Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

ENGINEERING, OPERATIONS, AND BIOSOLIDS MANAGEMENT COMMITTEE MEETING OF THE BOARD OF DIRECTORS INLAND EMPIRE UTILITIES AGENCY* AGENCY HEADQUARTERS, CHINO, CALIFORNIA

WEDNESDAY, APRIL 13, 2016
10:00 A.M.

Or immediately following the Public, Legislative Affairs, and Water Resources Committee Meeting

CALL TO ORDER

PUBLIC COMMENT

Members of the public may address the Board on any item that is within the jurisdiction of the Board; however, no action may be taken on any item not appearing on the agenda unless the action is otherwise authorized by Subdivision (b) of Section 54954.2 of the Government Code. Those persons wishing to address the Board on any matter, whether or not it appears on the agenda, are requested to complete and submit to the Board Secretary a "Request to Speak" form which is available on the table in the Board Room. Comments will be limited to five minutes per speaker. Thank you.

ADDITIONS TO THE AGENDA

In accordance with Section 54954.2 of the Government Code (Brown Act), additions to the agenda require two-thirds vote of the legislative body, or, if less than two-thirds of the members are present, a unanimous vote of those members present, that there is a need to take immediate action and that the need for action came to the attention of the local agency subsequent to the agenda being posted.

1. ACTION ITEMS

A. MINUTES

The Committee will be asked to approve the Engineering, Operations, and Biosolids Management Committee meeting minutes from the March 9, 2016, meeting.

B. CONTRACT AMENDMENT TO WEST VALLEY MOSQUITO AND VECTOR CONTROL DISTRICT FOR MIDGE FLY TREATMENT

It is recommended that the Committee/Board:

1. Ratify Contract Amendment No. 4600001970-001 with West Valley Mosquito and Vector Control District (WVMVCD) establishing a contract through June30, 2016, for midge fly treatment services at Turner, San Sevaine, Victoria and Ely Basins for a not-to-exceed amount of $120,000; and

2. Authorize the General Manager to execute the contract amendment.

C. **CEQA ADOPTION – LOWER DAY BASIN**

It is recommended that the Committee/Board:

1. Adopt the California Environmental Quality Act (CEQA) Initial Study/Mitigated Negative Declaration and Mitigation, Monitoring and Reporting Program for Lower Day Basin Recharge Master Plan Update (RMPU) Improvements Project No. RW15004; and

2. Authorize the General Manager to file the Notice of Determination (NOD) with the San Bernardino County Clerk of the Board.

D. **GROUNDWATER RECHARGE/RECYCLED WATER SCADA SYSTEM UPGRADES CONSTRUCTION CONTRACT AWARD**

It is recommended that the Committee/Board:

1. Approve the construction contract for the Groundwater Recharge and Recycled Water Supervisory Control and Data Acquisition (SCADA) Systems Upgrades, Project No. EN14047, to Trimax Systems, Inc. for $250,989; and

2. Authorize the General Manager to execute the contract.

E. **HEADQUARTERS' PERMIT OFFICE CONSTRUCTION CONTRACT AWARD**

It is recommended that the Committee/Board:

1. Approve the construction contract for the Headquarters' Permit Office, Project No. EN16068, to Mike Bubalo Construction Corporation, for $150,000; and

2. Authorize the General Manager to execute the contract.

F. **EAST DECLEZ PROPERTY ACQUISITION**

It is recommended that the Committee/Board:

1. Authorize the General Manager to purchase the East Declez property for the sum of $3.0 million on behalf of Chino Basin Watermaster (Watermaster); contingent upon the approval by the Watermaster Board of Directors;

2. Authorize the General Manager to spend up to $100,000 on behalf of Watermaster for necessary fees related to the purchase of the property; and

3. Approve a $3.1 million budget amendment for Project No. EN18007 in FY 2015/16 through an inter-fund loan from the Regional Wastewater Capital Improvement (RC) fund to the Recharge Water (RW) fund.

2. INFORMATION ITEM

A. RP-1/RP-5 EXPANSION PRELIMINARY DESIGN REPORT UPDATE (WRITTEN/POWERPOINT)

B. FY 2016/17 TEN YEAR CAPITAL IMPROVEMENT PLAN UPDATE (POWERPOINT)

RECEIVE AND FILE INFORMATION ITEM

C. ENGINEERING AND CONSTRUCTION MANAGEMENT MONTHLY UPDATE (POWERPOINT)

3. GENERAL MANAGER'S COMMENTS

4. COMMITTEE MEMBER COMMENTS

5. COMMITTEE MEMBER REQUESTED FUTURE AGENDA ITEMS

6. ADJOURN

*A Municipal Water District

In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, please contact the Board Secretary (909-993-1736), 48 hours prior to the scheduled meeting so that the Agency can make reasonable arrangements.

Proofed by: SR

DECLARATION OF POSTING

I, April Woodruff, Board Secretary of the Inland Empire Utilities Agency, A Municipal Water District, hereby certify that a copy of the agenda has been posted by 5:30 p.m. in the foyer at the Agency's main office, 6075 Kimball Ave., Building A, Chino, CA on Thursday, April 7, 2016.

for Stephanie Riley
April Woodruff

ACTION ITEM 1A

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

MINUTES

ENGINEERING, OPERATIONS, AND BIOSOLIDS MANAGEMENT COMMITTEE MEETING
INLAND EMPIRE UTILITIES AGENCY*
AGENCY HEADQUARTERS, CHINO, CA

WEDNESDAY, MARCH 9, 2016
10:00 A.M.

COMMITTEE MEMBERS PRESENT

Michael Camacho, Chair
Terry Catlin

STAFF PRESENT

P. Joseph Grindstaff, General Manager
Chris Berch, Executive Manager of Engineering/AGM
Christina Valencia, Chief Financial Officer/AGM
Ernest Yeboah, Executive Manager of Operations/AGM
Jerry Burke, Deputy Manager of Engineering
Warren Green, Manager of Contracts and Facilities Services
Jason Gu, Grants Officer
Randy Lee, Manager of Operations
David Mendez, Deputy Manager of Construction Management
Jeff Noelte, Manager of Technical Services
John Scherck, Acting Deputy Manager of Engineering
Shaun Stone, Manager of Engineering
Teresa Velarde, Manager of Internal Audit
April Woodruff, Board Secretary/Office Manager

OTHERS PRESENT

Jasmin A. Hall, Director

The meeting was called to order at 10:07 a.m. There were no public comments received or additions to the agenda.

ACTION ITEMS

The Committee:

- Approved the Engineering, Operations, and Biosolids Management Committee meeting minutes of February 10, 2016.

- Recommended that the Board:

    1. Approve Contract No. 4600002068, to West Valley Mosquito and Vector Control District establishing a two-year contract for midge fly sampling and control investigation services at the various groundwater recharge site for a not-to-exceed amount of $280,000; and

2. Authorize the General Manager, or his designee, to execute the contract;

as a Consent Item on the March 16, 2016 Board meeting agenda.

INFORMATION ITEMS
The following information items were presented or received and filed by the Committee:

- Engineering and Construction Management Monthly Update

GENERAL MANAGER'S COMMENTS
General Manager Joseph Grindstaff had no further comments.

COMMITTEE MEMBER COMMENTS
There were no Committee Member comments.

COMMITTEE MEMBER REQUESTED FUTURE AGENDA ITEMS
There were no Committee Member requested future agenda items.

With no further business, Director Camacho adjourned the meeting at 10:35 a.m.

Respectfully submitted,

April Woodruff
Board Secretary/Office Manager

*A Municipal Water District

APPROVED: APRIL 13, 2016

ACTION ITEM 1B

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Date: April 20, 2016

To: The Honorable Board of Directors

Through: Engineering, Operations, and Biosolids Management Committee *(4/13/16)*
Finance, Legal, and Administration Committee *(4/13/16)*

From: P. Joseph Grindstaff
General Manager

Submitted by: Ernest Yeboah EY
Executive Manager of Operations

Randy Lee RL
Manager of Operations

Subject: Contract Amendment to West Valley Mosquito and Vector Control District for Midge Fly Treatment

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RECOMMENDATION

It is recommended that the Board of Directors:

1. Ratify Contract Amendment No. 4600001970-001 with West Valley Mosquito and Vector Control District (WVMVCD) establishing a contract through June 30, 2016, for midge fly treatment services at Turner, San Sevaine, Victoria, and Ely Basins for a not-to-exceed amount of $120,000; and

2. Authorize the General Manager to execute the contract.

BACKGROUND

Midge flies are aquatic insects that inhabit water bodies such as lakes, streams, and ponds, and are ubiquitous throughout the world. In fact, the presence of midge flies within a water body is an indicator of a healthy aquatic system. Unlike mosquitoes, midge flies do not bite and are not a vector for disease. However, they can become a nuisance in populated areas as swarming and resting adults come into contact with people and buildings. The recharge basins in the Chino Basin contain standing bodies of water that provide suitable conditions for midge flies, and have in the past created nuisance levels of adult midge flies in the surrounding areas.

In order to respond to the warm weather and expected outbreaks of midge flies in March, WVMVCD recommended IEUA proactively treat midge fly outbreaks before they become a significant public nuisance. WVMVCD is uniquely positioned to perform the required treatment because of their specialized skill and local knowledge due to their service area covering much of IEUA's service area. As a result of WVMVCD's recommendation, IEUA had them start midge fly treatment in March 2016. In accordance, with Procurement Ordinance 101, the General Manager utilized his authority to authorize emergency procurement and approved the amendment with WVMVCD. Additionally, WVMVCD is concurrently conducting midge fly sampling under a separate IEUA contract and will have the most comprehensive and current understanding of the midge fly conditions within the recharge basins.

The midge fly treatment supports the Agency's objective to be a "Good Neighbor" under the business goal of Environmental Stewardship, as well as the objective of "maximizing the recharge of recycled water" under the business goal of Water Reliability.

PRIOR BOARD ACTION

The Board approved the purchase of an ARGO amphibious vehicle for midge fly treatment in 2014 and recently approved a contract to WVMVCD for midge fly sampling and control investigation.

IMPACT ON BUDGET

If approved, the anticipated expenses of $120,000 for Fiscal Year 2015/16 will be funded from the Groundwater Recharge's professional fees and services budget.

Inland Empire Utilities Agency

A MUNICIPAL WATER DISTRICT

CONTRACT AMENDMENT NUMBER: 4600001970-001

FOR

VECTOR CONTROL SERVICES

THIS AMENDMENT NUMBER 1, to Contract Number 4600001970, between the Inland Empire Utilities Agency, and West Valley Mosquito and Vector Control District, of Ontario, California, shall revise the Contract as follows:

REVISE SECTION 4, SCOPE OF WORK AND SERVICES, ADDING A PARAGRAPH "E" TO READ:

E. Contractor shall, for performance period through June 30, 2016, provide professional midge fly treatment services. As deemed necessary by WVMVCD staff, treatment services will be provided at each of four IEUA sites:
   1. Turner Basins
   2. Ely Basins
   3. San Sevaine Basins
   4. Victoria Basin

   Contactor's services shall be provided in accordance with WVMVCD's proposal letter dated February 24, 2016 (Attachment A), which is incorporated into and made a part of Contract Number 4600001970, with this reference.

REVISE SECTION 6, COMPENSATION, ADDING A PARAGRAPH TO READ:

As compensation for the satisfactory performance of the services required under Contract Amendment Number 4600001970-001, Agency shall increase the Not-to-Exceed value of the Contract by $120,000. With the full execution of this Contract Amendment Number 4600001970-001, the Not-to-Exceed value of the Contract Number 4600001970 shall be increased to **$145,000.**

ALL OTHER PROVISIONS OF THIS CONTRACT REMAIN UNCHANGED.

WITNESSETH, that the parties hereto have mutually covenanted and agreed as per the above amendment item, and in doing so have caused this document to become incorporated into the Contract Documents.

INLAND EMPIRE UTILITIES AGENCY:

P. Joseph Grindstaff — 3/11/16 (Date)
General Manager

WEST VALLEY MOSQUITO AND VECTOR CONTROL DISTRICT:

Min-Lee Cheng — 3 / 11 / 16 (Date)
District Manager

Attachment A

WEST VALLEY
MOSQUITO AND VECTOR CONTROL DISTRICT

1295 E. LOCUST STREET, ONTARIO, CA 91761 TELEPHONE (909)-635-0307
WWW.WVMOSQUITO.ORG

BOARD OF TRUSTEES

CHINO
Glenn Duncan

CHINO HILLS
Cynthia Moran

DISTRICT AT LARGE
Benjamin Lopez

MONTCLAIR
Carolyn Raft

ONTARIO
Paul Leon

RANCHO CUCAMONGA
William Wittkopf

DISTRICT MANAGER
Min-Lee Cheng, Ph.D.

February 24, 2016

Inland Empire Utilities Agency
Attn. Bill Leever
Groundwater Recharge Coordinator
6075 Kimball Ave.
Chino, CA 91708

Mr. Leever:

Per our discussions on midge fly treatment services at groundwater recharge basins, West Valley Mosquito and Vector Control District (WVMVCD) proposes to provide midge control treatment services at a rate of $80 per hour of staff time plus the cost of materials, not to exceed $120,000 (150 acres x 3 treatments), through June 30, 2016.

A general summary of anticipated services are listed below.

1) Based on survey results of midge fly populations (conducted under separate contract with IEUA), WVMVCD will notify the IEUA project manager by email (an inspection report) when midge treatment at Turner, San Sevaine, Victoria, and Ely Basins is deemed necessary.
2) IEUA will share basin maintenance schedules with WVMVCD (e.g. when the basin is going to be drained) at least a month ahead, so as to avoid chemical treatments.

WVMVCD looks forward to working with IEUA on midge fly control at the groundwater recharge basins.

Sincerely,

Min-Lee Cheng, Ph.D.
District Manager
West Valley Mosquito and Vector Control District
1295 E. Locust St, Ontario, CA 91761
mcheng@wvmvcd.org
909-635-0307

ACTION ITEM 1C

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Date: April 20, 2016

To: The Honorable Board of Directors

Through: Engineering, Operations, and Biosolids Management Committee *(04/13/16)*

From: P. Joseph Grindstaff
General Manager

Submitted by: Chris Berch
Executive Manager of Engineering/Assistant General Manager

Shaun J. Stone
Manager of Engineering

Subject: CEQA Adoption - Lower Day Basin

RECOMMENDATION

It is recommended that the Board of Directors:

1. Adopt the California Environmental Quality Act (CEQA) Initial Study/Mitigated Negative Declaration and Mitigation, Monitoring, and Reporting Program for the Lower Day Basin Recharge Master Plan Update (RMPU) Improvements, Project No. RW15004; and

2. Authorize the General Manager to file the Notice of Determination (NOD) with the San Bernardino County Clerk of the Board.

BACKGROUND

In 2013, the RMPU was approved by Inland Empire Utilities Agency (IEUA) and Chino Basin Watermaster (Watermaster). Under the RMPU, nine (9) basins were recommended for improvement to increase groundwater recharge with stormwater and recycled water. The Lower Day Basin Improvement Project is expected to provide an additional 789 acre feet per year (afy) of stormwater for groundwater recharge by designing and constructing a new channel diversion and outlet structures. The diversion structure is proposed along San Bernardino County's Day Creek Channel. The new diversion structure will increase stormwater flow rates between 500 to 1,000 cubic feet per second (cfs). The current flow capacity is 70 to 100 cfs. The new outlet structures will increase the basin's storage volume from 100 acre feet to over 500 acre feet. These two improvement will raise SW recharge to 1,184 afy.

This $2.48 million capital project is fully funded by Watermaster where IEUA is the lead agency in project management for procuring design/consulting services, bidding/awarding/managing

construction contracts, acquiring all permits, and meeting all the environmental review including documents under the CEQA.

Tom Dodson and Associates prepared the following environmental documents:

- Initial Study/Mitigated Negative Declaration (IS/MND)
- Mitigation, Monitoring, and Reporting Program (MMRP)

A MND has been prepared to state that mitigation measures, which are defined in the MMRP, will be implemented during and after construction to reduce all potential significant impacts to less than significant levels. The prepared IS supports the determination. A 30-day public review of these documents was completed in January 2016. The following state, county, and local agencies provided comments:

- State Office of Planning and Research, State Clearinghouse
- California Department of Transportation, District 8
- Jurupa Community Service District (through Albert A. Webb Associates)
- City of Rancho Cucamonga
- San Bernardino County Department of Public Works
- California Department of Fish and Wildlife
- California State Water Resources Control Board

The comments ranged from midge fly concerns to permitting coordination. Each of the comments were noted, addressed, and incorporated into the final IS/MND documents. These final documents require board adoption and the issuance of a NOD for state filing.

Adopting the recommended CEQA findings and mitigation measures for the groundwater recharge improvements at the Lower Day Basin is consistent with the IEUA business goal of *Water Reliability* by providing new water supplies through the improvement of groundwater recharge.

PRIOR BOARD ACTION

On July 16, 2014, the Board of Directors approved Task Order No. 2 between IEUA and Chino Basin Watermaster for the joint management and allocation of costs for the Lower Day Basin RMPU Improvements.

IMPACT ON BUDGET

None.

Attachments:
Attachment 1: Notice of Determination
Attachment 2: Mitigated Negative Declaration

PJG:CB:SS:ji

Lower Day Basin - CEQA Adoption

Project No. RW15004

April 2016




Joel Ignacio, P.E.
Senior Engineer

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Chino Basin Watermaster
Partners in Basin Management

Project Request

- The adoption of the CEQA Initial Study/Mitigated Negative Declaration and Mitigation, Monitoring, and Reporting Program (MMRP) for the proposed San Lower Day Basin under the Recharge Master Plan Update

Lower Day Basin – Recharge Cells 2 and 1

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Project Background

Oct. 2013

CBWM & IEUA approved the Amendment to 2010 RMPU

11 projects for 2020 completion

Jul. 2014

CBWM & IEUA executed the Master Agreement

Management and cost of joint capital projects

Aug. 2014

CBWM & IEUA executed Task Order No.8

IEUA is the lead agency

CBWM fully funds all cost

Jan. 2015

Started Lower Day

Preliminary Design Efforts

Dec. 2015

Completed draft CEQA documents.

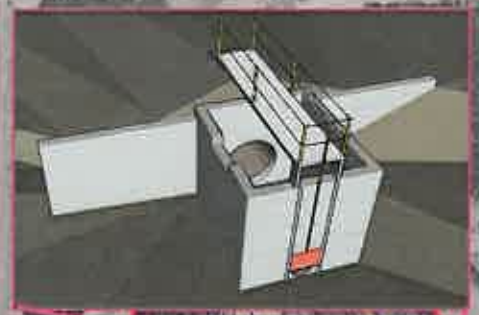
Initiated 30-day Public Review Period

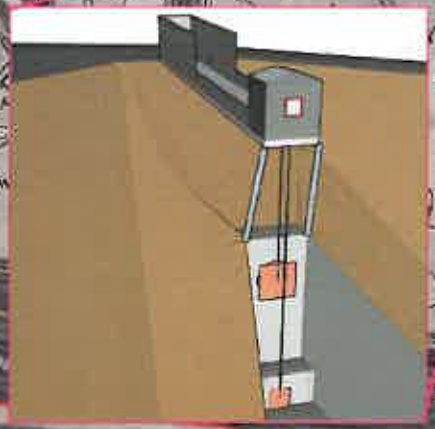
Project Scope

Project Improvements:

(1) New diversion structure at Day Creek Channel

(2) Outlet improvements at the upper and lower basins





Project Location:

City of Rancho Cucamonga

South of 210 Freeway

between Victoria Park and Highland

Project Benefits:

(1) Increase stormwater flow 500 to 1000 cubic feet per second

(2) Increase stormwater storage volume to 500 acre feet

(3)Add approximately 789 acre feet per year of stormwater

Lower Day Basin – Upper and Lower Basins

Environmental Findings

- Mitigated Negative Declaration (MND) is the appropriate environmental determination to comply with CEQA
- Initial Study (IS) states the findings and supports the environmental determination
- Mitigation measures are in the MMRP which reduce potential significant impact to a less than significant level on the following areas:

Air Quality	Hazards and Hazardous Waste
Biological Resources	Hydrology and Water Quality
Cultural Resources	Noise
Geology and Soils	Transportation/Traffic

- 30 day public review of IS/MND completed on January 14, 2016
- Eight public comments received and responded to in the final IS/MND

Recommendation

Staff recommends that the Board of Directors approves the adoption of CEQA Initial Study/Mitigated Negative Declaration and Mitigation, Monitoring, and Reporting Program for the Lower Day Basin RMPU Improvements, Project No. RW15004, and Authorize the General Manager to file the Notice of Determination (NOD) with the San Bernardino County Clerk of the Board.

Adopting the recommended CEQA findings and mitigation measures for the groundwater recharge improvements at the Lower Day Basin is consistent with the IEUA business goal of *Water Reliability* by providing new water supplies through the improvement of groundwater recharge.

Attachment 1

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.

LOWER DAY BASIN PROJECT
Project Title

SCH #2015121018	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 site consists of an existing basin with several cells. The Lower Day Basin is located immediately south of Interstate 210; immediately west of Day Creek channel; about 1/4 mile north of Base Line Road; and immediately east of Rochester Avenue. The project location is depicted on the USGS Cucamonga Peak 7.5' Topographic Quadrangle map. Specifically, the project is located within Section 31, Township 1 North, Range 6 West, San Bernardino Base and Meridian.

Project Description:
The Inland Empire Utilities Agency (IEUA) and the Chino Basin Watermaster (CBWM) are proposing the Lower Day Basin Improvement Project (proposed project). The objective of this project is to increase the recharge capacity (recycled water (RW) and stormwater (SW)) recharged into the Chino Groundwater Basin, specifically in the three cells located at Lower Day Basin. Under the Recharge Master Plan Update (RPMU), the proposed improvements for Lower Day Basin will increase recharge capacity by 789 acre-feet per year by modifying the San Bernardino County Flood Control District's (SBCFCD) diversion channel, installing a control gate valve on Cell 3's midlevel outlet, and improving the Basin embankments.

The proposed project includes modifications to the Basin inlets and outlets that will allow more storm water to be diverted into the Basin and stored at higher elevations for longer durations. There will be no modifications to the physical size, layout/configuration or storage volume of the Basin. The proposed improvements will allow the Basin operations to be modified to achieve increased groundwater recharge.

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

■ Lead Agency ☐ Responsible Agency

project on _____ and has made the following determination regarding the project:
(Date)

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.

Notice of Determination
Page 2 of 2

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	*Title*	*Date*

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: LOWER DAY BASIN PROJECT

State Clearinghouse Number: SCH#2015121018

Project Location: The proposed project is located in the City of Rancho Cucamonga, San Bernardino County, California. The proposed project site consists of an existing basin with several cells. The Lower Day Basin is located immediately south of Interstate 210; immediately west of Day Creek channel; about 1/4 mile north of Base Line Road; and immediately east of Rochester Avenue. The project location is depicted on the USGS Cucamonga Peak 7.5' Topographic Quadrangle map. Specifically, the project is located within Section 31, Township 1 North, Range 6 West, San Bernardino Base and Meridian.

Project Description: The Inland Empire Utilities Agency (IEUA) and the Chino Basin Watermaster (CBWM) are proposing the Lower Day Basin Improvement Project (proposed project). The objective of this project is to increase the recharge capacity (recycled water (RW) and stormwater (SW)) recharged into the Chino Groundwater Basin, specifically in the three cells located at Lower Day Basin. Under the Recharge Master Plan Update (RPMU), the proposed improvements for Lower Day Basin will increase recharge capacity by 789 acre-feet per year by modifying the San Bernardino County Flood Control District's (SBCFCD) diversion channel, installing a control gate valve on Cell 3's midlevel outlet, and improving the Basin embankments.

The proposed project includes modifications to the Basin inlets and outlets that will allow more storm water to be diverted into the Basin and stored at higher elevations for longer durations. There will be no modifications to the physical size, layout/configuration or storage volume of the Basin. The proposed improvements will allow the Basin operations to be modified to achieve increased groundwater recharge.

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 December 7, 2015 through January 14, 2016.

Mitigated Negative Declaration
Page 2 of 2

Mitigation Measures: All mitigation measures identified in the Initial Study are summarized on pages 54-57 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 *Title* *Date*

ACTION ITEM 1D

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Date: April 20, 2016

To: The Honorable Board of Directors

Through: Engineering, Operations, and Biosolids Management Committee *(04/13/16)*
Finance, Legal, and Administration Committee *(04/13/16)*

From: P. Joseph Grindstaff
General Manager

Submitted by: Chris Berch CB
Executive Manager of Engineering/Assistant General Manager

Shaun J. Stone SJS
Manager of Engineering

Subject: Groundwater Recharge/Recycled Water SCADA System Upgrades
Construction Contract Award

RECOMMENDATION

It is recommended that the Board of Directors:

1. Approve the construction contract for the Groundwater Recharge and Recycled Water Supervisory Control and Data Acquisition (SCADA) System Upgrades, Project No. EN14047, to Trimax Systems, Inc. for $250,989; and

2. Authorize the General Manager to execute the contract.

BACKGROUND

On May 2010, Inland Empire Utilities Agency (IEUA) completed the Recycled Water SCADA Master Plan which developed a capital plan to sustain a modern recycled water and groundwater recharge SCADA system by aligning recommended improvements and expansions with planned growth. The Agency's existing SCADA system consists of hardware and software components which control and gather real-time data from twenty four (24) remote recycled water and groundwater recharge facilities. Following the 2010 Recycled Water SCADA Master Plan, this project was created to implement the following system upgrades and improvements:

- Standardize the graphic screen navigation throughout the recycled water and groundwater recharge facilities

- Replace aging programmable logic controllers with new standardized programs at five rubber dams located at groundwater recharge basins
- Replace the outdated operator interface screens at the rubber dams with new Panelview screens

Standardizing the control interface appearance and programming structure will allow a more efficient and effective system for future upgrades of other recycled water and groundwater recharge sites.

On January 14, 2016, a request for bids was advertised to IEUA's list of pre-qualified contractors. On March 17, 2016, following bids were received:

Bidder's Name	Price
Trimax Systems, Inc.	$250,989
Tesco Controls, Inc.	$285,000
Southern Contracting Company Inc.	$389,900
Engineer's Estimate	**$399,000**

Trimax Systems, Inc. is the lowest responsive and responsible bidder with a bid of $250,989. IEUA staff and its engineering consultant evaluated Trimax's bid for completeness and contacted Trimax; who confirmed that their final bid price met all contract requirements and specifications. Trimax's past construction experience with the Agency include the development of IEUA's GWR SCADA system during the Chino Basin Facilities Improvement Project in 2005. They have also provided similar work at IERCF and RP-4.

The following is the project cost:

Description	Estimated Cost
Design	$196,812
Construction	$250,989
Construction Management	$108,688
Construction Contingency (~15%)	$54,000
Total Projected Cost	**$610,490**
IEUA Approved Budget	**$932,000**

The following is the project schedule:

Project Milestone	Date
Construction Contract Award	April 2016
Construction Completion	January 2017

The efforts in upgrading the GWR/RW SCADA system are consistent with the IEUA business goal of *Water Reliability* by promoting a reliable and efficient groundwater recharge system.

PRIOR BOARD ACTION

On February 19, 2014, the Board of Directors approved the design services contract with MSO Technologies, Inc., for the Recycled Water and Groundwater Recharge SCADA System Upgrades, Project No. EN14047, for the not-to-exceed amount of $129,620.

On August 28, 2014, the Board of Directors approved the IEUA/Watermaster Cost Sharing Agreement (Task Order No. 4) for the GWR SCADA Upgrades Project.

IMPACT ON BUDGET

The contract award for the Groundwater Recharge and Recycled Water SCADA System Upgrades, Project No. EN14047, in the amount of $250,989 is within the total project budget of $932,000 in the Recycled Water Capital (WC) Fund. Watermaster is fiscally responsible to reimburse IEUA for 50-percent of total project cost less any grants. The project received a $150,000 state grant from the Santa Ana Watershed Project Authority/Department of Water Resources and a low interest 30-year loan from the Clean Water State Revolving Fund through the State Water Resources Control Board.

PJG:CB:SS:ji

Groundwater Recharge & Recycled Water SCADA Upgrades

Construction Contract Award

Project No. EN14047

April 2016

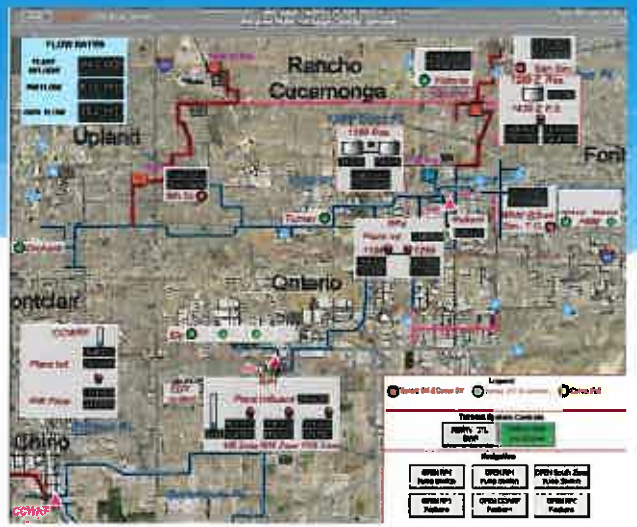



Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Joel Ignacio, P.E.
Senior Engineer

Project Background

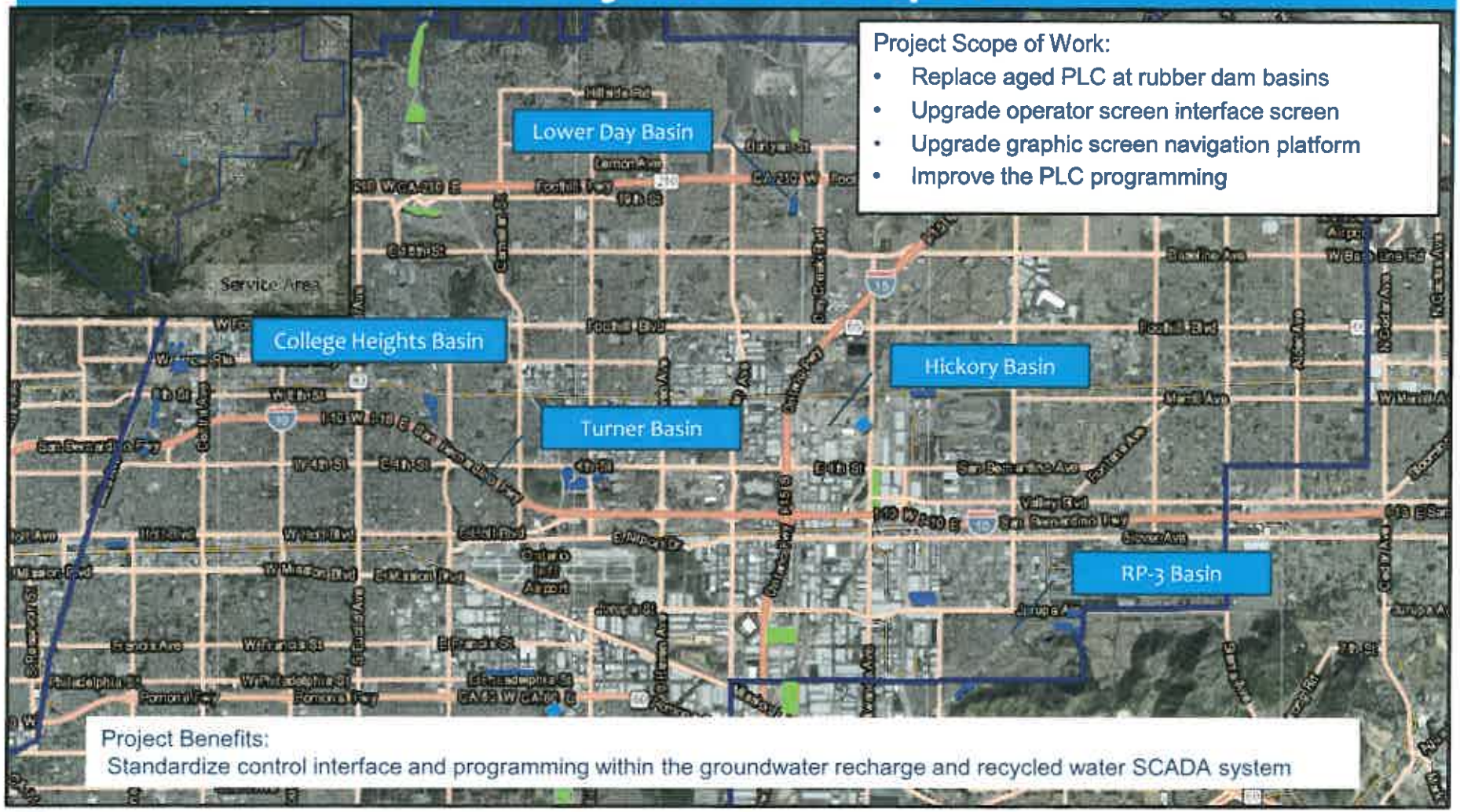
- Implements improvements Supervisory Control and Data Acquisition (SCADA) Master Plan
- 24 remote recycled water and groundwater recharge sites
- 50% cost shared with the Chino Basin Watermaster
- Received a $139,650 grant from SAWPA/DWR
- 30 year 1% SRF loan
- IEUA and Watermaster partnership



GWR Overview Screen

RP-3 Basin Overview Screen

Project Scope



Project Scope of Work:

- Replace aged PLC at rubber dam basins
- Upgrade operator screen interface screen
- Upgrade graphic screen navigation platform
- Improve the PLC programming

Project Benefits:
Standardize control interface and programming within the groundwater recharge and recycled water SCADA system

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Bid Summary

- Three (3) bids received on March 17, 2016

Bidder Name	Price
Trimax Systems, Inc.	$250,989
Tesco Controls, Inc.	$285,000
Southern Contracting Company, Inc.	$389,900
Engineer's Estimate	**$399,000**

Project Cost and Schedule

Description	Estimated Cost
Design	$196,812
Construction	$250,989
Construction Management	$108,688
Construction Contingency (~15%)	$54,000
Total Project Cost	$610,490
IEUA Approved Budget*	**$932,000**

* Budget also approved CBWM as 50/50 cost share

Project Milestone	Date
Construction Contract Award	April 2016
Construction Completion	January 2017

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Recommendation

Approve the contract award for the construction of the Groundwater Recharge Water/Recycled Water SCADA System Upgrades Project, EN14047, to Trimax Systems, Inc. for their low bid of $250,989 and authorize the General Manager to execute the contract.

The efforts in upgrading the GWR/RW SCADA system are consistent with the IEUA business goal of *Water Reliability* by promoting a reliable and efficient groundwater recharge system.

CONTRACT

THIS CONTRACT, made and entered into this ____day of April, 2016, by and between Trimax Systems, Inc., hereinafter referred to as "Contractor," and The Inland Empire Utilities Agency, a Municipal Water District, located in San Bernardino County, California, hereinafter referred to as "Agency".

WITNESSETH:

That for and in consideration of the promises and agreements hereinafter made and exchanged, the Agency and the Contractor agree as follows:

1. Contractor agrees to perform and complete in a workmanlike manner, all work required under the bidding schedule of said Agency's specifications entitled SPECIFICATIONS FOR GWR and RW SCADA Control Upgrades Project No. EN14047, in accordance with the specifications and drawings, and to furnish at their own expense, all labor, materials, equipment, tools, and services necessary, except such materials, equipment, and services as may be stipulated in said specifications to be furnished by said Agency, and to do everything required by this Contract and the said specifications and drawings.

2. For furnishing all said labor, materials, equipment, tools, and services, furnishing and removing all plant, temporary structures, tools and equipment, and doing everything required by this Contract and said specifications and drawings; also for all loss and damage arising out of the nature of the work aforesaid, or from the action of the elements, or from any unforeseen difficulties which may arise during the prosecution of the work until its acceptance by said Agency, and for all risks of every description connected with the work; also for all expenses resulting from the suspension or discontinuance of work, except as in the said specifications are expressly stipulated to be borne by said Agency; and for completing the work in accordance with the requirements of said specifications and drawings, said Agency will pay and said Contractor shall receive, in full compensation therefore, the price(s) set forth in this Contract.

3. That the Agency will pay the Contractor progress payments and the final payment, in accordance with the provisions of the contract documents, with warrants drawn on the appropriate fund or funds as required, at the prices bid in the Bidding and Contract Requirements, Section C - Bid Forms and accepted by the Agency, and set forth in this below.

   Total Bid Price $250,988.30
   Two hundred fifty thousand, nine hundred eighty-eight Dollars and thirty Cents.

   If this is not a lump sum bid and the contract price is dependent upon the quantities constructed, the Agency will pay and said Contractor shall receive, in

full compensation for the work the prices named in the Bidding and Contract Requirements, Section C - Bid Forms.

4. The Agency hereby employs the Contractor to perform the work according to the terms of this Contract for the above-mentioned price(s), and agrees to pay the same at the time, in the manner, and upon the conditions stipulated in the said specifications; and the said parties for themselves, their heirs, executors, administrators, successors, and assigns, do hereby agree to the full performance of the covenants herein contained.

5. The Notice Inviting Bids, Instructions to Bidders, Bid Forms, Information Required of Bidder, Performance Bond, Payment Bond, Contractors License Declaration, Specifications, Drawings, all General Conditions and all Special Conditions, and all addenda issued by the Agency with respect to the foregoing prior to the opening of bids, are hereby incorporated in and made part of this Contract, as if fully set forth.

6. The Contractor agrees to commence work under this Contract on or before the date to be specified in a written "Notice To Proceed" and to complete said work to the satisfaction of the Agency two hundred and seventy-nine (279) calendar days after award of the Contract. All work shall be completed before final payment is made.

7. Time is of the essence on this Contract.

8. Contractor agrees that in case the work is not completed before or upon the expiration of the contract time, damage will be sustained by the Agency, and that it is and will be impracticable to determine the actual damage which the Agency will sustain in the event and by reason of such delay, and it is therefore agreed that the Contractor shall pay to the Agency the amount of four thousand ($4,000) dollars for each day of delay, which shall be the period between the expiration of the contract time and the date of final acceptance by the Agency, as liquidated damages and not as a penalty. It is further agreed that the amount stipulated for liquidated damages per day of delay is a reasonable estimate of the damages that would be sustained by the Agency, and the Contractor agrees to pay such liquidated damages as herein provided. In case the liquidated damages are not paid, the Contractor agrees that the Agency may deduct the amount thereof from any money due or that may become due to the Contractor by progress payments or otherwise under the Contract, or if said amount is not sufficient, recover the total amount.

   In addition to the liquidated damages, which may be imposed if the Contractor fails to complete the work within the time agreed upon, the Agency may also deduct from any sums due or to become due the Contractor, liquidated damages in accordance with the Bidding and Contract Requirements, Section B - Instruction to Bidders, Part 5.0 "Liquidated Damages", for any violation of the

General Conditions, Section D - Contractor's Responsibilities, Part 8, "Law and Regulations"; Bidding and Contract Requirements Contract Section D – Contract and Relevant Documents, Part 1.0, Paragraphs 9 through 11; General Conditions, Section D – Contractor's Responsibilities, Part 4.0, "Labor, Materials and Equipment"; General Conditions Section D – Contractor's Responsibilities, Part 12.0, "Safety and Protection" or General Conditions Section H – Legal Responsibilities, Part 8.0, "Disturbance of the Peace".

9. That the Contractor will pay, and will require subcontractors to pay, employees on the work a salary or wage at least equal to the prevailing salary or wage established for such work as set forth in the wage determinations and wage standards applicable to this work, contained in or referenced in the contract documents.

10. That, in accordance with Section 1775 of the California Labor Code, Contractor shall forfeit to the Agency, as a penalty, not more than Fifty ($50.00) Dollars for each day, or portion thereof, for each worker paid, either by the Contractor or any subcontractor, less than the prevailing rates as determined by the Director of the California Department of Industrial Relations for the work.

11. That, except as provided in Section 1815 of the California Labor Code, in the performance of the work not more than eight (8) hours shall constitute a day's work, and not more than forty (40) hours shall constitute a week's work; that the Contractor shall not require more than eight (8) hours of labor in a day nor more than forty hours of labor in a week from any person employed by the Contractor or any subcontractor; that the Contractor shall conform to Division 2, Part 7, Chapter 1, Article 3 (Section 1810, et seq.) of the California Labor Code; and that the Contractor shall forfeit to the Agency, as a penalty, the sum of Twenty-Five ($25.00) Dollars for each worker employed in the execution of the work by Contractor or any subcontractor for each day during which any worker is required or permitted to labor more than eight (8) hours in violation of said Article 3.

12. That the Contractor shall carry Workers' Compensation Insurance and require all subcontractors to carry Workers' Compensation Insurance as required by the California Labor Code.

13. That the Contractor shall have furnished, prior to execution of the Contract, two bonds approved by the Agency, one in the amount of one hundred (100) percent of the contract price, to guarantee the faithful performance of the work, and one in the amount of one hundred (100) percent of the contract price to guarantee payment of all claims for labor and materials furnished.

14. The Contractor hereby agrees to protect, defend, indemnify and hold the Agency and its employees, agents, officers, directors, servants and volunteers free and harmless from any and all liability, claims, judgments, costs and demands,

including demands arising from injuries or death of persons (including employees of the Agency and the Contractor) and damage to property, arising directly or indirectly out of the obligation herein undertaken or out of the operations conducted by the Contractor, its employees agents, representatives or subcontractors under or in connection with this Contract.

The Contractor further agrees to investigate, handle, respond to, provide defense for and defend any such claims, demands or suit at the sole expense of the Contractor.

IN WITNESS WHEREOF, The Contractor and the General Manager of Inland Empire Utilities Agency*, thereunto duly authorized, have caused the names of said parties to be affixed hereto, each in duplicate, the day and year first above written.

Inland Empire Utilities Agency,*
San Bernardino County, California.

By _____
General Manager

Contractor

By _____
Title
MANAGER OF
BUSINESS DEVELOPMENT

*Municipal Water District

ACTION ITEM 1E

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Date: April 20, 2016

To: The Honorable Board of Directors

Through: Engineering, Operations, and Biosolids Management Committee *(04/13/16)*
Finance, Legal, and Administration Committee *(04/13/16)*

From: P. Joseph Grindstaff
General Manager

Submitted by: Chris Berch CB
Executive Manager of Engineering/Assistant General Manager

Shaun J. Stone SJS
Manager of Engineering

Subject: Headquarters' Permit Office Construction Contract Award

RECOMMENDATION

It is recommended that the Board of Directors:

1. Approve the construction contract for the Headquarters' Permit Office, Project No. EN16068, to Mike Bubalo Construction Corporation, for $150,000; and

2. Authorize the General Manager to execute the contract.

BACKGROUND

On January 4, 2016, the Agency began reviewing plans and collecting fees for all new water meters installed. It is also expected, with the renegotiation of the Regional Sewerage Service Contract, the Agency will begin performing plan checks to collect Equivalent Dwelling Unit (EDU) fees in the near future.

To perform plan checks and collect fees, Agency staff requires a plan-check/permit office to meet with the public to discuss changes to plans and define fees which need to be paid. In order to facilitate this work, the existing Reproduction Center, located in Building B, will be relocated and then retrofitted into a Permit Office. The work will be performed by a Design-Build contractor. The work will maintain consistency with the current building requirements meeting the standards for Leadership in Energy and Environmental Design (LEED).

On February 11, 2016, a request for bids was advertised on Planet Bids for the construction of the Permit Office. Two (2) contractors participated in the job walk. On March 3, 2016, the following bids were received:

Bidder's Name	Price
Mike Bubalo Construction Co.	$150,000
WA Rasic	$162,000
Engineer's Estimate	**$77,000**

Both contractors are pre-qualified contractors for projects under $2-million. Mike Bubalo Construction Company has performed work successfully for the Agency many times in the past, and is the lowest responsive and responsible bidder, with a bid of $150,000.

The difference in the bid price vs. the engineer's estimate is due to project size, the current bidding environment, and regulations related to working for public agencies in general. The type of contractor to perform this small project work is a tenant improvement contractor who is generally structured to meet the Prevailing Wage and Department of Industrial Relations requirements required to work for a public agency; as such only two general contractors from the Agency's under $2 million pre-qualification list bid the work. The project requires complex coordination and limited working hours in a small area. There is a need for multiple move ins and outs. All of these factors contribute to the costs exceeding the engineer's estimate and were not accounted for when the original estimate was prepared.

The following is the projected project cost:

Description	Estimated Cost
Design (In-House and Labor Augmentation)	$8,000
Construction	$150,000
Construction Management (IEUA and Labor Augmentation)	$34,000
In-house Procurement	$7,000
Construction Contingency (~15%)	$28,000
Total Project Cost	**$227,000**

The following is the project schedule:

Project Milestone	Date
Construction Contract Award	April 2016
Construction Completion	September 2016

The Headquarters' Permit Office project is consistent with IEUA business goal of *Business Practices* by applying ethical, fiscally responsible and environmentally sustainable principles to all aspects of business and organizational conduct.

PRIOR BOARD ACTION

None.

IMPACT ON BUDGET

The approved FY 2015/16 budget for Project No. EN16068 is $84,000. The total project budget will be augmented by $143,000, to $227,000 for FY 2016/17, during the TYCIP process in order to complete the project. Current fiscal year expenditures are not anticipated to exceed the current fiscal year budget.

PJG:CB:SS:mp

Headquarters' Permit Office Construction Contract Award

Project No. EN16068

April 2016

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Matthew A. Poeske, P.E.
Project Manager

Project Background

- IEUA reviewing plans and collecting fees for:
  - Water Connections, January 2016
  - EDU Connections, future
- Staff require a Permit Office to meet public and conduct business
- Detailed study of alternatives and magnitude cost estimates were prepared
- Best alternative was to relocate Building B Reproduction Center and convert to a Permit Office

City of Chino Plan Check Counter

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Project Location

Headquarters Building B

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Project Scope

- Headquarters' Permit Office scope includes:
  - Relocation of Reproduction Center
  - Remodel old and new Reproduction Center
  - Install plan check counter, lights, door, and handicap access
- Secondary amenities will be provided by IEUA staff and specialty contractor's and will include:
  - Window tinting
  - FOB door access
  - Data Drops
  - Direction signs

CVWD Plan Check Counter

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Bid Summary

Two bids received on March 3, 2016:

Bidder Name	Price
Mike Bubalo Construction Co.	$150,000
W. A. Rasic Construction Company, Inc.	$162,000
Engineer's Estimate	**$77,000**

Project Cost and Schedule

Description	Estimated Cost
Design (In-House and Labor Augmentation)	$8,000
Construction	$150,000
Construction Management (IEUA and Labor Augmentation)	$34,000
In-house Procurement	$7,000
Contingency (~15%)	$28,000
Total Project Cost	**$227,000**
Total Project Budget	**$227,000**

Project Milestone	Date
Construction Contract Award	April 2016
Construction Completion	September 2016

Agency Goal/Recommendation

Staff recommends that the Board of Directors approve the construction contract to Mike Bubalo Construction Corporation for the Headquarters' Permit Office, Project No. EN16068, in the amount of $150,000 and authorize the General Manager to execute the contract.

The Headquarters' Permit Office project is consistent with IEUA business goal of *Business Practices* by applying ethical, fiscally responsible and environmentally sustainable principles to all aspects of business and organizational conduct.

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

CONTRACT NUMBER: 4600002089
FOR
PERMIT OFFICE
EN16068

THIS CONTRACT (the "Contract"), is made and entered into this 20th day of April, 2016, by and between the Inland Empire Utilities Agency, a Municipal Water District, organized and existing in the County of San Bernardino under and by virtue of the laws of the State of California (hereinafter referred to as "Agency"), and Mike Bubalo Construction Company, of Baldwin Park, California (hereinafter referred to as "Contractor"), for design and construction of a permit office within the Agency's Headquarters Building B.

NOW, THEREFORE, in consideration of the mutual promises and obligations set forth herein, the parties agree as follows:

1. PROJECT MANAGER ASSIGNMENT: All technical direction related to this Contract shall come from the designated Project Manager. Details of the Agency's assignment are listed below.

Project Manager:	Matthew A. Poeske
	Construction Project Manager, PE
	Inland Empire Utilities Agency
Address:	6075 Kimball Avenue, Bldg. B
	Chino, California 91708
Telephone:	(909) 993-1723
Facsimile:	(909) 993-1982
Email:	mpoeske@ieua.org

2. CONTRACTOR ASSIGNMENT: Special inquiries related to this Contract and the effects of this Contract shall be referred to the following:

Contractor:	Dave D. Sorem, P.E.
	General Manager/Secretary
	Mike Bubalo Construction Company
Address:	5102 Gayhurst Avenue
	Baldwin Park, California 91706
Telephone:	(626) 960-7787
Email:	Dave@bubalo.com

3. ORDER OF PRECEDENCE: The documents referenced below represent the Contract Documents. Where any conflicts exist between the General Terms and Conditions, or addenda attached, then the governing order of precedence shall be as follows:

1. Amendments to Contract Number 4600002089
2. Contract Number 4600002089 General Terms and Conditions.
3. Agency Request for Proposal Number RFP-RW-15-081.
4. Contractor's Proposal dated March 3, 2016

4. SCOPE OF WORK AND SERVICES: Contractor services and responsibilities shall include and be in accordance with the plans and specifications identified in the Agency's Request for Proposal RFP-RW-15-081.

5. TERM: The term of this Contract shall extend from the date of the Notice to Proceed, and terminate one year after acceptance of construction(warranty period) or September 30, 2017, whichever occurs first, unless agreed to by both parties, reduced to writing, and amended to this Contract.

6. PAYMENT, INVOICING AND COMPENSATION: The Contractor may submit an invoice not more than once per month during the term of this Contract. Agency shall pay Contractor's properly executed invoice, approved by the Project Manager, within thirty (30) days following receipt of the invoice. Payment will be withheld for any service which does not meet the requirements of this Contract, until such service is revised, the invoice resubmitted and accepted by the Project Manager.

Contractor shall provide with their invoice certified payroll verifying that Contractor has paid prevailing requirements as stipulated in SB-854 (see link below for requirements) (http://www.dir.ca.gov/DIRNews/2014/2014-55.pdf).

All invoices shall be formulated consistent with the RFP requirements and Contractor's proposed pricing within the Contractor's accepted Proposal, dated March 3, 2016.

As compensation for the work performed under this Contract, Agency shall pay Contractor's monthly invoice, for a total not-to-exceed contract price of **$150,000** for all services satisfactorily provided hereunder during the term of this Contract.

To expedite payment of invoices email to apgroup@ieua.org with a copy to the Agency's Project Manager.

7. INSURANCE and BONDING: During the term of this Contract, the Contractor shall maintain at Contractor's sole expense, the following insurance.

A. Minimum Scope of Insurance:

1. General Liability: $1,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage. Coverage shall be at

least as broad as Insurance Services Office form number GL 0001-87 covering Comprehensive General Liability. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location, or the general aggregate limit shall be twice the required occurrence limit.

2. Automobile Liability: $1,000,000 combined single limit per accident for bodily injury and property damage. Coverage shall be at least as broad as Insurance Services Office form number CA 00 01 87, covering Automobile Liability, including "any auto."

3. Workers' Compensation and Employers Liability: Workers' compensation limits as required by the Labor Code of the State of California and employers Liability limits of $1,000,000 per accident.

B. Deductibles and Self-Insured Retention: Any deductibles or self-insured retention must be declared to and approved by the Agency. At the option of the Agency, either: the insurer shall reduce or eliminate such deductibles or self-insured retention as respects the Agency, its officers, officials, employees and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

C. Other Insurance Provisions: The policies are to contain, or be endorsed to contain, the following provisions:

1. General Liability and Automobile Liability Coverage

a. The Agency, its officers, officials, employees and volunteers are to be covered as insureds, endorsements GL 20 11 07 66, CG2010 1185 and/or CA 20 01 (Ed. 0178), as respects: liability arising out of activities performed by or on behalf of the Contractor, products and completed operations of the Contractor, premises owned, occupied or used by the Contractor, or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the Agency, its officers, officials, employees or volunteers.

b. The Contractor's insurance coverage shall be primary insurance as respects the Agency, its officer, officials, employees and volunteers. Any insurance or self-insurance maintained by the Agency, its officers, officials, employees, volunteers, property owners or engineers under contract with the Agency shall be excess of the Contractor's insurance and shall not contribute with it.

c. Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the Agency, its officers, officials, employees or volunteers.

d. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

e. The Contractor may satisfy the limit requirements in a single policy or multiple policies. Any Such additional policies written as excess insurance shall not provide any less coverage than that provided by the first or primary policy.

2. Workers' Compensation and Employers Liability Coverage

The insurer shall agree to waive all rights of subrogation against the Agency, its officers, officials, employees and volunteers for losses arising from work performed by the Contractor for the Agency.

3. All Coverages

Each insurance policy required by this contract shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to the Agency.

D. Acceptability of Insurers: Insurance is to be placed with insurers with a Best's rating of no less than A minus: VII, and who are admitted insurers in the State of California.

E. Verification of Coverage: Contractor shall furnish the Agency with certificates of insurance and with original endorsements effecting coverage required by the Agency for themselves and all subcontractors prior to commencing work, or allowing any subcontractor to commence work under any subcontract. The certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates and endorsements are to be approved by the Agency before work commences. The Agency reserves the right to require complete, certified copies of all required insurance policies, at any time.

F. Submittal of Certificates: Contractor shall submit all required certificates and endorsements to the following:

Inland Empire Utilities Agency
Attn: Angela Witte

P.O. Box 9020
Chino Hills, CA 91709

G. Payment and Performance Bond: Before execution of the contract by the Agency, the Consultant shall file with the Agency, on the forms furnished herewith, a payment and performance bond in an amount equal to one hundred (100) percent of the contract price to guarantee faithful performance of all the work, within the time prescribed, in a manner satisfactory to the Agency and that all materials and workmanship will be free from original or developed defects.

H. Unsatisfactory Surety: Should any Surety, at any time, be deemed unsatisfactory by the Agency, notice will be given the Consultant to that effect. No further payments shall be deemed due, or will be made under the contract until a new Surety is accepted by the Agency.

I. Effects of Changes or Extension of Time on the Surety: Changes to the work or schedule shall in no way release the Consultant or the Surety from their obligation under the bond.

J. Insufficiency of the Bonds: Should any bonds require under this section become insufficient, the Consultant shall renew the bonds within ten (10) calendar days after receiving notice from the Agency of the bonds insufficiency.

K. Procurement of Bonds: All bonds required under this section, shall be procured from a California licensed and admitted surety company, listed by the Fiscal Service of the United States Department of the Treasury under the Notice for "Companies Holding Certificates of Authority as Acceptable Sureties on federal Bonds and as Acceptable Reinsuring Companies," current on the date of the Notice of Award. The Consultant shall be responsible for the cost of all bond premiums, costs, and incidentals necessary to secure the required bonds.

L. How Bonds Are To Be Payable: All bonds shall be payable to the Inland Empire Utilities Agency and shall remain in effect for sixty (60) days after acceptance of all the deliverables and the works completion.

8. FITNESS FOR DUTY:

A. Fitness: Contractor and its Sub-Contractor personnel on the Jobsite:

1) shall report to work in a manner fit to do their job.

2) shall not be under the influence of or in possession of any alcoholic beverages or of any controlled substance (except a controlled substance as prescribed by a physician so long as the performance or safety of the Work is not affected thereby); and

3) shall not have been convicted of any serious criminal offense which, by its nature, may have a discernible adverse impact on the business or reputation of the Agency.

9. LEGAL RELATIONS AND RESPONSIBILITIES

A. Professional Responsibility: The Contractor shall be responsible, to the level of competency presently maintained by other practicing professionals performing the same or similar type of work.

B. Status of Contractor: The Contractor is retained as an independent Contractor only, for the sole purpose of rendering the services described herein, and is not an employee of the Agency.

C. Observing Laws and Ordinances: The Contractor shall keep itself fully informed of all existing and future state and federal laws and all county and city ordinances and regulations which in any manner affect the conduct of any services or tasks performed under this Contract, and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. The Contractor shall at all times observe and comply with all such existing and future laws, ordinances, regulations, orders and decrees, and shall protect and indemnify, as required herein, the Agency, its officers, employees and agents against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order or decree, whether by the Contractor or its employees.

D. Work Safety: Contract work requiring confine space entry must follow Cal-OSHA Regulation 8 CCR, Sections 5157 – 5158. This regulation requires the following to be submitted to IEUA for approval prior to the Contractor's mobilization to the work site:

1. Proof of training on confined space procedures, as defined in Cal-OSHA Regulation 8 CCR, Section 5157; and,

2. A written plan that includes; identification of confined spaces within the work site, alternate procedures where appropriate, contractor provisions and specific procedures for permit-required and non-permit required spaces and a rescue plan.

E. Subcontract Services: Any subcontracts for the performance of any services under this Contract shall be subject to the written approval of the Project Manager and shall comply with State of California, Department of Industrial Relations, SB 854 requirements.

F. Hours of Labor: The Contractor shall comply with all applicable provisions of California Labor Code Sections 1810 to 1817 relating to working hours. The Contractor shall, as a penalty to the Agency, forfeit $25.00 for each worker employed in the execution of the Contract by the Contractor or by any subcontractor for each calendar day during which such worker is required or

permitted to work more than eight hours in any one calendar day and forty (40) hours in any one calendar week in violation of the provisions of the Labor Code.

G. Travel and Subsistence Pay: The Contractor shall make payment to each worker for travel and subsistence payments which are needed to execute the work and/or service, as such travel and subsistence payments are defined in the applicable collective bargaining agreements with the worker.

H. Liens: Contractor shall pay all sums of money that become due from any labor, services, materials or equipment furnished to Contractor on account of said services to be rendered or said materials to be furnished under this Contract and that may be secured by any lien against the Agency. Contractor shall fully discharge each such lien at the time performance of the obligation secured matures and becomes due.

I. Indemnification: Contractor shall indemnify the Agency, its directors, employees and assigns, and shall defend and hold them harmless from all liabilities, demands, actions, claims, losses and expenses, including reasonable attorneys' fees, which arise out of or are related to the negligence, recklessness or willful misconduct of the Contractor, its directors, employees, agents and assigns, in the performance of work under this contract.

J. Conflict of Interest: No official of the Agency who is authorized in such capacity and on behalf of the Agency to negotiate, make, accept or approve, or to take part in negotiating, making, accepting or approving this Contract, or any subcontract relating to services or tasks to be performed pursuant to this Contract, shall become directly or indirectly personally interested in this Contract.

K. Equal Opportunity: During the performance of this Contract, the Contractor shall not unlawfully discriminate against any employee or employment applicant because of race, color, religion, sex, age, marital status, ancestry, physical or mental disability, sexual orientation, veteran status or national origin.

L. Disputes:

1. All disputes arising out of or in relation to this Contract shall be determined in accordance with this section. The Contractor shall pursue the work to completion in accordance with the instruction of the Agency's Project Manager notwithstanding the existence of dispute. By entering into this Contract, both parties are obligated, and hereby agree, to submit all disputes arising under or relating to the Contract which remain unresolved after the exhaustion of the procedures provided herein, to independent arbitration. Except as otherwise provided herein, arbitration shall be conducted under California Code of Civil Procedure Sections 1280, et. seq, or their successor.

2. Any and all disputes during the pendency of the work shall be subject to resolution by the Agency Project Manager and the Contractor shall comply, pursuant to the Agency Project Manager instructions. If the Contractor is not satisfied with any such resolution by the Agency Project Manager, they may file a written protest with the Agency Project Manager within seven (7) calendar days after receiving written notice of the Agency's decision. Failure by Contractor to file a written protest within seven (7) calendar days shall constitute waiver of protest, and acceptance of the Agency Project Manager's resolution. The Agency's Project Manager shall submit the Contractor's written protests to the General Manager, together with a copy of the Agency Project Manager's written decision, for his or her consideration within seven (7) calendar days after receipt of said protest(s). The General Manager shall make his or her determination with respect to each protest filed with the Agency Project Manager within ten (10) calendar days after receipt of said protest(s). If Contractor is not satisfied with any such resolution by the General Manager, they may file a written request for arbitration with the Project Manager within seven (7) calendar days after receiving written notice of the General Manager's decision.

3. In the event of arbitration, the parties hereto agree that there shall be a single neutral Arbitrator who shall be selected in the following manner:

   a. The Demand for Arbitration shall include a list of five names of persons acceptable to the Contractor to be appointed as Arbitrator. The Agency shall determine if any of the names submitted by Contractor are acceptable and, if so, such person will be designated as Arbitrator.

   b. In the event that none of the names submitted by Contractor are acceptable to Agency, or if for any reason the Arbitrator selected in Step (a) is unable to serve, the Agency shall submit to Contractor a list of five names of persons acceptable to Agency for appointment as Arbitrator. The Contractor shall, in turn, have seven (7) calendar days in which to determine if one such person is acceptable.

   c. If after Steps (a) and (b), the parties are unable to mutually agree upon a neutral Arbitrator, the matter of selection of an Arbitrator shall be submitted to the San Bernardino County Superior Court pursuant to Code of Civil Procedure Section 1281.6, or its successor. The costs of arbitration, including but not limited to reasonable attorneys' fees, shall be recoverable by the party prevailing in the arbitration. If this arbitration is appealed to a court pursuant to the procedure under California Code of Civil Procedure Section 1294, et. seq., or their successor, the costs of arbitration shall also include court costs

associated with such appeals, including but not limited to reasonable attorneys' fees which shall be recoverable by the prevailing party.

4. Joinder in Mediation/Arbitration: The Agency may join the Contractor in mediation or arbitration commenced by a contractor on the Project pursuant to Public Contracts Code Sections 20104 et seq. Such joinder shall be initiated by written notice from the Agency's representative to the Contractor.

M. Workers' Legal Status: For performance against this Contract, Contractor shall only utilize employees and/or subcontractors that are authorized to work in the United States pursuant to the Immigration Reform and Control Act of 1986.

N. Prevailing Wage Requirements: Pursuant to Section 1770 and following, of the California Labor Code, the Contractor shall not pay less that the general prevailing wage rates, as determined by the Director of the State of California Department of Industrial Relations for the locality in which the work is to be performed and for each craft or type of worker needed to execute the work contemplated under the Contract. The Contractor or any subcontractor performing part of said work shall strictly adhere to all provisions of the Labor Code, including, but not limited to, minimum wages, work days, nondiscrimination, apprentices, maintenance and availability of accurate payroll records and any other matters required under all Federal, State and local laws related to labor.

10. OWNERSHIP OF MATERIALS AND DOCUMENTS/CONFIDENTIALITY: The Agency retains ownership of any and all partial or complete reports, drawings, plans, notes, computations, lists, and/or other materials, documents, information, or data prepared by the Contractor and/or the Contractor's subcontractor(s) pertaining to this Contract. Said materials and documents are confidential and shall be available to the Agency from the moment of their preparation, and the Contractor shall deliver same to the Agency whenever requested to do so by the Project Manager and/or Agency. The Contractor agrees that same shall not be made available to any individual or organization, private or public, without the prior written consent of the Agency.

11. NOTICES: Any notice may be served upon either party by delivering it in person, or by depositing it in a United States Mail deposit box with the postage thereon fully prepaid, and addressed to the party at the address set forth below:

Agency: Warren T. Green
Manager of Contracts & Facilities Services
Inland Empire Utilities Agency
P.O. Box 9020
Chino Hills, CA 91709

Contractor: Mike Bubalo
President
Mike Bubalo Construction Company
5102 Gayhurst Avenue
Baldwin Park, California 91706

Any notice given hereunder shall be deemed effective in the case of personal delivery, upon receipt thereof, or, in the case of mailing, at the moment of deposit in the course of transmission with the United States Postal Service.

12. SUCCESSORS AND ASSIGNS: All of the terms, conditions and provisions of this Contract shall inure to the benefit of and be binding upon the Agency, the Contractor, and their respective successors and assigns. Notwithstanding the foregoing, no assignment of the duties or benefits of the Contractor under this Contract may be assigned, transferred or otherwise disposed of without the prior written consent of the Agency; and any such purported or attempted assignment, transfer or disposal without the prior written consent of the Agency shall be null, void and of no legal effect whatsoever.

13. RIGHT TO AUDIT: The Agency reserves the right to review and/or audit all Contractor's records related to the Work. The option to review and/or audit may be exercised during the term of the Contract, upon termination, upon completion of the Contract, or at any time thereafter up to twelve (12) months after final payment has been made to the Contractor. The Contractor shall make all records and related documentation available within three (3) working days after said records are requested by the Agency.

14. INTEGRATION: The Contract Documents represent the entire Contract of the Agency and the Contractor as to those matters contained herein. No prior oral or written understanding shall be of any force or effect with respect to those matters covered by the Contract Documents. This Contract may not be modified, altered or amended except by written mutual agreement by the Agency and the Contractor.

15. GOVERNING LAW: This Contract is to be governed by and constructed in accordance with the laws of the State of California.

16. TERMINATION FOR CONVENIENCE: The Agency reserves and has the right to immediately suspend, cancel or terminate this Contract at any time upon written notice to the Contractor. In the event of such termination, the Agency shall pay Contractor for all authorized and Contractor-invoiced services up to the date of such termination.

17. FORCE MAJEURE: Neither party shall hold the other responsible for the effects of acts occurring beyond their control; e.g., war, riots, strikes, natural disasters, etcetera.

18. LIQUIDATED DAMAGES: Liquidated Damages, in the amount of $500.00 per day, may be assessed by the Agency for each calendar day that the Contractor fails to complete the services in accordance with the contractually-committed delivery schedule. Any and

all Liquidated Damages assessed by the Agency will be taken as a direct credit against the Contractor's invoice for the missed services. The Contractor's acceptance of a contract subsequently issued in conjunction with this solicitation, shall serve to indicate acceptance of this Liquidated Damages clause, and the daily assessment of damages expressed herein.

19. CHANGES: The Agency may, at any time, make changes to this Contract's Scope of Work; including additions, reductions and other alterations to any or all of the work. However, such changes shall only be made via written amendment to this Contract. The Contract Price and Work Schedule shall be equitably adjusted, if required, to account for such changes and shall be set forth within the Contract Amendment.

20. NOTICE TO PROCEED: No services shall be performed or furnished under this Contract unless and until this document has been properly signed by all responsible parties and a Notice to Proceed order has been issued to the Contractor.

IN WITNESS WHEREOF, the parties hereto have caused the Contract to be entered as of the day and year written above.

INLAND EMPIRE UTILITIES AGENCY, A MUNICIPAL WATER DISTRICT:		MIKE BUBALO CONSTRUCTION COMPANY:	
P. Joseph Grindstaff General Manger	(Date)	David D. Sorem General Manager/Secretary	3/28/16 (Date)

ACTION ITEM 1F

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Date: April 20, 2016

To: The Honorable Board of Directors

Through: Public, Legislative Affairs, and Water Resources Committee *(04/13/16)*
Engineering, Operations, and Biosolids Mgmt. Committee *(04/13/16)*
Finance, Legal, and Administration Committee *(04/13/16)*

From: P. Joseph Grindstaff
General Manager

Submitted by: Chris Berch
Executive Manager of Engineering/Assistant General Manager

Shaun J. Stone
Manager of Engineering

Subject: East Declez Property Acquisition

RECOMMENDATION

It is recommended that the Board of Directors:

1. Authorize the General Manager to purchase the East Declez property for the sum of $3.0 million on behalf of Chino Basin Watermaster (Watermaster); contingent upon the approval by the Watermaster Board of Directors;

2. Authorize the General Manager to spend up to $100,000 on behalf of Watermaster for necessary fees related to the purchase of the property; and

3. Approve a $3.1 million budget amendment for Project No. EN18007 in FY 2015/16 through an inter-fund loan from the Regional Wastewater Capital Improvement (RC) fund to the Recharge Water (RW) fund.

BACKGROUND

In early 2015, the undeveloped 85-acre property, adjacent to the existing Declez Basin in Riverside County, was identified as a potential site for a new recharge basin for Watermaster. Following an initial field investigation from the Jurupa Community Services District and a preliminary level design evaluation from Wildermuth Environmental, Inc. (WEI), Inland Empire Utilities Agency (IEUA) and Watermaster made a determination that although the site appeared promising for recharge purposes, additional due diligence was required prior to site acquisition.

In November 2015, the IEUA Board authorized execution of the Purchase and Sale Agreement with the property owner, SLPR, LLC. The key terms within the agreement provided the following:

- Allow time to complete a 180 day feasibility study to validate the site's potential recharge benefit; ending on May 17, 2016.
- Open escrow with a $50,000 deposit which is fully refundable before the end the feasibility period.
- Establish an agreed property purchase price of $3.0 million.
- IEUA can terminate the agreement any time before May 17, 2016.

In January 2016, Thomas Harder and Co. (THC) completed a feasibility report which evaluated the site groundwater recharge viability consistent with the direction provided by Watermaster parties. THC's efforts included examining subsurface geology, describing the results of field investigation, and characterizing and analyzing the area's infiltration and mounding potential for groundwater recharge. THC's final "Subsurface Investigation-East Declez Basin Site" report was made available for review and presented to Watermaster's Appropriative Pool Meeting on March 10, 2016. THC, with support from WEI, conducted an analysis for recharge potential on two conceptual recharge basin configurations: 1) a shallow basin and 2) an expanded Declez Basin. Both concepts were developed based on the subsurface findings where the site revealed a shallow impermeable layer which prevented a deeper or wider new basin.

Unfortunately, the shallow basin concept was deemed unfeasible because it required an extensive pumping and conveyance system to receive stormwater. Therefore, only the expanded basin option was considered and evaluated. The evaluation looked into two potential construction alternatives.

Construction Alternatives	Projected Benefits		Estimated Cost	
	Additional Storage acre-feet (AF)	Additional Recharge acre-feet per year (AFY)	Estimated Capital Cost*	Total Annual Unit Cost (per AF)
Expand Declez eastward	130	144	$11,210,000	$5,099
Expand Declez eastward with upstream stormwater improvements	130	414	$15,090,000	$2,420

*The capital cost shown assumes a 90% reduction on excavation and hauling cost

In parallel with the feasibility report, staff began initial inquiries into the necessary CEQA requirements for the purchase of the property. IEUA's environmental consultant, Tom Dodson & Associates opined that the acquisition of this property falls under the following exemption:

> the "General Rule" Statutory Exemption (State CEQA Guidelines Section 15061(b)(3) which states that *"where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA."*

As such, IEUA will compile a more detailed environmental determination to comply with CEQA when a specific project is defined in the future. Thus, the property purchase will not incur any adverse environmental effects until a subsequent environmental finding is made by the IEUA Board for a site specific project.

Following the review and presentation of the report to the Appropriative Pool, the Committee Members requested having until April 2016 to recommend one of the following actions:

1. Proceed with the purchase of the property through IEUA; or
2. Cancel the property purchase.

The Watermaster Board will take action on the purchase of the East Declez property at the April 28, 2016, meeting. However, in order to meet the execution date of May 17, 2016, one day before IEUA's May Board of Directors meeting, staff is requesting contingent approval of the property purchase. In the event that the Watermaster Board elects not to purchase the property, IEUA will exercise the option to cancel the Purchase and Sale Agreement prior to the May 17, 2016, cancellation date. Staff will inform the IEUA Board of Watermaster's decision immediately following their action.

The East Declez property site is not currently planned to receive recycled water, or any other supplemental waters; therefore all cost associated with the property purchase, design and construction will be fully funded by Watermaster. Project EN18007 originally budgeted the property purchase in FY 2017/18; however, the decision to accelerate the acquisition to this fiscal year is to take advantage of the availability of the property and avoid losing it to potential developers as was the case with the lower San Sevaine property. IEUA will carry the property purchase until the Recharge Master Plan Update (RMPU) financing plan is implemented which is anticipated to be summer of 2017.

Staff has discussed the property purchase and project with several of the Watermaster Parties and has participated in discussions at the Appropriative Pool meetings. Based on these discussions, there is concern among the group about the value of the project itself due to the yield and associated unit costs. However, there seems to be some level of agreement that purchasing the property may be the right course of action based on its location next to an existing recharge basin. The concern, as noted above, is a repeat of losing a potential site to developers.

The efforts towards the potential purchase of the East Declez property for groundwater recharge are consistent with the IEUA business goal of *Water Reliability*, namely development and investigation of groundwater recharge.

PRIOR BOARD ACTION

On April 15, 2015, the Board of Directors approved the first Amendment to the Recharge Master Plan Task Order No. 1 with Watermaster. This authorized IEUA to conduct preliminary investigations on the East Declez Basin Project.

On June 17, 2015, the Board of Directors approved the Letter of Intent to Purchase the East Declez property.

On November 18, 2015, the Board of Directors approved the Purchase and Sale Agreement with SLPR, LLC for the East Declez property.

IMPACT ON BUDGET

If approved, IEUA will fund the purchase of the East Declez property with an inter-fund loan from the Regional Wastewater Capital Improvement (RC) fund to the Recharge Water (RW) fund to be repaid by Watermaster at the completion of the RMPU financing plan in the summer of 2017.

The RMPU Construction (hard cost), Project No. EN18007 under the RW fund budgeted for the land purchase in FY 2017/18 through the TYCIP. This will be reduced if the purchase is approved for this fiscal year.

Attachments:
Attachment 1: Feasibility Study

PJG:CB:SS:ji

East Declez - Property Purchase Update

Project No. EN18007
April 2016




Joel Ignacio, P.E.
Senior Engineer

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

CHINO BASIN WATERMASTER
Partners in Basin Management

Project Request

- Authorize the General Manager to purchase the property for the sum of $3.0 million on behalf of Chino Basin Watermaster, contingent upon the approval of the Watermaster Board of Directors;
- Authorize the General Manager to spend up to $100,000 for necessary fees related to the purchase;
- Approve a $3.1 million budget amendment for EN18007 through an inter-fund loan from the NR Fund to the RW Fund.

85 acres of new property east of Declez Basin

Project Background

Jan. 2015

CBWM & IEUA

Identified 85-acres east of Declez Basin as a potential new recharge basin

Apr. 2015

CBWM & IEUA

Executed amendment to Task Order 1 to allow further evaluation on East Declez

Jun. 2015

IEUA

Establish a letter of intent with the property owner to begin discussions on purchasing the site

Jul. 2015

IEUA

Contracted consulting services with Thomas Harder & Co. to prepare the feasibility study and report

Nov. 2015

IEUA

Entered into agreement to establish the terms purchasing the property

$50K refundable deposit

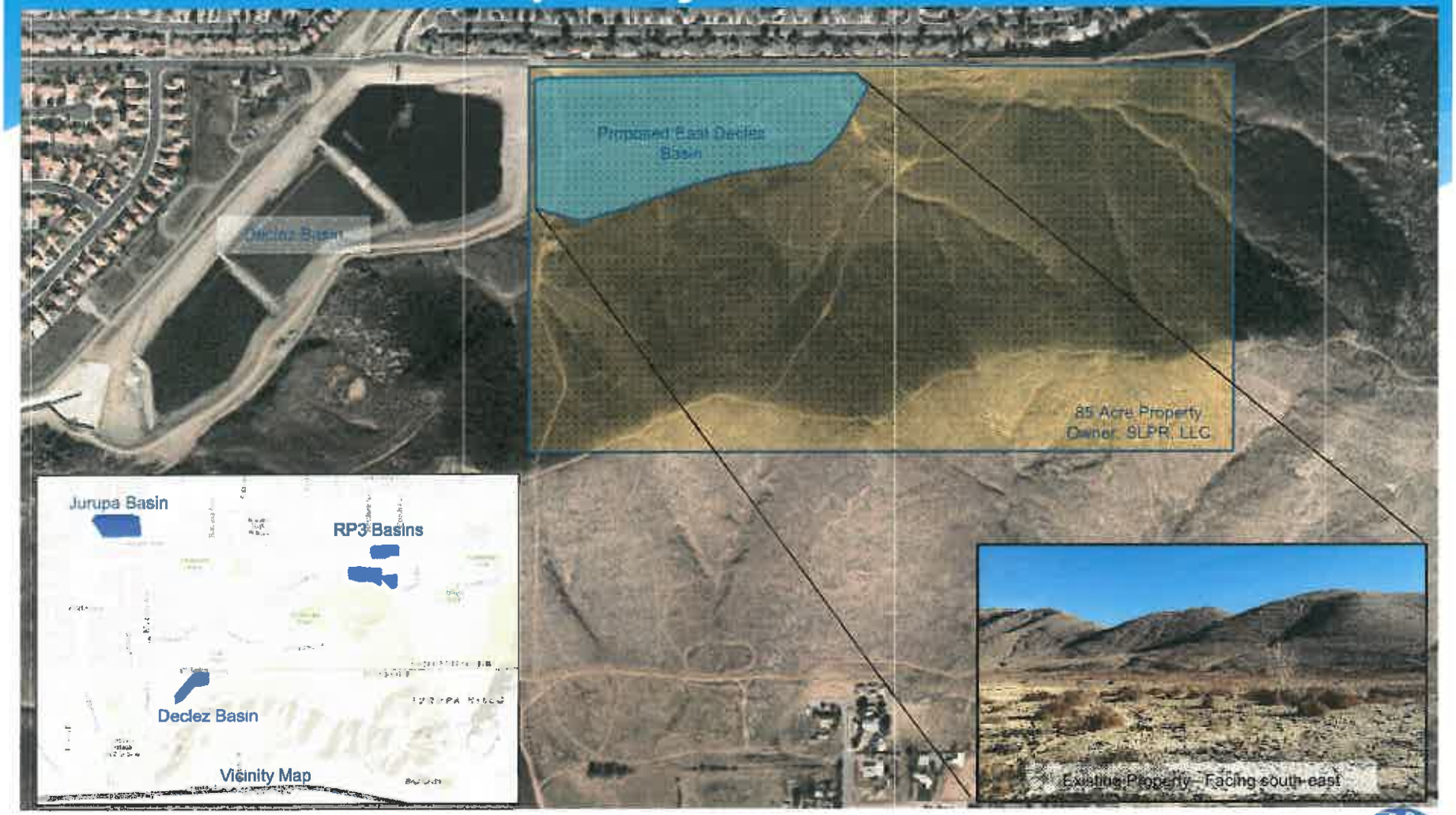
Feb. 2016

IEUA

Completed the initial draft to the East Declez Feasibility Study and Report

- Initially presented Feasibility Report to RIPCom in February 2016
- Presented Feasibility Report to Watermaster's AP in March 2016
- 180 day feasibility study ends on May 17, 2016

Property Location



South of Fontana in the Riverside County

Feasibility Study - Findings

- Site revealed a shallow impermeable layer
- Soil layer limited the depth and width for a large new basin
- Analyzed two recharge design concepts: shallow basin & expand existing
- Shallow basin deemed unfeasible due to extensive SW pumping/pipes
- Evaluated the following potential basin construction approach:

Construction Alternatives	Projected Benefits		Estimated Cost	
	Additional Storage acre-feet (AF)	Additional Recharge acre-feet per year (AFY)	Estimated Capital Cost*	Total Annual Unit Cost (per AF)
Expand Declez eastward	130	144	$11,210,000	$5,099
Expand Declez eastward with upstream stormwater improvements	130	414	$15,090,000	$2,420

*The capital cost shown assumes a 90% reduction on excavation and hauling cost

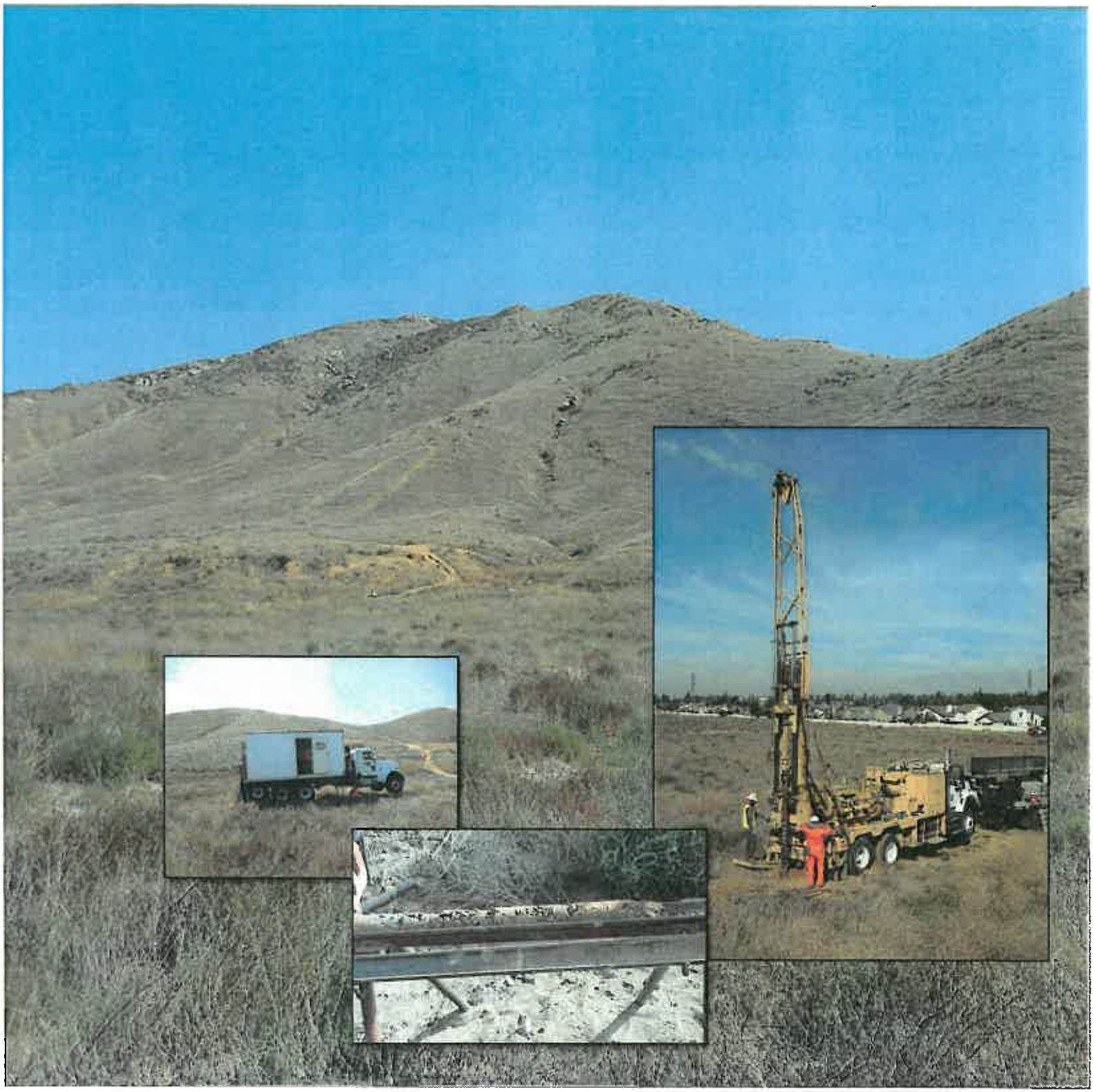
Recommendation

- Authorize the General Manager to purchase the property for the sum of $3.0 million on behalf of Chino Basin Watermaster, contingent upon the approval of the Watermaster Board of Directors;
- Authorize the General Manager to spend up to $100,000 for necessary fees related to the purchase;
- Approve a $3.1 million budget amendment for EN18007 through an inter-fund loan from the NR Fund to the RW Fund.

The efforts towards the potential purchase of the East Declez property for groundwater recharge are consistent with the IEUA business goal of *Water Reliability*, namely development and investigation of groundwater recharge.

Inland Empire Utilities Agency February 5, 2016

Subsurface Investigation - East Declez Basin Site



Thomas Harder & Co.
Groundwater Consulting

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Subsurface Investigation - East Declez Basin Site

2/5/2016

Prepared for

Inland Empire Utilities Agency

Prepared by

Thomas Harder
Principal Hydrogeologist

Ben Lewis
Project Geologist

PROFESSIONAL GEOLOGIST • STATE OF CALIFORNIA • THOMAS E. HARDER No: 6512

CERTIFIED HYDROGEOLOGIST • STATE OF CALIFORNIA • THOMAS E. HARDER No: 588

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1 Introduction

This report describes the results of subsurface field investigations to determine the feasibility of artificial recharge at a parcel of private property referred to herein as the East Declez Site (the Site). The Site covers approximately 22 acres and is located immediately east of Inland Empire Utilities Agency's (IEUA's) existing Declez Basin recharge site on the north slope of the Jurupa Mountains in Riverside County, California (see Figure 1).

The purpose of the field investigations was to characterize the infiltration and mounding potential of subsurface sediments beneath the Site, identify laterally extensive fine-grained layers that could prevent recharge of the regional aquifer system, assess the liquefaction potential of the currently unsaturated sediments in the upper 50 ft beneath the Site, and determine the depth to bedrock. The data collected during the investigation was used to develop estimates of the Site's recharge capacity, subsurface storage potential, and useable area for recharge basins.

Characterization of subsurface sediments was accomplished through the collection and analysis of soil samples. Soil samples were collected from exploratory boreholes. Additional subsurface characterization was conducted using Cone Penetrometer Tests (CPTs).

2 Site Background and Setting

2.1 Site Description

The Site consists of approximately 22 acres of private property located immediately east of the existing Declez Basin recharge site on the north slope of the Jurupa Mountains in Riverside County, California (see Figures 1 and 2). The land surface is relatively flat in the northern two-thirds of the Site. The southern third of the Site slopes up to the south towards the Jurupa Mountains.

2.2 Previous Investigations

The East Declez Site was originally identified for consideration as a recharge basin site by the Jurupa Community Services District (JCSD). As part of an initial due diligence program in consideration of purchasing the property, a borehole drilling and infiltration testing program was conducted in September 2014. The drilling and testing program included two boreholes (BH-1 and BH-2) that were drilled to bedrock and infiltration testing in three test pits (TP-1 through TP-3; see Figure 2).

Based on results from the initial September 2014 investigations, the Chino Basin Watermaster (the Watermaster) and IEUA agreed to consider the East Declez property for purchase and eventual improvements for use as an artificial recharge site. While the September 2014 initial investigation results appeared favorable, there was a desire by stakeholders within the Watermaster to obtain additional subsurface hydrogeological data and refine the cost of recharge basin construction prior to committing to purchase the property.

2.3 Hydrogeologic Conditions

The Site is located along the northern slope of the Jurupa Mountains within the Chino Groundwater Basin. The surface geology of the Site is characterized by young alluvial deposits in the northern and western portions of the Site adjacent to old alluvial fan deposits and crystalline bedrock in the eastern and southern portions of the Site (see Figure 2). Young alluvial valley deposits were reported by Geoscience (2014) to extend between approximately 36 ft and 52 ft below ground surface (bgs) beneath the Site based on boreholes drilled along the northern boundary of the Site (BH-1 and BH-2; see Figure 2 and Appendix A). The young alluvial valley deposits were reported to consist predominantly of sand with minor gravel, silt and clay layers. Older alluvium, which consists of a higher percentage of silt and clay, was reported by Geoscience (2014) between the younger alluvium and bedrock surface. Bedrock, consisting of weathered granite, was observed in previous boreholes along the northern Site boundary at depths from 125 ft bgs (BH-1) to 182 ft bgs (BH-2).

The bedrock that forms the Jurupa Mountains along the southern boundary of the Site consists of granitic and metamorphic (i.e. crystalline) rock that is relatively impermeable. This bedrock extends beneath the Site, as observed in Boreholes BH-1 and BH-2.

During borehole drilling in 2014, groundwater was initially observed in the northwest borehole (BH-2) at a depth of 175 ft bgs but later rose to approximately 153 ft bgs within the borehole, indicating that the aquifer at depth in this area is under pressure. Groundwater was not observed in BH-1 in the northeast portion of the Site. Groundwater has been measured at a depth of approximately 130 ft bgs in the monitoring well adjacent to the existing Declez Basin, located approximately 900 ft west of the Site (DCZ-1; see Figure 3 for location).

2.4 Data Gaps before this Investigation

Although the initial 2014 investigation provided valuable information regarding the characteristics of subsurface conditions along the northern boundary of the Site, the subsurface conditions beneath most of the rest of the Site remained unknown. Specific data gaps included:

1. The thickness of alluvial sediments available for groundwater storage.
2. The lithologic characteristics of sediments beneath the majority of the Site and the lateral extent of fine-grained sediments observed in existing boreholes along the northern boundary of the Site.
3. The lithologic characteristics of the older alluvium mapped at the surface in the southeastern portion of the Site (see Figure 2).
4. The permeability of alluvial sediments, knowledge of which will allow for an estimate of potential groundwater mounding and subsurface flow during artificial recharge conditions.
5. The liquefaction potential of the upper 50 ft of subsurface sediments.

3 Site Investigation

The site investigation to address the data gaps identified in Section 2.4 included data collection from six CPTs and seven boreholes (see Figure 2). The number and location of CPT and exploratory borehole locations were identified to:

1. Provide adequate subsurface data in areas of the Site not explored by previous investigations.
2. Provide a sufficient number of samples for characterization of subsurface sediments.
3. Enable the identification and correlation of fine-grained sediment layers across the Site.
4. Enable estimates of the thickness of alluvial sediments conducive to recharge and subsurface storage of water.
5. Assess the liquefaction potential of the upper 50 ft of sediments.

In general, CPTs and boreholes were located on the portions of the Site where surface sediments consist of younger alluvium, to coincide with the most likely area of future basin bottom. One borehole (BH-6) was drilled directly on the older alluvium in order to assess the potential for this formation to recharge and store water.

3.1 CPT Investigation

3.1.1 CPT Methodology

Cone Penetrometer Testing (CPT) was conducted by Kehoe Testing and Engineering of Huntington Beach, California. Each CPT provided a continuous subsurface soil profile based on the pressure and resistance observed from pushing an instrumented steel rod into the ground. Six CPTs were conducted, as shown on Figure 2.

Shear wave testing was conducted at 10-ft intervals at each CPT location. Shear wave testing involves sending shock waves through the subsurface using a strike plate and measuring the shear wave velocities. This data was used to assess the liquefaction potential of shallow sediments.

3.1.2 CPT Results

The six CPTs were completed to the maximum depth possible with the equipment. The total depths attained ranged from 17 to 39 ft bgs and were limited by the density and characteristics of the soil.

CPT	Total Depth (ft)
CPT-1	37
CPT-2	23
CPT-3	39
CPT-5	23
CPT-7	23
CPT-8	17

Results from the CPTs indicate soils in the upper approximately 20 to 40 ft bgs consist primarily of sand and silty sand (Appendix B). These sediments are likely very permeable and conducive to the percolation of surface water. The inability to extend the CPT probes deeper was likely due to the presence of gravel in the formation and/or the density of the formation.

3.2 Borehole Drilling and Soil Sample Collection

3.2.1 Borehole Drilling and Soil Sample Collection Methodology

A total of seven boreholes (BH-3 through BH-7; BH-4B and BH-5B) were drilled by J&H Drilling of Fullerton, California using a CME 85 truck-mounted hollow-stem auger drilling rig. During drilling, soil samples of the alluvium were collected on a continuous basis in 5-ft long, 2-inch diameter barrel samplers. In addition, the driller conducted Standard Penetration Tests (SPTs) at 10-ft intervals within the upper 50 ft of each borehole. The SPT consists of driving a split barrel sampler 18 inches into undisturbed formation using a 140-pound hammer falling 30-inches for each blow. Blow counts for every 6 inches driven were recorded in the field.

A split spoon sampler with stainless steel tubes collected a total of six 6-inch long, 2-inch diameter samples from six different boreholes. Two of these samples were obtained from the upper 50 ft and four samples were obtained from below 50 ft. Samples collected in the tubes were capped, properly labeled, and submitted to a geotechnical laboratory for analysis of vertical and horizontal permeability, grain size distribution, bulk density, and porosity.

All cuttings generated during drilling were spread evenly onsite. Upon completion of drilling, boreholes were backfilled from the total depth to the land surface using drill cuttings placed through the augers.

A TH&Co geoscientist provided full-time onsite inspection during all aspects of borehole drilling, testing and sample collection. Soil samples were logged in the field according to ASTM D 2488 (2000), Standard Practice for Description and Identification of Soils. Soil cores were

photo-logged and representative samples were stored and retained in sealable plastic bags for future inspection and analysis, as necessary.

3.2.2 Laboratory Analysis of Soil Samples

Six soil samples collected during drilling were submitted to PTS Laboratories in Santa Fe Springs, California for physical properties testing. Two samples were from the younger alluvium and four samples were from the older alluvium. All samples were analyzed for the following:

- Vertical hydraulic conductivity (API RP40/EPA 9100)
- Horizontal hydraulic conductivity (API RP40/EPA 9100)
- Grain size distribution (ASTM D4464 and ASTM D422)
- Bulk density (API RP40/ASTM D2937)
- Effective Porosity (Modified ASTM D425)

All samples were submitted to PTS Laboratories by a TH&Co geoscientist under chain-of-custody protocol. Results of the soil physical properties testing are summarized in Table 1. Soil laboratory reports are provided in Appendix C.

4 Investigation Results

4.1 Subsurface Sediment/Lithologic Characteristics

Subsurface geology at the Site is characterized by young alluvial deposits, older alluvial deposits, and crystalline bedrock (in order from shallowest to deepest; see Figures 4a through 4e). The lithologic logs of boreholes BH-3, BH-4, BH-5, and BH-7 show that sediments in the upper 30 to 50 feet generally consist of brown to gray sand with lesser amounts of gravel and silt (see Appendix D). These sediments are unconsolidated and correlate with the young alluvium observed at the land surface. Based on the sediment characteristics, the young alluvium is expected to be relatively permeable and conducive to the recharge and storage of water. These findings are consistent with the infiltration test results obtained by Geoscience (2014).

The young alluvial deposits are differentiated from the underlying older alluvium primarily by consistency, color, and grain size. The older alluvial deposits are characterized by dense, reddish brown silt and clay with lesser amounts of sand. Due to the dense, fine-grained nature of the older alluvium, it is assumed that this formation would not facilitate the storage and transmission of significant amounts of groundwater.

Crystalline bedrock was encountered beneath the older alluvium in BH-3, BH-4, and BH-5. In BH-3 (west side of the Site), the bedrock consisted of weathered granitic bedrock at approximately 75 ft bgs and hard consolidated granitic bedrock at 105 ft bgs. At BH-4 and BH-5, hard crystalline bedrock consisting of quartzite was encountered at depths of 146 ft bgs and 126 ft bgs, respectively.

4.2 Thickness of Younger Alluvium Available for Groundwater Storage

The thickness of the younger alluvium at the Site ranges from 0 ft at the surface contact with the older alluvium along the south side of the Site to over 50 ft thick in the northwestern portion of the Site (see Figure 5). Depths to the tops of the older alluvium and crystalline bedrock at each borehole are summarized as follows:

Borehole	Total Depth (ft bgs)	Depth to Top of Older Alluvium (ft bgs)	Depth to Crystalline Bedrock (ft bgs)
BH-1	126.5	36	125
BH-2	183	52	181.5
BH-3	108	54	Weathered at 75 Unweathered at 105
BH-4	146.5	40	146
BH-5	130	30	126
BH-6	45	0	Not encountered
BH-7	87	38	Not encountered

The thickness of younger alluvium available for groundwater recharge generally increases to the north and northwest beneath the Site.

4.3 Groundwater

Groundwater was not encountered during drilling to the extent that it collected in the open boreholes. Wet soil conditions were observed during the drilling of BH-3 at a depth of approximately 50 ft bgs, which corresponds approximately with the top of the older alluvium. As the older alluvium is less permeable than the upper alluvium, this water is likely localized perched groundwater that has collected from the infiltration of precipitation through the younger alluvium.

4.4 Analysis of Liquefaction Potential

Liquefaction is defined as the transformation of a granular material from a solid to a liquefied state as a consequence of increased pore-water pressure and reduced effective stress (Yould and Idriss, 2001). Potential for liquefaction in any area is based on the following criteria:

1. Sediment type
2. Potential for strong earthquakes, and
3. A groundwater table within 50 ft of the land surface

Sediment properties from the CPTs and boreholes were used to assess the first criterion. The second criterion is consistent with the Southern California region. The third criterion would be

possible at the Site during artificial recharge operations as a result of the groundwater mound that would develop in the younger alluvium.

Sediment properties from the CPTs were used to estimate liquefaction potential using the method by Juang et al., 2003. Liquefaction potential, using this method, is a function of depth-specific vertical effective stress, total overburden stress, measured cone tip resistance, and sleeve friction, all estimated based on data from the CPT. These variables are used to determine the "loading" to a soil induced by an earthquake which is defined as the cyclic stress ratio (CSR). The method also estimates the "resistance" of the soil to triggering of liquefaction, which is defined as the cyclic resistance ratio (CRR). The CRR is estimated using depth-specific vertical effective stress and total overburden stress from the CPT as well as an assumed peak ground acceleration and earthquake magnitude. The assumed peak ground acceleration for this analysis was 0.6 g (USGS, 2014) and the assumed earthquake magnitude was 7.5 (Juang et al., 2003). The ratio of CRR to CSR is defined as the factor of safety where liquefaction is "predicted" when the ratio is less than one. Applying this method and assumptions to the CPT results specific to the Site, the factor of safety for all sediments encountered was above one (see Figure 6). Accordingly, based on the results of this analysis, it does not appear that the younger alluvial soils beneath the Site are at risk for liquefaction during saturated conditions.

A second method was used to estimate liquefaction potential by using the shear wave velocities and the CSR as described by Kayabali, 1996. Shear wave velocities less than 200 meters per second (m/s) are typically more susceptible to liquefaction during an earthquake, particularly at a CSR above 0.1. The shear wave velocities measured from the CPT data at the Site ranged from 222 to 266 m/s and averaged 246 m/s with a CSR of 0.04. Results of this analysis also suggest that the younger alluvial soils beneath the Site are not at risk for liquefaction.

4.5 Estimated Recharge Capacity

The potential recharge capacity of the Site was evaluated using two different Site configuration options:

1. The first option assumed construction of a shallow recharge basin (or multiple basins) with a bottom elevation of approximately 852 ft above mean sea level (amsl; approximately 10 ft below existing grade). This option would allow for high infiltration rates but limited subsurface storage capacity due to the relatively thin younger alluvium beneath the basin.

2. The second option assumed deep excavation of the East Declez site to form an eastern extension of the existing Declez Basin. This option would create additional surface storage for the combined Declez Basin but recharge beneath the East Declez site

would be minimal as the bottom of the basin would be in the low permeability older alluvium.

4.5.1 Shallow Recharge Basin Option

TH&Co developed a conceptual shallow recharge basin layout in consideration of the findings of the drilling and sampling investigation. The conceptual basin area, as shown on Figure 7, is located over the area of permeable younger alluvium and incorporates a 10-ft wide perimeter road and 3:1 side slopes. The resulting active recharge area is approximately 11 acres. In consideration of the available thickness of younger alluvium, the conceptual basin invert elevation was as shallow as 10 ft below the existing land surface (see Figure 8).

Potential groundwater mounding associated with recharge of water in the conceptual Site basin was evaluated using a two-dimensional analytical groundwater flow model. The analysis incorporated the following assumptions:

- Water was applied to the basin at a rate of 1 ft/day.
- The hydraulic conductivity of the younger alluvium is 12 to 50 ft/day.
- The sediments in the subsurface are homogeneous.

The recharge rate of 1 ft/day is lower than obtained during testing by Geoscience (2014) but consistent with recharge rates for the existing Declez Basin adjacent to the Site. A range of hydraulic conductivity values was used for the analysis. The low end of the range was based on soil physical properties results of samples from the borehole drilling and testing program (see Table 1). The high end was based on hydraulic conductivity estimates for area aquifers as published in Wildermuth (2014).

Given these assumptions, the analysis shows that recharge within the conceptual Site basin at a surface infiltration rate of 1 ft/day will result in a groundwater mound that will rise to the bottom of the basin within 10 days (see Figures 9 and 10). Further recharge, at that point, would have to stop until the mound relaxed in accordance with the rate of subsurface outflow, which is dictated by the hydraulic conductivity (i.e. permeability) of the younger alluvium. Model analyses suggest that the time necessary to allow the mound to decline to near static conditions after the recharge event is approximately 30 to 80 days.

Based on this analysis, the conceptual shallow recharge basin could theoretically recharge between 260 and 1,100 ac-ft/yr if water was available on demand. As storm water is not available on demand, the actual average annual recharge would likely be closer to the lower end of this range.

It is noted that a review of the shallow recharge basin concept by Wildermuth Environmental (Wildermuth, 2016; Appendix E), indicated that it was not feasible to deliver water to the

shallow recharge basins from the Declez Channel due to the shallow elevation of the basin bottom. As such, this option is not considered viable. However, the analysis was conducted prior to the Wildermuth Environmental review and is presented herein for reference.

4.5.2 Expanded Declez Basin Option

A second analysis of recharge potential was based on expanding the existing Declez Basin Cell 1 to the east through a deep excavation of the East Declez site (see Figures 11 and 12). The conceptual basin area, as shown on Figure 13, is located over the area of permeable younger alluvium and incorporates a 10-ft wide perimeter road and 2:1 side slopes. The conceptual basin invert elevation (825 ft amsl) was assumed to be the same as the existing Declez Basin Cell 1 (see Figure 12). Maximum surface storage capacity of the East Declez portion of the expanded Declez Basin area would be limited by the elevation of the spillway at the southwest end of the Declez Basin, which is approximately 841 ft amsl. In consideration of this, the maximum surface storage capacity of the expanded East Declez area is approximately 130 acre-ft.

The recharge potential of the expanded Declez Basin option was estimated by Wildermuth Environmental using their surface water simulation model (see Appendix E). The net increase in average annual recharge was a function of the amount of storm water that can be delivered to the site, the increased surface storage potential of the expanded Declez Basin area, and the infiltration rate of the existing Declez Basin. The amount of storm water available for delivery to the expanded Declez Basin area was evaluated using two alternatives:

1a. Delivery of storm water using existing diversion structures (no new diversion improvements).

1b. Improvements for the increased diversion of water from San Sevaine Channel to the Jurupa Basin and then conveyance of this water to the expanded Declez Basin.

Based on the analysis presented in Wildermuth (2016), the range of potential net increase in recharge at the expanded Declez Basin is 144 acre-ft/yr to 414 acre-ft/yr for alternatives 1a and 1b, respectively.

5 Findings and Conclusions

The following summarizes the findings of the investigation of the East Declez Site:

- Subsurface sediments beneath the East Declez Site consist of upper younger alluvium that overlies older alluvial deposits that overlie metamorphic and granitic bedrock.
- The younger alluvium is 30 to 40 ft thick and consists predominantly of sand and gravel that is loose, permeable and conducive to the infiltration of surface water. The younger alluvium is not expected to be a liquefaction risk.
- The underlying older alluvium consists predominantly of dense clay with some sand and gravel. This formation has low permeability and would not facilitate significant infiltration of water.
- Infiltration of surface water at the Site will perch on the older alluvial deposits and mound within the younger alluvium.
- Given the limited thickness of permeable younger alluvium for subsurface storage of water, a recharge basin at the Site would have to be designed with a shallow bottom.
- Hydraulic analysis of potential storm water conveyance to the East Declez Site presented in Wildermuth (2016) showed that it is not feasible to deliver storm water from the East Declez Channel to a shallow recharge basin due to the high elevation of the basin bottom relative to the Declez Channel diversion point.
- An alternative use for the Site is to expand the existing Declez Basin to the east, which would create additional surface storage capacity. Preliminary estimates indicate a potential increase in surface storage capacity of approximately 130 acre-ft.
- Hydraulic analysis presented in Wildermuth (2016) estimates that the net increase in recharge to the groundwater basin from an expanded Declez Basin option could range from approximately 144 to 414 acre-ft/yr. The lower end of the range assumes no additional diversion or storm water supply improvements. The high end of the range assumes upstream storm water diversion improvements that increase the amount of water available for delivery to the expanded Declez Basin.

6 References

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Table

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East Declez Basin Improvements
Subsurface Investigation

TABLE 1

Soil Physical Properties Testing Summary

Borehole	Depth (ft bgs)[1]	Geologic Unit	Sample Orientation	Vertical Hydraulic Conductivity (ft/day)[2]	Horizontal Hydraulic Conductivity (ft/day)	Total Porosity	Effective Porosity	Dry Bulk Density (g/cc)[3]
BH-3	56.0 - 56.5	Older Alluvium	Vertical	0.01	N/A[4]	N/A	N/A	N/A
BH-4	52.5 - 53.0	Older Alluvium	Vertical	0.01	N/A	N/A	N/A	N/A
BH-5	76.0 - 76.5	Older Alluvium	Vertical	0.01	N/A	N/A	N/A	N/A
BH-6	44.5 - 45.0	Older Alluvium	Vertical	0.01	N/A	N/A	N/A	N/A
BH-3	56.0 - 56.5	Older Alluvium	Horizontal	N/A	0.01	N/A	N/A	N/A
BH-4	52.5 - 53.0	Older Alluvium	Horizontal	N/A	0.01	N/A	N/A	N/A
BH-5	76.0 - 76.5	Older Alluvium	Horizontal	N/A	0.01	N/A	N/A	N/A
BH-6	44.5 - 45.0	Older Alluvium	Horizontal	N/A	0.02	N/A	N/A	N/A
BH-4B	21.0 - 21.5	Younger Alluvium	Vertical	0.50	N/A	34.1%	N/A	1.77
BH-5B	21.0 - 21.5	Younger Alluvium	Vertical	0.44	N/A	32.0%	N/A	1.83
BH-4B	21.0 - 21.5	Younger Alluvium	Horizontal	N/A	0.15	26.3%	N/A	1.99
BH-5B	21.0 - 21.5	Younger Alluvium	Horizontal	N/A	11.71	32.2%	N/A	1.83

Notes:

[1] ft/bgs = feet below ground surface.
[2] ft/day = feet per day.
[3] g/cc = grams per cubic centimeter.
[4] N/A = not analyzed.

Figures

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East Declez Basin Improvements
Subsurface Investigations

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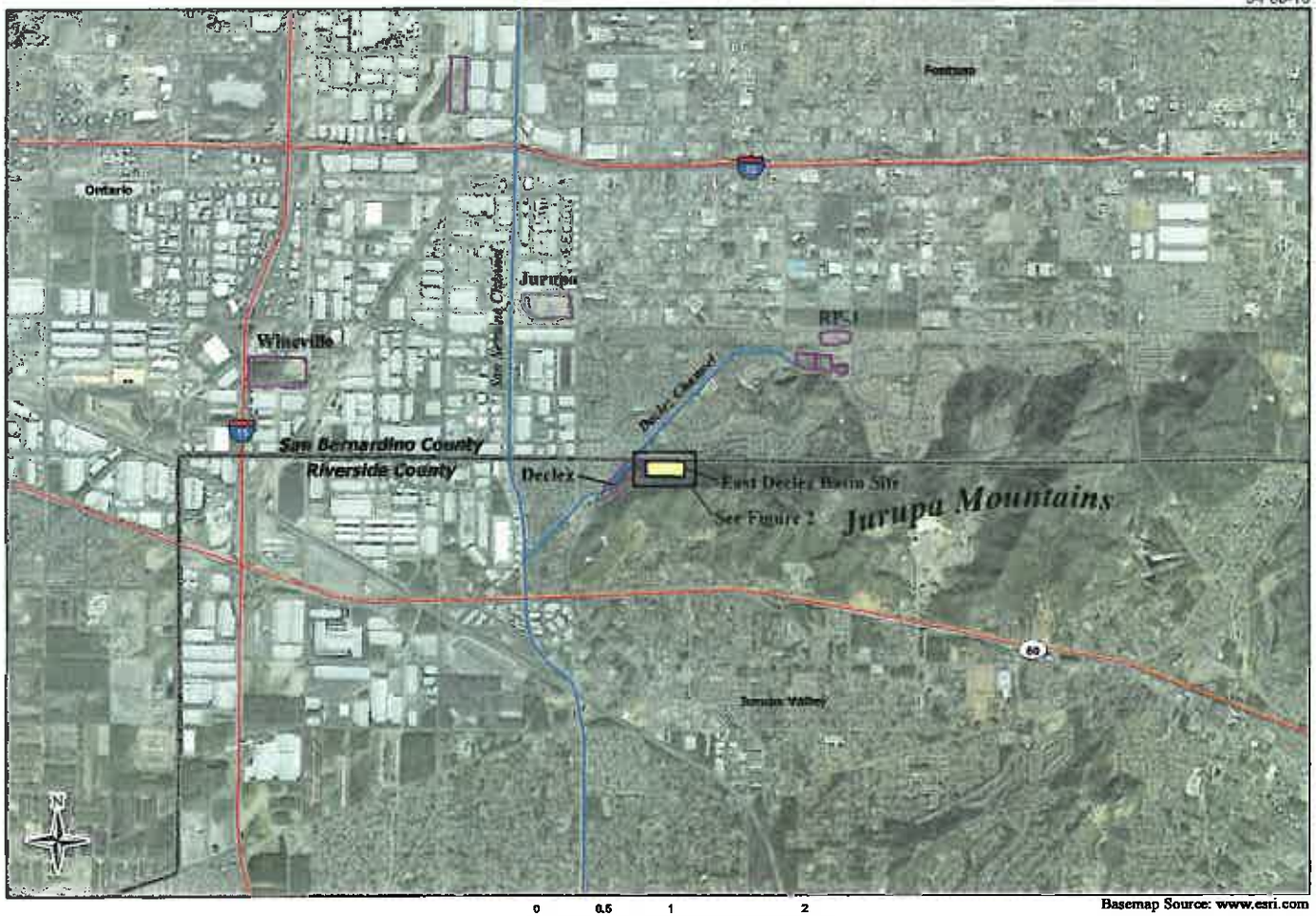


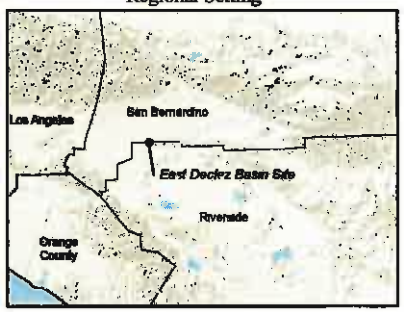
Basemap Source: www.esri.com

NAD 83 State Plane Zone 6

Map Features

- East Declez Basin Site
- Existing Recharge Basin
- County Boundary
- Declez/San Sevaine Channel
- Freeway

Regional Setting



Study Area

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Figure 1

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East Declez Basin Improvements
Subsurface Investigation

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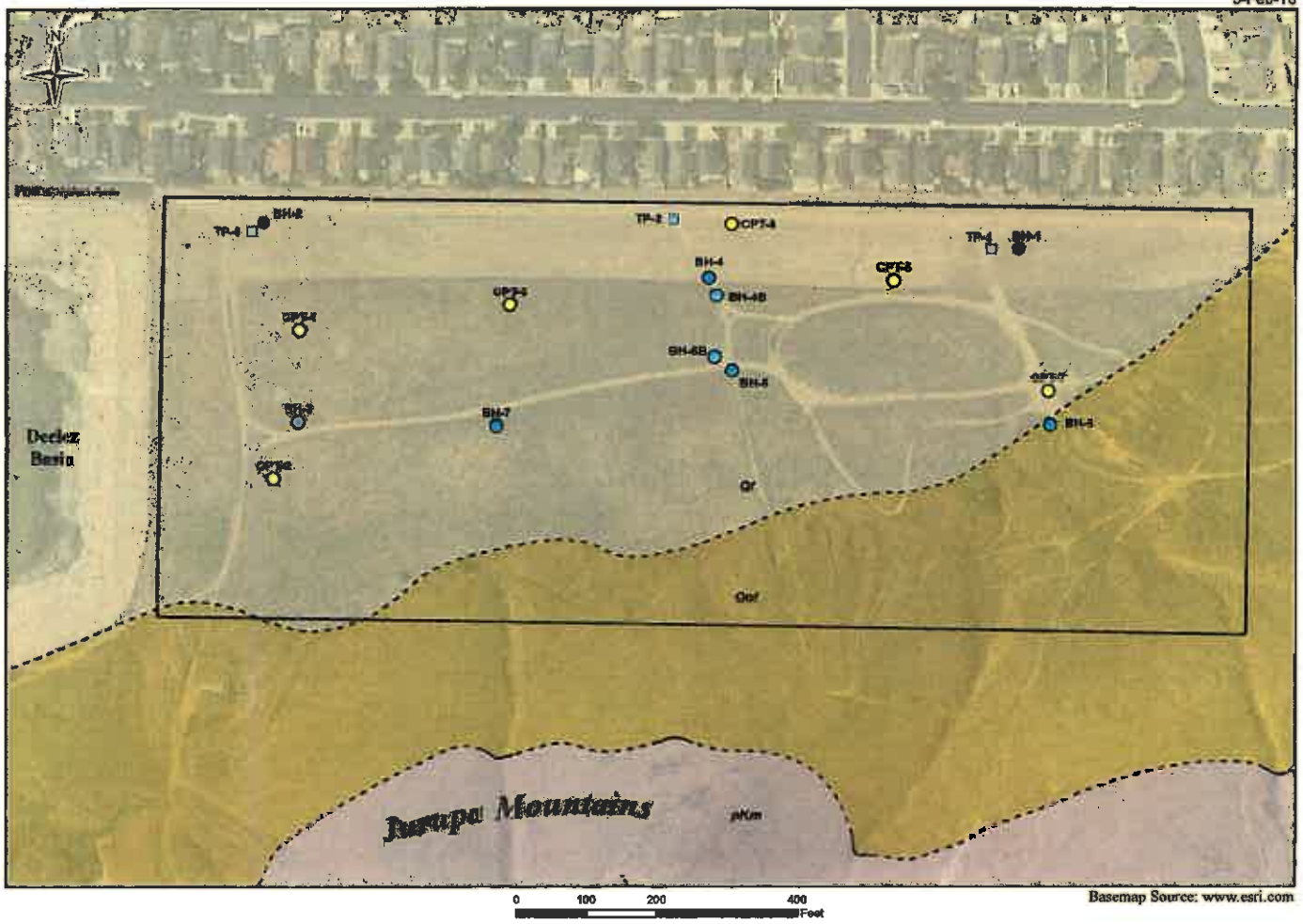

NAD 83 State Plane Zone 6

Map Features

- Borehole Location
- Shallow Borehole Location
- CPT Location
- Previous Borehole (Geoscience, 2014)
- Infiltration Test Pit (Geoscience, 2014)
- East Declez Basin Site
- Geologic Contact (Dashed Where Approximate)
- Qf — Young Alluvial Deposits
- Qof — Older Alluvial Deposits
- pKm — Crystalline Bedrock

East Declez Basin site boundary from Riverside County Geographic Information Services' Parcel Database http://gis.rivcoit.org/GISData.aspx

Geology from field mapping, September 2015 and modified from Morton and Miller, Geologic Map of the San Bernardino and Santa Ana 30' x 60' quadrangles, USGS Open File Report 2006

East Declez Basin Site

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Figure 2

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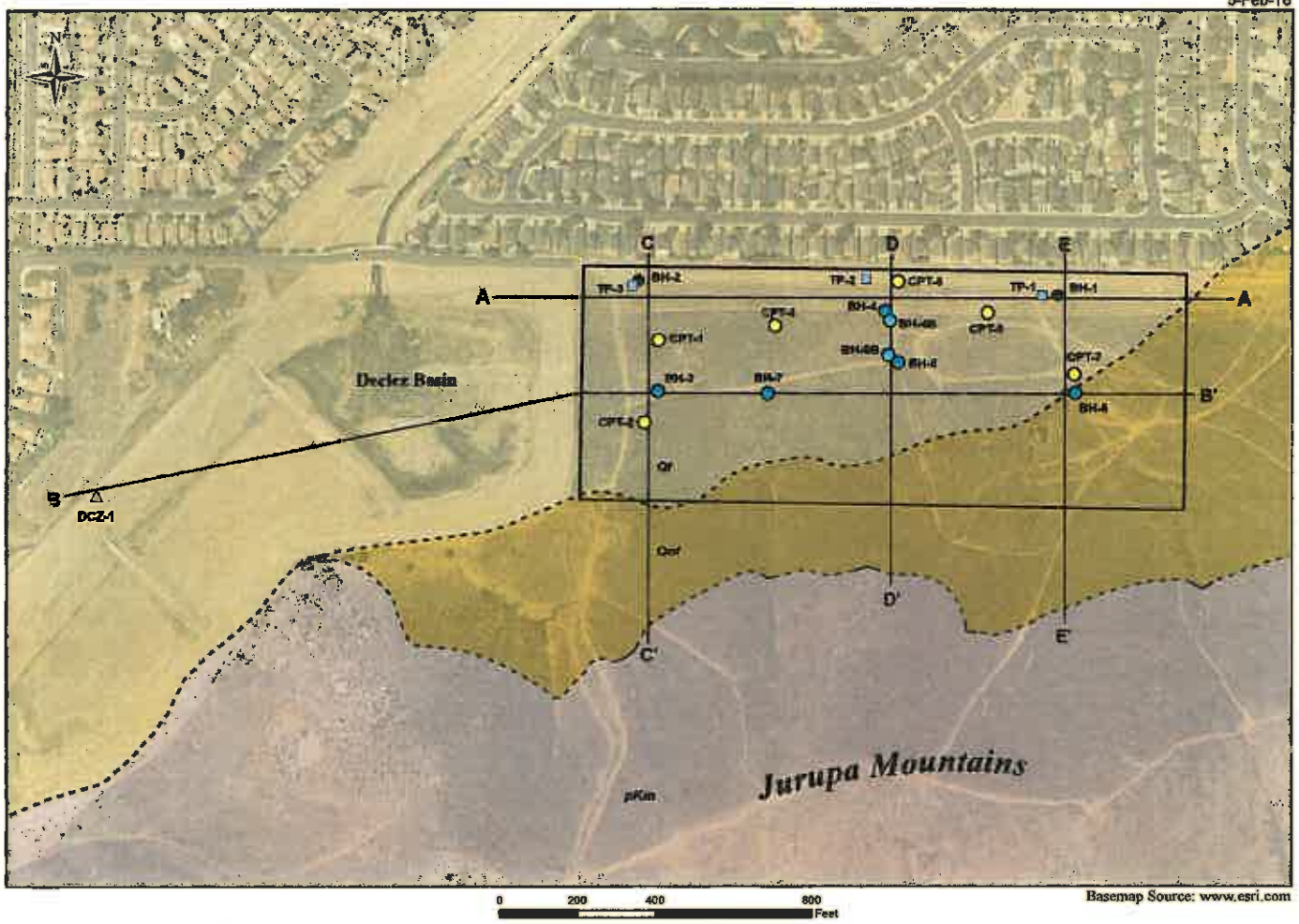
East Declez Basin Improvements
Subsurface Investigation



Map Features

- Borehole Location
- Shallow Borehole Location
- CPT Location
- Previous Borehole (Geoscience, 2014)
- Infiltration Test Pit (Geoscience, 2014)
- Existing Monitoring Well
- Cross Section Location
- East Declez Basin Site
- Geologic Contact (Dashed Where Approximate)
- Qyf — Young Alluvial Deposits
- Qof — Older Alluvial Deposits
- pKm — Crystalline Bedrock

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Cross Section Locations

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Figure 3

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East Declez Basin Improvements
Subsurface Investigation

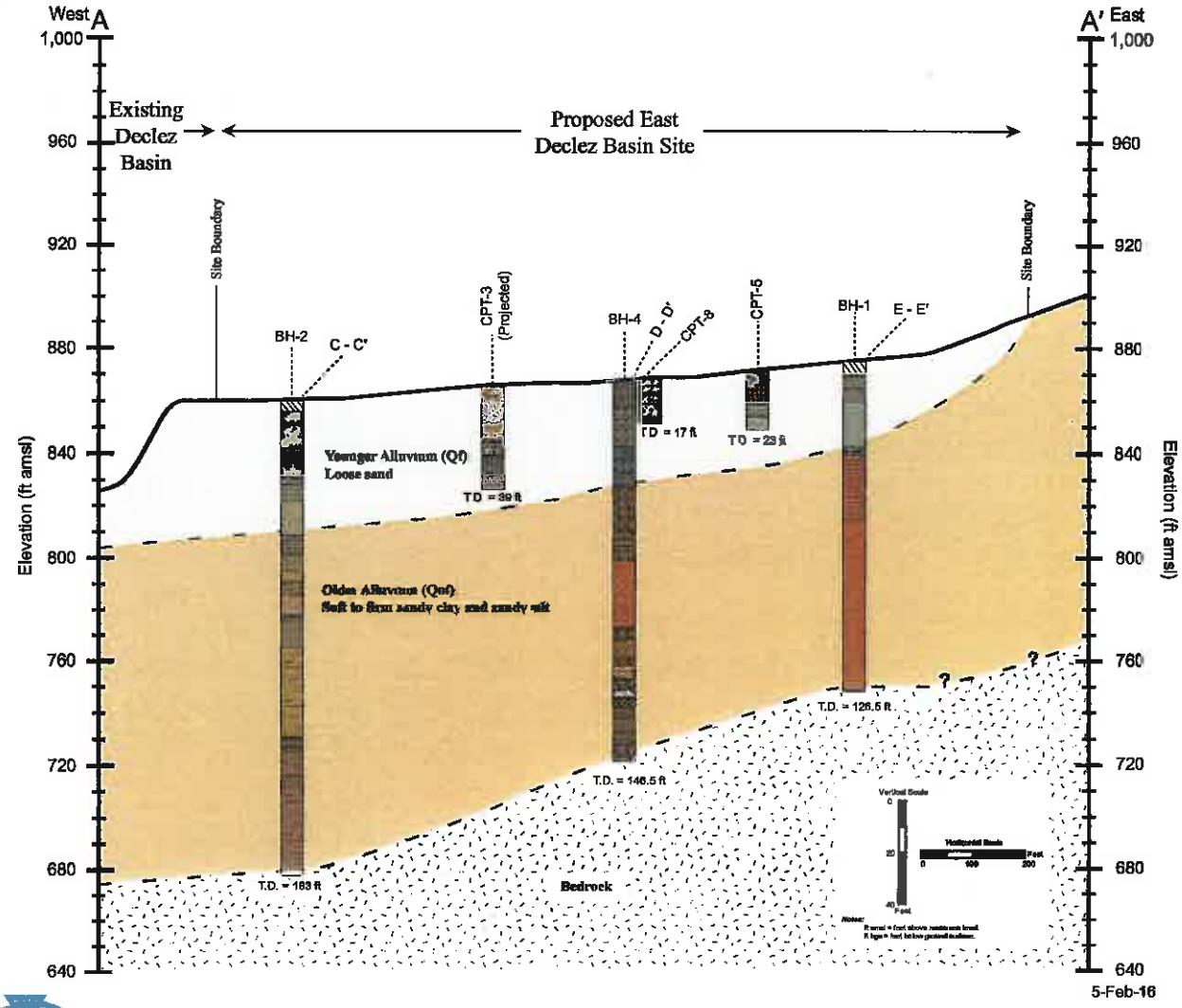

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Figure 4a

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East Declez Basin Improvements
Subsurface Investigation

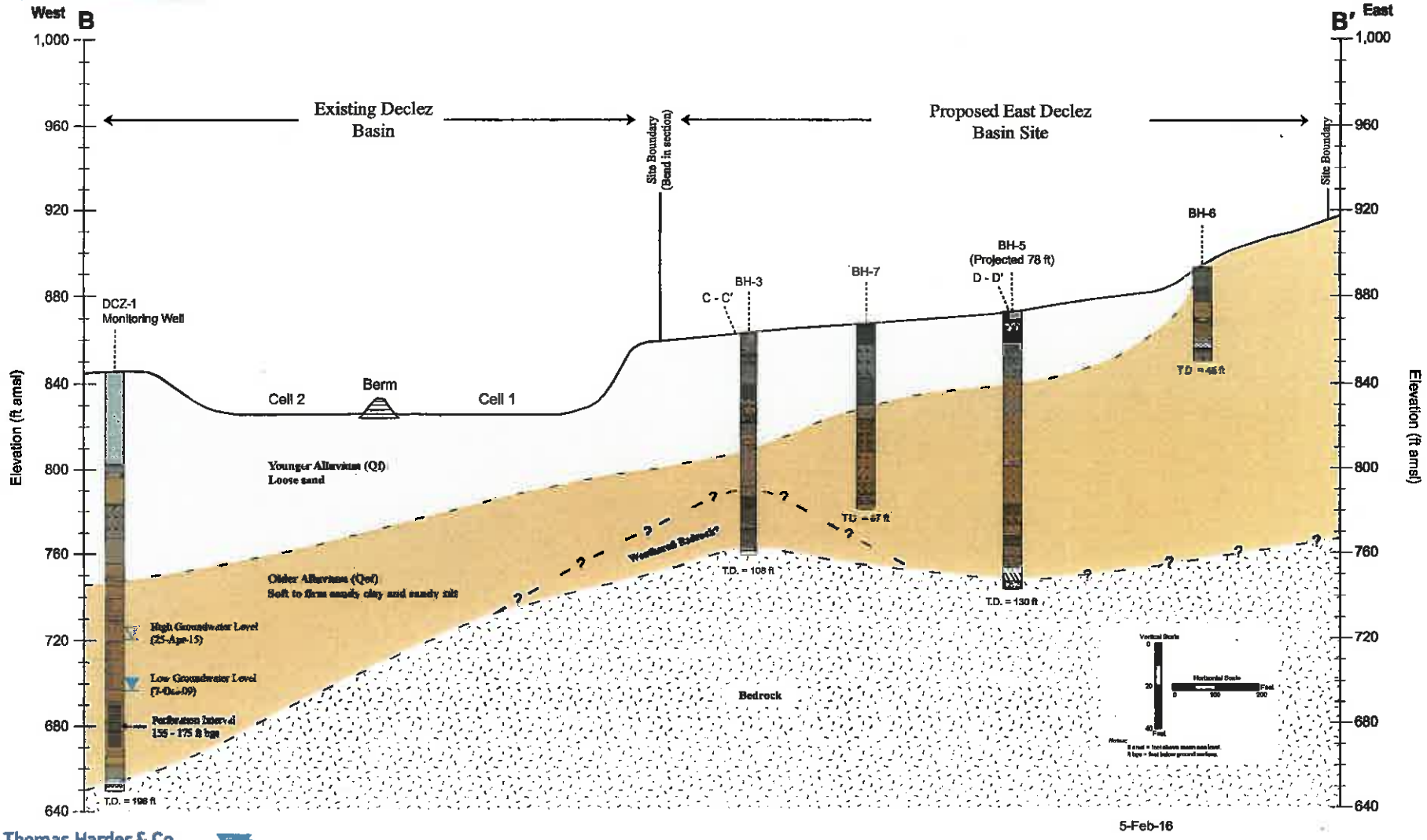

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Figure 4b

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East Declez Basin Improvements
Subsurface Investigation

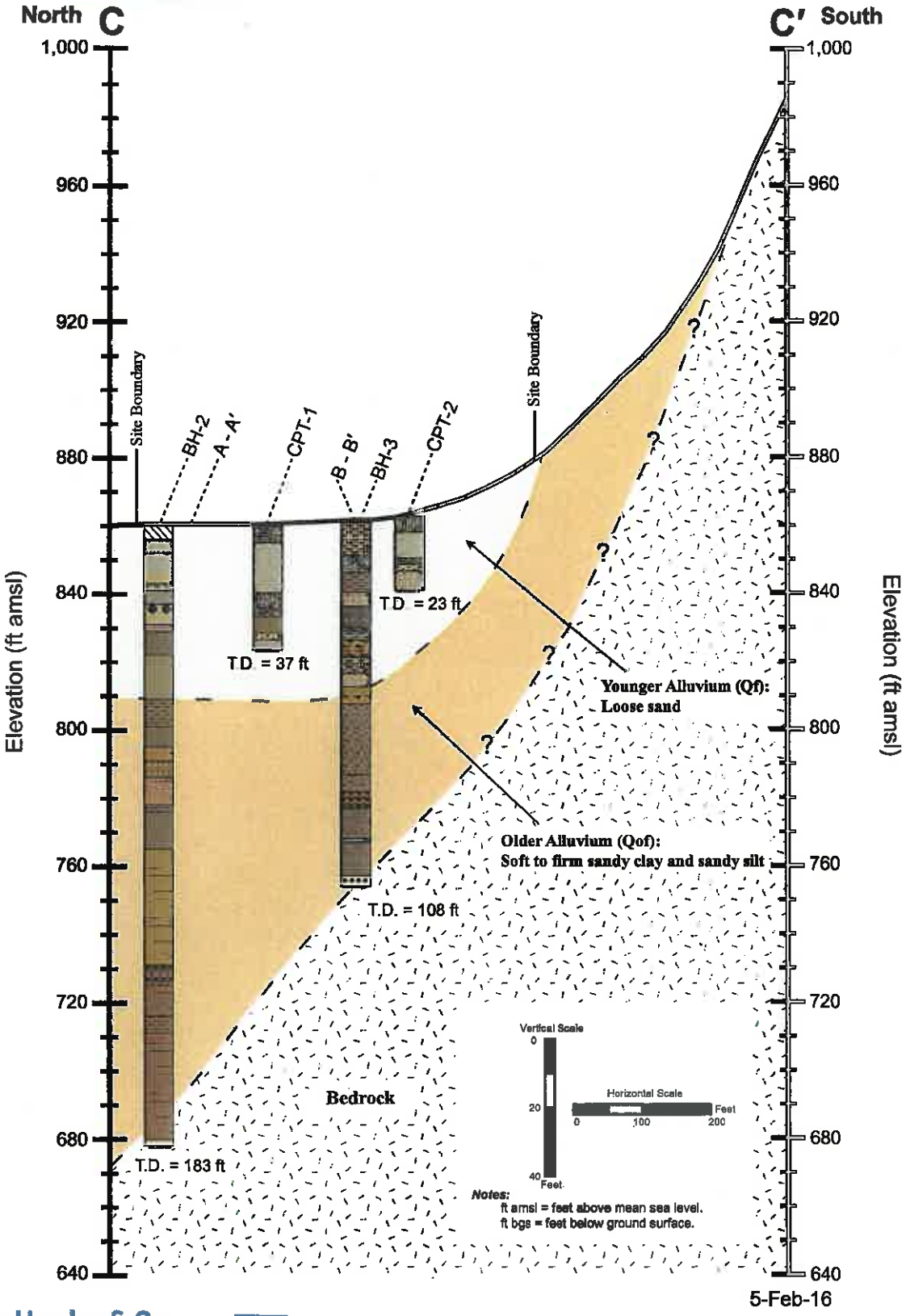

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Figure 4c

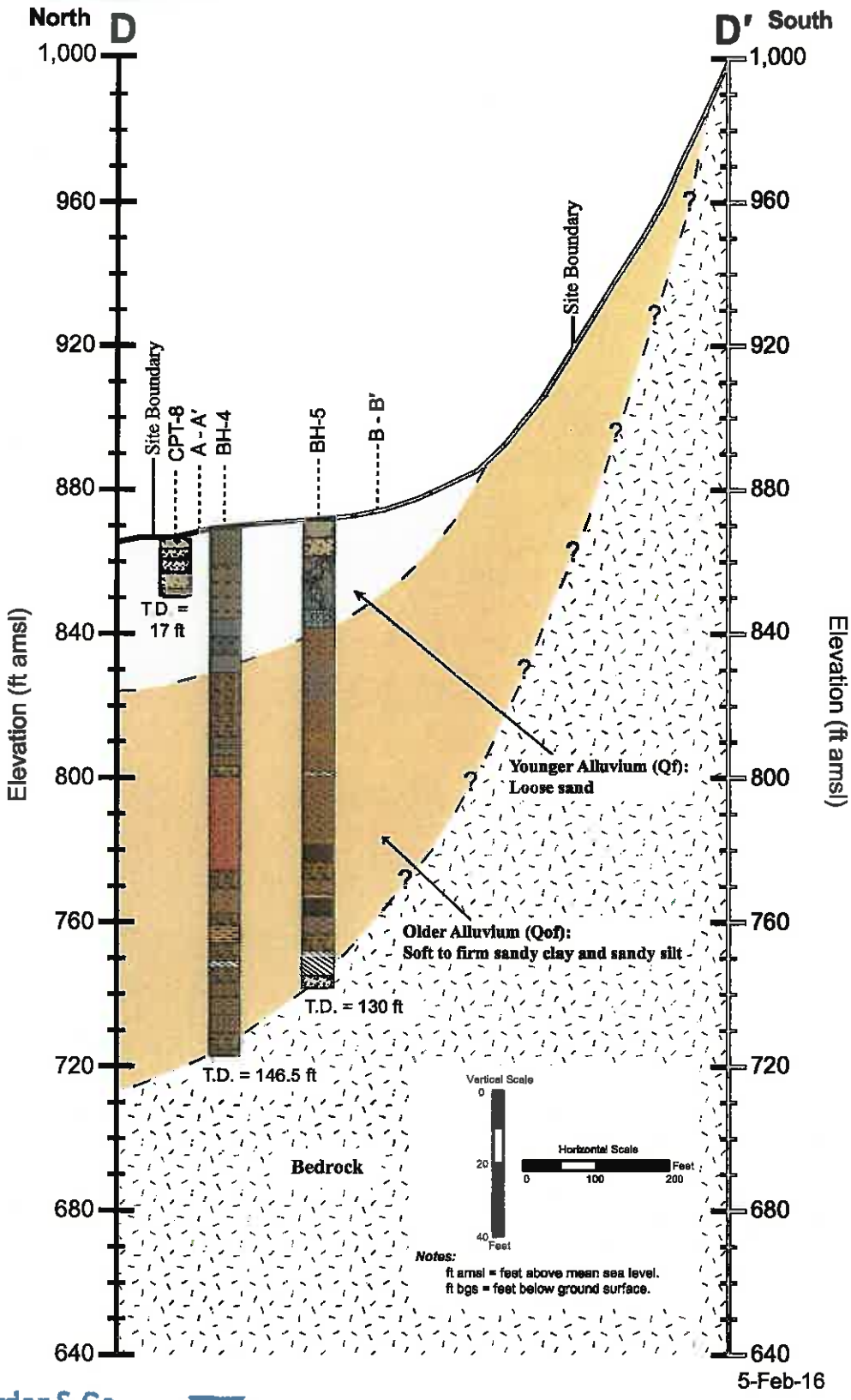
North
D
1,000
960
920
880
840
800
760
720
680
640
D'
South
1,000
960
920
880
840
800
760
720
680
640
Elevation (ft amsl)
Elevation (ft amsl)
Site Boundary
CPT-8
A - A'
BH-4
BH-5
B - B'
Site Boundary
TD = 17 ft
T.D. = 130 ft
T.D. = 146.5 ft
Younger Alluvium (Qf): Loose sand
Older Alluvium (Qof): Soft to firm sandy clay and sandy silt
Bedrock
Vertical Scale
0
20
40
Feet
Horizontal Scale
0
100
200
Feet
Notes:
ft amsl = feet above mean sea level.
ft bgs = feet below ground surface.
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Figure 4d

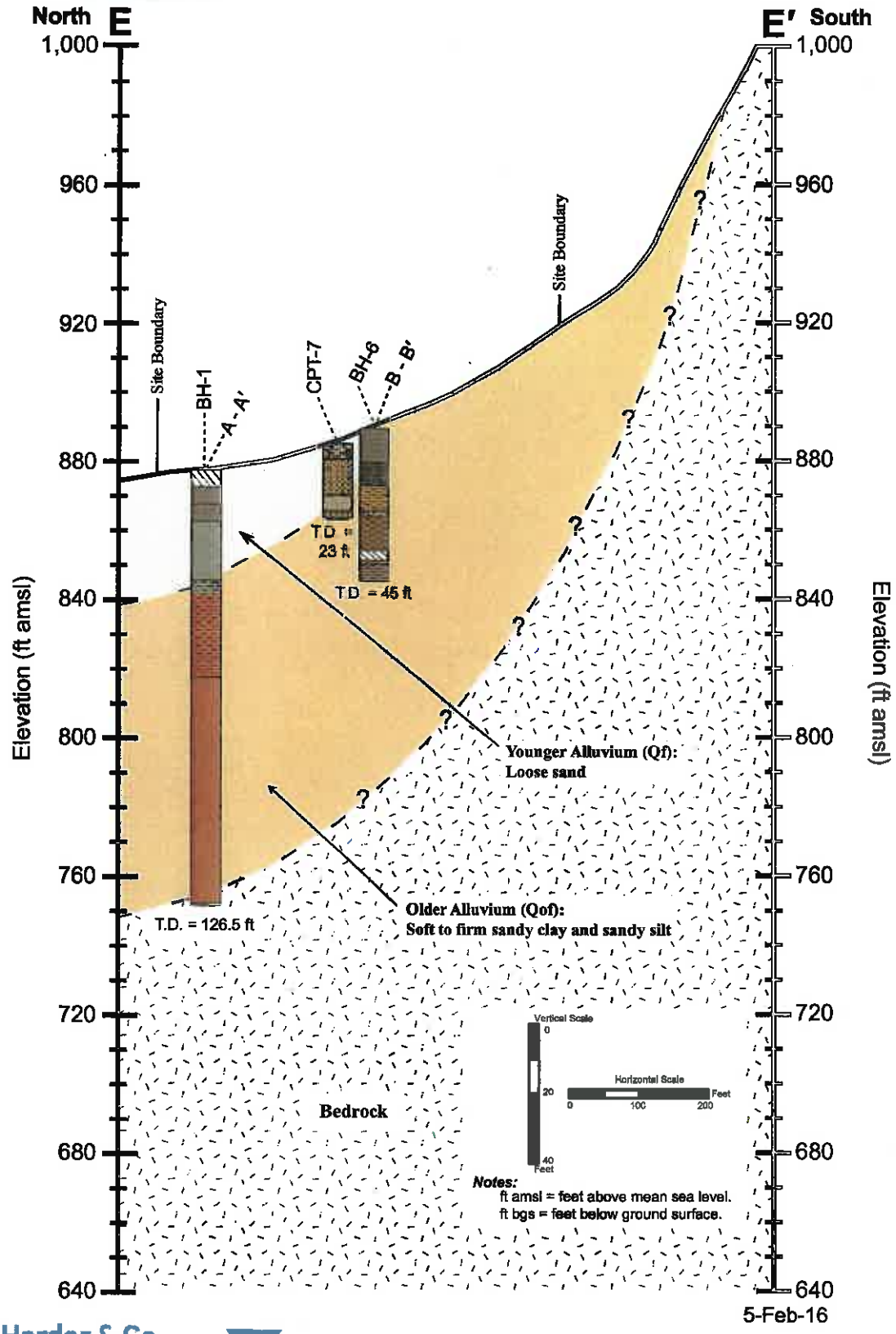
North
E
E'
South
1,000
960
920
880
840
800
760
720
680
640
Elevation (ft amsl)
Site Boundary
Site Boundary
BH-1
A - A'
CPT-7
BH-6
B - B'
TD = 23 ft
TD = 45 ft
T.D. = 126.5 ft
Younger Alluvium (Qf):
Loose sand
Older Alluvium (Qof):
Soft to firm sandy clay and sandy silt
Bedrock
Vertical Scale
0
20
40
Feet
Horizontal Scale
0
100
200
Feet
Notes:
ft amsl = feet above mean sea level.
ft bgs = feet below ground surface.
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Figure 4e

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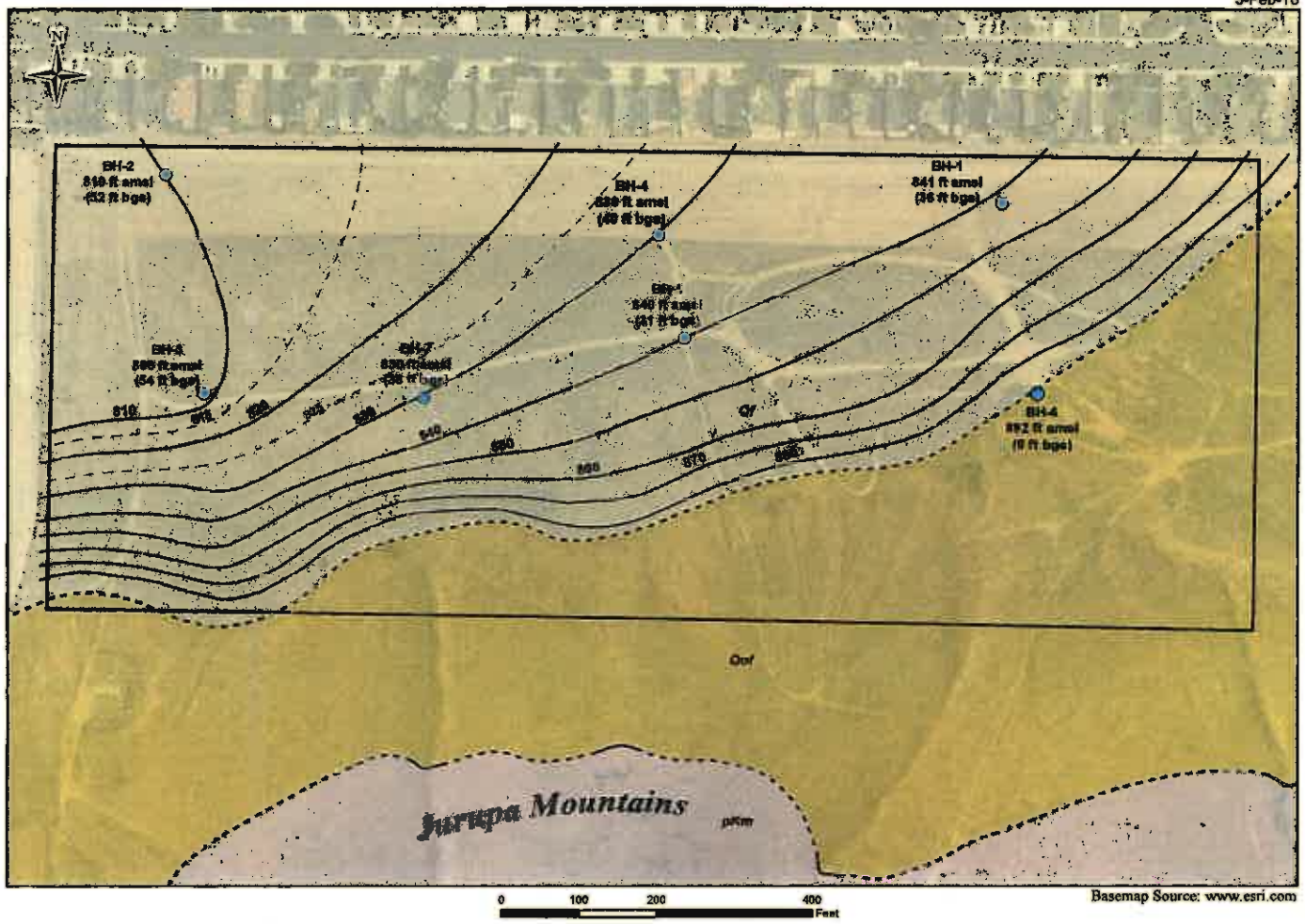
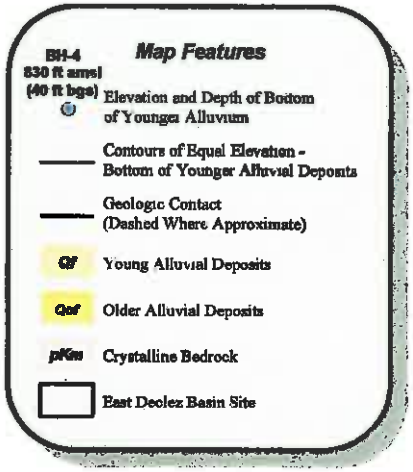
East Declez Basin Improvements
Subsurface Investigation



Basemap Source: www.esri.com

NAD 83 State Plane Zone 6



East Declez Basin site boundary from Riverside County Geographic Information Services' Parcel Database http://gis.rivcoit.org/GISData.aspx

Geology from field mapping, September 2015 and modified from Morton and Miller, Geologic Map of the San Bernardino and Santa Ana 30' x 60' quadrangles, USGS Open File Report 2006

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ft bgs = feet below ground surface

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Contours of Equal Elevation Bottom of Younger Alluvium

Figure 5

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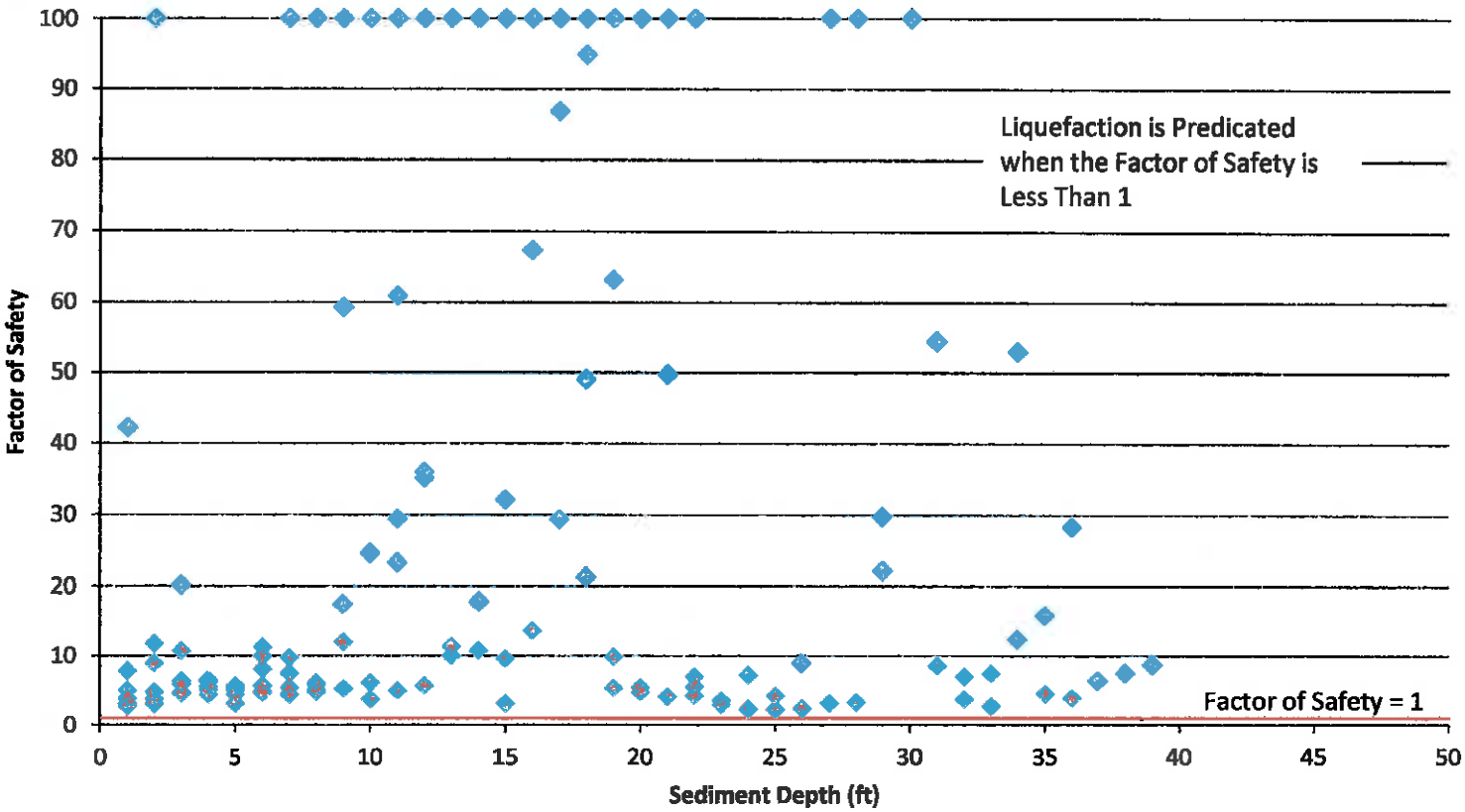
East Declez Basin Improvements
Subsurface Investigation

Figure 6

Sediment Liquefaction Potential
Using the Method from Juang et al. 2003



Note:

Values with a factor of safety greater than 100 shown as 100.

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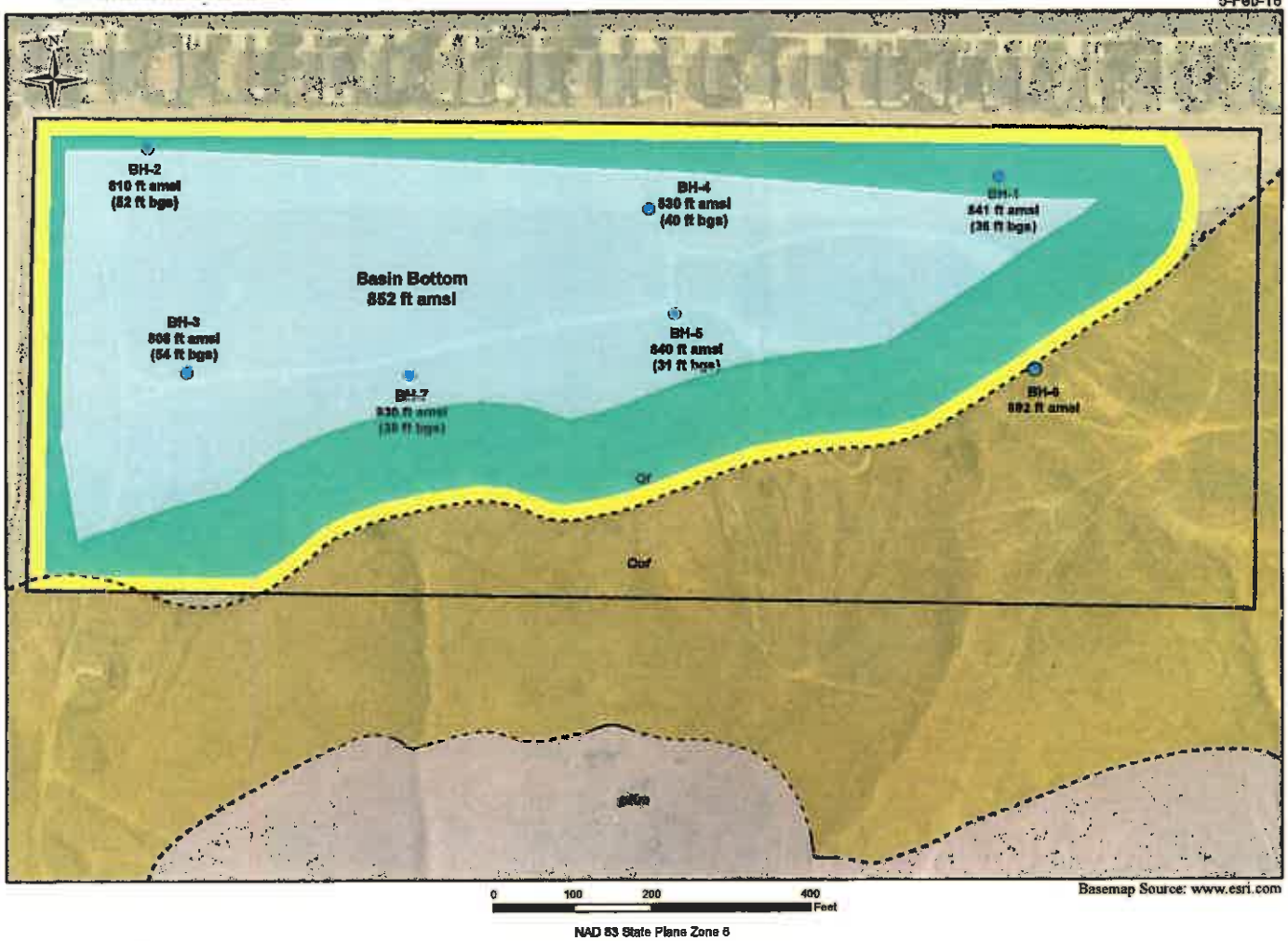
Subsurface Investigation



NAD 83 State Plane Zone 6

Map Features

BH-4
830 ft amsl
(40 ft bgs)
Elevation and Depth of Bottom of Younger Alluvium

Conceptual Basin Bottom

Conceptual Perimeter Road (20 ft wide)

Conceptual Basin Slope (1V 3H Slopes)

East Declez Basin Site

Geologic Contact (Dashed Where Approximate)

Qyf Young Alluvial Deposits

Qof Older Alluvial Deposits

pKm Crystalline Bedrock

East Declez Basin site boundary from Riverside County Geographic Information Services' Parcel Database http://gis.rivcoit.org/GISData.aspx

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ft amsl = feet above mean sea level
ft bgs = feet below ground surface

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Conceptual Basin Layout - Shallow Recharge Basin Option

Figure 7

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East Declez Basin Improvements
Subsurface Investigation

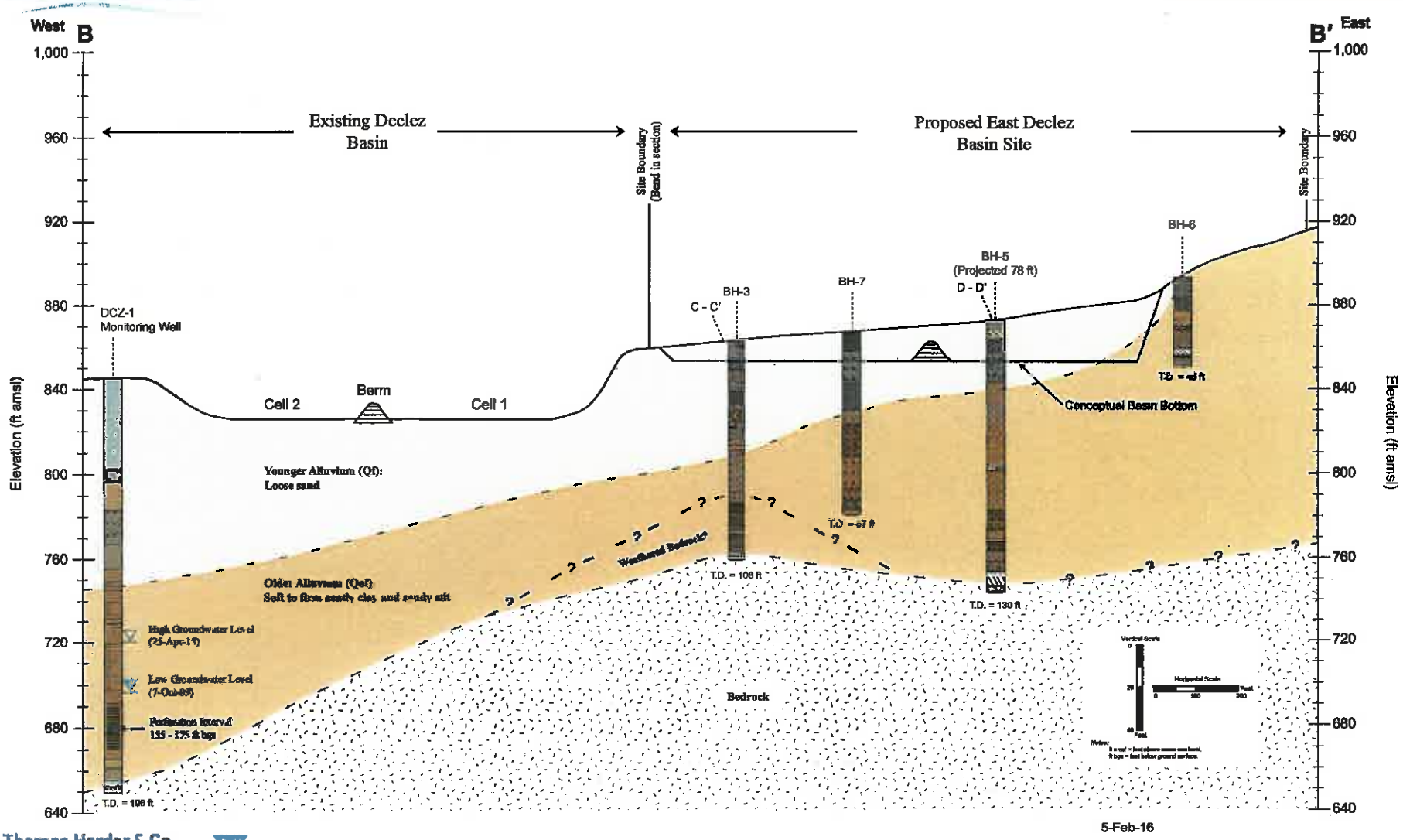

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Figure 8

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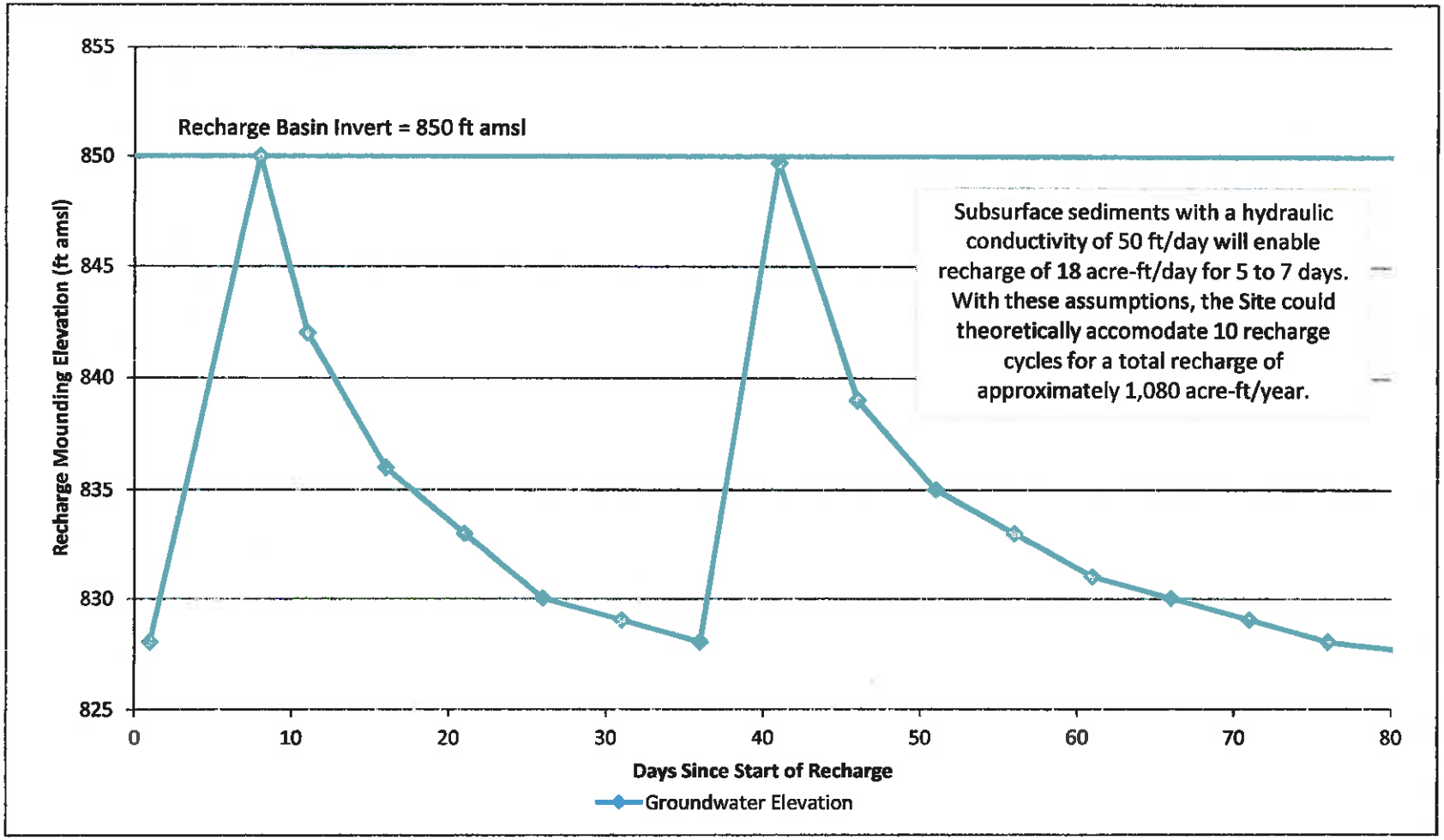
East Declez Basin Improvements
Subsurface Investigation

Figure 9

Model-Generated Recharge Scenario Hydrograph
Hydraulic Conductivity = 50 ft/day



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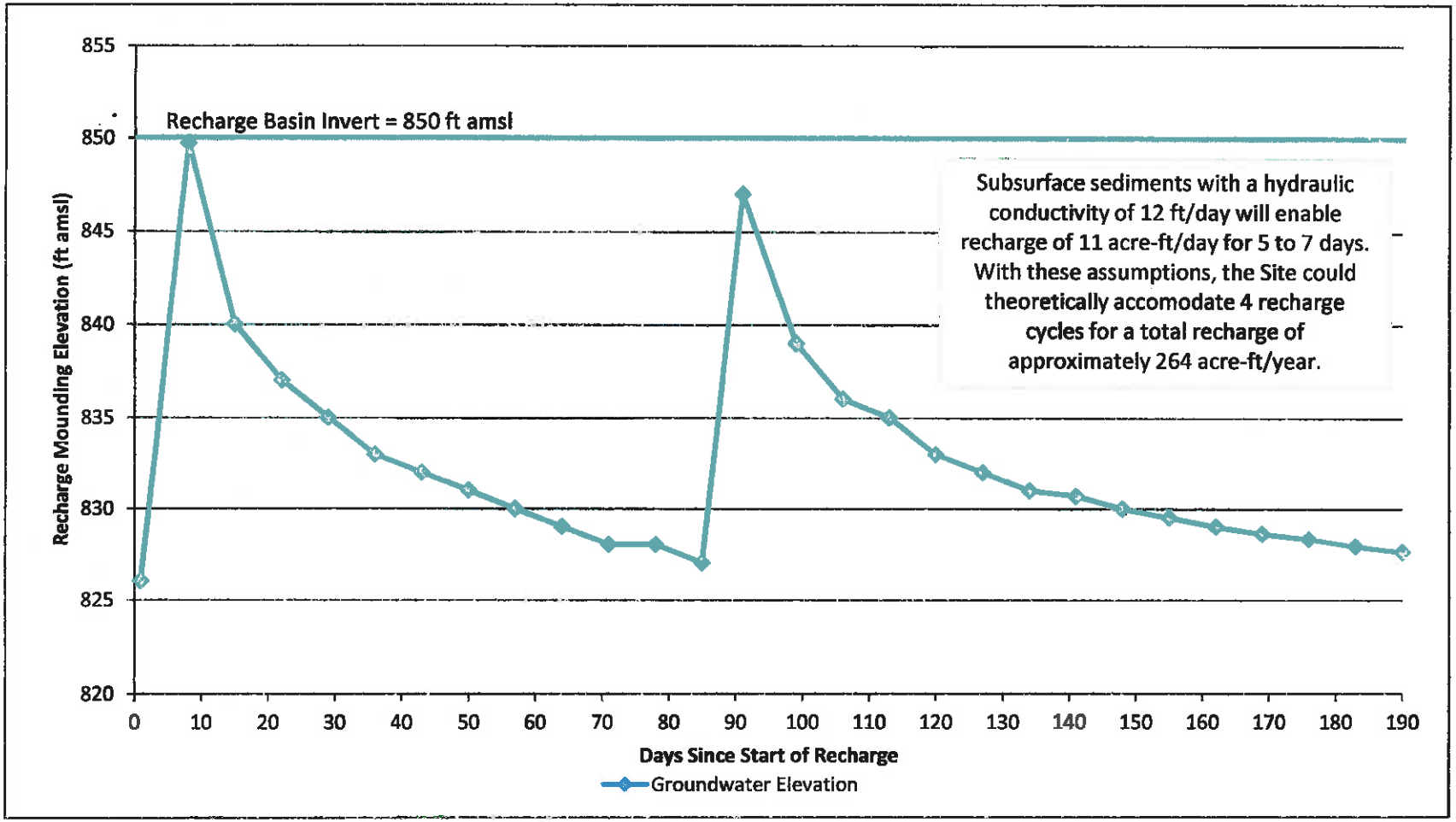
East Declez Basin Improvements
Subsurface Investigation

Figure 10

Model-Generated Recharge Scenario Hydrograph
Hydraulic Conductivity = 12 ft/day



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East Declez Basin Improvements
Subsurface Investigation

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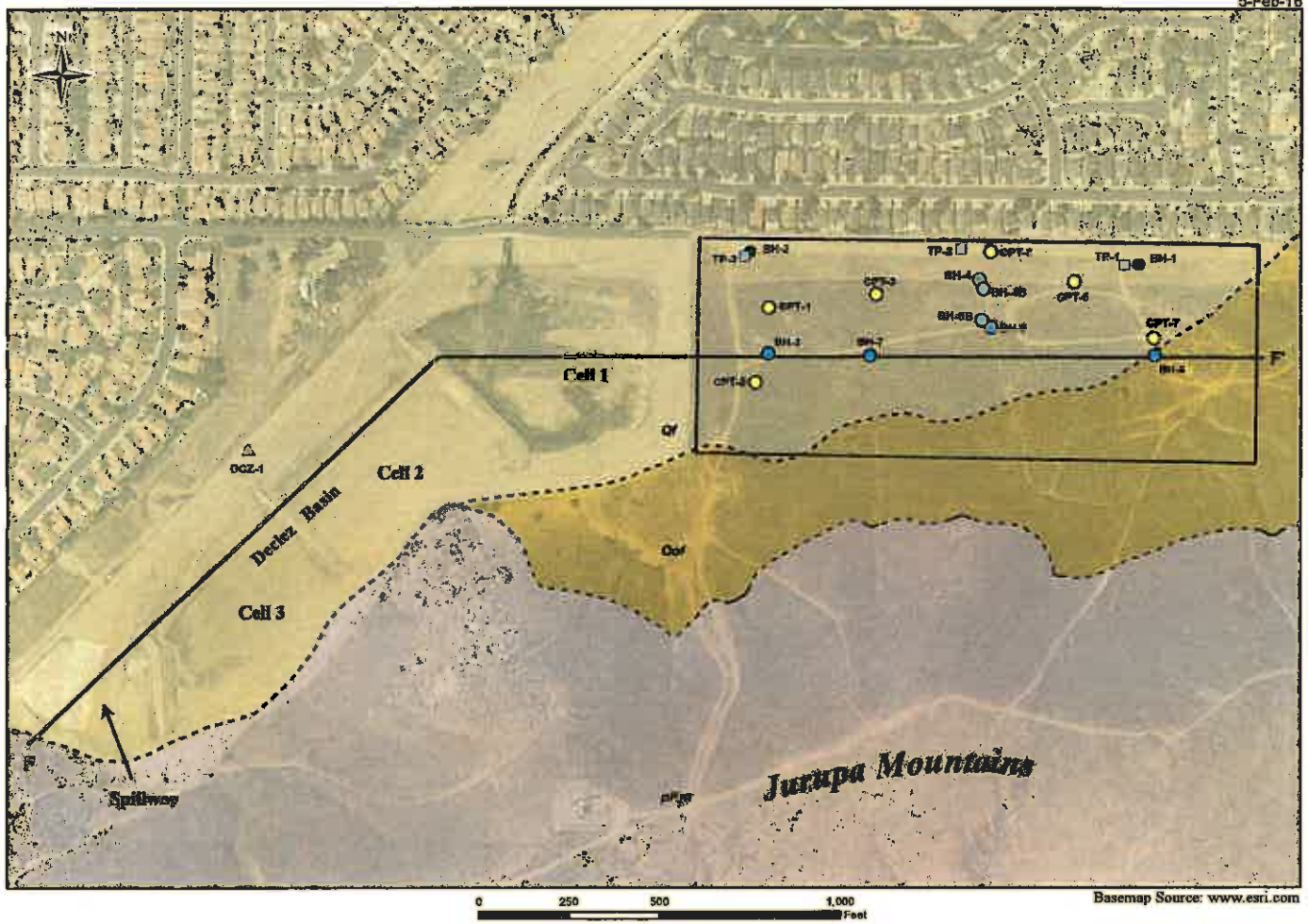

NAD 83 State Plane Zone 6

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Map Features

- Borehole Location
- Shallow Borehole Location
- CPT Location
- Previous Borehole (Geoscience, 2014)
- Infiltration Test Pit (Geoscience, 2014)
- Existing Monitoring Well
- Cross Section Location
- East Declez Basin Site
- Geologic Contact (Dashed Where Approximate)
- Qyf — Young Alluvial Deposits
- Qof — Older Alluvial Deposits
- pKm — Crystalline Bedrock

East Declez Basin site boundary from Riverside County Geographic Information Services' Parcel Database http://gis.rivcoit.org/GISData.aspx

Geology map from field mapping, September 2015 and modified from Morton and Miller, Geologic Map of the San Bernardino and Santa Ana 30' x 60' quadrangles, USGS Open File Report 2006

Cross Section Location
F - F'

Figure 11

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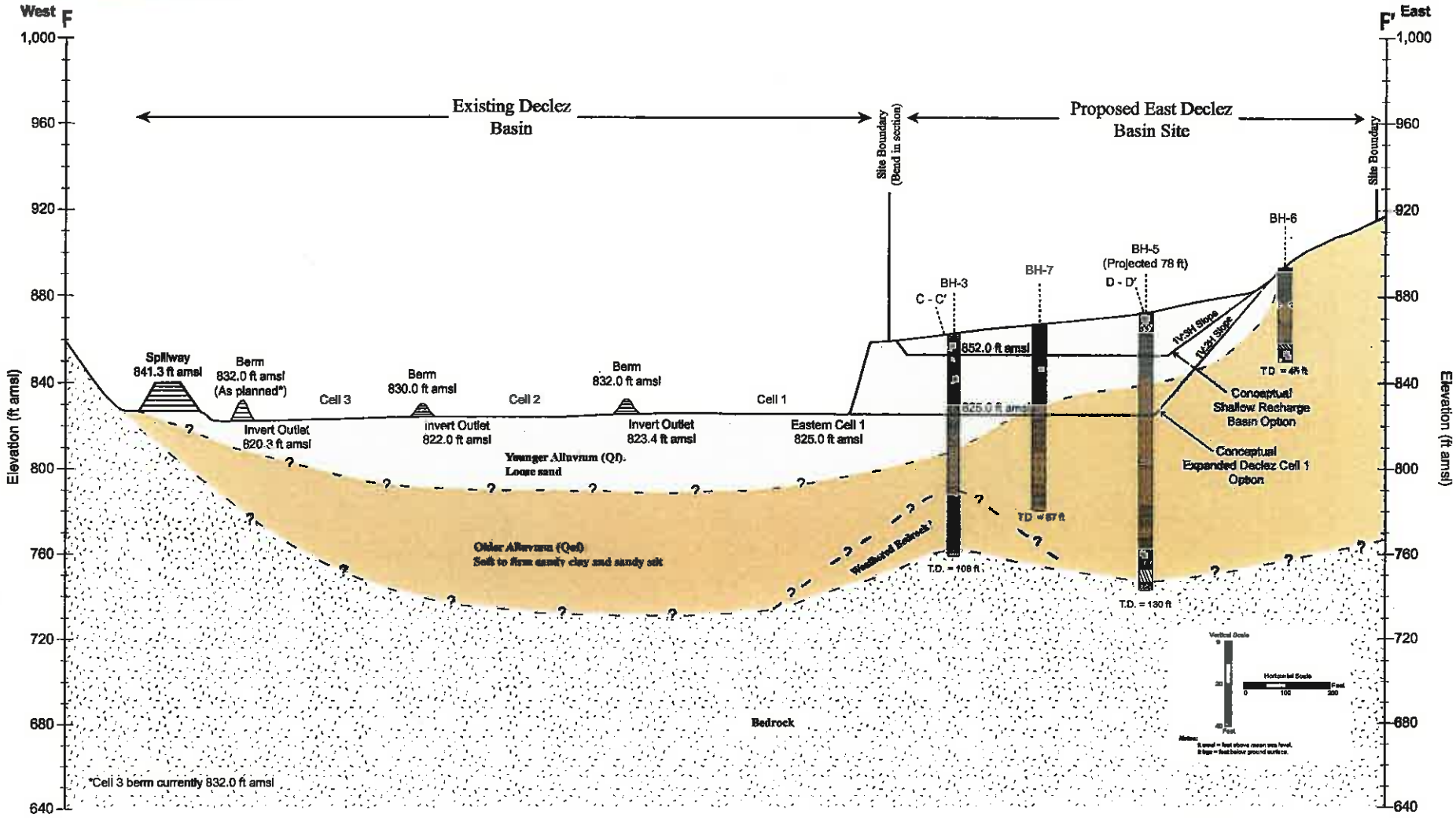
East Declez Basin Improvements
Subsurface Investigation



5-Feb-16

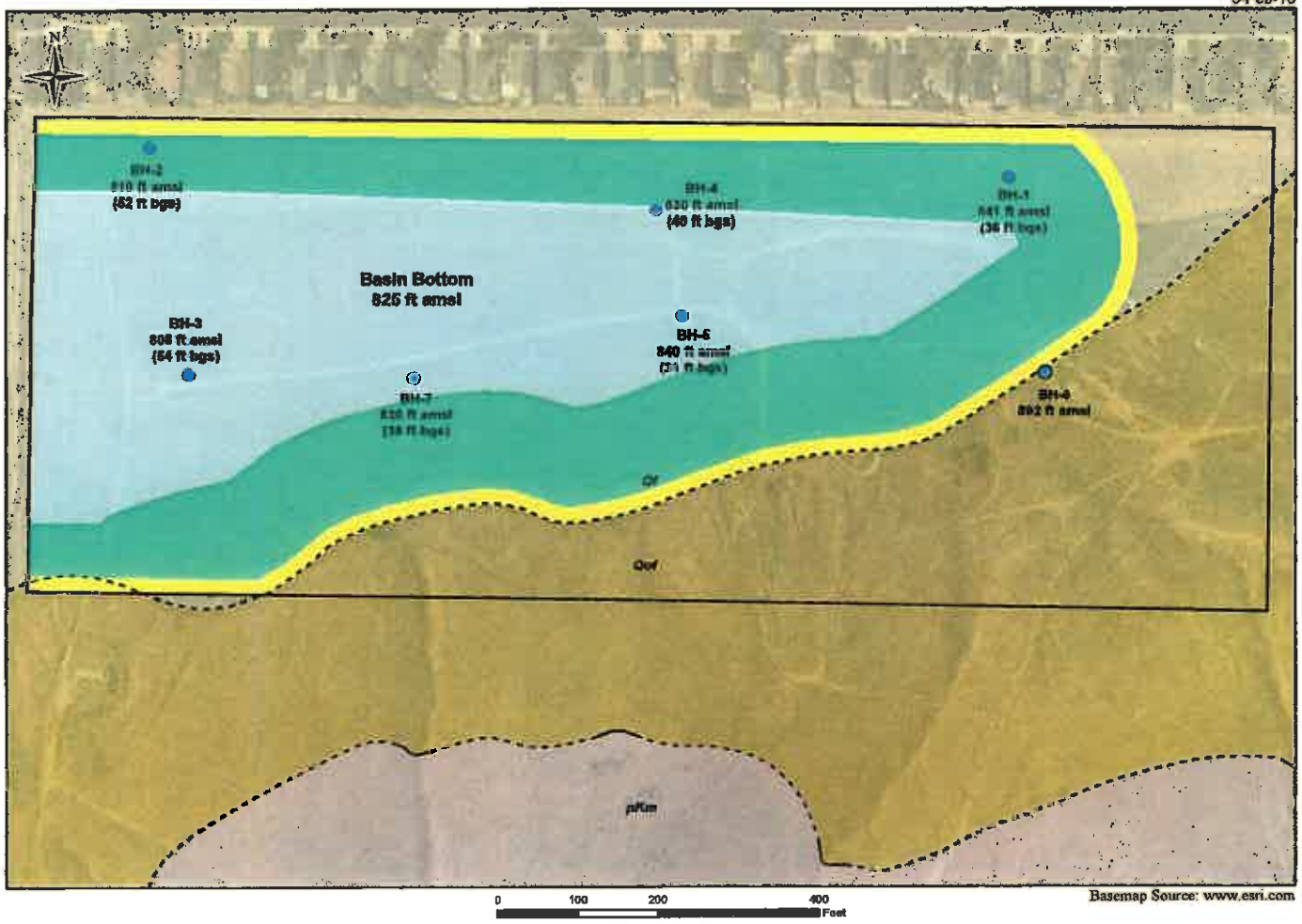
Thomas Harder & Co.
Groundwater Consulting

Figure 12

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

East Declez Basin Improvements
Subsurface Investigation

5-Feb-16



NAD 83 State Plane Zone 6

Map Features

BH-4
830 ft amsl
(40 ft bgs)
Elevation and Depth of Bottom of Younger Alluvium

Conceptual Basin Bottom

Conceptual Perimeter Road (20 ft wide)

Conceptual Basin Slope (1V:2H Slopes)

East Declez Basin Site

Geologic Contact (Dashed Where Approximate)

Qyf — Young Alluvial Deposits

Qof — Older Alluvial Deposits

pKm — Crystalline Bedrock

East Declez Basin site boundary from Riverside County Geographic Information Services' Parcel Database http://gis.rivcoit.org/GISData.aspx

Geology from field mapping, September 2015 and modified from Morton and Miller, Geologic Map of the San Bernardino and Santa Ana 30' x 60' quadrangles, USGS Open File Report 2006

ft amsl = feet above mean sea level
ft bgs = feet below ground surface

Conceptual Basin Layout - Expanded Declez Cell 1 Option

Figure 13

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Appendix A

Previous Investigation Borehole Lithologic Logs

GEOSCIENCE

Oak Tree Group
Recharge Feasibility
GEOSCIENCE Project No. 13055-14

LOG OF BORING BH-1

SHEET 1 OF 5

Location	34.033369 -117.493857	Date(s) Drilled	8/26/14 - 8/27/14	Drilling Contractor	ABC Liovin Drilling	Bearing (Azimuth)	NA
Ground Surface Elevation (ft)	882	Logged by	J. Sobolew	Drill Rig Type	CME - 85	Plunge (Degrees)	-90
Horizontal/Vertical Datum	NAD83/NAVD88	Reviewed by	J. Kingsbury	Borehole Diameter (in)	6	Total Depth (ft)	126.5

Depth (ft)	Notes	Core Run No.	Sample Information: Penetration (Graphic)	Type and No.	Blows per 6 in.	Penetration (in)	Recovery (in)	Geologic Unit	MATERIAL DESCRIPTION
0									No Sample
5		R1				60	12		SAND (SW): brown (7.5YR 5/4); 95% fine to medium grained sand, subangular to subrounded; 5% silt; dry sample; very loose.
10		R2				60	12		SILT (ML): brown (7.5YR 5/4); 95% silt; trace fine to coarse gravel up to 11mm, subangular; trace fine to medium grained sand, subangular; dry sample, very loose.
15		R3				60	15		SAND WITH GRAVEL (SP): grayish brown (10YR 5/2); 65% fine to coarse grained sand, angular to subangular; 35% fine to coarse gravel up to 26mm, angular to subangular; trace silt; poorly sorted; dry sample, loose.
20		R4				60	15		
25		R5				60	24		@25 ft bgs increase in fine to coarse gravel.
30									

GEOSCIENCE

Oak Tree Group
Recharge Feasibility
GEOSCIENCE Project No. 13055-14

LOG OF BORING BH-1

Location	34.033369 -117.493857	Date(s) Drilled	8/26/14 - 8/27/14	Drilling Contractor	ABC Liovin Drilling	Bearing (Azimuth)	NA
Ground Surface Elevation (ft)	882	Logged by	J. Sobolew	Drill Rig Type	CME - 85	Plunge (Degrees)	-90
Horizontal/Vertical Datum	NAD83/NAVD88	Reviewed by	J. Kingsbury	Borehole Diameter (in)	6	Total Depth (ft)	126.5

Depth (ft)	Notes	Core Run No.	Sample Information: Penetration (Graphic)	Type and No.	Blows per 6 in.	Penetration (in)	Recovery (in)	Geologic Unit	MATERIAL DESCRIPTION
30		R6				60	24		SILTY SAND (SM): grayish brown (10YR 5/2); 85% fine to coarse grained sand, angular to subangular; 15% silt; trace fine gravel up to 5mm, angular to subangular, fine to coarse gravel at base; poorly sorted; dry sample.
35		R7				60	24		SILTY SAND (SM): red (2.5YR 5/8); 80% fine to coarse grained sand, angular to subangular; 20% silt; trace fine gravel up to 5mm, angular to subangular; dense, dry sample.
40		R8				60	26.04		
45		R9				60	45.96		@46 ft bgs color changes to dark red (2.5YR 3/6).
50		R10				60	46.92		@50 ft bgs color changes to re (2.5YR 5/8); incease in fine to coarse sand.
55		R11				60	26.04		@55 ft bgs color changes to dark red (2.5YR 3/6).
60									@57 ft bgs color changes to red (2.5YR 5/8).

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Recharge Feasibility
GEOSCIENCE Project No. 13055-14

LOG OF BORING BH-1

SHEET 3 OF 5

Location	34.033369 -117.493857	Date(s) Drilled	8/26/14 - 8/27/14	Drilling Contractor	ABC Liovin Drilling	Bearing (Azimuth)	NA
Ground Surface Elevation (ft)	882	Logged by	J. Sobolew	Drill Rig Type	CME - 85	Plunge (Degrees)	-90
Horizontal/Vertical Datum	NAD83/NAVD88	Reviewed by	J. Kingsbury	Borehole Diameter (in)	6	Total Depth (ft)	126.5

Depth (ft)	Notes	Core Run No.	Sample Information: Penetration (Graphic)	Type and No.	Blows per 6 in.	Penetration (in)	Recovery (in)	Geologic Unit	MATERIAL DESCRIPTION
60		R12				60	56.4		SAND WITH GRAVEL (SP): red (2.5YR 5/8); 85% fine to coarse grained sand, subangular to subrounded; 15% fine to coarse gravel up to 45mm, subangular to subrounded; trace silt; poorly sorted; contains weathered clasts
65		R13				60	48.48		
70		R14				60	24		SAND WITH GRAVEL (SP): red (2.5YR 5/8); 85% fine to coarse grained sand, subangular to subrounded; 10% fine to coarse gravel, subangular to subrounded; 5% silt; poorly sorted; dense, dry
75		R15				60	6		
80		R16				60	27.96		
85		R17				60	31.5		
90									

GEOSCIENCE

Oak Tree Group
Recharge Feasibility
GEOSCIENCE Project No. 13055-14

LOG OF BORING BH-1

SHEET 4 OF 5

Location	34.033369 -117.493857	Date(s) Drilled	8/26/14 - 8/27/14	Drilling Contractor	ABC Liovin Drilling	Bearing (Azimuth)	NA
Ground Surface Elevation (ft)	882	Logged by	J. Sobolew	Drill Rig Type	CME - 85	Plunge (Degrees)	-90
Horizontal/Vertical Datum	NAD83/NAVD88	Reviewed by	J. Kingsbury	Borehole Diameter (in)	6	Total Depth (ft)	126.5

Depth (ft)	Notes	Core Run No.	Sample Information: Penetration (Graphic)	Type and No.	Blows per 6 in.	Penetration (in)	Recovery (in)	Geologic Unit	MATERIAL DESCRIPTION
90		R18				60	45.96		SAND WITH GRAVEL (SP): red (2.5YR 5/8); 85% fine to coarse grained sand, subangular to subrounded; 10% fine to coarse gravel, subangular to subrounded; 5% silt; poorly sorted; dense, dry
95		R19				60	18		@97 ft bgs large cobble, rig chatter.
100		R20				60	55.92		
105		R21				60	39		
110		R22				60	51.6		@110 ft bgs driller added water. @113 ft bgs fine to coarse grained sand stringer.
115		R23				60	32.04		
120									

GEOSCIENCE

Oak Tree Group
Recharge Feasibility
GEOSCIENCE Project No. 13055-14

LOG OF BORING BH-1

SHEET 5 OF 5

Location	34.033369 -117.493857	Date(s) Drilled	8/26/14 - 8/27/14	Drilling Contractor	ABC Liovin Drilling
Ground Surface Elevation (ft)	882	Logged by	J. Sobolew	Drill Rig Type	CME - 85
Horizontal/Vertical Datum	NAD83/NAVD88	Reviewed by	J. Kingsbury	Borehole Diameter (in)	6

Bearing (Azimuth)	NA
Plunge (Degrees)	-90
Total Depth (ft)	126.5

Depth (ft)	Notes	Core Run No.	Sample Information: Penetration (Graphic)	Sample Information: Type and No.	Sample Information: Blows per 6 in.	Sample Information: Penetration (in)	Sample Information: Recovery (in)	Geologic Unit	MATERIAL DESCRIPTION
120		R24				60	29.52		SAND WITH GRAVEL (SP): red (2.5YR 5/8); 85% fine to coarse grained sand, subangular to subrounded; 10% fine to coarse gravel, subangular to subrounded; 5% silt; poorly sorted; dense, dry
125		R25				18			Decomposing Granite

Total Depth 126.5 FT.

GEOSCIENCE

Oak Tree Group
Recharge Feasibility
GEOSCIENCE Project No. 13055-14

LOG OF BORING BH-2

SHEET 1 OF 7

Location	34.033373 -117.497266	Date(s) Drilled	8/25/14 - 8/26/14	Drilling Contractor	ABC Liovin Drilling	Bearing (Azimuth)	NA
Ground Surface Elevation (ft)	866	Logged by	J. Sobolew	Drill Rig Type	CME - 85	Plunge (Degrees)	-90
Horizontal/Vertical Datum	NAD83/NAVD88	Reviewed by	J. Kingsbury	Borehole Diameter (in)	6	Total Depth (ft)	183

Depth (ft)	Notes	Core Run No.	Sample Information: Penetration (Graphic)	Type and No.	Blows per 6 in.	Penetration (in)	Recovery (in)	Geologic Unit	MATERIAL DESCRIPTION	WELL CONSTRUCTION
0									NO SAMPLE	
5		R1				60	12		SAND (SW): light brownish gray (10YR 6/2); 95% fine grained sand, subangular to subrounded; trace fine gravel up to 6mm, subangular to subrounded; trace silt; dry sample, very loose.	
10		R2				60	8		SAND WITH GRAVEL (SP): light brownish gray (10YR 6/2); 75% fine to coarse grained sand, subangular to subrounded; 25% fine to coarse gravel up to 27mm, subangular to subrounded; trace silt; dry sample; poorly sorted.	
15		R3				60	10		SAND WITH GRAVEL (SP): pale brown (10YR 6/3); 60% fine to coarse grained sand, subangular to subrounded; 35% fine to coarse gravel up to 41mm, subangular to subrounded; 5% silt; dry sample; poorly sorted.	
20		R4				60	22		SILTY SAND WITH GRAVEL (SM): light gray (10YR 7/2); 55% fine to coarse grained sand, subangular to subrounded; 25% silt; 20% fine to coarse gravel up to 20mm, subangular to subrounded; dry sample; poorly sorted.	
25		R5				60	10		SILT (ML): grayish brown (10YR 5/2); 100% silt; trace fine grained sand, subrounded; dry sample.	
30									GRAVEL WITH SAND (GP): light yellowish brown (2.5Y 6/3); 55% fine to coarse gravel up to 47mm, subangular to subrounded; 40% fine to coarse grained sand, subangular to subrounded; 5% silt; dry sample; poorly sorted.	

GEOSCIENCE

Oak Tree Group
Recharge Feasibility
GEOSCIENCE Project No. 13055-14

LOG OF BORING BH-2

Location	34.033373 -117.497266	Date(s) Drilled	8/25/14 - 8/26/14	Drilling Contractor	ABC Liovin Drilling	Bearing (Azimuth)	NA
Ground Surface Elevation (ft)	866	Logged by	J. Sobolew	Drill Rig Type	CME - 85	Plunge (Degrees)	-90
Horizontal/Vertical Datum	NAD83/NAVD88	Reviewed by	J. Kingsbury	Borehole Diameter (in)	6	Total Depth (ft)	183

Depth (ft)	Notes	Core Run No.	Sample Information: Penetration (Graphic)	Type and No.	Blows per 6 in.	Penetration (in)	Recovery (in)	Geologic Unit	MATERIAL DESCRIPTION	WELL CONSTRUCTION
30										
		R6				60	32.4		GRAVEL WITH SILT AND SAND (GP-GM): light olive brown (2.5Y 5/4); 55% fine to coarse gravel up to 25mm, angular to subangular; 35% fine to coarse grained sand, angular to subangular; 10% silt; dry sample; poorly sorted.	
									SILT (ML): olive brown (2.5Y 4/4); 100% silt; trace fine grained sand, subangular to subrounded; dry sample.	
35		R7				60	13.2			
									SAND WITH GRAVEL (SP): olive (5Y 5/4); 70% fine to coarse grained sand, subangular to subrounded; 30% fine to coarse gravel up to 52mm, subangular to subrounded; trace silt; poorly sorted, dry sample.	
40		R8				60	34.8			
45		R9				60	30			
50		R10				60	40		SILTY SAND WITH GRAVEL (SM): dark yellowish brown (10YR 4/6); 55% fine to coarse grained sand, subangular; 25% fine gravel up to 8mm, subangular; 20% silt; wet sample; poorly sorted; ground water encountered at 52 ft bgs.	
55		R11				60	31.2			
60										

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Oak Tree Group
Recharge Feasibility
GEOSCIENCE Project No. 13055-14

LOG OF BORING BH-2

SHEET 3 OF 7

Location	34.033373 -117.497266	Date(s) Drilled	8/25/14 - 8/26/14	Drilling Contractor	ABC Liovin Drilling	Bearing (Azimuth)	NA
Ground Surface Elevation (ft)	866	Logged by	J. Sobolew	Drill Rig Type	CME - 85	Plunge (Degrees)	-90
Horizontal/Vertical Datum	NAD83/NAVD88	Reviewed by	J. Kingsbury	Borehole Diameter (in)	6	Total Depth (ft)	183

Depth (ft)	Notes	Core Run No.	Sample Information: Penetration (Graphic)	Type and No.	Blows per 6 in.	Penetration (in)	Recovery (in)	Geologic Unit	MATERIAL DESCRIPTION	WELL CONSTRUCTION
60		R12				60	39.6		SAND WITH GRAVEL (SP): dark yellowish brown (10YR 3/4); 75% fine to coarse grained sand, subangular to subrounded; 20% fine gravel up to 7mm, subangular to subrounded; 5% silt; wet sample; poorly sorted.	
65		R13				60	33.6		SILT WITH SAND (ML): yellowish brown (10YR 5/4); 85% silt; 15% fine to coarse grained sand, subangular to subrounded; trace fine gravel up to 5mm, subangular to subrounded; wet sample; contains quartz, mica, and amphibole; Top 1 ft layer similar to 60-65	
70		R14				60	51.6		SAND WITH SILT AND GRAVEL (SP-SM): yellowish brown (10YR 5/4); 70% fine to coarse grained sand, subangular to subrounded; 20% fine gravel up to 5mm, subangular to subrounded; 10% silt; wet sample; poorly sorted.	
75		R15				60	39.6		SILT WITH SAND (ML): yellowish red (5YR 5/6); 85% silt; 15% fine to medium grained sand, subangular; trace gravel, subangular; moist sample @78 ft bgs increase in fine grained sand	
80		R16				60	44.4		SILTY SAND WITH GRAVEL (SM): brown (7.5YR 5/3); 50% fine to coarse grained sand, subangular to subrounded; 30% fine to coarse gravel up to 31mm, subangular to subrounded; 20% silt; wet sample; poorly sorted.	
85		R17				60	49.2		SAND WITH GRAVEL (SP): dark yellowish brown (10YR 4/6); 65% fine to coarse grained sand, subangular to subrounded; 30% fine to coarse gravel up to 19mm, subangular to subrounded; 5% silt; moist sample; poorly sorted. @88 ft bgs sample becomes dry.	
90										

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Recharge Feasibility
GEOSCIENCE Project No. 13055-14

LOG OF BORING BH-2

SHEET 4 OF 7

Location	34.033373 -117.497266	Date(s) Drilled	8/25/14 - 8/26/14	Drilling Contractor	ABC Llovin Drilling	Bearing (Azimuth)	NA
Ground Surface Elevation (ft)	866	Logged by	J. Sobolew	Drill Rig Type	CME - 85	Plunge (Degrees)	-90
Horizontal/Vertical Datum	NAD83/NAVD88	Reviewed by	J. Kingsbury	Borehole Diameter (in)	6	Total Depth (ft)	183

Depth (ft)	Notes	Core Run No.	Sample Information: Penetration (Graphic)	Sample Information: Type and No.	Sample Information: Blows per 6 in.	Sample Information: Penetration (in)	Sample Information: Recovery (in)	Geologic Unit	MATERIAL DESCRIPTION	WELL CONSTRUCTION
90		R18				60	40.8		@90 ft bgs sample becomes moist.	
95		R19				60	54		SILT WITH SAND (ML): yellowish brown (10YR 5/8); 85% silt; 10% fine to coarse grained sand, subangular; 5% fine gravel up to 5mm, subangular; moist sample.	
100		R20				60	46.8			
105		R21				60	60			
110		R22				60	60		@110 ft bgs increase in silt to 114 ft bgs.	
115		R23				60	60		@116 ft bgs rig chatter	
120										

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Oak Tree Group
Recharge Feasibility
GEOSCIENCE Project No. 13055-14

LOG OF BORING BH-2

Location	34.033373 -117.497266	Date(s) Drilled	8/25/14 - 8/26/14	Drilling Contractor	ABC Liovin Drilling	Bearing (Azimuth)	NA
Ground Surface Elevation (ft)	866	Logged by	J. Sobolew	Drill Rig Type	CME - 85	Plunge (Degrees)	-90
Horizontal/Vertical Datum	NAD83/NAVD88	Reviewed by	J. Kingsbury	Borehole Diameter (in)	6	Total Depth (ft)	183

Depth (ft)	Notes	Core Run No.	Sample Information: Penetration (Graphic)	Type and No.	Blows per 6 in.	Penetration (in)	Recovery (in)	Geologic Unit	MATERIAL DESCRIPTION	WELL CONSTRUCTION
120										
		R24				60	60		@121 ft bgs rig chatter.	
125		R25				60	7.2		@128 ft bgs increase in fine gravel.	
130		R26				60	40.5		SILTY GRAVEL WITH SAND (GM): yellowish red (5YR 4/6); 40% fine gravel up to 16mm, subangular to subrounded; 35% silt; 25% fine to coarse grained sand, subangular to subrounded; wet sample; poorly sorted.	
135		R27				60	34.44		SANDY SILT (ML): yellowish red (5YR 4/6); 55% silt; 35% fine to coarse grained sand, subangular to subrounded; 10% fine gravel up to 5mm, subangular to subrounded; wet sample.	
140		R28				60	44.04			
145		R29				60	49.92		SILTY SAND (SM): brown (5YR 4/6); 75% fine to coarse grained sand, subangular to subrounded; 30% fine to coarse gravel up to 31mm, subangular to subrounded; 25% silt; wet sample.	
150										

GEOSCIENCE

Oak Tree Group
Recharge Feasibility
GEOSCIENCE Project No. 13055-14

LOG OF BORING BH-2

Location	34.033373 -117.497266	Date(s) Drilled	8/25/14 - 8/26/14	Drilling Contractor	ABC Liovin Drilling	Bearing (Azimuth)	NA
Ground Surface Elevation (ft)	866	Logged by	J. Sobolew	Drill Rig Type	CME - 85	Plunge (Degrees)	-90
Horizontal/Vertical Datum	NAD83/NAVD88	Reviewed by	J. Kingsbury	Borehole Diameter (in)	6	Total Depth (ft)	183

Depth (ft)	Notes	Core Run No.	Sample Information: Penetration (Graphic)	Sample Information: Type and No.	Sample Information: Blows per 6 in.	Sample Information: Penetration (in)	Sample Information: Recovery (in)	Geologic Unit	MATERIAL DESCRIPTION	WELL CONSTRUCTION
150		R30				60	52.08		SANDY SILT (ML): yellowish red (5YR 4/6); 55% silt; 35% fine to coarse grained sand, subangular to subrounded; 10% fine gravel up to 5mm, subangular to subrounded; wet sample.	
155		R31				60	54.96		@155 ft bgs increase in fine to coarse grained sand.	
160		R32				60	47.88		@158 ft bgs increase in fine to coarse grained sand.	
165		R33				60	57.96			
170		R34				60	47.52			
175		R35				60	51			
180										

GEOSCIENCE

Oak Tree Group
Recharge Feasibility
GEOSCIENCE Project No. 13055-14

LOG OF BORING BH-2

SHEET 7 OF 7

Location	34.033373 -117.497266	Date(s) Drilled	8/25/14 - 8/26/14	Drilling Contractor	ABC Liovin Drilling	Bearing (Azimuth)	NA
Ground Surface Elevation (ft)	866	Logged by	J. Sobolew	Drill Rig Type	CME - 85	Plunge (Degrees)	-90
Horizontal/Vertical Datum	NAD83/NAVD88	Reviewed by	J. Kingsbury	Borehole Diameter (in)	6	Total Depth (ft)	183

Depth (ft)	Notes	Core Run No.	Sample Information: Penetration (Graphic)	Type and No.	Blows per 6 in.	Penetration (in)	Recovery (in)	Geologic Unit	MATERIAL DESCRIPTION	WELL CONSTRUCTION
180		R36				36	43.68		Decomposed Granite	

Total Depth 183.0 FT.

Appendix B

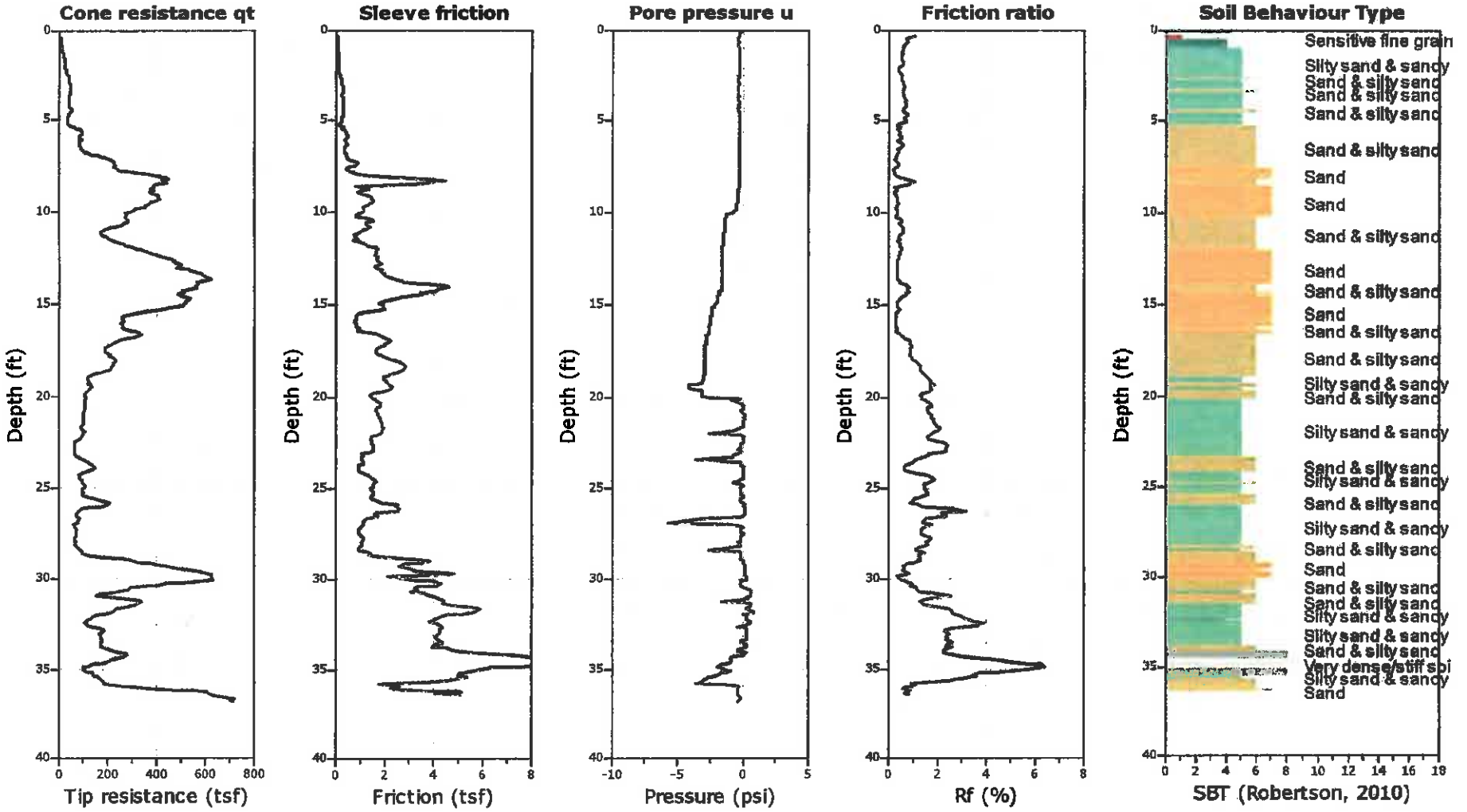
Cone Penetrometer Testing Logs

Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

CPT: CPT-1

Project: Thomas Harder & Company, Inc.
Location: 9998 Philadelphia Ave Mira Loma, CA

Total depth: 36.81 ft, Date: 9/22/2015
Cone Type: Vertek

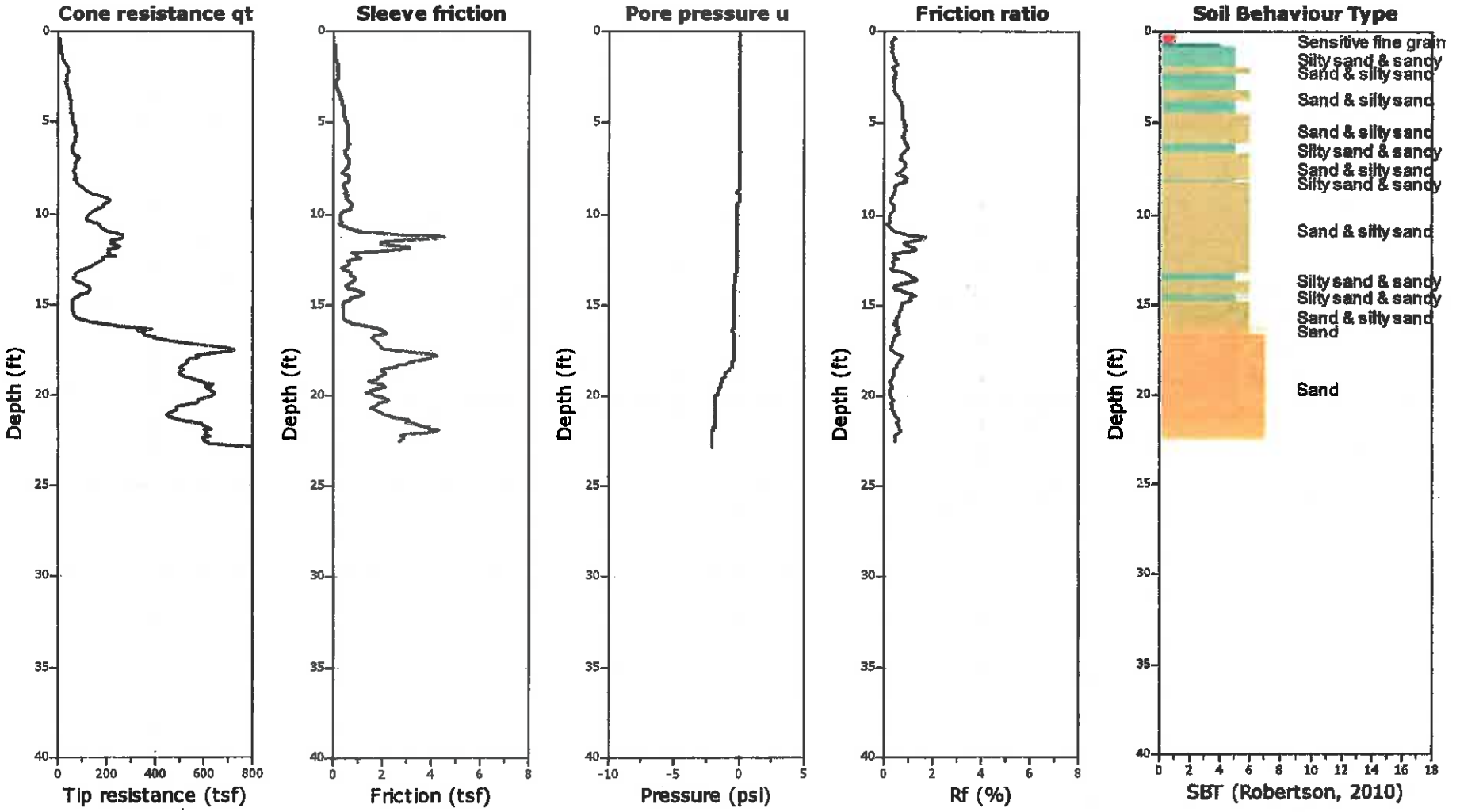


Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

CPT: CPT-2

Project: Thomas Harder & Company, Inc.
Location: 9998 Philadelphia Ave Mira Loma, CA

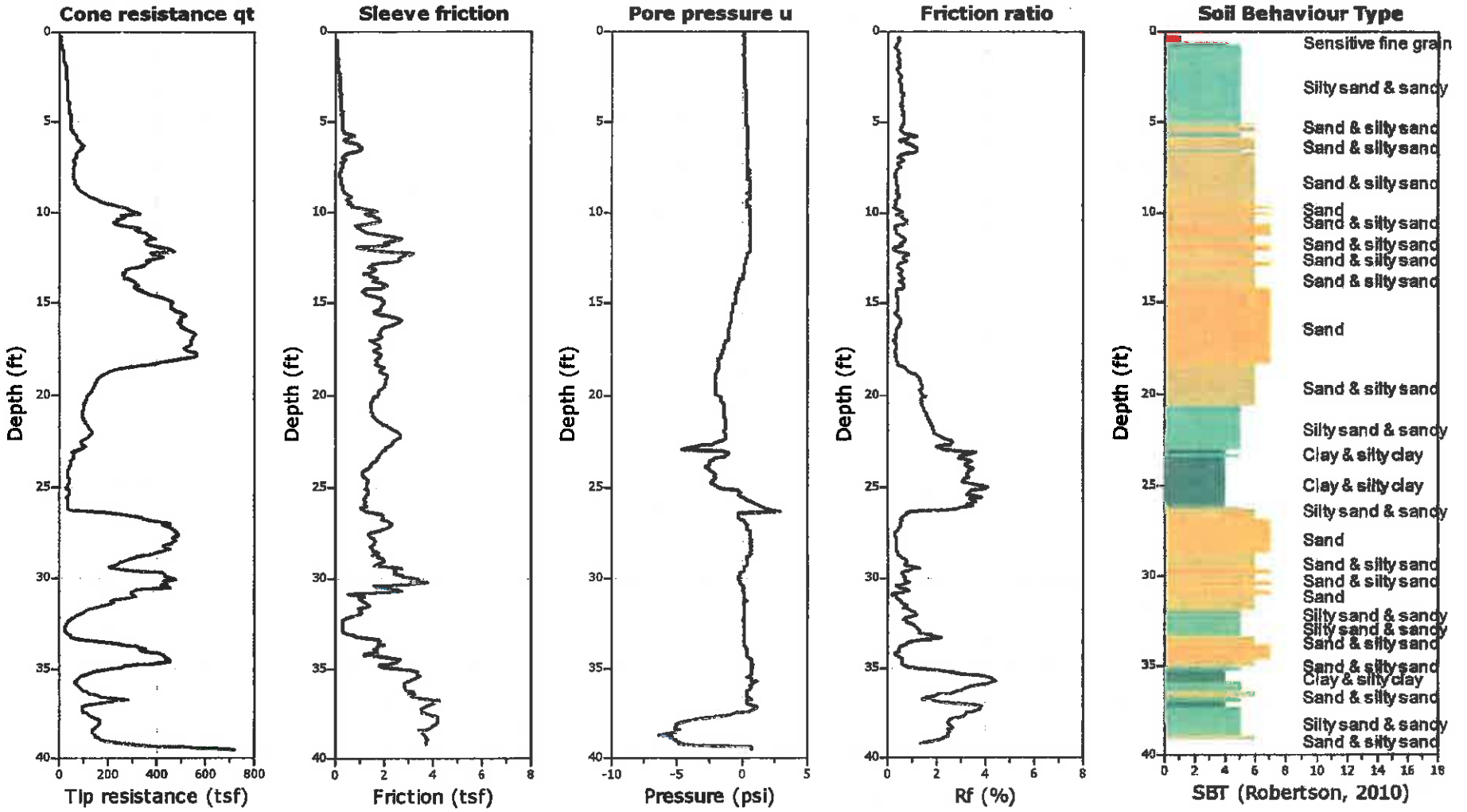
Total depth: 22.90 ft, Date: 9/22/2015
Cone Type: Vertek



Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

Project: Thomas Harder & Company, Inc.
Location: 9998 Philadelphia Ave Mira Loma, CA

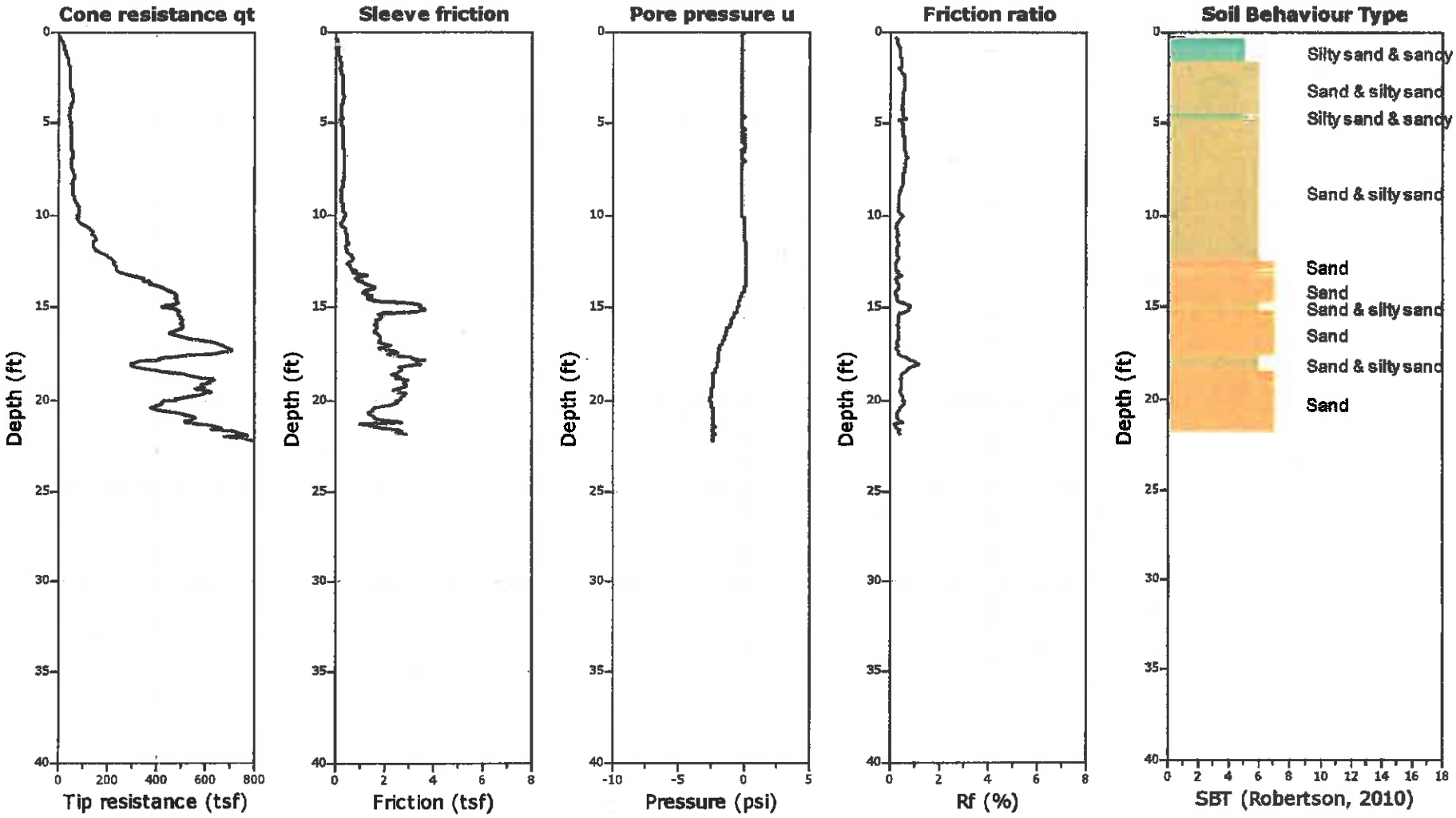
CPT: CPT-3
Total depth: 39.56 ft, Date: 9/22/2015
Cone Type: Vertek



Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

Project: Thomas Harder & Company, Inc.
Location: 9998 Philadelphia Ave Mira Loma, CA

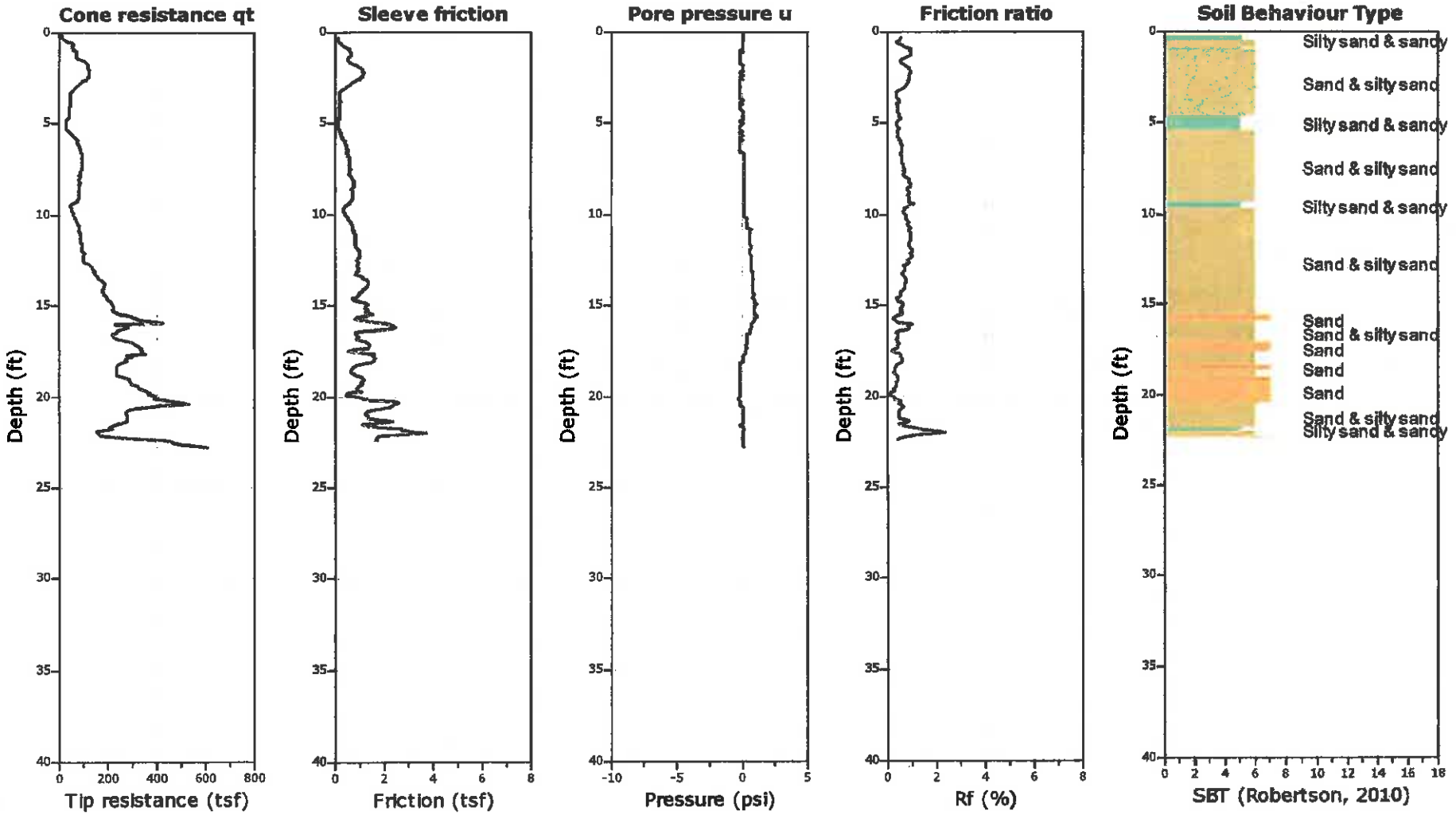
CPT: CPT-5
Total depth: 22.23 ft, Date: 9/22/2015
Cone Type: Vertek



Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

CPT: CPT-7
Total depth: 22.80 ft, Date: 9/22/2015
Cone Type: Vertek

Project: Thomas Harder & Company, Inc.
Location: 9998 Philadelphia Ave Mira Loma, CA

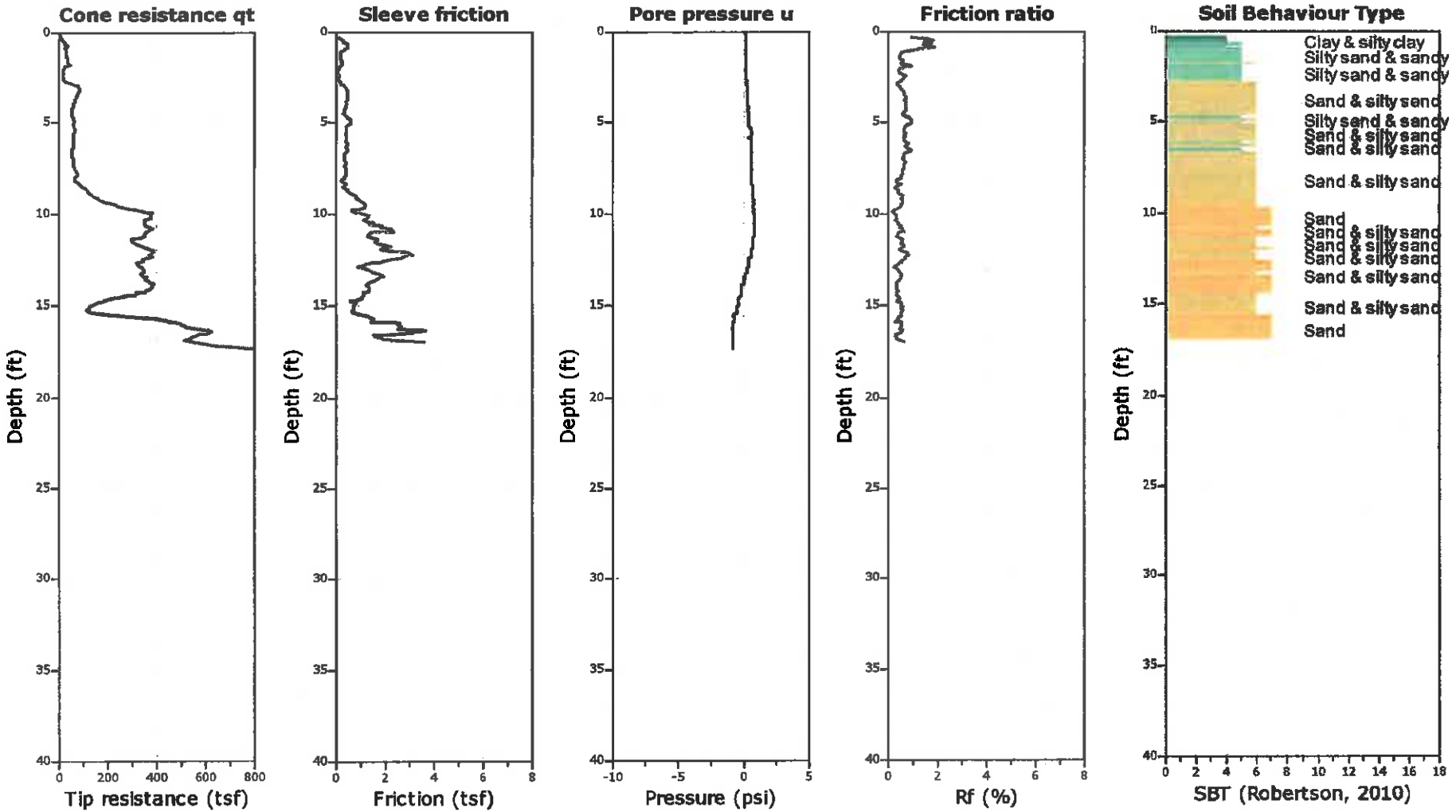


Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

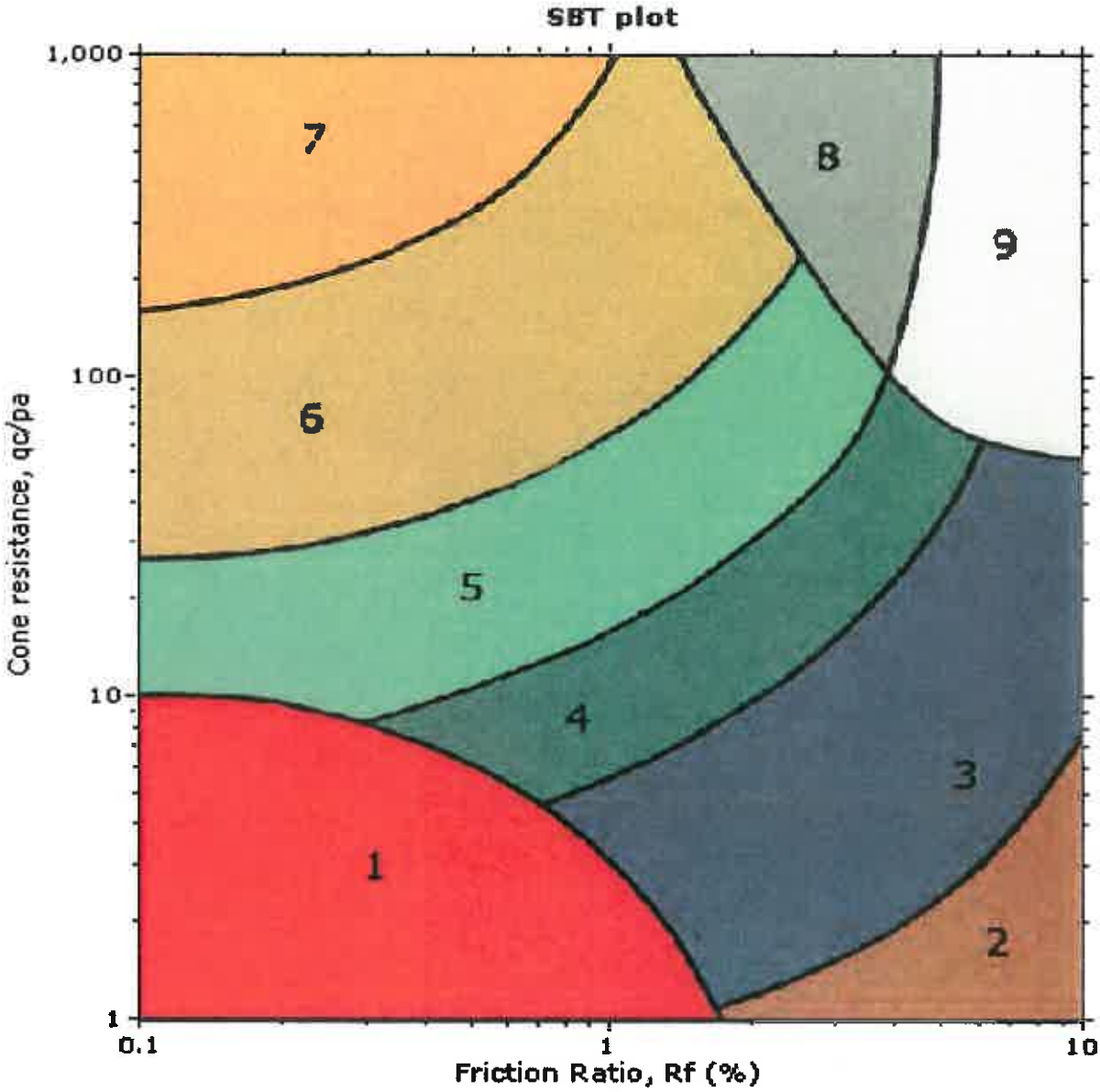
CPT: CPT-8

Project: Thomas Harder & Company, Inc.
Location: 9998 Philadelphia Ave Mira Loma, CA

Total depth: 17.37 ft, Date: 9/22/2015
Cone Type: Vertek



Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com



SBT legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Appendix C

Soil Physical Properties Testing Laboratory Reports

8100 Secura Way • Santa Fe Springs, CA 90670
Telephone (562) 347-2500 • Fax (562) 907-3610

November 2, 2015

Benjamin Lewis
Thomas Harder & Co.
1260 N. Hancock St., Suite 109
Anaheim, CA 92807

Re: PTS File No: 45627
Physical Properties Data
East Declez

Dear Mr. Lewis:

Please find enclosed report for Physical Properties analyses conducted upon samples received from your East Declez project. All analyses were performed by applicable ASTM, EPA, or API methodologies. The samples are currently in storage and will be retained for thirty days past completion of testing at no charge. Please note that the samples will be disposed of at that time. You may contact me regarding storage, disposal, or return of the samples.

PTS Laboratories Inc. appreciates the opportunity to be of service. If you have any questions or require additional information, please contact Morgan Richards at (562) 347-2509.

Sincerely,
PTS Laboratories, Inc.

Michael Mark Brady, P.G.
Laboratory Director

Encl.

Project Name: East Declez
Project Number: N/A

PTS File No: 45627
Client: Thomas Harder & Co.

TEST PROGRAM - 20151015

CORE ID	Depth ft.	Core Recovery ft.	Hydraulic Conductivity API RP40/EPA 9100	Hydraulic Conductivity API RP40/EPA 9100	Effective Porosity Mod. ASTM D425	Dry Bulk Density API RP40	Grain Size Analysis ASTM D422		Comments
		Plugs:	Vert. 1.5"	Horiz. 1.5"	Vert. 1.5"	Vert. 1.5"	Grab		
Date Received: 20151015									
BH-3	56-56.5	0.50	X	X					
BH-4	52.5-53	0.50	X	X					
BH-4B	21-21.5	0.50	X	X	X	X	X		
BH-5B	21-21.5	0.50	X	X	X	X	X		
BH-5	76-76.5	0.50	X	X					
BH-6	44.5-45	0.50	X	X					
TOTALS:	**6 Cores**	**3.00**	**6**	**6**	**2**	**2**	**2**		**6**

Laboratory Test Program Notes
Contaminant identification: _____
Standard TAT for basic analysis is 10 business days.
Effective Porosity: Includes Total Porosity.
ASTM D422: Dry Sieve only, Hydrometer analysis must be requested prior to initiating tests. Additional costs would apply.

PTS Laboratories

PTS File No: 45627
Client: Thomas Harder & Co.
Report Date: 11/02/15

PHYSICAL PROPERTIES DATA - DRAINAGE (EFFECTIVE) POROSITY

Project Name: East Declez
Project No: N/A

			METHODS:	API RP 40 / ASTM D2216	API RP40	Mod. ASTM D425	Mod. ASTM D425
SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENTATION (1)	ANALYSIS DATE	MOISTURE CONTENT, % weight	DENSITY BULK, g/cc	TOTAL POROSITY (2), %Vb	EFFECTIVE POROSITY, %Vb
BH-4B	21.3	V	20151026	--	1.77	20.9	15.7
BH-5B	21.3	V	20151026	--	1.83	20.0	15.6

(1) Sample Orientation: H = horizontal; V = vertical; R = remold
(2) Total Porosity = all interconnected pore channels.
Vb = Bulk Volume, cc; ND = Not Detected

PTS Laboratories

PTS File No: 45627
Client: Thomas Harder & Co.
Report Date: 11/02/15

PHYSICAL PROPERTIES DATA - HYDRAULIC CONDUCTIVITY

(Methodology: API RP 40; EPA 9100)

Project Name: East Declez
Project No: N/A

				25 PSI CONFINING STRESS		
SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENTATION (1)	ANALYSIS DATE	EFFECTIVE PERMEABILITY TO WATER (2,3), millidarcy	HYDRAULIC CONDUCTIVITY (3), cm/s	INTRINSIC PERMEABILITY TO WATER (3), cm^2
BH-3	56.3	V	20151027	2.63	2.66E-06	2.59E-11
BH-4	52.8	V	20151027	2.07	2.10E-06	2.05E-11
BH-4B	21.3	V	20151027	76.7	7.75E-05	7.57E-10
BH-5B	21.3	V	20151027	78.5	7.98E-05	7.75E-10
BH-5	76.3	V	20151027	3.91	4.02E-06	3.86E-11
BH-6	44.8	V	20151028	2.99	3.01E-06	2.95E-11

(1) Sample Orientation: H = horizontal; V = vertical; R = remold

(2) Effective (Native) = With as-received pore fluids in place.

(3) Permeability to water and hydraulic conductivity measured at saturated conditions.
Water = filtered Laboratory Fresh (tap) or Site water.

PTS File No: 45627
Client: Thomas Harder & Co.
Report Date: 11/02/15

PTS Laboratories

PHYSICAL PROPERTIES DATA - HYDRAULIC CONDUCTIVITY

(Methodology: API RP 40; EPA 9100)

Project Name: East Declez
Project No: N/A

				25 PSI CONFINING STRESS		
SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENTATION (1)	ANALYSIS DATE	EFFECTIVE PERMEABILITY TO WATER (2,3), millidarcy	HYDRAULIC CONDUCTIVITY (3), cm/s	INTRINSIC PERMEABILITY TO WATER (3), cm^2
BH-3	56.45	H	20151028	3.01	3.07E-06	2.98E-11
BH-4	52.95	H	20151028	2.40	2.43E-06	2.37E-11
BH-4B	21.45	H	20151028	81.8	8.35E-05	8.07E-10
BH-5B	21.45	H	20151028	464	4.70E-04	4.58E-09
BH-5	76.45	H	20151028	4.27	4.29E-06	4.21E-11
BH-6	44.95	H	20151028	5.71	5.78E-06	5.64E-11

(1) Sample Orientation: H = horizontal; V = vertical; R = remold

(2) Effective (Native) = With as-received pore fluids in place.

(3) Permeability to water and hydraulic conductivity measured at saturated conditions.
Water = filtered Laboratory Fresh (tap) or Site water.

PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422M)

PROJECT NAME: East Declez
PROJECT NO: N/A

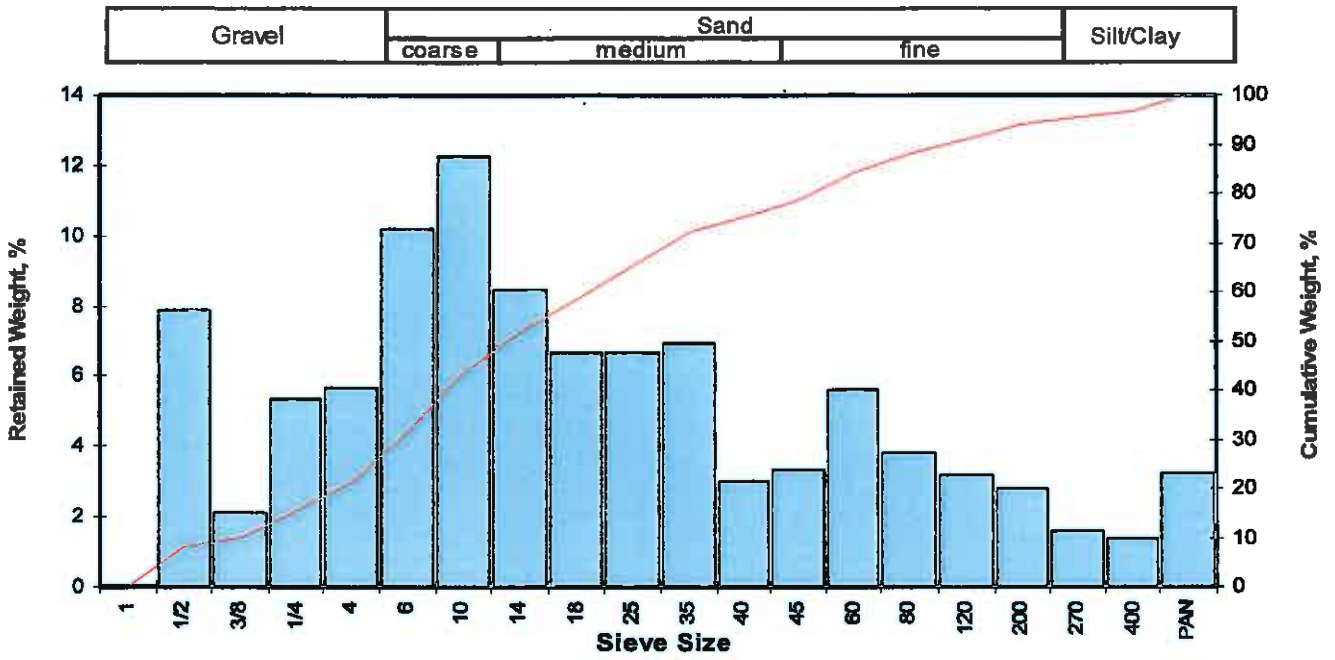
Sample ID	Depth, ft.	Mean Grain Size Description USCS/ASTM (1)	Median Grain Size, mm	Particle Size Distribution, wt. percent				
				Gravel	Sand Size			Silt/Clay
					Coarse	Medium	Fine	
BH-4B	21.1	Coarse sand	1.526	20.97	22.42	31.73	18.75	6.14
BH-5B	21.1	Coarse sand	1.901	26.27	22.51	29.16	14.95	7.11

(1) Based on Mean fromTrask

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D422M

Client:	Thomas Harder & Co.	**PTS File No:**	45627
Project:	East Declez	**Sample ID:**	BH-4B
Project No:	N/A	**Depth, ft:**	21.1



Opening		Phi of	U.S. Sieve	Sample Weight	Incremental Weight,	Cumulative Weight,
Inches	Millimeters	Screen	No.	grams	percent	percent
0.9844	25.002	-4.64	1	0.00	0.00	0.00
0.4922	12.501	-3.64	1/2	15.54	7.85	7.85
0.3740	9.500	-3.25	3/8	4.15	2.10	9.95
0.2500	6.351	-2.67	1/4	10.57	5.34	15.29
0.1873	4.757	-2.25	4	11.22	5.67	20.97
0.1324	3.364	-1.75	6	20.15	10.18	31.15
0.0787	2.000	-1.00	10	24.21	12.24	43.39
0.0557	1.414	-0.50	14	16.76	8.47	51.86
0.0394	1.000	0.00	18	13.15	6.65	58.50
0.0278	0.707	0.50	25	13.16	6.65	65.16
0.0197	0.500	1.00	35	13.74	6.94	72.10
0.0166	0.420	1.25	40	5.97	3.02	75.12
0.0139	0.354	1.50	45	6.63	3.35	78.47
0.0098	0.250	2.00	60	11.12	5.62	84.09
0.0070	0.177	2.50	80	7.53	3.81	87.89
0.0049	0.125	3.00	120	6.24	3.15	91.05
0.0029	0.074	3.75	200	5.57	2.82	93.86
0.0021	0.053	4.25	270	3.10	1.57	95.43
0.0015	0.037	4.75	400	2.69	1.36	96.79
			PAN	6.35	3.21	100.00
TOTALS				197.85	100.00	100.00

Cumulative Weight Percent greater than			
Weight	Phi	Particle Size	
percent	Value	Inches	Millimeters
5	-4.01	0.6332	16.082
10	-3.24	0.3727	9.466
16	-2.62	0.2412	6.127
25	-2.05	0.1633	4.147
40	-1.21	0.0909	2.309
50	-0.61	0.0601	1.526
60	0.11	0.0364	0.925
75	1.24	0.0167	0.423
84	1.99	0.0099	0.251
90	2.83	0.0055	0.140
95	4.11	0.0023	0.058

Measure	Trask	Inman	Folk-Ward
Median, phi	-0.61	-0.61	-0.61
Median, in.	0.0601	0.0601	0.0601
Median, mm	1.526	1.526	1.526
Mean, phi	-1.19	-0.31	-0.41
Mean, in.	0.0900	0.0489	0.0523
Mean, mm	2.285	1.241	1.330
Sorting	3.130	2.304	2.382
Skewness	0.868	0.129	0.146
Kurtosis	0.200	0.762	1.011
Grain Size Description (ASTM-USCS Scale)		Coarse sand (based on Mean from Trask)	

Description	Retained on Sieve #	Weight Percent
Gravel	4	20.97
Coarse Sand	10	22.42
Medium Sand	40	31.73
Fine Sand	200	18.75
Silt/Clay	<200	6.14
	Total	100

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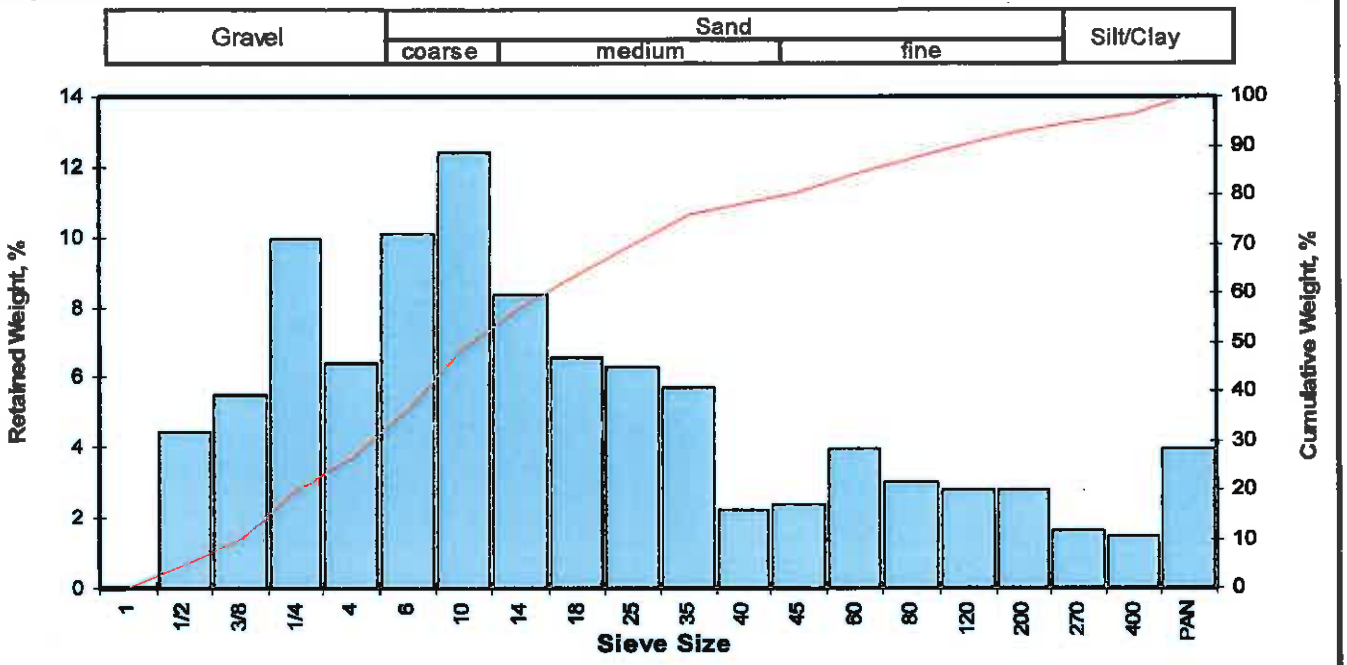
Phone: (562) 907-3607
Fax: (562) 907-3610

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D422M

Client:	Thomas Harder & Co.	**PTS File No:**	45627
Project:	East Declez	**Sample ID:**	BH-5B
Project No:	N/A	**Depth, ft:**	21.1



Opening		Phi of	U.S. Sieve	Sample Weight	Incremental Weight,	Cumulative Weight,
Inches	Millimeters	Screen	No.	grams	percent	percent
0.9844	25.002	-4.64	1	0.00	0.00	0.00
0.4922	12.501	-3.64	1/2	9.12	4.45	4.45
0.3740	9.500	-3.25	3/8	11.24	5.49	9.94
0.2500	6.351	-2.67	1/4	20.33	9.93	19.87
0.1873	4.757	-2.25	4	13.11	6.40	26.27
0.1324	3.364	-1.75	6	20.64	10.08	36.35
0.0787	2.000	-1.00	10	25.46	12.43	48.78
0.0557	1.414	-0.50	14	17.11	8.35	57.13
0.0394	1.000	0.00	18	13.47	6.58	63.71
0.0278	0.707	0.50	25	12.86	6.28	69.99
0.0197	0.500	1.00	35	11.73	5.73	75.71
0.0166	0.420	1.25	40	4.56	2.23	77.94
0.0139	0.354	1.50	45	4.84	2.36	80.30
0.0098	0.250	2.00	60	8.10	3.95	84.26
0.0070	0.177	2.50	80	6.19	3.02	87.28
0.0049	0.125	3.00	120	5.78	2.82	90.10
0.0029	0.074	3.75	200	5.71	2.79	92.89
0.0021	0.053	4.25	270	3.38	1.65	94.54
0.0015	0.037	4.75	400	3.07	1.50	96.04
			PAN	8.11	3.96	100.00
TOTALS				204.81	100.00	100.00

Cumulative Weight Percent greater than			
Weight	Phi	Particle Size	
percent	Value	Inches	Millimeters
5	-3.60	0.4789	12.164
10	-3.24	0.3731	9.478
16	-2.89	0.2925	7.430
25	-2.33	0.1983	5.037
40	-1.53	0.1137	2.887
50	-0.93	0.0748	1.901
60	-0.28	0.0479	1.216
75	0.94	0.0206	0.522
84	1.97	0.0101	0.256
90	2.98	0.0050	0.127
95	4.40	0.0019	0.047

Measure	Trask	Inman	Folk-Ward
Median, phi	-0.93	-0.93	-0.93
Median, in.	0.0748	0.0748	0.0748
Median, mm	1.901	1.901	1.901
Mean, phi	-1.47	-0.46	-0.62
Mean, in.	0.1094	0.0543	0.0604
Mean, mm	2.780	1.378	1.534
Sorting	3.106	2.430	2.428
Skewness	0.853	0.191	0.261
Kurtosis	0.241	0.647	1.004

Grain Size Description (ASTM-USCS Scale)	Coarse sand (based on Mean from Trask)

Description	Retained on Sieve #	Weight Percent
Gravel	4	26.27
Coarse Sand	10	22.51
Medium Sand	40	29.16
Fine Sand	200	14.95
Silt/Clay	<200	7.11
	Total	100

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Phone: (562) 907-3607
Fax: (562) 907-3610

PTS Laboratories, Inc.

CHAIN OF CUSTODY RECORD

PAGE OF

COMPANY: THOMAS HARDER AND COMPANY

ADDRESS: 1260 N. HANCOCK ST. CITY: ANAHEIM SUITE: 109 ZIP CODE: 92807

PROJECT MANAGER: BEN LEWIS email: blewis@thomashardercompany.com

PROJECT NAME: EAST DECCET PHONE NUMBER: 714-779-3875

PROJECT NUMBER: — FAX NUMBER: —

SITE LOCATION:

SAMPLER SIGNATURE:

PO#:

TURNAROUND TIME: 24 HOURS ☐ 5 DAYS ☐ 72 HOURS ☐ NORMAL ☑

OTHER:

SAMPLE INTEGRITY (CHECK): INTACT ✓ TEMP(F) 56

PTS QUOTE NO.:

PTS FILE: 45627

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	DEPTH, FT	NUMBER OF SAMPLES	SOIL PROPERTIES PACKAGE	HYDRAULIC CONDUCTIVITY PACKAGE	PORE FLUID SATURATIONS PACKAGE	TCEQ/TNRCC PROPERTIES PACKAGE	CAPILLARITY PACKAGE	FLUID PROPERTIES PACKAGE	PHOTOLOG: CORE PHOTOGRAPHY	VAPOR TRANSPORT PACKAGE	POROSITY: TOTAL AIR FILLED, WATER FILLED	POROSITY: EFFECTIVE, ASTM D4254M	SPECIFIC GRAVITY, ASTM D854	BULK DENSITY (DRY), API RP40 or ASTM D2937	AIR PERMEABILITY, API RP40	HYDRAULIC CONDUCTIVITY, EPA9100/API RP40 or D5084	GRAIN SIZE DISTRIBUTION, ASTM D422 or 4464M	TOC: WALKLEY-BLACK	ATTERBERG LIMITS, ASTM D4318	VAPOR INTRUSION PACKAGE	FREE PRODUCT MOBILITY PACKAGE	COMMENTS
BH-3				1																				
BH-4				1																				
BH-4B				1																				
BH-5B				1																				
BH-5				1																				
BH-6				1																				

1. RELINQUISHED BY	2. RECEIVED BY	3. RELINQUISHED BY	4. RECEIVED BY
COMPANY: THOMAS HARDER + CO.	COMPANY: PTS LABS	COMPANY:	COMPANY:
DATE: 10/15/15 TIME: 11:00 AM	DATE: 10/15/15 TIME: 11:00	DATE: TIME:	DATE: TIME:

8100 Secura Way • Santa Fe Springs, CA 90670
Telephone (562) 347-2500 • Fax (562) 907-3610

November 23, 2015

Benjamin Lewis
Thomas Harder & Co.
1260 N. Hancock St., Suite 109
Anaheim, CA 92807

Re: PTS File No: 45627
Physical Properties Data – selected test reruns
East Declez

Dear Mr. Lewis:

Please find enclosed report for Physical Properties analyses conducted upon samples received from your East Declez project. This report covers the retesting made at your request on samples BH-4B and BH-5B; hydraulic conductivity was remeasured on the two samples and total porosity was measured using Helium porosimetry via Boyle's Law principle of gas expansion.

PTS Laboratories Inc. appreciates the opportunity to be of service. If you have any questions or require additional information, please contact Morgan Richards at (562) 347-2509.

Sincerely,
PTS Laboratories, Inc.

Michael Mark Brady, P.G.
Laboratory Director

Encl.

PTS Laboratories

PTS File No: 45627
Client: Thomas Harder & Co.
Report Date: 11/23/15

PHYSICAL PROPERTIES DATA

Project Name: East Declez
Project No: N/A

		METHODS:	API RP 40 / ASTM D2216	API RP 40		API RP 40		
				DENSITY		POROSITY, %Vb (2)		
SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENTATION (1)	MOISTURE CONTENT, % weight	DRY BULK, g/cc	GRAIN, g/cc	TOTAL	AIR-FILLED	WATER-FILLED
BH-4B	21.30	V	2.6	1.77	2.68	34.1	29.4	4.7
BH-5B	21.30	V	2.9	1.83	2.69	32.0	26.8	5.2
BH-4B	21.45	H	2.1	1.99	2.69	26.3	22.1	4.1
BH-5B	21.45	H	1.8	1.83	2.70	32.2	28.9	3.3

Total Porosity by Helium Porosimetry (Boyle's Law).

(1) Sample Orientation: H = horizontal; V = vertical; R = remold

(2) Total Porosity = all interconnected pore channels; Air Filled = pore channels not occupied by pore fluids.

Vb = Bulk Volume, cc; - - = Analysis not requested.

PTS File No: 45627
Client: Thomas Harder & Co.
Report Date: 11/23/15

PTS Laboratories

PHYSICAL PROPERTIES DATA - HYDRAULIC CONDUCTIVITY

(Methodology: API RP 40; EPA 9100)

Project Name: East Declez
Project No: N/A

				25 PSI CONFINING STRESS		
SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENTATION (1)	ANALYSIS DATE	EFFECTIVE PERMEABILITY TO WATER (2,3), millidarcy	HYDRAULIC CONDUCTIVITY (3), cm/s	INTRINSIC PERMEABILITY TO WATER (3), cm^2
Remeasure Hydraulic Conductivity using same sample.						
BH-4B	21.3	V	20151118	177	1.76E-04	1.74E-09
Remeasure Hydraulic Conductivity usIng same sample.						
BH-5B	21.3	V	20151118	153	1.54E-04	1.51E-09

Note: vertical samples were dried during initial testing phase. Samples were resaturated with water and hydraulic conductivity measured.

(1) Sample Orientation: H = horizontal; V = vertical; R = remold
(2) Effective (Native) = With as-received pore fluids in place.
(3) Permeability to water and hydraulic conductivity measured at saturated conditions.
Water = filtered Laboratory Fresh (tap) or Site water.

PTS Laboratories

PTS File No: 45627
Client: Thomas Harder & Co.
Report Date: 11/23/15

PHYSICAL PROPERTIES DATA - HYDRAULIC CONDUCTIVITY

(Methodology: API RP 40; EPA 9100)

Project Name: East Declez
Project No: N/A

				25 PSI CONFINING STRESS		
SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENTATION (1)	ANALYSIS DATE	EFFECTIVE PERMEABILITY TO WATER (2,3), millidarcy	HYDRAULIC CONDUCTIVITY (3), cm/s	INTRINSIC PERMEABILITY TO WATER (3), cm^2
Remeasure Hydraulic Conductivity using same sample.						
BH-4B	21.45	H	20151118	55.0	5.43E-05	5.42E-10
Remeasure Hydraulic Conductivity using same sample.						
BH-5B	21.45	H	20151118	4200	4.13E-03	4.15E-08

(1) Sample Orientation: H = horizontal; V = vertical; R = remold

(2) Effective (Native) = With as-received pore fluids in place.

(3) Permeability to water and hydraulic conductivity measured at saturated conditions.
Water = filtered Laboratory Fresh (tap) or Site water.

Appendix D

Borehole Lithologic Logs

Lithologic Log

Client:	IEUA	**Drilling Contractor:**	J & H Drilling Co., Inc.
Borehole/ Well No:	BH-3	**Drilling Method:**	Hollow Stem Auger
Project Number:	15-010-102	**Borehole Diameter:**	8 inches
Project:	East Declez	**Location of boring/ Well (State Plane, NAD 83):**	
Start Date:	1-Oct-15	**X:** 6183762 (approximate)	
Finish Date:	2-Oct-15	**Y:** 2321637 (approximate)	
Logged By:	JB and MH		

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
0	SM	100		7.5 YR 6/4 Light Brown	**SILTY SAND**: Dry. Fine-grained sand, trace medium-grained sand and coarse-grained sand, less than 5 percent gravel up to 20 mm; subrounded; 20-30 percent silt.
-5		20		7.5 YR 6/4 Light Brown	Trace gravel up to 55 mm.
-10	SW-SM	40	25, 50 (6-inch)	7.5 YR 6/2 Pinkish Gray	WELL-GRADED SAND WITH SILT AND GRAVEL: Dry. Fine-grained sand, 20-30 percent gravel up to 20 mm; rounded; 10-15 percent silt.
-15	SM	20		7.5 YR 5/3 Brown	SILTY SAND WITH GRAVEL: Dry. Fine-grained sand, with medium-grained sand, trace-coarse grained sand, 10-15 percent gravel up to 25 mm; subrounded to rounded; 15-20 percent silt.
-20	SP	40	17, 23, 37	7.5 YR 6/3 Light Brown	POORLY GRADED SAND: Moist. Medium-grained sand, with fine-grained sand, some coarse-grained sand, less than 5 percent gravel up to 10 mm, 5-10 percent silt; subrounded to rounded; 5-10 percent silt.
-25					

Thomas Harder & Co.
Groundwater Consulting

Borehole Lithologic Log

Borehole/ Well No.:	BH-3
Client:	IEUA
Project No.:	15-010-102

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
-25	SW-SM	10		7.5 YR 5/3 Brown	WELL-GRADED SAND WITH SILT: Moist. Medium-grained sand, with fine-grained sand, some coarse-grained sand, less than 5 percent gravel up to 50 mm; rounded; 10-15 percent silt.
-30			22, 27, 35		
	ML	90		10 YR 5/1	SILT: Moist, very soft consistency. Less than 5 percent fine-grained sand. Silt: low dry strength, rapid dilatency, medium toughness, medium plasticity.
	SM	50		10 YR 5/2 Grayish Brown	SILTY SAND WITH GRAVEL: Moist. Fine-grained sand, with medium-grained sand, trace-coarse grained sand, 15-20 percent gravel up to 55 mm; subrounded to rounded; 20-30 percent silt.
-35	ML	50		10 YR 5/4 Yellowish Brown	SILT: Moist, firm consistency. Trace fine-grained sand. Silt: no dry strength, rapid dilatency, medium toughness, medium plasticity.
-40	SM	80	42, 54 (6-inch)	7.5 YR 6/3 Light Brown	SILTY SAND WITH GRAVEL: Moist, weakly cemented. Medium-grained sand, with fine-grained sand, some coarse-grained sand, 10-15 percent gravel up to 20 mm; subrounded to rounded; 15-20 percent silt.
-45	SP	30		10 YR 6/4 Light Yellowish Brown	POORLY-GRADED SAND: Moist,. Medium-grained sand, with coarse-grained sand, trace fine-grained sand, 5-10 percent gravel up to 10 mm; subrounded to rounded; 5-10 percent silt.
-50	SP-CL	100	18, 23, 35	10 YR 5/6 Yellowish Brown	CLAYEY SAND/SANDY CLAY: Wet, hard consistency. 50 percent very fine-grained sand, 50 percent clay. Clay: high dry strength, slow dilatency, low toughness, high plasticity.
-55	CL	40		7.5 YR 4/4 Brown	LEAN CLAY: Wet, hard consistency. 80-90 percent clay, 10-20 percent medium-grained sand, trace coarse-grained sand, some fine-grained sand. Clay: high dry strength, slow dilatency, medium toughness, medium plasticity.
		100			
		90	SAMPLE FOR LAB (56-56.5)	7.5 YR 4/4 Brown	LEAN CLAY WITH SAND: Wet, hard consistency. 75-85 percent clay, 15-25 percent medium-grained sand, trace coarse-grained-sand, some fine-grained sand, less than 5 percent gravel up to 30 mm; subangular to angular. Clay: high dry strength, slow

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Borehole Lithologic Log

Borehole/ Well No.:	BH-3
Client:	IEUA
Project No.:	15-010-102

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
-60					dilatency, medium toughness, medium plasticity.
		80		7.5 YR 4/4 Brown	LEAN CLAY WITH SAND: Wet, hard consistency. 75-85 percent clay, 15-25 percent medium-grained sand, trace coarse-grained sand, some fine-grained sand, less than 5 percent gravel up to 48 mm; subangular to angular. Clay: high dry strength, slow dilatency, medium toughness, medium plasticity.
-65		70			Trace gravel up to 30 mm.
-70		10			
-75	SP-SC	20		7.5 YR 4/4 Brown	POORLY GRADED SAND WITH CLAY AND GRAVEL (Weathered Bedrock?): Wet, weakly cemented, granitic. Medium-grained sand, with coarse-grained sand, some fine-grained sand, 20 percent gravel up to 25 mm; subangular to angular; 10-15 percent clay.
-80	GW	10		7.5 YR 5/8 Strong Brown	WELL-GRADED GRAVEL WITH SAND (Weathered Bedrock?): Wet, strongly cemented, granitic. 55-60 percent gravel up to 50 mm; subrounded to angular; 5-10 percent silt.
-85	SP	20		7.5 YR 4/4 Brown	POORLY GRADED SAND (Weathered Bedrock?): Moist, moderately cemented, granitic. Fine-grained sand, with medium-grained sand, coarse-grained sand, 10-15 percent gravel up to 15 mm; rounded to subrounded; less than 5 percent silt.
-90		10		7.5 YR 4/4 Brown	POORLY-GRADED SAND (Weathered Bedrock?): Moist, moderately cemented, granitic. Fine-grained sand, with medium-grained and coarse-grained sand, 10-15 percent gravel up to 35 mm; rounded to subangular; less than 5 percent silt.

Borehole Lithologic Log

Borehole/ Well No.:	BH-3
Client:	IEUA
Project No.:	15-010-102

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
-95		100		7.5 YR 6/2	POORLY-GRADED GRAVEL WITH SAND (Weathered Bedrock?): Moist, weakly cemented, granitic. 60-70 percent gravel up to 45 mm; subrounded to subangular; less than 5 percent silt.
		5		7.5 YR 4/4 Brown	POORLY-GRADED SAND WITH GRAVEL (Weathered Bedrock?): Moist, weakly cemented, granitic. Fine-grained sand, with medium-grained sand, trace coarse grained sand, 20-25 percent gravel up to 35 mm; rounded to subangular; less than 5 percent silt.
-100		10		7.5 YR 4/4 Brown	10-15 percent gravel up to 10 mm.
-105		20		10 YR 8/2 Very Pale Brown	POORLY GRADED GRAVEL (Bedrock?): Moist, strongly cemented, granitic. Gravel up to 70 mm, some medium-grained sand; angular; less than 5 percent silt.

Notes:

Grain size distribution and percentages are approximate based on visual inspection of samples.

Soil types classified based on Unified Soil Classification System.

Soil color based on Munsell Soil Color Charts.

"Trace" equals to 0-5 percent, "some" equals to 5-10 percent, and "with" equals to 10-15 percent.

Lithologic Log

Client:	IEUA	**Drilling Contractor:**	J & H Drilling Co., Inc.
Borehole/ Well No:	BH-4	**Drilling Method:**	Hollow Stem Auger
Project Number:	15-010-102	**Borehole Diameter:**	8 inches
Project:	East Declez	**Location of boring/ Well (State Plane, NAD 83):**	
Start Date:	29-Sep-15	X: 6184347 (approximate)	
Finish Date:	30-Sep-15	Y: 2321842 (approximate)	
Logged By:	JV and BL		

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
0		100		10 YR 4/4 Dark Yellowish Brown	POORLY GRADED SAND WITH SILT: Dry. Fine-grained sand, some medium-grained sand, trace coarse-grained sand, less than 5 percent gravel up to 10 mm; subangular to subrounded; 5-10 percent silt.
-5		0			
-10		50	35, 50 (6-inch)	10 YR 4/4 Dark Yellowish Brown	WELL-GRADED SAND: Dry. Medium-grained sand, with coarse-grained sand, some fine-grained sand, 5 percent gravel up to 20 mm; subrounded to subangular; less than 5 percent silt.
		0			
-15		5			
		20			
-20		5	41, 50 (6-inch)		
-25					

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Borehole Lithologic Log

Borehole/ Well No.:	BH-4
Client:	IEUA
Project No.:	15-010-102

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
-25		60		5 Y 4/2 Dark Reddish Gray	**POORLY GRADED SAND: Moist,. Fine-grained sand, trace medium-grained sand, less than 5 percent gravel up to 10 mm; subrounded to rounded; less than 5 percent silt.**
-30		25	50 (6-Inch)	5 Y 4/1 Dark Gray	POORLY GRADED SAND WITH GRAVEL: Moist. Fine-grained sand, some medium-grained sand, trace coarse-grained sand, 20 percent gravel up to 35 mm; subangular to subrounded; less than 5 percent silt.
		25			
-35		50		5 Y 4/4 Reddish Brown	POORLY GRADED SAND: Dry, weakly cemented. Fine-grained sand, with medium-grained sand, trace coarse-grained sand, 10 percent gravel up to 15 mm; subangular to subrounded; less than 5 percent silt. Lean clay from 35.0-35.5 feet.
-40		40	41, 50 (5-inch)	7.5 YR 4/6 Strong Brown	CLAYEY SILT WITH SAND: Moist, hard consistency. 70-80 percent fines, 20-30 percent fine-grained sand, less than 5 percent gravel up to 15 mm. Silt: medium dry strength, slow dilatancy, high toughness, medium plasticity.
		80			
-45					
-50		100	19, 21, 44	7.5 YR 4/6 Strong Brown	Increase in fines from 50 to 52 feet.
		80	13, 18, 21 SAMPLE FOR LAB (52.5-53)		
		80		7.5 YR 4/6 Strong Brown	Increase in sand from 53 to 54 feet, trace gravel.
-55					
				10 YR 4/6	SILTY SAND: Moist, weak cementation. Medium-grained sand, with fine-grained

Borehole Lithologic Log

Borehole/ Well No.:	BH-4
Client:	IEUA
Project No.:	15-010-102

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
-60	SP-SM	100			sand, some coarse-grained sand, less than 5 percent gravel up to 8 mm; subangular; 20-30 percent silt. Drilling rate slows at 59 feet.
		80		10 YR 4/6	
	CL	80		10 YR 4/4	POORLY GRADED SAND WITH SILT: Moist, moderate cementation. Fine-grained sand, trace medium-grained sand; sub-rounded; less than 10 percent silt.
	SP-SM	80		7.5 YR 4/6 Strong Brown	LEAN CLAY: Moist, firm consistency. 95 percent clay, 5 percent fine-grained sand. Clay: high dry strength, slow dilatancy, medium toughness, medium plasticity.
-65					POORLY GRADED SAND WITH SILT: Moist, moderate cementation. Fine-grained sand, some medium-grained sand, trace coarse-grained sand; subangular to angular; less than 10 percent silt.
	ML	100		10 YR 5/8 Yellowish Brown	SILT: Moist, hard consistency. 95 percent silt, 5 percent fine-grained sand. Silt: low dry strength, rapid dilatancy, medium toughness, high plasticity.
	CL	90		5 YR 4/6 Yellowish Red	LEAN CLAY: Moist, hard consistency. Greater than 95 percent clay, less than 5 percent fine-grained sand, trace medium-grained sand. Clay: high dry strength, slow dilatancy, medium toughness, high plasticity.
-70		100			
-75		100			
-80		100			
-85		100		5 YR 4/6 Yellowish Red	Increase in gravel from 85 to 89 feet.
-90		100			

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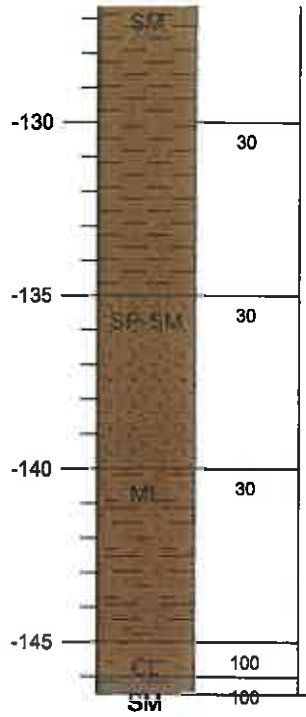
Borehole Lithologic Log

Borehole/ Well No.:	BH-4
Client:	IEUA
Project No.:	15-010-102

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
-95	ML	100		7.5 YR 4/6 Strong Brown	SILT WITH SAND: Moist, soft consistency. 90 percent silt, 10 percent fine-grained sand, trace medium-grained sand, trace coarse-grained sand, trace gravel to 20 mm. Silt: low dry strength, rapid dilatancy, low toughness, low plasticity.
-100	CL	30		7.5 YR 5/6 Strong Brown	LEAN CLAY: Moist, soft to firm consistency. 90-95 percent clay, 5-10 percent medium-grained sand, coarse-grained sand, fine-grained sand, less than 5 percent gravel up to 10 mm. Clay: high dry strength, slow to none dilatancy, medium toughness, medium plasticity.
-105		30			
	ML	100		7.5 YR 4/6 Strong Brown	SANDY SILT: Moist, very soft consistency. 50-60 percent silt, 40-50 percent fine-grained sand, with medium-grained sand, trace coarse-grained sand, less than 5 percent gravel up to 30 mm. Silt: low dry strength, slow dilatancy, low toughness, low plasticity.
-110	SM	40		7.5 YR 6/8 Reddish Yellow	SILTY SAND: Moist, moderate cementation. Fine-grained sand, some medium-grained sand, trace coarse-grained sand, less than 5 percent gravel to 35 mm; subrounded to subangular; 20-30 percent silt.
-115	ML	30		7.5 YR 5/6 Strong Brown	SANDY SILT: Moist, firm consistency. 60-70 percent silt, 30-40 percent fine-grained sand, some medium-grained sand, trace coarse-grained sand, less than 5 percent gravel up to 25 mm. Silt: low dry strength, slow to no dilatancy, medium toughness, medium plasticity.
-120	SM-ML	100		7.5 YR 5/6	SANDY SILT/SILTY SAND: Moist, firm consistency. 40 percent fine-grained sand, 40 percent silt, 20 percent gravel up to 40 mm. Silt: low dry strength, slow dilatancy, low toughness, low to medium plasticity.
	NR	0			No recovery
	ML	100		7.5 YR 5/6 Strong Brown	SILT: Moist, soft consistency. 60-70 percent silt, 30-40 percent fine-grained sand, trace medium-grained sand, less than 5 percent gravel up to 25 mm. Silt: low dry strength, slow dilatancy, low toughness, low plasticity. Lean clay from 122.0 to 122.5 feet, high toughness, high plasticity.
-125		40		7.5 YR 4/6	

Borehole Lithologic Log

Borehole/ Well No.:	BH-4
Client:	IEUA
Project No.:	15-010-102



Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
	SM			Strong Brown	SILTY SAND: Moist, soft consistency. Fine-grained sand, some medium-grained sand, trace coarse-grained sand, less than 5 percent gravel up to 12 mm; subrounded to angular; 10-15 percent silt.
-130		30		7.5 YR 5/6 Strong Brown	POORLY GRADED SAND WITH SILT: Moist, strongly cemented. Fine-grained sand, with medium-grained sand, trace coarse-grained sand, less than 5 percent gravel up to 50 mm; subrounded to angular; 10-15 percent silt.
-135	SP-SM	30		7.5 YR 4/6 Strong Brown	POORLY GRADED SAND WITH SILT: Moist, soft and weakly cemented. Fine-grained sand, with medium-grained sand, trace coarse-grained sand, 5-10 percent gravel up to 40 mm; subrounded to angular; 5-10 percent silt.
-140	ML	30		7.5 YR 5/6 Strong Brown	SANDY SILT WITH GRAVEL: Moist, soft consistency. 50-60 percent silt, 25-30 percent fine-grained sand, with medium-grained sand, trace coarse-grained sand, 15-20 percent gravel up to 55 mm. Silt: Low dry strength, rapid dilatancy, medium toughness, low plasticity.
-145	CL	100		7.5 YR 4/6	LEAN CLAY WITH SAND: Moist, soft constistency. 50-60 percent clay, 25-30 percent sand, 5-10 percent gravel up to 12 mm; subrounded to angular. Clay: high dry strength, slow dilatancy, medium toughness, high plasticity.
	SM	100		7.5 YR 4/4 Brown	SILTY SAND WITH GRAVEL (Bedrock?): Moist, weakly cemented. Coarse-grained sand, with medium-grained sand, trace-fine grained sand, 30-40 percent gravel up to 50 mm; angular to subrounded; 40-50 percent silt. Very slow drilling.

Notes:

Grain size distribution and percentages are approximate based on visual inspection of samples.

Soil types classified based on Unified Soil Classification System.

Soil color based on Munsell Soil Color Charts.

"Trace" equals to 0-5 percent, "some" equals to 5-10 percent, and "with" equals to 10-15 percent.

Lithologic Log

Client:	IEUA	**Drilling Contractor:**	J & H Drilling Co., Inc.
Borehole/ Well No:	BH-5	**Drilling Method:**	Hollow Stem Auger
Project Number:	15-010-102	**Borehole Diameter:**	8 inches
Project:	East Declez	**Location of boring/ Well (State Plane, NAD 83):**	
Start Date:	2-Oct-15	**X:** 6184380 (approximate)	
Finish Date:	5-Oct-15	**Y:** 2321712 (approximate)	
Logged By:	JB		

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
0	SP	100		7.5 YR 6/4 Light Brown	POORLY GRADED SAND: Dry. Fine-grained sand, with medium-grained sand, trace coarse-grained sand, less than 5 percent gravel up to 10 mm; subrounded to subangular; 5-10 percent silt.
-5	SP-SM	10		7.5 YR 6/4 Light Brown	POORLY GRADED SAND WITH SILT: Dry. Fine-grained sand, with medium-grained sand, 5-10 percent gravel up to 30 mm; subrounded to rounded; 10-15 percent silt.
-10	SW-SM	90	26, 50 (6-inch)	7.5 YR 6/3 Light Brown	WELL-GRADED SAND WITH SILT: Dry. Medium-grained sand, with fine-grained sand, some coarse-grained sand, 5-10 percent gravel up to 50 mm; subrounded to rounded; 10-15 percent silt.
		90			
-15		10			
-20		30	40, 50 (6-inch)	7.5 YR 7/1 Light Gray	WELL-GRADED SAND WITH SILT: Dry. Medium-grained sand, with fine and coarse-grained sand, 15-20 percent gravel up to 40 mm; subrounded to rounded; 10-15 percent silt.
-25					

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Borehole Lithologic Log

Borehole/ Well No.:	BH-5
Client:	IEUA
Project No.:	15-010-102

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
-25	SP-SM	30		7.5 YR 6/1 Gray	POORLY GRADED SAND WITH SILT: Dry. Fine-grained sand; subrounded to rounded; 10-15 percent silt.
-30	CL	90	20, 22, 40	7.5 YR 4/6 Strong Brown	LEAN CLAY WITH SAND: Dry, hard consistency. 80 percent clay, 15-20 percent fine-grained sand, with medium-grained sand, trace coarse-grained sand, less than 5 percent gravel up to 20 mm; subrounded to rounded. Clay: high dry strength, slow dilatancy, medium toughness, low plasticity.
		90			
-35		90			
-40		90	29, 50 (6-inch)	7.5 YR 4/4 Brown	LEAN CLAY: Dry, hard consistency. 90-95 percent clay, 5-10 percent medium-grained sand, with fine-grained sand. Clay: high dry strength, slow dilatancy, medium toughness, low plasticity.
-45		90			
-50		90	20, 29 (6-inch)	7.5 YR 5/6 Strong Brown	LEAN CLAY: Dry, firm consistency. 90-95 percent clay, 5-10 percent medium-grained sand, with fine-grained sand. Clay: high dry strength, slow dilatancy, medium toughness, low plasticity.
-55		100		7.5 YR 5/6	LEAN CLAY: Moist, hard consistency. 90-95 percent clay, 5-10 percent medium-grained sand, with fine-grained sand. Clay: high dry strength, slow dilatancy, medium toughness, low plasticity.
		40		7.5 YR 4/6 Strong Brown	LEAN CLAY: Moist, hard consistency. 90-95 percent clay, 5-10 percent medium-grained sand, with fine-grained sand. Clay: high dry strength, slow dilatancy, medium toughness, low plasticity.

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Borehole Lithologic Log

Borehole/ Well No.:	BH-5
Client:	IEUA
Project No.:	15-010-102

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
-60		60		5 YR 4/6 Yellowish Brown	Trace gravel up to 10 mm.
-65		10		7.5 YR 5/6 Strong Brown	SANDY LEAN CLAY: Moist, very soft consistency. 70-80 percent clay, 10-15 percent medium-grained sand, with coarse-grained sand, some fine-grained sand, 10-15 percent gravel up to 50 mm; subrounded to rounded. Clay: medium dry strength, slow dilatancy, medium toughness, medium plasticity.
-70		100	25, 50 (4-inch)		Lined sample collected.
		40	35, 50 (5-inch) SAMPLE FOR LAB (76-76.5)	7.5 YR 4/6 Strong Brown	LEAN CLAY: Moist, hard consistency. 90-95 percent clay, 5-10 percent medium-grained sand, trace coarse-grained sand. Clay: high dry strength, slow dilatancy, medium toughness, medium plasticity.
-75		100		7.5 YR 5/6 Strong Brown	SANDY LEAN CLAY WITH GRAVEL: Moist, very soft consistency. 50-60 percent clay, 30-35 percent medium-grained sand, with coarse-grained sand, with fine-grained sand, 20-25 percent gravel up to 40 mm; subangular to angular. Clay: medium dry strength, slow dilatancy, medium toughness, low plasticity.
		100			
		10		7.5 YR 4/6 Strong Brown	LEAN CLAY: Moist, very soft consistency. 90 percent clay, 5-10 percent fine-grained sand, less than 5 percent gravel up to 5 mm; subangular to angular. Clay: high dry strength, slow dilatancy, medium toughness, medium plasticity.
-80		10			
-85		10			
-90		100		5 YR 4/6	SANDY LEAN CLAY WITH GRAVEL: Wet, hard consistency. 50-60 percent clay, 30-35 percent medium-grained sand, with coarse-grained sand, with fine-grained sand, 20-25 percent gravel up to 70 mm, subangular to angular. Clay: High dry strength, slow dilatancy, medium toughness, medium plasticity.
		50		5 YR 3/4 Dark Reddish Brown	

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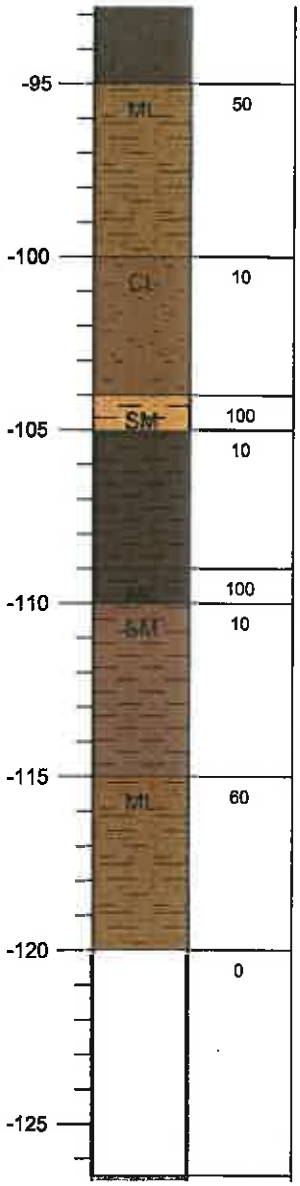
Borehole Lithologic Log

Borehole/ Well No.:	BH-5
Client:	IEUA
Project No.:	15-010-102



Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
-95	ML	50		5 YR 4/6 Yellowish Brown	SANDY LEAN CLAY: Wet, very soft consistency. 50-60 percent clay, 30-45 percent medium-grained sand, with fine-grained sand, with coarse-grained sand, 5-10 percent gravel up to 60 mm; subangular to angular. Clay: high dry strength, slow dilatancy, medium toughness, medium plasticity.
					SILT WITH SAND: Moist, very soft consistency. 80 percent silt, 15-20 percent medium-grained sand, with fine-grained sand, trace coarse-grained sand, less than 5 percent gravel up to 50 mm; subangular to angular. Silt: medium dry strength, rapid dilatancy, low toughness, low plasticity.
-100	CL	10		7.5 YR 5/6 Strong Brown	LEAN CLAY WITH SAND: Moist, very soft consistency. 75-80 percent clay, 20-25 percent fine-to medium-grained sand, trace coarse-grained sand, less than 5 percent gravel up to 30 mm; subangular to angular. Clay: high dry strength, slow dilatancy, medium toughness, high plasticity.
-105	SM	100		7.5 YR 6/6	SILTY SAND WITH GRAVEL: Moist, weakly cemented. Fine-grained sand, with medium-grained sand, with coarse grained sand, 15-20 percent gravel up to 40 mm; subangular to angular; 35-50 percent silt.
		10		5 YR 3/3 Dark Reddish Brown	SILTY SAND: Moist, moderately cemented. Medium-grained sand, with fine-grained sand, some coarse-grained sand, less than 5 percent gravel up to 60 mm; subangular to angular; 20-30 percent silt.
-110	SM	100		5 YR 3/4	SANDY SILT: Moist, very soft. 60-70 percent silt, 30-40 percent fine-grained sand, less than 5 percent gravel up to 20 mm; subangular to angular. Silt: low dry strength, rapid dilatancy, low toughness, low plasticity.
		10		5 YR 4/4 Reddish Brown	SILTY SAND WITH GRAVEL: Moist, no cementation. Fine-grained sand, some coarse-grained sand, 10-20 percent gravel up to 70 mm, 30-40 percent silt; subangular to angular; 30-40 percent silt.
-115	ML	60		5 YR 4/6 Yellowish Brown	SANDY SILT: Moist, very soft. 70-80 percent silt, 20-30 percent fine-grained sand, with medium-grained sand, trace-coarse grained sand, less than 5 percent gravel up to 45 mm; angular. Silt: low dry strength, rapid dilatancy, low toughness, low plasticity.
-120		0			No Recovery
-125					

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Borehole Lithologic Log

Borehole/ Well No.:	BH-5
Client:	IEUA
Project No.:	15-010-102

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
-130	SC			10 YR 6/4 Light Yellowish Brown	CLAYEY SAND: Moist, moderately cemented, granitic. Fine-grained sand, with medium-grained sand, trace coarse-grained sand, less than 5 percent gravel up to 50 mm; angular; 30-40 percent silt. Mica plates up to 3 mm.

Notes:

Grain size distribution and percentages are approximate based on visual inspection of samples.

Soil types classified based on Unified Soil Classification System.

Soil color based on Munsell Soil Color Charts.

"Trace" equals to 0-5 percent, "some" equals to 5-10 percent, and "with" equals to 10-15 percent.

Lithologic Log

Client:	IEUA	**Drilling Contractor:**	J & H Drilling Co., Inc.
Borehole/ Well No:	BH-6	**Drilling Method:**	Hollow Stem Auger
Project Number:	15-010-102	**Borehole Diameter:**	8 inches
Project:	East Declez	**Location of boring/ Well (State Plane, NAD 83):**	
Start Date:	28-Sep-15	**X:** 6184834 (approximate)	
Finish Date:	28-Sep-15	**Y:** 2321636 (approximate)	
Logged By:	JV & BL		

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
0		100		2.5 Y 4/4 Olive Brown	SAND: Dry. Fine-grained sand, trace medium-grained sand, trace coarse-grained sand; subrounded to rounded; less than 10 percent silt.
-5		10			
-10		70	48, 50 (6-inch)	10 YR 3/3 Dark Brown	SILT: Dry to moist, hard consistency. Less than 10 percent fine-grained sand.
		30			
-15		80			
				10 YR 5/4 Yellowish Brown	SILTY SAND: Dry, moderate to strongly cemented. Fine-grained sand, trace medium-grained sand, trace gravel up to 25 mm; subrounded to rounded; 10-20 percent silt.
-20		10	50 (3-inch)		
		30			
-25					

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Borehole Lithologic Log

Borehole/ Well No.:	BH-6
Client:	IEUA
Project No.:	15-010-102

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
-25	CL	100		10 YR 6/4	LEAN CLAY WITH SAND: Moist, very hard consistency. Less than 20 percent fine-grained sand, trace medium-grained sand.
	SM	50		7.5 YR 5/6 Strong Brown	SILTY SAND: Dry, weakly cemented. Fine-grained sand, some medium-grained sand, trace gravel to 50 mm; sub-rounded to rounded; 10-20 percent silt. Increase gravel at 28 feet and from 30 to 31 feet.
-30			37, 50 (4-inch)		
-35		0			No recovery
-40	GP	100		7.5 YR 4/6	SILTY GRAVEL WITH SAND: Dry, weakly cemented. 60 percent gravel up to 50 mm, 20-30 percent fine-grained sand; subangular to angular; 10-20 percent silt.
	SM	90		7.5 YR 4/4 Brown	SILTY SAND: Dry, moderately cemented. Fine-grained sand, some medium-grained sand; subangular to subrounded; 10-20 percent silt.
-45					

Notes:

Grain size distribution and percentages are approximate based on visual inspection of samples.

Soil types classified based on Unified Soil Classification System.

Soil color based on Munsell Soil Color Charts.

"Trace" equals to 0-5 percent, "some" equals to 5-10 percent, and "with" equals to 10-15 percent.

Lithologic Log

Client:	IEUA	**Drilling Contractor:**	J & H Drilling Co., Inc.
Borehole/ Well No:	BH-7	**Drilling Method:**	Hollow Stem Auger
Project Number:	15-010-102	**Borehole Diameter:**	8 inches
Project:	East Declez	**Location of boring/ Well (State Plane, NAD 83):**	
Start Date:	9-Oct-15	X: 6184044 (approximate)	
Finish Date:	9-Oct-15	Y: 2321631 (approximate)	
Logged By:	BL		

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
0		100		10 YR 2/2 Very Dark Brown	POORLY-GRADED SAND: Dry. Fine-grained sand, some medium-grained sand, less than 5 percent gravel up to 20 mm; subangular to subrounded; 5-10 percent silt.
-5		0			
-10	SW-GW	70	12, 18, 27	7.5 YR 4/1 Dark Gray	POORLY-GRADED SAND WITH GRAVEL: Dry. Medium-grained sand, with coarse-grained sand, some fine-grained sand, 40-50 percent gravel up to 20 mm; angular to subangular; less than 5 percent silt.
		0			
-15		20		7.5 YR 4/1 Dark Gray	Fine sand at 16 feet and 19 feet.
-20		30	38, 50.5 (5-inch)	7.5 YR 4/1 Dark Gray	Gravel to 50 mm at 24 feet.
		5			
-25					

Thomas Harder & Co.
Groundwater Consulting

Borehole Lithologic Log

Borehole/ Well No.:	BH-7
Client:	IEUA
Project No.:	15-010-102

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
-25		10		5Y 4/1 Dark Gray	POORLY-GRADED SAND: Moist. Fine-grained sand, trace medium-grained sand, trace gravel to 35 mm; subrounded to subangular; less than 5 percent silt.
-30		80	12, 13, 14	5Y 4/1 Dark Gray	Gravel to 45 mm at 34 feet. Rig chatter at 38 feet.
		30			
-35		40			
				7.5 YR 4/4 Brown	LEAN CLAY: Dry to moist, firm consistency. 90 percent clay, 10 percent fine-grained sand, trace medium-grained sand, less than 5 percent gravel up to 25 mm; subrounded to rounded. Clay: very high dry strength, slow dilatancy, medium toughness, medium plasticity. Gravel up to 50 mm at 42 feet.
-40		90	15, 25, 50		
		100			
-45				7.5 YR 5/6 Strong Brown	SILT: Dry to moist, hard consistency. 90 percent silt, 10 percent fine-grained sand, trace medium-grained sand, less than 5 percent gravel up to 30 mm. Silt: High dry strength, slow dilatancy, low toughness, low plasticity. Increase in gravel 49-50 feet.
		50			
-50		5	22, 29, 34	7.5 YR 5/6 Strong Brown	Driller reports "tight" drilling at 53 feet. Gravel up to 40 mm at 54 feet.
		70			
-55		70			

Thomas Harder & Co.
Groundwater Consulting

Borehole Lithologic Log

Borehole/ Well No.:	BH-7
Client:	IEUA
Project No.:	15-010-102

Depth	Graphic Log	Sample Recovery (Percent)	Blow Counts	Color	Sample Description
-60		30		7.5 YR 4/6 Strong Brown	GRAVELY SILT: 70-80 percent silt, 10 percent fine-grained sand, 20-30 percent gravel up to 50 mm; subangular to subrounded. Silt: low dry strength, rapid dilatancy, low toughness, low plasticity. Slow drilling 60 to 64 feet. Very slow drilling at 64 feet.
-65		30		7.5 YR 4/6 Strong Brown	
-70		30		7.5 YR 4/6 Strong Brown	Gravel at 74 feet. Very slow drilling from 70 to 87 feet.
-75		30		7.5 YR 5/6 Strong Brown	WELL GRADED SAND WITH GRAVEL: Moist, weakly cemented. Fine-grained and medium-grained sand, with coarse-grained sand, 20-30 percent gravel up to 35 mm; angular to subangular; 10 percent silt. Increase of gravel at 79 feet.
-80		30		7.5 YR 4/4 Brown	SILT WITH SAND: Moist, soft consistency. 80-90 percent silt, 10-20 percent fine-grained sand with medium-grained sand, trace gravel up to 25 mm; angular to subangular. Silt: low dry strength, slow dilatancy, low toughness, low plasticity.
-85		100		7.5 YR 4/6 Strong Brown	SANDY LEAN CLAY: Moist, soft consistency. 60-70 percent clay, 30-40 percent fine-grained sand, medium-grained sand, coarse-grained sand, trace gravel up to 40 mm; subangular to angular. Clay: Very high dry strength, no dilatancy, medium toughness, medium plasticity.

Notes:

Grain size distribution and percentages are approximate based on visual inspection of samples.

Soil types classified based on Unified Soil Classification System.

Soil color based on Munsell Soil Color Charts.

"Trace" equals to 0-5 percent, "some" equals to 5-10 percent, and "with" equals to 10-15 percent.

Appendix E

Wildermuth Environmental - Assessment of Additional Alternatives for Potential Storm Water Recharge Project East of Declez Basin

WILDERMUTH ENVIRONMENTAL, INC.

January 28, 2016

Chino Basin Watermaster
Attn: Peter Kavounas, General Manager
9641 San Bernardino Road
Rancho Cucamonga, CA 91730

Subject: Assessment of Additional Alternatives for Potential Storm Water Recharge Project East of Declez Basin

Dear Mr. Kavounas:

On December 16, 2015, Watermaster met with staff from WEI, IEUA, and Thomas Harder & Company (THC) to discuss additional alternative project designs for the potential East Declez Basin (EDB) recharge project. As a result of this meeting, Watermaster directed WEI to quantify storm water yields and cost opinions for four new project alternatives consistent with the methods used in the 2013 Amendment to the 2010 Recharge Master Plan Update (2013 RMPU). Descriptions of the alternatives, potential new recharge, and reconnaissance-level cost opinions are provided below.

Description of Alternatives

Two new basin design concepts were developed: 1) a basin with a roughly 11-acre footprint that is graded as an expansion of cell 1 of the existing Declez Basin at the same bottom elevation as the existing cell 1, and 2) a basin with roughly the same footprint as basin 1, but only eight feet deep as a separate basin adjacent to Declez. The infiltration rate for the new portion of the expanded Declez Basin cell 1 was assumed to be zero.

Two stormwater management concepts were developed for each new basin concept, yielding four alternatives for evaluation. They are referred to herein as Alternatives 1a, 1b, 2a, and 2b and are described below. Figure 1 depicts the layouts of alternatives 1a and 1b, and Figure 2 depicts the layouts of alternatives 2a and 2b.

- Alternative 1a – This alternative includes the expanded Declez Basin cell 1 without any new diversion works.
- Alternative 1b – This alternative is identical to alternative 1a, except that a rubber dam would be constructed in San Sevaine Channel to increase the amount of stormwater that can be diverted into Jurupa Basin. The pump station in Jurupa Basin would be expanded from 40 to 70 cfs to convey up to 30 cfs to the Declez Channel via a connection to an existing 72-inch storm drain that discharges to the Declez Channel near the southerly crossing with Cherry Avenue.
- Alternative 2a – This alternative uses the shallow and separate basin design. It involves the construction of a rubber dam diversion in the Declez Channel about 400' upstream of the

southerly crossing with Cherry Avenue to divert up to 30 cfs of storm water to the EDB. Storm water will be conveyed in a 42-inch pipe constructed in the channel access road parallel to the existing channel alignment and then due east along the north side of Declez Basin and then discharge to the EDB. This project would reduce the inflow and recharge into the Declez Basin.

- Alternative 2b – This alternative is identical to alternative 2a, except it includes the rubber dam in San Sevaine Channel and increased pump size in Jurupa describes in alternative 1b.

WEI performed a hydrologic analysis to estimate the net new stormwater yield of the four project alternatives with the same methodology used in the 2013 RMPU. Then, a hydraulic analysis was performed to design the necessary diversion and water conveyance structures for each alternative, and it was determined that there was no feasible hydraulic design to divert water from Declez Channel into the shallow EDB design. Therefore, alternatives 2a and 2b were determined infeasible.

New Recharge and Cost Opinion

The following table shows the results of our modeling and cost opinions.

Alternative	Net New Recharge (acre-ft/yr)	Annual Unit Cost ($/acre-ft)	Annual Unit Cost with 90% Excavation Cost Reduction ($/acre-ft)
1a	144	$11,152	$5,099
1b	414	$4,527	$2,420

Reconnaissance-level (Level-Five) cost opinions were developed for alternatives 1a and 1b and are included in Tables 1 and 2, respectively. In these cost opinions it was assumed that the land acquisition cost would cover the entire 85 acres considered for purchase by JCSD. These cost opinions assume that the cost to improve the Jurupa Basin inlet (other than the rubber dam in alternative 1b) is included as part of the 2013 RMPU 23a project. The net new recharge is calculated based on the recharge additional to what is already realized in the 2013 RMPU projects at RP3 and Declez Basins.

We appreciate the opportunity to serve the Chino Basin Watermaster on this important and timely project.

Wildermuth Environmental, Inc.

Garrett Rapp, EIT
Staff Engineer

Mark J. Wildermuth, PE
President and Principal Engineer

Encl.: Tables 1 and 2, and Figures 1 and 2.

Table 1
Cost Opinion for the East Declez Basin - Alternative 1a

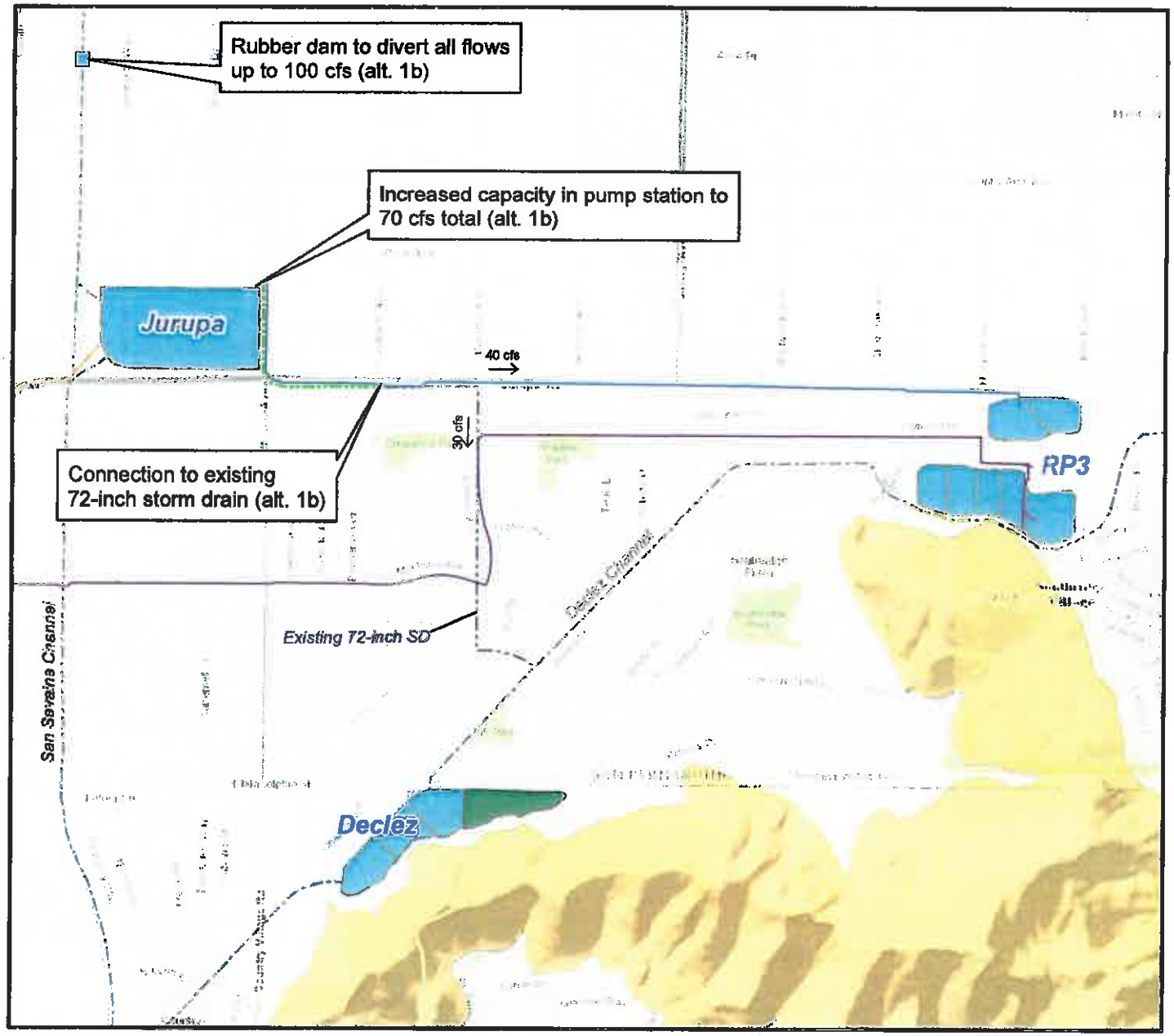
Description	Quantity	Unit	Unit Cost	Total Cost	Total Cost[1]
Direct Construction Costs					
1 Mobilization @ 5% Other Direct Construction Cost	1	Job	Lump Sum	$745,000	$745,000
2 Spreading Basin Excavation					
Excavate & Haul Offsite	820,000	Cu. Yds.	$18.17	$14,899,400	$1,489,940
3 Land Acquisition Cost					
Land Costs	85	$/acre	$35,300	$3,000,500	$3,000,500
Subtotal Direct Construction				**$18,640,000**	**$5,240,000**
Contingency > $2 million@ 10%				$1,864,000	$1,864,000
Construction Management > $2 million@ 10%				$1,864,000	$1,864,000
Total Construction				**$22,368,000**	**$8,968,000**
Engineering and Administration Costs					
Engineering and Admin > $2 million@ 10%				$2,237,000	$2,237,000
Total Engineering and Administration				**$2,237,000**	**$2,237,000**
Total Estimated Cost				**$24,605,000**	**$11,205,000**
Total Estimated Cost - Rounded				**$24,610,000**	**$11,210,000**
Annual Cost - 30 Years @ 5% Interest				**$1,600,600**	**$728,900**
CBWMs Share of Annual Project Cost				**$1,600,600**	**$728,900**
Annual Operations and Maintenance	144	AF	$37	$5,328	$5,328
Total Operational Costs				**$5,328**	**$5,328**
Total Annual Cost				**$1,605,928**	**$734,228**
Total Annual Unit Cost				**$11,152**	**$5,099**

[1] The capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

Table 2
Cost Opinion for the East Declez Basin - Alternative 1b

Description	Quantity	Unit	Unit Cost	Total Cost	Total Cost[1]
Direct Construction Costs					
1 Mobilization @ 5% Other Direct Construction Cost	1	Job	Lump Sum	$885,000	$885,000
2 Spreading Basin Excavation					
Excavate & Haul Offsite	820,000	Cu. Yds.	$18.17	$14,899,400	$1,489,940
3 Land Acquisition Cost					
Land Costs	85	$/acre	$35,300	$3,000,500	$3,000,500
4 Rubber Dam for San Sevaine Channel Diversion to Jurupa					
Rubber Dam Capturing up to 100 cfs	1	Job	$100,000	$100,000	$100,000
5 Pump expansion to 70 cfs					
30 cfs pump capacity increase	300	$/HP	$5,000	$1,500,000	$1,500,000
6 Conveyance to Declez Channel					
36" Diameter CMLC to existing storm drain	2,800	Lin. Ft.	$429	$1,201,200	$1,201,200
Subtotal Direct Construction				**$21,590,000**	**$8,180,000**
Contingency > $2 million@ 10%				$2,159,000	$2,159,000
Construction Management > $2 million@ 10%				$2,159,000	$2,159,000
Total Construction				**$25,908,000**	**$12,498,000**
Engineering and Administration Costs					
Engineering and Admin > $2 million@ 10%				$2,591,000	$2,591,000
Total Engineering and Administration				**$2,591,000**	**$2,591,000**
Total Estimated Cost				**$28,499,000**	**$15,089,000**
Total Estimated Cost - Rounded				**$28,500,000**	**$15,090,000**
Annual Cost - 30 Years @ 5% Interest				**$1,853,900**	**$981,600**
CBWMs Share of Annual Project Cost				**$1,853,900**	**$981,600**
Annual Operations and Maintenance	414	AF	$37	$15,318	$15,318
Annual Energy Cost	32,000	KW-hr	$0.15	$4,800	$4,800
Total Operational Costs				**$20,118**	**$20,118**
Total Annual Cost				**$1,874,018**	**$1,001,718**
Total Annual Unit Cost				**$4,527**	**$2,420**

[1] The capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

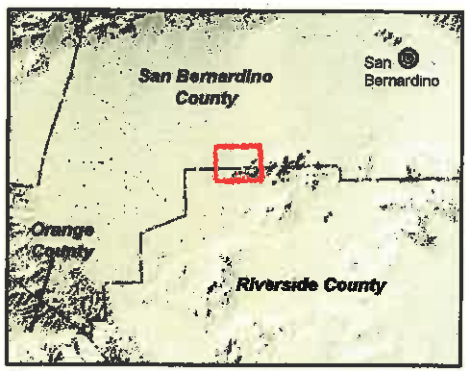


Piping Infrastructure

- Jurupa Force Main
- Wineville Recycled Water Pipeline
- Proposed Pipeline from Wineville Basin (PID 23a).
- 36" Pipeline from Jurupa Basin to Existing Storm Drain (alt. 1b)

Basins

- Existing
- Proposed Declez Basin Cell 1 Extension



Produced by:

WEI

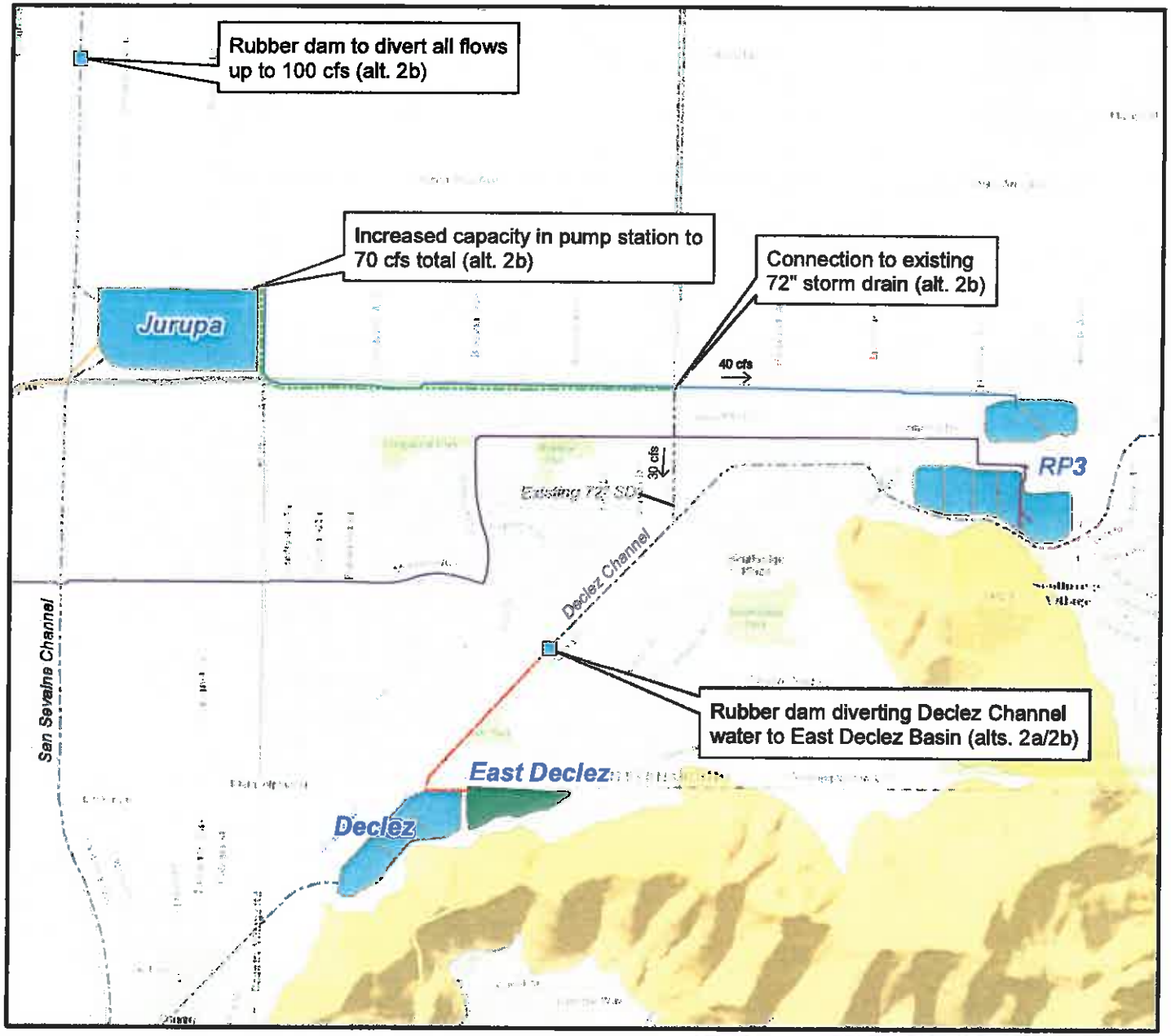
Author: GAR
Date: 1/28/2016
Name: EDeclez_2016_alt_1

0 2,000 4,000 Feet
0 250 500 1,000 Meters

Implementation of 2013 Amendment to the 2010 RMPU

East Declez Basin
New Project Alternatives 1a/1b

Figure 1



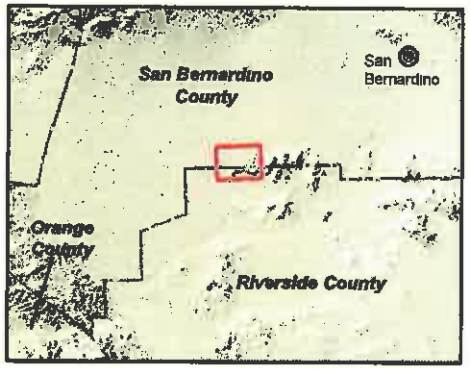
Planned Rubber Dams for the East Declez Basin Project

Piping Infrastructure

- Jurupa Force Main
- Wineville Recycled Water Pipeline
- Proposed Pipeline from Wineville Basin (PID 23a)
- 42" Diversion Pipeline to the East Declez Basin
- 36" Pipeline from Jurupa Basin to Existing Storm Drain (alt. 2b)

Basins

- Existing
- Proposed East Declez Basin



Produced by:

WEI

Author: GAR
Date: 1/28/2016
Name: EDeclez_2016_alt_2

0 2,000 4,000 Feet
0 250 500 1,000 Meters

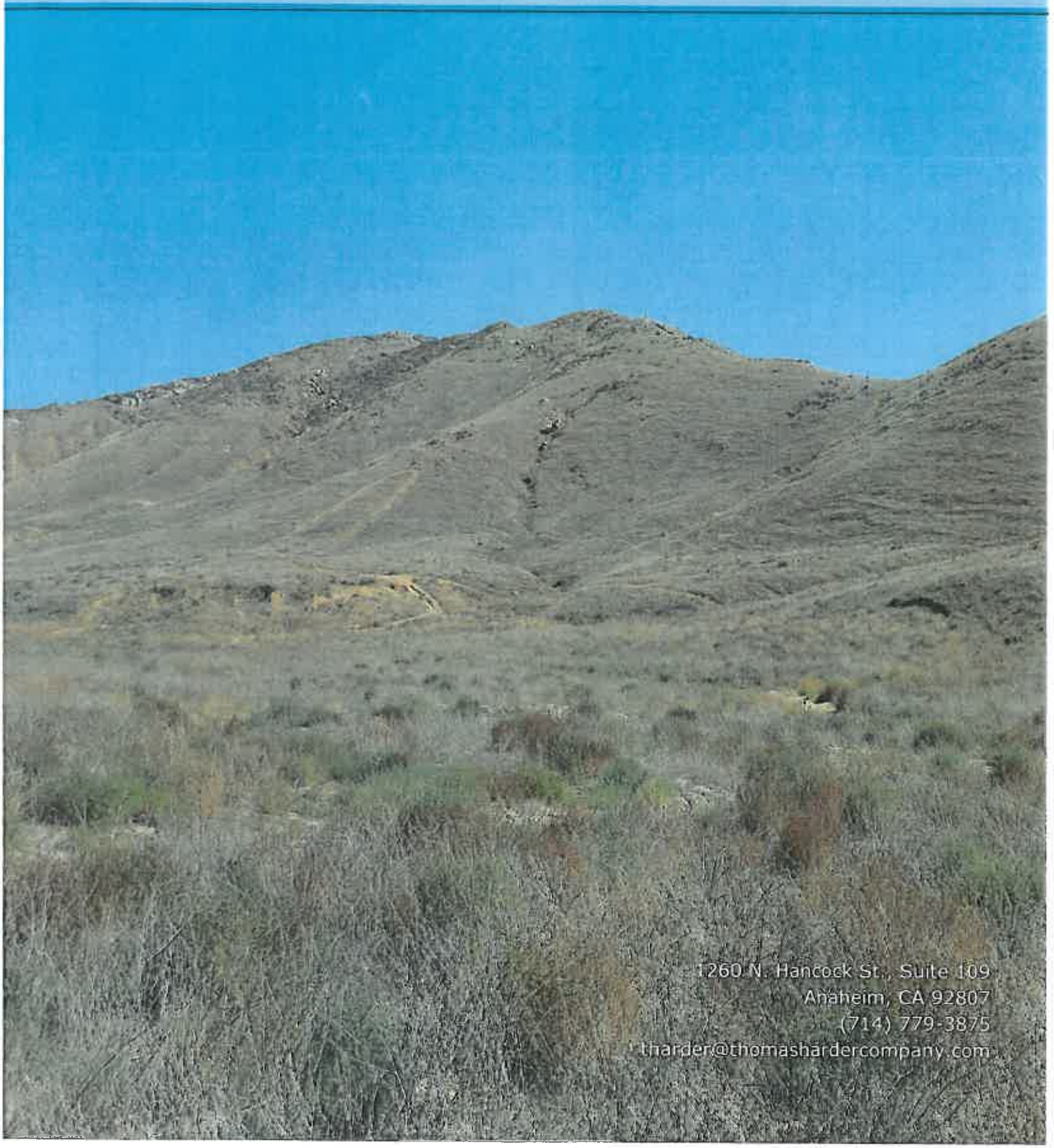
Implementation of 2013 Amendment to the 2010 RMPU

East Declez Basin
New Project Alternatives 2a/2b

Figure 2

Thomas Harder & Co.
Groundwater Consulting

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT



1260 N. Hancock St., Suite 109
Anaheim, CA 92807
(714) 779-3875
tharder@thomashardercompany.com

Engineering, Operations, and Biosolids Management Committee

INFORMATION ITEM 2A

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

Date: April 20, 2016

To: The Honorable Board of Directors

Through: Engineering, Operations, and Biosolids Management Committee *(04/13/16)*

From: P. Joseph Grindstaff
General Manager

Submitted by: Chris Berch
Executive Manager of Engineering/Assistant General Manager

Shaun J. Stone
Manager of Engineering

Subject: RP-1/RP-5 Expansion Preliminary Design Report (PDR) Update

RECOMMENDATION

This is an informational item for the Board of Directors.

BACKGROUND

Beginning in June 2013, the Inland Empire Utilities Agency (Agency) started a planning initiative to update the Agency's Wastewater Facilities Master Plan (WFMP). As part of the WFMP, the Agency planned existing facility improvements to accommodate for population growth and optimization of the wastewater collection and wastewater treatment systems, as well as the recycled water system. The WFMP incorporated the wastewater flow projections developed by the Integrated Water Resources Plan (IRP) and operational knowledge of the existing treatment systems to develop a comprehensive facilities and operations plan. According to the WFMP, influent wastewater flows are projected to increase as a result of population growth in the service area. By the year 2060, influent flows at RP-1 are projected to increase as much as 20 percent and more than double at RP-5. Table 1 provides the current facility treatment capacities, forecasted 2035 and 2060 influent flows, and the year the existing facility treatment capacity is anticipated to be exceeded:

Table 1: Current and Forecasted Facility Treatment Capacities

Facility	Existing Capacity	2035 Flow	2060 Flow	Capacity Exceeded
RP-1	32 MGD*	33.1 MGD	36.3 MGD	2030
RP-5	15.0 MGD	20.2 MGD	27.2 MGD	2025

* Estimated capacity as identified in WFMP

In addition, the United States Army Corps of Engineers (USACE) has begun a project to raise the Prado Dam Spillway, which will result in an increased high water service level behind the dam placing the RP-2 Solids Treatment Facility in a flood plain. Therefore, RP-2 must be decommissioned and a new Solids Treatment Facility must be constructed at RP-5 with sufficient capacity to treat existing and future service area flows.

The RP1/RP-5 Expansion PDR project will develop a consolidated PDR for the RP-1 Liquids & Solids Treatment System Expansion, RP-5 Liquids Treatment System Expansion, and RP-5 Solids Treatment Facility to size of the required treatment capacity expansions at each of the facilities, determine the schedule for design and construction, and estimate the project costs (design, construction, internal labor, & contingency). The Agency issued a Request for Proposal (RFP) for Engineering Preliminary Design Services on November 3, 2015. On January 20, 2016, the Board of Directors awarded the Contract for Engineering Preliminary Design Services to Parsons Water & Infrastructure Inc. for the not-to-exceed amount of $2,431,598 with a project schedule of one year.

On January 21, 2016, the Agency issued the notice-to-proceed and the Parsons/Agency project team initiated work on the predesign. The project plan for the PDR includes four major technical staff workshops scheduled for: April, July, September, and December of 2016 the three latter workshops being tentative dates based upon the progress of the project. Therefore, the Agency project team proposes to schedule four Board Workshops aligning with the staff workshops and an additional workshop focused on organics waste management to discuss the major decisions and recommendations forming the basis of the PDR with the Board of Directors. Table 2 provides the proposed schedule for the Board Workshops and the topics to be discussed:

Table 2: Proposed Board Workshop Schedule

Workshop	Date	Topics
1	May 2016	RP-1, CCWRF, RP-4, & RP-5 Facility Capacities and Expansion Sizing Requirements
2	July 2016	Organics Waste Management
3	August 2016	Major Treatment System Alternatives and Equipment Pre-selection
4	October 2016	Side Stream Processes and Decommissioning Plan for RP-2
5	January 2017	RP-1 & RP-5 Expansion PDR Final Recommendations

The RP-1/RP-5 Expansion PDR project is consistent with the IEUA business goal of *Wastewater Management Capacity*, namely that IEUA will maintain capacity within systems and facilities to meet essential service demands and to protect public health and environment.

PRIOR BOARD ACTION

On January 20, 2016, the Board of Directors approved the consulting engineering services contract award for the RP-1/RP-5 Expansion PDR to Parsons Water & Infrastructure Inc. for the not-to-exceed amount of $2,431,598.

IMPACT ON BUDGET

None.

PJG:CB:SS:jm

RP-1/RP-5 Expansion PDR Update

Project Nos. EN16025 & EN16028

April 2016

Inland Empire Utilities Agency

A MUNICIPAL WATER DISTRICT

Jason Marseilles, P.E.,
Senior Engineer

Proposed Board Workshop Schedule

- **Board Contract Award** — January 20, 2016
- **Workshop 1** — May 2016
  - Facility Capacities
  - Expansion Sizing Requirements
- **Workshop 2** — July 2016
  - Organics Waste Management
  - Beneficial Use of Digester Gas
- **Workshop 3** — August 2016
  - Major Treatment System Alternatives
  - Major Equipment Pre-Selection
- **Workshop 4** — October 2016
  - Side Stream Processes
  - Decommissioning Plan for RP-2
- **Workshop 5** — January 2017
  - RP-1 Expansion Final Recommendations
  - RP-5 Expansion Final Recommendations
- **Final PDR** — January 20, 2017

Riverside Water Quality Control Plant
MBR System – Online March 2016

The RP-1/RP-5 Expansion PDR project is consistent with the IEUA business goal of *Wastewater Management Capacity*, namely that IEUA will maintain capacity within systems and facilities to meet essential service demands and to protect public health and environment.

Engineering, Operations, and Biosolids Management Committee

INFORMATION ITEM 2B

FY16/17 Ten Year Capital Improvement Plan Update

Elizabeth Hurst

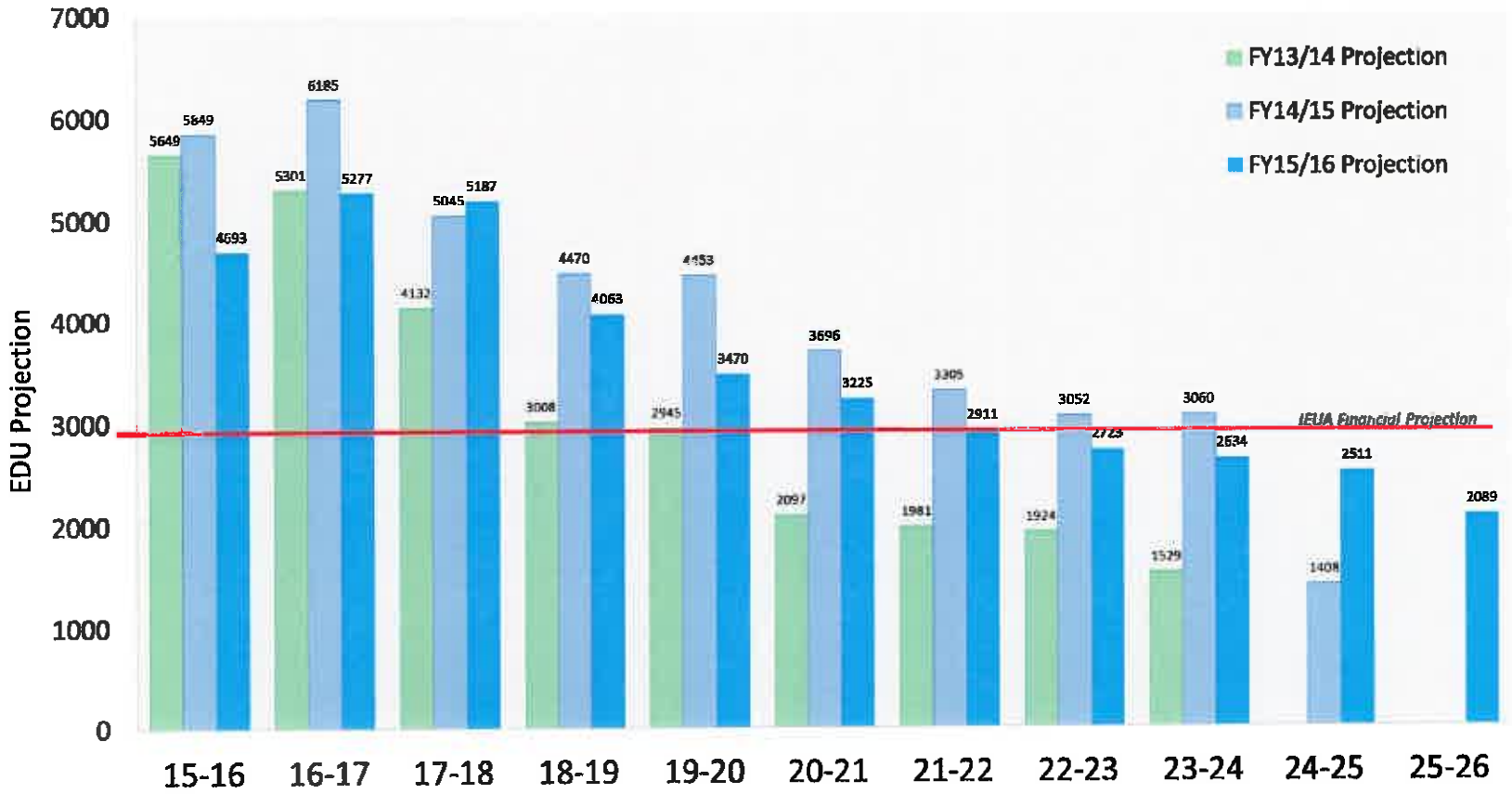
Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

IEUA Board of Directors Meeting
April 2016

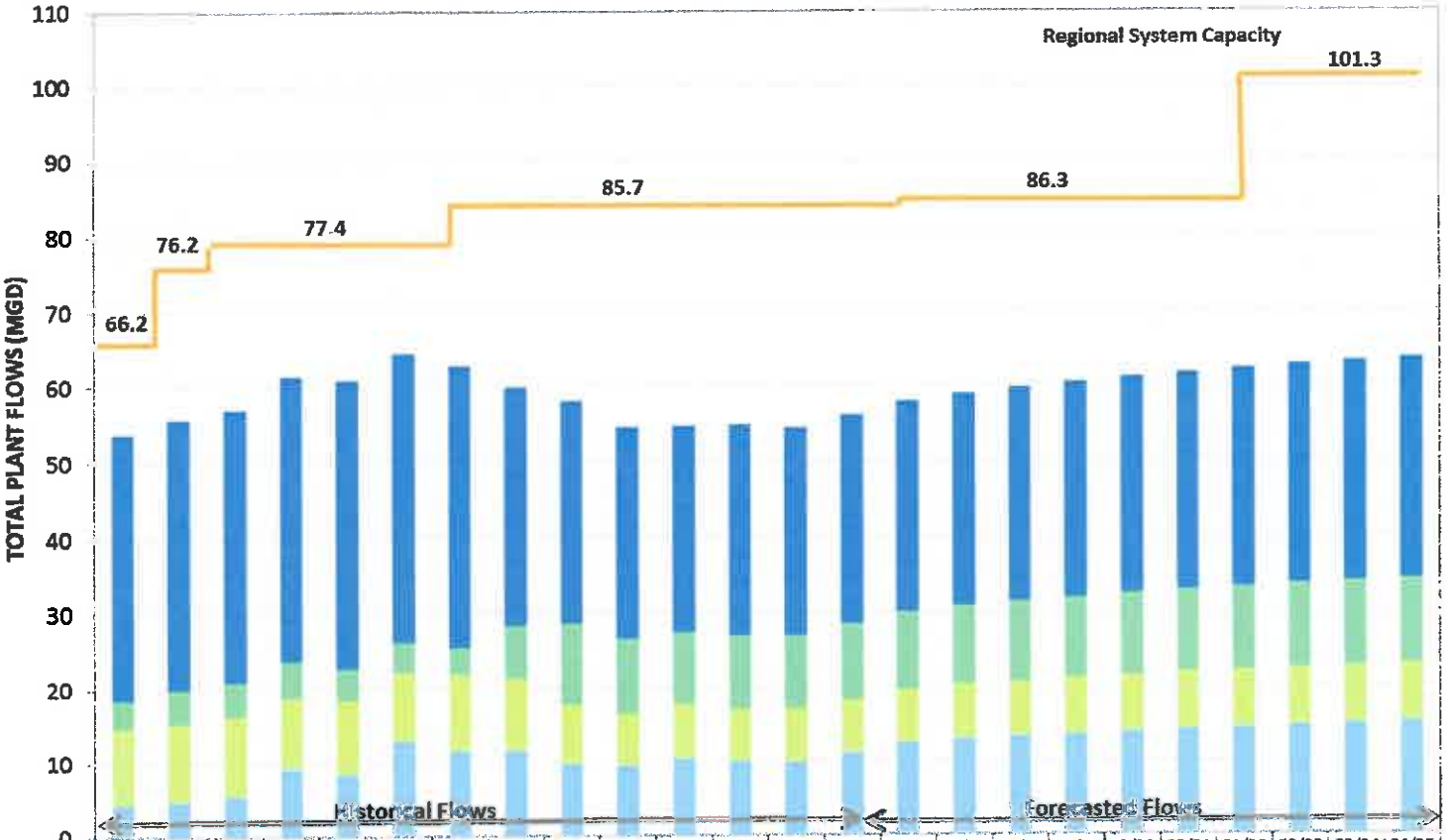
Key Drivers of the FY16/17 TYCIP

- Member Agency growth projections
- 2015 Wastewater Facilities Master Plan Updated flow factors and concentrations
- Asset Management Plan
- 2015 Recycled Water Program Strategy Update
- 2015 Energy Management Plan
- 2016 Integrated Resources Plan
- 2016 Water Use Efficiency Business Plan

10-Year EDU Growth Forecast



FY16/17-FY25/26 Member Agency Wastewater Flow Projections[1]



	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25
RP-1	35.20	35.80	36.01	37.74	38.00	38.28	37.21	31.40	29.40	28.00	27.30	27.90	27.31	27.55	27.80	28.07	28.30	28.49	28.67	28.83	28.97	29.11	29.24	29.35
RP-4	3.84	4.55	4.74	5.01	4.36	4.00	3.60	7.10	11.00	10.10	9.70	10.04	10.09	10.23	10.38	10.54	10.68	10.81	10.93	11.03	11.14	11.24	11.34	11.37
CCWRF	10.46	10.66	10.86	9.54	10.17	9.39	10.41	9.90	8.10	7.10	7.40	7.05	7.16	7.25	7.34	7.46	7.55	7.61	7.66	7.70	7.72	7.73	7.75	7.76
RP-5	4.19	4.70	5.27	9.12	8.26	12.81	11.50	11.40	9.60	9.40	10.30	9.93	9.85	11.07	12.38	12.88	13.23	13.55	13.84	14.13	14.40	14.67	14.94	15.20

[1] Flows estimated at 200 GPD/EDU

TYCIP Budget Estimate by Fund

	Description	FY 16/17	FY18/19	FY19-26	TYCIP Total
GG	Administrative Services Fund	4,469,012	1,680,200	6,538,600	12,687,812
NC	Non-Reclaimable Wastewater Fund	1,250,000	610,000	9,080,000	10,940,000
RC	Regional Capital Improvement Fund	21,134,400	24,044,000	319,850,000	365,028,400
RO	Regional Operations and Maintenance	26,854,520	33,545,000	92,122,000	152,521,520
RW	Recharge Water Fund	4,979,800	12,730,500	35,749,500	53,459,800
WC	Recycled Water Fund	24,782,800	24,143,195	29,365,000	78,290,995
WW	Water Resources Fund	6,879,250	6,479,250	36,104,000	49,462,500
	TOTAL	**90,349,782**	**103,232,145**	**528,809,100**	**722,391,027**

TYCIP Comparison to FY 15/16 Budget by Fund

	Description	FY15/16 Budget	Current TYCIP list
GG	Administrative Services Fund	$ 9.5 M	$ 12.6 M
NC	Non-Reclaimable Wastewater Fund	$ 17.2 M	$ 10.9 M
RC	Regional Capital Improvement Fund	$ 348.9 M	$ 365.0 M
RO	Regional Operations and Maintenance	$ 131.0 M	$ 152.5 M
RW	Recharge Water Fund	$ 49.3 M	$ 53.4 M
WC	Recycled Water Fund	$ 75.2 M	$ 78.2 M
WW	Water Resources Fund	$ 60.9 M	$ 49.4 M
	TOTAL	**$ 692.0 M**	**722.3**

Next Steps

- **March 31: Circulate TYCIP for Comments**
- **April 28: Technical Committee**
- **May 5: Policy Committee**
  - FY 16/17 TYCIP Recommendation for Approval
- **May 18: IEUA Board**
  - FY 16/17 TYCIP Recommendation for Approval

Engineering, Operations, and Biosolids Management Committee

INFORMATION ITEM 2C

Engineering and Construction Management Project Updates
April 2016

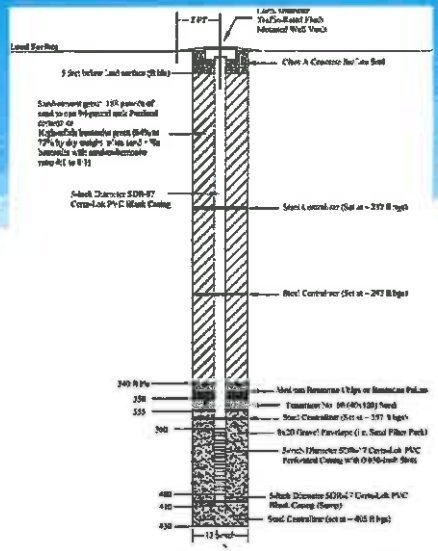



Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

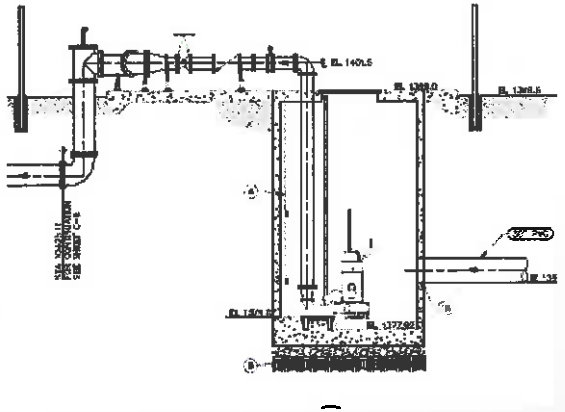
John Scherck
Acting Deputy Manager of Engineering

EN13001 - San Sevaine Improvements

- Engineering Consultant: Dudek
- Total Project Budget: $6.4 M
- Scope of Work: Storm/Recycled Water conveyance system and monitoring wells
- Anticipated Completion: May 2016 (Design)
- Percent Complete: 80%
- Current Activities:
  - Drafting 85% design submittals
- Focus Points:
  - Flood Control District design review



Monitoring Well Design Profile



Basin 5 Pump Station Design

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

EN15008 - Water Quality Laboratory

- Engineering Consultant: The Austin Company
- Current Contract: $1.37 M
- Total Project Budget: $21 M
- Scope of Work: Design, construction, and commissioning of Lab Building and Central Chiller Plant expansion
- Current Activities:
  - Bid advertised – March 1, 2016
  - Jobwalk completed – March 15, 2015
  - Bid addenda: Ongoing thru bid period
- Focus Points:
  - Bid opening - April 5, 2016
  - Complete Plan-Check (third-party)
  - Secure permit from Chino Valley Fire District
  - Maintain contact with prequalified contractor to ensure bid participation
  - Updated budget based on bid results.

Lab Rendering

EN13046 - RP-1 Flare System Improvements

- Contractor: W. A. Rasic
- Current Contract: $477 K
- Total Project Budget: $3.6 M
- Scope of Work: Install pressure reducing valve, control system upgrades, SCADA interface
- Contract Completion: February 2016
- Percent Complete: 100%
- Focus Points:
  - Project closeout administrative activities

RP-1 Flare

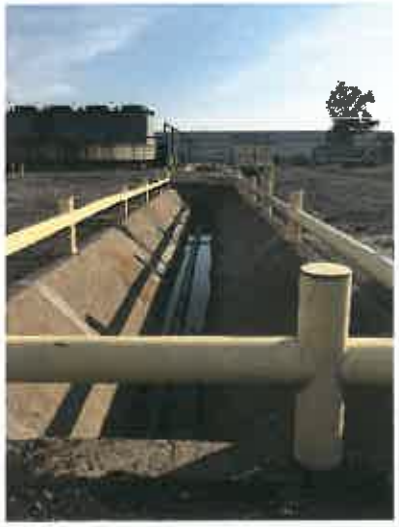
New PRV and Bypass Piping

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

EN16071 - San Bernardino Avenue Gravity Sewer

- Engineering Consultant: TKE Engineering, Inc.
- Total Project Budget: $1.5 M
- Scope of Work: Design and construct 1200 lf of sewer pipeline in San Bernardino Ave between Prologis WWTP and San Bernardino Lift Station
- Anticipated Completion: April 2016 (Design)
- Percentage Complete: 90%
- Current Activities:
  - Design plan review
  - Temporary bypass is in operation
- Focus Points:
  - Complete design and review
  - Bid advertisement

Godwin Pumps



HDPE Pipe, Fittings