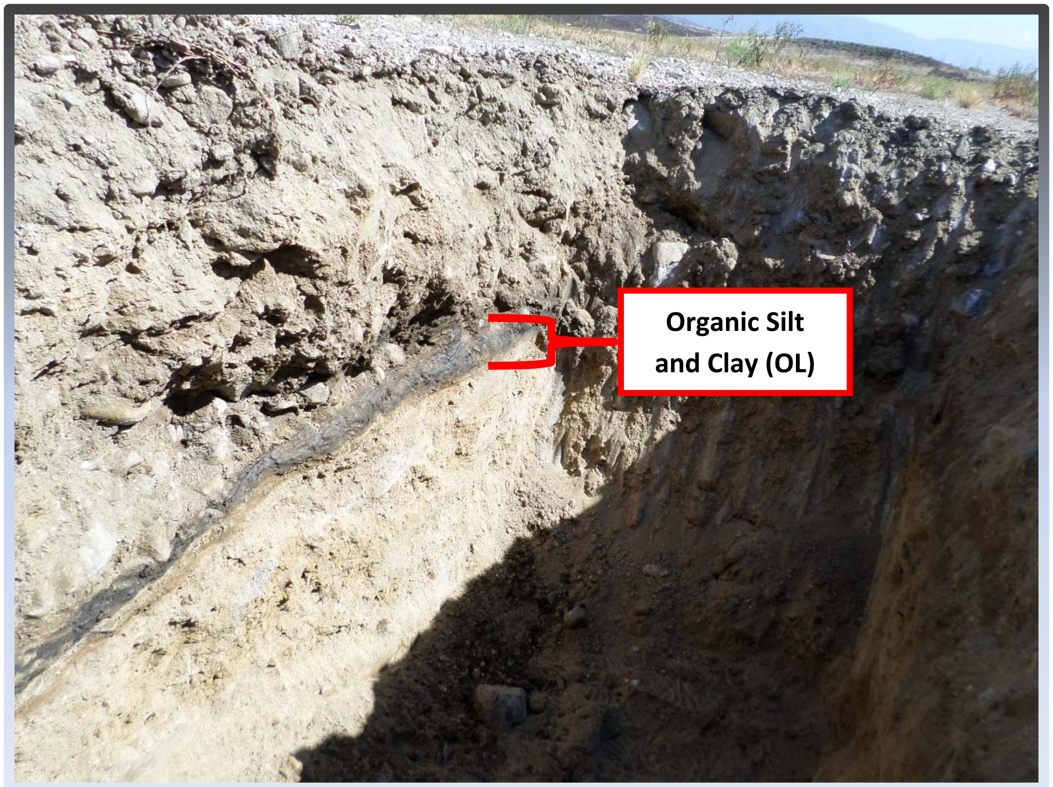


Figure 8: Exploratory Excavation TP-5-3



2014 Soil Borings

Three new soil borings were completed by Group Delta Consultants, Inc. (GDC) in Basins 3 and 5 on September 16 and 17, 2014. One boring (Boring #3) was performed in the approximate geographic center of Basin 3 to a depth of 100 feet bgs. Multiple layers of soil with high concentrations (> 30%) of fines were encountered throughout Boring #3 (see Appendix C for detailed results). Laboratory permeability testing was performed on a silty sand (SM) sample taken at 3-4 feet bgs. The laboratory permeability of the Boring #3 sample was 2.7 x 10^{-4} cm/sec (0.77 ft/day).

Two borings were performed in Basin 5, each to a depth of 50 bgs. Boring #2 was performed along the toe of the north-west slope in the northern ½ of Basin 5. This area is outside of the recharge area in Basin 5. In general the soils in Boring #2 had a coarser grain size than those found in the other two borings, indicating the potential for higher infiltration rates in the north-east area of Basin 5.

Boring #1 was performed in the approximate geographic center of the existing Basin 5 recharge area. A layer of sandy clay (CL) with a fines content of 52% was discovered at approximately 15 bgs which may coincide with an apparent hydraulic discontinuity observed in the lysimeter system in the south-west corner of Basin 5. Laboratory permeability testing was performed on a silty sand (SM) sample taken at 4-5 feet bgs.

The permeability of the Boring #1 sample was 7.1 x 10^{-5} cm/sec (0.20 ft/day). In general the samples from Boring #1 indicate that the deep subsurface has a similar percolation rate potential as the subsurface soils in Boring #3. Boring #2 grain size analysis indicates that a slightly higher percolation rate potential exists in Boring #2 than found Borings #1 and #3.

Infiltration rate estimates provided by GDC (Appendix C) indicate that the deep (> 10 feet) sub-surface soils in Basin 3 and Basin 5 have similar percolation rate potentials. This indicates that the differential in infiltration rates between Basin 3 and Basin 5 is likely due to near-surface basin conditions.

Existing Data

The surface and shallow sub-surface of the Basins contain the geotechnical properties and features which first control the infiltration rate into the Basin. However, deeper conditions exist which also affect sustainable infiltration rates and must be considered when deciding if near-surface improvements will result in a long-lasting infiltration rate benefits. Deep impeding layers can result in mounded groundwater and lower inflation rates. Impeding layers can also force additional lateral movement of groundwater thereby reducing infiltration rates in areas of the Basin that would otherwise perform better.

Any data at depths below the exploratory excavations is useful in determining the recharge potential of the Basin. There are two existing data sources available at depths greater than 10 feet bgs in Basin 5. They include an existing monitoring (MW-SVV1) well located in the service road near the south-west end of Basin 5 and a group of lysimeters in the bottom of the south-west end of Basin 5 (Figure 3). The monitoring well was installed in late 2009 and the lysimeters were installed in May of 2010. Thomas Harder & Co. performed the design and oversaw the installation of both systems. Drawing details of these two items can be found in Appendix A.

The top of MW-SSV1 is approximately at elevation 1,405 ft msl (20' higher than the bottom of Basin 5). The monitoring well logs indicate there is primarily silty sand, sand and clayey sand 100 feet below the basin bottom in this area. This data used in conjunction with the 3 new borings performed by GDC indicate that infiltration rates may be somewhat restricted by deep layers of silts and clays.

Data gathered from the lysimeters for water quality monitoring purposes indicates that there is a percolation restricting feature greater than 20 feet bgs in the south-west end of Basin 5. Based on the 2014 soil borings, and as discussed in the previous section of this report, it appears that this subsurface feature is somewhat continuous under the south-west half of Basin 5 around elevation 1,370 ft msl. However, if this apparent impeding layer at 15 – 20 feet bgs were the only infiltration rate restriction, then higher infiltration rates should be observed during the initial filling and operational period (typically 1 to 2 weeks) of Basin 5 until the newly infiltrated water reaches the impeding layer and "mounds-up", eventually restricting the measured infiltration rate in Basin 5. To-date, this condition has not been observed, which indicates that the Basin 5 infiltration rate impediment is likely near the surface of the Basin. This conclusion does not account for the possibility of "air-binding" in the Basin. Groundwater recharge basin air binding (similar to injection well air binding) is a theoretical condition that develops when water is delivered to the basin at a rate that exceeds the ability of the subsurface air to escape the Basin. This results in an infiltration rate reduction as the subsurface air travels vertically upward (thereby slowing the vertically downward water infiltration rate) until such time that all air has escaped from the soil in the Basin subsurface.

Basin 3 to Basin 5 Comparison

One of the objectives of this investigation is to better understand the variables which allow Basins 1 - 3 to perform at a much higher rate than Basin 5. When comparing the physical properties of Basin 3 to Basin 5 several key items stand out which likely contribute to the infiltration rate differences.

1) The surface of Basin 3 was found to be less densely packed than Basin 5.
2) Water is delivered into the upper end of Basin 3 by surface transfer from Basin 2 or by open channel flow from Hawker Crawford Channel. Each of these inlets produces turbulent flow in the upper end of Basin 3 (Basin 3 is relatively small) which can temporarily re-suspend the surface clogging layer on the Basin bottom, thereby promoting a short-term increase to infiltration rates in those areas of the Basin. Basin 5 receives RW from the lowest point in the Basin which "back-fills" the Basin in a tranquil pool manner. While this is the preferred method (for various reasons) to fill a recharge Basin, it does not produce a scouring effect and the short-term infiltration rate increases associated with temporary re-suspension of Basin bottom clogging sediments.
3) Basin 3 does not have a fill stockpile in it to act as an additional source of clogging sediments. The soil stockpile in Basin 5 is a significant source of fine-grained clogging material and the runoff from the stockpile is largely uncontrolled as it flows into the Basin 5 recharge area.
4) Basin 5 has a pronounced silt/clay layer from 2-5 feet bgs which will restrict infiltration rates.

Conclusion/Recommendations

The exploratory excavations and related data summarized above reveal several important characteristics about the San Sevaine Basins. The exploratory excavations presented here are relatively shallow and the overall coverage of the soil borings are relatively spread-out over a large area. For these reasons there may be un-identified impervious soils, or subsurface conditions, which could restrict infiltration rates in addition to those identified here. It is advisable to implement any Basin 5 improvements in a phased approach to be able to quantify the benefit and compare it to the improvement cost in a controlled manner. The following conclusions and recommendations provided by Scheevel Engineering have been listed in order of precedence. Phased implementation of these recommendations will allow data and experience from each previous task to be used to refine the subsequent task, thereby maximizing the recharge benefit at the least cost to stakeholders.

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

1) **Conclusion** – Existing recharge data estimates in Basins 1-5 have been based on a relatively small number of historical data points (less than 150 data points over 3 years). These estimates likely do not fully capture the variability in actual infiltration rates for each Basin. Variables that will affect infiltration rates include – water source, water quality (primarily TSS), time since last basin cleaning, time in operation, water level, inflow, outflow, changes in water surface elevation, evaporation, number of storm events, frequency and intensity of storm events, flood control operations, up-gradient watershed fire events, local groundwater pumping, local incidental recharge and groundwater elevations.
   Recommendation – Perform additional, focused, infiltration rate testing to the existing Basins while measuring/documenting as many of the above listed variables as possible. The variables critical to accurate infiltration rate measurement include inflow, outflow and change in water surface elevation over time.

2) **Conclusion** - Basin 3 has a compacted silt/clay surface covering the basin bottom and a near-surface silt/clay layer (from 1 – 4 feet bgs) covering the south-east portion of the Basin. Based on historical infiltration rates it appears that the areas outside of the sub-surface layer in Basin 3 have geotechnical properties which allow the Basin to perform at a rate more than 10 times greater than that of Basin 5.
   Recommendation – After completion of Recommendation #1 above, thoroughly clean Basin 3 (and if possible remove the sub-surface layer in the south-east quadrant) and re-measure infiltration rates to determine if the Basin 3 infiltration rates are controlled by the surface clogging layer or by the subsurface sediments. This data will help determine if the Basin 5 subsurface sediments are the limiting factor in Basin 5's performance. This data will also help quantify the benefit of more frequent cleanings in Basins 1-3.

3) **Conclusion** - The surface (top 6 - 8 inches) of Basin 5 has a relatively high fines content and many areas are highly compacted. Historically, Basin 5 has not exhibited an infiltration rate spike during the initial filling of the Basin after being out of service for long periods of time or after a cleaning event. This indicates that the infiltration rate restriction is occurring at, or very near, the surface of the Basin.
   Recommendation – After completion of Recommendation #1 above, closely monitor the next filling event without cleaning Basin 5. Measure water levels several times per hour, measure basin inflow and outflow, and hold water levels as constant as possible to accurately measure the infiltration rate decay curve. Terminate the test after several weeks or months of operation. Thoroughly clean Basin 5 (removing the top 6 – 8 inches of soil) and repeat the infiltration rate test. This data will help determine if the Basin 5 sub-surface sediments are the limiting factor in Basin 5's performance or if the surface sediments have been responsible for the historically low infiltration rates. This data will also help determine if Basin 5's performance can be improved by reconfiguring the SBCFCD stockpile, by increasing the frequency of cleanings or by sub-surface improvements.

4) **Conclusion** - The recharge area of Basin 5 is currently ½ of the bottom surface area of the Basin. SBCFCD utilizes approximately ½ of the Basin bottom for fill stockpile operations. The fill stockpile reduces the available area for groundwater recharge and introduces clogging materials (silt/clay) into the recharge area during storm events. Fill stockpile operations can also result in a highly compacted Basin bottom surface which restricts infiltration rates.
   Recommendation – Work with SBCFCD to reduce, reconfigure or remove the fill stockpile to maximize the recharge area in Basin 5, limit the amount of fine grained sediment from entering the recharge area and limit compaction to the Basin 5 bottom wherever possible. This may also include over-excavating the north-east half of Basin 5 to lower the Basin bottom elevation below the existing water conservation spillway elevation.

5) **Conclusion** – Basin 5 has a near-surface clay layer in the south-west 1/3rd of the Basin which will impede infiltration rates. It appears this layer was previously covered with fill material.
   Recommendation 5 A – Perform an infiltration rate test to identify the contribution of the southwestern 1/3rd of Basin 5 vs the remaining 2/3rd of the existing Basin 5 recharge area. This can be done by wetting and holding a constant elevation over the southwestern 1/3rd of the Basin for a number of days or weeks and collecting detailed infiltration rate data. Then, increase the water level to wet the remaining 2/3^{rds} of the Basin and hold a constant elevation (while measuring inflow) to measure the sustained rate over the entire Basin. The difference in infiltration rates will help to estimate how much the clay layer affects the overall performance of Basin 5 and whether or not it may be cost effective to remove of the impeding layer.
   Recommendation 5 B – Phase 1 - Construct a small test cell (1 acre or less) near the RW inlet to Basin 5 using existing sediments in the Basin. Perform a detailed infiltration rate test to develop an infiltration rate decay curve. Phase 2 – Over excavate the test cell below the clay layer and perform another detailed infiltration rate test to develop a decay curve. Compare decay curves to determine the benefit of removing the impeding layer.

6) **Conclusion** – The Basin 5 lysimeters and recent soil borings indicate an apparent percolation restriction from 15 to 25 feet bgs. This restriction, or other unidentified restrictions, may cause groundwater mounding once surface infiltration rate restrictions are mitigated.
   Recommendation – Perform a pilot project to test the feasibility of bypassing the apparent impeding layer (approx. 20 feet bgs). These pilot projects may include transfer wells, subsurface collection galleries to injection wells, basin perforation pits or trenches or large scale over-excavation. Implement any deep Basin improvements in a phased (or demonstration scale) approach to clearly quantify the cost/benefit of the improvements.

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

7) **Conclusion** – A very small percentage of Basin 5 is currently being utilized for stormwater capture and recharge.
Recommendation – Work with SBCFCD to increase the water conservation pool elevation in Basin 5. This may include re-configuration of the existing stockpile, raising the water conservation berm elevation, re-defining the groundwater recharge/flood control operating rules and/or gating the mid-level Basin 5 outlet.

Scheevel Engineering greatly appreciates the opportunity to provide consulting services to IEUA and looks forward to working with IEUA on the next phase of this project.

Sincerely,
Scheevel Engineering, LLC

Nate Scheevel, P.E.
Owner/Principal

References

Group Delta Consultants, Inc. (2015) “Preliminary Geotechnical Exploration Findings Report, San Sevaine Basin” See Appendix C.

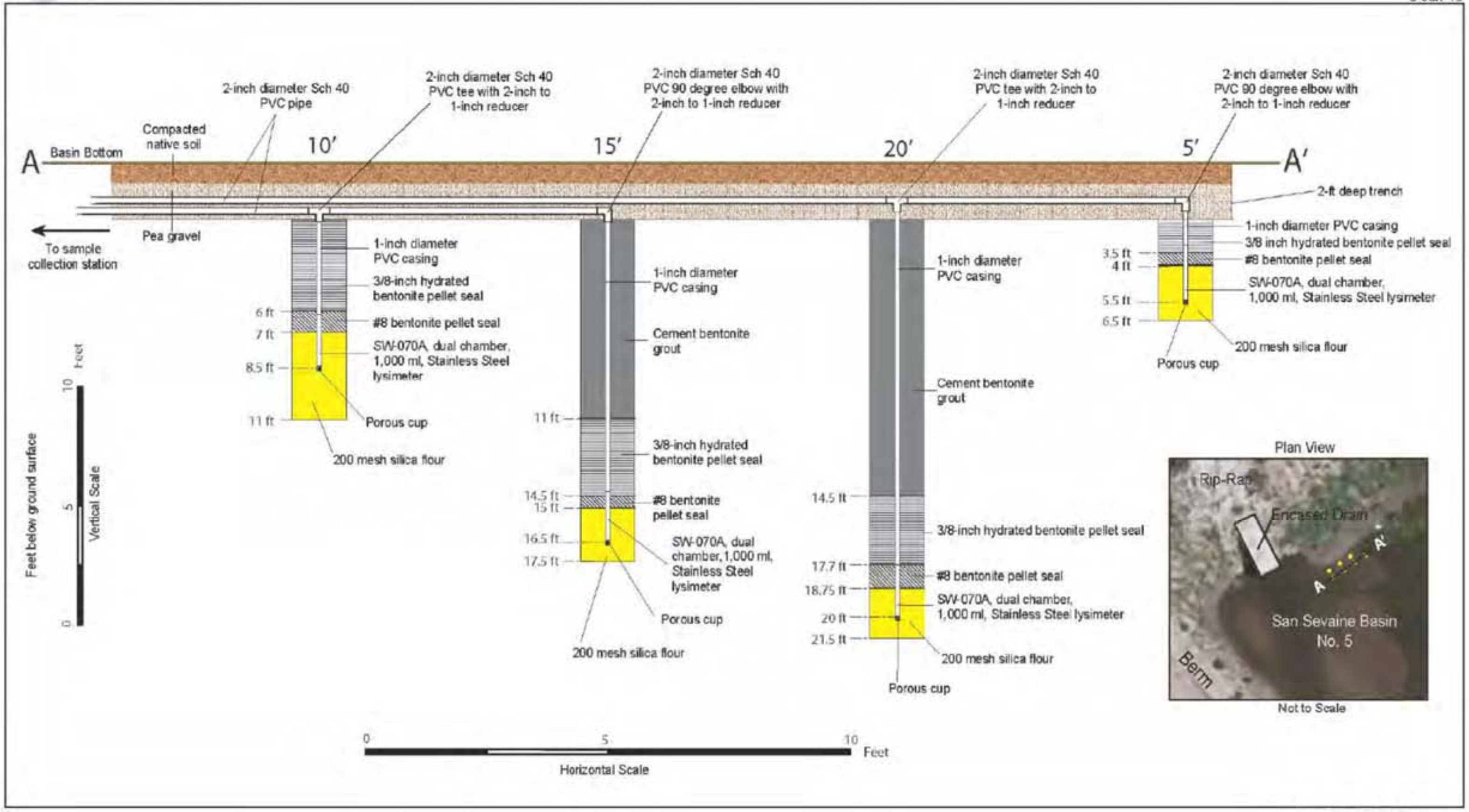
Thomas Harder & Co., Groundwater Consulting (2010), “Lysimeter and Monitoring Well Schematics” See Appendix A.

URS (2002), Memorandum, Chino Basin Facilities Improvement Project, Infiltration Rate Evaluation for San Sevaine Basins 1, 2, & 3, San Bernardino County, CA, Dated August 26th.

Appendix A: Existing Monitoring Well and Lysimeter Drawings
Thomas Harder & Co.

Results of Lysimeter Drilling, Construction and Testing

9-Jun-10



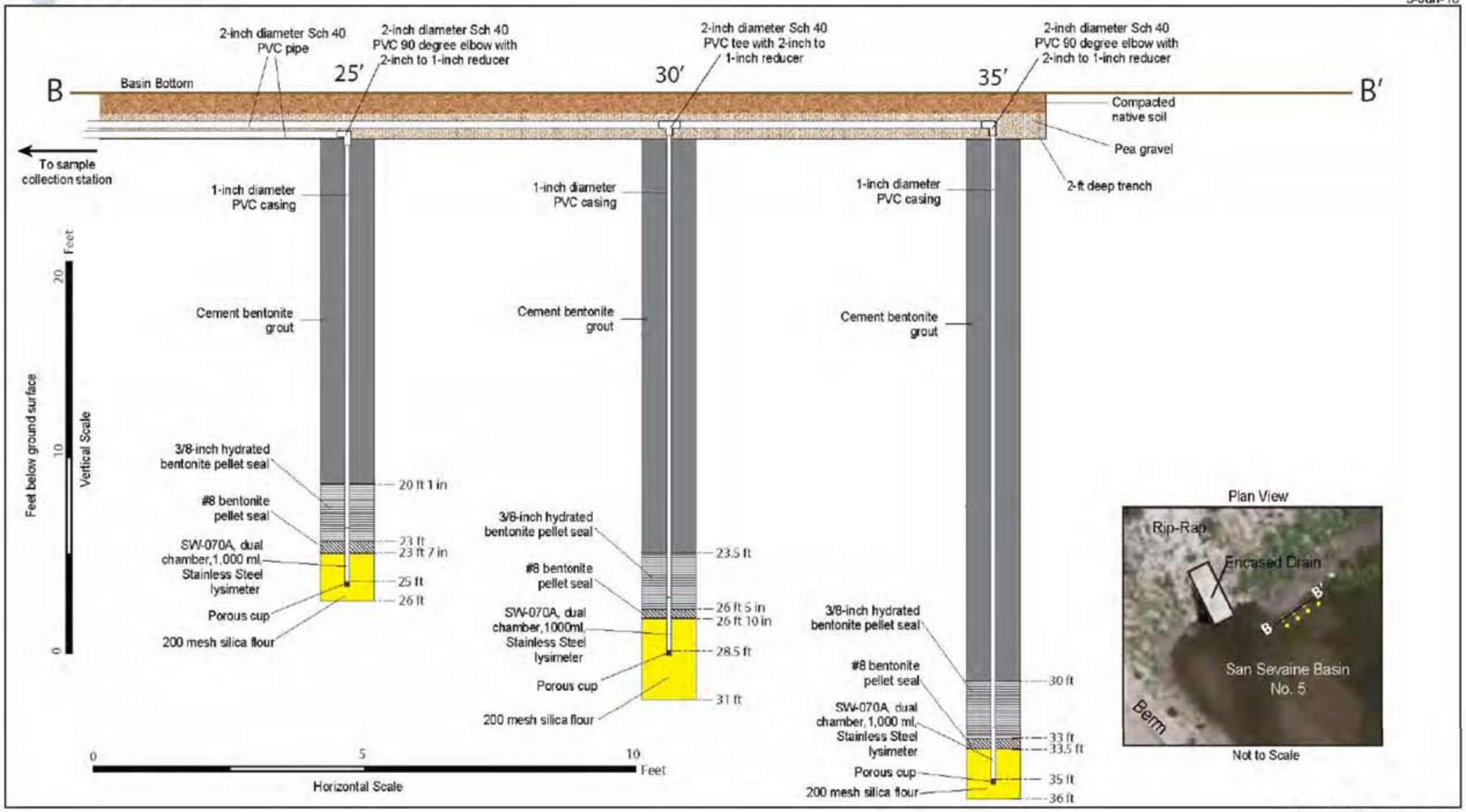
As Built Diagram San Sevaine Basin Cross Section A-A'

Figure 8a

Thomas Harder & Co.
Groundwater Consulting

Results of Lysimeter Drilling, Construction and Testing

9-Jun-10

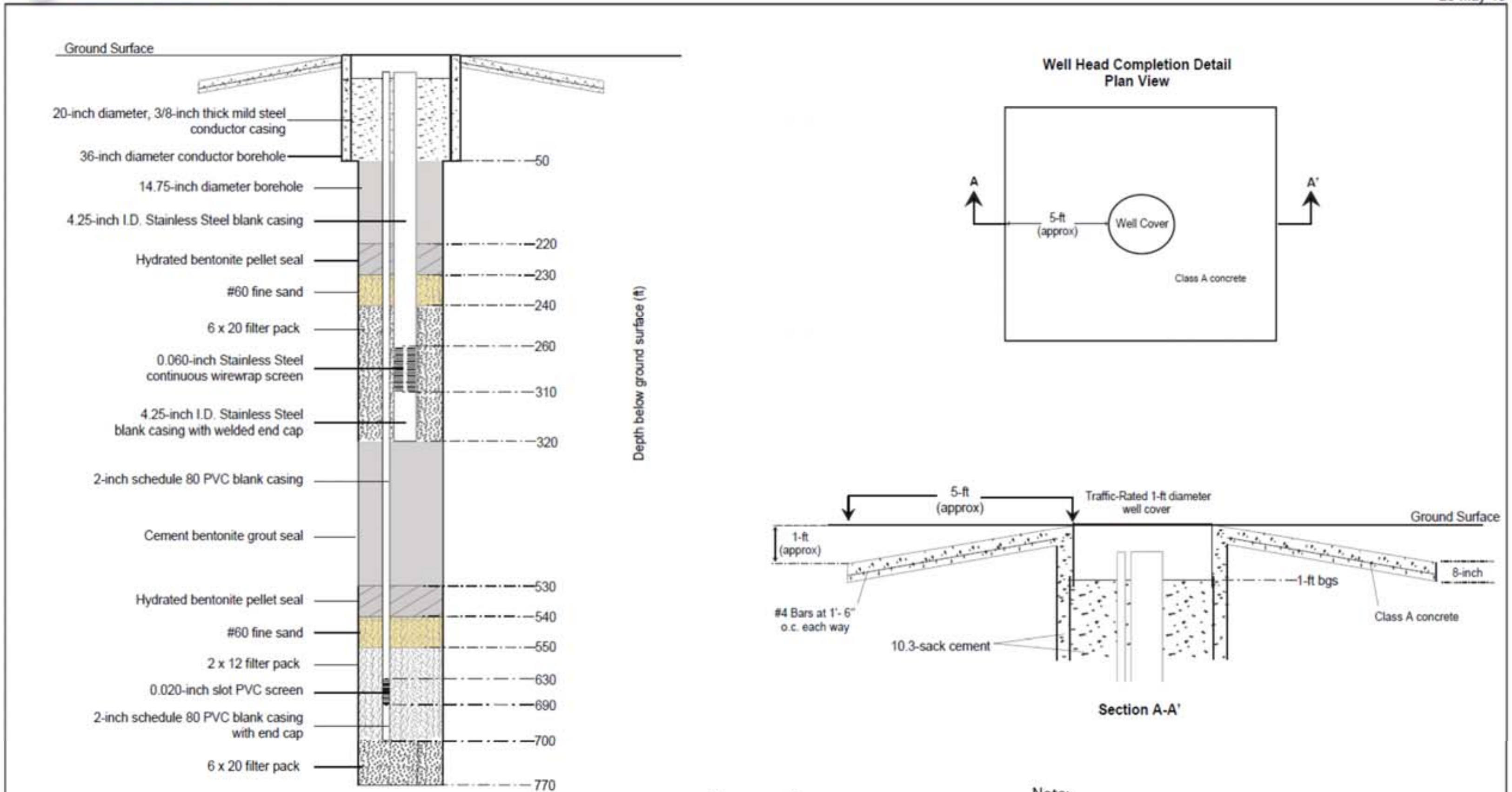


As Built Diagram
San Sevaine Basin
Cross Section B-B'

Figure 8b

Thomas Harder & Co.
Groundwater Consulting

Results of Monitoring Well, Drilling, Construction, Development and Testing
20-May-10



Not to scale

Note:
ft bgs = Feet below ground surface.

As Built Diagram
MW-SSV1
Figure 5

Appendix A

Lithologic Log

Client:	IEUA	**Drilling Contractor:**	Best Drilling and Pump, Inc.
Borehole/ Well No:	MW-SSV1	**Drilling Method:**	Fluid Reverse
Project Number:	08-010-101	**Borehole Diameter**	14 3/4 "
Project:	Monitoring Well Installation	**Location of boring/ Well:**	
Start Date:	11/05/09	X:	117° 30.132
Finish Date:	12/10/09	Y:	34° 08.314
Logged By:	AH		

Approx. Basin 5 Ground Surface

Depth	Graphic Log	Color	Sample Description
0	SP-SM	7.5YR 5/4 Brown	SAND with SILT: Fine to medium grained sand; trace coarse grained sand; trace fine to coarse gravel to 35 mm; subrounded to subangular; 10 to 15 percent silt; granitic and metamorphic.
	SW	7.5YR 5/4 Brown	SAND: Fine to coarse grained sand; trace fine to coarse gravel; to 55 mm; angular; 5 percent silt; granitic and metamorphic.
-20	SP-SM	7.5YR 5/4 Brown	SAND with SILT: Fine grained sand; with medium grained sand; trace coarse grained sand; trace fine to coarse gravel to 35 mm; subrounded to subangular; 10-15 percent silt; granitic and metamorphic.
		7.5YR 5/4 Brown	SAND with SILT: Same as above; increasing silt content.
-40	SM	7.5YR 5/4 Brown	SILTY SAND: Fine grained sand; some medium grained sand; trace coarse grained sand; trace fine to coarse gravel to 25 mm; subrounded; 15 percent silt; granitic and metamorphic.
	SP	5YR 6/4 Light Reddish Brown	SAND: Medium to coarse grained sand; trace fine grained sand; rounded; 99 percent quartz. Visually similar to sand that was poured into conductor casing to prevent grout intrusion.
-60		5YR 4/2 Dark Reddish Brown	SAND: Medium to coarse grained sand; with fine grained sand; some fine to coarse gravel to 35 mm; subangular to angular; metamorphic.
	SW	5YR 5/4 Reddish Brown	SAND: Fine to coarse grained sand; some fine to coarse gravel to 50 mm; subangular to angular; micaceous; metamorphic.
-80		5YR 4/2 Dark Reddish Brown	SAND: Same as above.
		5YR 6/3 Light Reddish Brown	SAND: Same as above; gravel to 30 mm.
-100			

Thomas Harder & Co.
Groundwater Consulting

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Borehole Lithologic Log

Borehole/ Well No.:	MW-SSV1
Client:	IEUA
Project No.:	08-010-101

Depth	Graphic Log	Color	Sample Description
	SC	5YR 4/2 Dark Reddish Brown	CLAYEY SAND: Fine to medium grained sand; with coarse grained sand; trace fine to coarse gravel to 30 mm; angular; 40 percent clay; metamorphic. CLAY: Medium plasticity; high dry strength; no dilatency.
		5YR 4/3 Reddish Brown	CLAYEY SAND: Same as above; 30-40 percent clay.
-120		5YR 4/2 Dark Reddish Brown	CLAYEY SAND: Same as above; 25-35 percent clay.
	SC-CL	5YR 5/4 Reddish Brown	CLAYEY SAND/ SANDY CLAY: 50 percent clay; 50 percent fine to medium grained sand; some coarse grained sand; subrounded to subangular; metmorphic. CLAY: High plasticity; high dry strength; slow dilatency.
-140	SP-SC	5YR 5/4 Reddish Brown	SAND with CLAY: Fine to medium grained sand; trace coarse grained sand; subrounded to subangular. CLAY: 10 percent of sample; low plasticity; high dry strength; moderate dilatency.
	SW	5YR 5/2 Reddish Brown	SAND: Fine to coarse grained sand; some fine gravel; subrounded to subangular; metamorphic. CLAY: Less than 5 percent; low plasticity; moderate dilatency.
-160	SP	7.5YR 4/4 Brown	SAND: Fine to medium grained sand; with coarse grained sand; trace fine to coarse gravel to 35 mm; subrounded to subangular; metamorphic. CLAY: Less than 5 percent.
	SW	7.5YR 4/3 Brown	SAND: Fine to coarse grained sand; trace coarse gravel to 35 mm; subrounded to subangular; metamorphic.
-180		7.5YR 3/1 Very Dark Gray	SAND: Fine to coarse grained sand; trace coarse gravel to 40 mm; subrounded to subangular; granitic and metamorhpic; less than 1 percent clay.
	SC	7.5YR 4/2 Brown	CLAYEY SAND: Fine to medium grained sand; with coarse grained sand; subrounded to subangular; 20 percent clay; metamorphic; primarily quartz and feldspar. CLAY: Moderate plasticity; high dry strength; slow dilatency.
-200	SP	7.5YR 5/3 Brown	SAND: Fine to medium grained sand; trace gravel to 10mm; subrounded to subangular; metamorphic.
	SC-CL	7.5YR 5/2 Brown	CLAYEY SAND/ SAND CLAY: 50 percent clay; 50 percent medium to coarse grained sand; with fine grained sand; subangular; primarily feldspar. CLAY: High plasticity; high dry strength; no dilatency.
-220	SC	7.5YR 4/3 Brown	CLAYEY SAND: Fine to medium grained sand; some coarse grained sand; subangular; 30-40 percent clay; metamorphic. CLAY: High plasticity; high dry strength; no dilatency.
		7.5YR 4/3 Brown	CLAYEY SAND: Medium grained sand; with fine and coarse grained sand; subrounded; 25-35 percent clay; metamorphic. CLAY: High toughness; high plasticity; high dry strength; no dilatency.
-240			

Borehole Lithologic Log

Borehole/ Well No.:	MW-SSV1
Client:	IEUA
Project No.:	08-010-101

Depth	Graphic Log	Color	Sample Description
-240		7.5YR 3/2 Dark Brown	CLAYEY SAND: Fine to medium grained sand; some coarse grained sand; trace fine gravel to 15 mm; subrounded; 30 percent clay; metamorphic. CLAY: High toughness; high dry strength; high plasticity.
		7.5YR 4/3 Brown	CLAYEY SAND: Same as above.
-260	SP	10YR 4/3 Brown	SAND: Fine to medium grained sand; trace coarse grained sand; trace fine to coarse gravel to 30 mm; subrounded to subangular; 5 percent clay; metamorphic. CLAY: High toughness; high plasticity; high dry strength; no dilatency.
	SC	5YR 4/6 Yellowish Red	CLAYEY SAND: Medium grained sand; with coarse grained sand; some fine grained sand; trace fine gravel to 12 mm; subrounded; 25 percent clay; metamorphic. CLAY: High toughness; high plasticity; high dry strength; no dilatency.
-280		5YR 5/6 Yellowish Red	CLAYEY SAND: Same as above.
		5YR 4/3 Reddish Brown	CLAYEY SAND: Same as above.
-300		5YR 4/3 Reddish Brown	CLAYEY SAND: Same as above; decreasing clay content.
	SC-CL	5YR 5/4 Reddish Brown	CLAYEY SAND/ SANDY CLAY: 50 percent clay; 50 percent fine to medium grained sand; some coarse grained sand; subrounded to subangular; metamorphic. CLAY:High toughness, high plasticity; high dry strength; no dilatency.
-320		5YR 5/4 Reddish Brown	CLAYEY SAND/ SANDY CLAY: Same as above.
		5YR 4/4 Reddish Brown	CLAYEY SAND/ SANDY CLAY: 50 percent clay; 50 percent medium to coarse grained sand; some fine grained sand; subrounded to subangular; primarily quartz and feldspar. CLAY: High toughness; medium plasticity, high dry strength; no dilatency.
-340	CL	5YR 4/6 Yellowish Red	SANDY CLAY: 80-90 percent clay; 10-20 percent medium to coarse grained sand; some fine grained sand; subangular; metamorphic. CLAY: High toughness; moderate plasticity; high dry strength; no dilatency.
		5YR 5/4 Reddish Brown	SANDY CLAY: 60 percent clay; 40 percent medium grained sand; with fine grained sand; some coarse grained sand; subrounded to subangular. CLAY: Moderate plasticity; high dry strength; no dilatency; sand and clay occur as a homogenous mixture.
-360		5YR 5/4 Reddish Brown	SANDY CLAY: Same as above; increasing coarse sand fraction.
		5YR 5/6 Strong Brown	SANDY CLAY: 65-75 percent clay; 25-35 percent medium to coarse grained sand; some fine grained sand; trace fine gravel; angular; metamorphic. CLAY: Moderate plasticity; high dry strength; moderate dilatency; occuring as a homogenous mixture.
-380			

Thomas Harder & Co.
Groundwater Consulting

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Appendix A

Borehole Lithologic Log

Borehole/ Well No.:	MW-SSV1
Client:	IEUA
Project No.:	08-010-101

Depth	Graphic Log	Color	Sample Description
-380	SC	7.5YR 4/4 Brown	CLAYEY SAND: Medium grained sand; with fine grained sand; trace coarse grained sand; subangular; 40 percent clay; metamorphic. CLAY: High dry strength; occuring as clay balls; reddish, clean.
	SW-SM	2.5Y 4/4 Olive Brown	SAND with SILT: Fine to coarse grained sand; trace fine to coarse gravel to 50 mm; 10-15 percent silt; subangular to angular; metamorphic. CLAY: Less than 1 percent; red; sandy, occuring as balls.
-400	SC	10YR 4/6 Dark Yellowish Brown	CLAYEY SAND: Medium grained sand; with coarse grained sand; trace fine gravel; angular; 15-20 percent clay; metamorphic; red staining on grains. CLAY: High dry strength; occurs as a homogenous mixture.
		7.5YR 5/6 Strong Brown	CLAYEY SAND: Same as above.
-420	SW-SM	7.5YR 5/4 Brown	SAND with SILT: Fine to coarse grained sand; trace coarse gravel to 70 mm; 10-15 percent silt; subrounded to subangular; metamorphic. CLAY: Less than 5 percent; medium plasticity; moderate dilatency; sandy, occuring as balls.
		7.5YR 5/4 Brown	SAND with SILT: Same as above, increasing clay content.
-440		7.5YR 4/3 Brown	SAND with SILT: Same as above.
	CL	5YR 4/4 Reddish Brown	SANDY CLAY: 80-90 percent clay; 10-20 percent coarse grained sand; with medium grained sand; trace fine grained sand; some fine gravel; trace coarse gravel to 10 mm. CLAY: High toughness; moderate plasticity; high dry strength; no dilatency.
-460		5YR 4/4 Reddish Brown	SANDY CLAY: Same as above; 70-80 percent clay.
		5YR 4/3 Reddish Brown	SANDY CLAY: Same as above; 90-95 percent clay.
-480	SC	10YR 4/3 Brown	CLAYEY SAND: Fine to coarse grained sand; trace fine gravel; angular; 30-40 percent clay; metamorphic. CLAY: High dry strength; homogenous mixture; not occuring as balls; reddish.
	CL	10YR 4/3 Brown	SANDY CLAY: 80-90 percent clay; 10-20 percent medium grained sand; with coarse grained sand; some fine grained sand; angular; metamorphic. CLAY: No dilatency; high dry strength; high plasticity; reddish.
-500		10YR 4/4 Dark Yellowish Brown	SANDY CLAY: Same as above; 85-95 percent clay.
		10YR 4/4 Dark Yellowish Brown	SANDY CLAY: Same as above; 85-95 percent clay.
-520			

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Borehole Lithologic Log

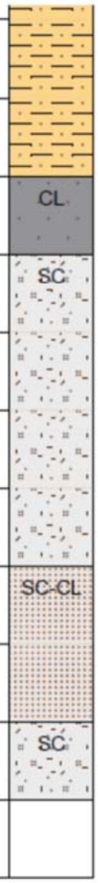
Borehole/ Well No.:	MW-SSV1
Client:	IEUA
Project No.:	08-010-101

Depth	Graphic Log	Color	Sample Description
-520		10YR 4/4 Dark Yellowish Brown	SANDY CLAY: Same as above; 85-95 percent clay.
		10YR 4/4 Dark Yellowish Brown	SANDY CLAY: Same as above; 85-95 percent clay.
-540	SC	2.5Y 5/3 Light Olive Brown	CLAYEY SAND: Medium to coarse grained sand; with fine grained sand; trace fine to coarse gravel to 33 mm; subrounded to subangular; 10 percent silt; 25 percent clay. CLAY: High plasticity; high dry strength; no dilatency; clean; reddish; occuring as balls.
	SM	2.5Y 4/3 Olive Brown	SILTY SAND: Medium grained sand; with fine grained sand; some coarse grained sand; subrounded to subangular; 15-20 percent silt; metamorphic; less than 1 percent clay.
-560		2.5Y 4/4 Reddish Brown	SILTY SAND with GRAVEL: Medium grained sand; with fine grained sand; with coarse grained sand; trace fine gravel to 15 mm; subrounded to subangular; 25 percent silt; metamorphic; less than 1 percent clay.
		2.5Y 5/4 Light Olive Brown	SILTY SAND with GRAVEL: Fine to coarse grained sand; with fine to coarse gravel to 20 mm; subrounded to subangular; 25 percent silt; metamorphic.
-580		7.5YR 5/6 Strong Brown	SILTY SAND with GRAVEL: Same as above. CLAY: Less than 5 percent; occurs as balls; sandy; light brown.
		7.5YR 5/6 Strong Brown	SILTY SAND with GRAVEL: Same as above; gravel to 40 mm.
-600		7.5YR 5/4 Brown	SILTY SAND with GRAVEL: Same as above. CLAY: Less than 5 percent; high plasticity; no dilatency; light gray to light tan; sandy; occurs as balls.
		7.5YR 5/4 Brown	SILTY SAND: Medium grained sand; with fine grained sand; trace coarse grained sand; trace gravel up to 15 mm; subrounded to angular; 25 percent silt; metamorphic.
-620		7.5YR 5/6 Strong Brown	SILTY SAND: Same as above. CLAY: Less than 5 percent clay; high plasticity; no dilatency; varies in color; looks like weathered granite; sandy; occuring as balls.
		7.5YR 5/4 Brown	SILTY SAND: Fine to coarse grained sand, trace fine gravel to 10 mm; subangular to angular; 20 percent silt; metamorphic. CLAY: Less than 5 percent; high plasticity; no dilatency; varies in color; looks like weathered granite; sandy; occurs as balls.
-640	CL	7.5YR 5/6 Strong Brown	SANDY CLAY: 75-85 percent clay; 15-25 percent medium grained sand; with coarse grained sand; some fine grained sand; angular; metamorphic. CLAY: High plasticity; high dry strength; no dilatency; varies in color; sandy; looks like weathered granite.
	SM	10YR 6/4 Light Yellowish	SILTY SAND with CLAY: Fine to coarse grained sand; with fine gravel; some coarse gravel to 25 mm; subangular to angular; 20 percent silt; metamorphic. CLAY: 5-10 percent; moderate plasticity; no dilatency; looks like weathered granite; sandy; occuring as balls

Scheevel Engineering, LLC • P.O. Box 28745 • Anaheim, CA 92809 • Phone: (714) 470-9045 • Email: nathanscheevel@yahoo.com

Borehole Lithologic Log

Borehole/ Well No.:	MW-SSV1
Client:	IEUA
Project No.:	08-010-101



Depth	Color	Sample Description
-660	Brown	
	10YR 5/4 Yellowish Brown	SILTY SAND: Same as above.
	10YR 5/4 Yellowish Brown	SILTY SAND: Same as above; less than 5 percent clay.
-680	10YR 4/4 Dark Yellowish Brown	SANDY CLAY: 75-85 percent clay; 15-25 percent fine to medium grained sand; some coarse grained sand; subrounded to subangular; metamorphic. CLAY: Moderate plasticity; high dry strength; no dilatency; sandy.
	10YR 4/4 Dark Yellowish Brown	CLAYEY SAND: Fine to coarse grained sand; trace fine to coarse gravel to 35 mm; subangular; 20 percent clay; metamorphic. CLAY: High plasticity; high toughness; no dilatency; blue to light tan.
-700	10YR 5/4 Yellowish Brown	CLAYEY SAND: Same as above.
	10YR 5/6 Yellowish Brown	CLAYEY SAND: Same as above; decreasing clay conent.
-720	10YR 5/4 Yellowish Brown	CLAYEY SAND: Same as above.
	10YR 5/6 Yellowish Brown	SANDY CLAY/ CLAYEY SAND: 50 percent clay; 50 percent fine to coarse grained sand; subangular to angular; trace gravel to 20 mm; granitic and metamorphic. CLAY: High plasticity; high dry strength; no dilatency.
-740	10YR 5/6 Yellowish Brown	SANDY CLAY/ CLAYEY SAND: Same as above.
	10YR 5/3 Brown	CLAYEY SAND: Fine to coarse grained sand; trace fine gravel to 15 mm; angular; 35-45 percent clay; granitic; metamorphic; and sedimentary. CLAY: High plasticity; high dry strength; no dilatency; high toughness; various colors.
-760		Sample not recovered. Borehole total depth = 770 ft bgs

Notes:

Grain Size distribution and percentages are approximate.

Soil Types classified based on Unified Soil Classification System.

Soil Color based on Munsell Soil Color Charts.

Samples from 0 to 50 feet were collected from bucket auger cuttings.

Thomas Harder & Co.
Groundwater Consulting

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Appendix B: Exploratory Excavation Photos

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Excavation TP-3-1

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Excavation TP-3-2

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Excavation TP-3-3


3-3-7


3-3-8


3-3-10

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Excavation TP-3-4

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Excavation TP-5-1

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com


5-1-8


5-1-9

Excavation TP-5-2

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com


-2-9


5-2-10

Excavation TP-5-3

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com


Ziploc
5-3-8


Ziploc
5-3-9


5-3-10

Excavation TP-5-4

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Page 70 of 138

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Excavation TP-5-5

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com


Ziploc
S-5-7


Ziploc
S-5-8

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Excavation TP-5-6

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com


Ziploc
S-6-7


Ziploc
S-6-8

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Excavation TP-5-7

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Excavation TP-5-8


S-8-6


S-8-7


5-8-9

Excavation TP-5-9

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Appendix C:

Group Delta Consultants, Inc.
Preliminary Geotechnical Exploration Findings Report
San Sevaine Basin
Dated: January 16, 2015

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

TECHNICAL MEMORANDUM

Project Name: San Sevaine Basin Improvements Project
Rancho Cucamonga, California

Project Number: MT-383A

Prepared for: Mr. Jason Plvovaroff
Inland Empire Utilities Agency

Date: January 16, 2015

Subject: Preliminary Geotechnical Exploration Findings and Infiltration Rate Estimates

INTRODUCTION

Group Delta Consultants (GDC) is pleased to present preliminary geotechnical exploration findings and infiltration rate estimates based on our recent explorations for the San Sevaine Basin improvement project located north of the intersection of Interstate 15 and State Route 210, in the City of Rancho Cucamonga, California (Site; Figure 1, *Site Location Map*). The purpose of our subsurface exploration was to investigate the subsurface lithology to evaluate the potential water infiltration rates at the Site. This Technical Memorandum presents the results of our field exploration, laboratory testing, and conclusions based on the obtained data.

PROJECT DESCRIPTION

The Site consists of five, in-series, soft-bottom, water basins situated along the San Sevaine Creek channel between Summit Avenue and Interstate 15 freeway, in Rancho Cucamonga. The Site encompasses approximately 132 acres and was originally constructed for flood control. The five basins are stair stepped with Basin 1 (furthest north) at approximately 1,490 feet above mean sea level (MSL) and Basin 5 (furthest south) at approximately 1,390 feet above MSL. Along with flood control, Basin 5 is currently receiving reclaimed water for groundwater recharge.

It is GDC's understanding that previous water infiltration rate studies have been performed at the Site and based on the data collected, Basin 5 may have a lower infiltration rate than the other basins above. The Inland Empire Utilities Agency, Chino Basin Watermaster along with other partnering agencies ("Agencies") are considering directing additional reclaimed water and storm water to the basins for groundwater recharge. However, before any further systems for directing water to the Site are established, the Agencies desire to further investigate what the potential infiltration rate is for Basin 5 and why the upper basins (Basins 1 through 3) have a higher water infiltration rates relative to Basin 5.

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

PURPOSE AND SCOPE OF INVESTIGATION

The purpose of GDC's study was to investigate subsurface soil conditions between Basins 3, and 5; compare the data with a previous investigation conducted by URS on Basins 1, 2, and 3; use the soil data from our investigation in conjunction with URS's data to estimate the potential infiltration rates for Basins 1, 2, 3, and 5; and evaluate why there is such a difference in infiltration rates between the northern basins 1-3 and 5. Our scope of work included the following:

- Review of available published geotechnical, geologic, and topographic data;
- Review of URS's Infiltration Rate Evaluation Memo for basins 1, 2, and 3;
- Drilling, logging, and sampling three borings;
- Performing laboratory tests on selected soil samples to characterize the engineering properties of the subsurface soils;
- Perform engineering analysis to estimate potential percolation rates in Basins 3 and 5;
- Present the results of our investigations, and conclusions in this memorandum.

FIELD INVESTIGATION AND LABORATORY TESTING PROGRAMS

GDC on September 16 and 17, 2014 directed the drilling of sonic borings to evaluate the subsurface conditions at the Site. Performed concurrently with GDC's investigation, Scheevel Engineering, LLC excavated test pits to closely observe the near surface sediments. Laboratory tests were performed on selected soil samples collected during the field investigations. A brief summary of the field and laboratory program is provided in the following sections.

Sonic Drilling

Under the direction and oversight of GDC, Cascade Drilling, L.P. drilled three sonic borings (B-1 through B-3) at the Site. Boring B-1 was drilled on the southwestern portion of Basin 5 to a maximum depth of approximately 50 feet below ground surface (bgs). Boring B-2 was drilled in the wash area on the northern portion of Basin 5 to a maximum depth of approximately 50 feet bgs. Boring B-3 was drilled in the northern center portion of Basin 3 to a maximum depth of approximately 100 feet bgs. The approximate locations of the borings are presented in Figure 2, *Boring Location Map*.

Due to the nature of sonic drilling, a continuous, disturbed column of soil was collected within a 6-inch diameter drill stem that was rotated and vibrated into the ground. After the drill stem was advanced 10 feet, it was removed from the ground and the soil within in the drill stem was vibrated out into an acetate bag that had a similar diameter as the drill stem. The acetate bags were proportioned into 2 ½ foot long sections, and each bag was placed in order of depth in a five foot long box that was divided along the center so each box contained a 10 foot long sample run. Each bag was split open and the soil within the bag was logged in the field. Field boring logs are provided as Appendix A, *Boring Logs*.

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Following drilling, the sample boxes were delivered to GDC's Ontario office. Soil within the boxes were reviewed by Inland Empire Utilities Agency representatives and soil samples were selected for laboratory analysis.

Test Pits

Scheevel Engineering excavated and logged 13 test pits at the Site to a depth of 10 feet below ground surface. Test pits TP-3-1 through TP-3-4 were excavated in Basin 3. Test pits TP-5-1 through TP-5-9 were excavated in Basin 5. Scheevel Engineering provided GDC with the results of their excavation so that we could incorporate the test pit data with the sonic boring data. A summary of the excavation procedures and the test pit excavation logs will be provided by Scheevel Engineering.

Laboratory Testing Program

Laboratory tests were performed on selected soil samples to help characterize the subsurface materials and develop index properties of the soils. The test results are summarized on the boring logs in Appendix A. Detailed descriptions of the laboratory testing program and test results are presented in Appendix B, *Laboratory Testing*. The laboratory testing program included the following:

- Soil classification
- Atterberg limits
- Grain size distribution and percent passing No. 200 sieve
- Permeability (hydraulic conductivity)

SUBSURFACE CONDITIONS

Regional Geology

The geologic map indicates that the site is underlain by Young Quaternary age alluvial gravel and sand deposits of valley areas. The alluvium is generally described as being composed of bolder gravel near the mountains grading outward into finer gravels and sands. Figure 3 presents an approximate location of the Site and regional geology (USGS, 2001).

Subsurface Conditions

The results of the field investigation indicates the Site is underlain by coarse grained alluvial deposits with significant fines content consisting of mostly silty sand and silty sand with fine to coarse gravel; with lenses of poorly graded sand and well graded sand with varying amount of fine to coarse gravel to the depths explored. Cobble to bolder size clasts were observed within

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

the test pits; however, due to the sonic drilling method, cobble and bolder sized rocks were broken up during drilling and therefore, could not be identified.

Clay and sandy clay lenses with varying amounts of fine to coarse gravel were observed within the borings. Given the spacing between the borings, the lateral extent of the clay lenses can only be interpreted. However, in test pits TP-5-1 through TP-5-3, an approximately 3 to 4 inch thick clay layer was observed at depths ranging from 2 to 4 feet below ground surface on southwestern portion of Basin 5. This clay bed was not observed in boring B-1. It is likely that this clay layer is continuous along the southwestern portion of Basin 5 and discontinues somewhere west of boring B-1. Figure 4, *Cross Section A-A'* provides GDC's interpretation of the subsurface geology.

Groundwater

Groundwater was not encountered during GDC's investigation.

INFILTRATION RATES ESTIMATES

Based on our field and laboratory investigation GDC developed model soil profiles at the three boring locations. Hydraulic conductivity values were estimated and assigned to each soil type identified in the soil profiles. These estimates were based on our investigation and values provided in the literature (EPRI 1990, Freeze and Cherry 1979, Cedergren 1989). Table 1 presents a list of the hydraulic conductivities and soil types used in our analysis. The hydraulic conductivity for silty sand (SM) is the result of the average of two laboratory permeability tests.

Table 1 – Hydraulic Conductivities for different soil types

Soil Type	Hydraulic Conductivity (cm/s)
Silty sand (SM)	1.7×10^{-4}
Sandy lean clay (CL)	1×10^{-5}
Silty clayey sand (SC-SM)	3×10^{-4}
Silty gravel with sand (GM)	5×10^{-1}
Well graded sand with silt and gravel (SW-SM)	1×10^{-3}
Poorly graded sand with silt (SP-SM)	1×10^{-3}
Sandy silt (ML)	1×10^{-5}
Well graded gravel with silt and sand (GW-GM)	5×10^{-1}
Clayey sand (SC)	5×10^{-5}

Infiltration rates were calculated using the Darcy's equation for saturated flow through an aquifer with horizontally layered medium. Infiltration rates were calculated along the vertical direction at different depths below the basin floors. Table 2 presents calculated infiltration rates for each boring location at 10-foot intervals to 50 feet below the basin floors.

Table 2 – Potential infiltration rates at boring locations and different depths below basin floors

Depth below basin floor (foot)	Infiltration rate (foot/day)				
	Basin 5		Basin 3	Average	
	B-1	B-2	B-3	B-1 and B-2	3 Borings
10	0.48	0.48	0.12	0.48	0.36
20	0.27	0.64	0.23	0.45	0.38
30	0.33	0.63	0.28	0.48	0.42
40	0.36	0.72	0.34	0.54	0.47
50	0.41	0.71	0.38	0.56	0.50

From Table 2, we observe that the infiltration rates at various depths below basin floor range from 0.27 to 0.48 feet per day for soil profile at Boring B-1, from 0.48 to 0.72 feet per day for soil profile at Boring B-2, and from 0.12 to 0.38 feet per day for soil profile at Boring B-3. The average infiltration rate for Borings B-1 and B-2 located at Basin 5 at 50 feet deep is 0.56 feet/day that is greater than the infiltration rate at this depth at Boring B-3 located in Basin 3.

At a depth of 50 feet below basin floor, at boring B-1 located in Basin 5 the infiltration rate is close to the infiltration rate estimated at boring B-3 located in Basin 3. However at boring B-2 also located in Basin 5, the infiltration rate is higher than that at boring B-3 located in Basin 3.

PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

The potential infiltration rates are best estimates based on our field and laboratory investigation, literature review and our experience with these types of soils. To reduce uncertainties associated with our estimates, we recommend to measure infiltration rates in the field and perform more laboratory hydraulic conductivity tests. If field infiltration rates have already been performed, GDC needs this information including location of the field tests to further calibrate our models.

LIMITATIONS

This Technical Memorandum, exploration logs, and other materials associated with this investigation were prepared exclusively for use for the Inland Empire Utilities Agency. This Technical Memorandum is not suitable for use on any project. If this memorandum or portions of this memorandum are provided to contractors or included in specifications, it should be understood that they are provided for information purposes only.

This investigation was performed in accordance with generally accepted geotechnical engineering principles and practice. The professional engineering work and judgments presented in this report meet the standard of care of our profession at this time. No warranty, express or implied, is made.

Should you have any questions regarding this report, please call us at (949) 450-2100.

Sincerely,
GROUP DELTA CONSULTANTS, INC.

Terry Otis, PG
Senior Geologist

Jorge Meneses, PhD, PE, GE
Associate Engineer

FIGURES

Figure 1	Site Location Map
Figure 2	Site Vicinity Map
Figure 3	Regional Geology
Figure 4	Cross Section A-A’

Appendices

Appendix A	Boring Logs
Appendix B	Laboratory Data

References

Cedergren, H.R. (1989), "Seepage, Drainage and Flow Nets." Third Edition, Wiley Inter. Science

USGS (2001), "Geologic Map of the Devore 7.5' Quadrangle, San Bernardino County, California," Version 1 by D. Morton and J. Matti and digital preparation by G. Morton and P. Cossette.

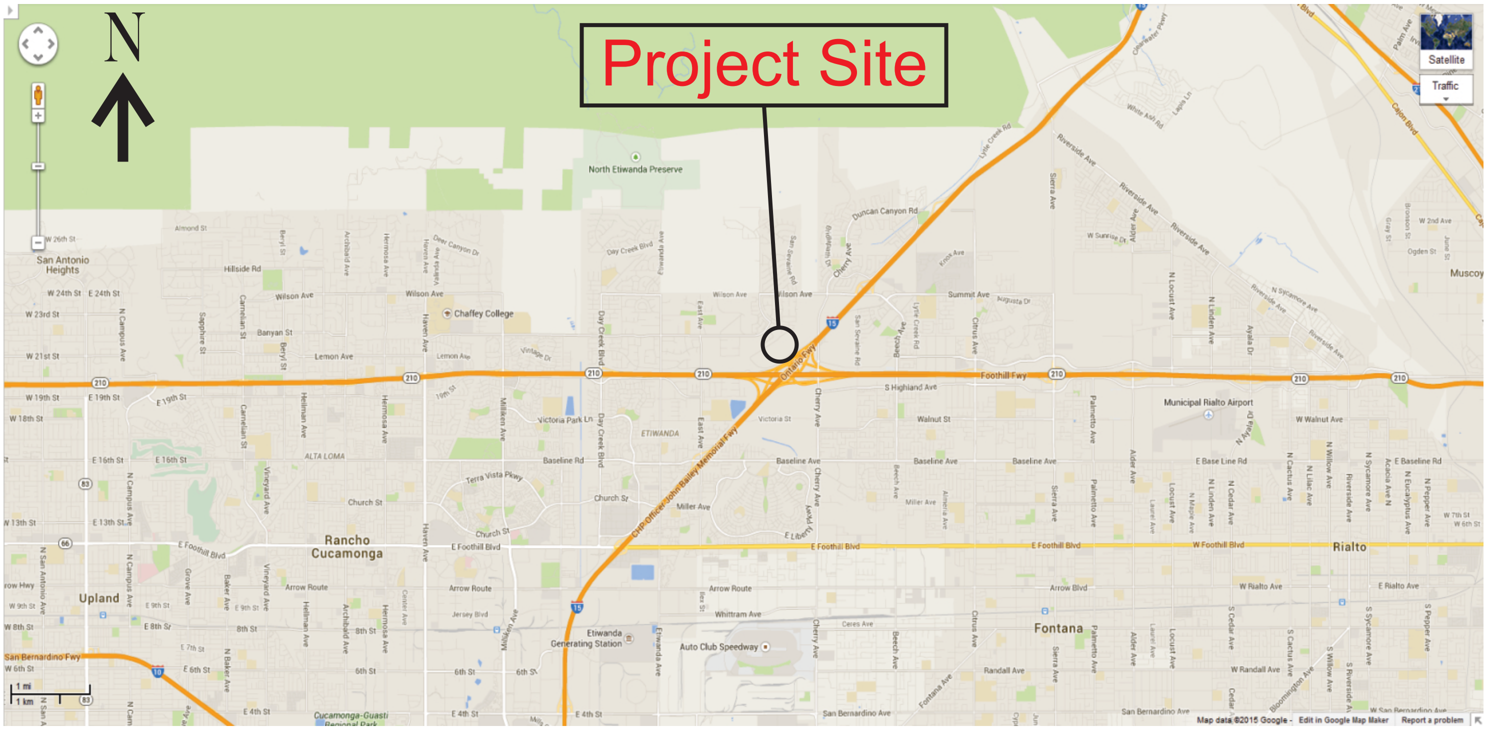
EPRI (1990), "Manual on Estimating Soil Properties for Foundation Design," prepared by Cornell University, Ithaca, New York.

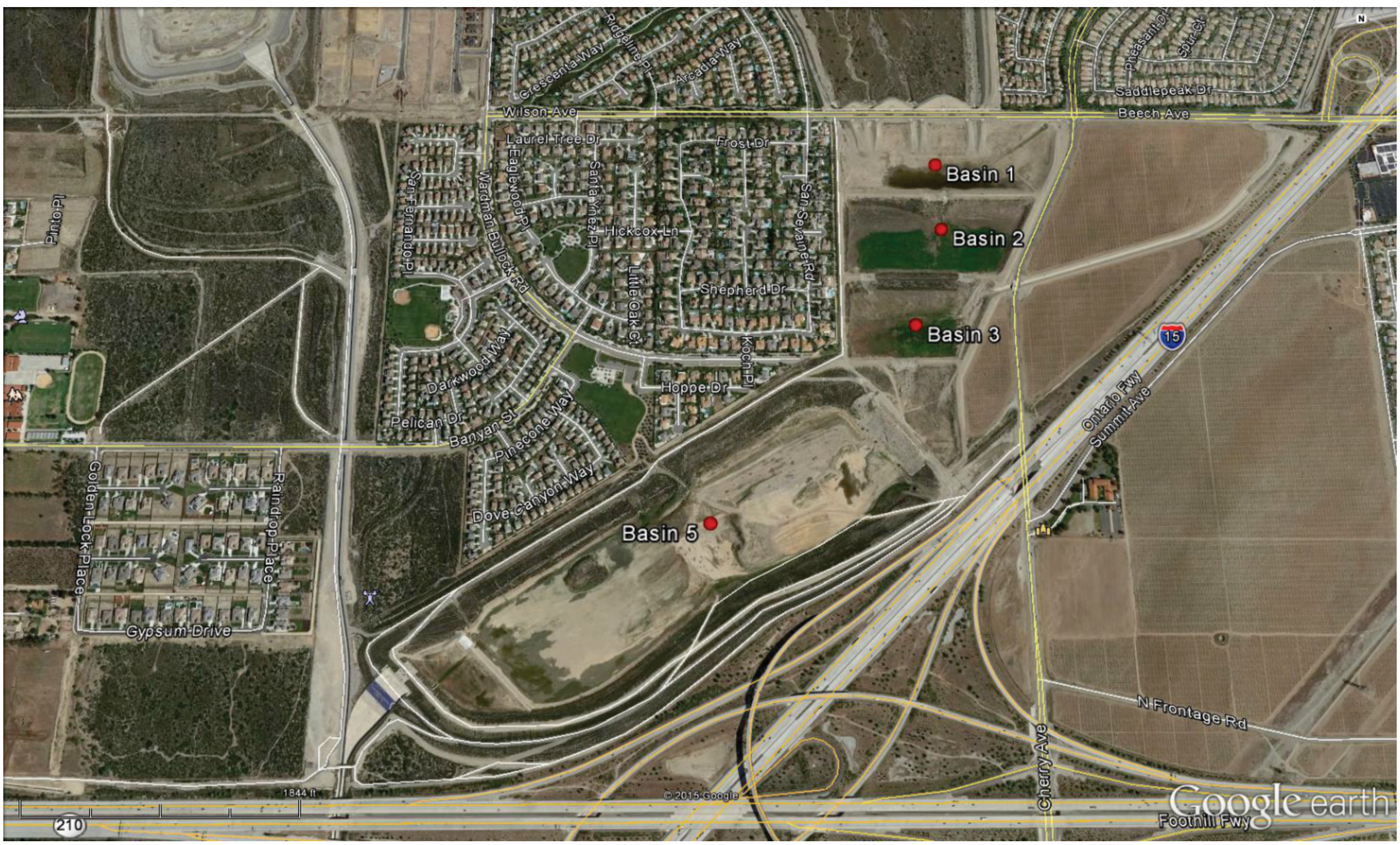
Freeze, A. R. and Cherry, J.A. (1979), "Groundwater." First Edition. Pearson Education, Inc.

URS, 2002, Memorandum, *Chino Basin Facilities Improvement Project, Infiltration Rate Evaluation for San Sevaine Basins 1, 2, & 3*, San Bernardino County, California, dated August 26th.

FIGURES

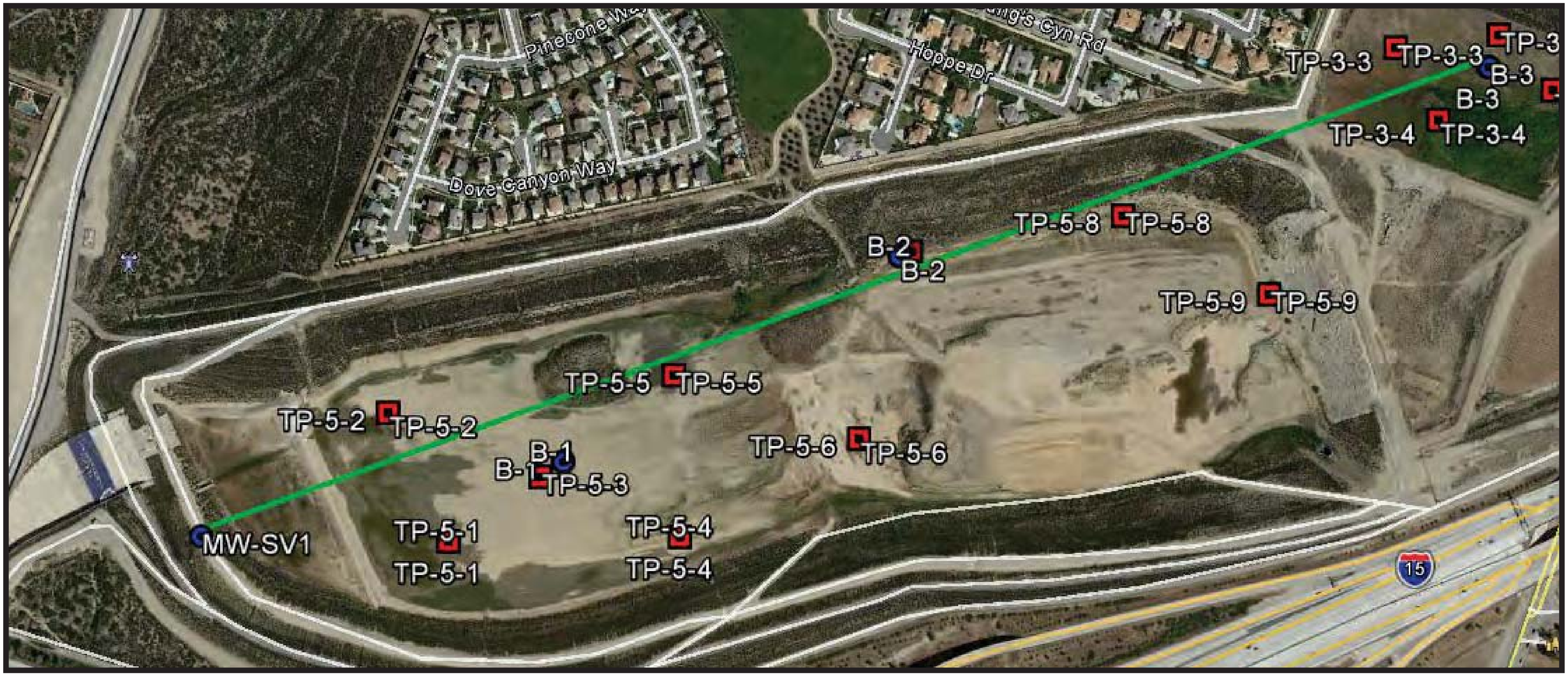
Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com





Ref: The base map and aerial photo are from Google Maps

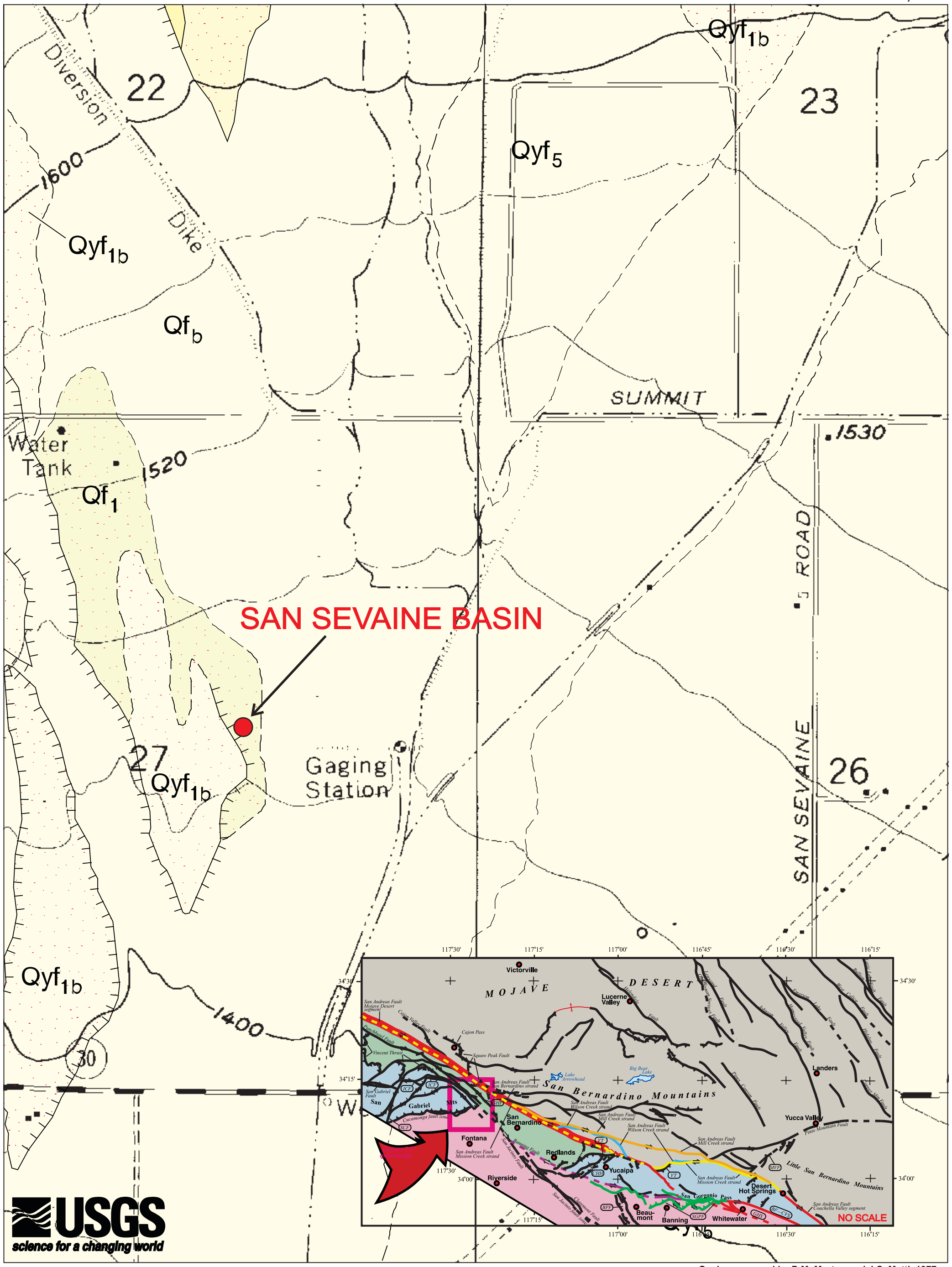
GROUP DELTA	GROUP DELTA CONSULTANTS, INC. ENGINEERS AND GEOLOGISTS 32 MAUCHLY, SUITE B IRVINE, CA 92618 (949) 450-2100	FIGURE NUMBER 1
	PROJECT NAME SAN SEVAINE BASIN	PROJECT NUMBER MT-383A
	Project Site	



GROUP DELTA	GROUP DELTA CONSULTANTS, INC. ENGINEERS AND GEOLOGISTS 32 MAUCHLY, SUITE B IRVINE, CA 92618 (949) 450-2100	FIGURE NUMBER 2
	PROJECT NAME SAN SEVAINE BASIN	PROJECT NUMBER MT-383A
	Exploration Location Map and Cross Section Line	

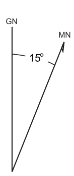
CONTOUR INTERVAL 40 FEET

SCALE 1:24,000



Gregory L. Morton and P. M. Cossette 2001

Geology mapped by D.M. Morton and J.C. Matti, 1977-89. Supported by National Cooperative Geologic Mapping Program and National Earthquake Hazards Reduction Program



0 1/2 1 MILE

0 .5 1 KILOMETER

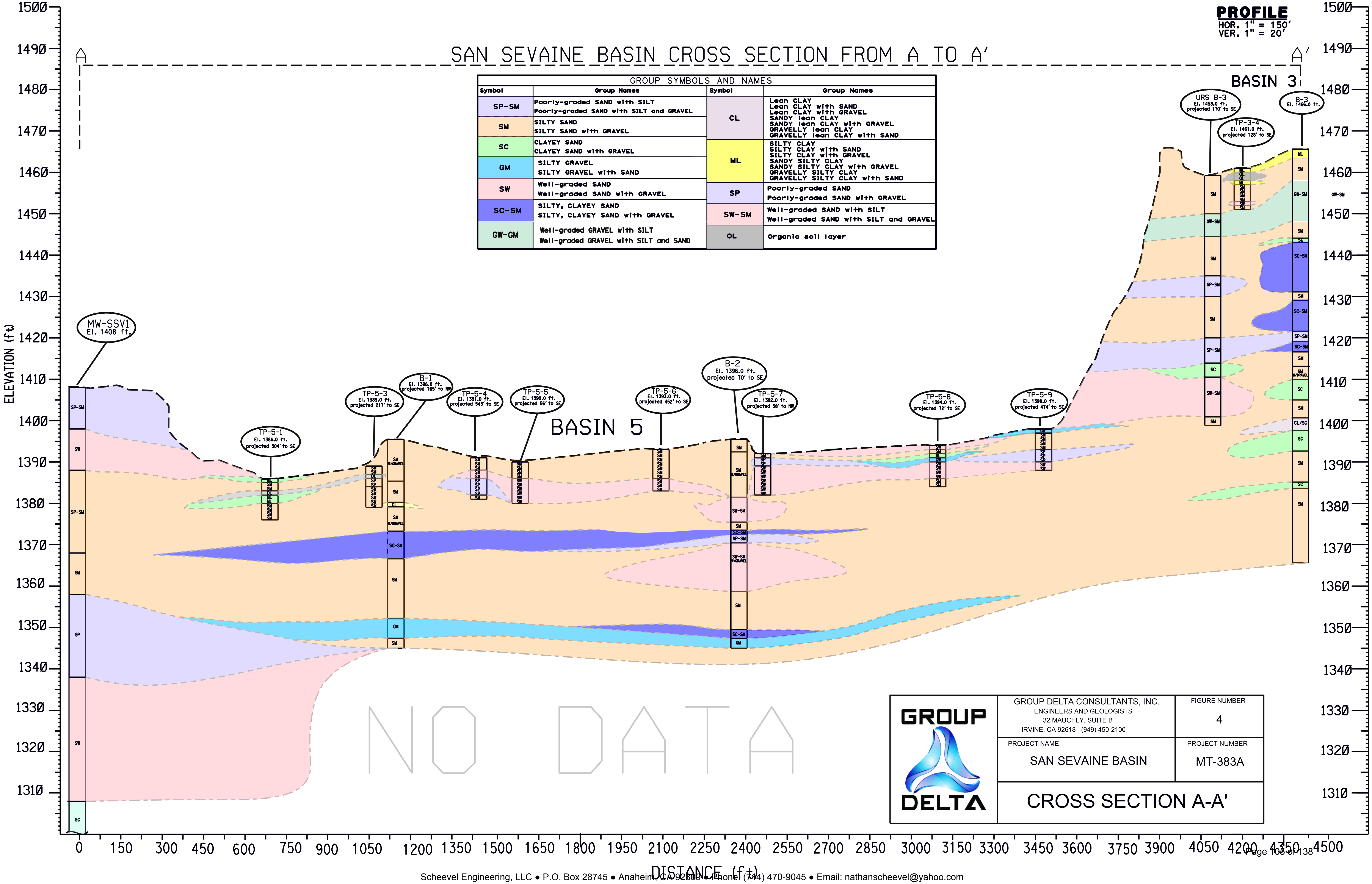
LOCATION MAP

GROUP DELTA

GROUP DELTA CONSULTANTS, INC.
ENGINEERS AND GEOLOGISTS
32 MAUCHLY, SUITE B
IRVINE, CA 92618 (949) 450-2100

FIGURE NUMBER	PROJECT NAME	PROJECT NUMBER
3	SAN SEVAINE BASIN	MT-383A

Regional Geology



GROUP SYMBOLS AND NAMES

Symbol	Group Names	Symbol	Group Names
SP-SM	Poorly-graded SAND with SILT Poorly-graded SAND with SILT and GRAVEL	CL	Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
SM	SILTY SAND SILTY SAND with GRAVEL		
SC	CLAYEY SAND CLAYEY SAND with GRAVEL	ML	SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
GM	SILTY GRAVEL SILTY GRAVEL with SAND		
SW	Well-graded SAND Well-graded SAND with GRAVEL	SP	Poorly-graded SAND Poorly-graded SAND with GRAVEL
SC-SM	SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL	SW-SM	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL
GW-GM	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND	OL	Organic soil layer

GROUP DELTA	GROUP DELTA CONSULTANTS, INC. ENGINEERS AND GEOLOGISTS 32 MAUCHLY, SUITE B IRVINE, CA 92618 (949) 450-2100	FIGURE NUMBER 4
	PROJECT NAME SAN SEVAINE BASIN	PROJECT NUMBER MT-383A
	CROSS SECTION A-A'	

APPENDICES

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

APPENDIX A – BORING LOGS

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING
San Sevaine Basin	MT-383A	B-1

SITE LOCATION	DATE(S) DRILLED	LOGGED BY	SHEET NO.
San Sevaine Basin	09/17/2014	KCH	1 of 3

DRILLING METHOD	DRILL BIT SIZE/TYPE	CHECKED BY	TOTAL DEPTH DRILLED (feet)
Sonic	3.5"	TO	50

DRILL RIG TYPE	DRILLED BY	INCLINATION FROM VERTICAL/BEARING
T600	Cascade Drilling	0 Degrees

APPARENT GROUNDWATER DEPTH	APPROXIMATE PILE TOP ELEVATION (feet)
None encountered	1396

COMMENTS	BOREHOLE BACKFILL
	Washed Plaster Sand

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
0–10	1395, 1390		1						**SILTY SAND with GRAVEL (SM)**: grayish brown; dry to moist; mostly fine to medium SAND; trace coarse SAND; little fines; little fine GRAVEL; few coarse GRAVEL. 57% SAND, 26% fines, 17% GRAVEL 58% SAND; 21% fines; 21% GRAVEL		PA P		
10–15	1385		2						**SILTY SAND (SM)**: brown; moist; mostly fine to medium SAND; trace coarse SAND; little fines; trace fine GRAVEL; nonplastic. Grayish brown; dry to moist.				
15	1380								**SANDY lean CLAY (CL)**: brown; moist; mostly fines; some fine to medium SAND; low plasticity. 52% fines, 48% SAND		PA,PI		
									SILTY SAND with GRAVEL (SM): brown; moist; mostly fine to medium SAND; few coarse SAND, little fines; little fine GRAVEL; trace coarse GRAVEL; nonplastic. 57% SAND; 27% GRAVEL; 26% fines		PA		

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE 1 a

LOG OF CORE BORING

PROJECT NAME San Sevaine Basin	**PROJECT NUMBER** MT-383A	**BORING** B-1	
SITE LOCATION San Sevaine Basin	**DATE(S) DRILLED** 09/17/2014	**LOGGED BY** KCH	**SHEET NO.** 2 of 3
DRILLING METHOD Sonic	**DRILL BIT SIZE/TYPE** 3.5"	**CHECKED BY** TO	**TOTAL DEPTH DRILLED (feet)** 50
DRILL RIG TYPE T600	**DRILLED BY** Cascade Drilling	**INCLINATION FROM VERTICAL/BEARING** 0 Degrees	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 1396	
COMMENTS		**BOREHOLE BACKFILL** Washed Plaster Sand	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	1375												
									SILTY CLAYEY SAND (SC-SM): brown; moist; mostly fine SAND; few medium to coarse SAND; some fines; trace fine GRAVEL; low plasticity. 64% SAND, 32% fines, 4% GRAVEL		PA,PI		
25			3										
	1370												
									70% SAND, 27% fines, 3% GRAVEL		PA,PI		
									SILTY SAND (SM): grayish brown; moist; mostly fine SAND; little medium to coarse SAND; few fine GRAVEL; little fines; trace coarse GRAVEL; nonplastic.				
30													
	1365												
									@ 33': Some coarse SAND; dry to moist.				
35			4										
	1360												

GDC_ROCK_CORE_ENG MT-383A_BORINGLOGS.GPJ ROCK2.GDT 11/19/14

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE 1 b

LOG OF CORE BORING

PROJECT NAME San Sevaine Basin	**PROJECT NUMBER** MT-383A	**BORING** B-1	
SITE LOCATION San Sevaine Basin	**DATE(S) DRILLED** 09/17/2014	**LOGGED BY** KCH	**SHEET NO.** 3 of 3
DRILLING METHOD Sonic	**DRILL BIT SIZE/TYPE** 3.5"	**CHECKED BY** TO	**TOTAL DEPTH DRILLED (feet)** 50
DRILL RIG TYPE T600	**DRILLED BY** Cascade Drilling	**INCLINATION FROM VERTICAL/BEARING** 0 Degrees	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 1396	
COMMENTS		**BOREHOLE BACKFILL** Washed Plaster Sand	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	1355								Brown; trace medium SAND.				
									SILTY GRAVEL with SAND (GM) grayish brown; dry to moist; some fine GRAVEL; trace coarse GRAVEL; some fine to coarse SAND; little fines; nonplastic. 44% GRAVEL; 39% SAND; 17% fines		PA		
45			5										
	1350								45% GRAVEL; 36% SAND; 19% fines		PA		
									SILTY SAND with GRAVEL (SM) grayish brown; dry to moist; mostly fine SAND; trace medium to coarse SAND; little fine GRAVEL; trace coarse GRAVEL; little fines; nonplastic. 61% SAND; 22% GRAVEL; 17% fines		PA		
50									Total Depth: 50 Feet below ground surface. Groundwater not encountered during drilling. Backfilled with washed plaster sand.				
	1345												
55													
	1340												

GDC_ROCK_CORE_ENG MT-383A_BORINGLOGS.GPJ ROCK2.GDT 11/19/14

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

FIGURE 1 c

LOG OF CORE BORING

PROJECT NAME San Sevaine Basin	**PROJECT NUMBER** MT-383A		**BORING** B-2
SITE LOCATION San Sevaine Basin	**DATE(S) DRILLED** 09/17/2014	**LOGGED BY** KCH	**SHEET NO.** 1 of 3
DRILLING METHOD Sonic	**DRILL BIT SIZE/TYPE** 3.5"	**CHECKED BY** TO	**TOTAL DEPTH DRILLED (feet)** 50
DRILL RIG TYPE T600	**DRILLED BY** Cascade Drilling	**INCLINATION FROM VERTICAL/BEARING** 0 Degrees	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 1396	
COMMENTS		**BOREHOLE BACKFILL** Washed Plaster Sand	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	1395								**SILTY SAND (SM)**: light grayish brown; dry to moist; mostly fine SAND; little medium to coarse SAND; little fines; few fine GRAVEL; trace coarse GRAVEL; nonplastic.				
									72% SAND; 22% fines; 6% GRAVEL		PA		
									@ 2.5': Trace fine GRAVEL.		PA		
									SILTY SAND with GRAVEL (SM) light grayish brown; dry to moist; mostly fine SAND; little medium to coarse SAND; little fine GRAVEL; trace coarse GRAVEL; little fines; nonplastic. 59% SAND; 29% GRAVEL; 12% fines				
5			1						@ 5': Few fine GRAVEL.				
	1390												
									@ 8': Brown.				
10									@ 10': Trace fine to coarse GRAVEL.				
	1385												
									Well Graded SAND with SILT and GRAVEL (SW-SM): brown; moist; mostly fine to coarse sand SAND; little fine GRAVEL; trace coarse GRAVEL; few fines; nonplastic.		PA		
15			2						77% SAND; 16% GRAVEL; 7% fines				
	1380												

GDC_ROCK_CORE_ENG MT-383A_BORINGLOGS.GPJ ROCK2.GDT 11/19/14

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

FIGURE 2 a

LOG OF CORE BORING

PROJECT NAME San Sevaine Basin	**PROJECT NUMBER** MT-383A	**BORING** B-2	
SITE LOCATION San Sevaine Basin	**DATE(S) DRILLED** 09/17/2014	**LOGGED BY** KCH	**SHEET NO.** 2 of 3
DRILLING METHOD Sonic	**DRILL BIT SIZE/TYPE** 3.5"	**CHECKED BY** TO	**TOTAL DEPTH DRILLED (feet)** 50
DRILL RIG TYPE T600	**DRILLED BY** Cascade Drilling	**INCLINATION FROM VERTICAL/BEARING** 0 Degrees	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 1396	
COMMENTS		**BOREHOLE BACKFILL** Washed Plaster Sand	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	1375								**SILTY SAND (SM)**: brown; moist; mostly fine SAND; trace medium to coarse SAND; some fines; trace fine GRAVEL; low plasticity.				
									SILTY, CLAYEY SAND (SC-SM) brown; moist; mostly fine SAND; few medium to coarse SAND; some fines; trace fine GRAVEL; low plasticity. 54% SAND, 42% fines, 4% GRAVEL		PA,PI		
									Poorly-graded SAND with SILT (SP-SM) brownish gray; dry to moist; mostly fine to medium SAND; few coarse SAND; few fines; few fine GRAVEL; nonplastic.				
25	1370		3						**SILTY SAND with GRAVEL (SM)** brownish gray; dry to moist; mostly fine to medium SAND, few coarse SAND; little fine to coarse GRAVEL; little fines; nonplastic. 56% SAND; 26% GRAVEL; 18% fines Brown; moist; trace COBBLES. Brownish grey; dry to moist.		PA		
									59% SAND, 23% GRAVEL, 18% fines		PA		
30	1365												
									Well- graded SAND with SILT and GRAVEL (SW-SM) : brownish gray; dry to moist; mostly fine to coarse SAND; some fine GRAVEL; trace coarse GRAVEL; few fines; nonplastic. 58% SAND; 31% GRAVEL; 11% fines		PA		
35	1360		4										
									SILTY SAND with GRAVEL (SM) brownish gray; dry to moist; mostly fine to medium SAND, few coarse SAND; little fine to coarse GRAVEL; little fines; nonplastic. 62% SAND, 22% fines, 16% GRAVEL		PA		

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

FIGURE 2 b

LOG OF CORE BORING

PROJECT NAME San Sevaine Basin	**PROJECT NUMBER** MT-383A	**BORING** B-2	
SITE LOCATION San Sevaine Basin	**DATE(S) DRILLED** 09/17/2014	**LOGGED BY** KCH	**SHEET NO.** 3 of 3
DRILLING METHOD Sonic	**DRILL BIT SIZE/TYPE** 3.5"	**CHECKED BY** TO	**TOTAL DEPTH DRILLED (feet)** 50
DRILL RIG TYPE T600	**DRILLED BY** Cascade Drilling	**INCLINATION FROM VERTICAL/BEARING** 0 Degrees	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 1396	
COMMENTS		**BOREHOLE BACKFILL** Washed Plaster Sand	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	1355												
45			5										
	1350								**SILTY, CLAYEY SAND with GRAVEL (SC-SM)** brown; moist; mostly fine SAND; few medium to coarse SAND; some fines; little fine GRAVEL; trace coarse GRAVEL; low plasticity. 42% SAND, 36% fines, 22% GRAVEL		PA,PI		
									SILTY GRAVEL with SAND (GM): brown; moist; mostly fine to coarse GRAVEL; some fine to medium SAND; trace coarse SAND; little fines; nonplastic. 49% GRAVEL; 33% SAND; 18% fines		PA		
50									Total Depth: 50 feet below ground surface. Groundwater not encountered during drilling. Backfilled with washed plaster sand.				
	1345												
55													
	1340												

GDC_ROCK_CORE_ENG MT-383A_BORINGLOGS.GPJ ROCK2.GDT 11/19/14

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

FIGURE 2 c

LOG OF CORE BORING

PROJECT NAME San Sevaine Basin	**PROJECT NUMBER** MT-383A	**BORING** B-3	
SITE LOCATION San Sevaine Basin	**DATE(S) DRILLED** 09/16/2014	**LOGGED BY** KCH	**SHEET NO.** 1 of 6
DRILLING METHOD Sonic	**DRILL BIT SIZE/TYPE** 3.5"	**CHECKED BY** TO	**TOTAL DEPTH DRILLED (feet)** 100
DRILL RIG TYPE T600	**DRILLED BY** Cascade Drilling	**INCLINATION FROM VERTICAL/BEARING** 0 Degrees	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 1466	
COMMENTS		**BOREHOLE BACKFILL** Washed Plaster Sand	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	1465								**SANDY SILT (ML)**: brown; moist; mostly fines; little fine to medium SAND; little fine GRAVEL; medium plasticity. 57% fines, 29% SAND, 14% GRAVEL		PA,PI		
									SILTY SAND with GRAVEL (SM) light brownish gray; dry to moist; mostly fine to medium SAND; little coarse SAND; some fine GRAVEL; trace coarse GRAVEL and COBBLES; little fines; nonplastic. 53% SAND, 32% GRAVEL, 15% fines		PA		
											P		
5			1										
	1460												
									Well-graded GRAVEL with SILT and SAND (GW-GM): light brownish gray; dry to moist; mostly fine to coarse GRAVEL; some fine to medium SAND; trace coarse SAND; few fines; nonplastic. 53% GRAVEL; 40% SAND; 7% fines @ 8': Grayish brown; moist.		PA		
10													
	1455												
									Trace COBBLES up to 4 inches in diameter. 55% GRAVEL, 37% SAND, 8% fines		PA		
15			2										
	1450												
									SILTY SAND with GRAVEL (SM) light brownish gray; dry to moist; some fine to medium SAND; trace coarse SAND; some fine to coarse SAND; trace COBBLES; little fines; nonplastic. 44% SAND, 40% GRAVEL, 16% fines		PA		

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

FIGURE 3 a

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING
San Sevaine Basin	MT-383A	B-3

SITE LOCATION	DATE(S) DRILLED	LOGGED BY	SHEET NO.
San Sevaine Basin	09/16/2014	KCH	2 of 6

DRILLING METHOD	DRILL BIT SIZE/TYPE	CHECKED BY	TOTAL DEPTH DRILLED (feet)
Sonic	3.5"	TO	100

DRILL RIG TYPE	DRILLED BY	INCLINATION FROM VERTICAL/BEARING
T600	Cascade Drilling	0 Degrees

APPARENT GROUNDWATER DEPTH	APPROXIMATE PILE TOP ELEVATION (feet)
None encountered	1466

COMMENTS	BOREHOLE BACKFILL
	Washed Plaster Sand

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	1445								**CLAYEY SAND (SC)**: brown; moist; mostly fine to medium SAND; little fines; few fine GRAVEL; medium plasticity.		PA,PI		
									SILTY, CLAYEY SAND with Gravel (SC-SM): brown; moist; some fine to medium SAND; little coarse SAND; some fine to coarse GRAVEL; little fines; low plasticity. 43% SAND, 36% GRAVEL. 21% fines		PA		
25			3						Light brownish gray; dry to moist; mostly fine to medium SAND. 50% SAND, 32% GRAVEL, 18% fines @ 25': Grayish brown.				
	1440												
30													
	1435								Little fine GRAVEL; trace coarse GRAVEL. 61% SAND, 23% GRAVEL, 16% fines		PA		
									Reddish brown.		PA		
35			4						**SILTY SAND (SM)**: grayish brown; dry to moist; mostly fine to medium SAND; few coarse SAND; little fines; little fine GRAVEL; trace coarse GRAVEL; nonplastic. 63% SAND, 25% fines, 12% GRAVEL				
	1430								**SILTY, CLAYEY SAND (SC-SM)** grayish brown; moist; mostly fine to medium SAND; few coarse SAND; some fines; few fine GRAVEL; low plasticity. Light grayish brown; dry to moist.				
									54% SAND, 38% fines, 8% GRAVEL		PA,PI		
									Brown; moist; trace coarse SAND; trace fine GRAVEL.				

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

FIGURE 3 b

LOG OF CORE BORING

PROJECT NAME San Sevaine Basin	**PROJECT NUMBER** MT-383A	**BORING** B-3	
SITE LOCATION San Sevaine Basin	**DATE(S) DRILLED** 09/16/2014	**LOGGED BY** KCH	**SHEET NO.** 3 of 6
DRILLING METHOD Sonic	**DRILL BIT SIZE/TYPE** 3.5"	**CHECKED BY** TO	**TOTAL DEPTH DRILLED (feet)** 100
DRILL RIG TYPE T600	**DRILLED BY** Cascade Drilling	**INCLINATION FROM VERTICAL/BEARING** 0 Degrees	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 1466	
COMMENTS		**BOREHOLE BACKFILL** Washed Plaster Sand	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	1425								Mostly fine SAND; few medium SAND; few fine GRAVEL; low plasticity. 55% SAND, 40% fines, 5% GRAVEL		PA,PI		
									Poorly- graded SAND with SILT and GRAVEL (SP-SM) : light gray; dry; mostly fine to medium SAND; few coarse SAND; little GRAVEL; trace coarse GRAVEL; few fines; nonplastic. 68% SAND, 23% GRAVEL, 9% fines		PA		
45	1420		5						**SILTY, CLAYEY SAND (SC-SM)** reddish brown; moist; mostly fine to medium SAND; few coarse SAND; some fines; few fine GRAVEL; low plasticity. 53% SAND, 38% fines 9% GRAVEL		PA,PI		
50	1415								**SILTY SAND (SM)**: brownish gray; dry to moist; mostly fine to medium SAND; few coarse SAND; some fines; few fine GRAVEL; trace coarse GRAVEL; nonplastic.				
									SILTY SAND with Gravel (SM): brownish gray; dry to moist; mostly fine to medium SAND; few coarse SAND; little fine GRAVEL; trace coarse GRAVEL; little fines; nonplastic.				
55	1410		6						**CLAYEY SAND with GRAVEL (SC)** brown; moist; some fine to medium SAND; few coarse SAND; some fines; little fine GRAVEL; trace coarse GRAVEL; low plasticity. 43% SAND, 39% fines, 18% GRAVEL		PA,PI		

GDC_ROCK_CORE_ENG MT-383A_BORINGLOGS.GPJ ROCK2.GDT 11/19/14

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE 3 c

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING
San Sevaine Basin	MT-383A	B-3

SITE LOCATION	DATE(S) DRILLED	LOGGED BY	SHEET NO.
San Sevaine Basin	09/16/2014	KCH	4 of 6

DRILLING METHOD	DRILL BIT SIZE/TYPE	CHECKED BY	TOTAL DEPTH DRILLED (feet)
Sonic	3.5"	TO	100

DRILL RIG TYPE	DRILLED BY	INCLINATION FROM VERTICAL/BEARING
T600	Cascade Drilling	0 Degrees

APPARENT GROUNDWATER DEPTH	APPROXIMATE PILE TOP ELEVATION (feet)
None encountered	1466

COMMENTS	BOREHOLE BACKFILL
	Washed Plaster Sand

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	1405								**SILTY SAND (SM)**: grayish brown; dry to moist; mostly fine to medium SAND; little coarse SAND; little fines; trace fine GRAVEL; nonplastic.				
									@ 63.5': Trace coarse GRAVEL and COBBLES.				
65	1400		7						**SANDY lean CLAY with GRAVEL/ CLAYEY SAND with GRAVEL (CL/SC)**: grayish brown; moist; nearly equal portions of fines and fine to medium SAND; little fine GRAVEL; trace coarse GRAVEL; low plasticity. 42% fines, 39% SAND, 19% GRAVEL		PA,PI		
									CLAYEY SAND (SC) brown; moist; mostly fine to medium SAND; few coarse SAND; little fines; low plasticity.				
70	1395												
									SILTY SAND (SM): grayish brown; dry to moist; mostly fine to medium SAND; little coarse SAND; little fines; few fine GRAVEL; nonplastic. 73% SAND; 16% fines; 11% GRAVEL		PA		
75	1390		8						@ 76': Brownish gray; trace coarse GRAVEL.				

GDC_ROCK_CORE_ENG MT-383A_BORINGLOGS.GPJ ROCK2.GDT 11/19/14

GROUP DELTA
GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE 3 d

LOG OF CORE BORING

PROJECT NAME San Sevaine Basin	**PROJECT NUMBER** MT-383A	**BORING** **B-3**	
SITE LOCATION San Sevaine Basin	**DATE(S) DRILLED** 09/16/2014	**LOGGED BY** KCH	**SHEET NO.** 5 of 6
DRILLING METHOD Sonic	**DRILL BIT SIZE/TYPE** 3.5"	**CHECKED BY** TO	**TOTAL DEPTH DRILLED (feet)** 100
DRILL RIG TYPE T600	**DRILLED BY** Cascade Drilling	**INCLINATION FROM VERTICAL/BEARING** 0 Degrees	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 1466	
COMMENTS		**BOREHOLE BACKFILL** Washed Plaster Sand	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	1385								**CLAYEY SAND (SC)**: brown to grayish brown; moist; mostly fine to medium SAND; few coarse SAND; little fines; few fine GRAVEL; low plasticity.		PA		
									SILTY SAND with GRAVEL (SM) light gray; dry to moist; mostly fine to medium SAND; little fine to coarse GRAVEL; few coarse SAND; trace COBBLES; few fines; nonplastic. 62% SAND, 27% GRAVEL, 11% fines				
85			9										
	1380								Little fines. 46% SAND, 36% GRAVEL, 18% fines		PA		
90													
	1375												
									56% SAND, 30% GRAVEL, 14% fines		PA		
95			10										
	1370												
									Total Depth: 100 feet below ground surface.				

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

FIGURE 3 e

LOG OF CORE BORING

PROJECT NAME San Sevaine Basin	**PROJECT NUMBER** MT-383A	**BORING** B-3	
SITE LOCATION San Sevaine Basin	**DATE(S) DRILLED** 09/16/2014	**LOGGED BY** KCH	**SHEET NO.** 6 of 6
DRILLING METHOD Sonic	**DRILL BIT SIZE/TYPE** 3.5"	**CHECKED BY** TO	**TOTAL DEPTH DRILLED (feet)** 100
DRILL RIG TYPE T600	**DRILLED BY** Cascade Drilling	**INCLINATION FROM VERTICAL/BEARING** 0 Degrees	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 1466	
COMMENTS		**BOREHOLE BACKFILL** Washed Plaster Sand	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	1365								Groundwater not encountered during drilling. Backfilled with washed plaster sand.				
105													
	1360												
110													
	1355												
115													
	1350												

GDC_ROCK_CORE_ENG MT-383A_BORINGLOGS.GPJ ROCK2.GDT 11/19/14

GROUP DELTA CONSULTANTS, INC.
32 Mauchly, Suite B
Irvine, CA 92618

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE 3 f

APPENDIX B – LABORATORY DATA

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

Boring No.	Sample No.	Depth (ft)	Sample Type	Geologic Unit	USCS Group Symbol	SPT N*60 (blows/ft)	Undrained Shear Strength, Su (ksf) Pocket Pen.	Mini Vane	UU Test	Moisture Content (%)	Dry Unit Weight (pcf)	Total Unit Wt (pcf)	Atterberg Limits LL	PL	PI	Grain Size Distribution (%) by dry weight Gravel	Sand	Fines	Clay	Other Tests
B-1		0.0			SM											17	57	26		PA
B-1		2.0			SM											21	58	21		PA
B-1		16.0			CL								27	19	8	0	48	52		PA
B-1		18.0			SM											27	47	26		PA
B-1		22.0			SC-SM								24	17	7	4	64	32		PA
B-1		27.0			SC-SM								22	16	6	3	70	27		PA
B-1		43.0			GM											44	39	17		PA
B-1		46.0			GM											45	36	18		PA
B-1		48.0			SM											22	61	17		PA
B-2		2.0			SM											6	72	22		PA
B-2		3.0			SM											29	59	12		PA
B-2		14.0			SW-SM											16	77	7		PA
B-2		22.0			SC-SM								24	17	7	4	54	42		PA
B-2		26.0			SM											26	56	18		PA
B-2		29.0			SM											23	59	18		PA
B-2		32.0			SW-SM											31	58	11		PA
B-2		39.0			SM											16	62	22		PA
B-2		46.0			SC-SM								19	15	4	22	42	36		PA
B-2		49.0			GM											49	33	18		PA
B-3		1.0			ML								44	32	12	14	29	57		PA
B-3		2.0			SM											32	53	15		PA
B-3		7.0			GW-GM											53	40	7		PA
B-3		12.0			GW-GM											55	37	8		PA
B-3		17.0			SM											40	44	16		PA
B-3		22.0			SC-SM								25	18	7	36	43	21		PA
B-3		24.0			SM											32	50	18		PA
B-3		32.0			SM											23	61	16		PA
B-3		34.0			SM											12	63	25		PA
B-3		38.0			SC-SM								27	20	7	9	53	38		PA
B-3		42.0			SC-SM								26	19	7	5	55	40		PA

GROUP DELTA CONSULTANTS. INC.
32 Mauchly, Suite B
Irvine, California 92618
Voice: (949) 450-2100 Fax: (949) 450-2108
www.GroupDelta.com

TABLE B-1: Summary of Laboratory Results

Project: I-405 Preliminary Field Investigation

Location: Orange County, California

Number: IR 487B

Boring No.	Sample No.	Depth (ft)	Sample Type	Geologic Unit	USCS Group Symbol	SPT N*60 (blows/ft)	Undrained Shear Strength, Su (ksf)			Moisture Content (%)	Dry Unit Weight (pcf)	Total Unit Wt (pcf)	Atterberg Limits			Grain Size Distribution (%) by dry weight			Clay	Other Tests
							Pocket Pen.	Mini Vane	UU Test				LL	PL	PI	Gravel	Sand	Fines		
B-3		44.0			SW-SM											23	68	9		PA
B-3		46.0			SC								26	18	8	9	53	38		PA
B-3		56.0			SC								27	19	8	18	43	39		PA
B-3		65.0			SC								28	19	9	19	39	42		PA
B-3		73.0			SM											11	73	16		PA
B-3		81.0			SW-SM											27	62	11		PA
B-3		86.0			SM											36	45	19		PA
B-3		92.0			SM											29	56	15		PA
TP-5-3-3		3.0			ML								48	33	15	0	39	61		PA

GDC TABLE B-1 IR487B - I-405 PRELIMINARY FIELD INVESTIGATION - COPY.GPJ GDC2013.GDT 11/19/14

GROUP DELTA CONSULTANTS
GROUP DELTA CONSULTANTS. INC.
32 Mauchly, Suite B
Irvine, California 92618
Voice: (949) 450-2100 Fax: (949) 450-2108
www.GroupDelta.com

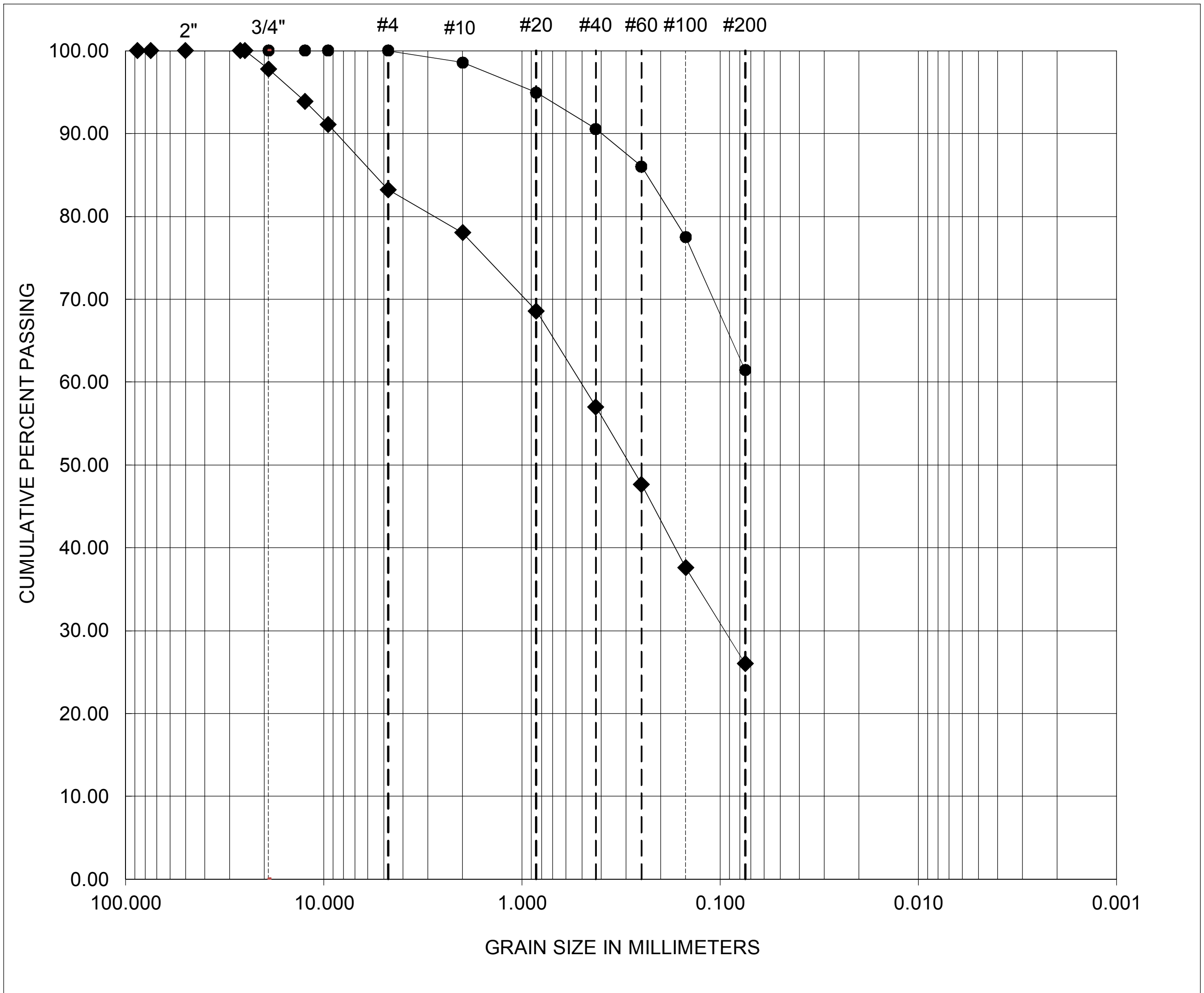
TABLE B-1: Summary of Laboratory Results

Project: I-405 Preliminary Field Investigation

Location: Orange County, California

Number: IR 487B

Sheet 2 of 2



COBBLE	GRAVEL	SAND	SILT	CLAY

SYMBOL	SAMPLE IDENTIFICATION			PERCENTAGES			ATTERBERG LIMITS			SOIL CLASSIFICATION	USCS TOTAL SAMPLE
	BORING NO.	SAMPLE NO.	DEPTH (ft.)	GRAVEL	SAND	FINES	LL	PL	PI		
◆	B-1	Surface	0'	17	57	26	NP	NP	NP	Silty Sand with Gravel	SM
●	TP-5-3-3	Bulk	3'	0	39	61	48	33	15	Sandy Silt	ML

GROUP DELTA

GROUP DELTA CONSULTANTS
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500 office
(714) 660-7550 fax

Inland Empire Utilities Agency

San Sevaine Basin Improvement Project

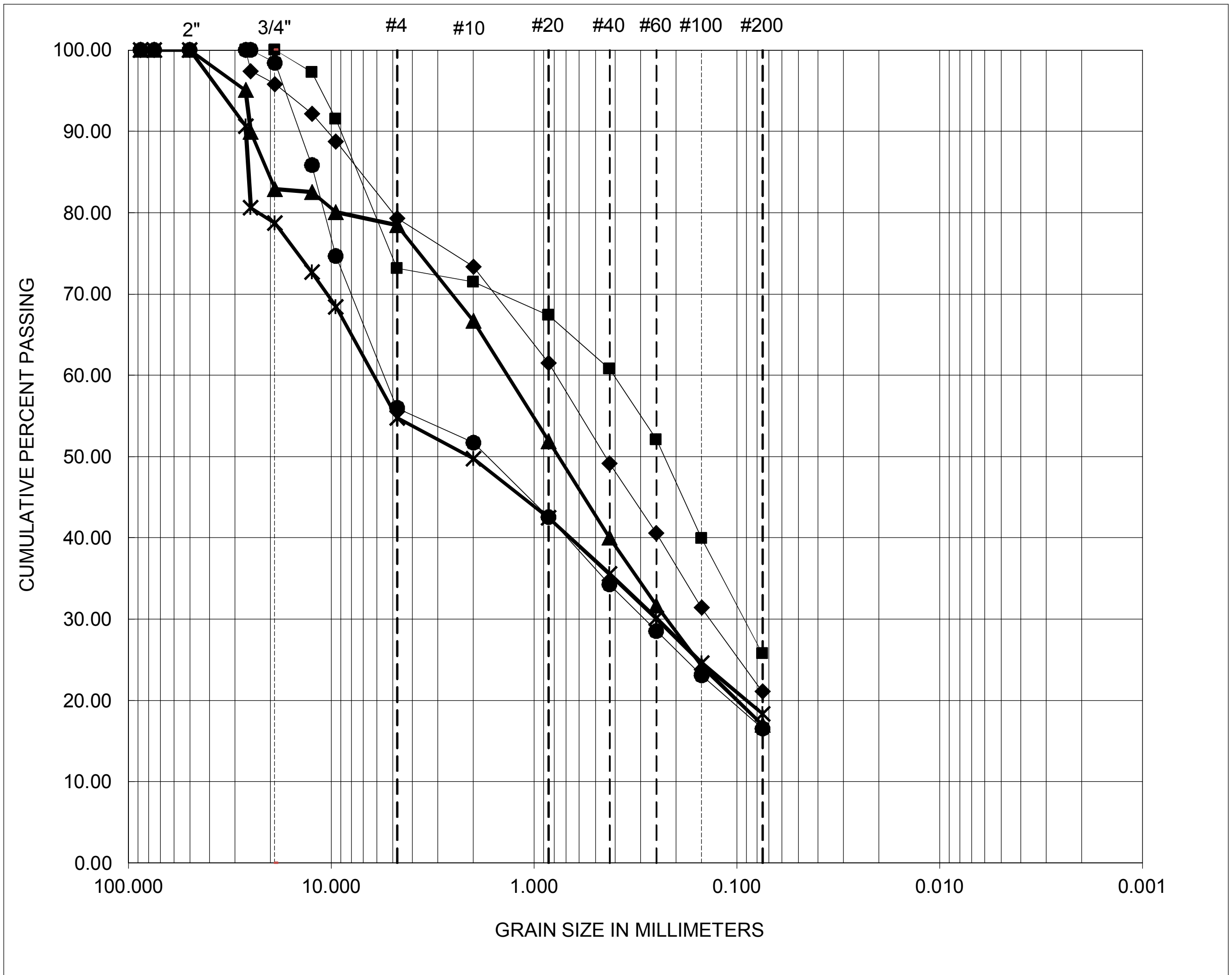
Ranch Cucamonga, CA

PLATE

B-1

PROJECT NO. MT-383A

GRAIN SIZE DISTRIBUTION



COBBLE	GRAVEL	SAND	SILT	CLAY

SYMBOL	SAMPLE IDENTIFICATION			PERCENTAGES			ATTERBERG LIMITS			SOIL CLASSIFICATION	USCS TOTAL SAMPLE
	BORING NO.	SAMPLE NO.	DEPTH (ft.)	GRAVEL	SAND	FINES	LL	PL	PI		
♦	B-1	Box 1	2'	21	58	21	--	--	--	Silty Sand with Gravel	SM
■	B-1	Box 2	18'	27	47	26	--	--	--	Silty Sand with Gravel	SC
●	B-1	Box 5	43'	44	39	17	--	--	--	Silty Gravel with Sand	GM
X	B-1	Box 5	46'	45	36	19	--	--	--	Silty Gravel with Sand	GM
▲	B-1	Box 5	48'	22	61	17	--	--	--	Silty Sand with Gravel	SM

GROUP DELTA

GROUP DELTA CONSULTANTS
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500 office
(714) 660-7550 fax

Inland Empire Utilities Agency

San Sevaine Basin Improvement Project

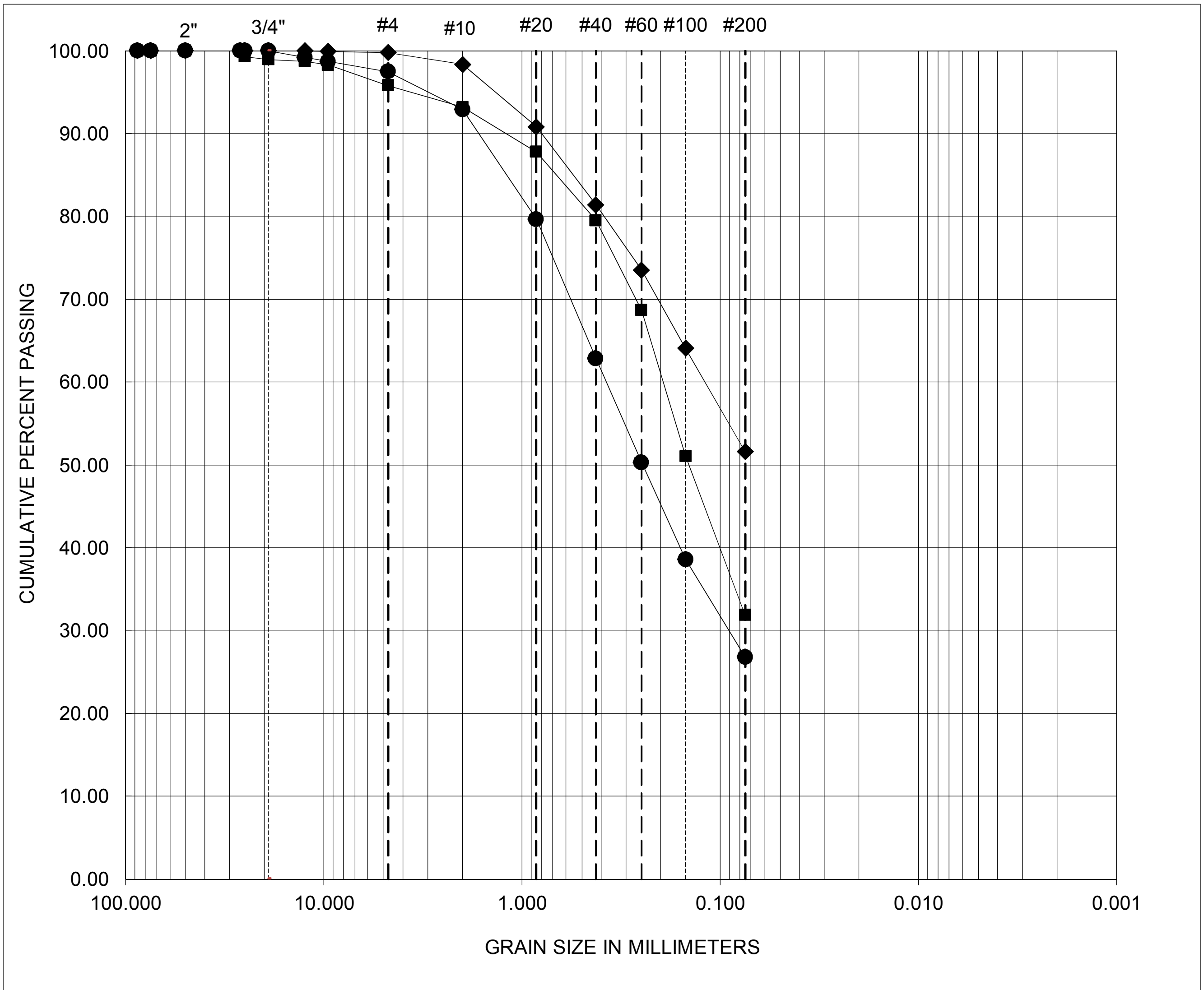
Ranch Cucamonga, CA

PLATE

B-1.1

PROJECT NO. MT-383A

GRAIN SIZE DISTRIBUTION



COBBLE	GRAVEL	SAND	SILT	CLAY

SYMBOL	SAMPLE IDENTIFICATION			PERCENTAGES			ATTERBERG LIMITS			SOIL CLASSIFICATION	USCS TOTAL SAMPLE
	BORING NO.	SAMPLE NO.	DEPTH (ft.)	GRAVEL	SAND	FINES	LL	PL	PI		
♦	B-1	Box 2	16'	0	48	52	27	19	8	Lean Clay with Sand	CL
■	B-1	Box 3	22'	4	64	32	24	17	7	Silty, Clayey Sand	SC-SM
●	B-1	Box 3	27'	3	70	27	22	16	6	Silty, Clayey Sand	SC-SM

GROUP DELTA

GROUP DELTA CONSULTANTS
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500 office
(714) 660-7550 fax

Inland Empire Utilities Agency

San Sevaine Basin Improvement Project

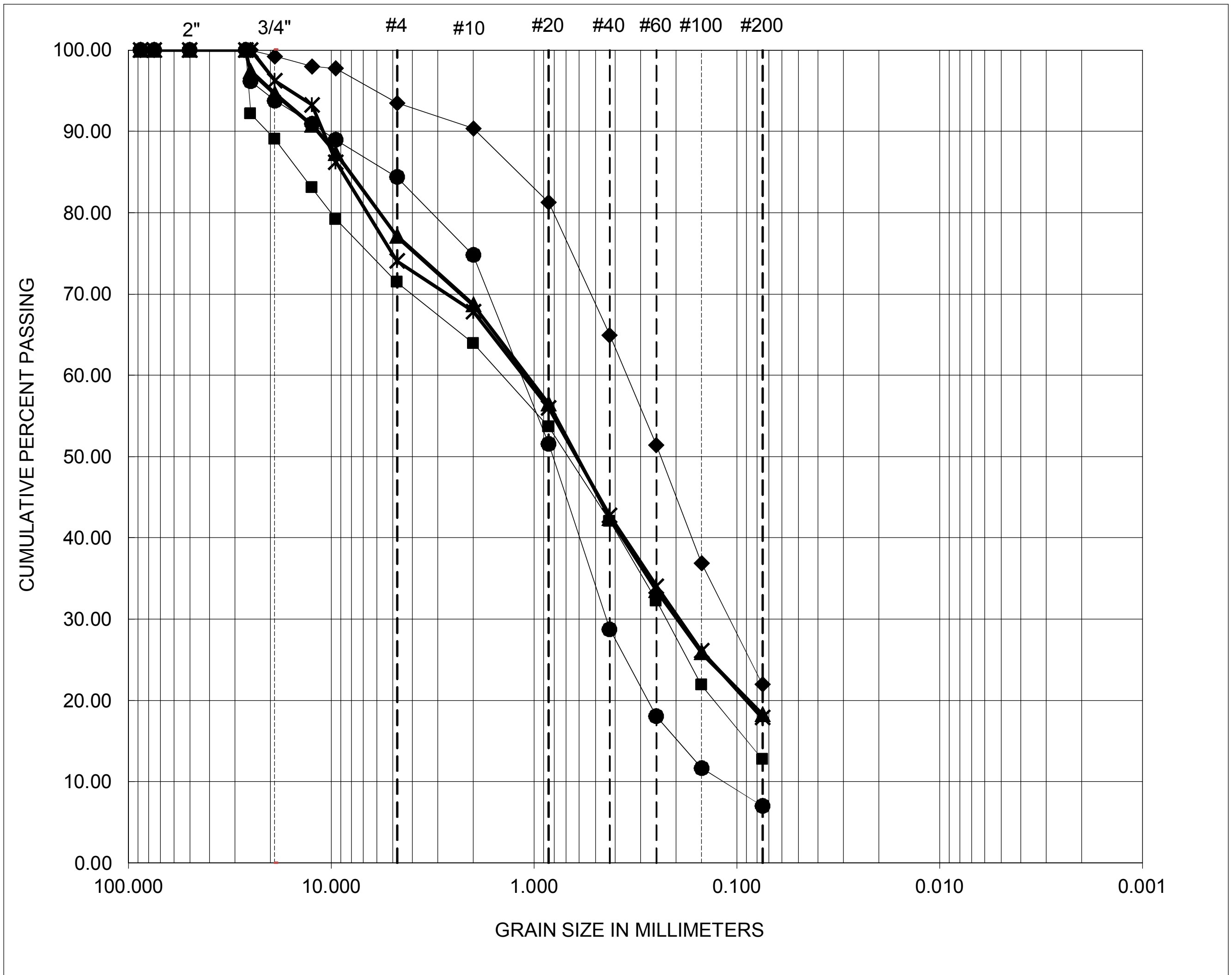
Ranch Cucamonga, CA

PLATE

B-1.2

PROJECT NO. MT-383A

GRAIN SIZE DISTRIBUTION



COBBLE	GRAVEL	SAND	SILT	CLAY

SYMBOL	SAMPLE IDENTIFICATION			PERCENTAGES			ATTERBERG LIMITS			SOIL CLASSIFICATION	USCS TOTAL SAMPLE
	BORING NO.	SAMPLE NO.	DEPTH (ft.)	GRAVEL	SAND	FINES	LL	PL	PI		
♦	B-2	Box 1	2'	6	72	22	--	--	--	Silty Sand	SM
■	B-2	Box 1	3'	29	59	12	--	--	--	Silty Sand with Gravel	SM
●	B-2	Box 2	14'	16	77	7	--	--	--	Well Graded Sand with Silt and Gravel	SW-SM
X	B-2	Box 3	26	26	56	18	--	--	--	Sity Sand with Gravel	SM
▲	B-2	Box 5	29'	23	59	18	--	--	--	Silty Sand with Gravel	SM

GROUP DELTA

GROUP DELTA CONSULTANTS
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500 office
(714) 660-7550 fax

Inland Empire Utilities Agency

San Sevaine Basin Improvement Project

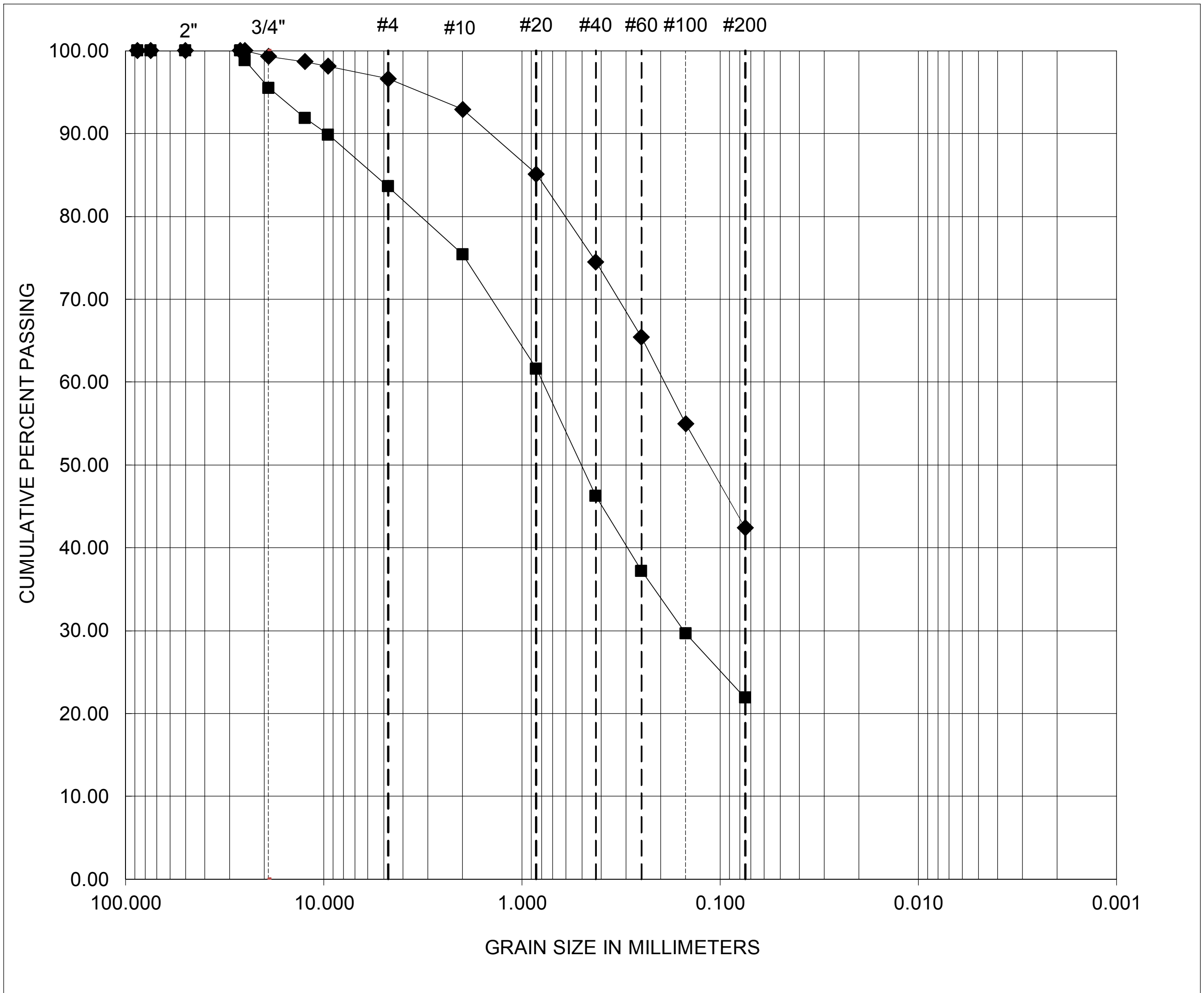
Ranch Cucamonga, CA

PLATE

B-2

PROJECT NO. MT-383A

GRAIN SIZE DISTRIBUTION



COBBLE	GRAVEL	SAND	SILT	CLAY

SYMBOL	SAMPLE IDENTIFICATION			PERCENTAGES			ATTERBERG LIMITS			SOIL CLASSIFICATION	USCS TOTAL SAMPLE
	BORING NO.	SAMPLE NO.	DEPTH (ft.)	GRAVEL	SAND	FINES	LL	PL	PI		
♦	B-2	Box 3	22'	4	54	42	24	17	7	Silty, Clayey Sand	SC-SM
■	B-2	Box 4	39'	16	62	22	NP	NP	NP	Silty Sand with Gravel	SM

GROUP DELTA

GROUP DELTA CONSULTANTS
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500 office
(714) 660-7550 fax

Inland Empire Utilities Agency

San Sevaine Basin Improvement Project

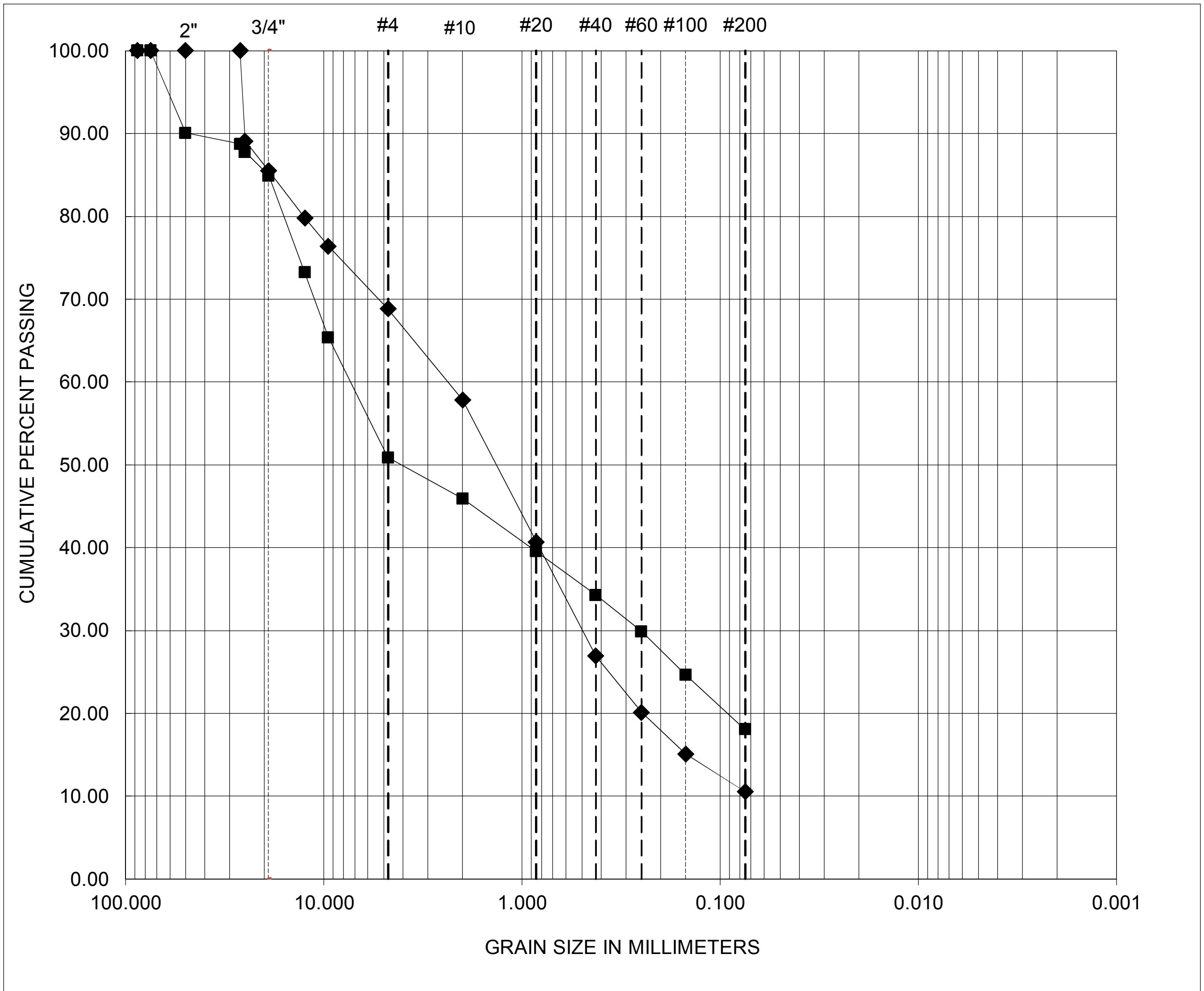
Ranch Cucamonga, CA

PLATE

B-2.1

PROJECT NO. MT-383A

GRAIN SIZE DISTRIBUTION



COBBLE	GRAVEL	SAND	SILT	CLAY

SYMBOL	SAMPLE IDENTIFICATION			PERCENTAGES			ATTERBERG LIMITS			SOIL CLASSIFICATION	USCS TOTAL SAMPLE
	BORING NO.	SAMPLE NO.	DEPTH (ft.)	GRAVEL	SAND	FINES	LL	PL	PI		
◆	B-2	Box 4	32'	31	58	11	--	--	--	Well- Graded Sand with Silt and Gravel	SW-SM
■	B-2	Box 5	49'	49	33	18	--	--	--	Silty Gravel with Sand	GM

GROUP DELTA CONSULTANTS
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500 office
(714) 660-7550 fax

Inland Empire Utilities Agency

San Sevaine Basin Improvement Project

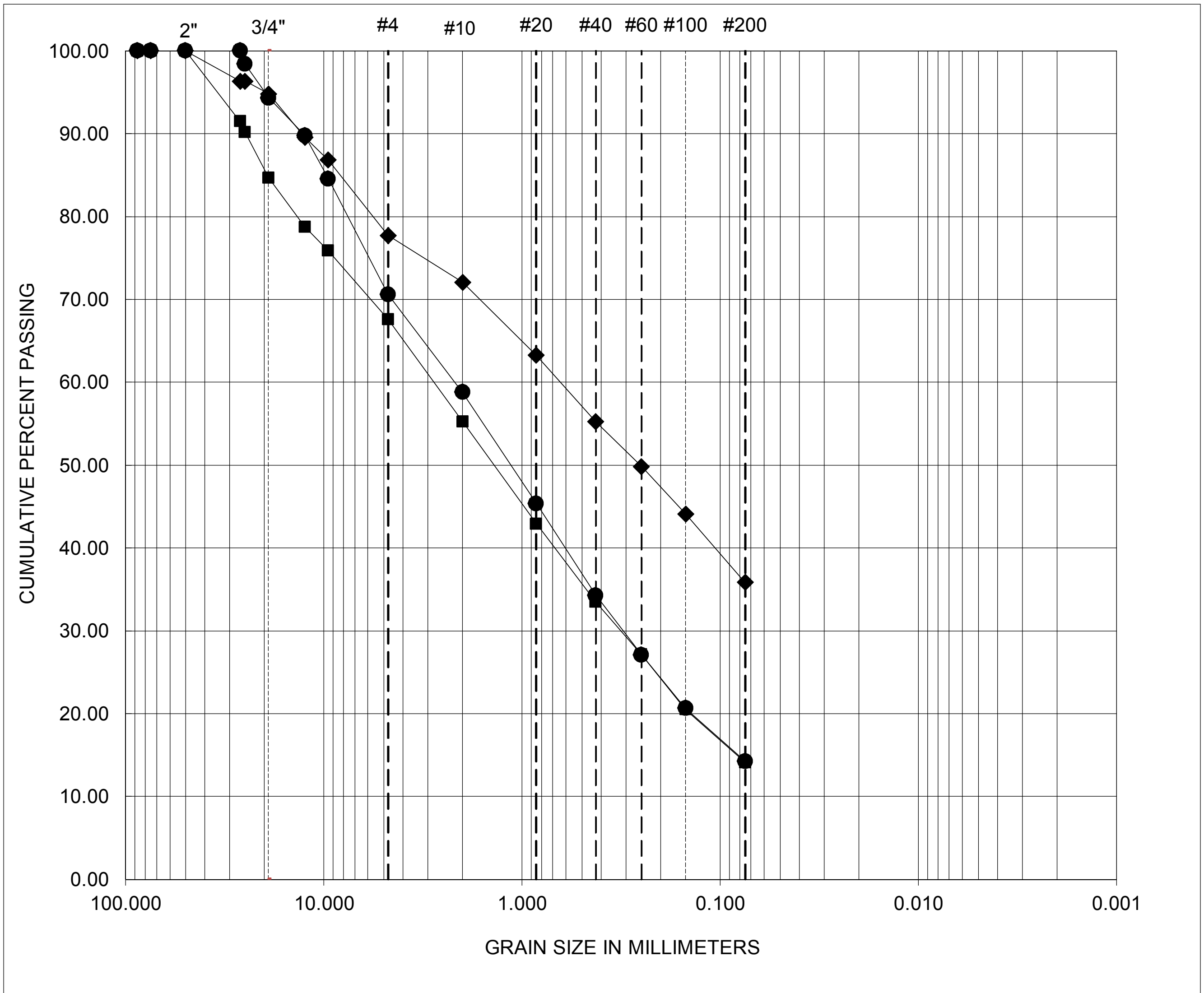
Ranch Cucamonga, CA

PLATE

B-2.2

PROJECT NO. MT-383A

GRAIN SIZE DISTRIBUTION



COBBLE	GRAVEL	SAND	SILT	CLAY

SYMBOL	SAMPLE IDENTIFICATION			PERCENTAGES			ATTERBERG LIMITS			SOIL CLASSIFICATION	USCS TOTAL SAMPLE
	BORING NO.	SAMPLE NO.	DEPTH (ft.)	GRAVEL	SAND	FINES	LL	PL	PI		
♦	B-2	Box 5	46'	22	42	36	19	15	4	Silty, Clayey Sand with Gravel	SC-SM
■	B-3	Box 1	2'	32	53	15	--	--	--	Silty Sand with Gravel	SM
●	B-3	Box 10	92'	30	56	14	--	--	--	Silty Sand with Gravel	SM

GROUP DELTA

GROUP DELTA CONSULTANTS
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500 office
(714) 660-7550 fax

Inland Empire Utilities Agency

San Sevaine Basin Improvement Project

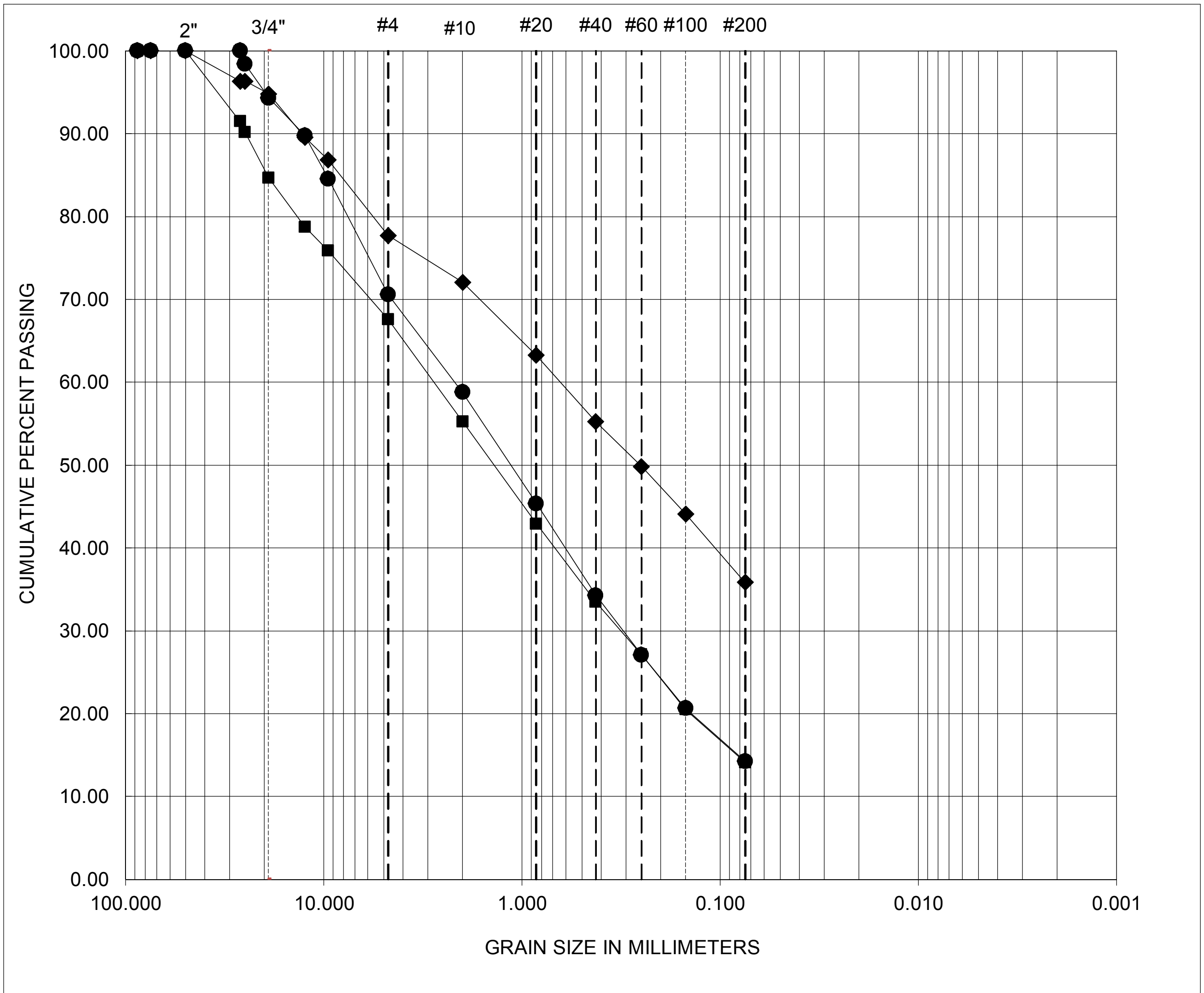
Ranch Cucamonga, CA

PLATE

B-2.2

PROJECT NO. MT-383A

GRAIN SIZE DISTRIBUTION



COBBLE	GRAVEL	SAND	SILT	CLAY

SYMBOL	SAMPLE IDENTIFICATION			PERCENTAGES			ATTERBERG LIMITS			SOIL CLASSIFICATION	USCS TOTAL SAMPLE
	BORING NO.	SAMPLE NO.	DEPTH (ft.)	GRAVEL	SAND	FINES	LL	PL	PI		
♦	B-2	Box 5	46'	22	42	36	19	15	4	Silty, Clayey Sand with Gravel	SC-SM
■	B-3	Box 1	2'	32	53	15	--	--	--	Silty Sand with Gravel	SM
●	B-3	Box 10	92'	30	56	14	--	--	--	Silty Sand with Gravel	SM

GROUP DELTA

GROUP DELTA CONSULTANTS
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500 office
(714) 660-7550 fax

Inland Empire Utilities Agency

San Sevaine Basin Improvement Project

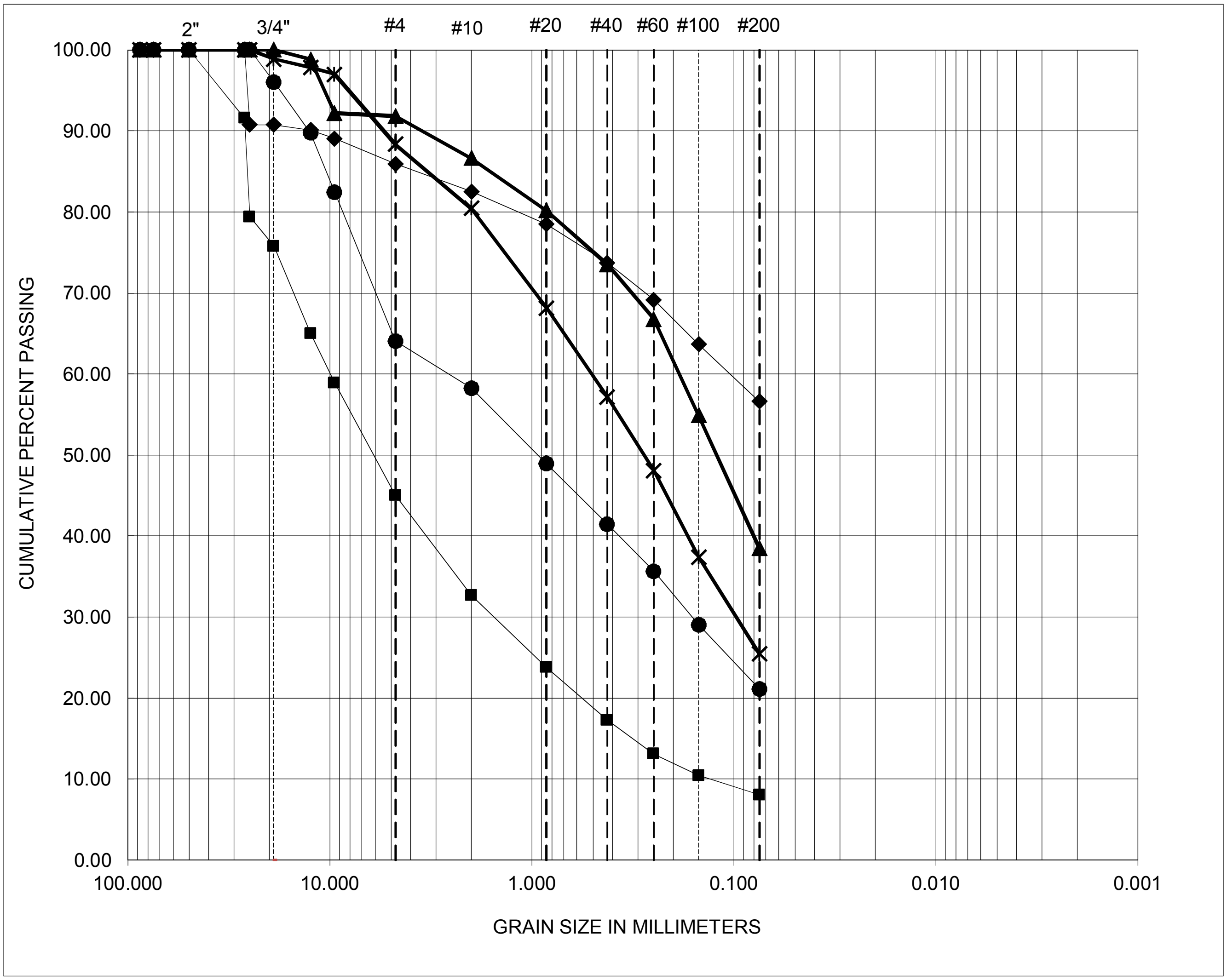
Ranch Cucamonga, CA

PLATE

B-2.3

PROJECT NO. MT-383A

GRAIN SIZE DISTRIBUTION



COBBLE	GRAVEL	SAND	SILT	CLAY

SYMBOL	SAMPLE IDENTIFICATION			PERCENTAGES			ATTERBERG LIMITS			SOIL CLASSIFICATION	USCS TOTAL SAMPLE
	BORING NO.	SAMPLE NO.	DEPTH (ft.)	GRAVEL	SAND	FINES	LL	PL	PI		
◆	B-3	Box 1	1'	14	29	57	44	32	12	Sandy Silt	ML
■	B-3	Box 2	12'	55	37	8	NP	NP	NP	Well Graded Gravel with Silt and Sand	GW-GM
●	B-3	Box 3	22'	36	43	21	25	18	7	Silty, Clayey Sand with Gravel	SC-SM
X	B-3	Box 4	34'	12	63	25	NP	NP	NP	Silty Sand	SM
▲	B-3	Box 4	38'	8	54	38	27	20	7	Silty, Clayey Sand	SC-SM

GROUP DELTA

GROUP DELTA CONSULTANTS
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500 office
(714) 660-7550 fax

Inland Empire Utilities Agency

San Sevaine Basin Improvement Project

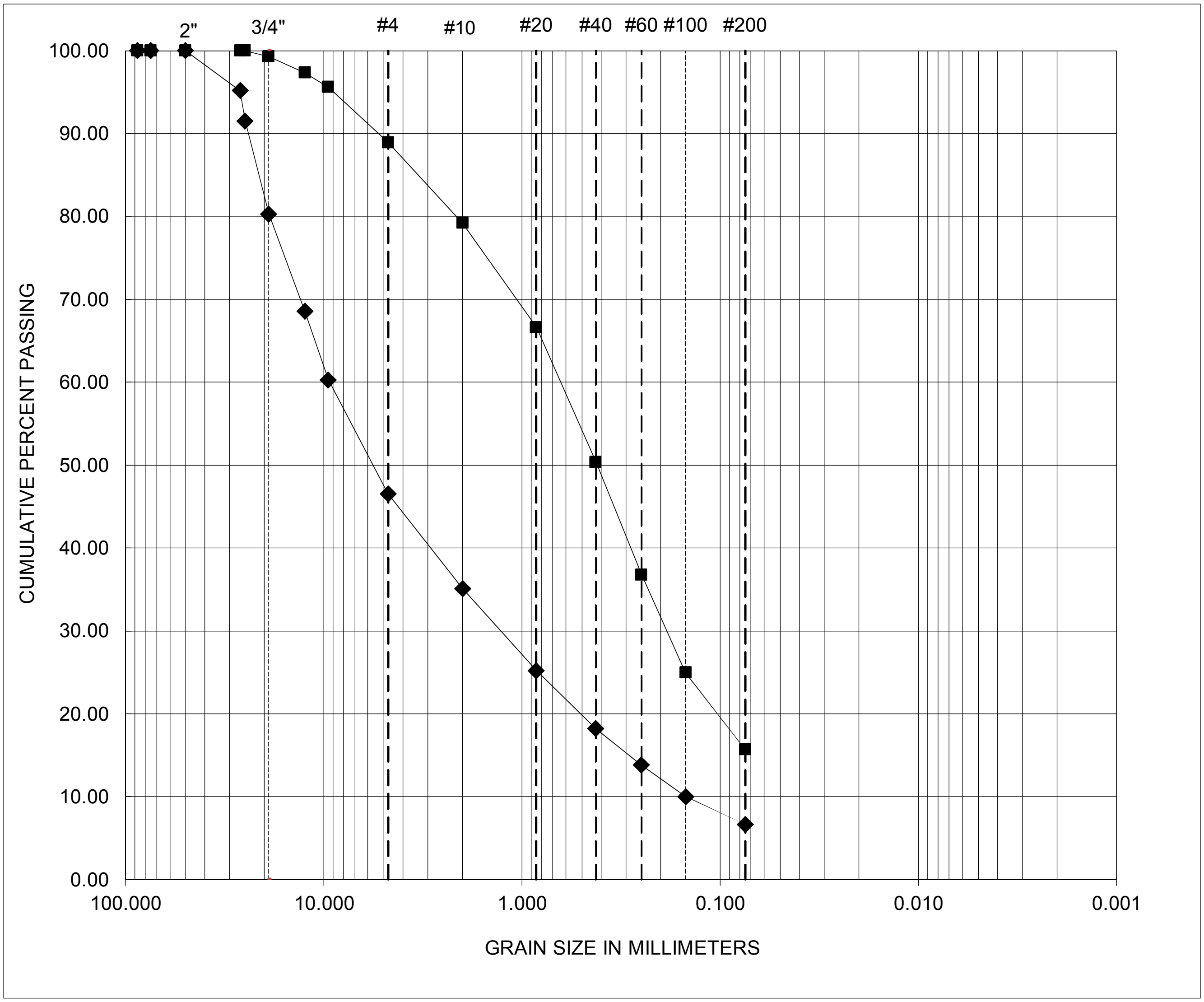
Ranch Cucamonga, CA

PLATE

B-3

PROJECT NO. **MT-383A**

GRAIN SIZE DISTRIBUTION



COBBLE	GRAVEL	SAND	SILT	CLAY

SYMBOL	SAMPLE IDENTIFICATION			PERCENTAGES			ATTERBERG LIMITS			SOIL CLASSIFICATION	USCS TOTAL SAMPLE
	BORING NO.	SAMPLE NO.	DEPTH (ft.)	GRAVEL	SAND	FINES	LL	PL	PI		
♦	B-3	Box 1	7'	53	40	7	--	--	--	Well- Graded Gravel with Silt and Sand	GW-GM
■	B-3	Box 8	73'	11	73	16	--	--	--	Silty Sand	SM

GROUP DELTA

GROUP DELTA CONSULTANTS
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500 office
(714) 660-7550 fax

Inland Empire Utilities Agency

San Sevaine Basin Improvement Project

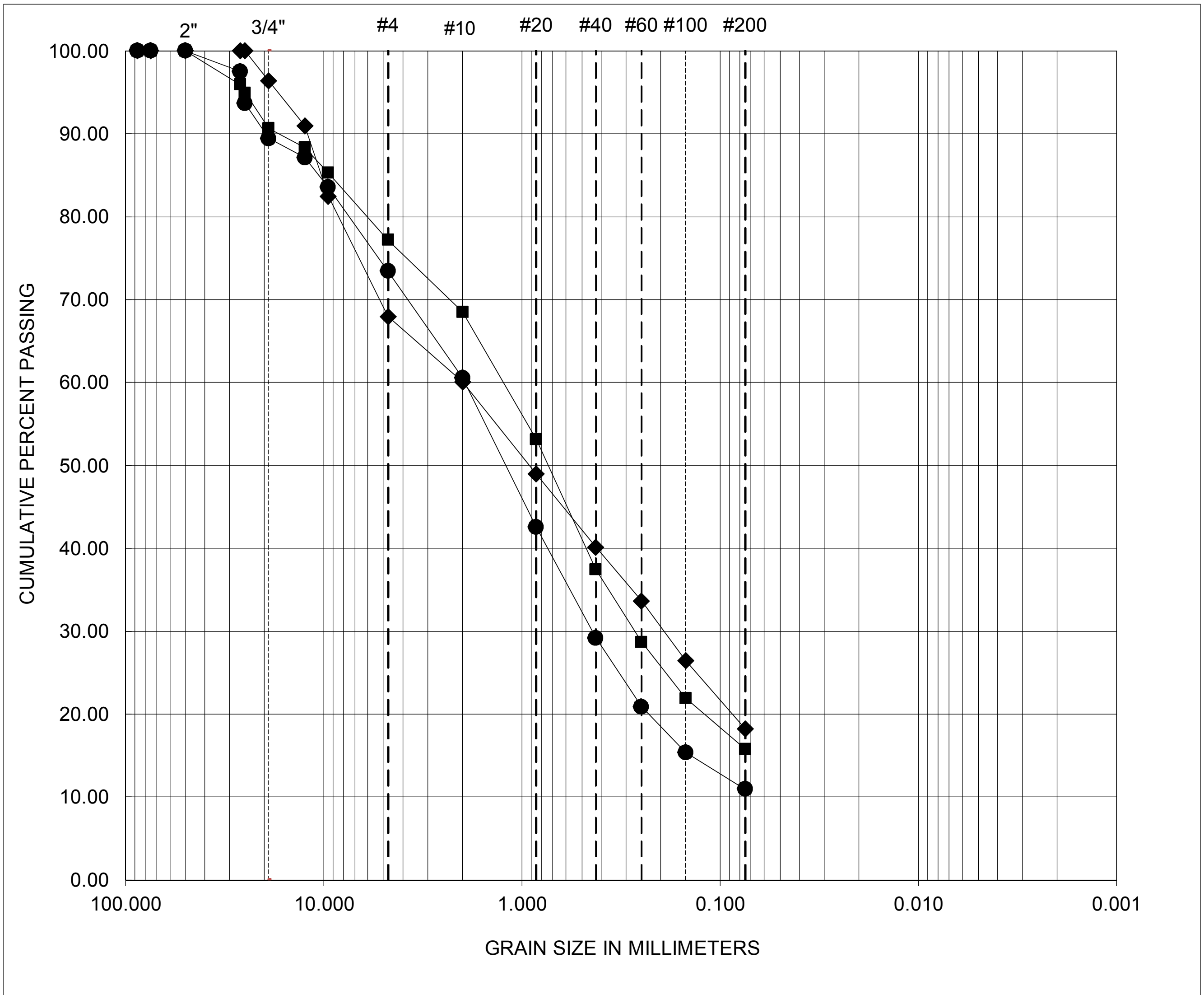
Ranch Cucamonga, CA

PLATE

B-3.1

PROJECT NO. MT-383A

GRAIN SIZE DISTRIBUTION



COBBLE	GRAVEL	SAND	SILT	CLAY

SYMBOL	SAMPLE IDENTIFICATION			PERCENTAGES			ATTERBERG LIMITS			SOIL CLASSIFICATION	USCS TOTAL SAMPLE
	BORING NO.	SAMPLE NO.	DEPTH (ft.)	GRAVEL	SAND	FINES	LL	PL	PI		
◆	B-3	Box 3	24'	32	50	18	--	--	--	Silty Sand with Gravel	SM
■	B-3	Box 4	32'	23	61	16	--	--	--	Silty Sand with Gravel	SM
●	B-3	Box 9	81'	27	62	11	--	--	--	Well- Graded Sand with Silt and Gravel	SW-SM

GROUP DELTA

GROUP DELTA CONSULTANTS
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500 office
(714) 660-7550 fax

Inland Empire Utilities Agency

San Sevaine Basin Improvement Project

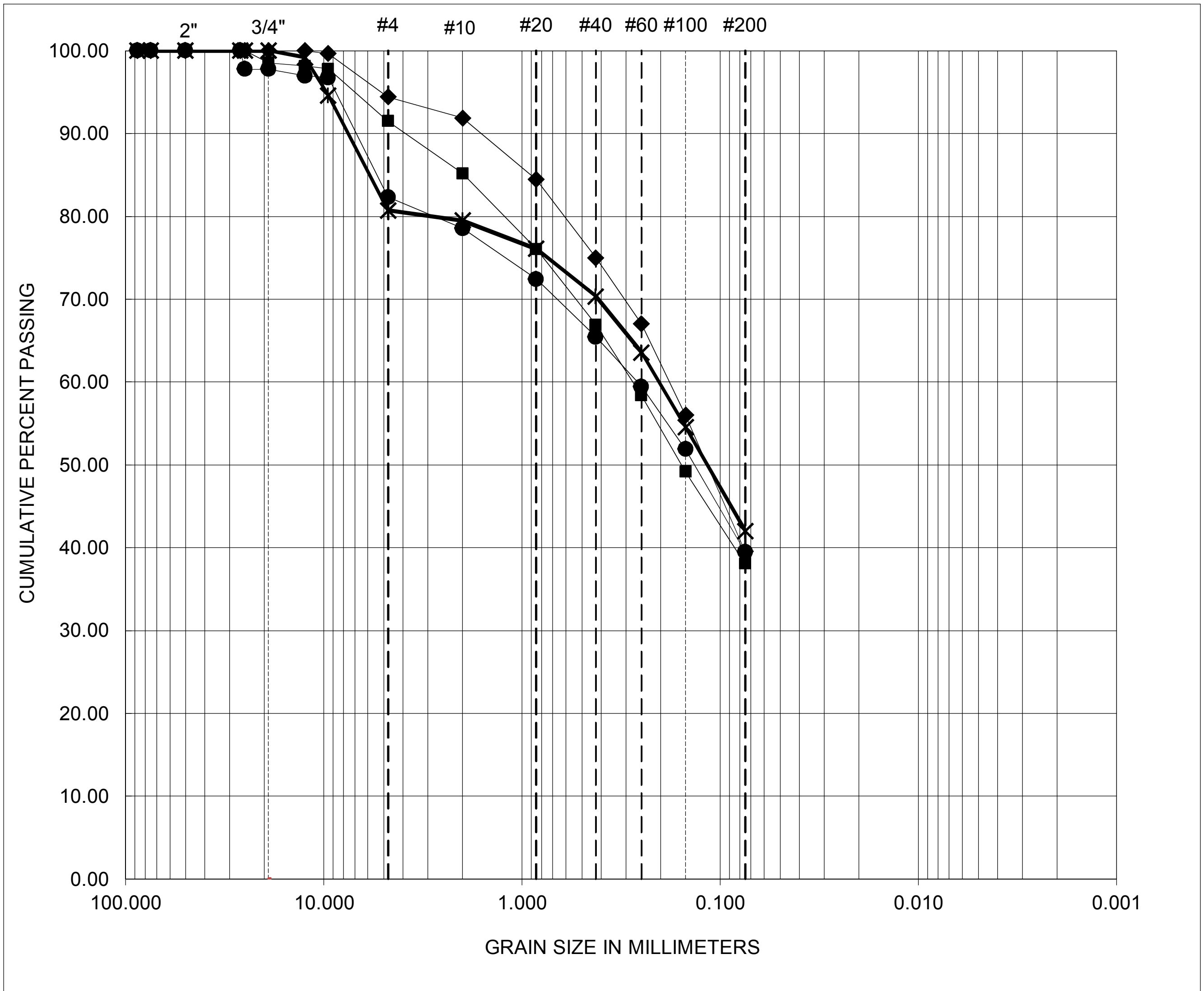
Ranch Cucamonga, CA

PLATE

B-3.2

PROJECT NO. MT-383A

GRAIN SIZE DISTRIBUTION



COBBLE	GRAVEL	SAND	SILT	CLAY

SYMBOL	SAMPLE IDENTIFICATION			PERCENTAGES			ATTERBERG LIMITS			SOIL CLASSIFICATION	USCS TOTAL SAMPLE
	BORING NO.	SAMPLE NO.	DEPTH (ft.)	GRAVEL	SAND	FINES	LL	PL	PI		
♦	B-3	Box 5	42'	5	55	40	26	19	7	Silty, Clayey Sand	SC-SM
■	B-3	Box 5	46'	9	53	38	26	18	8	Clayey Sand	SC
●	B-3	Box 6	56'	18	43	39	27	19	8	Clayey Sand with Gravel	SC
X	B-3	Box 7	65'	19	39	42	28	19	9	Clayey Sand with Gravel	SC

GROUP DELTA

GROUP DELTA CONSULTANTS
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500 office
(714) 660-7550 fax

Inland Empire Utilities Agency

San Sevaine Basin Improvement Project

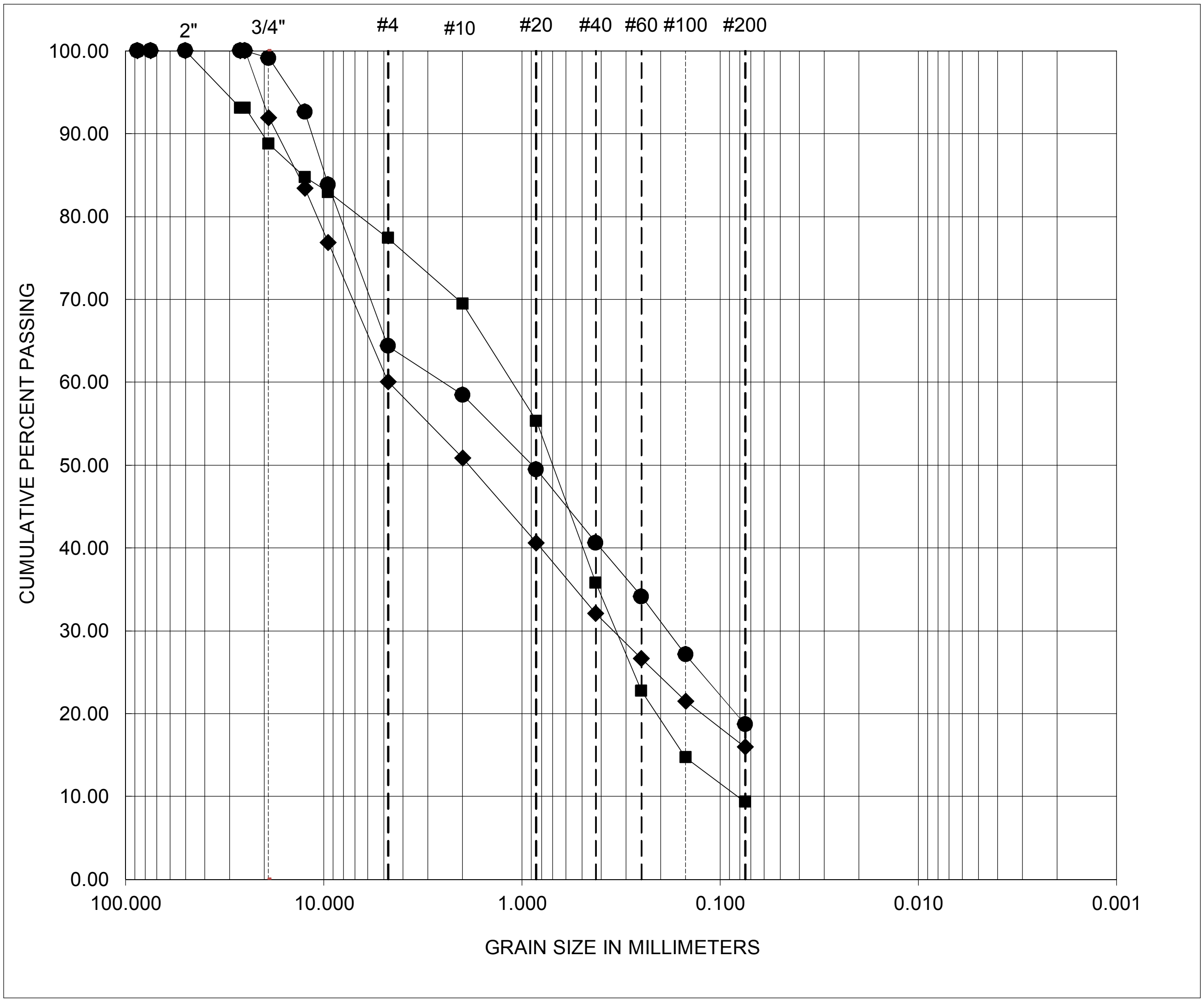
Ranch Cucamonga, CA

PLATE

B-3.3

PROJECT NO. MT-383A

GRAIN SIZE DISTRIBUTION



COBBLE	GRAVEL	SAND	SILT	CLAY

SYMBOL	SAMPLE IDENTIFICATION			PERCENTAGES			ATTERBERG LIMITS			SOIL CLASSIFICATION	USCS TOTAL SAMPLE
	BORING NO.	SAMPLE NO.	DEPTH (ft.)	GRAVEL	SAND	FINES	LL	PL	PI		
◆	B-3	Box 2	17'	40	44	16	--	--	--	Silty Sand with Gravel	SM
■	B-3	Box 5	44'	23	68	9	--	--	--	Well Graded Sand with Silt and Gravel	SW-SM
●	B-3	Box 9	86'	36	46	18	--	--	--	Silty Sand with Gravel	SM

GROUP DELTA CONSULTANTS
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500 office
(714) 660-7550 fax

Inland Empire Utilities Agency

San Sevaine Basin Improvement Project

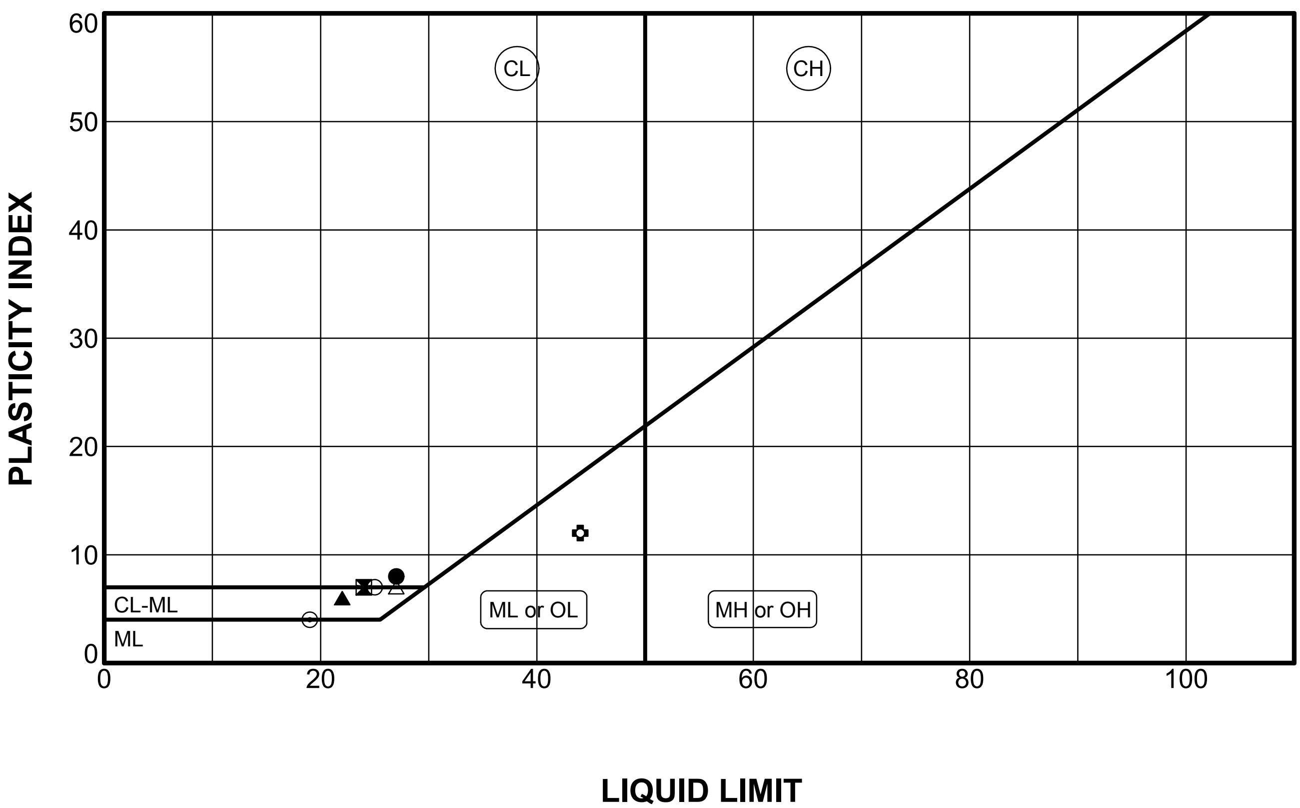
Ranch Cucamonga, CA

PLATE

B-3.4

PROJECT NO. MT-383A

GRAIN SIZE DISTRIBUTION



SYMBOL	BORING	DEPTH (ft)	LL	PL	PI	LI	w%	USCS CLASSIFICATION
●	**B-1**	**16.0**	**27**	**19**	**8**			**(CL) SANDY lean CLAY**
⊠	**B-1**	**22.0**	**24**	**17**	**7**			**(SC-SM) SILTY, CLAYEY SAND**
▲	**B-1**	**27.0**	**22**	**16**	**6**			**(SC-SM) SILTY, CLAYEY SAND**
★	**B-2**	**22.0**	**24**	**17**	**7**			**(SC-SM) SILTY, CLAYEY SAND**
⊙	**B-2**	**46.0**	**19**	**15**	**4**			**(SC-SM) SILTY, CLAYEY SAND with GRAVEL**
✪	**B-3**	**1.0**	**44**	**32**	**12**			**(ML) SANDY SILT**
○	**B-3**	**22.0**	**25**	**18**	**7**			**(SC-SM) SILTY, CLAYEY SAND**
△	**B-3**	**38.0**	**27**	**20**	**7**			**(SC-SM) SILTY, CLAYEY SAND**

GDC_ATTERBERG_APP_E IR487B - I-405 PRELIMINARY FIELD INVESTIGATION - COPY.GPJ GDC_WLOG.GDT 11/19/14

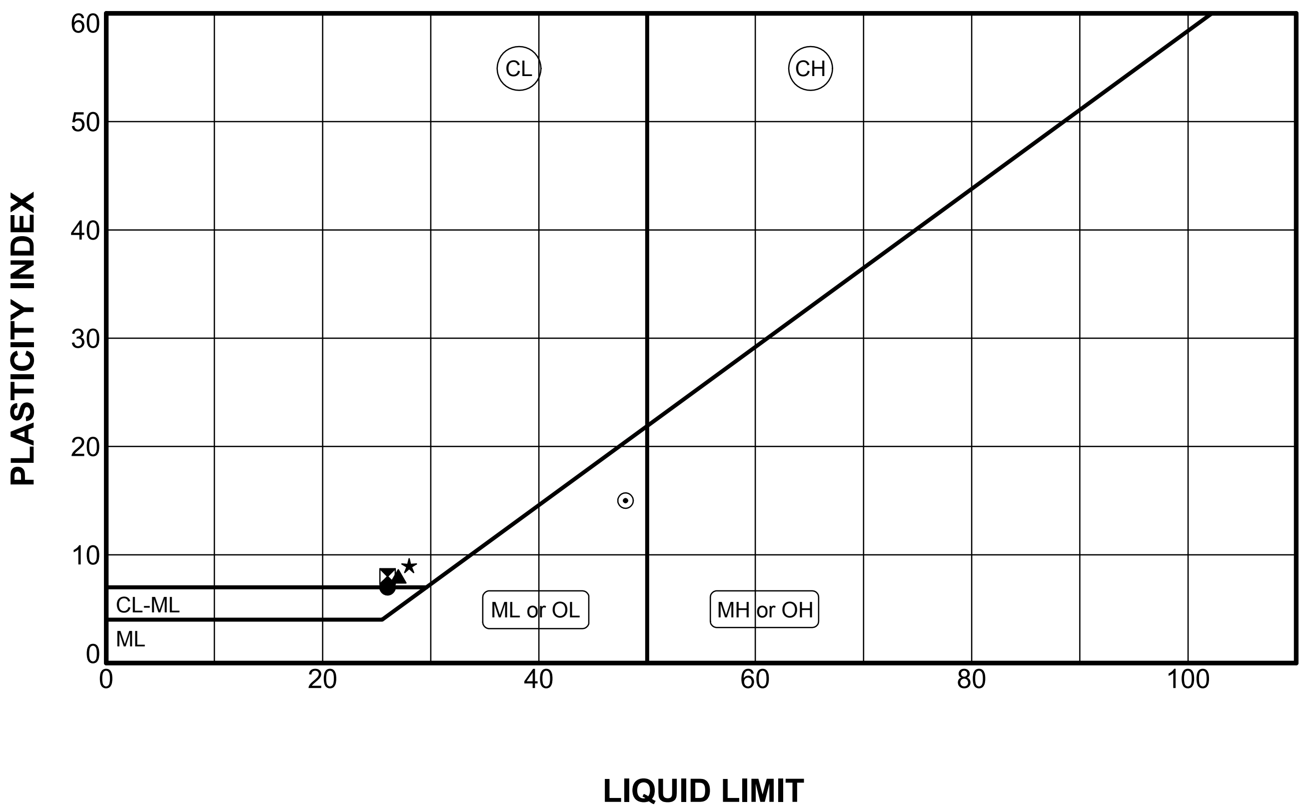
GROUP DELTA CONSULTANTS

ATTERBERG LIMITS

Group Delta Consultants, Inc.

Project: San Sevaine Basin Improvement Project
Location: Rancho Cucamonga, California
Number: MT-383A

FIGURE B-4a



SYMBOL	BORING	DEPTH (ft)	LL	PL	PI	LI	w%	USCS CLASSIFICATION
●	B-3	42.0	26	19	7			(SC-SM) SILTY, CLAYEY SAND
⊠	B-3	46.0	26	18	8			(SC-SM) SILTY, CLAYEY SAND
▲	B-3	56.0	27	19	8			(SC) CLAYEY SAND with GRAVEL
★	B-3	65.0	28	19	9			(SC) CLAYEY SAND with GRAVEL
⊙	TP-5-3-3	3.0	48	33	15			(ML) SANDY SILT

GROUP DELTA CONSULTANTS

ATTERBERG LIMITS

Group Delta Consultants, Inc.

Project: San Sevaine Basin Improvement Project

Location: Rancho Cucamonga, California

Number: MT-383A

FIGURE B-4b

SUMMARY OF PERMEABILITY TEST RESULTS

PROJECT NAME: San Sevaine Basin

EGLAB JOB NO.: 14-053-009

PROJECT NO.: MT383A

CLIENT: Group Delta Consultants

DATE: 12/31/2014

SUMMARIZED BY: JT

BORING NO.	SAMPLE NO.	DEPTH (ft)	MOISTURE CONTENT ASTM D2216 (%)	DRY DENSITY ASTM D2937 (pcf)	EFFECTIVE CONFINED PRESSURE (psi)	SATURATED HYDRAULIC CONDUCTIVITY ASTM D5084 (cm/sec)
B-1	Box 1	4-5	8.0	110.0	3	7.1E-05
B-3	Box 1	3-4	8.0	110.0	3	2.7E-04

Note: Sample was remolded to 110.0 pcf and 8.0% moisture content

Scheevel Engineering, LLC ● P.O. Box 28745 ● Anaheim, CA 92809 ● Phone: (714) 470-9045 ● Email: nathanscheevel@yahoo.com

APPENDIX 2

San Sevaine Basin

San Bernardino-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	0.00	User Defined Unit	130.00	5,662,800.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 32

Climate Zone 10 **Operational Year** 2016

Utility Company Southern California Edison

CO2 Intensity (lb/MWhr) 630.89 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project site is 130 acres

Construction Phase - Total days of Site Prep, grading and building const.

Off-road Equipment - Equipment for site prep

Off-road Equipment - equipment for grading

Off-road Equipment - equipment for building const.

Grading - 18,000 total cubic yards

Trips and VMT - 2700/76/16= truck trips for grading (20 was used for worst case senario), building construction numbers are an assumption.

Construction Off-road Equipment Mitigation - Rule 403 mitigation measures

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	3,100.00	45.00

tblConstructionPhase	NumDays	310.00	76.00
tblConstructionPhase	NumDays	120.00	22.00
tblGrading	AcresOfGrading	190.00	1.12
tblGrading	AcresOfGrading	11.00	0.00
tblGrading	MaterialExported	0.00	18,000.00
tblLandUse	LandUseSquareFeet	0.00	5,662,800.00
tblLandUse	LotAcreage	0.00	130.00
tblOffRoadEquipment	HorsePower	89.00	162.00
tblOffRoadEquipment	LoadFactor	0.20	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Forklifts
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Welders
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblTripsAndVMT	HaulingTripNumber	0.00	20.00
tblTripsAndVMT	VendorTripNumber	928.00	10.00
tblTripsAndVMT	WorkerTripNumber	15.00	8.00
tblTripsAndVMT	WorkerTripNumber	45.00	35.00
tblTripsAndVMT	WorkerTripNumber	2,378.00	20.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	6.8648	61.8354	37.2049	0.0559	18.1557	3.6014	19.3047	9.9544	3.3625	11.0115	0.0000	5,624.1368	5,624.1368	1.4493	0.0000	5,654.5714

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
2016	6.4111	58.0833	36.3749	0.0558	6.4651	3.3490	9.8141	3.4222	3.1253	6.5474	0.0000	5,562.3088	5,562.3088	1.4309	0.0000	5,592.3569
Total	**13.2759**	**119.9187**	**73.5798**	**0.1117**	**24.6208**	**6.9504**	**29.1188**	**13.3766**	**6.4878**	**17.5589**	**0.0000**	**11,186.4457**	**11,186.4457**	**2.8801**	**0.0000**	**11,246.9283**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	6.8648	61.8354	37.2049	0.0559	6.7830	3.6014	7.9320	3.7030	3.3625	4.7602	0.0000	5,624.1368	5,624.1368	1.4493	0.0000	5,654.5714
2016	6.4111	58.0833	36.3749	0.0558	2.6475	3.3490	5.9965	1.3348	3.1253	4.4600	0.0000	5,562.3088	5,562.3088	1.4309	0.0000	5,592.3569
Total	**13.2759**	**119.9187**	**73.5798**	**0.1117**	**9.4305**	**6.9504**	**13.9285**	**5.0378**	**6.4878**	**9.2202**	**0.0000**	**11,186.4457**	**11,186.4457**	**2.8801**	**0.0000**	**11,246.9283**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**61.70**	**0.00**	**52.17**	**62.34**	**0.00**	**47.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2015	10/30/2015	5	22	
2	Grading	Grading	10/31/2015	2/15/2016	5	76	
3	Building Construction	Building Construction	2/16/2016	4/18/2016	5	45	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1.12

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	174	0.41
Grading	Cranes	1	4.00	226	0.29
Grading	Forklifts	3	4.00	162	0.38
Grading	Excavators	1	6.00	162	0.38
Grading	Graders	2	8.00	174	0.41
Building Construction	Generator Sets	1	4.00	84	0.74
Grading	Off-Highway Trucks	2	2.00	400	0.38
Building Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Tractors/Loaders/Backhoes	3	6.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Generator Sets	1	8.00	84	0.74
Grading	Welders	2	6.00	46	0.45
Building Construction	Air Compressors	1	8.00	78	0.48
Building Construction	Skid Steer Loaders	1	8.00	64	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	6	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	18	35.00	0.00	20.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	20.00	10.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	1.7826	17.7321	9.8319	0.0125		1.1483	1.1483		1.0565	1.0565		1,312.0418	1,312.0418	0.3917		1,320.2675
Total	**1.7826**	**17.7321**	**9.8319**	**0.0125**	**18.0663**	**1.1483**	**19.2146**	**9.9307**	**1.0565**	**10.9872**		**1,312.0418**	**1,312.0418**	**0.3917**		**1,320.2675**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0363	0.0499	0.5256	1.0200e-003	0.0894	7.0000e-004	0.0901	0.0237	6.4000e-004	0.0244		88.2799	88.2799	5.0800e-003		88.3865
Total	**0.0363**	**0.0499**	**0.5256**	**1.0200e-003**	**0.0894**	**7.0000e-004**	**0.0901**	**0.0237**	**6.4000e-004**	**0.0244**		**88.2799**	**88.2799**	**5.0800e-003**		**88.3865**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.6936	0.0000	6.6936	3.6793	0.0000	3.6793			0.0000			0.0000
Off-Road	1.7826	17.7321	9.8319	0.0125		1.1483	1.1483		1.0565	1.0565	0.0000	1,312.0418	1,312.0418	0.3917		1,320.2675
Total	**1.7826**	**17.7321**	**9.8319**	**0.0125**	**6.6936**	**1.1483**	**7.8419**	**3.6793**	**1.0565**	**4.7358**	**0.0000**	**1,312.0418**	**1,312.0418**	**0.3917**		**1,320.2675**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0363	0.0499	0.5256	1.0200e-003	0.0894	7.0000e-004	0.0901	0.0237	6.4000e-004	0.0244		88.2799	88.2799	5.0800e-003		88.3865
Total	**0.0363**	**0.0499**	**0.5256**	**1.0200e-003**	**0.0894**	**7.0000e-004**	**0.0901**	**0.0237**	**6.4000e-004**	**0.0244**		**88.2799**	**88.2799**	**5.0800e-003**		**88.3865**

3.3 Grading - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Fugitive Dust					6.0645	0.0000	6.0645	3.3160	0.0000	3.3160			0.0000			0.0000
Off-Road	6.7008	61.5314	34.8444	0.0512		3.5969	3.5969		3.3584	3.3584		5,218.2924	5,218.2924	1.4269		5,248.2570
Total	**6.7008**	**61.5314**	**34.8444**	**0.0512**	**6.0645**	**3.5969**	**9.6614**	**3.3160**	**3.3584**	**6.6744**		**5,218.2924**	**5,218.2924**	**1.4269**		**5,248.2570**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.3700e-003	0.0855	0.0611	1.9000e-004	7.1100e-003	1.4100e-003	8.5300e-003	1.8800e-003	1.3000e-003	3.1800e-003		19.6201	19.6201	1.6000e-004		19.6234
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1586	0.2185	2.2994	4.4800e-003	0.3912	3.0600e-003	0.3943	0.1038	2.8000e-003	0.1066		386.2243	386.2243	0.0222		386.6910
Total	**0.1640**	**0.3040**	**2.3605**	**4.6700e-003**	**0.3983**	**4.4700e-003**	**0.4028**	**0.1056**	**4.1000e-003**	**0.1097**		**405.8444**	**405.8444**	**0.0224**		**406.3144**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.2469	0.0000	2.2469	1.2286	0.0000	1.2286			0.0000			0.0000
Off-Road	6.7008	61.5314	34.8444	0.0512		3.5969	3.5969		3.3584	3.3584	0.0000	5,218.2924	5,218.2924	1.4269		5,248.2570

Total	**6.7008**	**61.5314**	**34.8444**	**0.0512**	**2.2469**	**3.5969**	**5.8438**	**1.2286**	**3.3584**	**4.5870**	**0.0000**	**5,218.2924**	**5,218.2924**	**1.4269**		**5,248.2570**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.3700e-003	0.0855	0.0611	1.9000e-004	7.1100e-003	1.4100e-003	8.5300e-003	1.8800e-003	1.3000e-003	3.1800e-003		19.6201	19.6201	1.6000e-004		19.6234
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1586	0.2185	2.2994	4.4800e-003	0.3912	3.0600e-003	0.3943	0.1038	2.8000e-003	0.1066		386.2243	386.2243	0.0222		386.6910
Total	**0.1640**	**0.3040**	**2.3605**	**4.6700e-003**	**0.3983**	**4.4700e-003**	**0.4028**	**0.1056**	**4.1000e-003**	**0.1097**		**405.8444**	**405.8444**	**0.0224**		**406.3144**

3.3 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0645	0.0000	6.0645	3.3160	0.0000	3.3160			0.0000			0.0000
Off-Road	6.2649	57.8123	34.2558	0.0512		3.3450	3.3450		3.1215	3.1215		5,170.6002	5,170.6002	1.4104		5,200.2189
Total	**6.2649**	**57.8123**	**34.2558**	**0.0512**	**6.0645**	**3.3450**	**9.4095**	**3.3160**	**3.1215**	**6.4375**		**5,170.6002**	**5,170.6002**	**1.4104**		**5,200.2189**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	4.7300e-003	0.0754	0.0571	1.9000e-004	9.3700e-003	1.1300e-003	0.0105	2.4300e-003	1.0400e-003	3.4700e-003		19.4004	19.4004	1.4000e-004		19.4033
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1414	0.1955	2.0619	4.4800e-003	0.3912	2.9000e-003	0.3941	0.1038	2.6700e-003	0.1064		372.3083	372.3083	0.0203		372.7347
Total	**0.1462**	**0.2709**	**2.1191**	**4.6700e-003**	**0.4006**	**4.0300e-003**	**0.4046**	**0.1062**	**3.7100e-003**	**0.1099**		**391.7086**	**391.7086**	**0.0205**		**392.1380**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Fugitive Dust					2.2469	0.0000	2.2469	1.2286	0.0000	1.2286			0.0000			0.0000
Off-Road	6.2649	57.8123	34.2558	0.0512		3.3450	3.3450		3.1215	3.1215	0.0000	5,170.6002	5,170.6002	1.4104		5,200.2189
Total	**6.2649**	**57.8123**	**34.2558**	**0.0512**	**2.2469**	**3.3450**	**5.5919**	**1.2286**	**3.1215**	**4.3501**	**0.0000**	**5,170.6002**	**5,170.6002**	**1.4104**		**5,200.2189**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Hauling	4.7300e-003	0.0754	0.0571	1.9000e-004	9.3700e-003	1.1300e-003	0.0105	2.4300e-003	1.0400e-003	3.4700e-003		19.4004	19.4004	1.4000e-004		19.4033
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1414	0.1955	2.0619	4.4800e-003	0.3912	2.9000e-003	0.3941	0.1038	2.6700e-003	0.1064		372.3083	372.3083	0.0203		372.7347
Total	**0.1462**	**0.2709**	**2.1191**	**4.6700e-003**	**0.4006**	**4.0300e-003**	**0.4046**	**0.1062**	**3.7100e-003**	**0.1099**		**391.7086**	**391.7086**	**0.0205**		**392.1380**

3.4 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2655	10.3115	8.2159	0.0124		0.7646	0.7646		0.7380	0.7380		1,221.9104	1,221.9104	0.2342		1,226.8278
Total	**1.2655**	**10.3115**	**8.2159**	**0.0124**		**0.7646**	**0.7646**		**0.7380**	**0.7380**		**1,221.9104**	**1,221.9104**	**0.2342**		**1,226.8278**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0902	0.8969	1.1394	2.1600e-003	0.0628	0.0146	0.0774	0.0179	0.0134	0.0314		216.2128	216.2128	1.6200e-003		216.2467
Worker	0.0808	0.1117	1.1783	2.5600e-003	0.2236	1.6600e-003	0.2252	0.0593	1.5200e-003	0.0608		212.7476	212.7476	0.0116		212.9913
Total	**0.1710**	**1.0086**	**2.3177**	**4.7200e-003**	**0.2864**	**0.0163**	**0.3026**	**0.0772**	**0.0150**	**0.0922**		**428.9604**	**428.9604**	**0.0132**		**429.2380**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2655	10.3115	8.2159	0.0124		0.7646	0.7646		0.7380	0.7380	0.0000	1,221.910 4	1,221.9104	0.2342		1,226.8278
Total	**1.2655**	**10.3115**	**8.2159**	**0.0124**		**0.7646**	**0.7646**		**0.7380**	**0.7380**	**0.0000**	**1,221.910 4**	**1,221.9104**	**0.2342**		**1,226.8278**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0902	0.8969	1.1394	2.1600e-003	0.0628	0.0146	0.0774	0.0179	0.0134	0.0314		216.2128	216.2128	1.6200e-003		216.2467
Worker	0.0808	0.1117	1.1783	2.5600e-003	0.2236	1.6600e-003	0.2252	0.0593	1.5200e-003	0.0608		212.7476	212.7476	0.0116		212.9913
Total	**0.1710**	**1.0086**	**2.3177**	**4.7200e-003**	**0.2864**	**0.0163**	**0.3026**	**0.0772**	**0.0150**	**0.0922**		**428.9604**	**428.9604**	**0.0132**		**429.2380**

San Sevaine Basin

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	0.00	User Defined Unit	130.00	5,662,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2016
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project site is 130 acres

Construction Phase - Total days of Site Prep, grading and building const.

Off-road Equipment - Equipment for site prep

Off-road Equipment - equipment for grading

Off-road Equipment - equipment for building const.

Grading - 18,000 total cubic yards

Trips and VMT - 2700/76/16= truck trips for grading (20 was used for worst case senario), building construction numbers are an assumption.

Construction Off-road Equipment Mitigation - Rule 403 mitigation measures

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	3,100.00	45.00

tblConstructionPhase	NumDays	310.00	76.00
tblConstructionPhase	NumDays	120.00	22.00
tblGrading	AcresOfGrading	190.00	1.12
tblGrading	AcresOfGrading	11.00	0.00
tblGrading	MaterialExported	0.00	18,000.00
tblLandUse	LandUseSquareFeet	0.00	5,662,800.00
tblLandUse	LotAcreage	0.00	130.00
tblOffRoadEquipment	HorsePower	89.00	162.00
tblOffRoadEquipment	LoadFactor	0.20	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Forklifts
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Welders
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblTripsAndVMT	HaulingTripNumber	0.00	20.00
tblTripsAndVMT	VendorTripNumber	928.00	10.00
tblTripsAndVMT	WorkerTripNumber	15.00	8.00
tblTripsAndVMT	WorkerTripNumber	45.00	35.00
tblTripsAndVMT	WorkerTripNumber	2,378.00	20.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.1709	1.5562	0.9346	1.3800e-003	0.4387	0.0919	0.5306	0.2378	0.0856	0.3234	0.0000	126.3537	126.3537	0.0329	0.0000	127.0443

2016	0.1347	1.1847	0.8219	1.2800e-003	0.2431	0.0712	0.3142	0.1294	0.0669	0.1963	0.0000	114.6063	114.6063	0.0258	0.0000	115.1484
Total	**0.3055**	**2.7409**	**1.7565**	**2.6600e-003**	**0.6818**	**0.1630**	**0.8448**	**0.3672**	**0.1525**	**0.5197**	**0.0000**	**240.9600**	**240.9600**	**0.0587**	**0.0000**	**242.1927**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.1709	1.5562	0.9346	1.3800e-003	0.1686	0.0919	0.2604	0.0897	0.0856	0.1753	0.0000	126.3536	126.3536	0.0329	0.0000	127.0442
2016	0.1347	1.1847	0.8219	1.2800e-003	0.0980	0.0712	0.1692	0.0501	0.0669	0.1170	0.0000	114.6061	114.6061	0.0258	0.0000	115.1483
Total	**0.3055**	**2.7409**	**1.7565**	**2.6600e-003**	**0.2666**	**0.1630**	**0.4296**	**0.1398**	**0.1525**	**0.2923**	**0.0000**	**240.9597**	**240.9597**	**0.0587**	**0.0000**	**242.1925**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**60.90**	**0.00**	**49.15**	**61.93**	**0.00**	**43.76**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2015	10/30/2015	5	22	
2	Grading	Grading	10/31/2015	2/15/2016	5	76	
3	Building Construction	Building Construction	2/16/2016	4/18/2016	5	45	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1.12

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	174	0.41
Grading	Cranes	1	4.00	226	0.29
Grading	Forklifts	3	4.00	162	0.38
Grading	Excavators	1	6.00	162	0.38
Grading	Graders	2	8.00	174	0.41
Building Construction	Generator Sets	1	4.00	84	0.74
Grading	Off-Highway Trucks	2	2.00	400	0.38
Building Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Tractors/Loaders/Backhoes	3	6.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Generator Sets	1	8.00	84	0.74
Grading	Welders	2	6.00	46	0.45
Building Construction	Air Compressors	1	8.00	78	0.48
Building Construction	Skid Steer Loaders	1	8.00	64	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	6	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	18	35.00	0.00	20.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	20.00	10.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1987	0.0000	0.1987	0.1092	0.0000	0.1092	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0196	0.1951	0.1082	1.4000e-004		0.0126	0.0126		0.0116	0.0116	0.0000	13.0929	13.0929	3.9100e-003	0.0000	13.1750
Total	**0.0196**	**0.1951**	**0.1082**	**1.4000e-004**	**0.1987**	**0.0126**	**0.2114**	**0.1092**	**0.0116**	**0.1209**	**0.0000**	**13.0929**	**13.0929**	**3.9100e-003**	**0.0000**	**13.1750**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8000e-004	5.7000e-004	6.0000e-003	1.0000e-005	9.6000e-004	1.0000e-005	9.7000e-004	2.6000e-004	1.0000e-005	2.6000e-004	0.0000	0.8945	0.8945	5.0000e-005	0.0000	0.8956
Total	**3.8000e-004**	**5.7000e-004**	**6.0000e-003**	**1.0000e-005**	**9.6000e-004**	**1.0000e-005**	**9.7000e-004**	**2.6000e-004**	**1.0000e-005**	**2.6000e-004**	**0.0000**	**0.8945**	**0.8945**	**5.0000e-005**	**0.0000**	**0.8956**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0736	0.0000	0.0736	0.0405	0.0000	0.0405	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0196	0.1951	0.1082	1.4000e-004		0.0126	0.0126		0.0116	0.0116	0.0000	13.0929	13.0929	3.9100e-003	0.0000	13.1750
Total	**0.0196**	**0.1951**	**0.1082**	**1.4000e-004**	**0.0736**	**0.0126**	**0.0863**	**0.0405**	**0.0116**	**0.0521**	**0.0000**	**13.0929**	**13.0929**	**3.9100e-003**	**0.0000**	**13.1750**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8000e-004	5.7000e-004	6.0000e-003	1.0000e-005	9.6000e-004	1.0000e-005	9.7000e-004	2.6000e-004	1.0000e-005	2.6000e-004	0.0000	0.8945	0.8945	5.0000e-005	0.0000	0.8956
Total	**3.8000e-004**	**5.7000e-004**	**6.0000e-003**	**1.0000e-005**	**9.6000e-004**	**1.0000e-005**	**9.7000e-004**	**2.6000e-004**	**1.0000e-005**	**2.6000e-004**	**0.0000**	**0.8945**	**0.8945**	**5.0000e-005**	**0.0000**	**0.8956**

3.3 Grading - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Fugitive Dust					0.2305	0.0000	0.2305	0.1260	0.0000	0.1260	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1474	1.3537	0.7666	1.1300e-003		0.0791	0.0791		0.0739	0.0739	0.0000	104.1470	104.1470	0.0285	0.0000	104.7451
Total	**0.1474**	**1.3537**	**0.7666**	**1.1300e-003**	**0.2305**	**0.0791**	**0.3096**	**0.1260**	**0.0739**	**0.1999**	**0.0000**	**104.1470**	**104.1470**	**0.0285**	**0.0000**	**104.7451**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2000e-004	1.9100e-003	1.3700e-003	0.0000	1.5000e-004	3.0000e-005	1.8000e-004	4.0000e-005	3.0000e-005	7.0000e-005	0.0000	0.3921	0.3921	0.0000	0.0000	0.3922
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3300e-003	5.0000e-003	0.0525	1.0000e-004	8.4400e-003	7.0000e-005	8.5100e-003	2.2400e-003	6.0000e-005	2.3000e-003	0.0000	7.8272	7.8272	4.4000e-004	0.0000	7.8365
Total	**3.4500e-003**	**6.9100e-003**	**0.0539**	**1.0000e-004**	**8.5900e-003**	**1.0000e-004**	**8.6900e-003**	**2.2800e-003**	**9.0000e-005**	**2.3700e-003**	**0.0000**	**8.2193**	**8.2193**	**4.4000e-004**	**0.0000**	**8.2287**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0854	0.0000	0.0854	0.0467	0.0000	0.0467	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1474	1.3537	0.7666	1.1300e-003		0.0791	0.0791		0.0739	0.0739	0.0000	104.1469	104.1469	0.0285	0.0000	104.7449

Total	**0.1474**	**1.3537**	**0.7666**	**1.1300e-003**	**0.0854**	**0.0791**	**0.1645**	**0.0467**	**0.0739**	**0.1206**	**0.0000**	**104.1469**	**104.1469**	**0.0285**	**0.0000**	**104.7449**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2000e-004	1.9100e-003	1.3700e-003	0.0000	1.5000e-004	3.0000e-005	1.8000e-004	4.0000e-005	3.0000e-005	7.0000e-005	0.0000	0.3921	0.3921	0.0000	0.0000	0.3922
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3300e-003	5.0000e-003	0.0525	1.0000e-004	8.4400e-003	7.0000e-005	8.5100e-003	2.2400e-003	6.0000e-005	2.3000e-003	0.0000	7.8272	7.8272	4.4000e-004	0.0000	7.8365
Total	**3.4500e-003**	**6.9100e-003**	**0.0539**	**1.0000e-004**	**8.5900e-003**	**1.0000e-004**	**8.6900e-003**	**2.2800e-003**	**9.0000e-005**	**2.3700e-003**	**0.0000**	**8.2193**	**8.2193**	**4.4000e-004**	**0.0000**	**8.2287**

3.3 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2305	0.0000	0.2305	0.1260	0.0000	0.1260	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1002	0.9250	0.5481	8.2000e-004		0.0535	0.0535		0.0499	0.0499	0.0000	75.0510	75.0510	0.0205	0.0000	75.4810
Total	**0.1002**	**0.9250**	**0.5481**	**8.2000e-004**	**0.2305**	**0.0535**	**0.2840**	**0.1260**	**0.0499**	**0.1760**	**0.0000**	**75.0510**	**75.0510**	**0.0205**	**0.0000**	**75.4810**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0000e-005	1.2300e-003	9.3000e-004	0.0000	1.5000e-004	2.0000e-005	1.7000e-004	4.0000e-005	2.0000e-005	5.0000e-005	0.0000	0.2820	0.2820	0.0000	0.0000	0.2820
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1600e-003	3.2500e-003	0.0342	7.0000e-005	6.1400e-003	5.0000e-005	6.1900e-003	1.6300e-003	4.0000e-005	1.6700e-003	0.0000	5.4875	5.4875	2.9000e-004	0.0000	5.4937
Total	**2.2400e-003**	**4.4800e-003**	**0.0352**	**7.0000e-005**	**6.2900e-003**	**7.0000e-005**	**6.3600e-003**	**1.6700e-003**	**6.0000e-005**	**1.7200e-003**	**0.0000**	**5.7695**	**5.7695**	**2.9000e-004**	**0.0000**	**5.7757**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0854	0.0000	0.0854	0.0467	0.0000	0.0467	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1002	0.9250	0.5481	8.2000e-004		0.0535	0.0535		0.0499	0.0499	0.0000	75.0509	75.0509	0.0205	0.0000	75.4809
Total	**0.1002**	**0.9250**	**0.5481**	**8.2000e-004**	**0.0854**	**0.0535**	**0.1389**	**0.0467**	**0.0499**	**0.0966**	**0.0000**	**75.0509**	**75.0509**	**0.0205**	**0.0000**	**75.4809**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Hauling	8.0000e-005	1.2300e-003	9.3000e-004	0.0000	1.5000e-004	2.0000e-005	1.7000e-004	4.0000e-005	2.0000e-005	5.0000e-005	0.0000	0.2820	0.2820	0.0000	0.0000	0.2820
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1600e-003	3.2500e-003	0.0342	7.0000e-005	6.1400e-003	5.0000e-005	6.1900e-003	1.6300e-003	4.0000e-005	1.6700e-003	0.0000	5.4875	5.4875	2.9000e-004	0.0000	5.4937
Total	**2.2400e-003**	**4.4800e-003**	**0.0352**	**7.0000e-005**	**6.2900e-003**	**7.0000e-005**	**6.3600e-003**	**1.6700e-003**	**6.0000e-005**	**1.7200e-003**	**0.0000**	**5.7695**	**5.7695**	**2.9000e-004**	**0.0000**	**5.7757**

3.4 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0285	0.2320	0.1849	2.8000e-004		0.0172	0.0172		0.0166	0.0166	0.0000	24.9412	24.9412	4.7800e-003	0.0000	25.0416
Total	**0.0285**	**0.2320**	**0.1849**	**2.8000e-004**		**0.0172**	**0.0172**		**0.0166**	**0.0166**	**0.0000**	**24.9412**	**24.9412**	**4.7800e-003**	**0.0000**	**25.0416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0200e-003	0.0206	0.0263	5.0000e-005	1.3900e-003	3.3000e-004	1.7200e-003	4.0000e-004	3.0000e-004	7.0000e-004	0.0000	4.4349	4.4349	3.0000e-005	0.0000	4.4356
Worker	1.7300e-003	2.6100e-003	0.0275	6.0000e-005	4.9300e-003	4.0000e-005	4.9700e-003	1.3100e-003	3.0000e-005	1.3400e-003	0.0000	4.4096	4.4096	2.4000e-004	0.0000	4.4146
Total	**3.7500e-003**	**0.0232**	**0.0538**	**1.1000e-004**	**6.3200e-003**	**3.7000e-004**	**6.6900e-003**	**1.7100e-003**	**3.3000e-004**	**2.0400e-003**	**0.0000**	**8.8445**	**8.8445**	**2.7000e-004**	**0.0000**	**8.8502**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0285	0.2320	0.1849	2.8000e-004		0.0172	0.0172		0.0166	0.0166	0.0000	24.9412	24.9412	4.7800e-003	0.0000	25.0416
Total	**0.0285**	**0.2320**	**0.1849**	**2.8000e-004**		**0.0172**	**0.0172**		**0.0166**	**0.0166**	**0.0000**	**24.9412**	**24.9412**	**4.7800e-003**	**0.0000**	**25.0416**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0200e-003	0.0206	0.0263	5.0000e-005	1.3900e-003	3.3000e-004	1.7200e-003	4.0000e-004	3.0000e-004	7.0000e-004	0.0000	4.4349	4.4349	3.0000e-005	0.0000	4.4356
Worker	1.7300e-003	2.6100e-003	0.0275	6.0000e-005	4.9300e-003	4.0000e-005	4.9700e-003	1.3100e-003	3.0000e-005	1.3400e-003	0.0000	4.4096	4.4096	2.4000e-004	0.0000	4.4146
Total	**3.7500e-003**	**0.0232**	**0.0538**	**1.1000e-004**	**6.3200e-003**	**3.7000e-004**	**6.6900e-003**	**1.7100e-003**	**3.3000e-004**	**2.0400e-003**	**0.0000**	**8.8445**	**8.8445**	**2.7000e-004**	**0.0000**	**8.8502**

San Sevaine Basin

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	0.00	User Defined Unit	130.00	5,662,800.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 32

Climate Zone 10 **Operational Year** 2016

Utility Company Southern California Edison

CO2 Intensity (lb/MWhr) 630.89 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project site is 130 acres

Construction Phase - Total days of Site Prep, grading and building const.

Off-road Equipment - Equipment for site prep

Off-road Equipment - equipment for grading

Off-road Equipment - equipment for building const.

Grading - 18,000 total cubic yards

Trips and VMT - 2700/76/16= truck trips for grading (20 was used for worst case senario), building construction numbers are an assumption.

Construction Off-road Equipment Mitigation - Rule 403 mitigation measures

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	3,100.00	45.00

tblConstructionPhase	NumDays	310.00	76.00
tblConstructionPhase	NumDays	120.00	22.00
tblGrading	AcresOfGrading	190.00	1.12
tblGrading	AcresOfGrading	11.00	0.00
tblGrading	MaterialExported	0.00	18,000.00
tblLandUse	LandUseSquareFeet	0.00	5,662,800.00
tblLandUse	LotAcreage	0.00	130.00
tblOffRoadEquipment	HorsePower	89.00	162.00
tblOffRoadEquipment	LoadFactor	0.20	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Forklifts
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Welders
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Skid Steer Loaders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblProjectCharacteristics	OperationalYear	2014	2016
tblTripsAndVMT	HaulingTripNumber	0.00	20.00
tblTripsAndVMT	VendorTripNumber	928.00	10.00
tblTripsAndVMT	WorkerTripNumber	15.00	8.00
tblTripsAndVMT	WorkerTripNumber	45.00	35.00
tblTripsAndVMT	WorkerTripNumber	2,378.00	20.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.1709	1.5562	0.9346	1.3800e-003	0.4387	0.0919	0.5306	0.2378	0.0856	0.3234	0.0000	126.3537	126.3537	0.0329	0.0000	127.0443

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
2016	0.1347	1.1847	0.8219	1.2800e-003	0.2431	0.0712	0.3142	0.1294	0.0669	0.1963	0.0000	114.6063	114.6063	0.0258	0.0000	115.1484
Total	**0.3055**	**2.7409**	**1.7565**	**2.6600e-003**	**0.6818**	**0.1630**	**0.8448**	**0.3672**	**0.1525**	**0.5197**	**0.0000**	**240.9600**	**240.9600**	**0.0587**	**0.0000**	**242.1927**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.1709	1.5562	0.9346	1.3800e-003	0.1686	0.0919	0.2604	0.0897	0.0856	0.1753	0.0000	126.3536	126.3536	0.0329	0.0000	127.0442
2016	0.1347	1.1847	0.8219	1.2800e-003	0.0980	0.0712	0.1692	0.0501	0.0669	0.1170	0.0000	114.6061	114.6061	0.0258	0.0000	115.1483
Total	**0.3055**	**2.7409**	**1.7565**	**2.6600e-003**	**0.2666**	**0.1630**	**0.4296**	**0.1398**	**0.1525**	**0.2923**	**0.0000**	**240.9597**	**240.9597**	**0.0587**	**0.0000**	**242.1925**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**60.90**	**0.00**	**49.15**	**61.93**	**0.00**	**43.76**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2015	10/30/2015	5	22	
2	Grading	Grading	10/31/2015	2/15/2016	5	76	
3	Building Construction	Building Construction	2/16/2016	4/18/2016	5	45	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1.12

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	174	0.41
Grading	Cranes	1	4.00	226	0.29
Grading	Forklifts	3	4.00	162	0.38
Grading	Excavators	1	6.00	162	0.38
Grading	Graders	2	8.00	174	0.41
Building Construction	Generator Sets	1	4.00	84	0.74
Grading	Off-Highway Trucks	2	2.00	400	0.38
Building Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Tractors/Loaders/Backhoes	3	6.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Generator Sets	1	8.00	84	0.74
Grading	Welders	2	6.00	46	0.45
Building Construction	Air Compressors	1	8.00	78	0.48
Building Construction	Skid Steer Loaders	1	8.00	64	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	6	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	18	35.00	0.00	20.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	20.00	10.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1987	0.0000	0.1987	0.1092	0.0000	0.1092	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0196	0.1951	0.1082	1.4000e-004		0.0126	0.0126		0.0116	0.0116	0.0000	13.0929	13.0929	3.9100e-003	0.0000	13.1750
Total	**0.0196**	**0.1951**	**0.1082**	**1.4000e-004**	**0.1987**	**0.0126**	**0.2114**	**0.1092**	**0.0116**	**0.1209**	**0.0000**	**13.0929**	**13.0929**	**3.9100e-003**	**0.0000**	**13.1750**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8000e-004	5.7000e-004	6.0000e-003	1.0000e-005	9.6000e-004	1.0000e-005	9.7000e-004	2.6000e-004	1.0000e-005	2.6000e-004	0.0000	0.8945	0.8945	5.0000e-005	0.0000	0.8956
Total	**3.8000e-004**	**5.7000e-004**	**6.0000e-003**	**1.0000e-005**	**9.6000e-004**	**1.0000e-005**	**9.7000e-004**	**2.6000e-004**	**1.0000e-005**	**2.6000e-004**	**0.0000**	**0.8945**	**0.8945**	**5.0000e-005**	**0.0000**	**0.8956**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0736	0.0000	0.0736	0.0405	0.0000	0.0405	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0196	0.1951	0.1082	1.4000e-004		0.0126	0.0126		0.0116	0.0116	0.0000	13.0929	13.0929	3.9100e-003	0.0000	13.1750
Total	**0.0196**	**0.1951**	**0.1082**	**1.4000e-004**	**0.0736**	**0.0126**	**0.0863**	**0.0405**	**0.0116**	**0.0521**	**0.0000**	**13.0929**	**13.0929**	**3.9100e-003**	**0.0000**	**13.1750**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8000e-004	5.7000e-004	6.0000e-003	1.0000e-005	9.6000e-004	1.0000e-005	9.7000e-004	2.6000e-004	1.0000e-005	2.6000e-004	0.0000	0.8945	0.8945	5.0000e-005	0.0000	0.8956
Total	**3.8000e-004**	**5.7000e-004**	**6.0000e-003**	**1.0000e-005**	**9.6000e-004**	**1.0000e-005**	**9.7000e-004**	**2.6000e-004**	**1.0000e-005**	**2.6000e-004**	**0.0000**	**0.8945**	**0.8945**	**5.0000e-005**	**0.0000**	**0.8956**

3.3 Grading - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Fugitive Dust					0.2305	0.0000	0.2305	0.1260	0.0000	0.1260	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1474	1.3537	0.7666	1.1300e-003		0.0791	0.0791		0.0739	0.0739	0.0000	104.1470	104.1470	0.0285	0.0000	104.7451
Total	**0.1474**	**1.3537**	**0.7666**	**1.1300e-003**	**0.2305**	**0.0791**	**0.3096**	**0.1260**	**0.0739**	**0.1999**	**0.0000**	**104.1470**	**104.1470**	**0.0285**	**0.0000**	**104.7451**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2000e-004	1.9100e-003	1.3700e-003	0.0000	1.5000e-004	3.0000e-005	1.8000e-004	4.0000e-005	3.0000e-005	7.0000e-005	0.0000	0.3921	0.3921	0.0000	0.0000	0.3922
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3300e-003	5.0000e-003	0.0525	1.0000e-004	8.4400e-003	7.0000e-005	8.5100e-003	2.2400e-003	6.0000e-005	2.3000e-003	0.0000	7.8272	7.8272	4.4000e-004	0.0000	7.8365
Total	**3.4500e-003**	**6.9100e-003**	**0.0539**	**1.0000e-004**	**8.5900e-003**	**1.0000e-004**	**8.6900e-003**	**2.2800e-003**	**9.0000e-005**	**2.3700e-003**	**0.0000**	**8.2193**	**8.2193**	**4.4000e-004**	**0.0000**	**8.2287**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0854	0.0000	0.0854	0.0467	0.0000	0.0467	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1474	1.3537	0.7666	1.1300e-003		0.0791	0.0791		0.0739	0.0739	0.0000	104.1469	104.1469	0.0285	0.0000	104.7449

Total	**0.1474**	**1.3537**	**0.7666**	**1.1300e-003**	**0.0854**	**0.0791**	**0.1645**	**0.0467**	**0.0739**	**0.1206**	**0.0000**	**104.1469**	**104.1469**	**0.0285**	**0.0000**	**104.7449**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2000e-004	1.9100e-003	1.3700e-003	0.0000	1.5000e-004	3.0000e-005	1.8000e-004	4.0000e-005	3.0000e-005	7.0000e-005	0.0000	0.3921	0.3921	0.0000	0.0000	0.3922
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3300e-003	5.0000e-003	0.0525	1.0000e-004	8.4400e-003	7.0000e-005	8.5100e-003	2.2400e-003	6.0000e-005	2.3000e-003	0.0000	7.8272	7.8272	4.4000e-004	0.0000	7.8365
Total	**3.4500e-003**	**6.9100e-003**	**0.0539**	**1.0000e-004**	**8.5900e-003**	**1.0000e-004**	**8.6900e-003**	**2.2800e-003**	**9.0000e-005**	**2.3700e-003**	**0.0000**	**8.2193**	**8.2193**	**4.4000e-004**	**0.0000**	**8.2287**

3.3 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2305	0.0000	0.2305	0.1260	0.0000	0.1260	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1002	0.9250	0.5481	8.2000e-004		0.0535	0.0535		0.0499	0.0499	0.0000	75.0510	75.0510	0.0205	0.0000	75.4810
Total	**0.1002**	**0.9250**	**0.5481**	**8.2000e-004**	**0.2305**	**0.0535**	**0.2840**	**0.1260**	**0.0499**	**0.1760**	**0.0000**	**75.0510**	**75.0510**	**0.0205**	**0.0000**	**75.4810**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0000e-005	1.2300e-003	9.3000e-004	0.0000	1.5000e-004	2.0000e-005	1.7000e-004	4.0000e-005	2.0000e-005	5.0000e-005	0.0000	0.2820	0.2820	0.0000	0.0000	0.2820
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1600e-003	3.2500e-003	0.0342	7.0000e-005	6.1400e-003	5.0000e-005	6.1900e-003	1.6300e-003	4.0000e-005	1.6700e-003	0.0000	5.4875	5.4875	2.9000e-004	0.0000	5.4937
Total	**2.2400e-003**	**4.4800e-003**	**0.0352**	**7.0000e-005**	**6.2900e-003**	**7.0000e-005**	**6.3600e-003**	**1.6700e-003**	**6.0000e-005**	**1.7200e-003**	**0.0000**	**5.7695**	**5.7695**	**2.9000e-004**	**0.0000**	**5.7757**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0854	0.0000	0.0854	0.0467	0.0000	0.0467	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1002	0.9250	0.5481	8.2000e-004		0.0535	0.0535		0.0499	0.0499	0.0000	75.0509	75.0509	0.0205	0.0000	75.4809
Total	**0.1002**	**0.9250**	**0.5481**	**8.2000e-004**	**0.0854**	**0.0535**	**0.1389**	**0.0467**	**0.0499**	**0.0966**	**0.0000**	**75.0509**	**75.0509**	**0.0205**	**0.0000**	**75.4809**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Hauling	8.0000e-005	1.2300e-003	9.3000e-004	0.0000	1.5000e-004	2.0000e-005	1.7000e-004	4.0000e-005	2.0000e-005	5.0000e-005	0.0000	0.2820	0.2820	0.0000	0.0000	0.2820
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1600e-003	3.2500e-003	0.0342	7.0000e-005	6.1400e-003	5.0000e-005	6.1900e-003	1.6300e-003	4.0000e-005	1.6700e-003	0.0000	5.4875	5.4875	2.9000e-004	0.0000	5.4937
Total	**2.2400e-003**	**4.4800e-003**	**0.0352**	**7.0000e-005**	**6.2900e-003**	**7.0000e-005**	**6.3600e-003**	**1.6700e-003**	**6.0000e-005**	**1.7200e-003**	**0.0000**	**5.7695**	**5.7695**	**2.9000e-004**	**0.0000**	**5.7757**

3.4 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0285	0.2320	0.1849	2.8000e-004		0.0172	0.0172		0.0166	0.0166	0.0000	24.9412	24.9412	4.7800e-003	0.0000	25.0416
Total	**0.0285**	**0.2320**	**0.1849**	**2.8000e-004**		**0.0172**	**0.0172**		**0.0166**	**0.0166**	**0.0000**	**24.9412**	**24.9412**	**4.7800e-003**	**0.0000**	**25.0416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0200e-003	0.0206	0.0263	5.0000e-005	1.3900e-003	3.3000e-004	1.7200e-003	4.0000e-004	3.0000e-004	7.0000e-004	0.0000	4.4349	4.4349	3.0000e-005	0.0000	4.4356
Worker	1.7300e-003	2.6100e-003	0.0275	6.0000e-005	4.9300e-003	4.0000e-005	4.9700e-003	1.3100e-003	3.0000e-005	1.3400e-003	0.0000	4.4096	4.4096	2.4000e-004	0.0000	4.4146
Total	**3.7500e-003**	**0.0232**	**0.0538**	**1.1000e-004**	**6.3200e-003**	**3.7000e-004**	**6.6900e-003**	**1.7100e-003**	**3.3000e-004**	**2.0400e-003**	**0.0000**	**8.8445**	**8.8445**	**2.7000e-004**	**0.0000**	**8.8502**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0285	0.2320	0.1849	2.8000e-004		0.0172	0.0172		0.0166	0.0166	0.0000	24.9412	24.9412	4.7800e-003	0.0000	25.0416
Total	**0.0285**	**0.2320**	**0.1849**	**2.8000e-004**		**0.0172**	**0.0172**		**0.0166**	**0.0166**	**0.0000**	**24.9412**	**24.9412**	**4.7800e-003**	**0.0000**	**25.0416**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.0200e-003	0.0206	0.0263	5.0000e-005	1.3900e-003	3.3000e-004	1.7200e-003	4.0000e-004	3.0000e-004	7.0000e-004	0.0000	4.4349	4.4349	3.0000e-005	0.0000	4.4356
Worker	1.7300e-003	2.6100e-003	0.0275	6.0000e-005	4.9300e-003	4.0000e-005	4.9700e-003	1.3100e-003	3.0000e-005	1.3400e-003	0.0000	4.4096	4.4096	2.4000e-004	0.0000	4.4146
Total	**3.7500e-003**	**0.0232**	**0.0538**	**1.1000e-004**	**6.3200e-003**	**3.7000e-004**	**6.6900e-003**	**1.7100e-003**	**3.3000e-004**	**2.0400e-003**	**0.0000**	**8.8445**	**8.8445**	**2.7000e-004**	**0.0000**	**8.8502**

San Sevaine Energy Consumption Emissions
GHG Emissions Calculations

CO_2	630.89	lbs/MWhr - Southern California Edison Intensity Factors
CH_4	0.029	lbs/MWhr - Southern California Edison Intensity Factors
N_2O	0.00617	lbs/MWhr - Southern California Edison Intensity Factors
GWP - CH_4	25	Based on IPCC's AR4
GWP - N_2O	298	Based on IPCC's AR4
Lbs/MT	2204.62262	

Site Electrical Generation

	125,731	KWh/year
	125.731	MWh/year

	lbs CO2e	Lbs CO2e
CO_2	79,322	79,322
CH_4	4	91.15498
N_2O	1	231.1766
Total Lbs $CO_2$3		79,645
MT CO_2e		36.13

APPENDIX 3

BIOLOGICAL RESOURCES REPORT FOR SAN SEVAINE BASINS DEVELOPMENT PROJECT

LOCATED WITHIN CITY OF RANCHO CUCAMONGA
USGS – DEVORE ANDCUCAMONGA PEAK QUADRANGLES, 7.5-MINUTE SERIES
SECTIONS 26 AND 27 (DEVORE) AND SECTION 27 (CUCAMONGA PEAK)
TOWNSHIP 1 NORTH, RANGE 6 WEST, SAN BERNARDINO BASELINE MERIDIAN
SAN BERNARDINO COUNTY, CALIFORNIA

Prepared for:

Inland Empire Utilities Agency
6075 Kimball Avenue
Chino, California 91708

Prepared by:

Lisa Patterson
J.L. Patterson & Associates
P.O. Box 1888
Yucca Valley, California 92286

On behalf of:

Tom Dodson & Associates
2150 N. Arrowhead Avenue
San Bernardino, California 92405

July 2015

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1. Summary

1.1 Project Summary

Inland Empire Utilities Agency (IEUA) is proposing to develop additional groundwater recharge within San Sevaine Basins (project site). San Sevaine Basins are located within the City of Rancho Cucamonga, San Bernardino County, California. The Basins are an approximately 130-acre site that has been divided into five sub-basins. These sub-basins are numbered one through five with Basin 1 being the basin to in the northeastern part of the Basins and Basin 5 being the basin situated in the far southwestern portion of the Basins.

The project site is located south of Wilson Avenue, west of Interstate 15, and northwest of the Interstate 210/15 interchange. Figure 1 is the Regional Location Map and Figure 2 is the Site Location Map that depicts the project site on USGS 7.5 Minute quadrangle maps. Specifically, the project is mapped on the Devore Quadrangle within Sections 26 and 27 and on the Cucamonga Peak Quadrangle within Section 27; both within Township 1 North, Range 6 West, San Bernardino Baseline and Meridian. Additionally, Figure 3 shows the project site on an aerial photograph.

The proposed project includes increasing the delivery of recycled water produced by IEUA Water Reclamation Facilities (WRFs) to the existing San Sevaine Basins. In order to accommodate this additional recycled water, sub-basins, previously not utilized for groundwater recharge, will be included in the recharge program. In order to utilize these additional sub-basins, IUEA will need to construct new delivery pipelines and complete improvement to inlet structures that will increase the maximum operational volume of recycled water that can be delivered to these basins. Each sub-basin has inlet and outlet structures that allow the capture and recharge of various water sources. Currently, the primary mode of conveyance between the sub-basins is surface transfer, which restricts the operational flexibility of the system.

The purpose of the proposed basin modifications is to increase IEUA's groundwater recharge capacity which is part of a comprehensive effort to reverse the groundwater overdraft condition in the Chino Basin and to support the groundwater demands (potable water supply) of the population within the Chino Basin Water Conservation District's service area.

These San Sevaine Basins are a dual-use facility which serves both flood control and ground-water recharge functions. Currently, a total of 500 acre-feet per year (AFY) of recycled water and 300 AFY of stormwater (on average) is infiltrated into the groundwater basin at this location. The recommended improvements will allow up to an estimated 8,100 AFY of additional recycled water and up to an additional 2,700 AF of stormwater to be recharge at this location. The proposed new recycled water delivery infrastructure is shown on Figure 4, Site Conceptual Plan.

The Purpose and intended use of this Biological Resources Report (BRR) is to evaluate the onsite biological resources and determine the potential for occurrence of common and special-status species, their habitat, and other regulated habitats such as Waters of the United States including Wetlands, Waters of the State, and Streambed/Riparian resources within Project's Area of Potential Effect (APE). The APE is defined as the Project's proposed physical ground disturbance footprint, plus a buffer zone where indirect impacts may result from construction. Impacts within the Project's footprint and the APE are detailed in Section 5.0 of this document.

The proposed project consists of utilizing sub-basins 1-3 which have high infiltration rates and have not been effectively utilized for recharge in the past because the infrastructure does not exist to get recycled water into these sub-basins. Proposed construction activities consist of the following activities: (1) grading activities along the pipeline alignment, pump station location and electrical connection; (2) installing the trench along the pipeline alignment shown, approximately 5,000 feet; (3) installing the inlet/outlet structures; (4) installing the wet well for the pump station; (5) installing the pump station; and (6) installing an estimated five flow control valves/gates.

The Basins are owned by the San Bernardino County Flood Control District (SBCFCD). They were originally constructed for flood control mitigation to attenuate peak storm flows, but are now operated as multipurpose basins under a Four-Party Agreement between SBCFCD, IEUA, Chino Basin Watermaster (CBWM), and the Chino Basin Water Conservation District (CBWCD) (stakeholders). The stakeholders previously invested in improvements of the Basins to allow them to be used for groundwater recharge. They were modified to allow the capture and recharge of stormwater and supplemental water (supplemental water consists of imported water and recycled water) in a conjunctive use program.

IEUA presently performs the actual operation and maintenance of the Basins for recharge purposes in cooperation with CBWM and San Bernardino County Flood Control District (SBCFCD). Through recent operations and data collection afforded by the initial improvement project, IEUA and CBWM have identified several possible opportunities to further enhance and optimize the use of this facility for additional groundwater recharge.

The San Sevaine Basin Complex is considered a “flow” through basin built along the San Sevaine Creek channel. Because the Basin system has inlets and outlets from and two a Water of the United States, the basins are considered jurisdictional traditional navigable waters. Construction of structures below the level of the basin spillway to the west could be subject to permit requirements from the U.S. Army Corps of Engineers (Corps), California Department of Fish and Wildlife (CDFW), and the State Regional Water Quality Control Board (RWQCB).

1.2 Vegetation / Habitat Removal Information

The bottom of both Basins are excavated and engineered fill floors, constructed more than 50 feet below the original ground surface. Sub-basins 1-4 are characterized as predominantly non-native grass lands that have been mowed and weeded regularly. The bottom of these sub-basins have been excavated and engineered floors, and are characterized by degraded vegetation dominated by ruderal species and non-native grasses, including Brome grasses (Bromus sp.), mustard (Brassica geniculata), star thistle (Centaurea solstitialis), mustard (Herscfeldia incana), and common sunflower (Helianthus anuus).

The floor of sub-basin 5 is predominantly characterized by non-native grass and herbaceous weedy species except along a low-flow channel to the north, near the outlet structues to the south, and in the extreme western portoin of the basin. The western portion of sub-basin 5 is characterized by ponding with cattails (Typha sp.) and mulefat (Baccharis salicifolia) beginning to become established. With the exception of these wetter areas, species common in the ruderal adjacent areas include stork’s bill (Erodium cicutarium), brome grasses (Bromus spp.), mustard (Hirchfeldia incana), common mallow (Malva neglecta), bull thistle (Cirsium vulgare), common sunflower (Helianthus anuus), spiny sowthistle (Sonchus asper), perennial sowthistle (Sonchus arvensis), and western ragweed (Ambrosia acanthicarpa).

The walls of sub-basins 4 and 5 are characterized by well devleoped coastal cage crub (CSS). This vegetation community is found in diverse habitat mosaics and is dominated by a suite of shrub species with low moisture content. Shrub cover is dense, continuous and steep, xeric slopes with quickly draining soils. The CSS vegetation community occurring in the San Sevaine Basins are characterized by buckwheat (Eriogonum fasciculatum), California sage (Artemisia californica), black sage (Salvia mellifera), deerweed (Lotus scoparus), brittlebrus (Encelia farinosa), white sage (Salvia alba), yerba santa (Eriodictyon trichocalyx va. trichocalyx), and scale broom (Lepidospartum squamatum).

Figure 1 – Regional Location Map

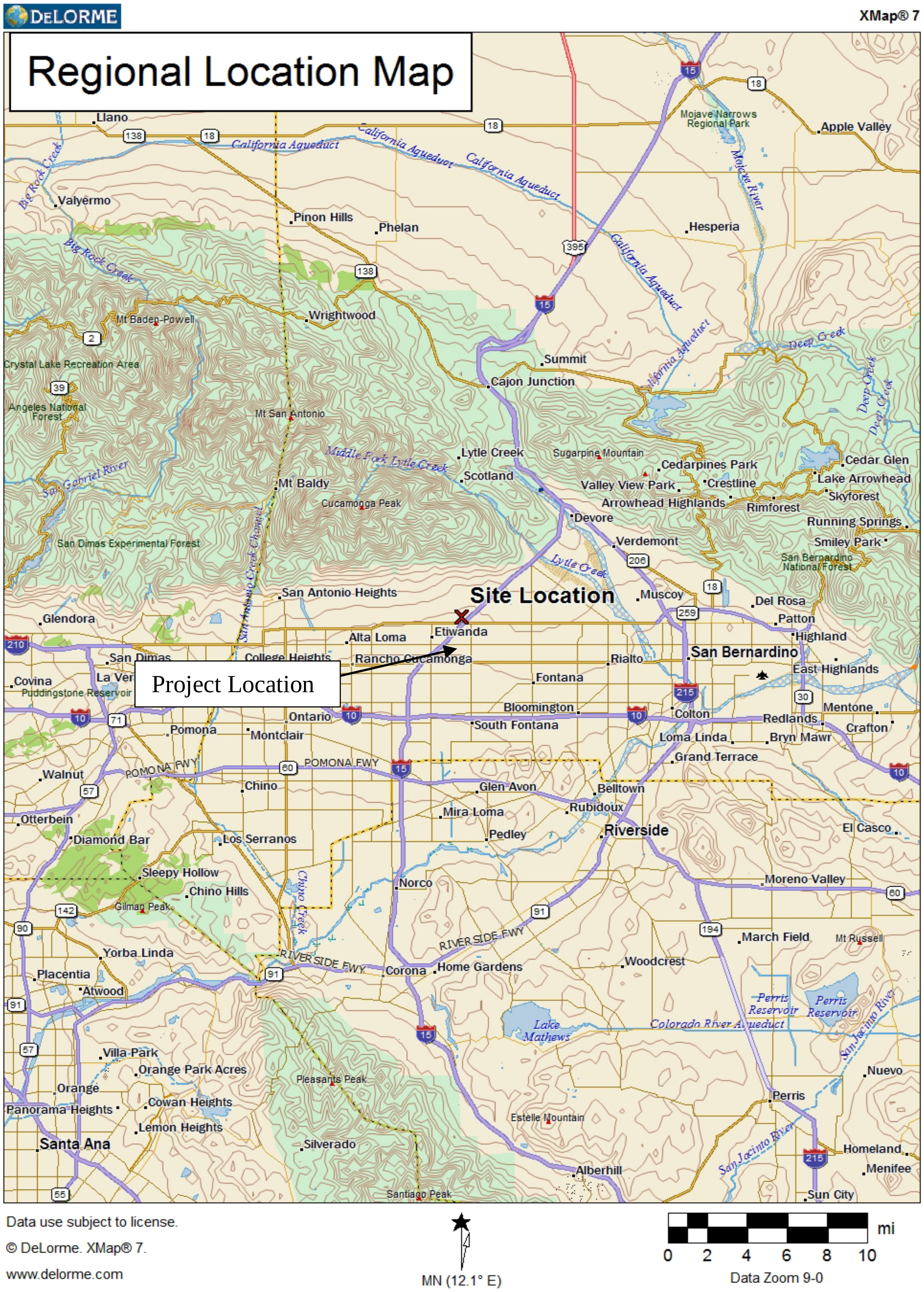
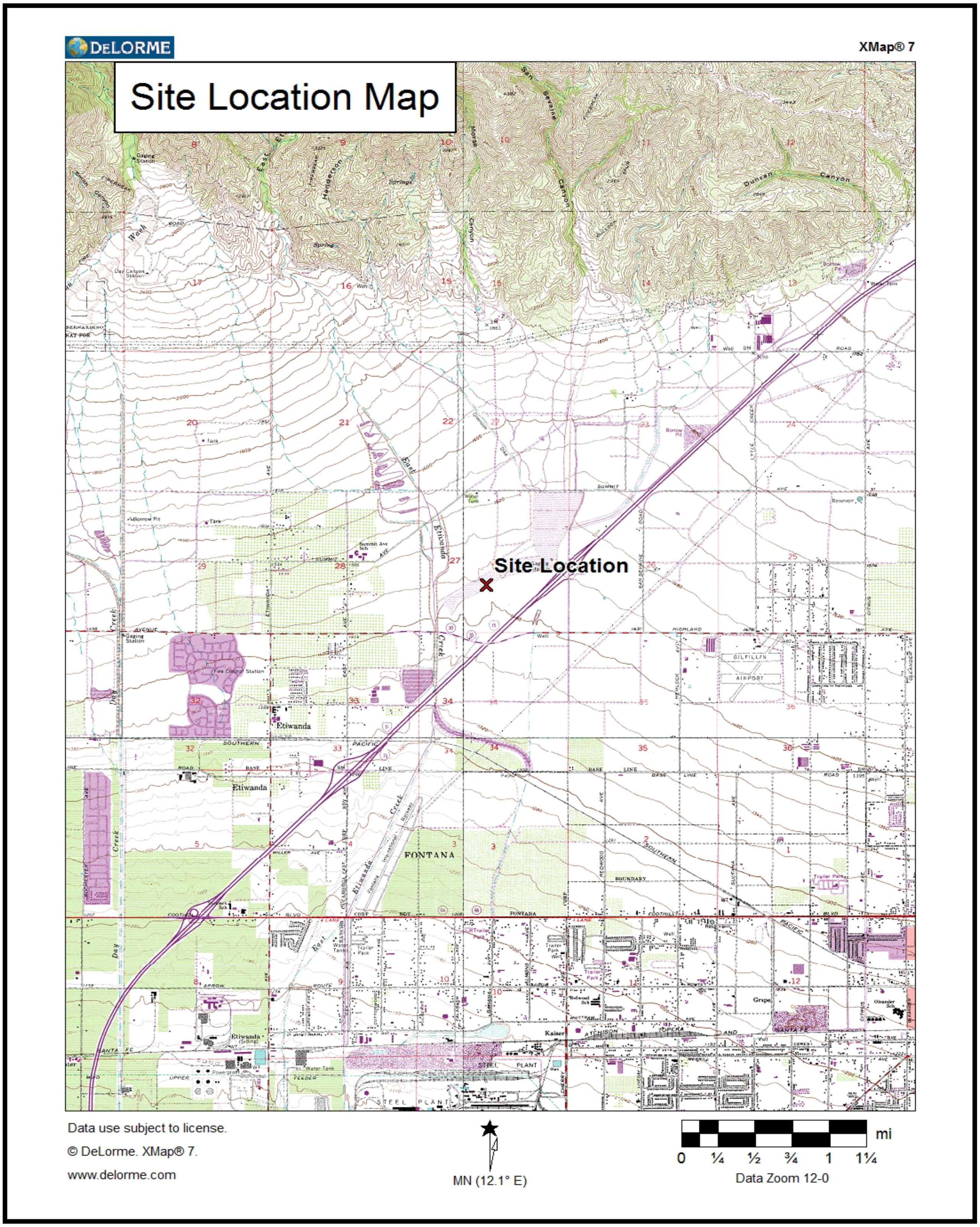


Figure 2 – Site Location Map



2. Introduction

The Inland Empire Utilities Agency (IEUA) was formed by popular vote of its residents in June of 1950, for the purpose of importing supplemental water supplies from Metropolitan Water District of Southern California (MWD). IEUA, as a member of the MWD, distributes imported water, and provides municipal and industrial wastewater collection and treatment services and other related utility services for the mid-portion of the Upper Santa Ana River watershed in the southwestern-most portion of San Bernardino County, California. In its wastewater management role, the IEUA serves the cities of Chino, Chino Hills, Fontana, Montclair, Ontario and Upland, and the Cucamonga Valley Water District (which generally encompasses the City of Rancho Cucamonga as well as some unincorporated areas of San Bernardino County). Approximately 800,000 people are currently estimated to reside in the IEUA service area, which encompasses approximately 242 square miles.

The proposed project includes the expansion of delivery of recycled water produced by IEUA Water Reclamation Facilities (WRFs) to the existing San Sevaine Basins located just north of the Interstate 15 and Interstate 210 interchange in the City of Rancho Cucamonga. This will include inclusion of additional San Sevaine flood control basins and the construction of new delivery pipelines and improvement of inlet facilities to increase the maximum operational volume of recycled water that can be delivered to these basins. The purpose of the proposed basin modifications is to increase the Agency's groundwater recharge capacity as part of a comprehensive effort to reverse the groundwater overdraft condition in the Chino Basin and to support the groundwater demands (potable water supply) of the population within the CBWCD's service area.

The Basins are owned by the San Bernardino County Flood Control District (SBCFCD). They were originally constructed for flood control mitigation to attenuate peak storm flows, but are now operated as multipurpose basins under a Four Party Agreement between SBCFCD, IEUA, CBWM, and the Chino Basin Water Conservation District (stakeholders). The stakeholders previously invested in improvements of the Basins to allow them to be used for groundwater recharge. They were modified to allow the capture and recharge of stormwater and supplemental water (supplemental water consists of imported water and recycled water) in a conjunctive use program.

IEUA presently performs the actual operation and maintenance of the Basins for recharge purposes in cooperation with CBWM and SBCFCD. Through recent operations and data collection afforded by the initial improvement project, IEUA and CBWM have identified several possible opportunities to further enhance and optimize the use of this facility for additional groundwater recharge. In order to fully utilize the recharge potential of the Basins, improvements should be implemented to either improve the infiltration rate of sub-basin 5, or have the ability to deliver RW and/or additional stormwater to sub-basins 1-3 which have higher infiltration rates.

The recycled water objective for this proposed project is 4,100 AFY. In order to accomplish this objective, the following criteria were considered when choosing the best project components that would meet the objective with the least impacts to the environment.

- Increasing capture and recharge of RW and stormwater
- Maximizing infiltration rates

- Minimizing environmental impacts
- Reducing construction costs
- Enhancing operational flexibility

Construction activities will consist of the following activities:

- Limited grading activities along the pipeline alignment, pump station location and electrical connection
- Installing the trench along the pipeline alignment shown, approximately 5,000 feet
- Installing the inlet/outlet structures (3)
- Installing the wet well for the pump station
- Installing the pump station
- Installing an estimated five flow control valves/gates

The Purpose and intended use of this Biological Resource Study is to evaluate the onsite biological resources and determine the potential for occurrence of common and special-status species, their habitat, and other regulated habitats such as Waters of the United States including Wetlands, Waters of the State, and Streambed/Riparian resources within Project's APE.

Figure 3 – Site Aerial Map

3. Regulatory Setting and Study Methods

This chapter presents the methods used to identify biological resources on the project site. In addition, this chapter provides an overview of the various regulatory requirements, definitions of terms used, background review conducted, field surveys, post-field data processing, personnel and survey dates, and coordination efforts with agency and professional contacts. It also summarizes the study limitations and how they may influence the results presented in this report.

Before conducting field surveys, existing background information was reviewed to identify the locations of jurisdictional waters, special-status plant and wildlife species, special-status plant communities, natural lands, and federally designated or proposed critical habitat units recorded or potentially occurring in the proposed infrastructure improvement areas. This section summarizes the background information that was reviewed.

3.1 Regulatory Requirements

3.1.1 Federal

3.1.1.1 Clean Water Act

The purpose of the Clean Water Act (CWA) (1977) is to “restore and maintain the chemical, physical, and biological integrity of the nation’s waters.” Section 404 of the CWA prohibits the discharge of dredged or fill material into “waters of the United States” without a permit from the United States Army Corps of Engineers (USACE). The definition of waters of the United States includes rivers, streams, estuaries, the territorial seas, ponds, lakes, and wetlands. Wetlands are defined as those areas “that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 Code of Federal Regulations [CFR] 328.3 7b). The U.S. Environmental Protection Agency (EPA) also has authority over wetlands and may override a USACE permit. Substantial impacts to wetlands may require an individual permit. Projects that only minimally affect wetlands may meet the conditions of one of the existing Nationwide Permits. A Water Quality Certification or waiver pursuant to Section 401 of the CWA is required for Section 404 permit actions; in California this certification or waiver is issued by the RWQCB.

3.1.1.2 Section 10 of the Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 requires authorization from the USACE for the construction of any structure in or over any navigable waters of the United States.

3.1.1.3 Endangered Species Act

The Federal Endangered Species Act (FESA) (1973) protects plants and wildlife that are listed by the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) as endangered or threatened. Section 9 of FESA (USA) prohibits the taking of endangered wildlife, where taking is defined as any effort to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct” (50 CFR 17.3). For plants, this statute governs removing, possessing, maliciously damaging, or destroying any endangered plant on federal land and removing, cutting, digging up, damaging, or destroying any endangered plant on non-federal land in knowing violation of state law (16 United States Code [USC] 1538). Under Section 7 of FESA, federal agencies are required to consult with the USFWS if their actions, including permit approvals or funding, could adversely affect an endangered species (including plants) or its critical habitat. Through consultation and the issuance of a biological opinion, the USFWS may issue an incidental take statement allowing take of the species that is incidental to an otherwise authorized activity, provided the action will not jeopardize the continued existence of the species. FESA specifies that the USFWS designate habitat for a species at the time of its listing in which are found the physical or biological features "essential to the conservation of the species," or which may require "special Management consideration or protection..." (16 USC § 1533[a][3].2; 16 USC § 1532[a]). This designated Critical Habitat is then afforded the same protection under the FESA as individuals of the species itself, requiring issuance of an Incidental Take Permit prior to any activity that results in "the destruction or adverse modification of habitat determined to be critical" (16 USC § 1536[a][2]).

Interagency Consultation and Biological Assessments

Section 7 of ESA provides a means for authorizing the "take" of threatened or endangered species by federal agencies, and applies to actions that are conducted, permitted, or funded by a federal agency. The statute requires federal agencies to consult with the USFWS or NMFS, as appropriate, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species. If a proposed project "may affect" a listed species or destroy or modify critical habitat, the lead agency is required to prepare a biological assessment evaluating the nature and severity of the potential effect.

Habitat Conservation Plans

Section 10 of the federal ESA requires the acquisition of an Incidental Take Permit (ITP) from the USFWS by non-federal landowners for activities that might incidentally harm (or "take") endangered or threatened wildlife on their land. To obtain a permit, an applicant must develop a Habitat Conservation Plan that is designed to offset any harmful impacts the proposed activity might have on the species.

3.1.1.4 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 U.S.C. Sections 661 to 667e et seq.) applies to any federal project where any body of water is impounded, diverted, deepened, or otherwise modified. Project proponents are required to consult with the USFWS and the appropriate state wildlife agency.

3.1.1.5 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. Section 1801 et seq.) requires all federal agencies to consult with the NMFS on all actions or proposed actions (permitted, funded, or undertaken by the agency) that may adversely affect fish habitats. It also requires cooperation among NMFS, the councils, fishing participants, and federal and state agencies to protect, conserve, and enhance essential fish habitat, which is defined as those waters and substrates needed by fish for spawning, breeding, feeding, and growth to maturity.

3.1.1.6 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (The Eagle Act) (1940), amended in 1962, was originally implemented for the protection of bald eagles (*Haliaeetus leucocephalus*). In 1962, Congress amended the Eagle Act to cover golden eagles (*Aquila chrysaetos*), a move that was partially an attempt to strengthen protection of bald eagles, since the latter were often killed by people mistaking them for golden eagles. This act makes it illegal to import, export, take (molest or disturb), sell, purchase, or barter any bald eagle or golden eagle or part thereof. The golden eagle, however, is accorded somewhat lighter protection under the Eagle Act than that of the bald eagle.

3.1.1.7 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (1918) implements international treaties between the United States and other nations created to protect migratory birds, any of their parts, eggs, and nests from activities, such as hunting, pursuing, capturing, killing, selling, and shipping, unless expressly authorized in the regulations or by permit. As authorized by the MBTA, the USFWS issues permits to qualified applicants for the following types of activities: falconry, raptor propagation, scientific collecting, special purposes (rehabilitation, education, migratory game bird propagation, and salvage), take of depredating birds, taxidermy, and waterfowl sale and disposal. The regulations governing migratory bird permits can be found in 50 CFR part 13 General Permit Procedures and 50 CFR part 21 Migratory Bird Permits. The State of California has incorporated the protection of birds of prey in Sections 3800, 3513, and 3503.5 of the California Fish and Game Code (CFGC).

3.1.1.8 Executive Orders (EO)

3.1.1.8.1 <u>Invasive Species—Executive Order 13112 (1999)</u>

Issued on February 3, 1999, promotes the prevention and introduction of invasive species and provides for their control and minimizes the economic, ecological, and human health impacts that invasive species cause through the creation of the Invasive Species Council and Invasive Species Management Plan.

3.1.1.8.2 <u>Protection of Wetlands—Executive Order 11990 (1977)</u>

Issued on May 24, 1977, helps avoid the long-term and short-term adverse impacts associated with destroying or modifying wetlands and avoiding direct or indirect support of new construction in wetlands when there is a practicable alternative.

3.1.1.8.3 <u>Migratory Bird—EO 13186 (2001)</u>

Issued on January 10, 2001, promotes the conservation of migratory birds and their habitats and directs federal agencies to implement the Migratory Bird Treaty Act. Protection and Enhancement of Environmental Quality—EO 11514 (1970a), issued on March 5, 1970, supports the purpose and policies of the National Environmental Policy Act (NEPA) and directs federal agencies to take measures to meet national environmental goals.

Migratory Bird Treaty Reform Act: The Migratory Bird Treaty Reform Act (Division E, Title I, Section 143 of the Consolidated Appropriations Act, 2005, PL 108–447) amends the Migratory Bird Treaty Act (16 U.S.C. Sections 703 to 712) such that nonnative birds or birds that have been introduced by humans to the United States or its territories are excluded from protection under the Act. It defines a native migratory bird as a species present in the United States and its territories as a result of natural biological or ecological processes. This list excluded two additional species commonly observed in the United States, the rock pigeon (*Columba livia*) and domestic goose (*Anser domesticus*).

3.1.2 State

3.1.2.1 California Fish and Game Code (CFGC)

3.1.2.1.1 Sections 1600 through 1606 of the CFGC

This section requires that a Streambed Alteration Application be submitted to the CDFW for “any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake.” The CDFW reviews the proposed actions and, if necessary, submits to the applicant a proposal for measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by the Department and the applicant is the Streambed Alteration Agreement. Often, projects that require a Streambed Alteration Agreement also require a permit from the USACE under Section 404 of the CWA. In these instances, the conditions of the Section 404 permit and the Streambed Alteration Agreement may overlap.

3.1.2.1.2 California Endangered Species Act

The California Endangered Species Act (CESA) (Sections 2050 to 2085) establishes the policy of the state to conserve, protect, restore, and enhance threatened or endangered species and their habitats by protecting “all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation.” Animal species are listed by the CDFW as threatened or endangered, and plants are listed as rare, threatened, or endangered. However, only those plant species listed as threatened or endangered receive protection under the California ESA.

CESA mandates that state agencies do not approve a project that would jeopardize the continued existence of these species if reasonable and prudent alternatives are available that would avoid a jeopardy finding. There are no state agency consultation procedures under the California ESA. For projects that would affect a species that is federally and state listed, compliance with ESA satisfies the California ESA if the California Department of Fish and Wildlife (CDFW) determines that the federal incidental take authorization is consistent with the California ESA under Section 2080.1. For projects that would result in take of a species that is state listed only, the project sponsor must apply for a take permit, in accordance with Section 2081(b).

3.1.2.1.3 Fully Protected Species

Four sections of the California Fish and Game Code (CFGC) list 37 fully protected species (CFGC Sections 3511, 4700, 5050, and 5515). These sections prohibit take or possession "at any time" of the species listed, with few exceptions, and state that "no provision of this code or any other law will be construed to authorize the issuance of permits or licenses to ‘take’ the species,” and that no previously issued permits or licenses for take of the species "shall have any force or effect" for authorizing take or possession.

3.1.2.1.4 Bird Nesting Protections

Bird nesting protections (Sections 3503, 3503.5, 3511, and 3513) in the CFGC include the following:

- Section 3503 prohibits the take, possession, or needless destruction of the nest or eggs of any bird.
- Section 3503.5 prohibits the take, possession, or needless destruction of any nests, eggs, or birds in the orders Falconiformes (new world vultures, hawks, eagles, ospreys, and falcons, among others), or Strigiformes (owls).
- Section 3511 prohibits the take or possession of fully protected birds.
- Section 3513 prohibits the take or possession of any migratory nongame bird or part thereof, as designated in the MBTA. To avoid violation of the take provisions, it is generally required that project-related disturbance at active nesting territories be reduced or eliminated during the nesting cycle.

3.1.2.1.5 Native Plant Protection Act

The Native Plant Protect Act (NPPA) (1977) (CFGC Sections 1900-1913) was created with the intent to "preserve, protect, and enhance rare and endangered plants in this State." The NPPA is administered by CDFW. The Fish and Game Commission has the authority to designate native plants as endangered or rare and to protect endangered and rare plants from take. CESA (CFGC 2050-2116) provided further protection for rare and endangered plant species, but the NPPA remains part of the Fish and Game Code.

3.1.2.1.6 Natural Communities Conservation Planning Act

This act was enacted to encourage broad-based planning to provide for effective protection and conservation of the state's wildlife resources while continuing to allow appropriate development and growth (CFGC Sections 2800 to 2835). Natural Community Conservation Plans (NCCP) may be implemented, which identify measures necessary to conserve and manage natural biological diversity within the planning area, while allowing compatible and appropriate economic development, growth, and other human uses.

3.1.2.1.7 Senate Concurrent Resolution No. 17 – Oak Woodlands

State Senate Concurrent Resolution No. 17 is legislation that requests state agencies having land use planning duties and responsibilities to assess and determine the effects of their decisions or actions within any oak woodlands containing Blue, Engleman, Valley, or Coast Live Oak. The measure requests those state agencies to preserve and protect native oak woodlands to the maximum extent feasible or provide replacement plantings where designated oak species are removed from oak woodlands. The mitigation measures, as described above, will ensure that impacts to oak woodlands are less than significant.

3.1.3 Local

General, Specific, or Rural Community Plans or Municipal Codes for each local jurisdiction through which the Project passes were reviewed for regulations pertaining to biological resources. Most of the local jurisdictions have few regulations relating to biological resources due to the low-density population nature of the land. Local regulations are listed below:

3.1.3.1 San Bernardino

3.1.3.1.1 Adopted Ordinance 4011 (2007); Amended Ordinance 4067 (2009) Development Code 88.01.010

This Ordinance provides regulations and guidelines for the management of plant resources in the unincorporated areas of the County on property or combinations of property under private o public ownership. The intent is to:

(a) Promote and sustain the health, vigor and productivity of plant life and aesthetic values within the County through appropriate management techniques.
(b) Conserve the native plant life heritage for the benefit of all, including future generations.
(c) Protect native trees and plants from indiscriminate removal and to regulate removal activity.
(d) Provide a uniform standard for appropriate removal of native trees and plants in public and private places and streets to promote conservation of these valuable natural resources.
(e) Protect and maintain water productivity and quality in local watersheds.
(f) Preserve habitats for rare, endangered, or threatened plants and to protect animals with limited or specialized habitats.

3.2 Studies Required

Prior to beginning the field surveys, available information was reviewed from resource management plans and other relevant documents to determine locations and types of biological resources that have the potential to exist within and adjacent to the APE.

The 2015 California Natural Diversity Database (CDFW, 2015), U.S. Fish and Wildlife Service Quad lists and IPac (USFWS, 2015 Attached), California Native Plant Society Electronic Inventory of Rare and Endangered Plants of California, and National Wetlands Inventory (USFWR, 2015) were queried for occurrence of special status species and habitats within the San Joaquin Rail Corridor. CDFW Bios database was also queried for general habitat types and potential features subject to environmental regulations (e.g., Clean Water Act [CWA], Porter-Cologne Water Quality Control Act [Porter-Cologne] and California Department of Fish and Wildlife's Fish and Game Code 1600 et seq. jurisdictional features) that may exist within or adjacent to the APE. Areas potentially suspected of being special aquatic resources were documented during field surveys

In addition to the aforementioned literature reviews, field surveys of the APE were performed to assess general and dominant vegetation types, habitat types, and the potential for special status wildlife and plant species to occur within the project area. Community types were based on observed dominant vegetation composition and density. Vegetation classifications of plant communities in the APE were derived from the criteria and definitions of Holland (1986). Follow-on focused protocol surveys for coastal California gnatcatcher (*Polioptila californica californica*), burrowing owl (*Athene cunicularia*), and San Bernardino Kangaroo Rat (*Dipodomys merriami parvus*) were conducted.

3.3 Personnel and Survey Dates

General Biological, Focused Burrowing Owl Survey, and focused coastal California Gnatcatcher Surveys were conducted between April 10, and May 11, 2015 by Lisa Patterson. Focused San Bernardino Kangaroo Rat surveys were conducted June 14-19, 2015 by Shay Lawrey.

3.4 Habitat Assessment

The APE was also assessed in the field for the poential to support special-status plant and animal species based on habitat suitability comparisons with reported occupied habitats. The following potential for occurrences definitions were utilized to assess the Project-related effects to species with the Project's footprint. Potential for occurrence designations were derived from Caltrans' standard environmental reference (Caltrans 2005):

Absent [A] - Species distribution is restricted by substantive habitat requirements, which do not occur or are negligible within the Project's physical disturbance footprint, and no further survey or study is necessary to derermine the likely presence or absence of this species.

Habitat Prsent [HP] - Species distribution is restricted by substantive habitat requirements, which occur within the Project's physical disturbance footprint, and further survey or study may be necessary to determine the likely presence or absence of this species.

Present [P] - Species or species sign were observed within the Project's physical disturbance footprint.

Critical Habitat [CH] - The Project's footprint is located within a designated critical habitat unit.

Focused Surveys for Burrowing Owl, San Bernardino Kangaroo Rat, and Coastal California Gnatcatcher were conducted.

3.5 Limitations That May Influence Results

Surveys were conducted during the appropriate time of year and conditions to detect any sensitive or listed species within the APE. Typically, biological surveys are valid for one year. Estimations and assumptions regarding the potential for jurisdictional waters and special-status species were based on assessments from previous projects, and existing IEUA permits and resource information.

Figure 4 – Site Conceptual Plan

4. Environmental Setting

The general Rancho Cucamonga area lies within the northern/northwestern portion of the Peninsular Geomorphic Province of southern California, which is characterized by northwest-southwest-trending faults, folds, and mountain ranges. The Site is situated on a broad alluvial fan, which extends from the southern flank of the San Gabriel Mountains and dips gradually southward to the confluence of San Antonio Channel, Cucamonga Channel/Mill Creek, and the Santa Ana River at the Prado Dam Flood Control Basin in Riverside County. Elevation ranges from 1,150 feet above mean sea level (amsl) in the northwest portion to 650 feet amsl in the south-central portion of the City (USGS 1978).

Climate

The proposed Project is located in the non-desert portion of San Bernardino County within the South Coast Air Basin (Basin). The regional climate within the Basin is considered semiarid and is characterized by warm summers, mild winters, infrequent seasonal rainfall, moderate daytime onshore breezes, and year-round moderate temperatures and low humidity. The average maximum temperature within the local vicinity is 90.9°F (Fahrenheit) in July while the average minimum temperature is reported at 40.5°F in December. Almost all rain falls from November through April and averages 21.64 inches per year. The area also experiences a typical daily wind pattern that is a daytime onshore sea breeze from the west and a nighttime land breeze. This regime is broken only by occasional winter storms and infrequent strong northeasterly Santa Ana winds from the mountains and deserts north of the Basin.

Geology

Recent (quaternary) alluvium underlies the entire valley. The western portion of the proposed Project area is underlain by young alluvial-fan deposits. The eastern portion is primarily underlain with young eolian (wind driven) deposits with small areas of young alluvial-fan deposits, artificial fill, and young alluvial-valley deposits.

Soils

The Site is located in a region that is made of the alluvial valley floors, fans, and terraces that cover broad areas of southwest San Bernardino County, extending eastward from Chino to the general vicinity of Yucaipa. The Soil Conservation Service Soil Survey of San Bernardino County, Southwestern Part (USDA 1980) identifies 4 soil types mapped for the City area. These include:

- Psamments and Fluyvents, Frequently Flooded (Ps) consists of sandy and gravelly material in intermittent streambeds of the Santa Ana River, Mill, Warm, and Cajon Creeks, large creeks and their major tributaries. During each flood, alluvium is freshly deposited and reworked. These areas have no value for farming and are mainly used as a source of sand and gravel for construction. Historically, vegetation was limited to scanty grasses and forbs and a few willows and cottonwood trees.

- The Soboba series consists of excessively drained, nearly level to moderately sloping soils formed on alluvial fans in granitic alluvium. These soils historically supported chamise, annual grasses, and forbs. These soils are rapidly permeable and are used mainly for irrigated citrus and dryfarmed seeded pasture.

- The Tujunga series consists of somewhat excessively drained, nearly level to moderately sloping soils that formed on alluvial fans in granitic alluvium. Tujunga soils are rapidly permeable. These soils historically supported thin strands of chamise, some big sagebrush, and annual grasses and forbs. These soils are used mainly for irrigated crops including citrus, grapes, small grains and potatoes. Tujunga loamy sand (TuB) is a gently sloping soil on broad alluvial fans. It one of the predominant soils and is mapped throughout the approximate western half of the City. Tujunga gravelly loamy sand (TvC) is nearly level to moderately sloping soils occurring on long, broad, smooth alluvial fans.

- The Hanford series consists of well-drained, nearly level to strongly sloping soils that formed in recent granitic alluvium on valley floors and alluvial fans. These soils are moderately rapidly permeable. Historically, vegetation was mainly annual grasses and forbs. These soils are used regionally for irrigated crops such as citrus, alfalfa, grapes, pasture plants, and small grains. Some areas are used for home sites. Hanford coarse sandy loam (HaC) occupies alluvial fans and is mapped near the western edge of the City and in the vicinity of Ontario International Airport. Hanford sandy loam (HbA) is on valley floors and toe slopes of alluvial fans. Small areas along the westernmost portion of the City are mapped as HbA.

4.1 Description of the Existing Biological and Physical Conditions

San Sevaine Basin complex was graded out of a predominantly upland area that had dry channels traversing the site. The bottoms of the sub-basins are excavated and engineered fill floors, constructed more than 50 feet below the original ground surface. The sides of sub-basin 5 were seeded with coastal sage scrub as part of SBCFC's restoration plan for the basin's construction. With the exception of a rain event, sub-basins 1-4 are predominantly dry. Sub-basin 1 receives urban runoff that pools at the eastern end of the site during typical summer months when people water. Sub-basin 5 also receives urban runoff, as well as the IUEA Recycled water that is put into the basin for recharge. The western portion of sub-basin 5 has developed wetland herbaceous vegetation as well as riparian shrubs and trees. These riparian trees occur sporadically and in small clump in the sub-basin bottom.

4.1.1 Vegetation Communities

4.1.1.1 Urban/ Disturbed

This community occurs at the top and sides of the sub-basins 1-4 slopes and in disturbed areas. The community is characterized by storksbill (*Erodium cicutarium*), foxtail chess (*Bromus madritensis*), wild oats (*Avena barbata*), ripgut brome grass (*Bromus diandris*), and foxtail fescue (*Vulpia myuros*). Other species occurring in this community are short-pod mustard (*Brassica geniculata*), barley (*Hordium vulgare*), *Amsinkia sp*., and star thistle (*Centaurea melitensis*).

Due to the chronic disturbances as well as flood control maintenance activities, this area does not support a diverse fauna. The most common animal species observed on the site were dogs (*Canis lupus familularis*) and beachy ground squirrels (O*tospermophilus beecheyi*). Other common species include western meadowlark (*Sturnella magna*), cottontail rabbits (*Sylvalegus audobonii*), and mourning doves (*Zenaida macroura*.

4.1.1.2 Wetlands in Sub-Basin 5

Bulrush and cattails have the potential to be temporarily impacted within the Project's APE. They are typically dominated by erect, rooted, herbaceous hydrophytic plant species adapted to growing in conditions of prolonged inundation. Common plant species present in this wetland type include cattails (*Typha* spp.) and bullrush (Scirpus sp.) The wetlands are freshwater wetlands that support ponded or saturated soil conditions during winter and spring and are dry through the summer and fall until the first substantial rainfall. The vegetation is composed of wetland generalists, such as hyssop loosestrife (*Lythrum hyssopifolia*), cocklebur (*Xanthium* spp.), and Italian ryegrass (*Lolium multiflorum*) that typically occur in frequently disturbed sites, such as along streams.

Riparian/Streambed in the north-central portion of sub-basin 5. This channel is characterized as a highly disturbed drainage ditch that has spotty areas of mulefat (bacchari.) and willow trees (Salix sp.), and then other patches of non-native grasses and little or no vegetation.

Well-developed coastal sage scrub occurs on wall of sub-basin 5 and in patchy distribution on the walls of sub-basin 4. This vegetation community found in diverse habitat mosaics and is dominated by a suite of shrub species with low moisture content. Annual herbs, including weedy grasses and forbs and native wildflowers, are common in openings and disturbed areas. Dominant plant species found occurring within the coastal sage scrub on site include California sagebrush, black sage, ceanothus (Ceanothus sp.), brittlebush, California buckwheat, Palmer's goldenbush (Ericameria palmeri), snapdragon penstemon (Keckiella breviflora), and scalebroom (Lepidospartum squamatum).

Wildlife species common in this habitat type on site include western fence lizard (Sceloporus occidentalis), common side-blotched lizard, Anna's hummingbird, western scrub-jay (Aphelo-coma californica), California towhee (Melozone crissalis), Audubon's cottontail, and coyote (Canis latrans).

4.1.2 <u>Animals</u>

Due to the chronic disturbances, surrounding industrial uses, major arterial and highway road features, and adjacent construction, this area does not support a diverse fauna. The most common species observed on the site were dogs (Canis lupus familularis) and beachy ground squirrels (Otospermophilus beecheyi). Other common species include western meadowlark (Sturnella magna), cottontail rabbits (Sylvalegus audobonii), and mourning doves (Zenaida macroura. A complete list of species observed on site is included as Appendix A

4.1.3 <u>Disturbances</u>

Typically the level of disturbance with the Project APE is severe. The majority of the adjacent areas along the proposed facilities pipeline alignment ranges from native CSS habitat to completely disturbed asphalt roads.

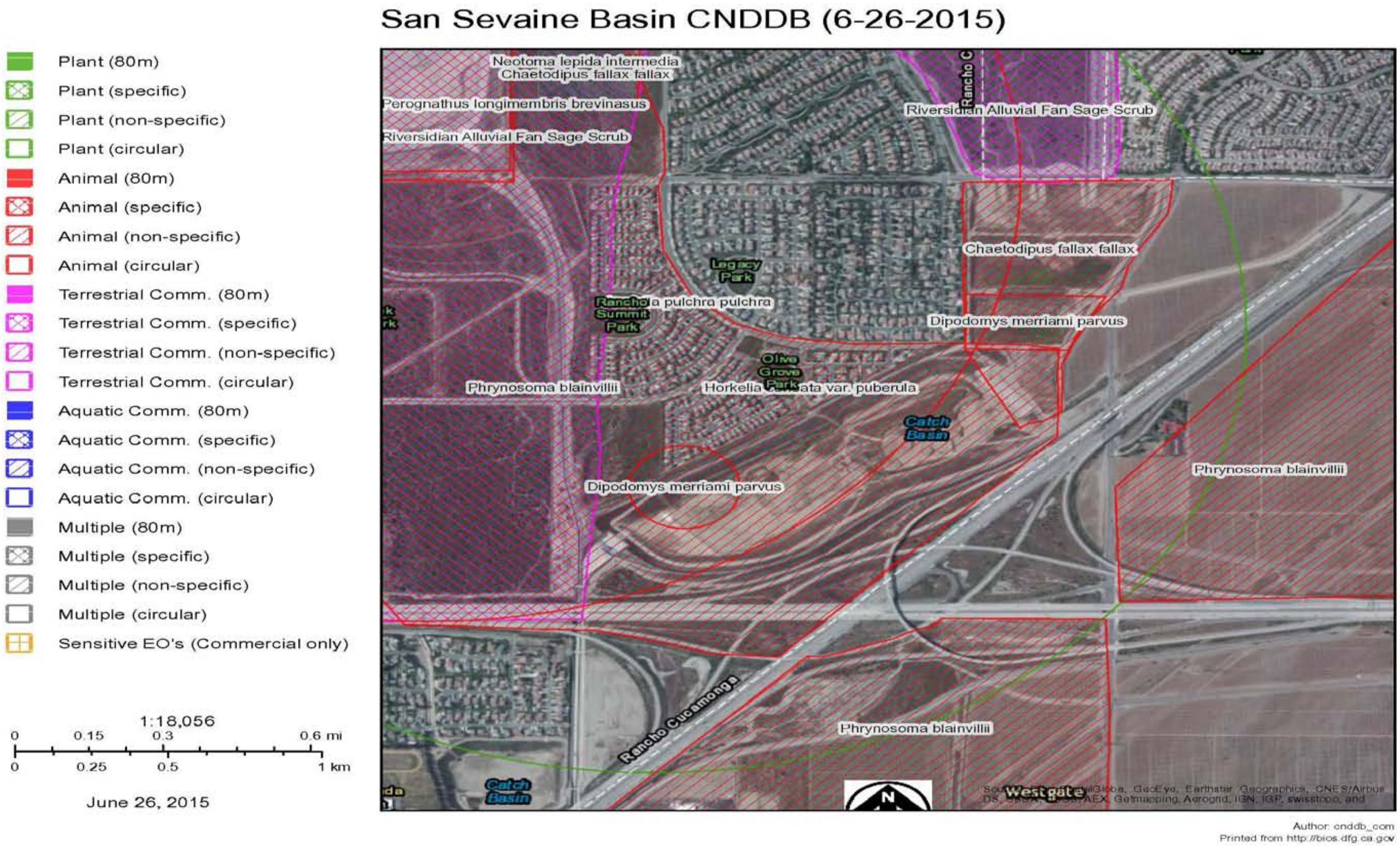
4.1.4 <u>Jurisdictional Determination</u>

The result of the jurisdictional determination is that San Sevaine Basin complex is subject to regulatory jurisdiction by the US Army Corps of Engineers under Section 404 of the Clean Water Act; the State Water Quality Control Board under Section 401 of the Clean Water Act, and California Department of Fish and Wildlife under Section 1600 of the Fish and Game Code.

The limits of the jurisdiction vary between the agencies. The limit of jurisdiction for Sections 404 and 401 of the Clean Water Act extend to the spillway height for the entire basin complex. The limits of jurisdiction for Section 1600 of the Fish and Game Code is the top of bank for each sub-basin.

Two components of the proposed project, the pump station in Basin 5, including the electrical connections; and the turnouts into Basins 1, 2 and 3 appear to be located within jurisdictional waters of the United States and State of California. The estimated area of disturbance within waters is 0.12 acres for temporary impacts and 0.12 acres for permanent impacts.

Figure 5 – CNDDB Occurrences



4.2 Potentially Occurring Listed or Protected Species

4.2.1 Burrowing Owl Habitat Assessment and Surveys

Burrowing owl (Athene cunicularia) surveys were conducted in the APE within suitable habitat, The 2015 surveys consisted of a habitat assessment and comprehensive burrow surveys

Burrowing owl is federally protected under the MBTA and by California Fish and Game Code Sections 3503, 3503.5, and 3800. In addition, the burrowing owl is a State Species of Special Concern and is covered under both the WR-MSHCP and CV-MSHCP. The California Fish and Game Commission rejected a proposal for State listing because of relatively high population levels in some parts of the State. However, because the species has declined in other parts of California, and it is particularly vulnerable to incidental take due to its unique utilization of burrows, the burrowing owl has been the focus of specific CDFW management recommendations since the 1990s.

Burrowing owls inhabit open country in North and South America. These owls are known to occupy and modify former ground squirrel burrows in grasslands, agricultural fields, rangelands, and other open habitat types including those in railroad rights-of-ways, margins of highways, golf courses, and airports. They often utilize structures such as earthen berms, concrete culverts, pipes, and concrete, asphalt, rock, or wood debris piles. Burrowing owls are active year-round and forage both diurnally and nocturnally for insects, scorpions, amphibians, reptiles, birds, and small mammals (Poulin et al. 2011).

Focused surveys for burrowing owls were conducted during the breeding season in 2015. The result of this survey is that no burrowing owls, burrowing owl sign, or evidence of historic use by burrowing owls was observed within the project site.

4.2.2 Coastal California Gnatcatcher Assessment and Surveys

Focused coastal California gnatcatcher surveys were conducted by permitted biologists on all potentially suitable habitat within the San Sevaine Basin. The result of this focused protocol survey was this species is absent from this site. The focused survey report is attached as Appendix D.

4.2.3 Small Mammal Habitat Assessment and Surveys

Habitat assessments for San Bernardino kangaroo rat (Dipodomys merriami parvus)(SBKR) was conducted in 2015 prior to conducting small mammal trapping within the APE. Examination of aerial images to locate suitable habitat was followed up by ground visits to many areas to identify the most promising trapping sites for the target species. Protocol surveys consisted of five consecutive nights of trapping. USFWS protocol states that trapping may be terminated if the target species is captured. Each trap was opened and baited at dusk, checked near midnight, and checked and closed at dawn. All animals were identified and released unharmed where they were captured.

In the early 2000's SBKR were detected in Basin 5, as such presence/absence surveys were warranted for this project in Basin No. 5. Following a 15-Day Notification to the U. S. Fish and Wildlife Service (USFWS), the subject property was surveyed for the federally-listed as endangered SBKR by permitted biologist Shay Lawrey on June 14-19, 2015. No SBKR were trapped during the survey and the negative finding indicates that SBKR are absent from the study area. The focused survey report is attached as Appendix E.

4.3 Other Species with Potential to Occur within the Project APE

California Department of Fish and Wildlife's CNDDB for the Cucamonga Peak and Devore USGS 7.5 Minute Quadrangles, and surrounding areas was searched as well as the U.S. Fish and Wildlife Service's Official List of Threatened and Endangered Species with the potential to occur on the Cucamonga Peak and Devore USGS 7.5 Minute Quadrangles, and the U.S. Fish and Wildlife Service's IPac Results. The following is a discussion of the species listed by the databases as occurring within the vicinity of the Project. Note the Species on the U.S. Fish and Wildlife Service's list are in bolded text.

TABLE 1: SPECIAL STATUS PLANT AND ANIMAL SPECIES KNOWN TO OCCUR OR POTENTIALLY OCCUR WITHIN THE PROJECT APE

Scientific and Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
Abronia Villosa var. *aurita* Chaparral sand-verbena	N / N	Grows in sandy, bare areas of chaparral and coastal sage scrub.	No suitable habitat for this species occurs on the site. Due to the highly disturbed nature of the site, there is no potential for this species to occur.
Accipiter cooperi (nesting3) Cooper's hawk	N/N	Oak and riparian woodlands, windrows, open fields. Known to use urban areas, occupying trees among residential and commercial uses.	Suitable foraging habitat occurs within the APE, Observed on site during field surveys.
Accipiter striatus (nesting) sharp-shinned hawk	N/N	Variety of residential, chaparral, grassland, sage scrub, crop land, riparian, and oak woodland, windrows, open fields.	Suitable foraging habitat, however uncommon in the area. Probability of occurrence is low to moderate.
Agelaius tricolor ***Tricolored blackbird***	**N/N**	**Marshes and grasslands. Breeding colonies requires nearby water, nesting substrate, and open range foraging habitat of natural grassland, woodland, or agricultural cropland.**	Suitable nesting habitat occurs at the west end of sub-basin 5. Redwing blackbird observed, however this species was not observed during any of the field surveys. Therefore, probability of occurrence is very low.
Aimophila ruficeps canescens southern California rufous-crowned sparrow	N / N	Inhabits steep rocky hillsides with grass and forb patches in coastal sage scrub and sparse chaparral.	Suitable habitat for this species occurs on the site. Species has been observed on this site in the past. Therefore probability of occurrence is high.

Scientific and Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
Anaxyrus californicus **Arroyo Toad**	**E/N**	**Anaxyrus californicus prefers sandy or cobbly washes with swift currents and associated upland and riparian habitats, in Southern California and Baja California. An arroyo is also called a wash; it is a dry creek or stream bed. It fills and flows after sufficient rain, but only temporarily during specific seasons. The arroyo toad inhabits these areas alongside rivers with shallow pebble-like rocks near sandy terrains.**	**No suitable habitat for this species occurs within the APE. Therefore probability of occurrence is zero.**
Antrozous pallidus pallid bat	N/N	Oak and grassland ecotones. Prefers foraging in the open Roosts in attics or rock cracks; in the open, near foliage at night..	Marginally suitable habitat occurs adjacent to the APE. Potential for occurrence within the APE is low.
Aquila chrysaetos golden eagle	N / DFG fully protected species	Nests in cliff-walled canyons or large trees and nests and winters in rolling foothills mountain areas, sage-juniper flats and desert.	There is no suitable nesting substrate within the project APE, however there is potential foraging within the APE
Ardea alba [Casmerodius albus] (rookery) great egret	N/N	Wet areas, fields, margins of open water.	This species was observed within sub-basin 5.
Ardea herodias (rookery) great blue heron	N/N	Wet areas, fields, margins of open water.	This species was observed within sub-basin 5.
Asio flammeus **short-eared owl**	**N / N**	**Nests in riparian bottomlands of tall willows and cotton- woods and in belts of live oak paralleling stream courses. Requires adjacent open lands for foraging and the presence of old nests of crows, hawks, or magpies for nests.**	**No suitable habitat occurs within the project APE, therefore, occurrence potential is low.**
Aspidoscelis tigris stejnegeri [Cnemidophorus tigris multiscutatus] coastal (western) whiptail	N/N	Open, often rocky areas with little vegetation or sunny microhabitats within shrub or grassland associations	Limited to no suitable habitat. Probability of this species occurring within the APE is low..

Scientific and Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
Astragalus brauntonii **Braunton's Milk-vetch**	**E/N**	**Astragalus brauntonii is a plant of the coastal prairie grasslands, coastal sage scrub, and chaparral plant communities of the region. It is often found growing in disturbed areas, especially in carbonate soils areas.[**	**The 16 known remaining populations are found in the southwestern Transverse Ranges (eastern Santa Monica Mountains, east end Simi Hills, south base San Gabriel Mountains), northern Peninsular Ranges (northwest side Santa Ana Mountains) — within Los Angeles, Orange, and Ventura Counties The site is outside the known range of this species and there are no suitable soils within the APE. Therefore the probability occurrence is zero.**
Athene cunicularia **burrowing owl**	**N/N**	**Subterranean nester, dependent upon burrowing animals such as ground squirrels and desert tortoise for burrow sites. Inhabits open, dry annual or perennial grasslands as well as deserts and scrublands characterized by low-growing vegetation. Shortgrass prairies, grasslands lowland scrub, agricultural lands, coastal dunes, desert floors, and some artificial open areas. Uses abandoned ground squirrel burrows and artificial structures such as berms, culverts, and underpasses.**	**Surveys for this species have been on going in this basin since 2000. None have been observed. Therefore this species is considered absent from the site.**
Atriplex coulteri Coulter's saltbush	N / N	Grows on ocean bluffs, dunes and ridgetops, as well as in alkaline low places in coastal scrub, valley and foothill grassland between 10 and 440 meters.	The site is extremely marginal habit for this species. Due to the highly disturbed nature of the site, occurrence potential for this species is very low.
Baeolophus inornatus *Oak Titmouse*	N/N	It prefers open woodlands of warm, dry oak and oak-pine at low to mid-elevations but can also be found in forests as long as adequate oak trees are present.	No suitable habitat for this species occurs within the APE. Therefore probability of occurrence is zero.
Buteo regalis (wintering) ferruginous hawk	N/N	Grasslands and other open terrain of the plains and foothills. Wintering species. Primarily open fields with low vegetation.	Moderate. Suitable foraging, limited nesting habitat. Expected occasionally. Observed.
Buteo swainsoni *Swainson's Hawk*	N/N	Grasslands and other open terrain.	Low. Potential for foraging. None for nesting. Expected only rarely.
California Walnut Woodland	N / N		This habitat does not occur on the site.
Calochortus weedii var. *intermedius* intermediate mariposa lily	N / N	Grows on dry, rocky open slopes and rock outcrops between 120-850meters in coastal scrub, chaparral, valley and foothill grassland.	No suitable habitat for this species occurs on the site. Due to the highly disturbed nature of the site, there is no potential for this species to occur.

Scientific and Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
Carduelis lawrencei Lawrence's Goldfinch	N/N	The typical nesting habitat is dry and open woods that are near both brushy areas and fields of tall annual weeds, usually within 0.5 mi (0.80 km) of a small body of water. It may nest in other habitats, including rural residential areas, but not in deserts or dense forests. Outside the nesting season it occurs in many open habitats including deserts, suburbs, and city parks	This species in not likely to occur during nesting season, however may utilize the area during migration or in winter. Probability of occurrence within the APE is low to moderate.
Carpodacus cassinii *Cassin's Finch*	N/N	Their breeding habitat is coniferous forest in mountains of western North America as far south as northern New Mexico and Arizona; also Southern California near Baja California. They nest in large conifers. They move to lower elevations in winter.	This species in not likely to occur during nesting season, however may utilize the area during migration or in winter. Probability of occurrence within the APE is low to moderate.
Calypte costae *Costa's Hummingbird*	N/N	Arid brushy deserts and any nearby gardens of the Southwestern United States and the Baja California Peninsula of Mexico.	This species has been observed within the project APE.
Catostomus santaanae Santa Ana sucker	T / SC	This species is typically fund in small to medium sized streams with width less than 7 meters and depths of a few centimeters to over a meter. Suckers prefer clear water but can tolerate seasonal turbidity and sever periodic flooding. Adults prefer gravel and cobble substrates, but may tolerate sand. Juveniles may prefer sandy substrates. They appear intolerant of highly polluted or highly modified streams. It is endemic to Los Angeles basin south coastal streams.	There is no suitable habitat for this species within the APE. There is no potential for this species to occur within the project APE
Chaetodipus [Perognathus] fallax fallax northwestern San Diego pocket mouse	None/None	Coastal sage scrub, sage scrub/grassland ecotones, and chaparral communities Moderately gravelly and rocky substrates, disturbed grassland and open sage scrub vegetation with sandy-loam to loam soils.	There is suitable habitat for this species within the APE. This species was observed on site during the focused SBKR surveys.
Charadrius montanus mountain plover	N/N	Dry upland prairies and plains, semi-desert, bare dirt fields.	Limited suitable foraging habitat. Probability of occurrence within the APE is very low.
Circus cyaneus (nesting) northern harrier	N/N	Grasslands and other open terrain. Soars over open fields, low perches.	Limited suitable foraging habitat. Probability of occurrence within the APE is very low.
Clemmys marmorata pallida southwestern pond turtle	SC / SC	This species inhabits permanent or nearly permanent bodies of water in many habitat types below 6000 ft elevation. Requires basking sites such as partially submerged logs, vegetation mats, or open mud banks and suitable nesting sites.	There is no suitable habitat for this species within the APE. There is no potential for this species to occur within the project APE

Scientific and Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
Cnemidophorus hyperythrus orange-throated whiptail	N / SC	Inhabits washes and other sandy areas with patches of brush and rocks with sufficient perennial plants to sustain termite populations in low-elevation coastal scrub, chaparral, and valley-foothill hardwood habitats.	Only extremely marginal habitat for this species occurs on the site. Due to the highly disturbed nature of the site, occurrence potential for this species is low.
Coccyzus americanus occidentalis western yellow-billed cuckoo	C / E	Nests in riparian thickets of willow and cottonwood with blackberry, nettles, or wild grape understory along the broad, lower flood-bottoms of larger river systems.	There is no suitable habitat for this species within the APE. There is no potential for this species to occur within the project APE
Contopus cooperi *Olive-sided Flycatcher*	N/N	Breeding habitat is coniferous woods across Canada, Alaska and the northeastern and western United States, and other types of wooded area in California. Olive-sided flycatchers are abundant in early post fire landscapes that have burned at high severity. This species migrates to Central America and the Andes region of South America.	There is no suitable habitat for this species within the APE. There is no potential for this species to occur within the project APE
Corynorhinus townsendii Townsend's big-eared bat	N/N	A wide variety of habitats including woodlands and arid grasslands. Roosts in mines and caves.	Limited to no suitable habitat. Not expected to occur within the APE.
Dendroica petechia brewsteri yellow warbler	N / SC	Most often nests in riparian areas with willows, cotton- woods, aspens, sycamores and alders but also in montane shrubbery in open conifer forests.	Only extremely marginal habitat for this species occurs on the site. Due to the highly disturbed nature of the site, occurrence potential for this species is low.
Diadophus punctatus modestus San Bernardino ringneck snake	N/N	Chaparral, coastal sage scrub, grassland, riparian, and woodlands	Only extremely marginal habitat for this species occurs on the site. Due to the highly disturbed nature of the site, occurrence potential for this species is low.
Dodechahema leptoceras **Slendar-horned Spineflower**	**E/E**	**This plant grows in the silt-rich floodplains and washes of the foothills of the Transverse Ranges and the Peninsular Ranges of southern California. It is known from fewer than 40 reported sightings, many of which were in locations that have since been claimed for development or otherwise altered. About 19 occurrences are believed to exist now.[1] This plant has been recorded in only a few general areas, including Tujunga Wash and the flood lands surrounding the Santa Ana and San Jacinto Rivers**	**There is no suitable habitat for this species within the APE. There is no potential for this species to occur within the project APE**

Scientific and Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
Dudleya multicaulis many-stemmed dudleya	N/N	Grows in heavy, often clayey soil in chaparral, coastal scrub, valley and foothill grassland between 0 and 790 meters. Endemic to Southern California.	No suitable habitat occurs on the site. Occurrence potential is very low.
Dipodomys merriammi parvus ***San Bernardino kangaroo rat***	**E/N**	**Riversidean alluvial fan sage scrub and sandy loam soils, alluvial fans and flood plains, and along washes with nearby sage scrub. Prefers sandy loam substrates. Santa Ana River, Cajon Creek Wash, Lytle Creek Wash, City Creek, and upper Etiwanda Wash in San Bernardino County, and sites in western Riverside County**	**Focused Protocol Surveys were conducted for this species. The result of this survey is that this species is absent from this site.**
Egretta thula (rookery) snowy egret	N/N	Wet areas, fields, margins of open water.	Probability of this species occurring within the APE is moderate to high. Fairly common resident
Elanus leucurus (nesting) white-tailed kite	N/N	Open woodlands and grasslands, windrows. Hovers over open fields.	Suitable foraging, limited nesting habitat. Species has been observed within the project APE.
Empidonax traillii **willow flycatcher**	**E / E**	**Inhabits extensive thickets of low, dense willows on edges of wet meadows, ponds, or backwaters between 2000-8000 elevation.**	**Only extremely marginal habitat for this species occurs on the site. Due to the highly disturbed nature of the site, occurrence potential for this species is low.**
Eremophila alpestris actia California horned lark	N/N	Variety of open habitats, usually where trees and large shrubs are absent.	Only extremely marginal habitat for this species occurs on the site. Due to the highly disturbed nature of the site, occurrence potential for this species is low.
Eriastrum densifolium **ssp.** ***sanctorum*** **Santa Ana River woollystar**	**E / E**	**Grows on sandy soils of riparian floodplains and terraced fluvial deposits between 150 and 610 meters. Formerly known from Orange and San Bernardino Counties but has been extirpated by much of its former range.**	**The site does not contain flood deposited terraces, and therefore, no suitable habitat occurs on the site. There is no potential for this species to occur on the site.**
Euderma maculatum spotted bat	N/N	Arid deserts, grasslands, and mixed conifer forests. Roosts in rock crevices.	Only extremely marginal habitat for this species occurs on the site. Due to the highly disturbed nature of the site, occurrence potential for this species is low.
Eumops perotis californicus California mastiff bat	N/N	Open areas with high cliffs.	Only extremely marginal habitat for this species occurs on the site. Due to the highly disturbed nature of the site, occurrence potential for this species is low.
Falco columbarius (wintering) merlin	N/N	Grasslands, coastal sage scrub and estuaries, windrows, open fields.	Suitable foraging habitat, no nesting habitat. Expected only rarely. Winter visitor.
Falco mexicanus (nesting) prairie falcon	N/N	Grasslands, coastal sage scrub and estuaries.	Potential habitat for foraging, none for nesting. Expected only rarely. Winter visitor

Scientific and Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
Falco peregrinus anatum (nesting peregrine falcon*)*	Delisted/SE	Estuaries, wetlands, and coastal bluffs. Breeding habitat in high cliffs along the coast.	Suitable foraging, no nesting habitat. Potential for this species is low.
Gila orcutti Arroyo chub	N / N	Inhabits slow moving streams with mud or sand bottoms and emergent vegetation. Feeds on aquatic vegetation and associated invertebrates.	There is no suitable habitat for this species within the APE. There is no potential for this species to occur within the project APE
Gymnogyps Californianus ***California Condor***	**E/E**	**Its range includes rocky, open-country scrubland, coniferous forest and oak savanna. Cliffs, rocky outcrops or large trees are used as nest sites (USFWS 1996). It scavenges on the carcasses of large mammals and also feeds on the carcasses of small mammals, but perhaps only where there are sufficient numbers at one site (L. Kiff in litt. 2009). Released birds have become increasingly independent in finding food and may range more than 400 km from release sites (Anon. 1998).**	**Although the APE is within 400 Km of foraging Condors, none have been observed in the area. Further there is no suitable sized carrion for forage within the urbanized area of the project site. The probability of this species occurring within the project APE is zero.**
Haliaeetus leucocephalus ***Bald Eagle***	**Delisted/N**	**The bald eagle typically requires old-growth and mature stands of coniferous or hardwood trees for perching, roosting, and nesting. Tree species reportedly is less important to the eagle pair than the tree's height, composition and location.[29] Perhaps of paramount importance for this species is an abundance of comparatively large trees surrounding the body of water.**	**There is no suitable habitat for this species within the APE. There is no potential for this species to occur within the project APE**
Icteria virens Yellow-breasted chat	N / N	A summer resident that nests in low, dense riparian growth consisting of willow, black- berry and wild grape. It forages and nests within 10 feet of the ground.	Suitable habitat for this species occurs in the riparian growth in sub-basin 5. This species as observed during the field surveys.
Ixobrychus exilis *Least Bittern*	N/N	These birds nest in large marshes with dense vegetation from southern Canada to northern Argentina. The nest is a well-concealed platform built from cattails and other marsh vegetation.	There is no suitable habitat for this species within the APE. Further the APE is outside the known range for this species. There is no potential for this species to occur within the project APE
Lanius ludovicianus loggerhead shrike	N/N	Grasslands and open scrub. Forages in open country, using low perches (fences etc.) for scanning, and nests in dense scrub and brush.	Suitable foraging and nesting habitat. Probability of occurrence within the APE is moderate.
Larus californicus (nesting colony California gull*)*	N/N	Nearly all types of fresh and salt water, cropland, landfills, refuse areas, open lawns.	Common in winter. Occasional in summer. Probability of occurrence within the APE is moderate to high.

Scientific and Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
Lasiurus xanthinus western yellow bat	N/N	Desert regions of the southwestern U.S., southern California. Capture sites are often associated with water features; open grassy areas and scrub, canyons and riparian areas, orchards. Particular association with palms in oases and ornamental palms in landscaping.	There is no suitable habitat for this species within the APE. Further the APE is outside the known range for this species. There is no potential for this species to occur within the project APE
Lepus californicus bennettii San Diego black-tailed jackrabbit	N/N	Coastal sage scrub and on the margins between shrub and herbaceous areas. Also know to occur in agricultural and ruderal areas.	Probability of this species occurring within the APE is moderate to high.
Melanerpes lewis Lewis's Woodpecker	N/N	Three principal habitats are open ponderosa pine forest, open riparian woodland dominated by cottonwood, and logged or burned pine forest Breeding: From interior southern British Columbia and southwestern Alberta south to Lewis's Woodpecker range: Arizona and New Mexico, and from coastal California east to Colorado. Virtually the entire Canadian population occurs in British Columbia. Winter: Interior southern British Columbia (casually) south through the western states to northern Mexico, but mainly in the southwestern United Sta	The site is outside the known range of this species and there are no suitable soils within the APE. Therefore the probability occurrence is zero.
Myotis ciliolabrum small-footed myotis	N/N	Feeds among trees or over brush. Roosts in caves, mines, and in cliff or rock openings.	Probability of this species occurring within the APE is moderate to high.
Myotis yumanensis Yuma myotis	N/N	Water and wooded canyon bottoms. Roosts in caves and abandoned buildings.	Probability of this species occurring within the APE is moderate to high.
Neotoma lepida intermedia San Diego desert woodrat	N/N	Riversidean and coastal sage scrub, chaparral and nonnative grasslands. Shrub and desert habitats, primarily associated with rock outcroppings, boulders, cacti, or areas of dense undergrowth	Probability of this species occurring within the APE is moderate.
Nolina cismontana chaparral nolina	N / N	Grows primarily on sand- stone and shale and occasionally gabbro substrates in chaparral and coastal scrub habitats between 140 and 1,275 meters.	No suitable habitat for this species occurs on the site. Due to the highly disturbed nature of the site, there is no potential for this species to occur.
Numenius americanus long-billed curlew	N/N	Coastal estuaries, upland herbaceous areas, croplands, wet areas, open fields, shores of open water.	No suitable habitat for this species occurs on the site. Due to the highly disturbed nature of the site, there is no potential for this species to occur.
Nyctinomops Macrotis big free-tailed bat	N/N	Desert habitats. Roosts in rock crevices in cliffs.	No suitable habitat for this species occurs on the site. Due to the highly disturbed nature of the site, there is no potential for this species to occur.

Scientific and Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
Nyctinomops Femorosaccus pocketed free-tailed bat	N/N	Desert habitats. Roosts in rock crevices in cliffs.	No suitable habitat for this species occurs on the site. Due to the highly disturbed nature of the site, there is no potential for this species to occur.
Otus flammeolus *Flammulated Owl*	N/N	This species is generally associated with montane forested habitats often with brushy understory. This owl may also occur in forests with mixes of oak, Douglas Fir, white fir, incense cedar, or sugar pine.	No suitable habitat for this species occurs on the site. Due to the highly disturbed nature of the site, there is no potential for this species to occur.
Passerella iliaca *Fox Sparrow*	N/N	Fox sparrows commonly breed in coniferous or mixed forests, which have dense undergrowth and shrub. They also breed in woodland thickets, scrub, chaparral, and riparian woodland. During the winter months, fox sparrows are commonly found in forests, forest edges, woodlots, and other woodland habitats that have dense undergrowth	Suitable foraging and nesting habitat. Probability of occurrence within the APE is moderate.
Perognathus longimembris brevinasus Los Angeles pocket mouse	N/N	Inhabits open ground of fine sandy composition. Probably prefers sparsely vegetated habitats.	No suitable habitat for this species occurs on the site. Due to the highly disturbed nature of the site, there is no potential for this species to occur.
Phalacrocorax auritus double-crested cormorant	N/N	Lakes, fresh, salt, and estuarine waters	No suitable habitat for this species occurs on the site. Due to the highly disturbed nature of the site, there is no potential for this species to occur.
Picoides albolarvatus ***White headed woodpecker***	**N/N**	**Found on mountaintops of the San Gabriel Mountains to San Diego County**	**No suitable habitat for this species occurs on the site. Due to the highly disturbed nature of the site, there is no potential for this species to occur.**
Picoides nuttalli ***Nuttall's Woodpecker***	**N/N**	**Preferred habitat is arid to mesic woodlands. In particular, these woodpeckers prefer oak woodlands, although they also occur in riparian sites and chaparral in the most southern parts of its range because of the decrease in oak abundance.**	**No suitable habitat for this species occurs on the site. Probability of occurrence adjacent to the APE is very low.**
Plegadis chihi (rookery site) white-faced ibis	N/N	Freshwater marshes and brackish areas.	There is no suitable habitat for this species within the APE. There is no potential for this species to occur within the project APE
Pipilo chlorurus Green-tailed Towhee	N/N	Breeding range covers most of the interior Western United States, with a winter range in Mexico and the southern edge of the Southwestern United States.	The site is outside the known range of this species and there are no suitable soils within the APE. Therefore the probability occurrence is zero

Scientific and Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
Polioptila californica californica **Coastal California gnatcatcher**	**T / N**	**Inhabits various successional stages of the sage scrub communities characterized by Artemisia californica, Eriogonum fasciculatum, Encelia farinosa, Salvia spp., and Opuntia spp. CAGN will also utilize chaparral, grassland, and riparian plant communities where they occur adjacent to or intermixed with sage scrub.**	**The site is not within proposed or designated critical habitat for this species. Focused Protocol Survey was conducted for CAGN. The result of this survey it there CAGN is absent from the site.**
Rhaphiomidas terminatus abdominalis Delhi Sands flower- loving fly.	E/N	Wholly or partially consolidated dunes (Delhi soils series), open sand. Fine, sandy soils with sparse vegetation cover of California buckwheat, croton, deerweed, and evening primrose	No Suitable habitat occurs within the Project APE. Therefore the probability of occurrence is zero
Rana muscosa ***Mountain Yellow-legged frog***	**E/E**	**The frog occurs in mountain creeks, lakes and lakeshores, streams, and pools, preferring sunny areas. It rarely strays far from water. The tadpoles require a permanent water habitat for at least two years while they develop. The frog has been noted at elevations of between about 1,214 and 7,546 feet (370 and 2,300 meters) in Southern California**	**No suitable habitat for this species occurs on the site. Therefore there is no potential for this species to occur.**
Sidalcea neomexicana Salt Spring Checkerbloom	N / N	Grows in alkali springs and marshes in alkali playas, brackish marshes, chaparral, coastal scrub, lower montane coniferous forest and Mojavean desert scrub between 0-1500 meters in elevation.	No Suitable habitat occurs within the Project APE. Therefore the probability of occurrence is zero
Spea [Scaphiopus] hammondi western spadefoot toad	N/N	Seasonal pools in coastal sage scrub, chaparral, and grasslands.	Marginally suitable habitat occurs within the APE. Therefore the probability of occurrence is low.
Sphyrapicus thyroideus *Williamson's Sapsucker*	N/N	Breeding habitat is open forested areas with conifers, mainly ponderosa pine, douglas fir, and grand fir. Subalpine fir and western larch may also be important components of good habitat for these birds.[2] Partially migratory, they breed in western North America from northern Mexico as far north as British Columbia	No Suitable habitat occurs within the Project APE. Therefore the probability of occurrence is zero
Spizella atrogularis Black-chinned Sparrow	N/N	Common in open chaparral in the mountain and foothills of Los Angeles and Santa Barbara Counties. Transient in San Bernardino County.	The APE is outside the typical range for this species. Probability of occurrence is very low.

Scientific and Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
Spizella breweri Brewer's Sparrow	N/N	This species breeds on sagebrush flats and other open scrubby areas. It winters from just south of the breeding range in south-western USA to central Mexico	The APE is outside the typical range for this species. Probability of occurrence is very low.
Stellula calliope Calliope Hummingbird	N/N	The breeding habitat of calliope hummingbird is varied among open shrub habitats and altitudes. Nesting usually occurs at higher altitudes in the Rocky Mountains. Nests have been observed from as low as 300 m (980 ft) in Washington elevation to the tree line at over 3,000 m (9,800 ft). In Montana, the minimum elevation observed for breeding is 1,200 m (3,900 ft).[4][5] Open montane forest, mountain meadows, and willow and alder thickets may variously serve as breeding grounds. During migration and winter, they also occur in chaparral, lowland brushy areas, deserts and semi-desert regions	The APE is outside the typical range for this species. Probability of occurrence is very low.
Strix occidentalis occidentalis California Spotted Owl	Review/N	California spotted owls occur in hardwood, coniferous, and coniferous-hardwood forests. Occupied coniferous habitats include mixed coniferous forests. California red fir and eastside pine forests which are composed of ponderosa pine and/or Jeffrey pine (Pinus jeffreyi). Redwood/California bay (Umbellularia californica), ponderosa pine/hardwood,[20] and live oak-bigcone Douglas-fir (Quercus chrysolepis or Q. agrifolia-Pseudotsuga macrocarpa) are hardwood-mixed coniferous forests used by California spotted owls. They also occur in hardwood habitats including riparian and oak (Quercus sp.) woodlands. For example, in the Tehachapi Mountains of southern California they occurred in stands dominated by canyon live oak (Q. chrysolepis).[	No suitable habitat for this species occurs on the site. Therefore there is no potential for this species to occur.
Toxostoma lecontei Le Conte's Thrasher	N/N	The typical desert habitat consists of dunes, alluvial fans, and flat to gently rolling hills with shallow washes with sparse vegetation. The vegetation that it may utilize includes low vegetation such as saltbush, creosote, cholla cacti, and Mojave yucca. The range of altitude spans as low as 80 m below sea level (in Death Valley) to as high as 1,600 m, although 500 m above sea level is the average	No suitable habitat for this species occurs on the site. Therefore there is no potential for this species to occur.

Scientific and Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
Vireo bellii pusillus **least Bell's vireo**	**E / E**	**Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite. In low riparian, in vicinity of water or in dry river bottoms below 2000 ft.**	**Occupied suitable habitat for this species occurs in 1000 feet of the project. However no suitable habitat occurs on site, and the project will be constructed during the time when this species is absent from southern California. Therefore occurrence potential is very low.**

Bold Indicates the species occurs on the U.S. Fish and Wildlife Service's List

4.4 Animals

Due to the chronic disturbances, surrounding industrial uses, major arterial and highway road features, and adjacent construction, this area does not support a diverse fauna. The most common species observed on the site were dogs (*Canis lupus famillularis*) and beachy ground squirrels (O*tospermophilus beecheyi*). Other common species include western meadowlark (*Sturnella magna*), cottontail rabbits (*Sylvalegus audobonii*), and mourning doves (*Zenaida macroura*. A complete list of species observed on site is included as Appendix A

5. Conclusions and Recommendations

The project will likely have temporary impacts to California streambeds and may have temporary impacts to jurisdictional waters. The extent of these temporary impacts will be identified once the plans are finalized. Depending upon the extent of temporary impacts, a CWA Section 404 permit, CWA Section 401 Certification, and CDFG Code Section 1600 Streambed Alteration Agreement may be required for those impacts.

Based on information presented above in the results section, this BRA concludes that coastal California gnatcatcher, San Bernardino kangaroo rat, and burrowing owl are absent from the site and there is no risk of the project resulting in a "taking" of any of these species. Incidental take authority from the CDFG or the USFWS is not required.

According to protocol and standard practices, the results of this survey will remain valid for the period of one year, or until July 2016, after which time, if the site has not been disturbed in the interim, another survey may be required to determine the persisting absence the above referenced species. Regardless of survey results and conclusions given herein, these species are protected by applicable State and/or federal laws, including but not exclusive to the California Endangered Species Act and Federal Endangered Species Act. As such, if a one is subsequently found on-site or at the time of construction, all activities likely to affect the animal(s) should cease immediately and regulatory agencies should be contacted to determine appropriate management actions. Importantly, nothing given in this report, including recommended mitigation measures, is intended to authorize the incidental take of any listed species during project construction. Such authorization must come from the appropriate regulatory agencies, including CDFG (i.e., authorization under section 2081 of the Fish and Game Code) and USFWS.

A minimal loss of potential foraging and nesting habitat for local and migratory bird species may occur from the project construction. These impacts for these bird species however, are not considered regionally or locally significant and therefore, no compensatory mitigation is proposed.

Due to either the lack of suitable habitat, or the absence of observations during any of the field surveys, none of the special-status species reported from the CNDDB or the IPAC will be adversely affected by the proposed project.

6. Proposed Avoidance and Minimization Measures

6.1 San Bernardino Kangaroo Rat

SBKR are considered absent from this site and as such no specific avoidance or minimization measures are proposed for this species.

6.2 Coastal California Gnatcatcher

The CAGN occurs in coastal sage scrub plant community. This species has been recorded historically in the vicinity of the project site. Although no CAGN were detected during surveys, habitat on site is suitable for this species. If a CAGN is encountered during construction, all construction activity will cease until the USFWS is contacted and concurrence regarding the next measure is established.

6.3 Burrowing Owl

The BUOW is a state Species of Special Concern. The BUOW is typically found in grassland, scrubland and desert habitats with numerous small mammal burrows (Coulombe 1971). Burrowing owls nest and roost in modified, expanded burrows originally created by fossorial animals including ground squirrels, rabbits, and badgers. They are also known to make use of human-created structures such as cement culverts and pipes for burrows. Within 30 days of the start of any land disturbance activities, a qualified biologist should survey the site to determine if burrowing owls are present and nesting in the construction area. If BUOW are encountered and determined to not be nesting, land disturbance activities shall not commence until the biologist has implemented the required measures according to the CDFW to clear the site for construction. No disturbance to an active BUOW nest will be permitted and all work within a 500-foot buffer zone radius will cease until the hatchlings have fledged. If the nest is not occupied by eggs or chicks then CDFW may agree to a passive relocation plan. This type of relocation requires the construction of artificial burrows in the near vicinity and collapsing of the old burrows once the owls have clearly flushed out of the site. If burrowing owls are encountered during construction, construction activities shall be halted in the vicinity of the find and the biologist/monitor called to the site. The contractor shall implement the recommendations of the biological monitor.

6.4 Nesting Birds

The State of California prohibits the “take” of active bird nests. To avoid an illegal take of active bird nests, any grubbing, brushing or tree removal should be conducted outside of the State identified nesting season (nesting season is February 15 through September 1). Alternatively, the site can be evaluated by a qualified biologist prior to initiation of ground disturbance to determine the presence or absence of nesting birds. Active bird nests MUST be avoided during the nesting season. If an active nest is located in the project construction area it will be flagged and a 300-foot buffer placed around it. No activity will occur within the 300 foot buffer until the young have fledged the nest.

6.5 Jurisdictional Waters

All project activities should be limited to a well-defined and visually delineated area. Prior to grading and construction activities, the limits of disturbance will be clearly marked with flagging, stakes, or fencing. Additionally, should regulatory permits be necessary, then any and all measures identified in these permits shall be included in the monitoring program.

7. References

AOU (American Ornithologists'' Union). 1998. Check-List of North American Birds. Seventh Edition. American Ornithologists'' Union, Washington, D.C. 829pp.

Baxter, Randall. 1999. Splittail Abundance and Distribution Update. California Department of Fish and Game- Central Valley Bay Delta Branch.

Bent, A.C. 1938. Life histories of North American birds of prey. Part 2. U.S. Natl. Mus. Bull. 170. 482pp.

Best, T.L. 1996. Lepus californicus, Mammalian Species, Publication of the American Society of Mammalogists, pp. 1-10.

Blus, L.J. 1996. Effects of pesticides on owls in North America. J. Raptor Research 30: 198-206.

Botelho, E.S. and P.C. Arrowood. 1998. The effect of burrow site use on the reproductive success of a partially migratory population of western burrowing owls (Speotyto cunicularia hypugaea). J. Raptor Research 32: 233-240.

Bronson, F.H. and O.W. Tiemeir. 1959. The relationship of precipitation and black-tailed jack rabbit populations in Kansas. Evolution 40:194-198.

Bronson, F.H. and O.W. Tiemeir. 1958. Reproduction and age distribution of black-tailed jack rabbits in Kansas. Journal of Wildlife Management 22:409-414.

Brown, J.H. and B.A. Harney. 1993. Population and community ecology of heteromyid rodents in temperate habitats. In H.H. Genoways and J.H. Brown (eds.) Biology of the Heteromyidae, Special Publication No. 10 of the American Society of Mammalogists, pages 618-651.

Brown, J.H. and G.A. Lieberman. 1973. Resource utilization and coexistence of seed-eating desert rodents in sand dune habitats. Ecology 54:788-797.

Brown, J.W., H.A. Wier, and D. Belk. 1993. New records of fairy shrimp (Crustacea: Anostraca) from Baja California, Mexico. The Southwestern Naturalist 38(4): 389 - 390.

Brylski, P., L. Barkley, B. McKernan, S.J. Montgomery, R. Minnich, and M. Price. 1993. Proceedings of the Biology and Management of Rodents in Southern California Symposium. San Bernardino County Museum, Redlands, California, June 26, 1993. Presented by the Southern California Chapter of the Wildlife Society.

Butts, K.O. 1973. Life history and habitat requirements of burrowing owls in western Oklahoma. Unpublished MS thesis, Oklahoma State University, Stillwater. 188 pp. California Science and Engineering Associates. 1996. Final threatened and endangered species survey, March Air Reserve Base, Riverside County, California.

California Department of Fish and Game

1998. Endangered and Threatened Animals of California, 7pp.

1998. Endangered, Threatened and Rare Plants of California, 13pp.

1995. Staff Report on Burrowing owl mitigation. State of California.

1984. Guidelines for assessing effects of proposed developments on rare and endangered plants and plant communities, 2pp.

1992. Natural communities. (Update of Holland, R., 1986)

CDFG (California Department of Fish and Game). 2005. California's Plants and Animals. Habitat Conservation Planning Branch Web Page. www.dfg.ca.gov/hcpb/species. Sacramento, CA.

California Natural Diversity Data Base (NDDB). 2012 Annotated record search for special animals, plants and natural communities – Avena, Escalon, Riverbank, Stockton East and Stockton West quadrangles. Natural Heritage Division, Sacramento, California.

CNPS (California Native Plant Society). 2001. Inventory of Rare and Endangered Plants of California – sixth edition. Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. California Native Plant Society. Sacramento, CA.

Clayton, K.M and J.K. Schmutz. 1999. Is the decline of burrowing owls, Speotyto cunicularia in prairie Canada linked to changes in the Great Plains ecosystems? Bird Conservation International 9: 163-185.

Contra Costa County. 2005. Draft East Contra Costa County Habitat Conservation plan and Natural Community Conservation Plan. Prepared for East Contra Costa County Habitat Conservation Plan Association, Contra Costa County Community Development Department. Prepared by Jones and Stokes, San Jose, CA.

Costa, W.R., K.A. Nagy, and V.H. Shoemaker. 1976. Observations of the behavior of jackrabbits (Lepus californicus) in the Mojave Desert. Journals of Mammalogy 57:399-402.

Coulombe, H.N. 1971. Behavior and population ecology of the burrowing owl, Speotyto cunicularia, in the Imperial Valley of California. Condor 73: 162-176.

Coulombe, H.N. 1970. Physiological and physical aspects of temperature regulation in the burrowing owl Speotyto cunicularia. Comp. Biochem. Physiol. 35: 307-337.

DeSante, D.F. and E.D. Ruhlen. 1995. (Draft) A census of burrowing owls in California, 1991-1993.

Dudek and Associates, Inc. 1999. “Draft Proposal”, Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP), Riverside Integrated Plan (RCIP). Prepared for County of Riverside Transportation and Land Management Agency. Unpublished report. Encinitas, California. August.

Edmonds, V.W. 1973. Longevity of the pocket mouse. The Southwestern Naturalist 17:300-301.

Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1992. *Birds in Jeopardy*. Stanford University Press, Stanford, California.

Eng, L.L., D. Belk and C.H. Eriksen. 1990. California Anostraca: distribution, habitat and status. Journal of Crustacean Biology 10: 247 - 277.

Eriksen, C. and D. Belk. 1999. Fairy Shrimps of California''s Puddles, Pools, and Playas. Mad River Press, Inc., Eureka, California.

French, A.R. 1993. Physiological ecology of the heteromyidae: economics of energy and water utilization. In Genoways, H.H. and J.H. Brown (eds.) Biology of the Heteromyidae, Special Publication No. 10, The American Society of Mammalogists, pp. 509-538.

Green, G.A. 1983. Ecology of breeding burrowing owls in the Columbia basin, Oregon. M.Sc. Thesis. Oregon State University, Corvallis.

Green, G.A. 1983. Ecology of breeding burrowing owls in the Columbia Basin, Oregon. Unpublished MS thesis, Oregon State University, Corvallis. 51 pp

Green, G.A., R.G. Anthony. 1989. Nesting success and habitat relationships of burrowing owls in the Columbia Basin, Oregon. Condor 91: 347

Grinnell, J. and A.H. Miller. 1944. The Distribution of the Birds of California. Pacific Coast Avifauna Number 27. Copper Ornithological Club, Berkeley, California. Reprinted by Artemisia Press, Lee Vining, California; April 1986. 617 pp.

Hall, E.R. 1981. The Mammals of North America. John Wiley and Sons, New York. 2 Vol. 1181 pp.

Hathaway, S.A., D.P. Sheehan, and M..A. Simovich. 1996. Vulnerability of branchiopod cysts to crushing. Journal of Crustacean Biology 16(3): 448 - 452.

Hathaway, S.A. and M.A. Simovich. 1996. Factors affecting the distribution and co-occurrence of two southern Californian anostracans (Branchiopoda), Branchinecta sandiegonensis and Streptocephalus wootonii. Journal of Crustacean Biology 16(4): 669 - 677.

Haug, E.A., B.A. Millsap, and M.S. Martell. 1993. Burrowing Owl (Speotyto cunicularia). In The Birds of North America, No. 130 (A. Poole and F. Gill, Eds.) . Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists'' Union.

Hayden, P., J.J. Gambino, and R.G. Lindberg. 1966. Laboratory breeding of the little pocket mouse, Perognathus longimembris. Journal of Mammalogy 47:412-423.

Hickman, James C., Ed. 1993. *The Jepson Manual: Higher Plants of California*. University of California Press, Berkeley, California.

Hjertaas, D.G. 1997. Recovery plan for the burrowing owl in Canada. Journal of Raptor Research Report 9:107-111.

Hjertaas, D., S. Brechtel, K. De Smet, O. Dyer, E. Haug, G. Holroyd, P. James, and J. Schmutz. 1995. National Recovery Plan for the Burrowing Owl. Report No. 13. Ottawa: Recovery of the Nationally Endangered Wildlife Committee. 33 pp.

Holland, Robert F., Ph.D. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game Nongame Heritage Program (now Natural Heritage Division), Sacramento. October.

Holland, V.L. and Keil, David J. 1990. *California Vegetation*, 4th ed. El Corral Publications, San Luis Obispo, California.

James, P.C. and R.H.M. Espie. 1997. Current status of the burrowing owl in North America: an agency survey. Journal of Captor Research Report 9:3-5.

James, P.C., and T.J. Ethier. 1989. Trends in the winter distribution and abundance of burrowing owls in North America. American Birds 43:1224-1225.

Jameson, E.W. Jr. and H.J. Peeters. 1988. California Mammals. University of California Berkeley Press. 403 pp.

Jennings, M. and M. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California* (draft). California Department of Fish and Game.

Kenagy, G.J. 1973. Daily and seasonal patterns of activity and energetics in a heteromyid rodent community. Ecology 54:1201-1219.

Kennard, J.H. 1975. Longevity records of North American birds. Bird-banding 46: 55-73.

Lincer, J.L. and K. Steenhof [eds]. 1997. The burrowing owl, its biology and management: including the Proceedings of the First International Symposium. Raptor Research Report Number 9.

Lutz, R.S. and D.L. Plumpton. 1999. Philopatry and nest site reuse by burrowing owls: implications for productivity. J. Raptor Research 33: 149-153.

MacCracken, J.G., D.W. Uresk, and R.M. Hansen. 1985. Vegetation and soils of burrowing owl nest sites in Conata Basin, South Dakota. Condor 87:152-154.

Maza, B.G., N.R. French, and A.P. Aschwanden. 1973. Home range dynamics in a population of heteromyid rodents. Journal of Mammalogy 54:405-425.

Meserve, P.L. 1976. Food relationships of a rodent fauna in a California coastal sage scrub community. Journal of Mammalogy 57:300-319.

Millsap, B.A. and C. Bear. 1992. Connector-brooding by Florida Burrowing Owls. Wilson Bull. 102: 313-317.

National Geographic Society. 1983. *Field Guide to the Birds of North America*. National Geographic Society, Washington, D.C.

Pacific Southwest Biological Services. 1991. Western Riverside County Multi-species Habitat Conservation Plan.

Patten, M.A., S.J. Myers, C. McGaugh, and J.R. Easton. ca 1992. Los Angeles pocket mouse (Perognathus longimembris brevinasus). Unpublished report by Tierra Madre Consultants, Riverside, California.

Price, M.V. and S.H. Jenkins. 1986. Rodents as seed consumers and dispersers. In Seed Dispersal, Academic Press, Australia, pp. 191-235.

Reichman, O.J. and M.V. Price. 1993. Ecological aspects of heteromyid foraging. In H.H. Genoways and J.H. Brown (eds.) Biology of the Heteromyidae, Special Publication No. 10 of the American Society of Mammalogists, pages 539-574.

Remsen, J.V., Jr. 1978. Bird species of special concern in California. Calif. Dept. Fish and Game, Sacramento. Wildl. Manage. Admin. Rep. No. 78-1. 54pp.

Sawyer, J.O. and Keeler-Wolf, T. 1995. A Manual of California Vegetation. California Native Plant Society. Sacramento, CA.

Schmutz, S.M., and J.S. Moker. 1991. A cytogenetic comparison of some North American owl species. Genome 34: 714-717.

Sibley, D. 2000. National Audubon Society The Sibley Guide to Birds. Published by Alfred A. Knopf, Inc., New York, NY.

Simovich, M.A. and S.A. Hathaway. 1997. Diversified bet-hedging as a reproductive strategy of some ephemeral pool anostracans (Branchiopoda). Journal of Crustacean Biology 17(1): 38 - 44.

Skinner, M.W. and B. M. Pavlik, eds. 1994. *Inventory of Rare and Endangered Vascular Plants of California,* 5th edition. California Native Plant Society, Sacramento, California.

State of California. 1991. Annual Report on the Status of California State Listed Threatened and Endangered Animals and Plants. Natural Heritage Division, Department of Fish and Game, Sacramento, California.

Stebbins, Robert C. 1985. *A Field Guide to Western Reptiles and Amphibians*. Houghton Mifflin, Boston, Massachusetts.

Terres, John K. 1980. *The Audubon Society Encyclopedia of North American Birds*. Knopf. New York, New York.

Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal airport. Condor 73: 177-192.

Trulio, L. 1997. Burrowing owl demography and habitat use at two urban sites in Santa Clara County, California. Journal of Raptor Research Report 9:84-89.

Trulio, L.A. 1995. Passive relocation: a method to preserve burrowing owls on disturbed sites. J. Field Ornithology 66: 99-106.

U.S. Department of Agriculture. 1971. *Soil Survey of Contra Costa Area, California*. Soil Conservation Service, Washington, D.C. / USDA-SCS (U.S. Department of Agriculture-Soil Conservation Service). 1980. Soil Survey of Contra Costa County, California. In cooperation with University of California Agricultural Experiment Station.

U.S. Fish and Wildlife Service). 1988. National List of Plant Species That Occur in Wetlands: 1988 National Summary. U.S. Government Printing Office.

Wellicome, T.I. 1997. Reproductive performance of burrowing owls (Speotyto cunicularia): effects of supplemental food. Journal of Raptor Research Report 9: 68-73.

Whitaker, J.O. Jr., W.J. Wrenn, and R.E. Lewis. 1993. Parasites. In H.H. Genoways and J.H. Brown (eds.) Biology of the Heteromyidae, Special Publication No. 10 of the American Society of Mammalogists, pages 386-478.

Zarn, M. 1974. Burrowing Owl, Report No. 11. Habitat management series for unique or endangered species. Bureau of Land Management, Denver. 25 pp.

Zeiner, D.C., W.,F. Laudenslayer, Jr., K.E. Mayer, M. White. Editors. 1990. California's Wildlife. Volume 2. Birds. State of California, Department of Fish and Game. Sacramento, California. 731 pp.

Zeiner, D.C., W.R. Laudenslayer, Jr., K.E. Mayer and M. White. 1990b. California's Wildlife, Volume 3. Mammals. State of California, Department of Fish and Game. Sacramento, California.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. *California's Wildlife.* Volumes I, II, III. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game. Sacramento, CA.

2003. List of California Terrestrial Natural Communities Recognized by The California Natural Diversity Database. Wildlife and Data Analysis Branch, The Vegetation Classification and Mapping Program, Sacramento, CA.

2006. Online Sixth Inventory of Rare Plants. http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi.

2012. List of endangered and threatened species that may occur in or be affected by projects in the Antioch North, Honker Bay, and San Francisco North quadrangles. Sacramento, CA.

1991. Soil Survey of San Mateo County, Eastern Part, and San Francisco County, California.

1995. Hydric Soils of California.

Kopchik, John. 2005. County of Contra Costa, personal communication by phone, October 20.

APPENDIX A

SPECIES LIST

APPENDIX A
SPECIES LIST

PLANT SPECIES LIST

<u>**Angiosperms**</u>	<u>**Flowering Plants**</u>
Asteraceae	Composites
Artemisia californica	California Sage
Artemisia douglasiana	Mugwort
Ambrosia acanthicarpa	Ann. Bur-sage
Anthemis sp.	Mayweed
Baccharis glutinosa	Mulefat
Centaurea melitensis	Star thistle
*Carduus pycnocephalus	Italian thistle
Gnaphalium californicum	Everlasting
Haploppus squarrosus	Common Sunflower
Hemizonia fasciculata	Tarweed
*Helminthotheca echioides	Ox Tongue
Heterotheca grandiflora	Telegraph weed
**Lactuca seriola*	Prickly lettuce
Lepidosartum squamatum	*Scalebroom*
Nemizonia pugensis	Spikeweed
**Sonchus olenaceus*	Sow-thistle
Xanthium strumarium	Cocklebur
Apiaceae	Parsley Family
Cicuta douglasii	Western waterhemlock
Boraginaceae	Borage Family
Amsinckia intermedia	Fiddleneck
Criptantha sp.	Popcorn Flower
plagiobothrys californicus	
Brassicaceae	Mustard Family
Brassica geniculata	Short-pod Mustard
Chenopodiaceae	Pig Weed Family
Salsola iberica	Russian Thistle
Fabaceae	Pea Family
Lotus scoparius	Deerweed
Lupinus bicolor	Lupine
*Melilotus indicus	Yellow sweet clover
Medicago polymorpha	Burclover
Geraneaceae	Geranium Family
Erodium cicutarium	Filaree

Lamiaceae	Mint Family
Marrubium vulgare	Horehound
Salvia apiana	White sage
Salvia mellifera	Black sage
Hydropphyllaceae	Waterlief Family
Eriodictyon trichocalyx	Yerba Santa
Polygonaceae	Buckwheat Family
Eriogonum fasciculatum	California Buckwheat
Rumix crispus	Curley Dock
Salicaceae	Willow Family
Salix sp.	Willow
Solonaceae	Nightshade Family
Datura meteloides	Jimson weed
Nicotiana glauca	Tobacco tree

Monocots

Amaryllidaceae	Amaryllis Family
Dichelostemma pulchella	Blue Dicks
Poaceae	Grass Family
Avena barbata	Oats
Bromus diandris	Ripgut
Bromus rubins	Red Brome Grass
Hordium vulgare	Barley
Vulpia myuros	Fescue
Typhaceae	Cattail Family
Typha latifolia	Cattails

ANIMAL SPECIES LIST

<u>Mammalia</u>	**<u>Mammals</u>**
Canidae	Canines
Canis latrans	Coyote
Canis lupis familiaris	Dog
Leporidae	Rabbits, Hares
Sylvalegus audubonii	Cotton-tail rabbit
Geomyidae	Gophers
Thomomys bottae	Pocket gopher
Sciuridae	Squirrels
Otospermophilus beecheyi	Beechey ground squirrel
<u>Reptilia</u>	**<u>Reptiles</u>**
Iguanidae	Iguana
Scelopoporus occidentalis	Western fence lizard
Uta stansburiana	Side-blotched lizard
Teiidae	Whiptails
Cnemidophorus tigris multiscutatus	Coastal whiptail
Colubridea	Colubrid Snakes
Pituophis melanoleucus	Gopher snake

AVIAN SPECIES OBSERVED

Common Name	Species Code	Common Name	Species Code
American Crow	AMCR	Lesser goldfinch	LEGO
American Goldfinch	AMGO	Lincoln's sparrow	LISP
American kestrel	AMKE	Mallard	MALL
Anna's hummingbird	ANHU	Mourning dove	MODO
Ash-throated flycatcher	ATFL	Northern mockingbird	NOMO
Barn swallow	BASW	Northern rough-winged swallow	NRWS
Bewick's wren	BEWR	Phainopepla	PHAI
Black phoebe	BLPH	Red-tailed hawk	RTHA
Brewer's Blackbird	BRBL	Red-winged blackbird	RWBL
Brown-headed cowbird	BHCO	Rock dove	RODO
Bushtit	BUSH	Say's phoebe	SAPH
California quail	CAQU	Song sparrow	SOSP
California towhee	CATO	Spotted towhee	SPTO
Cliff swallow	CLSW	Turkey vulture	TUVU
Common raven	CORA	Violet-green swallow	IGSW
Common yellowthroat	COYE	Western bluebird	WEBL
Cooper's hawk	COHA	Western kingbird	WEKI
Costa's hummingbird	COHU	Western meadowlark	WEME
European starling	EUST	White-tailed kite	WTKI
Hooded oriole	HOOR	White-throated swift	WTSW
House finch	HOFI	Wilson's warbler	WIWA
House Sparrow	HOSP	Yellow-rumped warbler	YRWA
House wren	HOWR	Yellow-brested chat	YBCH
Kildeer	KILL	American Avocet	AMAV
Lawrence's goldfinch	LAGO		
Lazuli bunting	LABU		

APPENDIX B

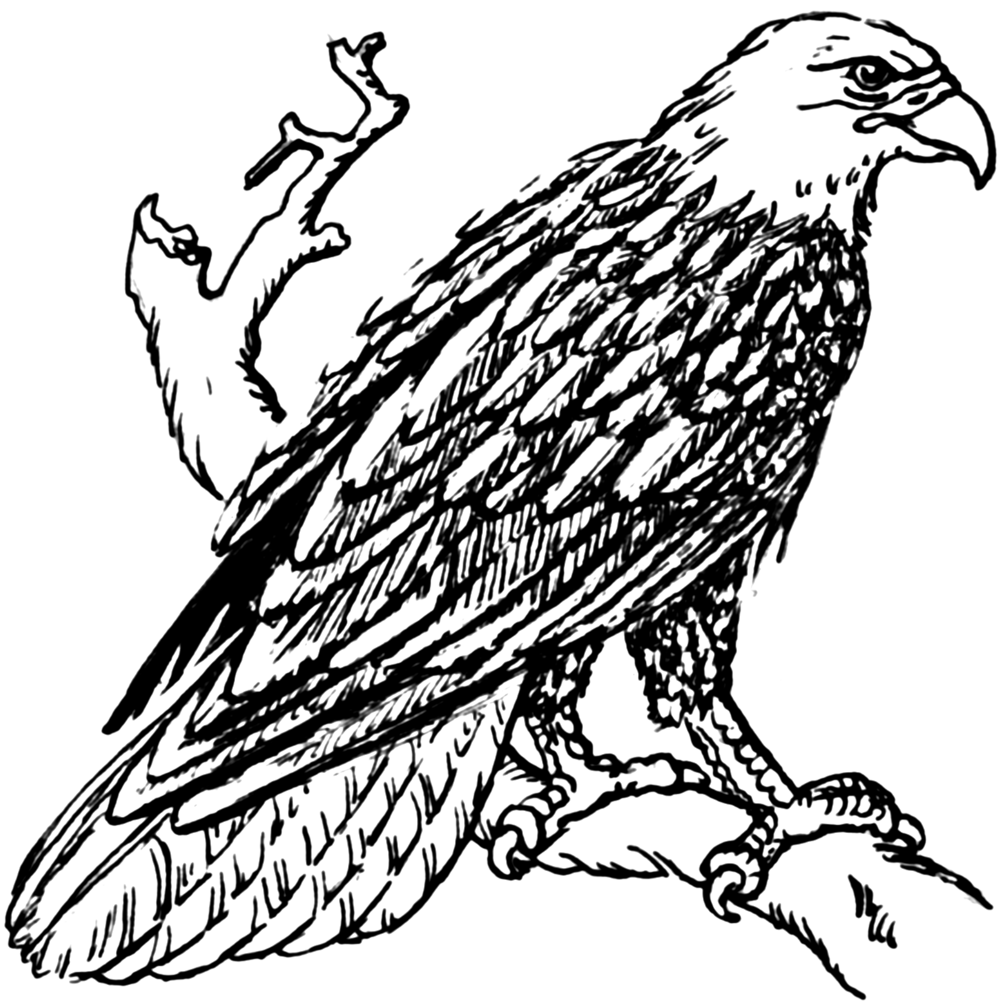
IPAC REPORT

U.S. Fish & Wildlife Service

My project

IPaC Trust Resource Report

Generated June 12, 2015 01:58 PM MDT



US Fish & Wildlife Service

IPaC Trust Resource Report

Project Description

NAME

My project

PROJECT CODE

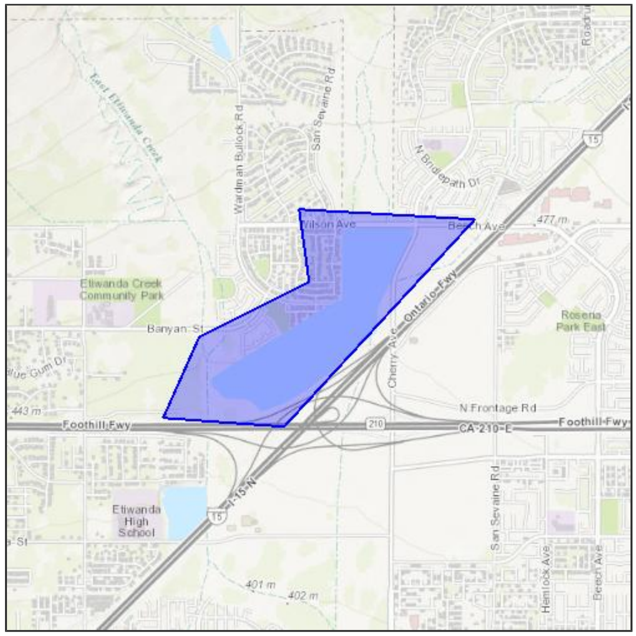
ZYBTG-HJ5HJ-CZJOF-KYY66-HL36UA

LOCATION

San Bernardino County, California

DESCRIPTION

No description provided



U.S. Fish & Wildlife Contact Information

Species in this report are managed by:

Carlsbad Fish And Wildlife Office

2177 Salk Avenue - Suite 250

Carlsbad, CA 92008-7385

(760) 431-9440

Endangered Species

Proposed, candidate, threatened, and endangered species that are managed by the Endangered Species Program and should be considered as part of an effect analysis for this project.

Amphibians

Arroyo (=arroyo Southwestern) Toad Anaxyrus californicus **Endangered**

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=D020

Mountain Yellow-legged Frog Rana muscosa **Endangered**

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=D02H

Birds

California Condor Gymnogyps californianus **Endangered**

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B002

Coastal California Gnatcatcher Polioptila californica californica **Threatened**

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B08X

Least Bell's Vireo Vireo bellii pusillus **Endangered**

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B067

Southwestern Willow Flycatcher Empidonax traillii extimus **Endangered**

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B094

Flowering Plants

Braunton's Milk-vetch Astragalus brauntonii
Endangered

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q05E

Santa Ana River Woolly-star Eriastrum densifolium ssp. sanctorum
Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q29A

Slender-horned Spineflower Dodecahema leptoceras
Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2T6

Mammals

San Bernardino Merriam's Kangaroo Rat Dipodomys merriami parvus
Endangered

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A0G8

Critical Habitats

Potential effects to critical habitat(s) within the project area must be analyzed along with the endangered species themselves.

San Bernardino Merriam's Kangaroo Rat Critical Habitat Final designated

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A0G8#crithab

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity which results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service (1). There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

You are responsible for complying with the appropriate regulations for the protection of birds as part of this project. This involves analyzing potential impacts and implementing appropriate conservation measures for all project activities.

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B008

Black-chinned Sparrow Spizella atrogularis — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0IR

Brewer's Sparrow Spizella breweri — Bird of conservation concern
Year-round
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0HA

Burrowing Owl Athene cunicularia — Bird of conservation concern
Year-round
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0NC

California Spotted Owl Strix occidentalis occidentalis — Bird of conservation concern
Year-round
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B08L

Calliope Hummingbird Stellula calliope — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0K3

Cassin's Finch Carpodacus cassinii — Bird of conservation concern
Year-round
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0J6

Costa's Hummingbird Calypte costae — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0JE

Flammulated Owl Otus flammeolus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0DK

Fox Sparrow Passerella iliaca — Bird of conservation concern
Year-round
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0NE

Green-tailed Towhee Pipilo chlorurus **Bird of conservation concern**
Season: Breeding
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0IO

Lawrence's Goldfinch Carduelis lawrencei **Bird of conservation concern**
Year-round
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0J8

Le Conte's Thrasher toxostoma lecontei **Bird of conservation concern**
Season: Breeding
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0GE

Least Bittern Ixobrychus exilis **Bird of conservation concern**
Year-round
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0JW

Lewis's Woodpecker Melanerpes lewis **Bird of conservation concern**
Season: Wintering
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0HQ

Loggerhead Shrike Lanius ludovicianus **Bird of conservation concern**
Year-round
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0FY

Mountain Plover Charadrius montanus **Bird of conservation concern**
Season: Wintering
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B078

Nuttall's Woodpecker Picoides nuttallii **Bird of conservation concern**
Year-round
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0HT

Oak Titmouse Baeolophus inornatus **Bird of conservation concern**
Year-round
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0MJ

Olive-sided Flycatcher Contopus cooperi **Bird of conservation concern**
Season: Breeding
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0AN

Peregrine Falcon Falco peregrinus **Bird of conservation concern**
Season: Wintering
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0FU

Short-eared Owl Asio flammeus **Bird of conservation concern**
Season: Wintering
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0HD

Swainson's Hawk Buteo swainsoni **Bird of conservation concern**
Season: Breeding
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B070

Tricolored Blackbird Agelaius tricolor **Bird of conservation concern**
Year-round
https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B06P

White Headed Woodpecker Picoides albolarvatus **Bird of conservation concern**

Year-round

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0HU

Williamson's Sapsucker Sphyrapicus thyroideus **Bird of conservation concern**

Season: Wintering

https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B0FX

Refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. If your project overlaps or otherwise impacts a Refuge, please contact that Refuge to discuss the authorization process.

There are no refuges within this project area

Wetlands

Impacts to NWI wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes.

Project proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Freshwater Pond

PUSCh	5.34 acres

Riverine

R4SBCx	11.3 acres
R4SBCr	7.23 acres
R4SBAx	1.44 acres

APPENDIX C

U.S. FISH AND WILDLIFE USGS QUADRANGLE REPORT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Carlsbad Fish and Wildlife Office
2177 SALK AVENUE - SUITE 250
CARLSBAD, CA 92008
PHONE: (760)431-9440 FAX: (760)431-5901
URL: www.fws.gov/carlsbad/

Consultation Code: 08ECAR00-2015-SLI-0479 June 12, 2015
Event Code: 08ECAR00-2015-E-00926
Project Name: San Sevaine Basin

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at:
http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm;
http://www.towerkill.com; and
http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

Official Species List

Provided by:

Carlsbad Fish and Wildlife Office
2177 SALK AVENUE - SUITE 250
CARLSBAD, CA 92008
(760) 431-9440
http://www.fws.gov/carlsbad/

Consultation Code: 08ECAR00-2015-SLI-0479
Event Code: 08ECAR00-2015-E-00926

Project Type: WATER SUPPLY / DELIVERY

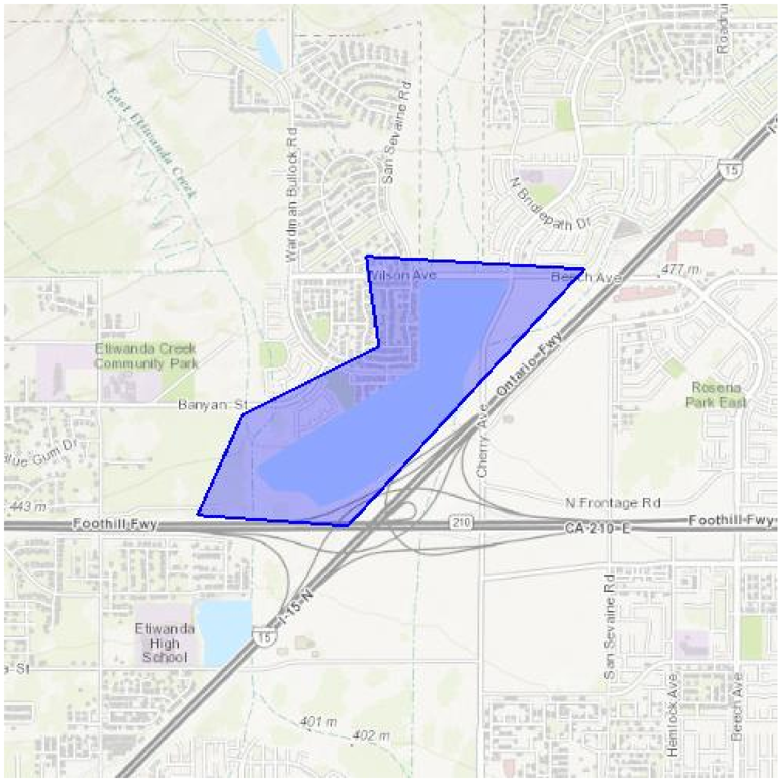
Project Name: San Sevaine Basin
Project Description: Improvements for Groundwater recharge.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

United States Department of Interior
Fish and Wildlife Service

Project name: San Sevaine Basin

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-117.49637603759766 34.15159051366224, -117.48144149780273 34.150880214361884, -117.49757766723633 34.136388804862065, -117.5078773498535 34.13695714225531, -117.50478744506836 34.14264030596289, -117.4955177307129 34.146476225377484, -117.49637603759766 34.15159051366224)))

Project Counties: San Bernardino, CA

United States Department of Interior
Fish and Wildlife Service

Project name: San Sevaine Basin

Endangered Species Act Species List

There are a total of 10 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Amphibians	**Status**	**Has Critical Habitat**	**Condition(s)**
arroyo toad *(Anaxyrus californicus)* Population: Entire	Endangered	Final designated	
Mountain Yellow-Legged frog *(Rana muscosa)* Population: Southern California DPS	Endangered		
Birds			
California condor *(Gymnogyps californianus)* Population: Entire, except where listed as an experimental population	Endangered	Final designated	
Coastal California gnatcatcher *(Polioptila californica californica)* Population: Entire	Threatened	Final designated	
Least Bell's vireo *(Vireo bellii pusillus)* Population: Entire	Endangered	Final designated	
Southwestern Willow flycatcher *(Empidonax traillii extimus)* Population: Entire	Endangered	Final designated	

Flowering Plants			
Braunton's milk-vetch *(Astragalus brauntonii)*	Endangered	Final designated	
Santa Ana River woolly-star *(Eriastrum densifolium ssp. sanctorum)*	Endangered		
Slender-Horned spineflower *(Dodecahema leptoceras)*	Endangered		
Mammals			
San Bernardino Merriam's kangaroo rat *(Dipodomys merriami parvus)* Population: Entire	Endangered	Final designated	

Critical habitats that lie within your project area

The following critical habitats lie fully or partially within your project area.

Mammals	**Critical Habitat Type**
San Bernardino Merriam's kangaroo rat *(Dipodomys merriami parvus)* Population: Entire	Final designated

APPENDIX D

COASTAL CALIFORNIA GNATCATCHER FOCUSED SURVEY REPORT

Focused Coastal California Gnatcatcher (*Polioptila californica californica*) Survey for Inland Empire Utilities Agency San Sevaine Basin Improvement Project

Prepared by:

Lisa M. Patterson

On Behalf Of:
Tom Dodson & Associates
2150 N. Arrowhead Avenue
San Bernardino, CA 92405

July 2015

Certification: I hereby certify that the statements furnished herein and in the attached exhibits present data and information required for this Biological Survey to the best of my ability, and the facts, statements and information presented are true and correct to the best of my knowledge and belief.

Lisa M Patterson

Lisa M. Patterson

TABLE OF CONTENTS

INTRODUCTION AND SUMMARY OF FINDINGS

Tom Dodson & Associates (TDA) was contracted by Inland Empire Utilities Agency (IEUA) to conduct a focused coastal California gnatcatcher (*Polioptila californica californica*) (CAGN) for the proposed groundwater recharge improvements. The proposed project includes installation of pipe and turn out structures in sub-basins 1-5.

The proposed project site is outside of, but tributary to, San Sevaine Creek, The project site is located, south of Wilson Avenue; west of Interstate 15; and northwest of the Interstate 210/15 interchange. Figure 1 is the Regional Location Map, and Figure 2 is the Site Location Map that depicts the project site on USGS 7.5 minute quadrangle maps. Specifically, the project is mapped on the “Devore” USGS 7.5 Minute Quadrangle, within Sections 26 and 27 and on the “Cucamonga Peak” USGS 7.5 Minute Quadrangle within Section 27, Township 1 North, Range 6 West, San Bernardino Baseline and Meridian.

Habitat suitability evaluations were conducted for the federally listed as threatened California gnatcatcher (*Polioptila californica californica*). The result of this assessment was that the proposed project site has approximately 65 acres of habitat with characteristics and species composition that could support CAGN. Breeding season protocol surveys were conducted between April 10, 2015 and May 26, 2015.

The result of this survey is that no CAGN were observed during this survey.

FIGURE 1 – Regional Location Map

FIGURE 2 – Project Area Map

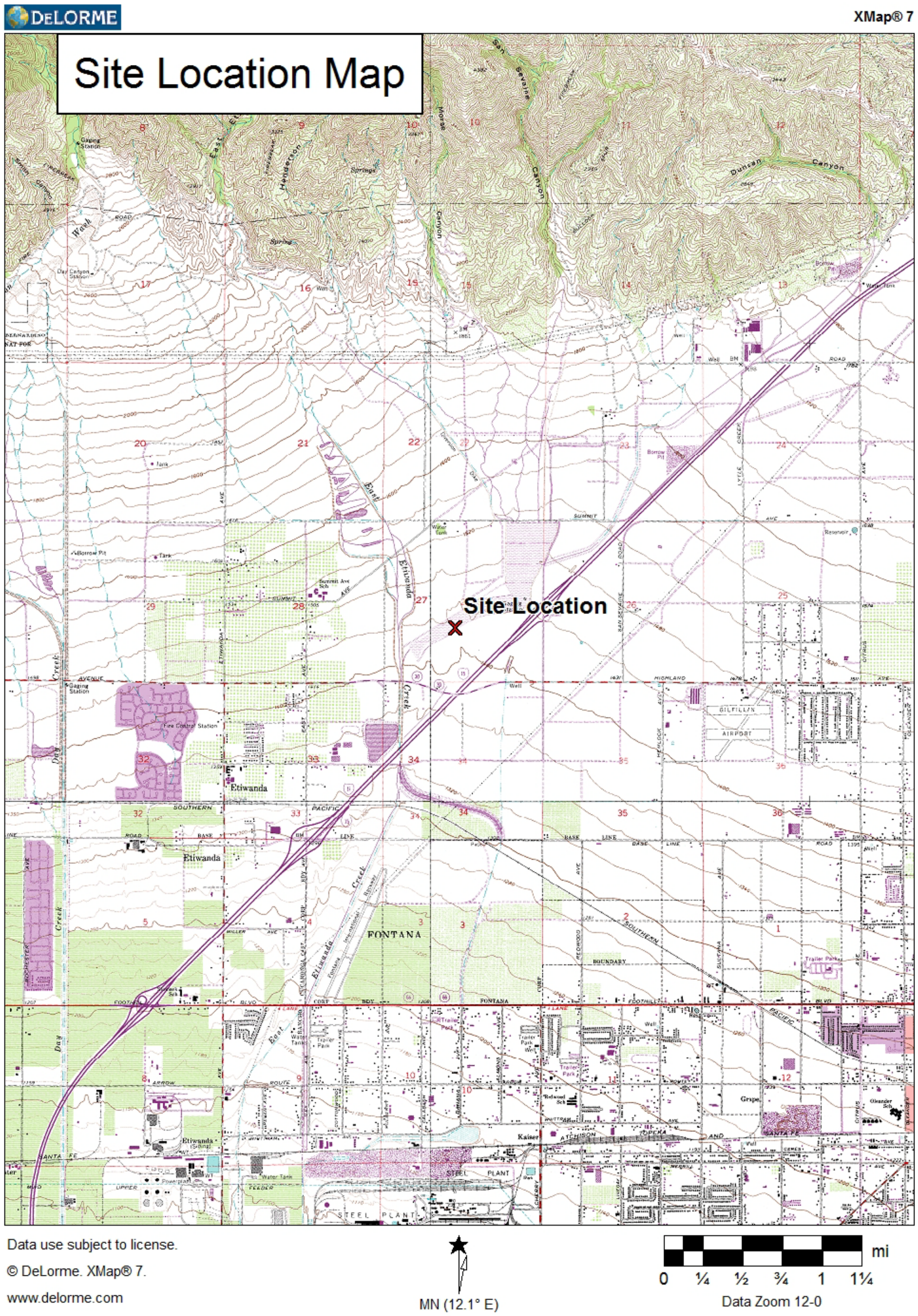
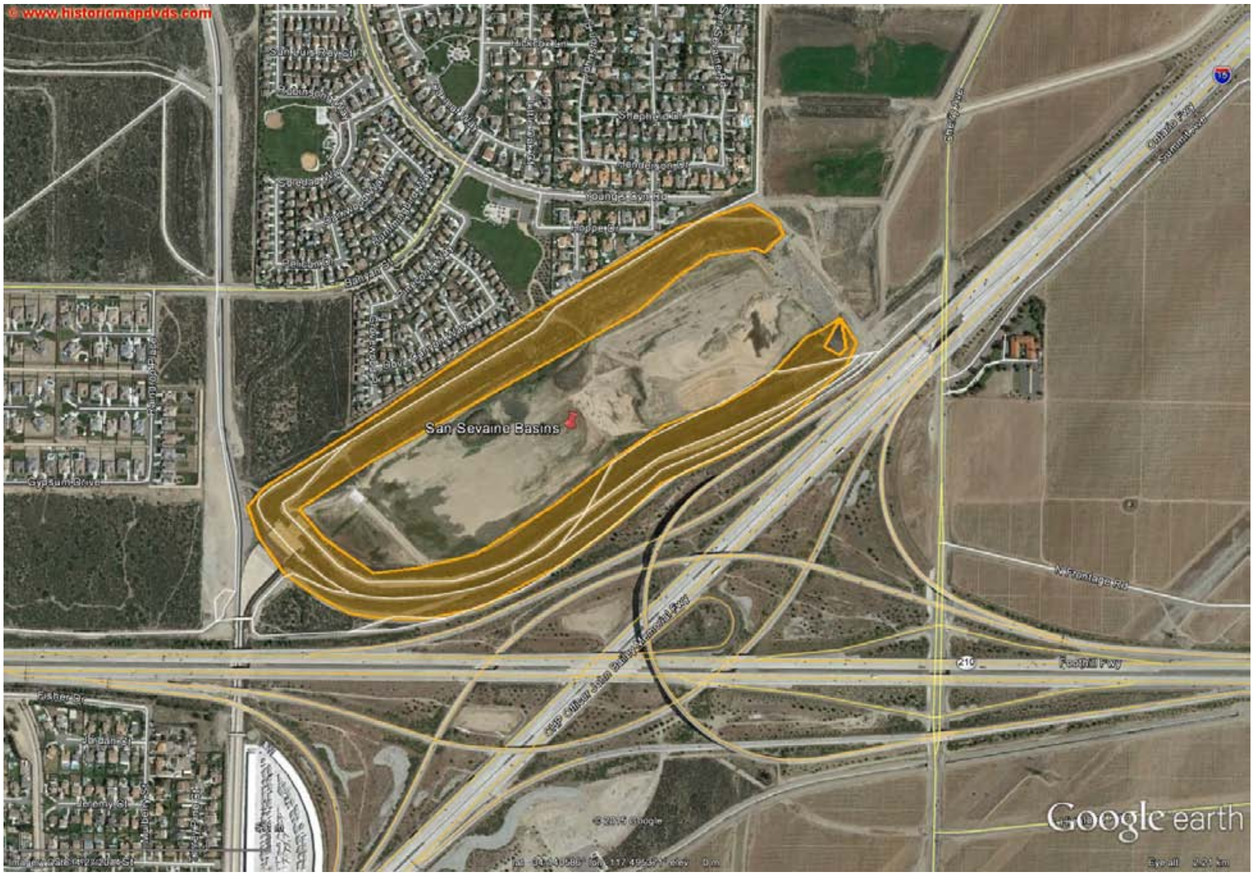


FIGURE 3 – Survey Area



SITE DESCRIPTION

The project site is located within a rural undeveloped area in between Cajon Creek and Cajon Blvd. Development in the area includes some scattered residences, railroad tracks, I-15 freeway, and Old Highway 66 (Cajon Blvd). The nearest residential unit is located over one-half mile from the project site.

The proposed project consists of utilizing sub-basins 1-3 which have high infiltration rates, and have not been effectively utilized for recharge in the past because the infrastructure does not exist to get recycled water into these sub-basins. Proposed construction activities consist of the following activities: 1) Grading activities along the pipeline alignment, pump station location and electrical connection. 2) Installing the trench along the pipeline alignment shown, approximately 5,000 feet 3) Installing the inlet/outlet structures (3) 4) Installing the wet well for the pump station 5) Installing the pump station. And 6) Installing an estimated five flow control valves/gates

The walls of sub-basins 4 and 5 are characterized by well devleoped coastal cage crub (CSS). This vegetation community is found in diverse habitat mosaics and is dominated by a suite of shrub species with low moisture content. Shrub cover is dense and continuous, and steep, xeric slopes with quickly draining soils. The CSS vegetation community occurring in the San Sevaine Basin is characterized by buckwheat (Eriogonum fasciculatum), California sage (Artemisia californica), black sage (Salvia mellifera), deerweed (Lotus scoparus), brittlebrus (Encelia farinosa), white sage (Salvia alba), yerba santa (Eriodictyon trichocalyx va. trichocalyx), and scale broom (Lepidospartum squamatum).

METHODOLOGY

Approximately 50-percent of the land adjacent to the Project alignment is comprised of RAFSS which provides habitat for a myriad of regionally sensitive flora and fauna, unique to this region. Listed species identified to have a potential to occur within the vicinity of the project area include the coastal California gnatcatcher (CAGN) [*Polioptila californica californica*]. The project is not mapped within CAGN critical habitat however there is suitable habitat within and adjacent to the project site.

The accepted CAGN focused survey protocol during the breeding season (March 15 to June 30) requires 6 visits not less than 7 days apart. The methodology for this breeding survey was conducted in accordance with the protocol for a breeding season survey.

A 15-day notice was sent to the U.S. Fish and Wildlife Service advising them of the intent to conduct the modified CAGN surveys on the project site (Notice attached as Appendix B). Field surveys were conducted by Lisa Patterson (#TE 832945-4) and begun on April 10, 2015 extended until May 26, 2015. Each survey was conducted by walking the site and visually and audibly identifying birds within the coastal sage scrub vegetation community. Bird species observed were recorded during each visit.

Table 1 is a summary of the survey visits.

Table 1
SURVEY DATA SUMMARY

Date	Survey Time		Temperature (°F)		Results CAGN
	Start	End	Start	End	
04/10/2015	0630	1130	52°F	65°F	None Detected
04/20/2015	0715	1200	56°F	68°F	None Detected
05/01/2015	0615	1140	65°F	86°F	None Detected
05/11/2015	0800	1115	68°F	77°F	None Detected
05/18/2015	0740	1200	58°F	64°F	None Detected
05/26/2015	0645	1115	58°F	59°F	None Detected

Background Information for *Polioptila californica californica* (CAGN)

This bird species is a federally listed Threatened Species that occurs in Coastal Sage Scrub (CSS) in southern California. The CAGN are year-round residents of the CSS vegetative community in southern California. As late as the mid-1940s the CAGN was considered locally common and by the mid-1960s, a noticeable decline had begun. The CAGN was listed as Threatened in 1992.

Breeding pairs become highly territorial by late February or early March. The CAGN is a small thrush-like songbird approximately 4 to 5 inches in length with dark, blue-gray plumage above and gray-white plumage below. Nest building begins during the second or third week of March.

RESULTS

Observations of wildlife included scat, tracks, burrows, nest, calls, and individual animals. The reptile and amphibian species observed include the western fence lizard, western toad, and gopher snake. The most common mammal species detected include individuals or sign of cottontail rabbit and coyote. The most common bird species observed were Bushtits, house finch, California tohee, mourning dove, and common raven. See Appendix A for a Data Sheets.

Coastal California Gnatcatcher

The result of this survey is that no CAGN were observed during this survey. According to the "Final Critical Habitat mapping Unit #12" for San Bernardino County, this site is not located within designated critical habitat for the CAGN.

Typical Site Photographs

Photo #1 Sub- Basin 5 (West End)

The approximate location of the pipeline location.

Photo #2 Sub-Basin 5 looking East

View of the typical habitat on Sub Basin 5 walls.

CONCLUSION

The result of this survey is that no CAGN were observed during this survey. Further, the site is not within designated critical habitat which has been established by the U.S. Fish and Wildlife Service as part of their recovery efforts for this species.

REFERENCES

Arnett, Ross H. and Richard L. Jacques. 1981. Simon and Schuster's Guide to Insects. New York: Simon and Schuster, Inc.

Borror, Donald J. and Richard E. White. 1970. A Field Guide to Insects: America North of Mexico. New York: Houghton Mifflin Company.

California Department of Fish and Game. 1994. Natural Diversity Data Base.

Garth, John S. and J.W. Tilden. 1986. California Butterflies. University of California Press. Berkeley, California and London, England.

Hickman, J.C. Ed. 1993. The Jepson Manual: Higher Plants of California. Berkeley and Los Angeles, University of California Press.

Hogue, Charles L. 1993. Insects of the Los Angeles Basin. Los Angeles: Natural History Museum Foundation.

Holland, R.F. 1986. Preliminary Descriptions fo the Terrestrial Natural Communities of California. California Resources Agency, Department of Fish and Game.

Munz, P.A. Flora of Southern California.

National Geographic Society. 1987. Field Guide to Birds of North America, 2nd Edition. National Geographic Society, Washington D.C.

Peterson, Roger Tory. 1990. A Field Guide to Western Birds. Boston: Houghton Mifflin.

Powell, Jerry A. and Charles L. Hogue. 1979. California Insects. Berkeley and Los Angeles: University of California Press.

Sawyer, John O. and Todd Keeler-Wolf. 1995. A Manual of California Vegetation. Sacramento: California Native Plant Society.

Stebbins, Robert C. 1985. A Field Guide to Western Reptiles and Amphibians. Houghton Mifflin Company, Boston, Massachusetts.

Stokes, Donald and Lillian. 1996. Stokes Field Guide to Birds: Western Region. Boston and New York: Little, Brown and Company.

APPENDIX A

DATA SHEETS

SURVEY TYPE: CAGN - BREEDING SITE VISIT NO. 1 2 3 4 5 6 7 8 9

SURVEYING BIOLOGIST: Lisa Patterson DATE: 4/10/2015

PROJECT NAME: San Sevaine Basin TOTAL SITE ACRES: ~65

STATE: CA COUNTY San Bernardino

Time (24 hr)	Sky	Wind (Beaufort)	Temp °F or °C
Begin 0630	clear / partly cloudy / overcast / fog / drizzle / shower	<1 1-3 4-7 8-12 >12	52°F
End 1130	clear / partly cloudy / overcast / fog / drizzle / shower	<1 1-3 4-7 8-12 >12	65°F

FINDINGS:

Plant sp.	Birds Observed	Other
Well developed CSS MF- around bottom w/ sedges growing in ponded areas. Basin 1 has 10% CSS Basin 2 has 0% CSS Basin 3 has 20% CSS Basin 4 has 40% CSS Basin 5 has 80% CSS	MODO HOFI ANHB MALL BLPH LEGF CORA KILL BASW CLSW AMAV BUSH NOMB WCSP BEWR WEBB GWCSB	

Surrounding land uses (including adjoining properties): RESIDENTIAL / PARK / Ag / FREEWAY / FLD CTRL CHANNEL.

Habitat onsite (circle): open soils hilltop ridge Plantago Castilleja soil crusts old roads nectar clay soils rock outcrops

Conditions: (e.g., grazing agricultural sowbugs/earwigs recent fire grading)

Other: Actively weeding + maint Rodent Population
∴ CAGN not Present

SURVEY TYPE: CAGN - Breeding SITE VISIT NO. 1 2 3 4 5 6 7 8 9

SURVEYING BIOLOGIST: Lisa Patterson DATE: 4/20/2015

PROJECT NAME: San Sevaine Basin TOTAL SITE ACRES: ~65

STATE: CA COUNTY San Bernardino

Time (24 hr)	Sky	Wind (Beaufort)	Temp °F or °C
Begin 0715	clear / partly cloudy / overcast / fog / drizzle / shower	<1 1-3 4-7 8-12 >12	56°F
End 1200	clear / partly cloudy / ~~overcast~~ / fog / drizzle / shower HAZY	<1 1-3 4-7 8-12 >12	68°F

FINDINGS:

Plant sp.	Birds Observed	Other
Buckwheat Blk sage Wht sage Ca sage Yerba santa lots sunp Yucca whip. MF Sedg mng Croton	NOMB MODO WRTI BLPH AMAV YBCH BASW HOFI CAWU CORA KILL ANHB CLSW ATFL CATO BUSH SPTO LEGF RWBB BEWR BHCB RODO	

Surrounding land uses (including adjoining properties):

Habitat onsite (circle): open soils hilltop ridge Plantago Castilleja soil crusts old roads nectar clay soils rock outcrops

Conditions: (e.g., grazing agricultural sowbugs/earwigs recent fire grading)

Other:
∴ CAGN not Present

SURVEY TYPE: CAGN - BREEDING SITE VISIT NO. 1 2 3 4 5 6 7 8 9

SURVEYING BIOLOGIST : Lisa Patterson DATE: 5/1/2015

PROJECT NAME: San Sevaine Basin TOTAL SITE ACRES: ~65

STATE: CA COUNTY San Bernardino

Time (24 hr)	Sky	Wind (Beaufort)	Temp °F or °C
Begin 0605	clear / partly cloudy / overcast / fog / drizzle / shower HIGH CLDS	<1 1-3 4-7 8-12 >12	65°F
End 1040	clear / partly cloudy / overcast / fog / drizzle / shower HIGH CLDS	<1 1-3 4-7 8-12 >12	86°F

FINDINGS:

Plant sp.	Birds Observed	Other
	KILL MALL BUSH CATO MODO CAQU NOMB WEKI AWAB HOFI CORA COHB UNK SPARROW CHAT WTGF RTHA	COYOTE ♂♀ BEECHY

Surrounding land uses (including adjoining properties):

Habitat onsite (circle): open soils hilltop ridge Plantago Castilleja soil crusts old roads nectar clay soils rock outcrops

Conditions: (e.g., grazing agricultural sowbugs/earwigs recent fire grading)

Other: SPRAYING WEEDS WHERE KILL was being [illegible]

∴ Cagn not Present

SURVEY TYPE: CAGN - Breeding SITE VISIT NO. 1 2 3 4 5 6 7 8 9

SURVEYING BIOLOGIST : Lisa Patterson DATE: 5/11/2015

PROJECT NAME: San Sevaine Basin TOTAL SITE ACRES: ~65

STATE: CA COUNTY San Bernardino

Time (24 hr)	Sky	Wind (Beaufort)	Temp °F or °C
Begin 0800	clear / partly cloudy / overcast / fog / drizzle / shower	<1 1-3 4-7 8-12 >12	68°F
End 1115	clear / partly cloudy / overcast / fog / drizzle / shower	<1 1-3 4-7 8-12 >12	77°F

FINDINGS:

Plant sp.	Birds Observed	Other
	BLPH MODO HOFI NOMB KILL RWBB BASW CLSW BUSH BEWR CATO CORA ANHB MALL WTGF RTHA KEST	

Surrounding land uses (including adjoining properties):

Habitat onsite (circle): open soils hilltop ridge Plantago Castilleja soil crusts old roads nectar clay soils rock outcrops

Conditions: (e.g., grazing agricultural sowbugs/earwigs recent fire grading)

Other:

∴ CAGN NOT PRESENT

SURVEY TYPE: CAGN - BREEDING SITE VISIT NO. 1 2 3 4 5 6 7 8 9

SURVEYING BIOLOGIST : Lisa Patterson DATE: 5/18/2015

PROJECT NAME: San Sevaine Basin TOTAL SITE ACRES: ~65

STATE: CA COUNTY San Bernardino

Time (24 hr)	Sky	Wind (Beaufort)	Temp °F or °C
Begin 0740	clear / partly cloudy / overcast / fog / drizzle / shower	<1 1-3 4-7 8-12 >12	58°F
End 1200	clear / partly cloudy / overcast / fog / drizzle / shower	<1 1-3 4-7 8-12 >12	64°F

FINDINGS:

Plant sp.	Birds Observed	Other
	CLSW, BLPH, CATO, BUSH, MODO, CORA, MALL, AVOC, MALL, LEGF, SOSP, SPTO, NOMO, CAQU, WEKB, BEWR, RODO, KILL, RWBB, BHCB, ~~[illegible]~~, ANHB, COHB	

Surrounding land uses (including adjoining properties):

Habitat onsite (circle): open soils hilltop ridge Plantago Castilleja soil crusts old roads nectar clay soils rock outcrops

Conditions: (e.g., grazing agricultural sowbugs/earwigs recent fire grading)

Other:

∴ CAGN not Present

SURVEY TYPE: CAGN - Breeding SITE VISIT NO. 1 2 3 4 5 6 7 8 9

SURVEYING BIOLOGIST : Lisa Patterson DATE: 5/26/2015

PROJECT NAME: San Sevaine Basin TOTAL SITE ACRES: ~65

STATE: CA COUNTY San Bernardino

Time (24 hr)	Sky	Wind (Beaufort)	Temp °F or °C
Begin 0645	clear / partly cloudy / overcast / fog / drizzle / shower	<1 1-3 4-7 8-12 >12	58°F
End 1115	clear / partly cloudy / overcast / fog / drizzle / shower	<1 1-3 4-7 8-12 >12	59°F

FINDINGS:

Plant sp.	Birds Observed	Other
	KILL, MODO, CORA, CLSW, BASW, BEWR, MALL, CATO, RWBB, BUSH, WEKB, LEGF, BLPH, SOSP, RTHA, HOFI, YBCH, HOOR, BUST, SAPH, ANHB, ATFC, AMGF, NOMO, RODO, CAQU, AMGF	COYOTE, CTN-TAIL

Surrounding land uses (including adjoining properties): RESIDENTIAL / FREEWAY AG - FLD CTRL CHANNEL

Habitat onsite (circle): open soils hilltop ridge Plantago Castilleja soil crusts old roads nectar clay soils rock outcrops

Conditions: (e.g., grazing agricultural sowbugs/earwigs recent fire grading)

Other: CSS in Basin 4 + 5 = mitigation

∴ Cagn not Present

APPENDIX B

15-DAY NOTICE

J.L. PATTERSON & ASSOCIATES, INC.
CIVIL-TRACKWORK ENGINEERING

March 25, 2015

Stacy Love
Recovery Permit Coordinator
Carlsbad Fish and Wildlife Office
6010 Hidden Valley road, Suite 101

Subject: 15-Day Notification to conduct coastal California gnatcatcher Breeding period survey for San Sevaine Basin, San Bernardino County, CA.

The surveys will be conducted along CSS areas within the basin. The area of CSS within the basin is approximately 65 acres.

Dear Ms. Love,

This letter is a notification of my intent to conduct focused non-breeding season surveys for the coastal California gnatcatcher on those areas identified on the attached graphics. The site is located in the vicinity of Mentone, San Bernardino County, California.

The pipeline alignment has been identified as suitable CAGN habitat depicted on the attached graphics.

The site is mapped on USGS 7.5 minute Quads, "Cucamonga Peak" and "Devore" in Section 34 of T1N, R6W SBBM, San Bernardino County, California
Lat: N34.1396713° Lon: W117.5009854°

If you have any questions regarding this request or would like any additional information, please call or email.

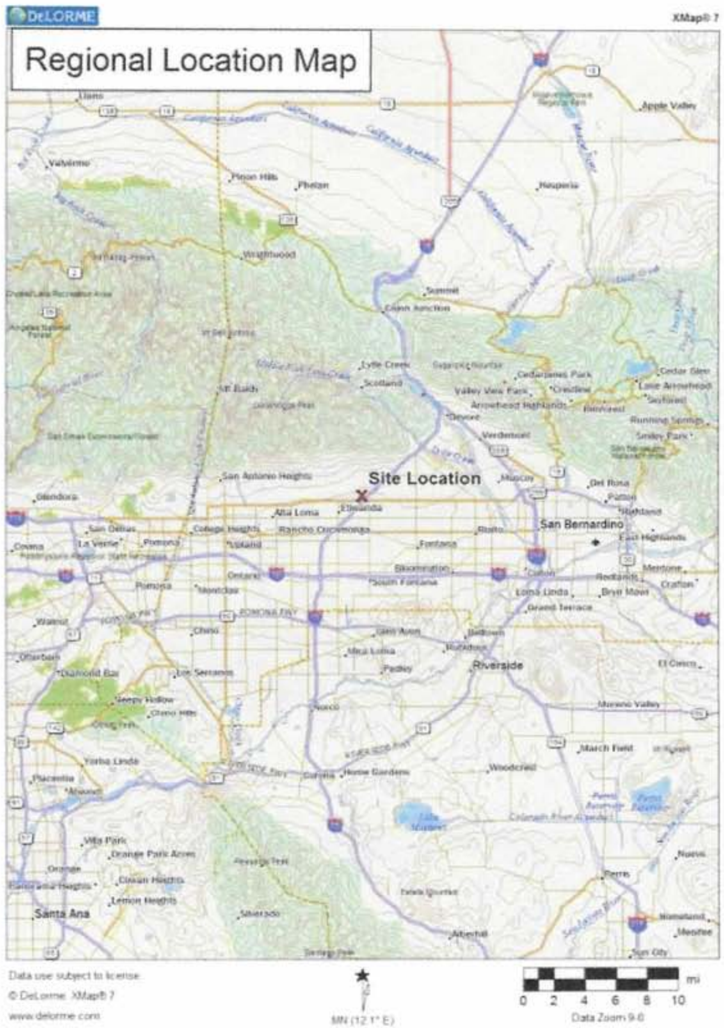
Sincerely,

Lisa Patterson
TE832945-5
Sr. Environmental Manager
Ecologist/Regulatory Specialist/QSP

725 Town & Country Road, Suite 300 - Orange, CA 92868 - Telephone (909) 838-1333; Fax (714) 835-6671 www.jlpatterson.com

PATTERSON & ASSOCIATES, INC.
CIVIL-TRACKWORK ENGINEERING

Lisa Patterson
CAGN 15-day Notification
San Sevaine Basin
Page 2



725 Town & Country Road, Suite 300 - Orange, CA 92868 - Telephone (909) 838-1333; Fax (714) 835-6671 www.jlpatterson.com

PATTERSON & ASSOCIATES, INC.
CIVIL-TRACKWORK ENGINEERING

Lisa Patterson
CAGN 15-day Notification
San Sevaine Basin
Page 3

725 Town & Country Road, Suite 300 - Orange, CA 92868 - Telephone (909) 838-1333; Fax (714) 835-6671 www.jlpatterson.com

PATTERSON & ASSOCIATES, INC.
CIVIL-TRACKWORK ENGINEERING

Lisa Patterson
CAGN 15-day Notification
San Sevaine Basin
Page 4

Survey Area Map

725 Town & Country Road, Suite 300 - Orange, CA 92868 - Telephone (909) 838-1333; Fax (714) 835-6671 www.jlpatterson.com

APPENDIX E

SAN BERNARDINO KANGAROO RAT FOCUSED SURSVEY REPORT

July 01, 2015

Stacey Love
Recovery Permit Coordinator
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008

RE: USFWS permit No. TE-094308-3
45-Day Presence/Absence Survey Report San Sevaine Basin No. 5
San Bernardino kangaroo rat (SBKR) [*Dipodomys merriami parvus*]

Dear Ms. Love,

This letter report contains the findings of my June 2015 San Bernardino kangaroo rat (*Dipodomys merriami parvus* [SBKR]) presence/absence survey on an approximate 30-acre area within San Sevaine Basin No. 5 located south of Summit Avenue, north of the 30-(210) freeway, and west of Cherry Avenue, in the City of Rancho Cucamonga, in western San Bernardino County.

In the early 2000's SBKR were detected in Basin 5, as such presence/absence surveys were warranted for this project in Basin No. 5. Following a 15-Day Notification to the U. S. Fish and Wildlife Service (USFWS), the subject property was surveyed for the federally-listed as endangered SBKR by permitted biologist Shay Lawrey on June 14-19, 2015. **No SBKR** were trapped during the survey and the negative finding indicates that SBKR are absent from the study area.

Project Description

The Inland Empire Utilities Agency (IEUA) and the Chino Basin Watermaster (CBWM) are proposing the San Sevaine Basin Improvements Project. This project would increase the amount of recycled water (RW) and stormwater recharged into the Chino Groundwater Basin. The existing San Sevaine Basins (Basins) are made up of five individual basins covering approximately 130 acres. These basins are dual-use facilities which serve flood control and groundwater recharge functions.

Species Background

There are 19 subspecies of Merriam's k-rat (*D. merriami*), three of which occur in California, including the SBKR. Of the three California subspecies, SBKR are the smallest. The historic range of the subspecies SBKR lies west of the desert divide of the San Jacinto and San Bernardino mountains and extends from the San Bernardino Valley in San Bernardino County to the Menifee Valley in Riverside County (Lidicker 1960; Hall 1981). The historical range of SBKR is thought to have encompassed an area of approximately 326,467 acres. Currently SBKR occupies approximately 3,247 acres of suitable habitat in about seven general locations (USFWS 1998), including the Santa Ana River, Cajon Creek Wash, Lytle Creek Wash, City Creek, and upper Etiwanda Wash in San Bernardino County, and sites in western Riverside County. Of these primary occupied locations in the San Bernardino and San Jacinto Valleys, only three sites (Santa Ana River and its tributaries, Cajon and Lytle creeks, and San Jacinto and Bautista creeks) support sustaining populations of SBKR and large contiguous patches of occupied habitat.

SBKR are found primarily on well drained, sandy loam substrates, characteristic of alluvial fans and floodplains, where they are able to dig simple, shallow burrows. They are primarily nocturnal animals, but they also exhibit crepuscular behavior around dusk and dawn. They emerge from their burrows around dusk to engage in foraging and other activities. Animals may be active any hour of the night, but the heaviest concentration of activity tends to occur in the three- to four-hour time span just after dusk. They usually return permanently to their burrows before dawn (Behrends et al. 1986a).

Factors affecting the amount and patterns of surface activity of individuals include: (1) sex and reproductive condition, with reproductive active males traveling farther than female or males with regressed testes (Behrends et al. 1996a); and (2) moonlight, with animals reducing surface activity and shifting activity toward places with relatively dense cover (Lockard and Owings 1974; Price et al. 1984). Daly et al. (1992b) found that *D. merriami* shifted from nocturnal activity during full moon to more crepuscular activity during dawn and dusk periods, suggesting a more complex and fine-grain compensatory behavioral response to moonlight rather than simply reducing overall surface activity to avoid moonlight.

The USFWS emergency listed the SBKR on January 27, 1998 and subsequently listed them as federally endangered later that same year on September 24, 1998 (63 FR 3837) under the Endangered Species Act of 1973 (63 FR 3877), as amended. The USFWS also designated critical habitat units for the SBKR on April 23, 2002 (67 FR 19811). The units included reaches of the Santa Ana, Lytle and Cajon creeks, San Jacinto River and Bautista creek, and the Etiwanda alluvial fan (65 FR 77178). Identified threats to the San Bernardino kangaroo rat include the loss of habitat, habitat fragmentation, urban and industrial development, highway construction, flood control and water conservation projects, sand and gravel mining, grazing, and vandalism (USFWS 1998). Additional threats to the species likely include farming and discing of habitat for weed abatement, heavy grazing, and off-road vehicles. Although this species is associated with sandy washes and drainages, they occur in habitat supporting sparse alluvial fan sage scrub on benches above creek channels.

<u>Methods</u>

Ms. Lawrey has over a decade of experience with SBKR and is a biologist permitted (USFWS permit number TE 094308-3) by the USFWS to trap and handle SBKR. Ms. Lawrey initiated the survey on the evening of Sunday, June 14, 2015 and ended the survey on the morning of Friday, June 19, 2015. The survey concentrated on the north embankment and berm between Basin Nos. 4 and 5. These areas are where either SBKR have been detected in the past and/or where the most suitable habitat exists on site.

A total of 180 traps, 12-inch Sherman live traps (product number SLK; H.B. Sherman Traps, Tallahassee, FL) were set within the targeted habitat with spacing between each trap at approximately 10 meters. Each trap was baited after dusk with mixture of rolled oats and commercially-formulated small mammal feed (seed) that included a millet seed. Traps were inspected at midnight and again at dawn. All animals were identified and released unharmed at the point of capture. Daily notes included weather conditions such as temperature, wind speed, cloud cover, precipitation and moon phase. Site characteristics such as soils, topography, the condition of the plant communities, and evidence of human use of the site were also noted.

Results

The San Sevaine Basins are bordered to the south by the Interstate 210, Cherry Avenue to the east, residential development to the north and the Etiwanda Channel to the west. The surrounding land uses are a combination of residential, transportation, utility easements, flood control, and government uses. The study area can be found on the USGS – Devore and Cucamonga Peak Quadrangles, 7.5 Minute Series topographic map in Section 26 and 27 respectively, Township 1 North, Range 6 West (see Figures 1-2).

No portion of the San Sevaine Basins is mapped within SBKR critical habitat. In fact, the USFWS excluded these flood control facilities from critical habitat because they understood that these basin systems would be maintained annually for flood control purposes and would therefore not retain habitat value for SBKR that they may have held in the past. Although the San Sevaine Basins are located within the historic range of the SBKR, there is no suitable habitat for SBKR within Basins 1-3. These basins are wet most of the year they do not possess the soil characteristics or vegetation types suitable for SBKR. Basins 1-3 are not considered suitable for SBKR for the following reasons:

- Basins 1-3 are not located within designated critical habitat for SBKR,
- SBKR have been absent from Basins 1-3 for over a decade
- The soils are fine grained, moist and compacted which do not typically support SBKR,
- Small mammal burrows are currently lacking in the floors and slopes of Basins 1-3,
- The vegetation in Basins 1-3consist of riparian or non-native grasses;
- Floodplain bench/terraces subject to dynamic geomorphological and hydrological processes typical of fluvial systems are lacking in Basins 1-3.

Focused SBKR surveys were not warranted or recommended within San Savaine Basins 1-3 and as such they were excluded from the presence/absence survey.

The only areas where the soil and vegetation types would be considered suitable to support SBKR is within Basin 5 and along the berm between Basins Nos. 4 and 5 and this is where the study occurred. In 2002, Shay Lawrey, determined presence of SBKR along the northwest slope of Sevaine Basin No. 5. In 2003, consulting biologist, Philippe Vergne, also determined the presence of SBKR between San Sevaine Basins Nos. 4 and 5. During the reconstruction of San Sevaine Basin No. 5 in 2003-2004, two (2) SBKR were caught and relocated outside of the basin to appropriate habitat located directly north of the basin. The relocation occurred per conditions set forth in the Biological Opinion issued by the USFWS for the Etiwanda/San Sevaine flood control project. After the improvements to Basin 5 were complete the embankments were seeded to encourage the establishment of Riversidean alluvial fan sage scrub (RAFSS) habitat. No SBKR have been captured in the San Sevaine Basins where suitable habitat occurs (Basin 5 and berm separating 4 and 5) since the reconstruction of Basin No. 5.

The soils and substrate in the basin are composed of sandy loam which is friable and conducive for small mammal burrow construction and maintenance. Habitat in San Sevaine Basin No. 5 primarily consists of even aged RAFSS characterized by brittlebrush (*Encelia farinosa*), buckwheat (*Eriogonum fasciculatum*), deerweed (*Lotus scoparus*) yerba santa (*Eriodictyon trichocalyx* va. *trichocalyx*), and scale broom (*Lepidospartum squamatum*). A swath of willows (*Salix* sp) are growing in bottom of the basin. The RAFSS habitat is dense and even aged but is in good condition with a few alien grasses interspersed throughout. This habitat is potentially suitable habitat for SBKR. SBKR are typically found on either flat or gently sloping alluvial fans, floodplains, along washes, in adjacent uplands and in areas with historical braided channels. They typically occupy areas that support alluvial sage scrub and chaparral vegetation. As stated above SBKR tend to prefer the more open areas seen in pioneer and intermediate type alluvium, but can also be found in mature RAFSS depending on its distance to pioneer RAFSS.

Temperatures were warm with overnight low temperatures ranging between 63°F and 65°F. The moon was full and the skies were clear. A light breeze to moderate winds blew during the trapping session, with gusts reaching 20 miles per hour.

Table 1. Survey dates of trap night, weather conditions, and moon phases

Survey Dates	% Cloud Cover	Wind (BFT)	Overnight Low Temp (°F)	Precipitation	Moon Phase
6/14	0	2	63	0	Waning crescent
6/15	0	3	63	0	Waning crescent
6/16	5	2	64	0	New Moon
6/17	10	1	63	0	Waxing crescent
6/18	0	3	65	0	Waxing crescent

On the surface, sign typically indicative of kangaroo rat species (tracks, scat, tail drags, sand bath sites, or burrows) was absent. Scat and tracks of various other small mammals species was observed however. Eight (8) native rodent species were trapped in the survey area. No animals were marked as part of this survey, so determining unique individuals versus recaptured individuals was not possible. The term “trap night” is used to relay how many individuals, per species were caught over the 5-night session. Each trap is counted as a trap night, so with 180 traps surveyed over five nights there was a total of 900 trap nights (Table 2). The fifth survey night had the highest trapping success with 71 animals being caught; whereas, the first survey night had the lowest trapping success of 39 animals captured. **No SBKR** were trapped during the survey.

Table 2. Species captured

Species	Trap night
Deer mouse (*Peromyscus maniculatus*)	165
Cactus mouse (*Peromyscus eremicus*)	102
San Diego pocket mouse (*Chaetodipus fallax*)	98
California vole (*Microtus californicus*)	2
California mouse (*Peromyscus califonicus)*	48
wood rat (*Neotoma lepida*)	20
grasshopper mouse (*Onychomys torridus*)	2
western harvest mouse (*Reithrodontomys megalotis*)	3

(Phylogenetic listing per Jameson & Peters, California Mammals, 1988)

Conclusions

The San Sevaine Basins encompasses a significant area of land that is virtually undisturbed by the daily habits found in a suburban area. Within the basins there are no direct impacts by lighting, traffic, noise, recreational vehicles, pedestrians, or house hold pets such as dogs and cats. There are, however, indirect impacts from the adjacent roads, freeway and residential developments. A high diversity of common wildlife is found in the basins. The restoration efforts in basin number 5 appear successful. Historically, the Etiwanda fan and the local vicinity supported sustainable breeding populations of SBKR within the sage scrub habitat community. SBKR can be found in all habitat types within the species' historic distribution. Furthermore, trapping surveys conducted in the last decade have shown SBKR to occupy highly disturbed areas in a range of soil and vegetation types in various states of alteration and degradation. They have been captured in dirt parking lots and dirt roads as well as RAFSS, Coastal sage scrub, and chaparral. As such, it was appropriate to trap basin 5 and along the berm between 4 and 5 to provide a updated data to the USFWS. The trapping results indicate that SBKR are **absent** from the study site and will not be adversely affected by the facilities proposed by IEUA.

Please do not hesitate to contact at 909-915-5900 should you have any questions or require further information.

Sincerely,

Shay Lawrey,

Attachments:

- Vicinity Map
- Site Location Map
- 2015 SBKR Study Area
- Site Photos

Figure 1. Vicinity Map

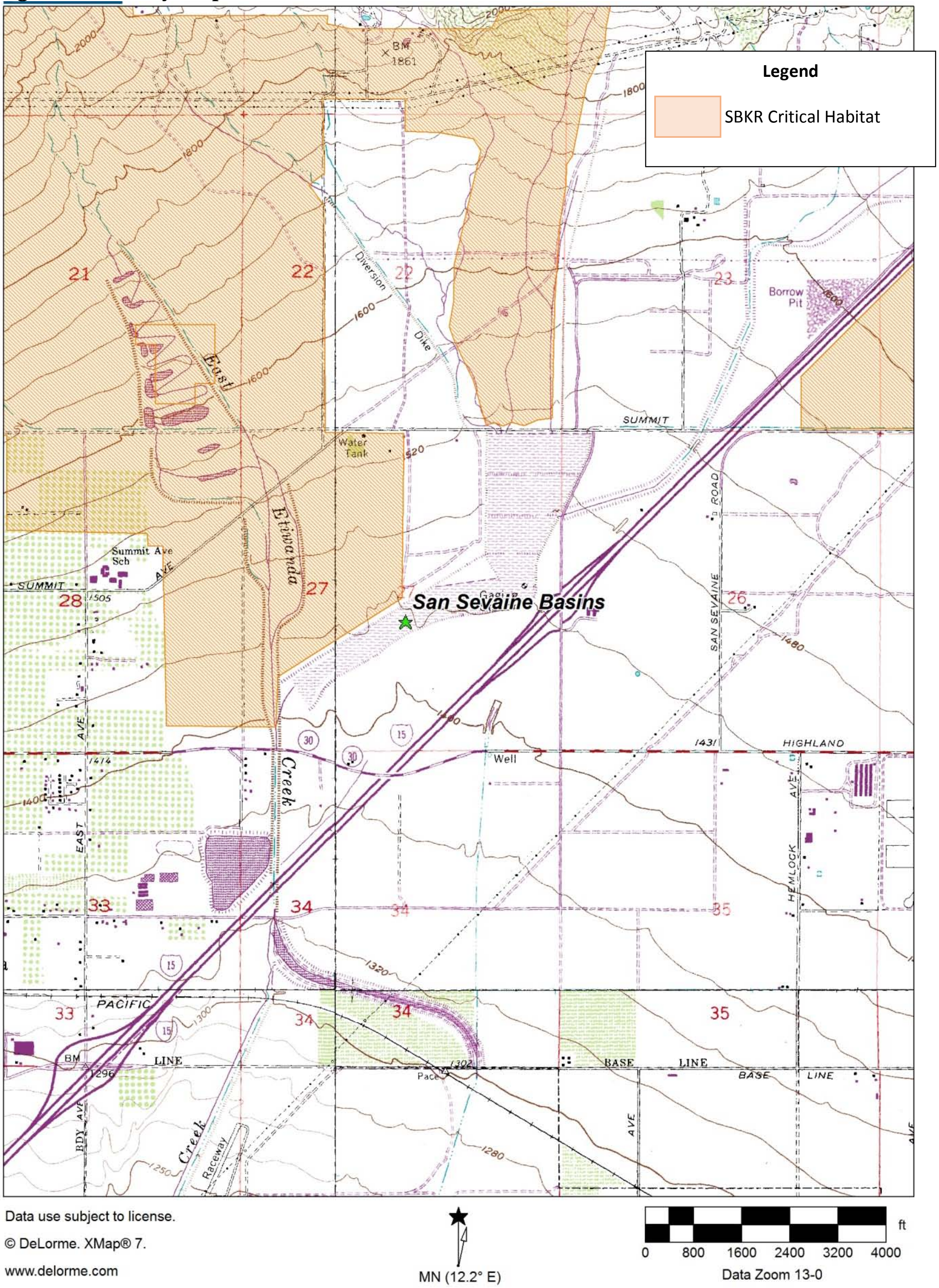
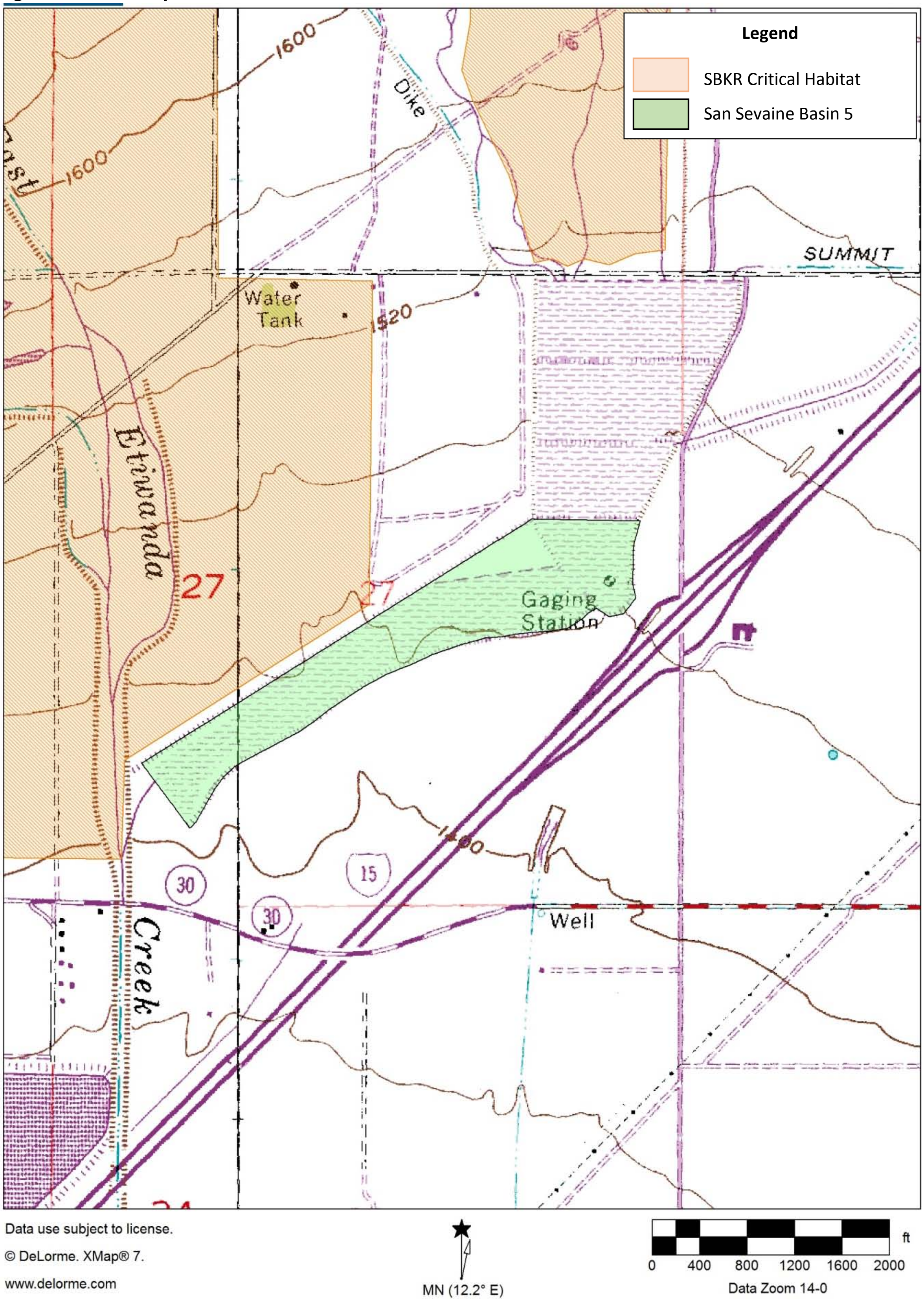


Figure 2. Site Map




2015 SBKR study area
San Sevaine Basin No. 5
Legend
Trapline Locations
Shepherd Dr
Henderson Dr
Little Oak Ct
Wardman Bullock Rd
Young's Cyn Rd
Hoppe Dr
Soledad Way
Darkwood Way
Hummingbird Way
Rose Way
Blossom Pl
Pelican Dr
Banyan St
Pinecone Way
Dove Canyon Way
Grovewood Pl
Ontario Fwy
Summit Ave
Cherry Ave
15
1000 ft
N
Google earth
Image © 2015 DigitalGlobe

Photo 1. San Sevaine Basin No. 1. Not suitable soil or habitat for SBKR

Photo 2. San Sevaine Basin No. 2. Not suitable soil or habitat for SBKR

Photo 3. San Sevaine Basin No. 3. Not suitable soil or habitat for SBKR

Photo 4. San Sevaine Basin No. 4. Not suitable soil or habitat for SBKR

Photo 5. San Sevaine Basin No. 5. Suitable soil and habitat for SBKR on slopes previously occupied in 2002, 2003 and 2004.

Photo 6. Along the NE corner of the berm that separates Basins 4 and 5.

Photo 7. View looking at trapping area along north embankment of Basin 5.

Photo 8. 2nd view looking at trapping area along north embankment of Basin 5.

APPENDIX 4
(Confidential – Not for Public Distribution)

Available upon request only. Request directly from Tom Dodson & Associates at (909) 882-3612 or tda@tdaenv.com

APPENDIX 5

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11 North. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the San Bernardino County ISD.GIS Department, United States Geological Survey, the Bureau of Land Management, the United States Department of Agriculture, and the National Geodetic Survey. This imagery was flown by the US Department of Agricuture Farm Sevice Agency in 2012 and was produced with a 1-meter ground sampling distance.

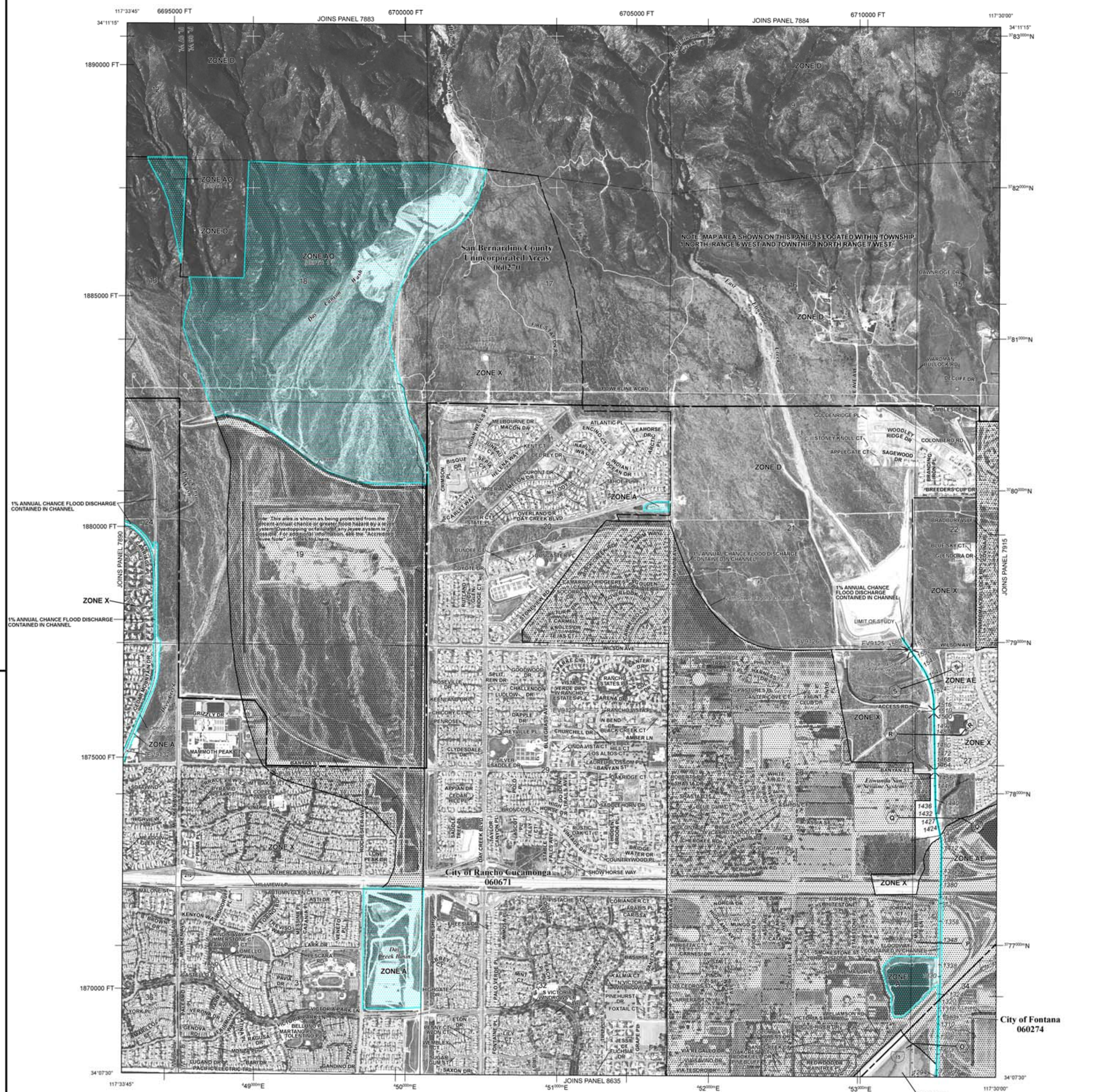
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Accredited Levee Notes to Users: Check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system shown as providing protection for areas on this panel. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA website at http://www.fema.gov/business/nfip/index.shtm.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - 23	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4275000mE	1000-meter Universal Transverse Mercator grid values, zone 11
6000000 FT	5000-foot grid ticks: California State Plane coordinate system, Zone V (FIPSZONE = 405), Lambert projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories List on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
March 18, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
September 26, 2014: for a description of revisions, see Notice to Users page in the Flood Insurance Study report.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

N

MAP SCALE 1" = 1000'

500 0 500 1,000 1,500 2,000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 7895J

FIRM
FLOOD INSURANCE RATE MAP
SAN BERNARDINO COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 7895 OF 9400

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FONTANA, CITY OF	060274	7895	J
RANCHO CUCAMONGA, CITY OF	060671	7895	J
SAN BERNARDINO COUNTY	060270	7895	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06071C7895J

MAP REVISED
SEPTEMBER 26, 2014

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11 North. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from digital orthophotography collected by the U.S. Department of Agriculture Farm Service Agency. This imagery was flown in 2005 and was produced with a 1-meter ground sample distance.

This map may reflect more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to confirm to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

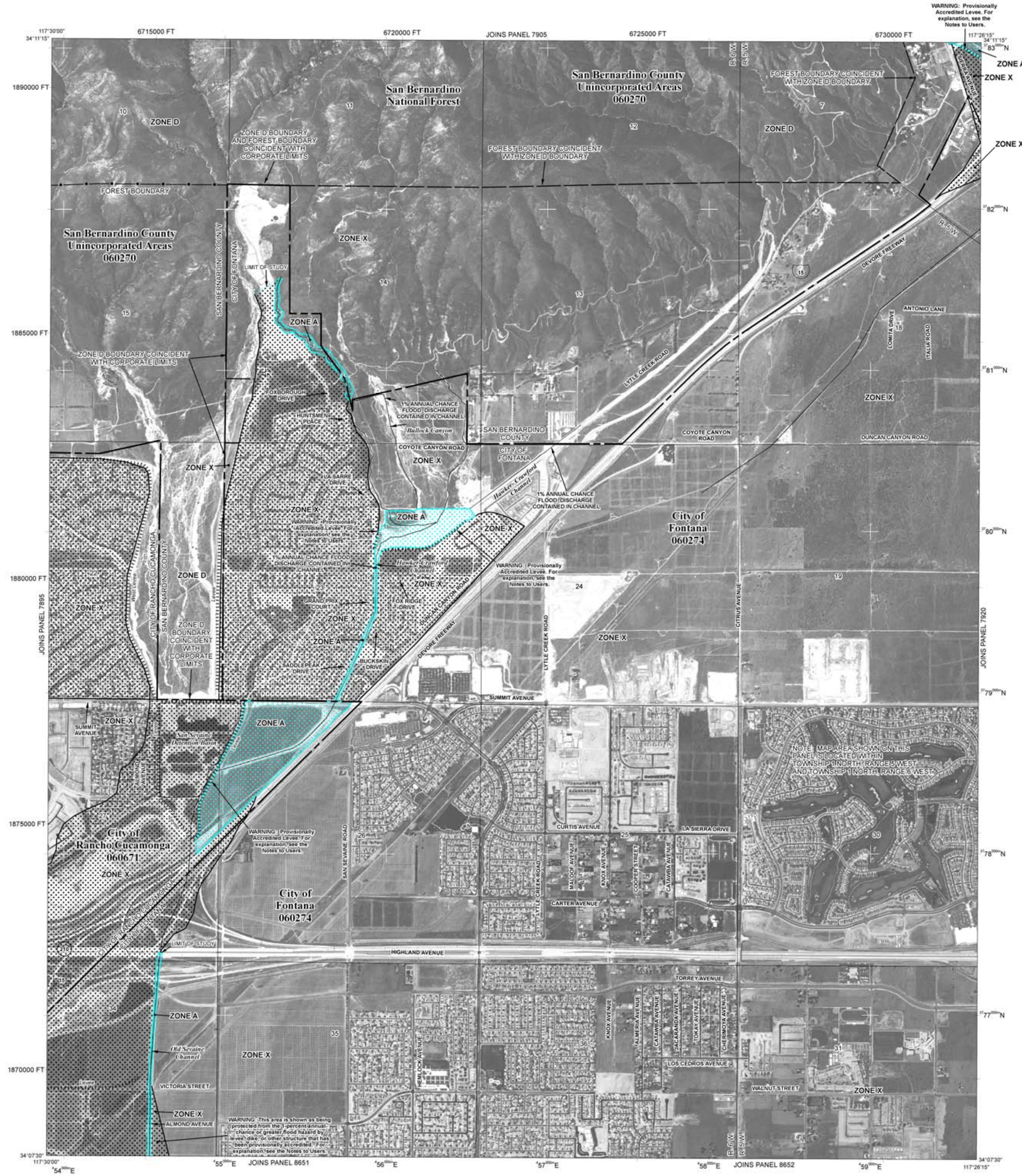
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.

WARNING: This map contains levees, dikes, or other structures that have been provisionally accredited and mapped as providing protection from the 1-percent–annual-chance flood. To maintain accreditation, the levee owner or community is required to submit documentation necessary to comply with 44 CFR Section 65.10 by August 8, 2009. Because of the risk of overtopping or failure of the structure, communities should take proper precautions to protect lives and minimize damages in these areas, such as issuing an evacuation plan and encouraging property owners to purchase flood insurance.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

(A)———(A)	Cross section line
(23)- - - - -(23)	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
$^{37}76^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 11N
600000 FT	5000-foot grid ticks: California State Plane coordinate system, zone V (FIPSZONE 0405), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
March 18, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
January 17, 1997 - to change Base Flood Elevations and Special Flood Hazard Areas, and to update map format.
August 28, 2008 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

N

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 7915H

FIRM

FLOOD INSURANCE RATE MAP

SAN BERNARDINO COUNTY, CALIFORNIA
AND INCORPORATED AREAS
PANEL 7915 OF 9400

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FONTANA, CITY OF	060274	7915	H
RANCHO CUCAMONGA, CITY OF	060671	7915	H
SAN BERNARDINO COUNTY	060270	7915	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06071C7915H

MAP REVISED
AUGUST 28, 2008

Federal Emergency Management Agency