



**US Army Corps
of Engineers**

**Los Angeles District
Geotechnical Branch
Dam and Levee Safety Section**

Appendix C

Tres Rio North Levee Final Construction Report

**NATIONAL FLOOD INSURANCE PROGRAM, LEVEE SYSTEM
EVALUATION REPORT (NLSE) FOR TRES RIOS NORTH LEVEE,
MARICOPA COUNTY, ARIZONA**



Center: Tres Rios North Levee looking downstream.
Lower Left: Downstream end of interior drainage outlet flap gates.
Upper Right: Near upstream end on levee crest looking upstream.

by
US Army Corps of Engineers
Los Angeles District, Geotechnical Branch
915 Wilshire Boulevard, Los Angeles CA 90017
November 2012

Appendix C

Tres Rios North Levee Final Construction Report

TRANSMITTAL

Attn: Chris A. Spitzer, PE
To: U.S. Army Corps of Engineers
Los Angeles District
Address: 915 Wilshire Boulevard, 13-238
Los Angeles, California 90017

Date: 25 September 2012
PGT
Project No.: 345-PGT-TO2
Subject: Final Construction Report for the Tres Rios Environmental Restoration Project Phases 1A and 1B, North Levee, Maricopa County, Phoenix, Arizona

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Comments: This report was sent to you via Newforma, and consists of a PDF file. Hard copies and DVD/CD will be provided under a separate cover. Should you have any questions please contact either of the undersigned at 949-753-8766.

Thank you.

cc: _____

From: Joseph J. Kulikowski, PE, GE
John Ho, Ph.D, PE, GE



**FINAL CONSTRUCTION REPORT
FOR THE
TRES RIOS ENVIRONMENTAL RESTORATION PROJECT
PHASES 1A AND 1B, NORTH LEVEE
MARICOPA COUNTY, PHOENIX, ARIZONA**

Prepared For:

**U.S. Army Corps of Engineers
Los Angeles District
915 Wilshire Boulevard 13-238
Los Angeles, California 90017**

Prepared By:

**GENTERRA Consultants, Inc.
PGT Joint Venture
Contract No. W912PL-11-D-0019
Task Order No. 2**

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PGT Project No. 345-PGT-T02

September 24, 2012

24 September 2012

Project No. 345-PGT-TO2

U.S. Army Corps of Engineers
Los Angeles District
915 Wilshire Boulevard, 13-238
Los Angeles, California 90017
Attention: Mr. Chris A. Spitzer, PE
Transmitted by Newforma/E-mail: Chris.A.Spitzer@usace.army.mil

SUBJECT: Final Construction Report for the Tres Rios Environmental Restoration Project
Phases 1A and 1B, North Levee, Maricopa County, Phoenix, AZ
PGT Joint Venture Contract No. W912PL-11-D-0019
Task Order No. 2

Dear Mr. Spitzer:

The Praad/GENTERRA/Taber, LLC Joint Venture (PGT) is pleased to present to the U.S. Army Corps of Engineers (USACE) this Final Construction Report. Assistance to USACE in preparation of this report was provided by GENTERRA Consultants, Inc. (GENTERRA) in general accordance with the following:

- The approved Scope of Work provided by USACE (8 June 2012);
- The Notice to Proceed dated 24 July 2012;
- A review of USACE's construction documents transmitted to us through meetings, E-mails, and Newforma in July and August 2012;
- GENTERRA's site visit and verification of the current levee conditions conducted on 31 July 2012;
- Subsequent discussions through phone calls and E-mails; and,
- USACE review comments on the draft report issued on 14 August 2012.

We hope that this report meets or exceeds your expectations. Please contact me to schedule any necessary discussions regarding this report. I can be reached at (949) 753-8766 or at joekul@genterra.com. Dr. John Ho, the Task Order Manager, can be reached at (949) 753-8766 or at johnho@genterra.com. We appreciate this opportunity to be of service.

Respectfully Submitted,

PGT JOINT VENTURE



Joseph J. Kulikowski, P.E.
Geotechnical Engineer No. 491
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GENTERRA Consultants, Inc.



**FINAL CONSTRUCTION REPORT
FOR THE
TRES RIOS ENVIRONMENTAL RESTORATION PROJECT
PHASES 1A AND 1B, NORTH LEVEE
MARICOPA COUNTY, PHOENIX, ARIZONA**

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SECTION 1 GENERAL

a. Introduction

This report was prepared for the U.S. Army Corps of Engineers, Los Angeles District (USACE) by GENTERRA Consultants, Inc. (GENTERRA) under a contract for the Praad/GENTERRA/Taber LLC (PGT) Joint Venture. GENTERRA is also providing the Contract Project Management. Review was provided by Dr. Daniel Pradel of Praad Geotechnical and Ron Loutzehiser of Taber Consultants.

The Tres Rios, Arizona Ecosystem Restoration and Flood Control Project at Maricopa County, Arizona, was authorized by Section 101(b)(4) of the Water Resources Development Act of 2000. GENTERRA was not involved with the design or construction of the project. GENTERRA's scope of work included the preparation of this report through use of documents provided by USACE, discussions with USACE, and observations made during a site visit on July 31, 2012. GENTERRA personnel for the site visit included: Joseph J. Kulikowski, PE, GE (Project Manager and Geotechnical), John Ho, PE, GE, PhD (Geotechnical), and Joseph Dluzak, EIT (Hydrology and Hydraulics).

The Tres Rios North Levee as described below is part of a larger Tres Rios Environmental Restoration Project between the City of Phoenix, Arizona and USACE. The Tres Rios North Levee was constructed in two phases, Phase 1A and Phase 1B (Figure 1, Aerial Site Map).

The Phase 1A construction was completed in 2006. During the Phase 1A construction, a new levee was constructed and the existing Holly Acres Levee was improved. The completed project alignment extended from the east side of South 115th Avenue (South Avondale Boulevard) to the west side of South 105th Avenue, and was designed to meet the 1% annual exceedance probability (1% AEP) or 100-year flood event.

The Phase 1B construction was completed in 2008. During the Phase 1B construction, the height of the existing Holly Acres Levee was raised and the width was widened from the east side of El Mirage Road to the west side of South 115th Avenue in order to meet the 1% AEP (100-year) requirements.



Figure 1. Aerial Site Map

b. Pertinent Data Sheet

The Tres Rios North Levee Phase 1A and Phase 1B Project consists of construction of a new portion of the levee and improvement of the existing Holly Acres Levee, as well as construction of several access ramps, two collector channels, two catch basins, nine guide dikes, two operation and maintenance roads, interior drainage including Reinforced Concrete Box (RCB) culverts, and four-wire right-of-way fence. Additional details for the levee can be found in a report prepared by USACE entitled "Tres Rios Environmental Restoration Project, Design Documentation Report (DDR) for Flood Control North Levee Phase 1A & 1B, Maricopa County, Arizona, Final Submittal," dated April 2012 (USACE, 2012). The Flood Control District of Maricopa County (FCDMC) is the local owner/operator of the Tres Rios Flood Control North Levee. Operation and Maintenance (O&M) of the project is performed by FCDMC. Key components of the project are summarized below. Detailed project data sheets are included in Appendix IV.

A field visit was conducted by GENTERRA on July 31, 2012 to verify and document the current conditions of the Tres Rios North Levee. Selected photos from GENTERRA's visit are presented in Appendix II.

(1) Holly Acres Levee Modifications

About one mile of the existing Holly Acres Levee was modified, extending from El Mirage Road to Avondale Boulevard. These modifications included increasing the height of the levee, modifying or repairing existing revetment, and operation and maintenance road modifications. The height of the Phase 1A levee varies from approximately 3 feet at the upstream end (105th Avenue) to approximately 5 feet at Avondale Boulevard (also referred to as 115th Avenue). The Phase 1B levee height ranges from approximately 5 feet at 115th Avenue to approximately 20 feet at El Mirage Road. The levee slopes generally range from approximately 2.5H:1V to 3H:1V (Horizontal:Vertical).

(2) Access Ramps

Four access ramps, including turnarounds, to provide access for invert/toe to levee crest were included in Phase 1A. Two of these ramps are an upstream and downstream pair located at approximate Station 202+50 and provide access to the channel. These riverside ramps are 14 feet wide and consist of a grouted surface along the ramps. Two ramps are located on the landside of the levee at approximately Station 168+00. These two ramps have an Aggregate Base Course (ABC) surface.

Three access ramps were provided in Phase 1B. One of the access ramps is located downstream of the Avondale Boulevard bridge, is 14 feet wide and consists of a grouted surface along the ramp. The second access ramp is for the landside located at approximately Station 4+00 and has a grouted surface and grouted stone above and below the ramp. The third access ramp is located on the protected and northern side of the El Mirage Road catch basin described below and provides access to the basin.

(3) Collector Channels

For Phase 1A, a 1.1-mile-long reinforced concrete trapezoidal channel extending from 105th Avenue to 113th Avenue drains water on the protected side of the levee to a catch basin upstream of Avondale Boulevard. For Phase 1B, a 1-mile-long reinforced concrete trapezoidal channel extending from El Mirage Road to Avondale Boulevard drains water on the protected side of the levee to a catch basin upstream of El Mirage Road. Several concrete culverts located on the northern channel slope direct irrigation ditch tailwater into the collector channel.

(4) Catch Basins

Two catch basins collect water from the collector channels before discharge through the levee into the river channel. One 15 acre-foot earthen catch basin, for Phase 1A, is located between 113th Avenue and Avondale Boulevard and a second 8.5 acre-foot earthen catch basin, for Phase 1B, is located upstream of El Mirage Road.

(5) Guide Dikes

Eight compacted earthfill guide dikes were constructed or rehabilitated as part of construction of the Tres Rios North Levee. Four dikes, named 115th Avenue Guide Dike, West 113th Avenue Guide Dike, East 113th Avenue Guide Dike, and 95th Avenue Guide Dike (located approximately 190 feet west of the street centerline) were constructed for Phase 1A. These dikes are armored by 27-inch riprap with the exception of the 95th Avenue Guide Dike, which is armored by 36-inch riprap. The toes are protected by 12-inch-thick gabion mattresses.

Four dikes, named West 121st Avenue Guide Dike, West 119th Avenue Guide Dike, East 119th Avenue Guide Dike, and West 117th Avenue Guide Dike were constructed or modified as part of Phase 1B construction. Both the West 121st Avenue Guide Dike and the West 119th Avenue Guide Dike were constructed and armored by 27-inch riprap and protected by 12-inch-thick gabion mattresses. The East 119th Avenue Guide Dike, and West 117th Avenue Guide Dike were previously constructed and only the 12-inch-thick gabion mattresses were constructed at the toes of the dikes. All seven of the guide dikes are oriented at a 90-degree angle with respect to the levee centerline.

(6) O&M Roads

Two Operation and Maintenance (O&M) Roads are required for each phase. One is located along the levee crest and the other is situated between the toe of the levee landside slope and the collector channel. These O&M roads consist of 3-inch-thick Aggregate Base Course (ABC), and 14-foot-wide cross section, and turnarounds and other modifications as indicated on the As-Built Plans.

(7) RCB/RCP Culverts

Three Reinforced Concrete Box (RCB) culverts were constructed as part of the Tres Rios North Levee project. One RCB culvert is utilized as a crossing of the collector

channel at approximately 113th Avenue at the upstream end of the catch basin upstream of Avondale Boulevard. This RCB consists of a single barrel, 18 feet wide by 4 feet high. The other two RCB culverts are at the downstream end of the catch basins. Each barrel is 5 feet wide by 3 feet high and each has a rectangular flap gate at the outlet. At the inlet, trash racks are installed across the entire RCB inlet width.

One Reinforced Concrete Pipe (RCP) culvert was constructed during Phase 1B across El Mirage Road.

(8) Utilities

Several power and telephone lines were removed or relocated as part of the construction of the Tres Rios North Levee. Details regarding the locations of these power and telephone lines can be found in the DDR (USACE, 2012).

(9) Concrete Irrigation Canal Connections

Several concrete irrigation canal (CIC) connections, or sidedrains, have been modified and discharge from an outlet into the collector channel. The existing 18-inch-diameter CMPs that originally discharged from an outlet into the river through the Holly Acres Levee were sealed. New sidedrains were constructed and discharge from an outlet into the collector channel.

(10) Avondale Boulevard Crossing (Identified as 115th Avenue)

The crossing of Avondale Boulevard is located on the downstream end of Phase 1A and the upstream end of Phase 1B. The crossing was built by the Maricopa County Department of Transportation (MCDOT), is designated as 116th Avenue, and consists of bridge deck and approach supported on piers and shallow foundations. The levee alignment portion of the crossing is constructed of soil cement with 1.5 Horizontal:1 Vertical (1.5H:1V) riverside slopes.

c. Location and Vicinity Map

The Tres Rios North Levee project is located near the confluence of the Salt, Gila, and Aqua Fria Rivers, approximately 9 miles west of the City of Phoenix in the County of Maricopa, Arizona.

The levee is located along the north bank of the Salt/Gila Rivers (Figure 1). The levee begins at the alignment of 105th Avenue (approximate Station 224+62.57), continues downstream past Avondale Boulevard (also known as 115th Avenue and 116th Avenue, at approximate Station 153+72.90), and ends at El Mirage Road (approximate Station 0+00). The construction of the Tres Rios North Levee was conducted in two phases (1A and 1B) and with Phase 1A being from 105th Avenue downstream to Avondale Boulevard, and Phase 1B being from Avondale Boulevard downstream to El Mirage Road.

An existing levee, the Holly Acres Levee, located between approximately Station 103+00 and 168+00, was modified in 1983 and had been operated and maintained by the

FCDMC. The Holly Acres Levee was incorporated into the Phase 1A and Phase 1B construction of the Tres Rios North Levee.

d. Site Description

The project area is generally characterized by a broad alluvial valley surrounded by steeply sloped mountain ranges that rise several thousand feet above the valley floors. The sub-basin is bounded on the south by the Sierra Estrella, the South Mountains, and the Buckeye Hills; on the west by the White Tanks Mountains; and on the north by the Wickenburg, Hieroglyphic, and New River Mountains (City of Phoenix 1997).

The project activities occur mostly within the river floodplain. However, the project area encompasses terrestrial lands north and south of the Gila and Salt Rivers. The surrounding land is relatively flat and rural. The general land uses in the project area consist of rural residential, agricultural and agribusiness, light industry, 91st Avenue Waste Water Treatment Facilities, public and semipublic areas, and vacant land.

The geology of the Tres Rios study area is dominated by valley fills and alluvium associated with the Salt River and Gila River channels. Granite and metamorphic bedrock outcrops are found in the south portion of the Tres Rios project area, in the Sierra Estrella Mountains. The surface materials within the Tres Rios study area are Quaternary age river sediment deposited as alluvium and, to a lesser extent, sheet wash deposited alluvium and slope deposited colluvium.

This alluvium thins in the direction of local mountains. Sand and gravel, moderately poorly graded and stratified, compose the bulk of the deposits left by the Salt River. These deposits consist of well-rounded clasts and are locally interbedded with irregular silt, sand, and clay lenses. The fine sediments are derived from overbank flows during flood stage. Prominent terraces of the Salt River sediments are present within the limits of the study area. Colluvium is formed of loose to well-cemented silt, sand, clay, and gravel. The colluvium and alluvial deposits rest upon bedrock consisting of Tertiary granite rocks, as well as the Precambrian metamorphic rocks. Bedrock is relatively deep in the area of the project but outcrops can be found south of the project site in the Sierra Estrella Mountains.

e. Foundation Investigations

(1) Investigations Prior to Construction (Including Testing)

USACE conducted field exploration/sampling and laboratory testing programs for the Tres Rios project in September 2002, January 2003, and December 2003. URS Corporation (URS) conducted additional field investigations in March 2005. Details regarding these investigations can be found in the DDR (USACE, 2012).

Field exploration was performed and soil samples were collected from the proposed levee alignment and existing Holly Acres Levee in September 2002, January 2003, and December 2003 by USACE. Investigations in September 2002 included 15 test trenches ranging in depth from 4 to 12 feet. Investigations in January 2003 included

9 test holes using a 24-inch-wide bucket auger to a maximum depth of 20 feet. Investigations in December 2003 included 4 test trenches.

A total of 175 samples were collected from 9 boring holes and 5 test trench locations during the investigations. An additional field exploration program was conducted by URS Corporation in March 2005 for the Tres Rios project. This investigation included 24 borings and 34 test pits. While drilling borings, soil samples were obtained at about five-foot intervals. Four test pits were dug near or on the levee footprint. Depths explored ranged from 10 to 14 feet.

(2) Investigations During Construction

No geotechnical investigations were performed during construction. Some observations were made as documented in daily reports.

f. Overview Photograph(s) of Completed Project

Selected overview photographs (Photo Nos. F-1 and F-2) of the completed project are presented below; more photos (GENTERRA, July 31, 2012) are included in Appendix II.



Photo No. F-1. Phase 1A Collector Channel Looking Downstream Near the 105th Avenue.



Photo No. F-2. Viewing Upstream from Phase 1B Catch Basin.

SECTION 2 FOUNDATION CONSTRUCTION

Phase 1A

The foundation construction elements in Phase 1A included subgrade treatment of the following features:

- Three access ramps with turnaround areas to allow for maintenance vehicle access to the levee crest;
- Four compacted earthfill guide dikes, armored with 27-inch or 36-inch riprap. Three of the guide dikes are oriented at 90 degrees to the levee centerline. One of the guide dikes is located near 95th Avenue it was moved to 190 feet west of the street centerline;
- Two gravel-surfaced operation and maintenance (O&M) roads. One of the O&M roads is located along the levee crest and the other is located between the toe of the levee on the landside and the collector channel. Both of the O&M roads extend along the full length of the levee from 105th Avenue to 115th Avenue;
- A 1.1-mile-long reinforced concrete trapezoidal collector channel that extends from 105th Avenue to 113th Avenue;
- A 14 acre-foot earthen catch basin located on the landside of the levee between 113th Avenue and Avondale Boulevard;
- Two reinforced concrete box (RCB) culverts with trash racks and flap gates. One carries inflows from the collector channel into the catch basin and the other conveys outflows for the catch basin and discharges into the Gila River;
- Several concrete irrigation canal connection structures (sidedrains) that join the existing concrete canal with the collector channel; and,
- An 858-foot-long earthen trapezoidal drainage ditch (115th Avenue Drainage Ditch) that conveys nuisance and low flows from the catch basin through the RCB culvert into the Gila River. The culvert is located on the riverside of the levee.

The construction reports, including the Inspectors Quality Assurance Reports (QAR) and the Inspectors Quality Control Reports (QCR), for this project reported overall good workmanship. Quality Assurance testing was provided by AMEC; Quality Control testing was provided by Hoque and Associates, Inc. (Hoque and Associates).

Foundation preparation and treatment (under embankment and structural elements) for Phase 1A included the following:

- The surface of a partial length of the existing Holly Acres Levee, which received compacted fill;
- The foundation for the new levee within its footprint;
- The foundations for a five-celled, 3-foot by 5-foot RCB with flap gate and trash rack; and a single cell, 4-foot by 18-foot RCB without flap gate and trash rack;

- The foundations for four compacted earthfill guide dikes (the 95th Avenue Guide Dike; the East 113th Avenue Guide Dike; the West 113th Avenue Guide Dike; and the East 115th Avenue Guide Dike); and,
- The foundations for a reinforced concrete lined trapezoidal collector channel on the dry side of the levee and side channels.

In the improved sections of the existing Holly Acres Levee, compacted fill was placed on both sides of the levee after removing riprap and stripping the upper six inches of surface soil. Gabions were installed near the toe of the Holly Acres Levee to improve scouring resistance.

The new levee sections were built on a prepared subgrade by stripping six inches of topsoil and compacting to 95% of the maximum dry density (relative compaction) in accordance with ASTM D 1557. The new levee sections of the Phase 1A construction incorporated a toe-down protection (with a depth of 3.75 feet and a width of 14 feet) on the river side for scour protection.

The foundation preparation of the RCBs included excavation and sloping back the sides of the excavation to the designed elevation. The exposed subgrade was proof-rolled and a layer of Aggregate Base Course (ABC) was placed and compacted to form the foundation of the RCBs. Foundation preparation of the collector channel and sidedrains included over-excavation to the designed elevation and sloping back the sides of the excavation. The exposed subgrade surface under structural elements was scarified, moisture-conditioned, and compacted to 95% relative compaction in accordance with ASTM D 1557. Backfill soils around the structural elements were compacted to 90% relative compaction in accordance with ASTM D 1557.

Construction equipment used for this project on an as-needed basis during preparation and treatment of foundation are listed below:

- Caterpillar 623F Scraper (up to two scrapers on the same day);
- Caterpillar 623 Water Pull;
- Caterpillar 140H Motor Grader;
- Caterpillar 815 Compactor;
- Caterpillar D6 LGP Dozer;
- John Deere 210 Gannon;
- John Deere 644 Loader;
- John Deere 200 Excavator;
- John Deere 310 Backhoe;
- Hitachi EX200-3 Crawler Excavator;
- Freightliner Water Truck;
- KW Water Truck;
- International 4,000-gallon Water Truck; and,
- Ford 2,000-gallon Water Truck.

a. Special Design and/or Construction Considerations

Levee Foundations: The Project Specifications required that foundation surface to be cleared of obstructions including removal of old slope protection materials, vegetation debris; and all other unsuitable materials. Removal of a minimum of six inches of topsoil/surface soils was required within the levee footprint in accordance with the Specifications, and the exposed surface was required to be proof-rolled by four passes of compaction equipment and then scarified to a depth of six inches before receiving fill.

Benching into sloping ground surface (steeper than 4H:1V) was required in a manner so that compaction equipment would be bearing on the full depth of the fill or backfill layer. The design of the new levee sections included a toe-down construction which consisted of placement of launching toe stones to a depth of 3.75 feet below the adjacent grade, and a width of 14 feet. The existing Holly Acres Levee sections had gabion mattresses. New gabion mattresses were installed and tied into the existing gabion mattresses.

Guide Dike Foundations: The design of the guide dikes included 12-inch-thick gabion mattresses at the toe of the guide dikes, extending 30 feet beyond the toe.

b. Foundation Excavation Procedures

Acceptance Criteria

Acceptance criteria for foundation excavations were provided in the Project Specifications, Section 02300 Earthwork, Part 3 Execution. The acceptance criteria are summarized below:

- Excavation of levee foundation and levee toe-down: Levee foundation excavation criteria included removal of six inches of topsoil to the lines and grades indicated on the As-Built Plans, and in compliance with the Project Specifications Section 02230 Clear Site and Remove Obstructions, which specified that additional excavation other than that shown on the As-Built Plans may be directed by the Contracting Officer;
- Excavation for foundation of RCB culvert: Excavation criteria for concrete structures included the removal of all materials to the lines and grades indicated for concrete structure, and in compliance with the Project Specifications Section 02230 Clear Site and Remove Obstructions;
- Excavation for foundation of the collector channel: Collector channel excavation criteria included the removal of all materials within the channel footprint to the lines and grades indicated in the As-Built Plans; and,
- Excavation of the existing Holly Acres Levee: Excavation criteria of the existing levee embankment included excavations to the lines and grades as shown on the As-Built Plans, and in accordance with Project Specifications Section 02300 Earthwork, Part 3 Execution, Paragraph 3.3 Preservation of Property.

(1) Comparison of Excavation Grades Between Design and As-Built Conditions

The contractor started site clearing on November 17, 2005, which included the following:

- Clearing of the waste tires and trash scattered on the site using skip loader;
- Removing fallen cottonwood trees between the levee alignment and 115th Avenue catch basin;
- Removing existing fence and posts at 115th Avenue catch basin;
- Removing and stockpiling riprap from the catch basin and the existing levee slopes;
- Clearing guide dike site at 113th Avenue; and,
- Grubbing consisting of removal and disposal of stumps, roots large than three-inch diameter, and matted roots from the designated areas.

After clearing and grubbing, the contractor started stripping a minimum of six inches of topsoil (refer to the Quality Control Report No. 132 dated January 3, 2006). The contractor disposed of the stripped soil in the designated areas (between Stations 174+00 and 194+00 on January 3, 2006; and between Stations 182+00 and 194+00 on January 6, 2006), and excavated levee toe-down to the specified depth of 3.75 feet. The construction was conducted in several segments, generally proceeding from west to east. The As-Built excavation grades were constructed in general conformance with the designed grades.

(2) Overburden Excavation

Overburden excavations included those for the new levee sections, levee toe-down, collector channel, and RCB culvert. The excavations were sloped back and no shoring supports were used.

- The levee toe-down was excavated to a depth of 3.75 feet with side slopes of 1H:1V on the riverside and 2H:1V on the levee side. The excavated soils were removed and stockpiled in the designated areas for use as levee fill;
- The contractor started excavating the collector channel on February 27, 2006 at 107th Avenue. The depth of the invert of the collector channel varies from 1.5 feet to 3 feet. The side slopes for excavation were 2H:1V;
- The excavation for the single cell, 4-foot by 18-foot RCB was constructed with side slopes of 3H:1V; and,
- The excavation for the five-celled, 3-foot by 5-foot RCB during construction was performed with a side slope of 2H:1V.

c. Character of Foundation

(1) Foundation Surface

Based on a review of the project documents, the foundation surface materials within the levee footprint generally consisted of alluvial deposits, including Silty Sand with Gravel, Sandy Silt, Poorly-Graded Sand with Silt and Gravel, and Silty Gravel with Sand. The materials were generally loose to medium dense before subgrade treatment. The levee was constructed using materials derived from the native soils, including Silty Sand with Gravel, Sandy Silt, and Poorly Graded Sand with Silt and Gravel.

(2) Condition of Foundation Soil

Upon stripping of the topsoil, the records indicate that the moisture contents of the exposed subgrade under the new levee sections generally ranged from 7% to 12%. The records also indicate that the moisture contents of the materials in the existing Holly Acres Levee, which were exposed upon removal of surface soils and riprap, were generally dry to moist, and were generally within a few percent lower than the optimum moisture content.

(3) Groundwater

Based on a review of the existing project documents, groundwater was not encountered during excavation. However, flooding of the project site by irrigation water from the adjacent farmland was reported on several occasions, and as summarized below:

- Construction of guide dikes was interrupted due to flooding by irrigation water (QAR No. 222 dated April 3, 2006);
- The subgrade at the east side of the West 113th Avenue Guide Dike was flooded by irrigation water. The contractor cut a ditch to the south to drain this water (QAR No. 233 dated April 14, 2006);
- Levee subgrade was reportedly flooded by irrigation water between Stations 205+00 and 210+00. The saturated subgrade was over-excavated by one foot, and it was backfilled with fill mixed with 3-inch rock (QAR No. 245 dated April 26, 2006);
- During construction of the 95th Avenue Guide Dike, the contractor had to dewater the site due to irrigation water (QAR No. 316 dated July 6, 2006);
- Irrigation water overflowed into the catch basin from the farm north of the catch basin, and eroded the slope of the catch basin (QAR No. 364 dated August 23, 2006); and,
- “Too much standing water and mud” was reported (QARs No. 377 dated September 5, 2006 and No. 378 September 6, 2006) upstream of 113th Avenue prior to concrete placement of the collector channel. Specifications required that the Contractor had to deal with high groundwater or surface rainfall events as part of the Contract.

- An investigation and assessment of damage to the dikes was undertaken (memos dated from January 2006 to November 2007) after settlement had occurred in the 95th Avenue Guide Dike. Exploration trenching was conducted for the 95th Avenue Guide Dike, West 113th Avenue Guide Dike, East 113th Avenue Guide Dike, and East 115th Avenue Guide Dike on November 13, 2007. As a result of the investigation, the guide dikes were repaired by placing sacrificial Silty Sand in a dry powder form on top of the gabions, and allowing the material to migrate through the gabions in order to fill in the voids for support. The undersides of the gabions were repaired by the following procedure: (1) identifying the damaged areas, (2) filling the voids beneath the gabions, (3) removing the basket cover, (4) removing the rock and Silty Sand to expose the openings in the gabion, and (5) placing new wire to cover the holes and restore the gabion.
- On March 5, 2008, Paul Beaver, Geotechnical Engineer from USACE, visited the site of the West 121st Avenue Guide Dike to inspect the foundation. The site visit was prompted by field personnel contacting the Engineering Division in Los Angeles describing the existence of a six-foot-deep pond filled with water, which was located within the footprint of the 121st Avenue Guide Dike. A meeting was conducted on March 6, 2008 with a team consisting of attendees from the USACE's Soils Design and Materials, Design A, and Hydraulics Sections to discuss potential solutions to this problem. The team agreed to construct the guide dike as shown on the plans. The Contractor was responsible for groundwater control per specifications. It was directed that the groundwater shall be pumped out. A visual inspection of the pond bottom was to be conducted by a representative of the USACE's Geotechnical Branch to determine whether additional excavation of the pond bottom was necessary. The pond was to be backfilled with competent foundation material containing cobbles, gravel, sand, and silt. The foundation material was to be placed in lifts of up to 18 inches for the first two lifts and 12-inch lifts thereafter. The foundation was to meet specification density and moisture content requirements at two feet below the ground surface in the surrounding area. Compaction of the materials placed below two feet was required, but specification limits were not mandated.

d. Foundation Treatment

Acceptance Criteria

Acceptance criteria for foundation treatment are documented in the Project Specifications, Section 02300, Paragraph 3.4 EXCAVATION OF EXISTING STRUCTURES, and are summarized below:

Levee Foundation: After clearing, grubbing and stripping, the exposed subgrade surfaces were required to be proof-rolled by four passes of compaction equipment and scarified to a depth of six inches before receiving fill. Benching into sloping ground surfaces steeper than 4H:1V was required to be stepped-in such that the compaction equipment would bear on the full depth of the fill layer.

Subgrade for RCB Culvert, Collector Channel, Concrete Irrigation Canals (CIC) and Irrigation Pipes (IP): The RCB culvert subgrade was required to be scarified to a depth of six inches below culvert, moisture conditioned, proof-rolled by four passes of the compaction equipment, trimmed to a uniform grade and smoothed with a steel-wheeled roller to make the subsurface ready to receive concrete. The subgrade was required to be compacted to a density of 95% of the maximum dry density per ASTM D 1557.

Specifications included no provisions for guide dike foundation treatment. However, the same foundation treatment for the levee foundations was applied under the guide dikes.

(1) Levee Foundation Compaction or Consolidation

After clearing, grubbing, and stripping operations were completed, instead of proof-rolling by four passes of the compaction equipment, the levee foundation was scarified to a depth of six inches with a Caterpillar 140H Grader and compacted with a Caterpillar 815 Compacter (refer to QCR No. 132 dated January 3, 2006). The levee foundation was moisture-conditioned and compacted to 95% relative compaction in accordance with ASTM D 1557. In wet areas, the foundation was aggressively disked and allowed to dry or mixed with dry soil. In dry areas, the soil was moisture-conditioned to within 2% of the optimum moisture content. Some portions of the foundation required additional treatment prior to embankment placement due to pumping subgrade. Two general methods were reported for the treatment of wet or soft/pumping subgrade:

- In areas where wet and soft subgrade was encountered, the subgrade was disked and allowed to air dry, or was mixed with dry soil to bring soil to within 2% of the optimum moisture content (QAR No. 253 dated May 4, 2006); and,
- In a relatively small ponding area three-inch rock was used to fill the low spot and to build a working platform before receiving fill (as reported in QAR No. 245 dated April 26, 2006 at the levee subgrade between Stations 205+00 and 210+00).

(2) Other Foundation Treatment

As indicated in QAR No. 322 dated July 12, 2006, Aggregate Base Course (ABC) was placed under RCB (five-celled, 3-foot by 5-foot reinforced concrete box located at the catch basin outlet, near 115th Avenue). On July 18, 2006 (QAR No. 328 dated July 18, 2006), the contractor placed additional ABC to rectify elevation difference from inaccurate surveys. The thickness of the ABC was not documented. It is noted that this construction deviated from the As-Built Plans and Specifications; and permeable materials placed under the RCB may present a concern for potential internal erosion problem.

e. Potential Future Problems

(1) Conditions That Could Produce Problems

The required benching into sloping ground steeper than 4H:1V was not noted in the QARs and QCRs, therefore, it could not be verified. Without proper benching, differential settlement and slope stability problems may occur in the future. Sloping ground conditions that would have required benching exist at the following locations:

- Improved sections of the existing Holly Acres Levee;
- The new levee sections from Stations 168+00 to 171+00;
- At the interface between the levee and the guide dikes; and,
- Between the improved and the new levee sections.

A review of the As-Built Plans showed that the geotextile fabric beneath the riprap materials in the guide dikes terminated at the toe of the riprap, and was not extended into the bottom of the 12-inch gabion mattress. Potential erosion in the toe area should be checked during regular inspections and O&M operations.

Overflow irrigation water can cause erosion damages to the farm-side of the collector channel. Erosion protection measures and additional sidedrains should be considered to reduce erosion and undermining.

(2) Additional Observations

Potential Differential Settlements: In places where the compacted fill soils were placed on a sloping foundation surface as described above, differential settlement may occur. Periodic observation, surveys, and maintenance are recommended.

Potential Erosion and Undermining: In the toe area of guide dikes and at the catch basin slopes, localized erosion may continue to occur. Periodic observations, surveys, and inspections should include checking for erosion and undermining that may occur around the collector channel and at the sidedrains.

Potential Seepage: 3-inch rocks and ABC were used to stabilize subgrade at several locations where pumping subgrade and/or ponding were reported. Potential seepage issues should be checked during periodic inspections.

f. Record of Foundation Approval

Foundation approvals were well documented in the QCRs and QARs. Compaction test locations are presented in Appendix I, and field and laboratory density test results are summarized in Appendix IV. Follow-up test results for some of the failed field density tests were either not available or were non-existent. Several tests were passed by meeting the required relative compaction (as documented in the QCRs); but the reported field moisture were not within the specified ranged of moisture contents (as noted in Appendix IV).

Phase 1B

The foundation construction elements in Phase 1B included subgrade treatment of the following features:

- Collector Channel: Approximately one mile of reinforced concrete trapezoidal channel extending from El Mirage Road to 115th Avenue;
- Catch Basin: An 8.5 acre-foot earthen catch basin located at the northeast corner of the modified Holly Acres Levee and El Mirage Road, including the basin Operation & Maintenance Road (north side) and the vehicular concrete access ramp;
- A five-cell Reinforced Concrete Box (RCB) culvert with trash rack and flap gate;
- One 48-inch-diameter (estimated by visual inspection) Reinforced Concrete Pipe (RCP) culvert with inlet and outlet structures, including headwalls and wingwalls to convey flows under El Mirage Road. The El Mirage Road Diversion Channel, RCP Culvert Plan, Profile, Sections and Details, can be found on Plate 33 and Sheet Divc-40, dated July 22, 2008 as shown in the DDR (dated April 2012) and the OMRR&RM (dated April 2009) included four 24-inch RCPs which was completed during the Phase 1B construction. However, it appears that a reconstruction was conducted by others since the completion of Phase 1B construction. Only one RCP pipe (more details are provided in Section 3 – Embankment Criteria and Performance Evaluation) was observed under the El Mirage Road during GENTERRA’s field visit on July 31, 2012;
- A trapezoidal grouted-stone diversion channel to convey flows from the RCB culvert to the El Mirage Road RCP culvert;
- Two 24-inch-diameter (estimated by visual inspection) Corrugated Metal Pipes (CMP) under an access road to convey flow from the RCB to the originally designed Diversion Channel. These CMP pipes were observed during GENTERRA’s field visit on July 31, 2012, but were shown as “deleted” on the As-Built Plans (refer to OMRR&RM and DDR);
- Four compacted earthfill guide dikes armored with riprap and gabion mattresses. These guide dikes are oriented at 90 degrees to the levee centerline;
- Three access ramps and several landing/turnaround areas to allow maintenance vehicle access to the levee crest;
- Two Operation and Maintenance (O&M) roads surfaced with Aggregate Base Course (ABC). One of the O&M roads is on the levee crest; and the other located between the toe of the levee on the landside and the collector channel. Both O&M roads extend along the full length of the levee from El Mirage Road to 115th Avenue; and,
- Eight sidedrains (concrete irrigation canal connections) were constructed along the levee, extending from the existing concrete canals to the collector channel.

The construction reports, including the Inspectors Quality Assurance Reports (QAR) and the Inspectors Quality Control Reports (QCR), for this project reported overall good workmanship. Quality assurance testing was provided by AMEC; Quality Control testing was provided by Hoque and Associates.

Foundation preparation and treatment (under embankment and structural elements) for Phase 1B included the following:

- The foundation for the new levee within its footprint (Stations 0+00.00 to 9+58.32);
- The surface of the existing Holly Acres Levee which received compacted fill (Stations 111+17.72 to 153+72.90);
- The foundations for five-celled, 3-foot by 5-foot Reinforced Concrete Boxes (RCB) with flap gates and trash rack;
- The foundations for four 24-inch-diameter RCPs under the El Mirage Road without flap gate or trash rack;
- The foundations for two compacted earthfill guide dikes, armored with 27-inch riprap; and the foundations for the gabion mattresses of two improved guide dikes. The guide dikes were constructed perpendicular to the levee centerline and are located at west and east of 121st Avenue, west of 119th Avenue, and west of 117th Avenue; and,
- The foundations for a reinforced concrete-lined trapezoidal collector channel (Stations 7+60.00 to 48+85.96) on the dry side of the levee, and eight sidedrains connected to the collector channel.

Along the improved sections of the existing Holly Acres Levee, the enlarged compacted fill on the dry side was placed following removal of old riprap and stripping of the upper six inches of surface soil. The new levee sections were constructed on prepared subgrade treated by stripping six inches of surface soil/topsoil and compacted to 95% relative compaction in accordance with ASTM D 1557. The new levee sections incorporated a toe-down protection on the riverside, which consisted of launching toe-stones (with a depth of 3.75 feet and a width of 14 feet). In addition, 12-inch-deep by 12-foot-wide gabion mattresses were placed immediately adjacent to toe-down protection to prevent scouring. New gabion mattresses, 12-inch-deep by 6-foot-wide, were placed near the toe of the existing Holly Acres Levee, and were tied into the old 9-inch-deep by 24-foot-wide gabion mattresses.

Foundation preparation of the RCB and RCP included excavation to the design elevations and placement of newly compacted fill in accordance with the As-Built Plans and Specifications.

Foundation preparation of the single cell, 4-foot by 18-foot RCB, the collector channel, and the sidedrains included excavation to the designed elevation by sloping back the excavation. The subgrade surface was then scarified, moisture-conditioned, and compacted to 95% relative compaction in accordance with ASTM D 1557. Backfill soils around the structural elements were compacted to 90% relative compaction in accordance with ASTM D 1557.

Construction equipment used for this project on an as-needed basis during preparation and treatment of foundation are listed below:

- Caterpillar Scraper 631E #541;
- Caterpillar Scraper 631E #581;
- Caterpillar 825C Compactor;

- Caterpillar D6 Dozer;
- Caterpillar D8 Dozer;
- Caterpillar 140M Motor Grader;
- Caterpillar 140H Motor Grader;
- Hertz Loader;
- Hertz Wheel Loader;
- Hertz 3,700-gallon Water Truck;
- Caterpillar 320 Excavator;
- Caterpillar 330 Excavator;
- Caterpillar D6 Dozer;
- Caterpillar D8 Dozer;
- Caterpillar 966 Wheel Loader;
- Caterpillar 35-ton Dump Truck (up to two on the same day);
- Caterpillar Roller; and,
- Caterpillar Mach 563 D Smooth Drum Roller.

a. Special Design and/or Construction Considerations

Levee Foundation: The specified foundation preparation included clearing of all obstructions, vegetation, debris, and removal of other unsuitable materials. Under the new levee foundation, the Project Specifications required removal of six inches of topsoil within the levee footprint, exposed subgrade was to be proof-rolled by four passes of the compaction equipment and scarified to a depth of six inches before receiving fill. The Project Specifications required compacted fill/backfill be benched into sloping ground surface steeper than 4H:1V, so that compaction equipment will bear on the full depth of the fill layer. The new levee design included levee toe-down protection, which consisted of 15-inch launching toe-stones embedded to a depth of 3.75 feet below the adjacent ground with a width of 14 feet; and 12-inch-deep by 24-foot-wide gabion mattresses. The design included improvements of the existing Holly Acres Levee. The old gabion mattresses were located in place, and tied to new gabion mattresses (12-inch-deep by 6-foot-wide).

Guide Dikes: The new guide dikes were designed with a 24-inch-deep toe-down protection consisting of launching toe-stones. The mattresses extend 30 feet beyond the footprint of the guide dikes, from the toe of the dikes. Improvements were designed for the existing guide dikes. Improvements to the East 119th Avenue Guide Dike included 12-inch-deep by 18-foot-wide gabion mattresses tied into the existing 9-inch-deep by 12-foot-wide gabion mattresses. Improvements to the West 117th Avenue Guide Dike included 12-inch-deep by 6-foot-wide gabion mattresses tied into the existing 9-inch-deep by 24-foot-wide gabion mattresses.

b. Foundation Excavation Procedures

Acceptance Criteria

Acceptance criteria for foundation excavations were provided in the Project Specifications, Section 02300 Earthwork, Part 3 Execution. The acceptance criteria are summarized below:

- Excavation of Levee Landside Slope Enlargement and Guide Dikes: The specified levee landside slope enlargement and guide dikes foundation excavation consisted of removal of six inches of topsoil, excavation to the lines and grades indicated on the As-Built Plans, and in compliance with the Project Specifications Section 02230 Clear Site and Remove Obstructions, which specified that additional excavation other than that shown on the As-Built Plans may be directed by the Contracting Officer;
- Excavation of Levee and Guide Dike Gabion Mattress: The specified excavation consisted of removal all materials to the lines and grades indicated on the As-Built Plans and in compliance with the Project Specifications Section 02230 Clear Site and Remove Obstructions. Additional excavation other than that shown on the As-Built Plans may be directed by the Contracting Officer;
- Excavation for the Foundation of Reinforced Concrete Box (RCB) Culvert, Concrete Irrigation Canals (CIC) or Irrigation Pipes (IP): The specified excavation of concrete structures consisted of the removal of all materials to the lines and grades indicated for concrete structures, and in compliance with section with the Project Specifications Section 02230 Clear Site and Remove Obstructions;
- Excavation for the Foundation of the El Mirage Collector Channel: The specified El Mirage collector channel excavation consisted of the removal of all materials within the channel to lines and grades as indicated on the As-Built Plans; and,
- Excavation of the Existing Holly Acres Levee and Guide Dikes: The Project Specifications required that the excavation be performed to the lines and grades as shown on the As-Built Plans; and that the excavation to expose the old gabion mattresses of the existing Holly Acres Levee and Dikes be carried to the lines and grades as indicated on the As-Built Plans, and in accordance with Project Specifications Section 02300 Earthwork, Part 3 Execution, Paragraph 3.3 Preservation of Property.

(1) Excavation Grades As-Designed and As-Built

The construction started with site clearing and grubbing on January 9, 2008, which included removal of fallen trees, debris, tree stumps, roots larger than three inches in diameter, matted roots; removal and stripping the 15-inch riprap from the dry side of the existing levee; removal of cobbles from the toe of the old levee sections to be removed; clearing at the guide dikes and collector channel alignments; and disposal at the specified areas.

Upon completion of clearing and grubbing, the contractor started stripping six inches of surface soil/topsoil. The construction was conducted in several segments, generally proceeding from west to east. The As-Built excavation grades were constructed in general accordance with the designed grades.

(2) Overburden Excavation

Overburden excavations include those for the new levee sections, levee toe-down, collector channel, and the RCB and the RCP culverts. The excavations were sloped back, and no shoring supports were used.

- The levee toe-down was excavated to a depth of 3.75 feet with side slopes of 1H:1V on the riverside and 2H:1V on the levee side and landside. The excavated soils were removed and stockpiled in the designed area for use as levee fill;
- The contractor started excavating for the collector channel on January 31, 2008 by stripping the upper six inches of topsoil. The depths of the invert of collector channel varied from 3 feet 8 inches to 5 feet 8 inches. The side slopes for excavation were maintained at 2H:1V;
- The excavation for the five-celled, 3-foot by 5-foot RCB during construction was performed with side a slope of 2H:1V; and,
- No As-Built Plans were available for review at the El Mirage Road culvert (QARs and QCRs indicated four 24-inch RCPs with headwall and wingwalls were installed).

c. Character of Foundation

(1) Foundation Surface

Based on a review of the project documents, the foundation surface materials within the levee footprint generally consisted of alluvial deposits, including Silty Sand with Gravel, Sandy Silt, Poorly-Graded Sand with Silt and Gravel, and Silty Gravel with Sand. The materials were generally loose to medium dense before subgrade treatment. The levee was constructed using materials derived from the native soils including Silty Sand with Gravel, Sandy Silt, and Poorly Graded Sand with Silt and Gravel.

(2) Condition of Foundation Soil

Upon stripping of the topsoil, moisture contents of the exposed subgrade under the new levee sections generally ranged from 7 to 12%. The moisture contents of the materials in the existing Holly Acres Levee exposed upon removal of surface soils and riprap were generally dry to moist, and were lower than the optimum moisture content.

(3) Groundwater

Based on a review of the construction documents, groundwater was encountered during excavation (QCR No. 306 dated September 29, 2008). Standing water was reported in the QCR No. 70 dated February 6, 2008 on the riverside of the levee from Station 103+00 to Station 111+00. Flooding due to irrigation water was also reported (QCR No. 105 dated March 12, 2008). A bog at the end of 121st Avenue Guide Dike was drained by pumping (QCR No. 110 dated March 17, 2008). Fine grading of the RCB pad was disturbed due to flooding by irrigation water (QCR No. 133 dated April 9, 2008).

d. Foundation Treatment

Acceptance Criteria

Acceptance criteria are documented in the Phase 1B Project Specifications, Section 02300, Paragraphs 3.4 and 3.8, and are summarized below:

Levee and Guide Dikes: After clearing, grubbing, and stripping, the exposed subgrade surface was required to be proof-rolled by four passes of compaction equipment, and scarified to a depth of six inches before receiving fill. Benching into sloping ground surfaces steeper than 4H:1V was required to be stepped-in such that the compaction equipment would bear on the full depth of the fill layer (Paragraph 3.4 Excavation of Existing Structures).

Subgrade for RCB/RCP Culverts, Collector Channel, Concrete Irrigation Canals (CIC) or Irrigation Pipes (IP): The RCB culvert subgrade was required to be scarified to a depth of six inches, moisture conditioned, and proof-rolled by four passes of the compaction equipment and trimmed to a uniform grade and smoothed with a steel-wheeled roller to make the subsurface ready to receive concrete. The subgrade was required to be compacted to 95% of the maximum dry density per ASTM D 1557.

The Phase 1B Project Specifications also required that “Channel, Guide Dikes, and Levee Embankment subgrade materials that cannot be brought to 95% relative compaction after scarification and compaction shall be removed and re-compacted” (Paragraph 3.8 Removal of Unsatisfactory Soils and Materials).

(1) Foundation Compaction or Consolidation

After clearing, grubbing, and stripping operations were completed on February 8, 2008 (QCR No. 72), the levee foundation was scarified to a depth of six inches with a Caterpillar 631E Scraper and compacted with a Caterpillar 825C Compactor. The foundation was treated and compacted to 95% relative compaction in general accordance with ASTM D 1557. In wet areas, the subgrade was disked and air-dried or mixed with dry soils; and in dry areas, the subgrade soil was moisture-conditioned to within 2% of the optimum moisture content.

Some portions of the foundation required additional treatment prior to embankment placement due to wet subgrade. Several methods were reported for the treatment of wet or soft subgrade:

- Wet and/or soft subgrade was disked and air-dried or was mixed with dry soil to bring soil to within 2% of the optimum moisture content; and,
- Groundwater was encountered at a depth of 6.5 feet in the excavation of the El Mirage Road (QCR No. 306 dated September 29, 2008) during the construction of the RCP culvert. Four inches of leach rock was placed to stabilize the bottom of the excavation. Concrete slurry was placed to keep the excavation from caving due to the presence of groundwater (QCR No. 307 dated September 30, 2008).

(2) Other Treatments and Problems

No information was available regarding whether geotextile fabrics were placed under the old riprap in the existing Holly Acres. Future erosion may be an issue if no geotextile fabrics were placed.

e. Potential Future Problems

(1) Conditions That Could Produce Problems

The required benching into sloping ground steeper than 4H:1V was not noted in the QARs and QCRs, therefore, could not be verified. Without proper benching, differential settlement and slope stability problems may occur. Sloping ground conditions (that require benching) exist at the following locations:

- Improved sections of the existing Holly Acres Levee;
- New levee sections from Stations 111+17.12 to 153+72.90;
- At the interface between the levee and the guide dikes;
- Between the improved and the new levee sections;
- A review of the As-Built Plans indicate that the geotextile fabric beneath the riprap materials in the guide dikes terminated at the toe of the riprap, and was not extended under the bottom of 12-inch gabion mattress. Potential erosion in the toe area should be checked during regular inspections and O&M operations; and,
- Overflow irrigation water can cause erosion damages to the farm-side of the collector channel. Erosion protection measures and additional sidedrains should be considered to reduce erosion and undermining.

(2) Recommended Observations

Potential Differential Settlements: In places where the compacted fill soils were placed on sloping foundation surface as described above, differential settlement may occur. Periodic observations, surveys, and maintenance are recommended.

Potential Erosion and Undermining: In the toe area of guide dikes and at the catch basin slopes, localized erosion may continue to occur. Periodic observations, surveys, and inspections should include checking for erosion and undermining that may occur around the collector channel and at the sidedrains.

Potential Seepage: Leach rocks were used to stabilize subgrade at the El Mirage Road RCP construction where groundwater was encountered. Potential seepage issues should be checked during periodic inspection.

f. Record of Foundation Approval

Foundation approvals were documented in the QCRs and QARs. Compaction test locations are presented in Appendix I, and field and laboratory density test results are summarized in Appendix IV. Follow-up test results for some of the failed field density tests were not available. Several tests were passed by meeting the required, relative compaction (as documented in the QCRs); but the reported field moistures were not within the specified range of moisture contents (as noted in Appendix IV). Several QCRs that documented approval of design changes during construction as summarized below:

- The collector channel invert design slope was revised to be less than two percent (QCR No. 107 dated March 14, 2008 and QAR No. 107 dated March 14, 2008);
- A six-inch by six-inch toe-down trench was excavated for the collector channel (QCR No. 104 dated March 11, 2008) from Stations 26+50 to 26+00. This excavation was not shown on the As-Built Plans; and,
- Based on a field discussion between the quality control representative and the quality assurance representative (QCR No. 97 dated March 4, 2008), the subgrade compaction requirement for the collector channel was reduced from the specified 95% (Specifications Section 3.13.2.1 Compaction) to 90% of the maximum dry density in accordance with ASTM D1557. This reported change was based on “the fact that excessive fines” existed in the channel subgrade which makes the specified 95% relative compaction unachievable for most of the channel.

SECTION 3. EMBANKMENT CRITERIA AND PERFORMANCE EVALUATION

Phase 1A

a. General

The construction reports, including the Inspectors Quality Assurance Reports (QAR; QA testing provided by AMEC) and the Inspectors Quality Control Reports (QCR; QC testing provided by Hoque and Associates), for this project reported overall good workmanship.

Before the placement of compacted fill, the foundation surface was cleared of all existing obstructions, including existing slope protection, vegetation, and debris. Unsuitable materials were removed where directed by USACE personnel. Levee fill materials were moisture-conditioned to within 2% of the optimum moisture content and compacted to not less than 95% of the maximum dry density per ASTM D 698. Backfill for RCB culverts, collector channel, and concrete irrigation canal were moisture-conditioned and compacted to not less than 90% of the maximum dry density per ASTM D 1557.

A review of the results of field density tests (sand cone and nuclear gauge) showed that the compaction generally satisfied the Project Specifications. Failed tests were generally re-worked, retested and passed. Field compaction test locations are shown in Appendix I, Drawings. Retest results of several failed tests could not be found, and are highlighted in the Phase 1A Compaction Tests in Appendix IV.

Construction equipment applied on-site on an as-needed basis during construction included the following:

- Caterpillar 623F Scraper (up to two scrapers on the same day);
- Caterpillar 623 Water Pull;
- Caterpillar 140H Motor Grader;
- Caterpillar 815 Compactor;
- Caterpillar D6 LGP Dozer;
- John Deere 210 Gannon;
- John Deere 644 Loader;
- John Deere 200 Excavator;
- John Deere 310 Backhoe;
- Hitachi EX200-3 Crawler Excavator;
- Freightliner Water Truck;
- KW Water Truck;
- International 4,000-gallon Water Truck; and,
- Ford 2,000-gallon Water Truck.

Temporary Flooding During Construction

Temporary flooding/saturation from irrigation water or rains were noted. Impacted subgrade soils were removed by over-excavation, scarified, and/or air dried and compacted prior to concrete and/or levee fill placement. Other issues noted in the construction reports such as inconsistent moisture (fill or subgrade materials that require blending and mixing), inadequate fill materials, inadequate re-bar clearance, etc. were generally corrected during construction.

Borrow Sources

Borrow sources for the levee construction were generally identified on the Plan Sheet 10. Additional borrow sources that had been identified during construction are listed below, together with relevant issues documented in the QARs.

- Materials from the 113th Avenue to 115th Avenue catch basin excavations were used for levee construction (QAR No. 140 dated January 11, 2006);
- Borrow areas between 111th Avenue and 109th Avenue were identified (QAR No. 154 dated January 25, 2006; and QAR No. 160 dated January 31, 2006). Approximately half of the borrow materials at the 111th Avenue borrow site (QAR No. 168 dated February 8, 2006) was found to consist of sands and were unsuitable for levee construction;
- Some of the fill materials from the 111th Avenue borrow site contained organic materials, including large tree stumps and limbs (QAR No. 215 dated March 27, 2006) and were removed from the levee construction (QAR No. 216 dated March 28, 2006);
- Borrow areas east of 107th Avenue and west of 105th Avenue (QARs dated February 23, 2006; February 26, 2006; March 3, 2006; March 21, 2006, and March 22, 2006);
- The contractor needed additional fill materials (on the order of 2,000 to 4,000 cubic yards, as noted in QAR dated April 5, 2006). An area on the west side of 107th Avenue was designated by USACE for additional borrow materials; and,
- The City of Phoenix provided information for a borrow site at the 95th Avenue (QARs dated April 5, 2006 and April 12, 2006).

b. Water Diversions and Closures for Construction

The Phase 1A construction affected irrigation drainage from 113th Avenue to 115th Avenue, and the following temporary drainage facilities were installed to facilitate local drainage during construction:

- A double box culvert was installed through the levee at 111th Avenue (QAR dated December 21, 2005);
- A 14-inch-diameter pipe was installed through the levee at 113th Avenue for water diversion from the SRP irrigation canals (QAR dated January 5, 2006); and,
- A trench was cut at 113th Avenue to drain the canal (QAR dated January 9, 2006).

Closures for the construction included the south ends of local streets that terminated at the levee (105th Avenue, 107th Avenue, 109th Avenue, 111th Avenue, 113th Avenue, and the east side of 115th Avenue). Electrical poles and buildings at 115th Avenue, 111th Avenue, and 107th Avenue within the construction limits were removed by the City of Phoenix. Residents in a condemned residential building on the 107th Avenue were evicted on March 16, 2006 (QARs dated November 7, 2005; November 15, 2005; November 28, 2005; January 4, 2006; January 17, 2006; March 1, 2006; and March 16, 2006).

c. Construction Notes

Construction notes presented below are based on a review of the listed construction documents for the Tres Rios Levee Phase 1A, and on GENTERRA's field visit conducted on July 31, 2012:

- Specifications: IFB No. W912PL-05-B-0004;
- As-Built Plans: Tres Rios-River, Maricopa County, Arizona, Environmental Restoration Flood Control North Levee Phase 1A (115th Avenue to 105th Avenue), February 2005;
- Design Document Report: Tres Rios Environmental Restoration Project, Design Document Report (DDR) for Flood Control North Levee Phase 1A & 1B, Maricopa County, Arizona, Final Submittal, Prepared By USACE Los Angeles District, P.O. Box 2711, Los Angeles, California 90053, April 2012;
- OMRR&RM: Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual, Tres Rios Environmental Restoration Project Flood Control North Levee, Phase 1A (105th Avenue to 115th Avenue), Maricopa County, Arizona, December 2007;
- Inspectors Quality Assurance Reports (QAR) Daily Log of Construction – Civil (ER1180-1-6): October 25, 2005 through February 6, 2007;
- Contractors Quality Control Reports (QCR) Daily Log of Construction – Civil: October 25, 2005 through January 24, 2007; and,
- Summary of Test Data: Presented in Appendices III and IV.

Contractor's information, construction milestones, and contract amount are summarized below:

- Contractor: TPA-CKY Joint Venture, 302 West 5th Street, Suite 310, San Pedro, California 90731;
- Contract Award Date: June 13, 2005;
- Note to Proceed Date: August 24, 2005;
- Completion Date: February 6, 2007; and,
- Contract Cost: 4.2 million dollars.

A summary of pertinent construction issues for Phase 1A is presented in Appendix IV, Data Summary Sheets. A field visit was conducted by GENTERRA on July 31, 2012 to verify and document the current conditions of the Tres Rios Levee. Selected photos from GENTERRA's visit are presented in Appendix II.

Project modifications/design revisions (red-lined As-Built Plans included in the OMRR&RM) include the following:

- The 95th Avenue Guide Dike was relocated 190 feet to the west of the original contract drawing's centerline (refer to Sheet GD-21 and QAR dated April 12, 2006) due to obstructions (eucalyptus trees) encountered in the field;
- The 107th Avenue Access Ramp, constructed on the south side of the north levee (refer to Sheet AR-19; and Phase 1A OMRR&RM, Plate 13);
- East 113th Avenue Guide Dike (Sheet GD-22; Phase 1A OMRR&RM, Plate 16);
- West 113th Avenue Guide Dike (Sheet GD-23; Phase 1A OMRR&RM, Plate 17);
- East 115th Avenue Guide Dike (Sheet GD-24; Phase 1A OMRR&RM, Plate 18); and,
- The 115th Avenue Access Ramp, constructed north of the catch basin (refer to Sheet AR-18; and Phase 1A OMRR&RM, Plate 12).

Project modifications/design revisions that were made during construction but were not included in the As-Built Plans include the following:

- The contractor requested to replace the specified 15-inch riprap with 24-inch riprap at the levee toe, and the request was approved by the Quality Assurance Inspector in the field (QAR dated May 17, 2006). The contractor was working in the area from the East 113th Avenue Guide Dike to 107th Avenue. This revision was not shown in the As-Built Plans. No information was provided regarding the gradation or the limits of the 24-inch riprap. This detail could not be confirmed during GENTERRA's field visit on July 31, 2012;
- A decision was made by USACE to delete gabions from the 115th Avenue Bridge to the west side of the East 115th Avenue Guide Dike (QAR dated May 24, 2006);
- The As-Built Plans showed 4-wire fences (Sheet M-1) along the project boundaries; however, they were observed only along the north boundary (the farm side) during GENTERRA's field visit on July 31, 2012;
- Newer and stronger two-cable fences were observed along a majority of the project boundaries except for the areas north of the catch basin. No Specifications or As-Built Plans of the newer fences were available for review;
- Some new rail fences were noted on the RCB culvert inlet and outlet at 113th Avenue; holes from previous support posts were observed in the concrete headwall.
- The As-Built Plans (Sheet GD-21) showed 33-inch riprap at the 95th Avenue Guide Dike; however, 36-inch riprap was reported (QAR dated August 9, 2006).

No gradation data were available to verify the actual materials used at this location; and,

- In a meeting among representatives of the USACE, City of Phoenix, and Maricopa County Flood Control District, it was decided to construct an Operation & Maintenance (O&M) road on the north side of the catch basin, and tie it into the O&M road east of the 113th Avenue (QARs dated September 7 and September 19, 2006; the road is not shown on the As-Built Plans).

Surface water and/or groundwater-related issues (such as wet/soft subgrade, standing water, or flooding by irrigation water) that were reported during construction are discussed below. The level of available details presented in the QAR and QCR varied (regarding locations, dimensions, gradation of backfill materials, and how these issues were resolved).

- Pumping levee subgrade was reported between Stations 189+00 and 202+00. The subgrade was over-excavated to a depth of three feet, and was scarified and re-compacted (QAR March 22, 2006);
- Pumping levee subgrade was reported between 111th Avenue and 107th Avenue. The subgrade was scarified to a depth of two feet, and re-compacted (QAR March 29, 2006);
- The subgrade at the east side of the West 113th Avenue Guide Dike was flooded by irrigation water. The contractor cut a ditch to the south to drain this water (QAR dated April 14, 2006);
- Levee subgrade was reportedly flooded by irrigation water between Stations 205+00 and 210+00. The saturated subgrade was over-excavated by one foot and backfilled with fill mixed with 3-inch rock (QAR dated April 26, 2006);
- Two soft spots were reported (approximately 20 feet in length) at approximately 300 feet and 150 feet west of 107th Avenue (QAR dated May 4, 2006). These soft spots were over-excavated and backfilled with fill mixed with aggregate. Depths of over-excavation were not noted;
- Considerable amounts of organics and unblended fill were reported (QAR dated July 10, 2006) at the 95th Avenue Guide Dike during embankment fill placement. No details were provided regarding the locations, dimensions, or how this issue was resolved;
- Irrigation water overflowed into the catch basin from the farm north of the catch basin and eroded the slope of the catch basin (QAR dated August 23, 2006);
- “Too much standing water and mud” was reported (QARs dated September 5 and September 6, 2006) upstream of 113th Avenue prior to concrete placement of the collector channel; and,
- “Inconsistent moisture, unsuitable materials due to rain saturation and runoff from the collector channel” were reported (QAR dated October 2, 2006) at 113th Avenue during subgrade preparation for the construction of the box culvert. No follow-up notes were provided regarding how this issue was resolved.

d. Operational Notes

Field conditions observed during GENTERRA's site visit on July 31, 2012 include the following issues that may be helpful to the operation and maintenance activities:

- Rodent activities, loose soils, and minor erosion damages were observed along the levee, the collector channel, and around the catch basin;
- Sediments, weeds, and stagnant water were observed in the collector channel;
- Irrigation water and seepage pressures behind the north side of the collector channel may have contributed to the observed cracks (which appear to be patched more than once) along the channel;
- Erosion gullies and water stains were observed at multiple locations on the north bank of the collector channel, apparently from overflowing irrigation water;
- Sidedrains blocked by weeds were observed at several locations;
- An exposed non-woven geotextile, loose soils (related to soil erosion), and some gravel were observed among 15-inch riprap at a distance of approximately 150 feet upstream of the East 115th Avenue Guide Dike;
- No apparent areas of settlements were observed on the levee. Minor displacement of gravel mulch was observed at several locations; and,
- The riverside of the levee slope at the 115th Avenue Bridge was treated by Cement Stabilized Alluvium (CSA). A review of the Record Drawings (116th Avenue Bridge over Gila River, North Bank C.S.A., Sheet C1 of 7; and 116th Avenue Bridge Details, C.S.A. Details – North Bank, Sheet C6 of 7) by Maricopa County DOT showed that the CSA treated zone extended from approximately 350 feet upstream of the center of the 115th Avenue Bridge to approximately 415 feet downstream of the center of the bridge. The thickness of the CSA materials was approximately eight feet, with a slope inclination of 1.5H:1V. The observed CSA slope appear to be irregular and over-steepened, with a slope inclination varying from approximately 1H:1V in the upper parts of the slope to roughly 1.5H:1V near the toe. Loose soils, gravel, random riprap materials, minor erosion, and sloughing were observed.

Phase 1B

a. General

The construction reports, including the Inspectors Quality Assurance Reports (QAR; QA testing provided by AMEC) and the Inspectors Quality Control Reports (QCR, QC testing provided by Hoque and Associates), for this project reported overall good workmanship.

Before the placement of compacted fill, the foundation surface was cleared of all existing obstructions, including existing slope protection, vegetation, and debris. Unsuitable materials were removed where directed. Levee fill materials were moisture-conditioned to within 2% of the optimum moisture content and compacted to not less than 95% of the maximum dry density per ASTM D 698. Backfill for RCB and RCP culverts, collector

channel, and Concrete Irrigation Canal were moisture-conditioned and compacted to not less than 90% of the maximum dry density per ASTM D 1557.

A review of the results of field density tests (sand cone and nuclear gauge) showed that the compaction generally satisfied the Project Specifications. Fill materials that contained excess moisture were scarified, air-dried, and retested (for examples, refer to QCRs dated February 11 through 14, and February 19, 2008). Failed tests were generally re-worked, retested, and passed. Field compaction test locations are shown in Appendix I, Drawings. Retest results of several failed tests could not be found and are highlighted in the Phase 1B Compaction Tests in Appendix IV, Data Summary Sheets.

Construction equipment applied on-site on an as-needed basis during construction included the following:

- Caterpillar Scraper 631E #541;
- Caterpillar Scraper 631E #581;
- Caterpillar 825C Compactor;
- Caterpillar D6 Dozer;
- Caterpillar D8 Dozer;
- Caterpillar 140M Motor Grader;
- Caterpillar 140H Motor Grader;
- Hertz Loader;
- Wheel Loader;
- 3,700-gallon Water Truck;
- Caterpillar 320 Excavator;
- Caterpillar 330 Excavator;
- Caterpillar D6 Dozer;
- Caterpillar D8 Dozer;
- Caterpillar 966 Wheel Loader;
- Caterpillar 35-ton Dump Truck (up to two on the same day);
- Caterpillar Roller; and,
- Caterpillar Mach 563 D Smooth Drum Roller.

Wet subgrade areas were generally scarified, air-dried, and/or removed and replaced with suitable materials. Examples include the following:

- Scarified and Air-Dried: At the collector channel between Stations 16+00 to 20+00 and Stations 25+00 and 48+50 (QCRs dated February 27, 28, and 29, 2008); and,
- Removal and Replacement: From Stations 148+00 to 150+00 (QCRs dated February 21 and 22, 2008).

Borrow sources for the levee construction generally consist of materials obtained from the following areas:

- Existing (Holly Acres) levee fills from Station 103+00 to 111+00 were removed and reused for construction of the new levee (As-Built Plan Sheet 6);
- Soils excavated from the catch basin construction;
- Excess soils excavated from the collector channel construction;
- Materials excavated from the north end of the 121st Avenue Guide Dike;
- Materials excavated during construction of the turndown (subsurface cutoff wall) of the outlet structure at the catch basin; and,
- The optional borrow site as identified on the Plan Sheet 9.

b. Water Diversions and Closures for Construction

Localized areas of water ponding were noted (QARs dated February 26, 2008; February 28, 2008; and March 20, 2008) which included the subgrade of 117th Avenue Guide Dike and 121st Avenue Guide Dike. Water was pumped out, and the low areas were backfilled with 15-inch rock. Guide dikes were constructed over the backfilled subgrade.

Representative incidences of heavy rains, snow melt, and flooding were also documented in the QCRs, including the following:

- Ponding: Documented in the QCRs dated January 28 and 29, 2008;
- Flooding due to rain: Between Stations 103+00 and 113+00 as noted in the QCRs dated February 4 and 5, 2008;
- Flooding due to snow melt: Documented in the QCR dated February 19, 2008; and,
- Flooding due to irrigation water: QAR dated September 17, 2008. Actual location and extent was not reported.

c. Construction Notes

Construction notes presented below are based on a review of the following construction documents of the Tres Rios Levee Phase 1B, and on GENTERRA's field visit conducted on July 31, 2012.

- Specifications: IFB No. W912PL-07-B-0003;
- As-Built Plans: Tres Rios-River, Maricopa County, Arizona, Environmental Restoration Flood Control North Levee Phase 1B (El Mirage Road to 115th Avenue), October 2006;
- Design Document Report: Tres Rios Environmental Restoration Project, Design Document Report (DDR) for Flood Control North Levee Phase 1A & 1B, Maricopa County, Arizona, Final Submittal, Prepared By USACE Los Angeles District, P.O. Box 2711, Los Angeles, California 90053, April 2012;

- OMRR&RM: Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual, Tres Rios Environmental Restoration Project Flood Control North Levee, Phase 1B (115th Avenue to El Mirage Road), Maricopa County, Arizona, April 2009;
- Inspectors Quality Assurance Reports (QAR) Daily Log of Construction – Civil (ER1180-1-6): 21 December 2007 to 12 November 2008;
- Contractors Quality Control Reports (QCR) Daily Log of Construction – Civil: 07 January 2008 to 30 October 2008; and,
- Summary of Test Data: Presented in Appendices III and IV.

Contractor's information, construction milestones and contract amount of the Tres Rios Levee Phase 1B are summarized below:

- Specifications: IFB No. W912PL-07-B-0003;
- Contractor: ERS-JV (Joint Venture), 302 West 5th Street, Suite 310, San Pedro, California 90731;
- Contract Award Date: August 28, 2007;
- Note to Proceed Date: November 28, 2007;
- Completion Date: November 12, 2008; and,
- Contract Cost: About 4.0 million dollars.

A summary of construction issues for Phase 1B is presented in Appendix IV, Data Summary Sheets. A field visit was conducted by GENTERRA on July 31, 2012 to verify and document the current conditions of the Tres Rios Levee. Selected photos from GENTERRA's visit are shown in Appendix II.

Project modifications cited in the QAR reports include the following:

- RCP across El Mirage Road: Design revisions referred to as "Mod 0006" were cited in the QARs (September 30, 2008, October 2, 2008, October 6, 2008, October 9, 2008, etc.). The "El Mirage Road Diversion Channel and RCP Culvert Plan, Profile, Sections and Details, Plate 33, Sheet Divc-40, dated July 22, 2008" as shown in the DDR (dated April 2012) and the OMRR&RM (dated April 2009) included four 24-inch RCPs, and showed that the originally designed Diversion Channel was deleted in 2008. However, the observed site conditions are different from those shown in the As-Built Plans. It appears that the El Mirage Road RCP culvert has been reconstructed since the completion of the Phase 1B project. It was observed during GENTERRA's field visit on July 31, 2012 that one 48-inch-diameter (estimated by visual inspection) RCP was placed under the El Mirage Road. The RCP culvert drains to a wetland area on the west side of El Mirage Road. The remains of several 24-inch-diameter RCP pipes were left on the western shoulder of the El Mirage Road. A relatively new pavement section was observed above the RCP culvert;

- Two 24-inch-diameter (estimated by visual inspection) CMP pipes were placed under an access road over the originally designed Diversion Channel. The access road and the CMP pipes were not shown on the As-Built Plans. The originally designed Diversion Channel, which was deleted in 2008, was observed in GENTERRA's field visit on July 31, 2012;
- Minor field modifications to Mod 0006 were made to the west side of El Mirage Road (QAR dated 14 October 2008); however, the modifications were not documented in the As-Built Plans;
- A low area (referred to as "the water pond" in the QAR dated February 28, 2008) at the existing 117th Avenue Guide Dike was backfilled with 15-inch rock to support a gabion mattress. Exact location and dimensions of the low area was not reported;
- A low area (referred to as "the watering hole" in the QAR dated February 28, 2008; and as referred to as "the bog" in the QAR dated March 20, 2008) at the 121st Avenue Guide Dike was encountered. The exact location and dimensions of the low area were not reported. It was reported that "the bog" was drained and backfilled with rock on-site without identifying the sizes of rock used (QAR dated March 20, 2008);
- The collector channel invert design slope was revised to be less than two percent (QAR dated March 14, 2008). The As-Built Plans (EMCC-26 through EMCC-34) showed the channel invert slope ranging from 0.03% (along a majority of the alignment) to 1.2% (at the entrance to the catch basin);
- The contractor requested to install 24-inch-diameter RCPs for sidedrains instead of the designed V-ditch or trapezoidal ditch. The request was approved by USACE (QAR dated April 23, 2008); however, the As-Built Plans did not reflect these revisions. It was verified during GENTERRA's field visit on July 31, 2012 that 24-inch-diameter RCPs were installed for all eight of the sidedrains in Phase 1B;
- It was reported that a wet area on the O&M Road was excavated and replaced with Aggregate Base Course (QAR dated August 28, 2008); however, the actual location and extent of the removal/replacement was not reported;
- It was reported that silt was washed down from the levee slope contaminating approximately two feet of Aggregate Base Course on the lower O&M Road (QAR dated September 3, 2008). The QAR report indicated that this condition was corrected; however, its exact location was not reported; and,
- One 24-inch-diameter RCP pipe with headwall surrounded by grouted riprap, and a power pole, were observed on July 31, 2012 under the access road north of the catch basin. This is reflected on Sheet EMDB-SD, which was added to the As-Built Plans.

d. Operational Notes

Field conditions observed during GENTERRA's site visit on July 31, 2012 include the following issues that may be pertinent to the operation and maintenance activities:

- Loose soils, gravel, and sparse weeds were observed on the riverside levee slopes among the rounded riprap particles, indicating soil erosion under the riprap and in the old Holly Acres Levee and guide dikes. Relatively minor but appreciable movements and uneven surface of the rounded riprap materials were observed at the East 119th Avenue Guide Dike, and on the riverside levee slopes (generally covered by rounded riprap) between the East 119th Avenue Guide Dike and the 115th Avenue Bridge;
- Rodent activities, loose soils, and minor erosion damages were observed along the levee, the collector channel, and around the catch basin;
- Sediments, weeds, algae growth, and stagnant water were observed in the collector channel;
- Irrigation water and seepage pressures behind the north side of the collector channel may have contributed to the observed cracks (which appear to be patched and re-occurred) along the channel;
- Erosion gullies and water stains were observed at multiple locations on the north bank of the collector channel from overflowing irrigation water;
- Sidedrains blocked by weeds were observed at several locations;
- No apparent areas of settlement were observed on the levee. Minor displacement of gravel mulch was observed at several locations; and,
- Two small slippages were observed near the northwest corner of the catch basin near El Mirage Road during GENTERRA's field visit on July 31, 2012. These slippages were located on the slope immediately below the O&M road north of the catch basin. The larger of the two slope slippages was approximately 10 feet wide and 3 feet deep. The smaller slippage was approximately 2 feet wide and 1 to 2 feet deep. It appears that rodent activities and surface water entering the catch basin from the farm side may have contributed to the slippages.

SECTION 4 CONCRETE MATERIALS

a. Project Description

The concrete elements of the project constructed in Phase 1A and Phase 1B are summarized below:

Phase 1A

The concrete elements in Phase 1A include the following features:

- A 1.1-mile long reinforced concrete trapezoidal channel (the collector channel) that extends from 105th Avenue to 113th Avenue;
- Two reinforced concrete box (RCB) culverts with trash racks and flap gates. One carries inflows from the collector channel into the basin and the other conveys outflows for the catch basin and discharges into the Gila River;
- Several concrete irrigation canal connection structures (sidedrains) that join the existing concrete canal with the collector channel; and,
- An 858-foot-long earthen trapezoidal drainage ditch (115th Avenue drainage ditch) that conveys nuisance and low flows from the catch basin through the RCB culvert into the Gila River. The culvert is located on the riverside of the levee.

A review of the construction reports for Phase 1A of this project indicated overall good workmanship. Construction reports reviewed consisted of Inspectors Quality Assurance Reports (QAR; QA testing was provided by AMEC) and Inspectors Quality Control Reports (QCR, QC testing was provided by Hoque and Associates).

Phase 1B

The concrete elements in Phase 1B include the following features:

- Approximately one mile of reinforced concrete trapezoidal channel (the collector channel) extending from El Mirage Road to 115th Avenue;
- A five-cell reinforced concrete box (RCB) culvert with trash rack and flap gate;
- Four 18-inch-diameter reinforced concrete pipe (RCP) culvert with inlet and outlet structures (that was completed in 2008), including headwalls and wingwalls to convey flows under the El Mirage Road. However, the observed site conditions are different from those shown in the As-Built Plans. It appears that the El Mirage Road RCP culvert has been reconstructed since the completion of the Phase 1B project. It was observed during GENTERRA's field visit on July 31, 2012 that one 48-inch-diameter (estimated by visual inspection) RCP was placed under the El Mirage Road. The RCP culvert drains to a wetland area on the west side of El Mirage Road. The remains of several 24-inch-diameter RCP pipes were left on the western shoulder of the El Mirage Road. A relatively new pavement section was observed above the RCP culvert; and several concrete irrigation canal connections (sidedrains) were constructed along the levee (see As-Built Plans), extending from the existing concrete canals to the collector channel.

A review of the construction reports for Phase 1B of this project indicated overall good workmanship. Construction reports reviewed consisted of Inspectors Quality Assurance Reports (QAR; QA testing was provided by AMEC) and Inspectors Quality Control Reports (QCR, QC testing was provided by Hoque and Associates).

b. Aggregate Sources

The aggregate sources for the concrete materials were provided by different companies (Appendix IV). The various size concrete aggregates range from three-quarters of an inch to 36 inches. Rocks larger than one inch were provided by ABC Sand & Rock, Inc., Kilauea Crushers, Inc., Sunrise Construction, Inc., and Phoenix San-Man, Inc. The three-quarter inch ($\frac{3}{4}$ ") rocks were provided by Cemex. Plant locations were not provided on the delivery tickets or any other documents.

The concrete sources used to supply concrete on this project were provided by two companies. The two companies were iMix Group LLC (iMix) and the Rinker Materials, Inc. (Rinker). Rinker provided concrete materials from June 2006 through November 2006. iMix provided the concrete materials from March 2008 through October 2008.

c. Aggregate Production

Aggregate sources for the concrete materials came from four different quarries/plants: (1) ABC, (2) Hassy, (3) Kilauea Tuthill, and (4) Estrella North Plant.

Rinker provided concrete for this project from three different batch plants in the area. Each different Rinker plant has a number designation. The Rinker batch plant numbers used for this project were plant #951/1951, #956-1956, and #957/1957.

iMix provided concrete for this project from two to three different batch plants in the area. Each different iMix plant has a number designation. From the delivery tickets provided, two of the iMix batch plant numbers used for this project were plant #130 and #132. Plant locations were not provided on the delivery tickets or any other documents.

d. Chemical Admixtures

There were no observed chemical admixtures used in the concrete production and construction of the concrete materials for the collector channel, RCB culvert, and headwalls and wing-walls. This includes any air entraining admixtures, water reducing admixtures, retarding admixtures, and accelerating admixtures.

e. Concrete Batching and Mixing Plants

The concrete batching and mixing plants used for this project consisted of two plants and are separated by sections of time when the concrete material was used. The two companies, iMix and Rinker, provided these services. The Rinker plants (#951/1951, #956-1956, and #957/1957) were used from June 2006 through November 2006 and the iMix plants (#130, #132 and possible unknown third plant) were used from March 2008 through October 2008.

f. Concrete Mixtures Specified and Used

The concrete mixtures used are designated by aggregate size and strength design for the intended structure (Appendix IV). The concrete mix identification numbers are supplied on each separate pour and location and are different from the two suppliers (Rinker and iMix). There are two different types of concrete use: Concrete of the collector channel, and structural concrete of the reinforced concrete box (RCB) with head-walls and wing-walls.

(1) Mass Concrete

Concrete on the Tres Rios Levee Project consists of collector channel bottom and panels. Rinker's designated mix identification number 1332583 MAG A #57 Air Ash, and iMix's designated mix identification number P3025705 were used for the required design strength of 3,000 psi. There is also a grout mix for the ramp area at 107th Avenue. Rinker's designated mix identification number 1332856-#8, 7.5SK Grout Air Ash was used for the required design strength of 2,000 psi. For the 115th Avenue catch basin and fence footings, Rinker's designated mix identification number 1332336 MAG B #57 Air Ash was used for the required design strength of 2,500 psi.

(2) Structural Concrete

Structural concrete on the Tres Rios Levee Project consists of collector channel reinforced concrete box culvert, headwalls, and wingwalls. Rinker's designated mix identification number, 1333126 MAG AA #57 Air Ash and iMix's designated mix identification number P4025AA5 were used for the required design strength of 4,000 psi.

g. Concrete Transportation, Placement, and Consolidation/Compaction

The concrete materials, transportation, and placement were provided by two batching and mixing plants (iMix and Rinker) over the project duration.

h. Concrete Curing and Protection

Concrete curing and protection of testing samples were completed per specifications by Hoque & Associates. The concrete structural strength cylinders were cast onsite and left in a secure location to avoid damage to the specimens. Each concrete placement testing consisted of four cylinders. The cylinders were designed to test for strength (Table IV-9 of Appendix IV). The first cylinder was tested at seven days; the second and third cylinders were tested for an average at 28 days; and a fourth cylinder was to be preserved (sample put on hold), to be used only if additional testing was needed or if design compressive strength was not met.

The cylinders were left onsite for approximately 24 hours to field cure before being taken to the Hoque and Associates laboratory for controlled cure and strength testing of the concrete cylinder specimens.

i. Temperature Control

Temperature control testing was monitored onsite and during each individual concrete pour. Records of ambient air and concrete temperature were recorded during the placement of the concrete (Appendix IV).

The only special concrete (grout) used was recorded on a single pour on October 25, 2006. The special concrete is a grout mix for the ramp area at 107th Avenue. Rinker's designated mix identification number 1332856 #8, 7.5SK Grout Air Ash was used for the required design strength of 2,000 psi.

One set of quality control samples was cast on that day with recorded breaks after a 7-day laboratory cure and an 11-day laboratory cure. The specimens reached required strength after the 11-day cure.

j. Precast Concrete

Precast concrete onsite consisted of various sized Reinforced Concrete Pipe (RCP). The RCP was placed/installed at locations throughout the project (see As-Built Plans). The RCB culverts placed/installed at locations throughout the project (at 115th Avenue and 113th Avenue) involved a form and cast-in-place design. Quality control samples for strength were taken at headwall, wingwall, and slab-on-grade areas while concrete placement was in progress.

k. Quality Verification and Testing

Quality verification and testing was performed by Hoque and Associates and documented as Inspectors Quality Control Reports (QC, QA testing). Hoque and Associates laboratory facility was used in the testing of concrete compressive strength and aggregate samples.

l. Summary and Discussion of Test Data

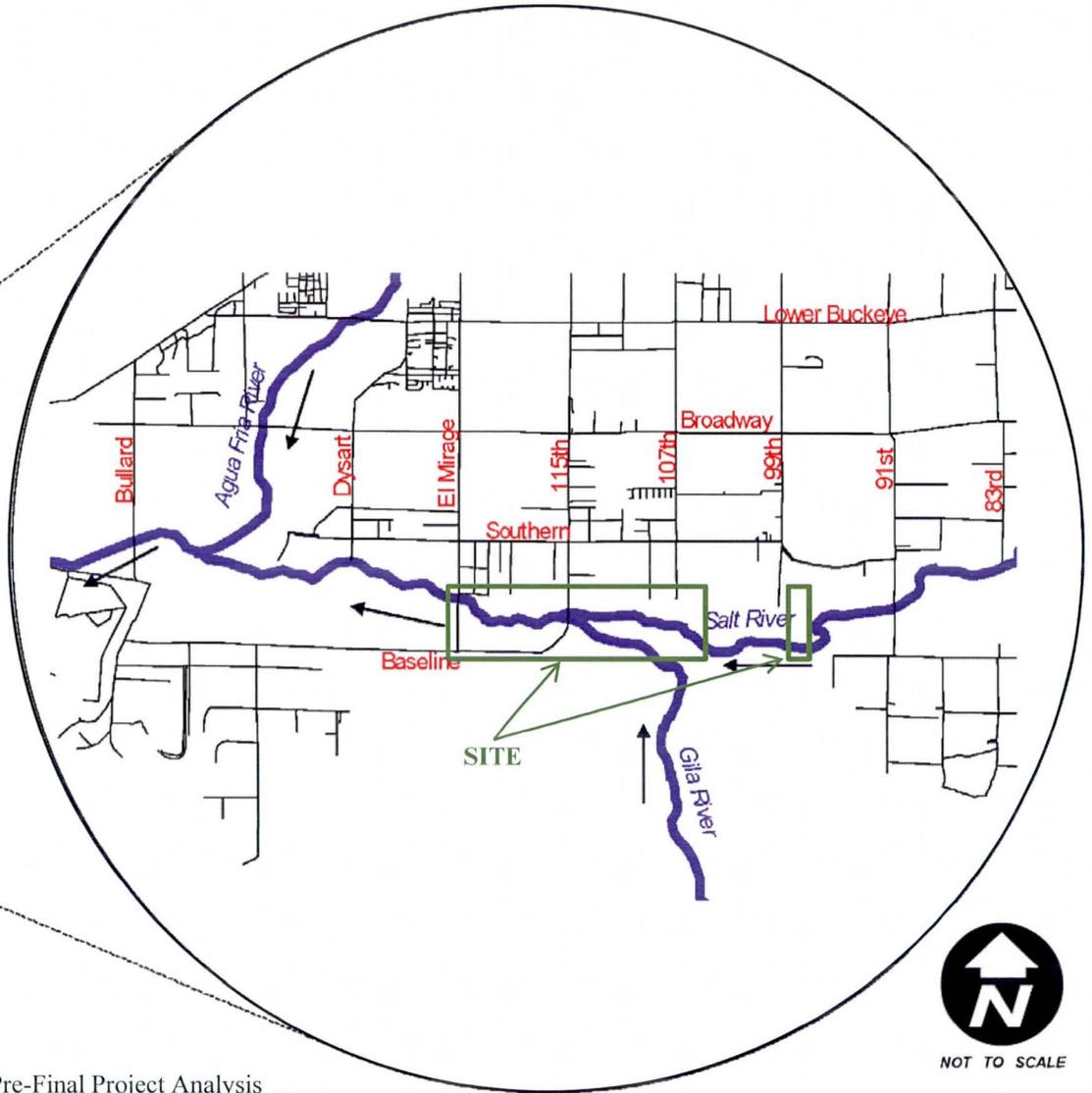
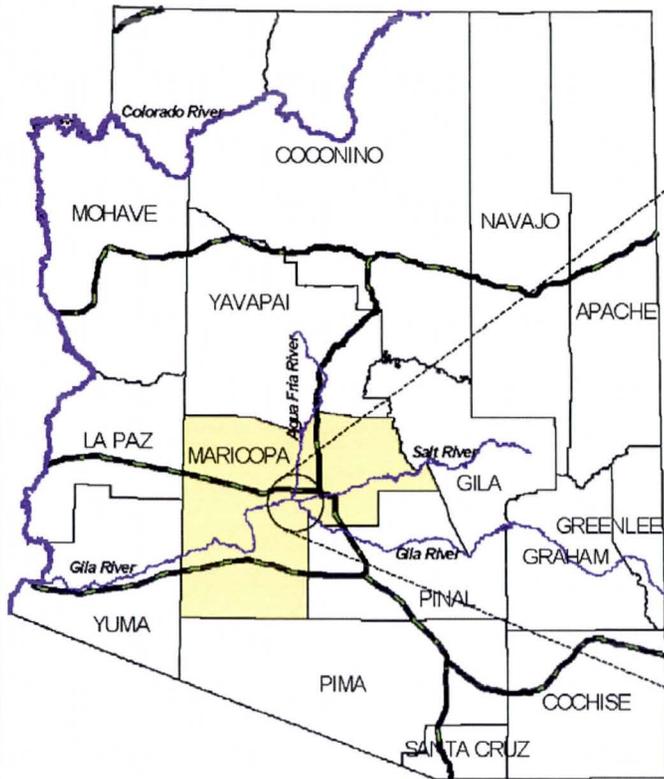
The following items describe the types of tests performed for this project:

- Aggregate quality tests
- Aggregate grading tests
- Concrete strength tests
- Air content tests
- Slump tests
- Placing temperature

A summary of test data can be located on the data summary sheets located in Appendix IV.

APPENDIX I - DRAWINGS

LOCATION AND VICINITY MAP



REFERENCE: Taken from WEST Consultants, Inc. Figure 1-1 of the Pre-Final Project Analysis Final Report to the PED Hydraulic Design of Tres Rios, dated April 2004.



U.S. Army Corps of Engineers
Los Angeles District

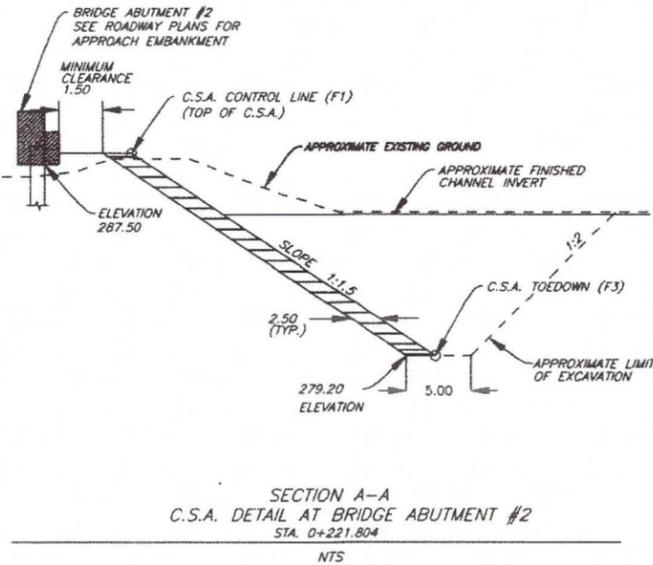
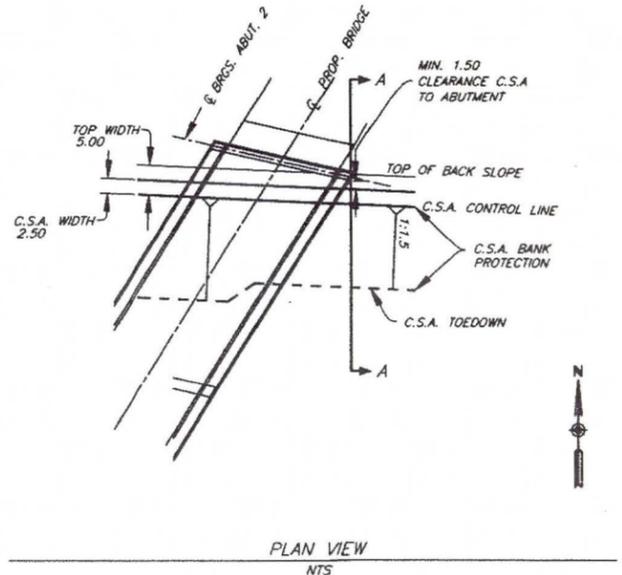
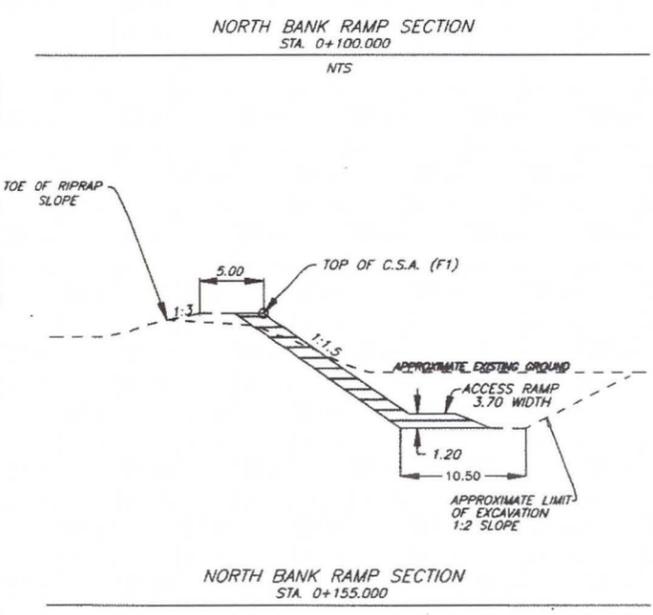
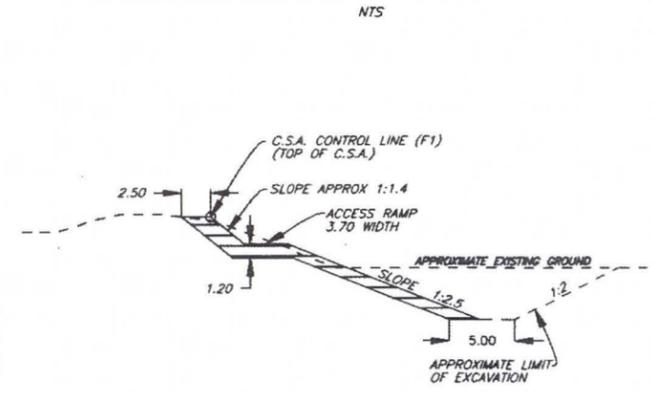
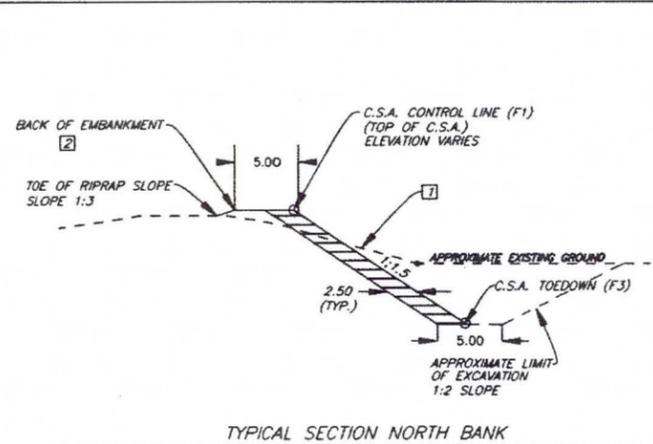


Project No. 345-PGT-TO2

Date: September 2012

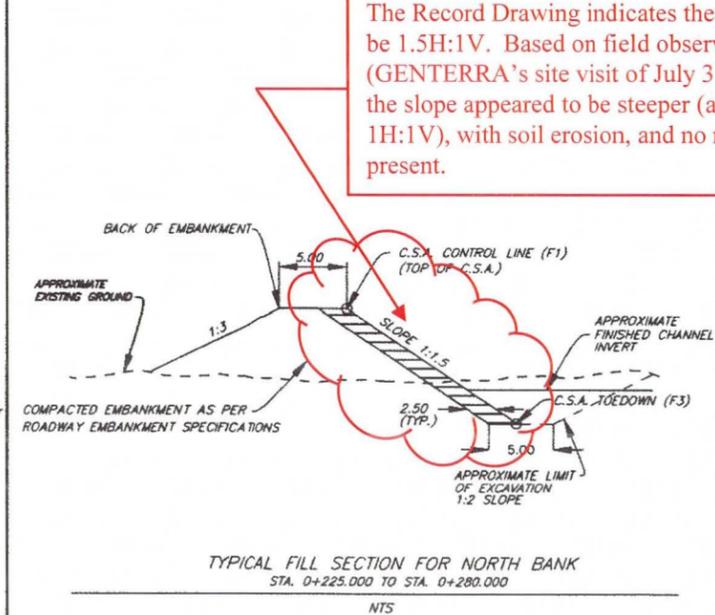
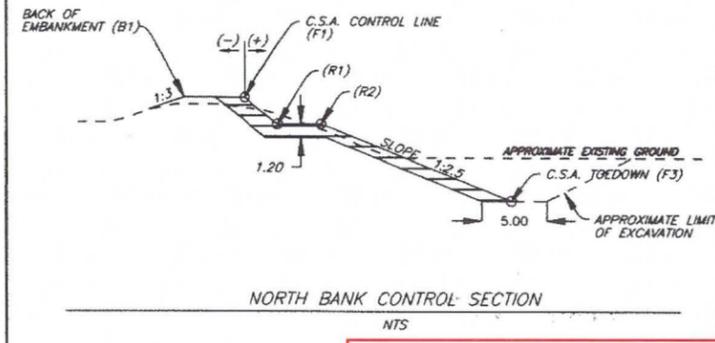
FIGURE I-1

Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



NORTH BANK C.S.A. OFFSET TABLE

BANK STATION	OFFSET (B1)	ELEV.	OFFSET (F1)	ELEV.	OFFSET (F3)	ELEV.	OFFSET (R1)	ELEV.	OFFSET (R2)	ELEV.
0+079.500	-2.500	287.520	0	287.520	24.600	279.200	0	287.520	3.700	287.520
0+085.000	-2.750	287.610	0	287.610	24.072	279.200	0.852	287.010	4.552	287.010
0+100.000	-3.400	287.850	0	287.850	22.906	279.200	3.176	285.621	6.876	285.621
0+120.000	-4.300	288.180	0	288.180	21.349	279.200	6.274	283.768	9.974	283.768
0+134.800	-5.000	288.420	0	288.420	20.196	279.200	8.567	282.396	12.267	282.396
0+140.000	-5.000	288.428	0	288.428	19.792	279.200	9.322	281.915	13.072	281.915
0+155.000	-5.000	288.452	0	288.452	18.624	279.200	11.696	280.497	15.396	280.497
0+169.300	-5.000	288.474	0	288.474	17.611	279.200	13.911	279.200	17.611	279.200
0+173.700	-5.000	288.474	0	288.474	13.911	279.200	---	---	---	---
0+173.700	-5.000	288.481	0	288.481	17.222	277.000	---	---	---	---
0+202.700	-5.000	288.526	0	288.526	17.289	277.000	---	---	---	---
0+207.100	-5.000	288.533	0	288.533	14.000	279.200	---	---	---	---
0+216.169	-5.000	288.548	0	288.548	14.022	279.200	---	---	---	---
0+221.804	-4.000	288.557	0	288.557	14.036	279.200	---	---	---	---
0+222.389	-5.000	288.558	0	288.558	14.037	279.200	---	---	---	---
0+300.952	-5.000	288.684	0	288.684	14.226	279.200	---	---	---	---
0+310.140	-5.000	288.694	0	288.694	14.241	279.200	---	---	---	---
0+314.067	0.000	288.700	0	288.700	14.250	279.200	---	---	---	---



F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ	STP.MMA-0(18)P	67	68	

- REMOVAL/RELOCATE
- CONSTRUCTION
- 1 SALVAGE EXISTING RIPRAP MATERIAL (REUSE AS SPECIFIED ON SHEET C1)
- 2 PLACE SALVAGED RIP-RAP ON NEW EMBANKMENT BACK SLOPE

RECORD DRAWING

RECORD DRAWING NOTATIONS
 These record drawings reflect certain dimensions, details, specifications, and plan revisions prepared by others or obtained from other record drawings which have not been independently verified by Entranco. As a result, Entranco is not responsible for the accuracy, appropriateness or completeness of such information depicted in these record drawing notations.
 ENTRANCO ENGINEERS, INC.
 DATE: 8-10-99

NOTE: ALL DIMENSIONS AND ELEVATIONS ARE IN METERS UNLESS NOTED OTHERWISE

NO.	REVISION	BY	DATE
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION ENGINEERING DIVISION			
116TH AVENUE BRIDGE DETAILS			
DESIGNED	T. MORRISON	DATE	3/29/96
DRAWN	B. LOTT	DATE	3/29/96
CHECKED	M. LISOTTA	DATE	3/29/96
SIMONS, LI & ASSOCIATES			
TEMPE			ARIZONA
C.S.A. DETAILS - NORTH BANK			SHEET OF 7

Reference: Sheet C6 of Maricopa County Department of Transportation 116th Avenue Bridge at Gila River Record Drawings.

U.S. Army Corps of Engineers
Los Angeles District



Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



PROJECT NO.

345-PGT-TO2

DATE

September 2012

FIGURE I-11d

115th Avenue Bridge Record Drawing
Sheet C6

TRACS NO. SS34501C

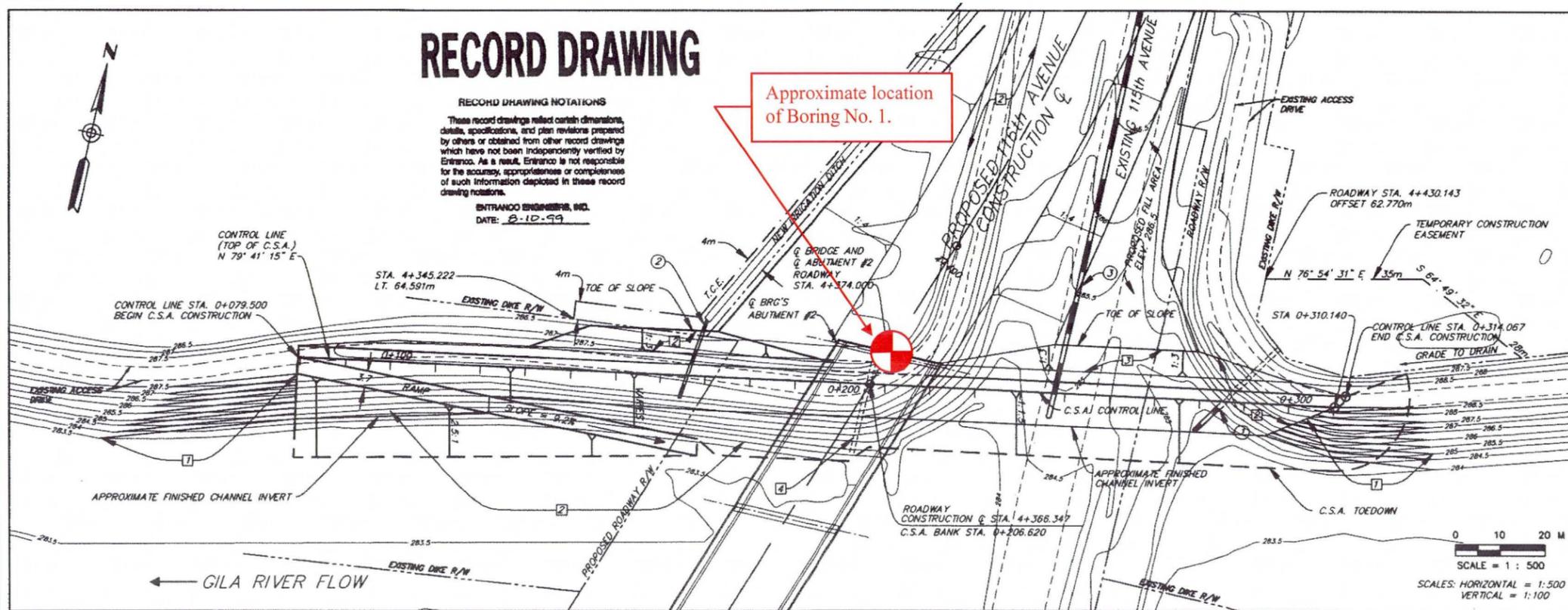
RECORD DRAWING

RECORD DRAWING NOTATIONS

These record drawings reflect certain dimensions, details, specifications, and plan revisions prepared by others or obtained from other record drawings which have not been independently verified by Entranco. As a result, Entranco is not responsible for the accuracy, appropriateness or completeness of such information depicted in these record drawing notations.

ENTRANCO ENGINEERS, INC.
DATE: 8-10-99

Approximate location of Boring No. 1.



F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ	STP.MMA-D(18)P	62	68	

REMOVAL/RELOCATE

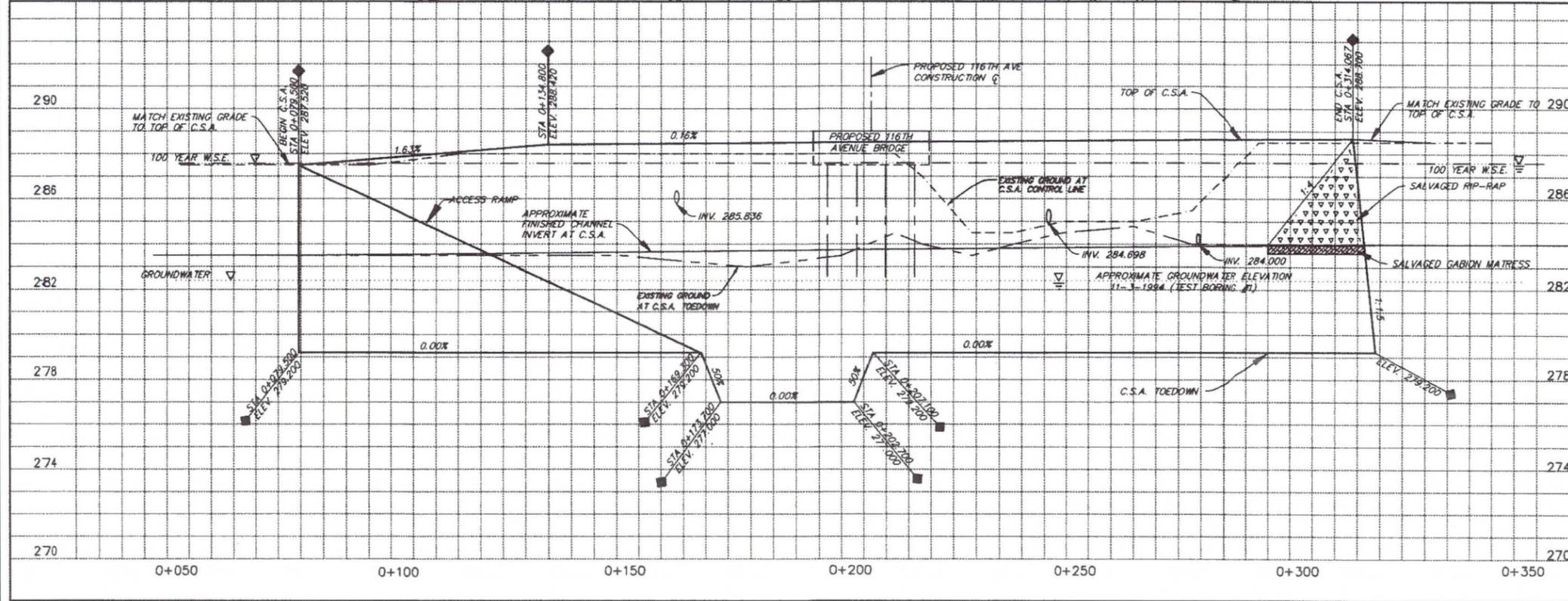
- 1 SALVAGE AND REPLACE EXISTING RIP-RAP AND GABION MATRESS TO MATCH EXISTING
- 2 SALVAGE EXISTING RIP-RAP FOR PLACEMENT ON BACKSIDE OF EMBANKMENT
- 3 PLACE SALVAGED RIP-RAP ON NEW EMBANKMENT BACK SLOPE TO MATCH EXISTING
- 4 REMOVE EXISTING DRAIN PIPE (SEE IRRIGATION PLANS, SHT W1)

CONSTRUCTION

- 1 EXTEND EXISTING 450mm CMP PIPE 8m THRU C.S.A.
- 2 NEW PIPE CULVERT (SEE IRRIGATION PLANS, SHT. W1)
- 3 NEW STORM DRAIN (SEE STORM DRAIN PLANS, SHTS. D2 AND D3)

NOTE: SLOPE ABOVE RAMP VARIES. SEE C.S.A. DETAILS - NORTH BANK SHEET C6

NOTE: ALL DIMENSIONS AND ELEVATIONS ARE IN METERS UNLESS NOTED OTHERWISE



NO.	REVISION	BY	DATE

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

116TH AVENUE BRIDGE
OVER GILA RIVER

DESIGNED	BY	DATE
M. LISOTTA	M. LISOTTA	3/29/96
B. LOTT	B. LOTT	3/29/96
T. MORRISON	T. MORRISON	3/29/96

SIMONS, LI, & ASSOCIATES, INC.
TEMPE ARIZONA
NORTH BANK C.S.A. SHEET OF C1 OF 7

TRACS NO. 5534501C

Reference: Sheet C1 of Maricopa County Department of Transportation 116th Avenue Bridge at Gila River Record Drawings.

U.S. Army Corps of Engineers
Los Angeles District



Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



PROJECT NO.

345-PGT-TO2

DATE

September 2012

FIGURE I-11c

115th Avenue Bridge Record Drawing
Sheet C1

LOG OF TEST BORING NO. 1

PROJECT 116th Avenue Bridge
 JOB NO. E94-171 DATE 11-3-84 Location: Abutment #2 Sta. 4+374.0m

Depth in Meters	Continuous Penetration Resistance	Graphical Log	Sample Type	Blow Count	Dry Density kg. per cubic meter	Moisture Content Percent of Dry Weight	Unified Soil Classification	REMARKS		VISUAL CLASSIFICATION	
								AP-1000	9 1/4" Dual-Wall Percussion Hammer		
0.00	17							metol to very moist	Man-made FILL SILTY SAND & GRAVEL, poorly graded, subrounded to subangular, nonplastic, brown		
1.22	19		A				GM-GP	dense to dense			
2.44	13		A								
3.66	11		A								
4.88	8		A					wet medium dense to dense	SAND, GRAVEL & COBBLES, poorly graded, subangular to subrounded, nonplastic, brown note: maximum estimated particle size of 400mm		
6.10	13										
7.32	24		A				GP				
8.54	18		A								
9.76	47										
10.98	51										
12.20	36		A								
13.42	20		A								
14.64	47										
15.86	56		A								
17.08	30						GP-GC	wet dense to very dense	SAND, GRAVEL & COBBLES, poorly graded, medium plasticity, brown		
18.30	49		S16-34-42	12							
19.52	21		A								
20.74	58							wet dense to very dense	SAND & GRAVEL, considerable cobbles, poorly graded, subrounded to subangular, nonplastic, brown		
21.96	43						GP-GM				
23.18	40		A								
24.40	52										

Elev. 265.0
Pile Tip @ Abut. 2

24.40	66		S 25-50/1 1/2"				GC-GP	wet dense to very dense	CLAYEY SAND, GRAVEL & COBBLES, poorly graded, medium plasticity, brown
25.62	42								
26.84	15						GP	wet dense to very dense	SAND, GRAVEL & COBBLES, trace of clay, poorly graded, low plasticity, brown
28.06	47								
29.28	30								
30.50	2							wet loose to dense	GRAVELLY SAND, trace of cobbles, poorly graded, nonplastic, light brown
31.72	15								
32.94	14						SP		
34.16	21								
35.38	18								
36.60	11								
37.82	9								
39.04	14								
40.26	9								
41.48	13								
42.70									Stopped Drill at 42.5m
43.92									
45.14									Groundwater @ 5.5m

NOTE:

The boring logs show subsurface conditions at the dates and locations shown in AEE Job No. E94-171, and it is not warranted that they are representative of subsurface conditions at other locations and times.

The sand gravel and cobble (SGC) deposits contain occasional boulders.

Classification of soil materials is visual unless accompanied by lab testing presented in the Geotechnical Investigation Report, prepared by Agra Earth & Environmental, Inc., Project No. E94-171.

The absence of a ground water indication does not constitute a representation that the ground water will not be present during construction. Ground water is indicated herein only when found during the foundation investigation and represents that condition only on the date of the investigation.

Tube samplers are driven with a 63.5 Kg hammer with 762 mm free falls, no cushion.

SAMPLE TYPE KEY

A - Auger Cuttings

S - 50.8mm O.D. 35mm I.D. tube sampler
Blows are recorded every 152.4 mm of penetration

Reference: Portion of Sheet S5 of Maricopa County Department of Transportation 116th Avenue Bridge at Gila River Record Drawing.

U.S. Army Corps of Engineers
Los Angeles District



Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



PROJECT NO.

345-PGT-TO2

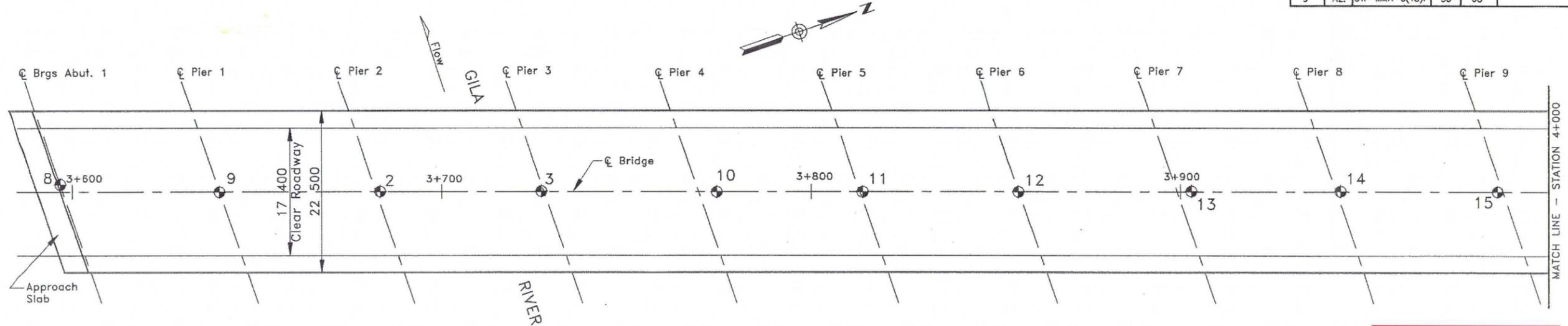
DATE

September 2012

FIGURE I-11b

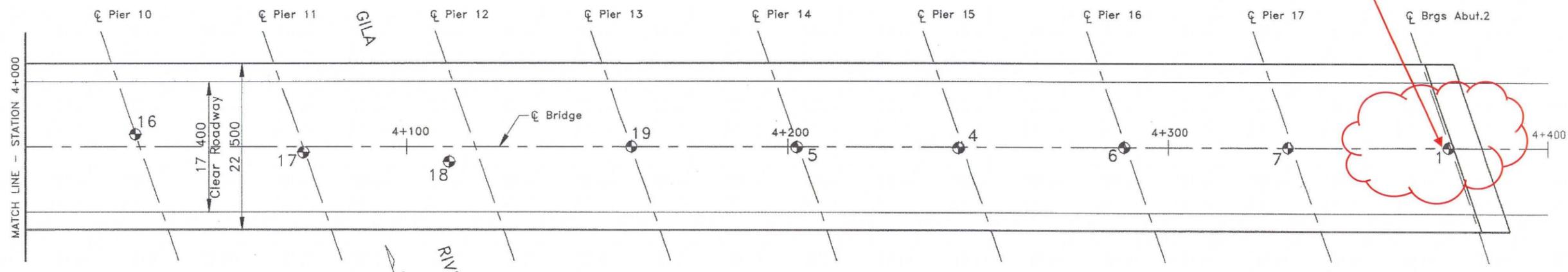
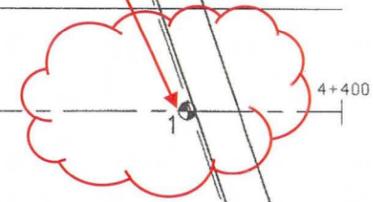
115th Avenue Bridge Record Drawing
Sheet S5

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	STP-MMA-0(18)P	36	68	



PLAN
SCALE 1:500

Location of Boring No. 1.



PLAN
SCALE 1:500

RECORD DRAWING

RECORD DRAWING NOTATIONS

These record drawings reflect certain dimensions, details, specifications, and plan revisions prepared by others or obtained from other record drawings which have not been independently verified by Entranco. As a result, Entranco is not responsible for the accuracy, appropriateness or completeness of such information depicted in these record drawing notations.

ENTRANCO ENGINEERS, INC.
DATE: 8-10-99

NO.	REVISION	BY	DATE
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION ENGINEERING DIVISION			
116TH AVENUE BRIDGE OVER GILA RIVER			
DESIGNED	N.H. WETZ	BY	DATE
DRAWN	T.M. PORTER		7/95
CHECKED	D.E. PETERSON		7/95
LOCATION OF TEST BORINGS			SHEET OF S4 529

Reference: Sheet S4 of Maricopa County Department of Transportation 116th Avenue Bridge at Gila River Record Drawings.

TRACS NO. SS34501C

U.S. Army Corps of Engineers
Los Angeles District



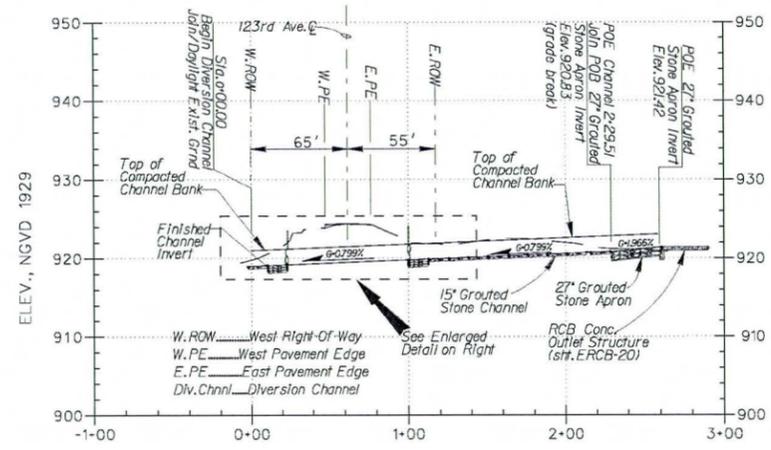
Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



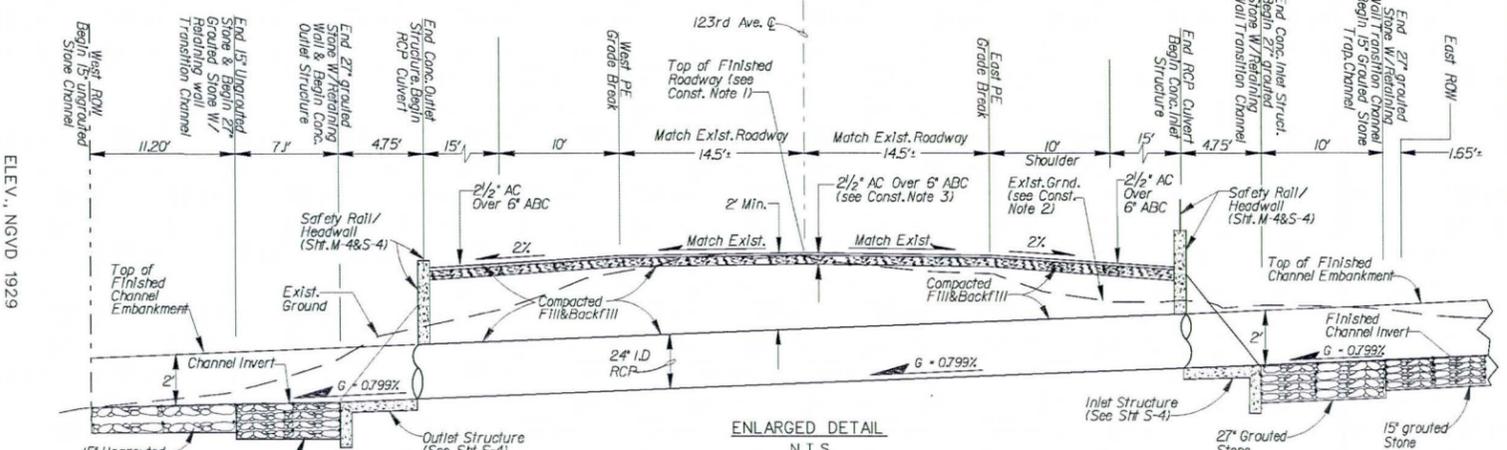
PROJECT NO.
345-PGT-TO2

DATE
September 2012

FIGURE I-11a
115th Avenue Bridge Record Drawing
Sheet S4

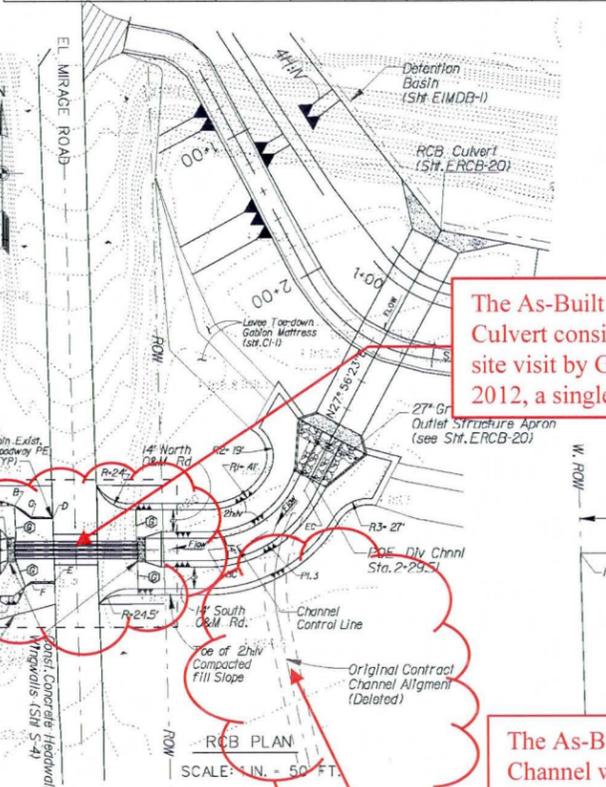


DIVERSION CHANNEL AND RCP CONTROL LINE PROFILE

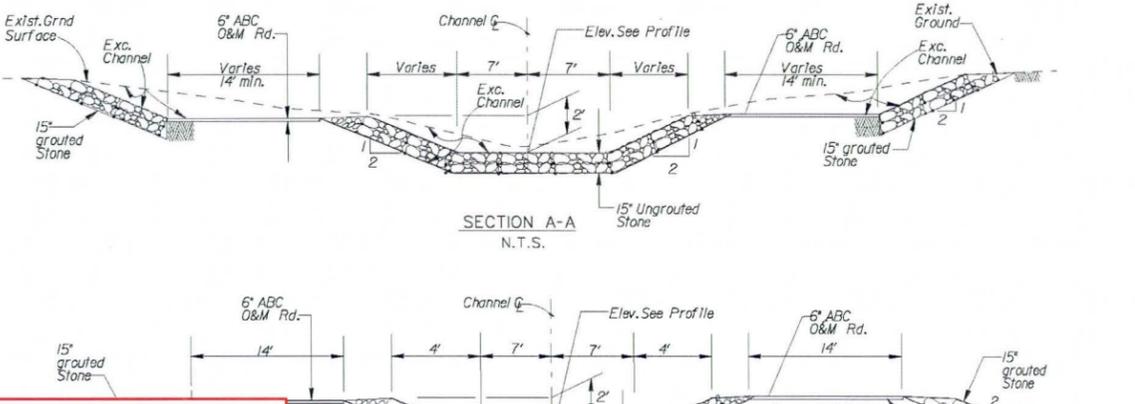


ENLARGED DETAIL N.T.S.

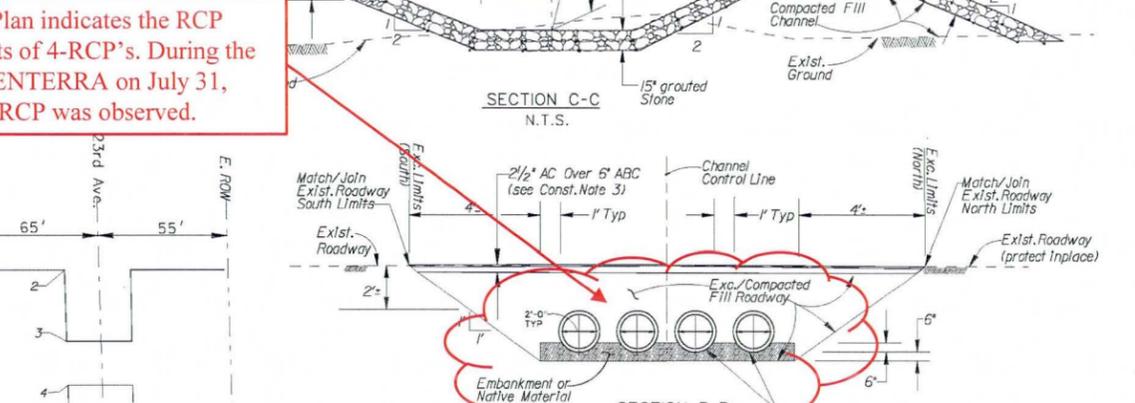
P.J. No.	NORTHING	EASTING	Δ	RIFT	T (FT)	LIFT	B.C. Sta.	E.C. Sta.
1	867484.75	575923.47	34.4128'	14.25	4.45	8.63	0+09.41	0+18.04
2	867484.75	575996.89	62.0331'	70.00	42.11	75.82	1+44.90	2+20.72



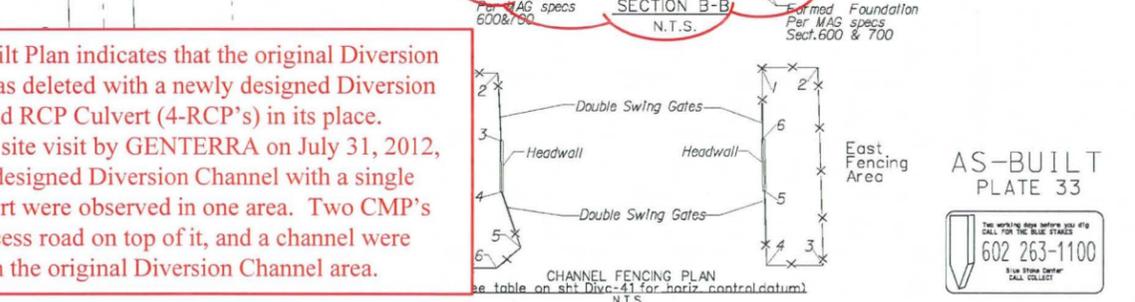
RCB PLAN SCALE: 1\"/>



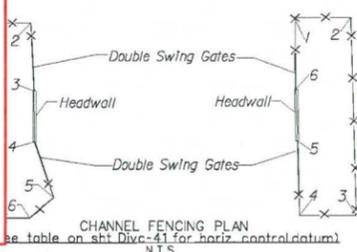
SECTION A-A N.T.S.



SECTION C-C N.T.S.



SECTION B-B N.T.S.



CHANNEL FENCING PLAN N.T.S.

The As-Built Plan indicates the RCP Culvert consists of 4-RCP's. During the site visit by GENTERRA on July 31, 2012, a single RCP was observed.

The As-Built Plan indicates that the original Diversion Channel was deleted with a newly designed Diversion Channel and RCP Culvert (4-RCP's) in its place. During the site visit by GENTERRA on July 31, 2012, the newly designed Diversion Channel with a single RCP Culvert were observed in one area. Two CMP's with an access road on top of it, and a channel were observed in the original Diversion Channel area.

HORIZONTAL CONTROL LINE-DATA POINTS

P.I.	NORTHING	EASTING
A	867512.43	575911.11
B	867512.48	575932.62
C	867504.25	575943.39
D	867504.29	575957.28
E	867464.21	575958.49
F	867464.25	575943.25
G	867455.31	575932.25
H	867455.27	575912.66

CONSTRUCTION NOTES:

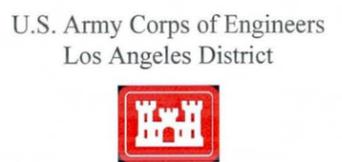
- Elevation of top of finished 123rd Avenue shall match the existing roadway elevation. This applies to every point along the roadway cross section.
- Exist. ground surface shown does not represent the current ground condition, especially the one on the east side of the 123rd Avenue where compacted fill is present.
- Minimum Pavement Replacement with 2-1/2" AC over 6" ABC or Match existing Pavement whichever ever is greater.
- 15 Grouted Stone is required for levee Sta. 1+37.74 to 1+47.74 on the west side of 123rd Ave. and Sta. 1+94.35 to 3+38.05 on the east side of 123rd Avenue.
- See Structure Sheets S-3, S-4 and S-7 for related structural details and trash rack.
- The Contractor shall obtain all permits necessary and incidental to construction of the diversion channel and the RCP culvert with FCDMC, MCDOT and City of Phoenix.
- Grading (Cut/Fill) is required to obtain a positive slope to drain toward west.
- Install 15' ungrouted stone/riprap for entire channel cross section including channel invert, inside and outside slopes for channel Sta. 0+00.00 to 0+11.20. Install 15' grouted stone for entire channel cross section including channel invert, inside and outside slopes for channel Sta. 1+15.30 to 2+29.51 (east portion).

DATE	REVISIONS
09/11/12	AS-BUILT PLATE 33

DESIGNED BY: D.P.
DRAWN BY: D.P.
CHECKED BY: P.L.
U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS
ARTHUR Y. JUNG, P.E.
CHIEF, DESIGN BRANCH
SPEC. NO. WSPD-07-0-0003
DISTRICT FILE NO. 2012/443
FILE NAME: Divc-40

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE)
EL MIRAGE ROAD DIVERSION CHANNEL AND RCP CULVERT
PLAN, PROFILE, SECTIONS AND DETAILS

Reference: From Phase 1B O&M Manual As-Built Plans Sheet Divc-40.



Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



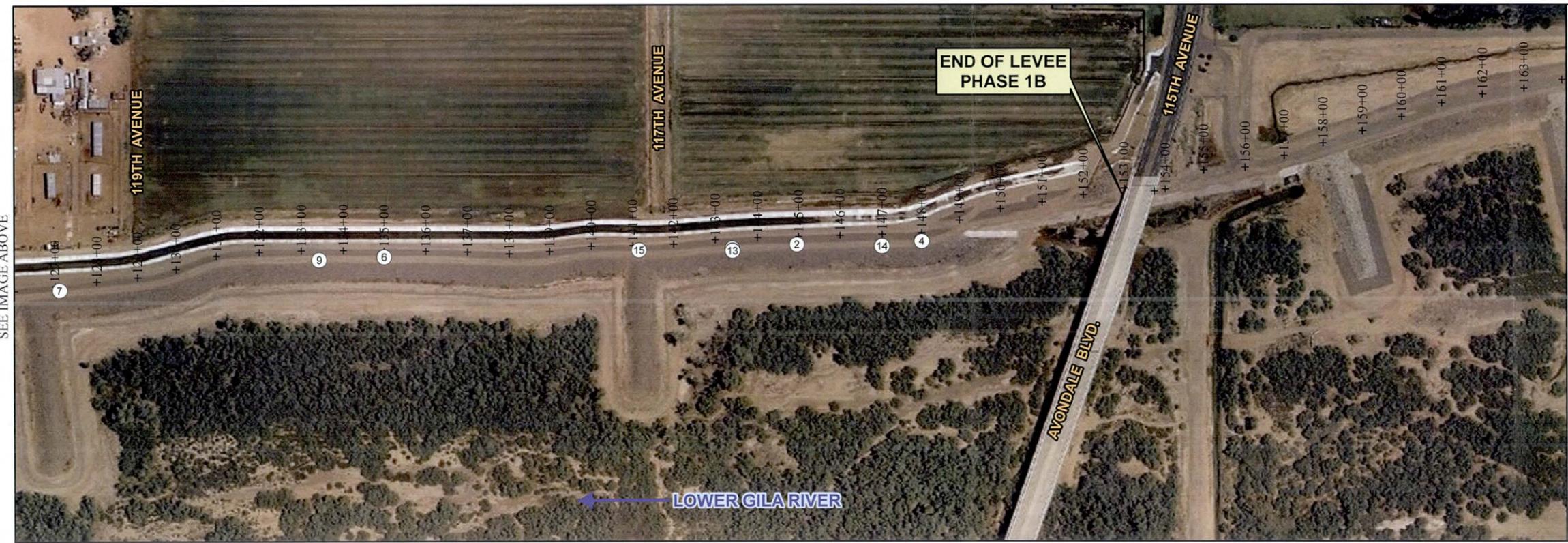
PROJECT NO.
345-PGT-TO2

DATE
September 2012

FIGURE I-10
Phase 1B As-Built Sheet Divc-40



SEE IMAGE BELOW



SEE IMAGE ABOVE

Legend

+ 200+00
+ Levee Station

④ Approximate Location of
Compaction Test on Levee
(test number inside circle)

Date of Aerial: April 15, 2009

0 150 300 600 Feet

1 inch = 300 feet



U.S. Army Corps of Engineers
Los Angeles District

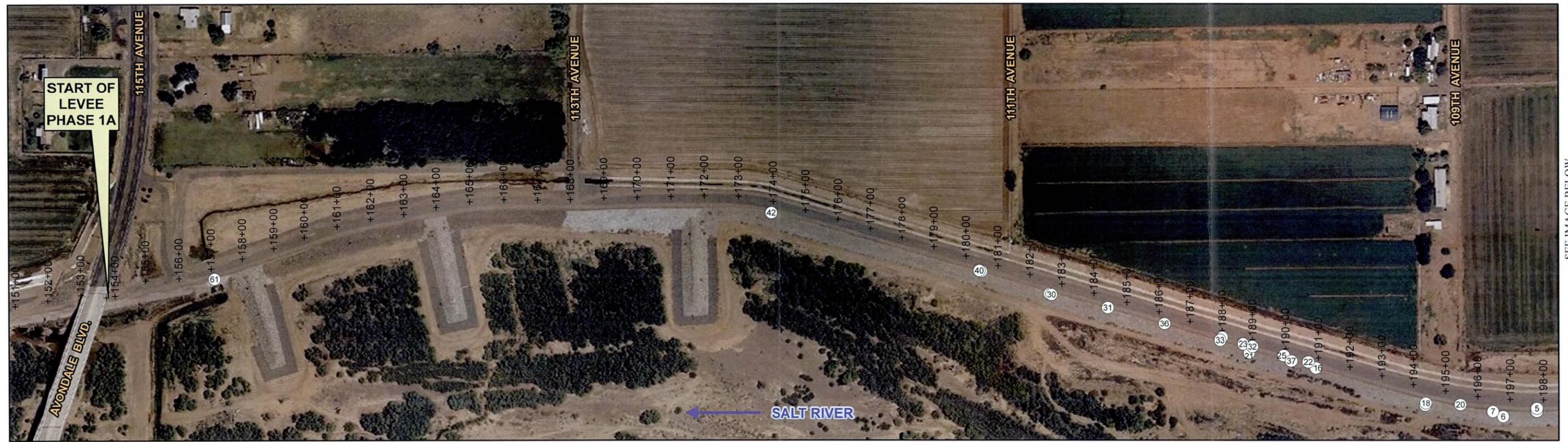
Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



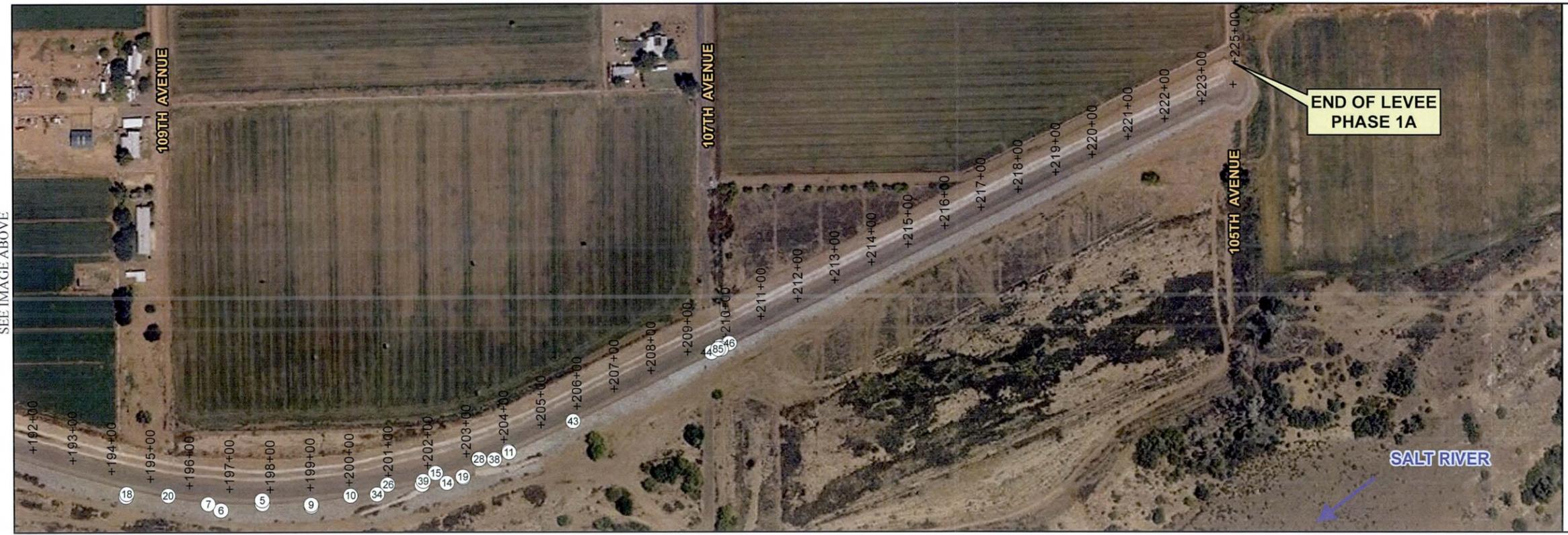
Project No.
345-PGT-TO2

Date
September 2012

FIGURE I-9
PHASE 1B
COMPACTION TEST MAP



SEE IMAGE BELOW



SEE IMAGE ABOVE

Legend

- + 200+00 Levee Station
- Ⓢ Approximate Location of Compaction Test on Levee (test number inside circle)

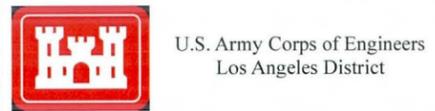
Date of Aerial: April 15, 2009



0 150 300 600 Feet



1 inch = 300 feet



**Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona**



Project No.

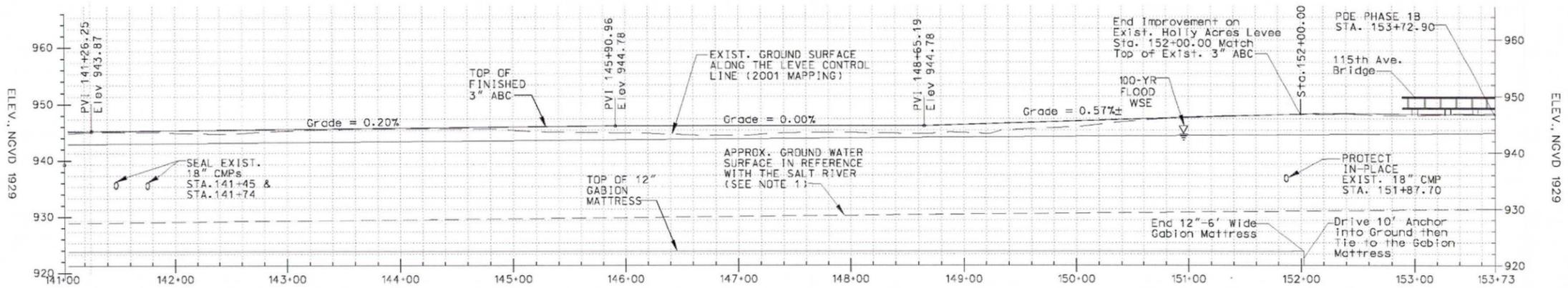
345-PGT-TO2

Date

September 2012

FIGURE I-8

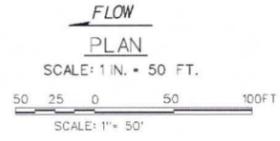
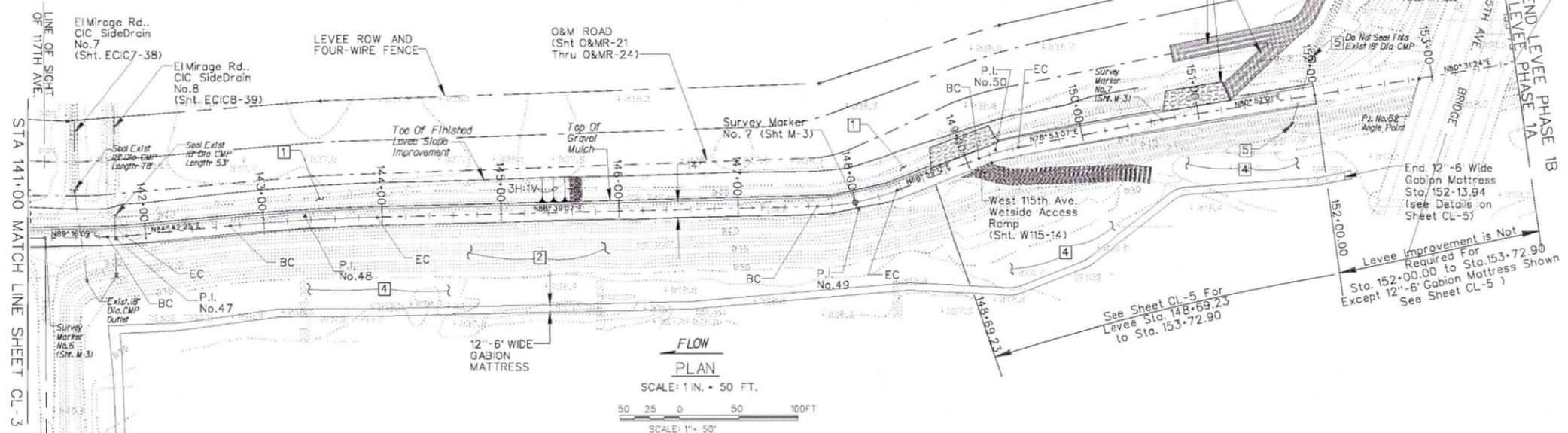
PHASE 1A
COMPACTION TEST MAP



LEVEE CONTROL LINE AND GABION MATTRESS PROFILE
 HORIZ. SCALE: 1" = 10'
 VERT. SCALE: 1" = 50'

LEVEE HORIZONTAL CONTROL LINE-CURVE DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(FT)	T(FT.)	L(FT.)	B.C. Sta.	E.C. Sta.
47	868,079.73	579,838.12	4° 33' 44" LF	200.00	7.97	15.93	141+67.03	141+82.95
48	868,094.36	569,996.10	3° 56' 42" RT	1,800.00	61.99	123.93	142+71.65	143+95.58
49	868,105.38	580,464.25	19° 39' 55" LF	200.00	34.66	68.65	147+67.21	148+35.85
50	868,150.60	580,581.97	9° 53' 55" RT	200.00	17.32	34.55	149+09.97	149+44.53

LEVEE HORIZONTAL CONTROL POINT DATA			
P.I. NO.	NORTHING	EASTING	Δ°
51	868,177.86	570,720.73	ANGLE POINT
52	868,212.80	580,938.06	ANGLE POINT



CONSTRUCTION NOTES

- 1 2 3 4 (SEE SHEET CL-1)
- 5 PROTECT EXIST. 18" CMP IN-PLACE

NOTES

1. GROUND WATER TABLE LEVEL INDICATED ON THE PROFILE APPLIES TO SPRING AND WINTER SEASONS. IT IS ABOUT 2 FT. LOWER DURING FALL AND SUMMER.
2. LEVEE TOE-DOWN IS NOT REQUIRED FOR STA. 103+44 TO STA. 153+72.90 ALONG THE EXISTING HOLLY ACRES LEVEE.
3. SEE SHEET CLX-6 FOR DETAILS OF TYPICAL CROSS SECTION STA. 103+44 TO STA. 148+69.23
4. 12"-6" WIDE GABION MATTRESS IS REQUIRED FOR STA. 127+10.00 TO STA. 152+13.94 AND AROUND THE WEST 117TH AVE. GUIDE DIKE.

AS-BUILT
 PLATE 6



REVISIONS	
SYMBOL	DESCRIPTIONS
DATE	APPROVAL

DESIGNED BY: D.P.	THOMAS H. SAGE, P.E.
DRAWN BY: D.P.	CHIEF DESIGN BRANCH
CHECKED BY: P.A.J.	
FILE NAME: CL-4.Dgn	
SPEC. NO. W92PL-07-B-0003	
DISTRICT FILE NO. 2037/407	
SCALE: 50:1	
SHEET: CL-4	

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE)
 PLAN AND PROFILE
 STA. 141+00 TO STA. 153+72.90

P.O.E. PHASE 1B
 STA. 153+72.90
 N. 868,226.66
 E. 581,021.07
 JOIN LEVEE
 PHASE 1A POB

Levee Improvement is Not
 Required For
 Sta. 152+00.00 to Sta. 153+72.90
 Except 12"-6" Gabion Mattress Shown
 See Sheet CL-5

See Sheet CL-5 For
 Levee Sta. 148+69.23
 to Sta. 153+72.90

U.S. Army Corps of Engineers
 Los Angeles District



Tres Rios Restoration Project
 Phases 1A and 1B, North Levee
 Maricopa County, Phoenix, Arizona

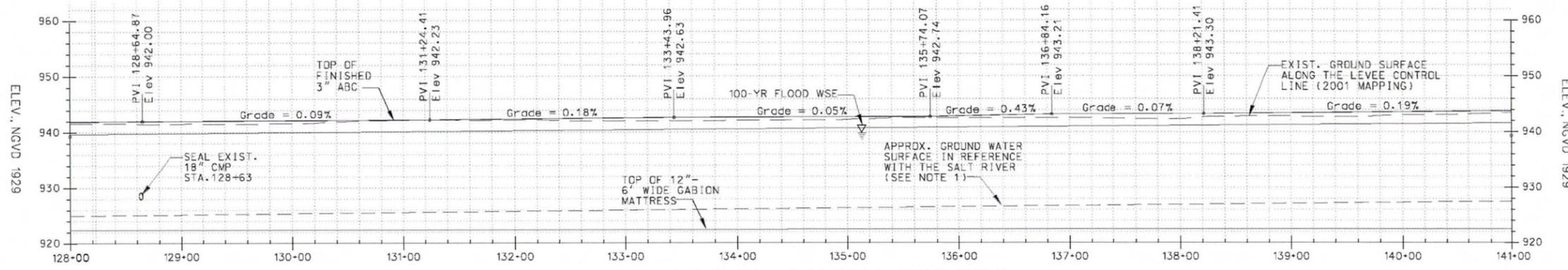


PROJECT NO.
 345-PGT-TO2

DATE
 September 2012

FIGURE I-7e

Phase 1B
 (STA 141+00 to STA 153+72.90)

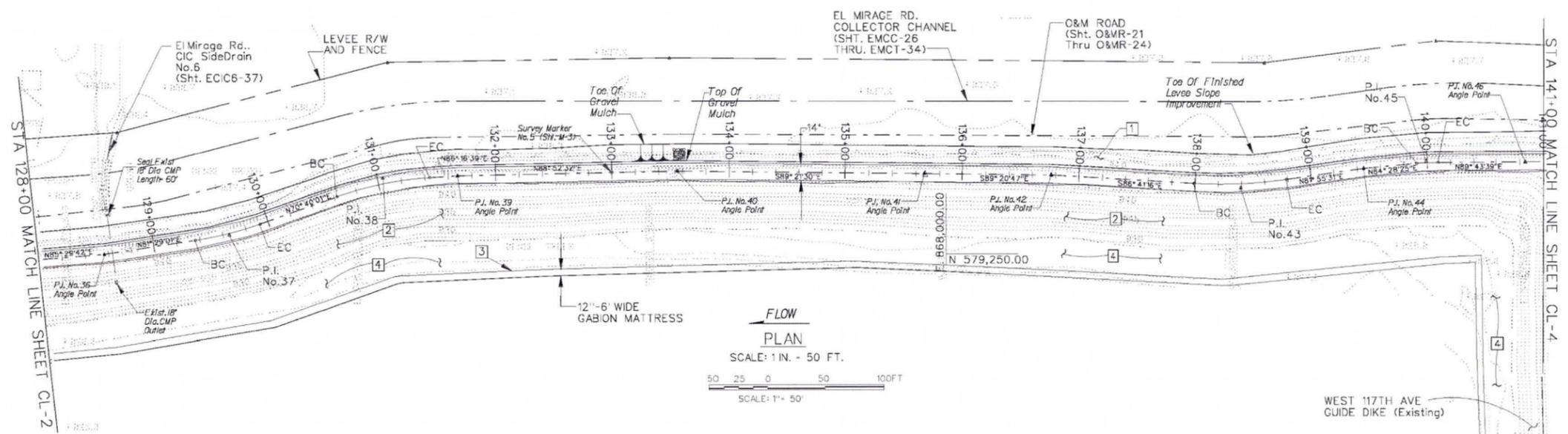


LEVEE CONTROL LINE AND GABION MATTRESS PROFILE
 HORIZ. SCALE: 1" = 10'
 VERT. SCALE: 1" = 50'

LEVEE HORIZONTAL CONTROL LINE-CURVE DATA								
P.I. NO.	NORTHING	EASTING	Δ	R(FT)	T(FT.)	L(FT.)	B.C. Sta.	E.C. Sta.
37	868,016.79	578,635.86	10° 49' 01" L	300.00	28.40	56.64	129+35.63	129+92.27
38	868,062.67	578,767.48	15° 36' 39" L	300.00	41.12	81.74	130+62.23	131+43.96
43	868,057.89	579,502.85	11° 23' 13" L	400.00	39.88	79.50	137+98.80	138+78.29
45	868,078.17	579,663.01	5° 15' 15" L	200.00	9.18	18.34	139+90.71	140+09.05
47	868,079.73	579,838.12	4° 33' 44" L	200.00	7.97	15.93	141+67.03	141+82.95

LEVEE HORIZONTAL CONTROL LINE-POINT DATA			
P.I. NO.	NORTHING	EASTING	Δ
36	868,000.84	578,529.36	ANGLE POINT
39	868,067.19	578,832.29	ANGLE POINT
40	868,070.88	579,020.34	ANGLE POINT
41	868,068.51	579,231.50	ANGLE POINT

LEVEE HORIZONTAL CONTROL LINE-POINT DATA			
P.I. NO.	NORTHING	EASTING	Δ
42	868,067.26	579,340.80	ANGLE POINT
44	868,072.94	578,608.99	ANGLE POINT
46	868,078.57	579,747.48	ANGLE POINT



FLOW
 PLAN
 SCALE: 1 IN. = 50 FT.
 SCALE: 1" = 50'

- NOTES
- GROUND WATER TABLE LEVEL INDICATED ON THE PROFILE APPLIES TO SPRING AND WINTER SEASONS. IT IS ABOUT 2 FT. LOWER DURING FALL AND SUMMER.
 - LEVEE TOE-DOWN IS NOT REQUIRED FOR STA. 103+44 TO STA. 153+72.90 ALONG THE EXISTING HOLLY ACRES LEVEE.
 - SEE SHEET CLX-6 FOR DETAILS OF TYPICAL CROSS SECTION STA. 103+44 TO STA. 148+69.23
 - 12'-6" WIDE GABION MATTRESS IS REQUIRED FOR STA. 127+10.00 TO STA. 152+13.94.

CONSTRUCTION NOTES
 1 2 3 4 (SEE SHEET CL-1)

REVISIONS	
SYMBOL	DESCRIPTIONS
DATE	APPROVAL

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
 ENVIRONMENTAL RESTORATION
 FLOOD CONTROL NORTH LEVEE
 PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE)
 PLAN AND PROFILE
 STA. 128+00 TO STA. 141+00

DESIGNED BY: D.P.
 DRAWN BY: D.P.
 CHECKED BY: P.U.

U.S. ARMY ENGINEER DISTRICT
 LOS ANGELES
 CORPS OF ENGINEERS

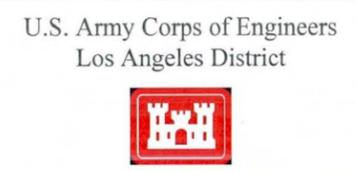
THOMAS H. SAGE, P.E.
 CHIEF DESIGN BRANCH

SUBMITTED BY: THOMAS H. SAGE, P.E.
 CHIEF DESIGN BRANCH

DISTRICT FILE NO. 2037-106
 SPEC. NO. W92PL-07-B-0003
 FILE NAME: CL3.dgn

AS-BUILT
 PLATE 5
 602 263-1100

Reference: Plate 5 of the O&M Manual dated 2009, which provided the As-Built Plans dated October 2006.



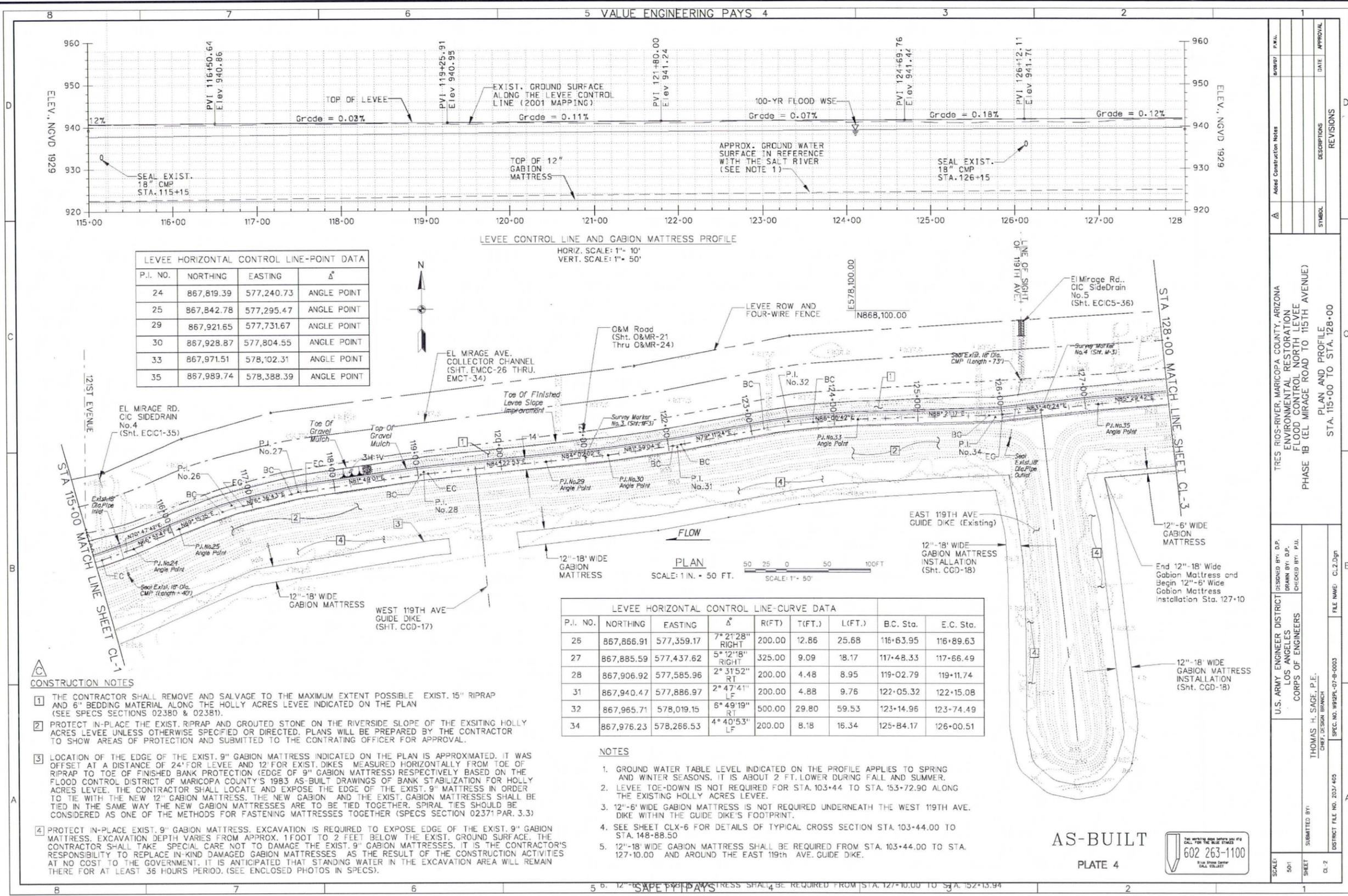
Tres Rios Restoration Project
 Phases 1A and 1B, North Levee
 Maricopa County, Phoenix, Arizona



PROJECT NO.
 345-PGT-TO2

DATE
 September 2012

FIGURE I-7d
 Phase 1B
 (STA 128+00 to STA 141+00)



- CONSTRUCTION NOTES**
- THE CONTRACTOR SHALL REMOVE AND SALVAGE TO THE MAXIMUM EXTENT POSSIBLE EXIST. 15" RIPRAP AND 6" BEDDING MATERIAL ALONG THE HOLLY ACRES LEVEE INDICATED ON THE PLAN (SEE SPECS SECTIONS 02380 & 02381).
 - PROTECT IN-PLACE THE EXIST. RIPRAP AND GROUTED STONE ON THE RIVERSIDE SLOPE OF THE EXISTING HOLLY ACRES LEVEE UNLESS OTHERWISE SPECIFIED OR DIRECTED. PLANS WILL BE PREPARED BY THE CONTRACTOR TO SHOW AREAS OF PROTECTION AND SUBMITTED TO THE CONTRACTING OFFICER FOR APPROVAL.
 - LOCATION OF THE EDGE OF THE EXIST. 9" GABION MATTRESS INDICATED ON THE PLAN IS APPROXIMATED. IT WAS OFFSET AT A DISTANCE OF 24' FOR LEVEE AND 12' FOR EXIST. DIKES MEASURED HORIZONTALLY FROM TOE OF RIPRAP TO TOE OF FINISHED BANK PROTECTION (EDGE OF 9" GABION MATTRESS) RESPECTIVELY BASED ON THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY'S 1983 AS-BUILT DRAWINGS OF BANK STABILIZATION FOR HOLLY ACRES LEVEE. THE CONTRACTOR SHALL LOCATE AND EXPOSE THE EDGE OF THE EXIST. 9" MATTRESS IN ORDER TO TIE WITH THE NEW 12" GABION MATTRESS. THE NEW GABION AND THE EXIST. GABION MATTRESSES SHALL BE TIED IN THE SAME WAY THE NEW GABION MATTRESSES ARE TO BE TIED TOGETHER. SPIRAL TIES SHOULD BE CONSIDERED AS ONE OF THE METHODS FOR FASTENING MATTRESSES TOGETHER (SPECS SECTION 02371 PAR. 3.3)
 - PROTECT IN-PLACE EXIST. 9" GABION MATTRESS. EXCAVATION IS REQUIRED TO EXPOSE EDGE OF THE EXIST. 9" GABION MATTRESS. EXCAVATION DEPTH VARIES FROM APPROX. 1 FOOT TO 2 FEET BELOW THE EXIST. GROUND SURFACE. THE CONTRACTOR SHALL TAKE SPECIAL CARE NOT TO DAMAGE THE EXIST. 9" GABION MATTRESSES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REPLACE IN-KIND DAMAGED GABION MATTRESSES AS THE RESULT OF THE CONSTRUCTION ACTIVITIES AT NO COST TO THE GOVERNMENT. IT IS ANTICIPATED THAT STANDING WATER IN THE EXCAVATION AREA WILL REMAIN THERE FOR AT LEAST 36 HOURS PERIOD. (SEE ENCLOSED PHOTOS IN SPECS).

- NOTES**
- GROUND WATER TABLE LEVEL INDICATED ON THE PROFILE APPLIES TO SPRING AND WINTER SEASONS. IT IS ABOUT 2 FT. LOWER DURING FALL AND SUMMER.
 - LEVEE TOE-DOWN IS NOT REQUIRED FOR STA. 103+44 TO STA. 153+72.90 ALONG THE EXISTING HOLLY ACRES LEVEE.
 - 12"-6" WIDE GABION MATTRESS IS NOT REQUIRED UNDERNEATH THE WEST 119TH AVE. DIKE WITHIN THE GUIDE DIKE'S FOOTPRINT.
 - SEE SHEET CLX-6 FOR DETAILS OF TYPICAL CROSS SECTION STA. 103+44.00 TO STA. 148+88.50
 - 12"-18" WIDE GABION MATTRESS SHALL BE REQUIRED FROM STA. 103+44.00 TO STA. 127+10.00 AND AROUND THE EAST 119TH AVE. GUIDE DIKE.

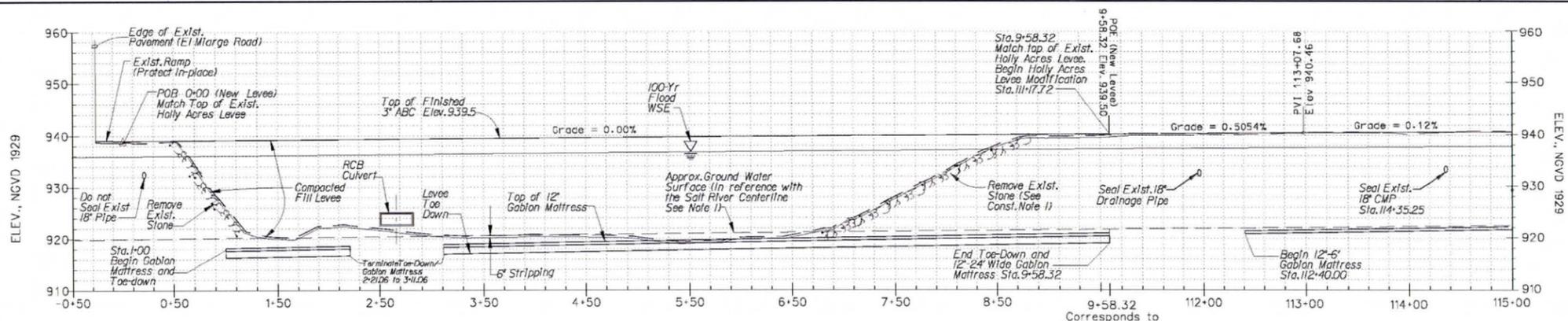
SCALE	SHEET	DATE	REVISIONS
501	CL-2		

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

DESIGNED BY: D.P.	DESIGNED BY: D.P.	FILE NAME: CL2.Dgn
DRAWN BY: D.P.	CHECKED BY: P.U.	
CORPS OF ENGINEERS		
THOMAS H. SAGE, P.E.		
CHIEF, DESIGN BRANCH		
SPEC. NO. WSPPL-07-B-0003		
DISTRICT FILE NO. 203/405		

Reference: Plate 4 of the O&M Manual dated 2009, which provided the As-Built Plans dated October 2006.

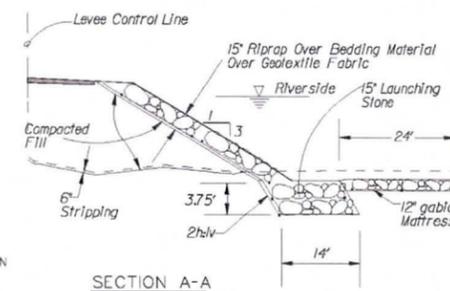
 <p>U.S. Army Corps of Engineers Los Angeles District</p>	<p>Tres Rios Restoration Project Phases 1A and 1B, North Levee Maricopa County, Phoenix, Arizona</p>	 <p>GENTERRA CONSULTANTS, INC. ENGINEERING & GEOTECHNICAL SERVICES</p>	PROJECT NO.	DATE	FIGURE I-7c
			345-PGT-TO2	September 2012	Phase 1B (STA 115+00 to STA 128+00)



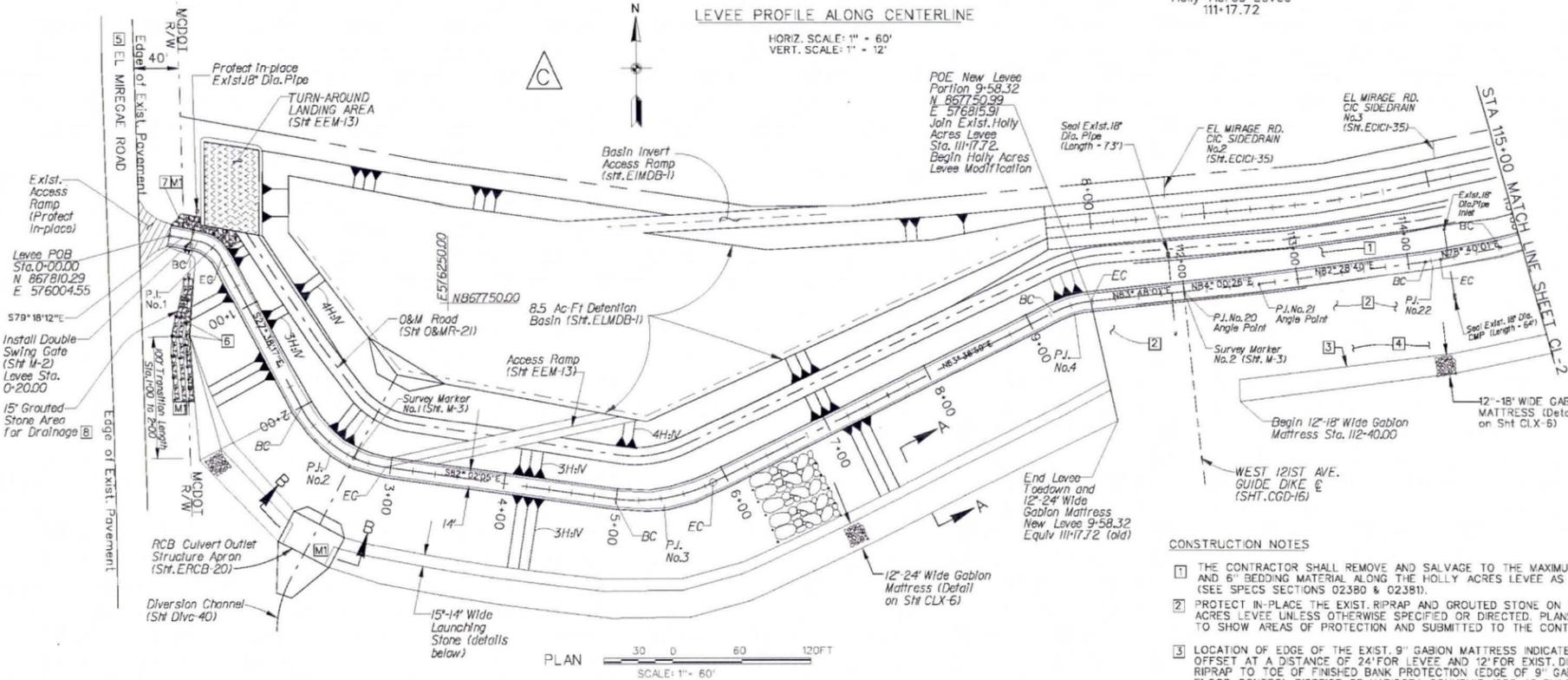
LEVEE PROFILE ALONG CENTERLINE

HORIZ. SCALE: 1" = 60'
VERT. SCALE: 1" = 12'

P.I. NO.	NORTHING	EASTING	Δ
20	867,759.85	576,897.44	ANGLE POINT
21	867,766.69	576,962.57	ANGLE POINT



SECTION A-A
N.T.S.
THIS PORTION OF CROSS SECTION APPLIES TO NEW LEVEE STA. 0+00 TO 9+58.32



P.I. NO.	NORTHING	EASTING	Δ	R(FT)	T(FT.)	L(FT.)	B.C. Sta.	E.C. Sta.
1	867,802.87	576,043.86	51° 39' 55" RT	30	14.52	27.05	0+25.48	0+52.53
2	867,613.27	576,143.13	54° 23' 48" LF	100.00	51.39	94.94	2+00.63	2+95.57
3	867,571.71	576,440.17	34° 18' 56" LF	150.00	46.31	89.84	4+97.80	5+87.64
4	867,749.07	576,798.24	20° 09' 02" RT	100.00	17.11	35.17	9+23.15	9+58.32
22	867,787.12	577,117.35	3° 48' 39" LT	200.00	6.65	13.30	114+14.73	114+28.04

- NOTES
- GROUND WATER TABLE LEVEL INDICATED ON THE PROFILE APPLIES TO SPRING AND WINTER SEASONS. IT IS ABOUT 2 FT. LOWER DURING FALL AND SUMMER.
 - LEVEE TOE-DOWN IS NOT REQUIRED FOR STA. 111+17.72 TO STA. 115+72.90 ALONG THE EXISTING HOLLY ACRES LEVEE.
 - 12'-18" WIDE GABION MATTRESS IS NOT REQUIRED UNDERNEATH THE 121ST AVE. DIKE WITHIN THE DIKE'S FOOTPRINTS.
 - SEE SHEETS ELMDB-1 FOR DETAILS OF TYPICAL CROSS SECTION FOR STA. 0+00.00 TO 9+58.32 AND CLX-6 FOR STA. 111+17.72 TO STA. 118+88.50
 - 12'-18" WIDE GABION MATTRESS SHALL BE REQUIRED FROM STA. 117+17.72 TO STA. 127+10.00 EXCEPT GUIDE DIKES

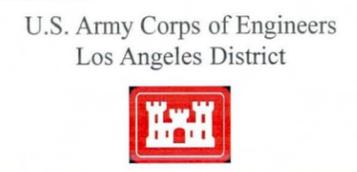
- CONSTRUCTION NOTES
- THE CONTRACTOR SHALL REMOVE AND SALVAGE TO THE MAXIMUM EXTENT POSSIBLE EXIST. 15" RIPRAP AND 6" BEDDING MATERIAL ALONG THE HOLLY ACRES LEVEE AS REQUIRED AND INDICATED ON THE PLAN (SEE SPECS SECTIONS 02380 & 02381).
 - PROTECT IN-PLACE THE EXIST. RIPRAP AND GROUDED STONE ON THE RIVERSIDE SLOPE OF THE EXISTING HOLLY ACRES LEVEE UNLESS OTHERWISE SPECIFIED OR DIRECTED. PLANS WILL BE PREPARED BY THE CONTRACTOR TO SHOW AREAS OF PROTECTION AND SUBMITTED TO THE CONTRACTING OFFICER FOR APPROVAL.
 - LOCATION OF EDGE OF THE EXIST. 9" GABION MATTRESS INDICATED ON THE PLAN IS APPROXIMATED. IT WAS OFFSET AT A DISTANCE OF 24' FOR LEVEE AND 12' FOR EXIST. DIKES MEASURED HORIZONTALLY FROM TOE OF RIPRAP TO TOE OF FINISHED BANK PROTECTION (EDGE OF 9" GABION MATTRESS) RESPECTIVELY BASED ON THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY'S 1993 AS-BUILT DRAWINGS OF BANK STABILIZATION FOR HOLLY ACRES LEVEE. THE CONTRACTOR SHALL LOCATE AND EXPOSE THE EDGE OF THE EXIST. 9" MATTRESS IN ORDER TO TIE WITH THE NEW 12" GABION MATTRESS. THE NEW GABION AND THE EXIST. GABION MATTRESSES SHALL BE TIED IN THE SAME WAY THE NEW GABION MATTRESSES ARE TO BE TIED TOGETHER. SPIRAL TIES SHOULD BE CONSIDERED AS ONE OF THE METHODS FOR FASTENING MATTRESSES TOGETHER (SPECS SECTION 02371 PAR. 3.3)
 - PROTECT IN-PLACE EXIST. 9" GABION MATTRESS. EXCAVATION IS REQUIRED TO EXPOSE EDGE OF THE EXIST. 9" GABION MATTRESS. EXCAVATION DEPTH VARIES FROM APPROX. 1 FOOT TO 2 FEET BELOW THE EXIST. GROUND SURFACE. THE CONTRACTOR SHALL TAKE SPECIAL CARE NOT TO DAMAGE THE EXIST. 9" GABION MATTRESSES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REPLACE IN-KIND DAMAGED GABION MATTRESSES AS THE RESULT OF THE CONSTRUCTION ACTIVITIES AT NO COST TO THE GOVERNMENT. IT IS ANTICIPATED THAT STANDING WATER IN THE EXCAVATION AREA WILL REMAIN THERE FOR AT LEAST 36 HOURS PERIOD. (SEE ENCLOSED PHOTOS IN SPECS).
 - PROTECT IN-PLACE THE EL MIRAGE ROAD.
 - LEVEE TOEDOWN AND GABION MATTRESS SHALL BEGIN AT LEVEE STA. 1+00 AND TRANSIT TO A FULL 14' WIDE TOE-DOWN AND 24' WIDE GABION MATTRESS. OUTER EDGE OF THE GABION MATTRESS MUST NOT EXTEND BEYOND THE MDDOT R/W WHICH IS 40 FT. FROM EDGE OF THE EXIST. EL MIRAGE ROAD INDICATED IN THE PLAN.
 - DRY SIDE (BACK SIDE) OF LEVEE STA. 0+00 TO 0+50 SHALL BE ARMORED WITH 15" GROUDED STONE. MINIMUM GRADING OF THE LEVEE CREST IS REQUIRED TO OBTAIN TOP OF FINISHED 3" ABC O&M ROAD FOR THIS PARTICULAR AREA.
 - 15" GROUDED STONE IS REQUIRED FOR AN AREA OF APPROX. 10' LONG AND VARIES IN WIDTH. INSTALLATION OF 15" GROUDED STONE SHALL FOLLOW EXISTING CONTOURS SUCH THAT FLOW CAN BE WITHIN DEFINED DITCH CONFIGURATION.

AS-BUILT
PLATE 3
602 263-1100

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
1	Added 15" Groued Stone Area & Gabion Connection Detail	9/9/07	P.W.U.
2	Deleted Levee Sta. 103+00 thru 111+17.72 and Replaced with New Levee Sta. 0+00 thru 9+58.32	9/9/07	P.W.U.

DESIGNED BY: DP	FILE NAME: CLD3P
DRAWN BY: DP	
CHECKED BY: PUL	
U.S. ARMY ENGINEER DISTRICT	
LOS ANGELES	
CORPS OF ENGINEERS	
THOMAS H. SAGE, P.E.	
CHIEF, DESIGN BRANCH	
SPEC. NO. W829P-07-B-0003	
DISTRICT FILE NO. 2037 404	

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1B (EL MIRAGE ROAD TO 115TH AVENUE)
PLAN AND PROFILE
STA. 0+00 TO 9+58.32 (New Levee)
AND 111+17.72 TO 115+00 (Holly Acres Levee)



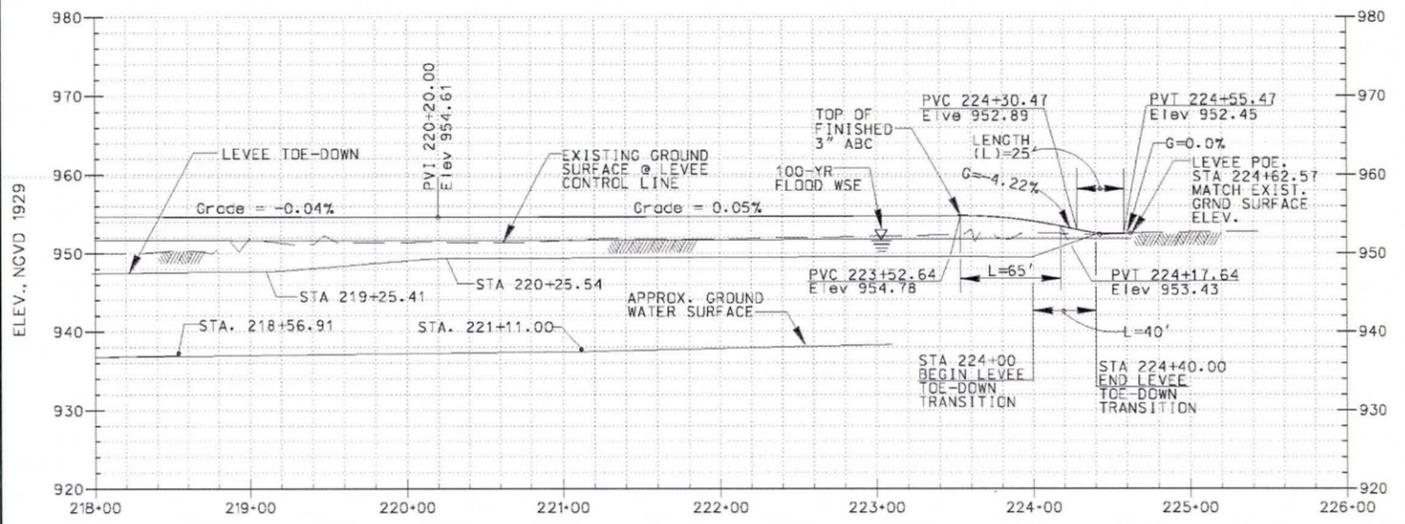
Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



PROJECT NO.
345-PGT-TO2

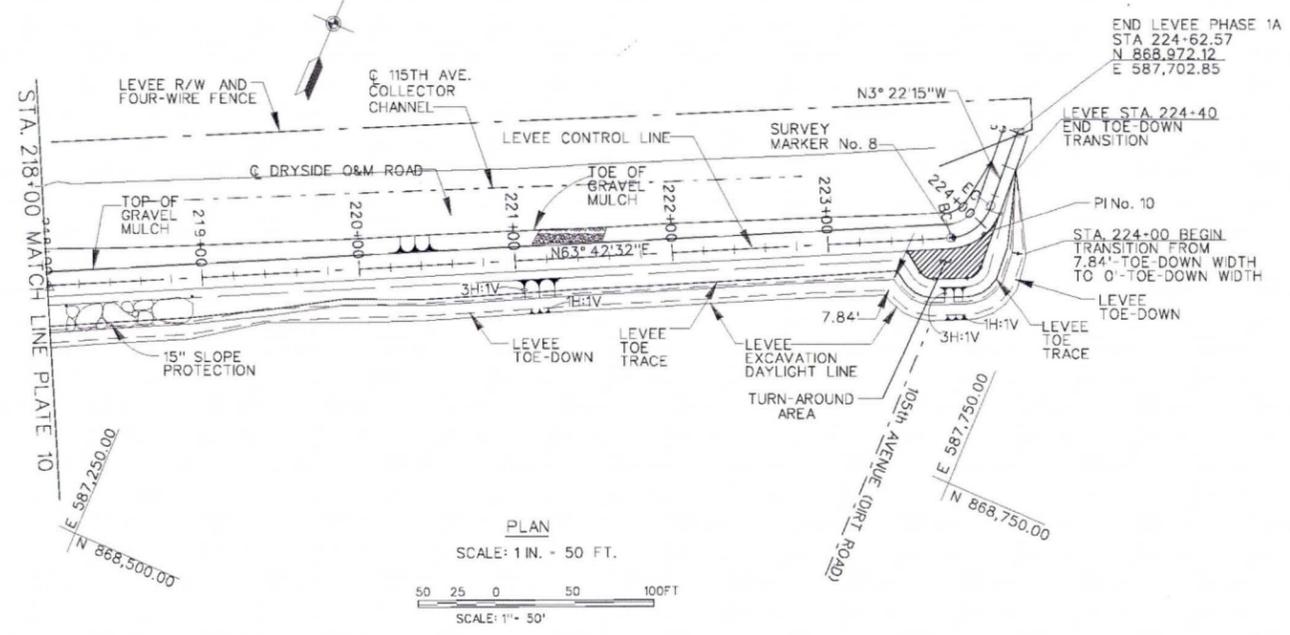
DATE
September 2012

FIGURE I-7a
Phase 1B
(STA 0+00 TO STA 9+58.32 New Levee and
STA 111+17.72 TO STA 115+00 Holly Acres Levee)



LEVEE CONTROL LINE AND TOE-DOWN PROFILE

HORIZ. SCALE: 1" = 50'
VERT. SCALE: 1" = 10'



PLAN

SCALE: 1 IN. = 50 FT.



SCALE: 1" = 50'

AS-BUILT

SCALE: 5011	U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	DISTRICT FILE No. 203/239	SPEC. NO. W91PPL-05-R0004	SYMBOL	DESCRIPTIONS	DATE	APPROVAL
				PLATE 11	TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) LEVEE PLAN AND PROFILE STA. 218+00 TO STA. 224+62.57		

Reference: Plate 11 of the O&M Manual dated 2007, which provided the As-Built Plans dated February 2005.

U.S. Army Corps of Engineers
Los Angeles District



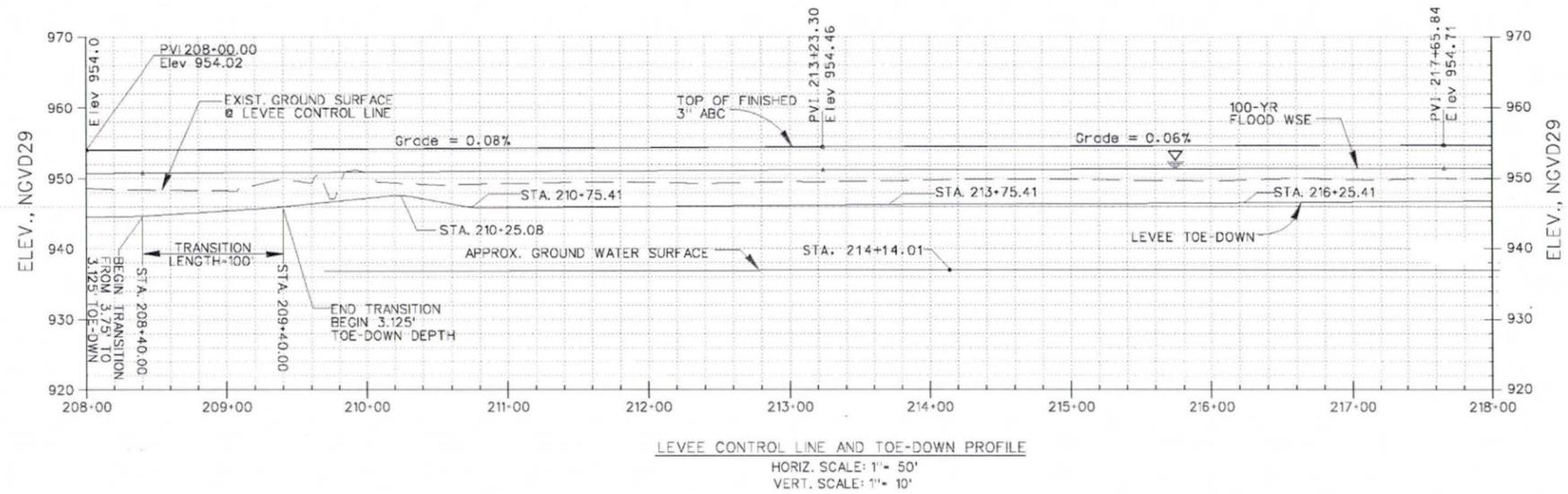
Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



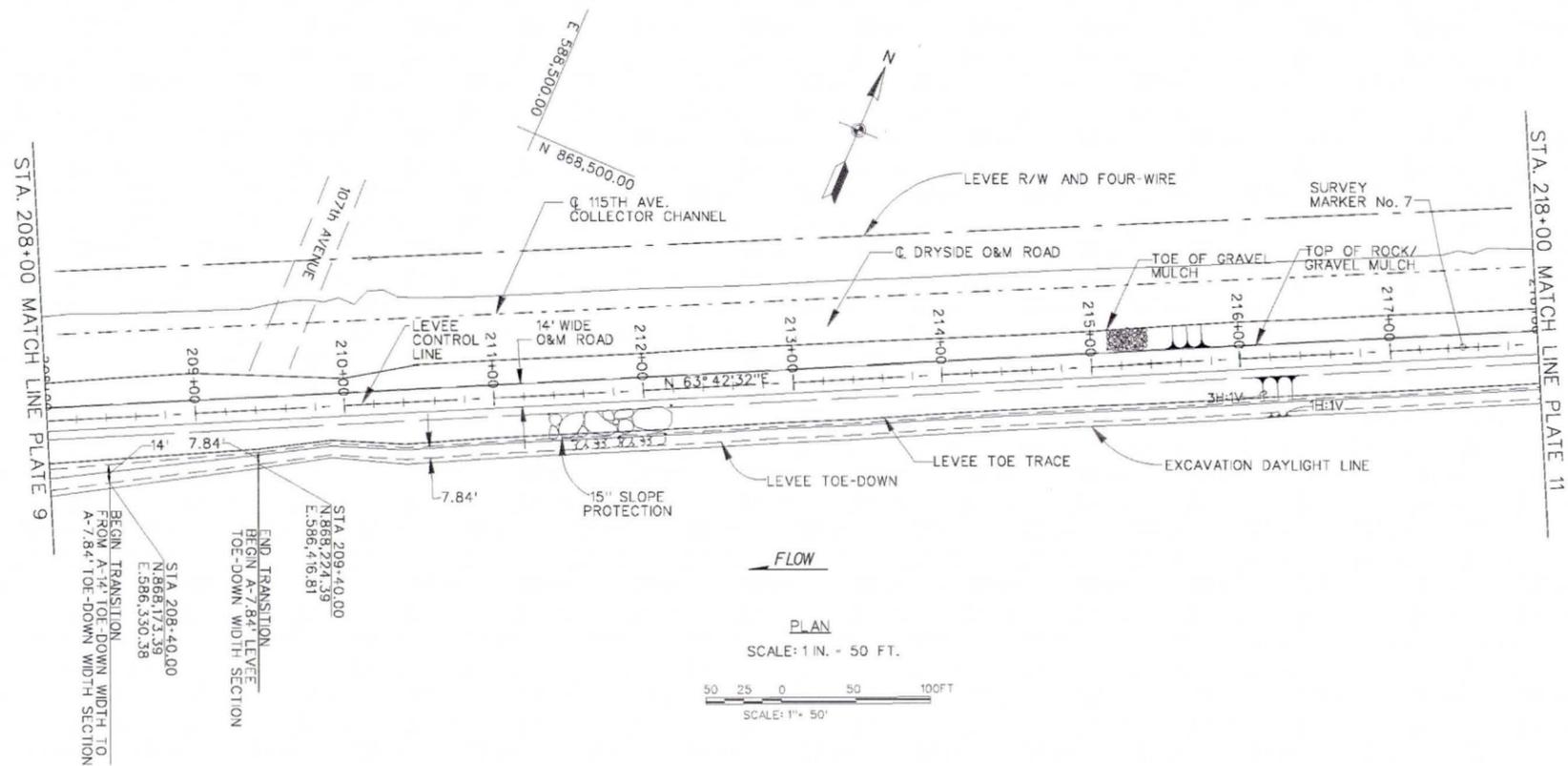
PROJECT NO.
345-PGT-TO2

DATE
September 2012

FIGURE I-6h
PHASE 1A
(STA 218+00 to STA 224+62.57)



LEVEE CONTROL LINE AND TOE-DOWN PROFILE
 HORIZ. SCALE: 1" = 50'
 VERT. SCALE: 1" = 10'



PLAN
 SCALE: 1 IN. = 50 FT.
 SCALE: 1" = 50'

AS-BUILT

SCALE: 50'	PLATE 10	DISTRICT FILE No. 203/228 SPEC. NO. W92PL-05-0004	U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS		TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL-NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) LEVEE PLAN AND PROFILE STA. 208+00 TO STA. 218+00	
			SYMBOL	DESCRIPTIONS	DATE	APPROVAL

Reference: Plate 10 of the O&M Manual dated 2007, which provided the As-Built Plans dated February 2005.

U.S. Army Corps of Engineers
Los Angeles District



Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



PROJECT NO.

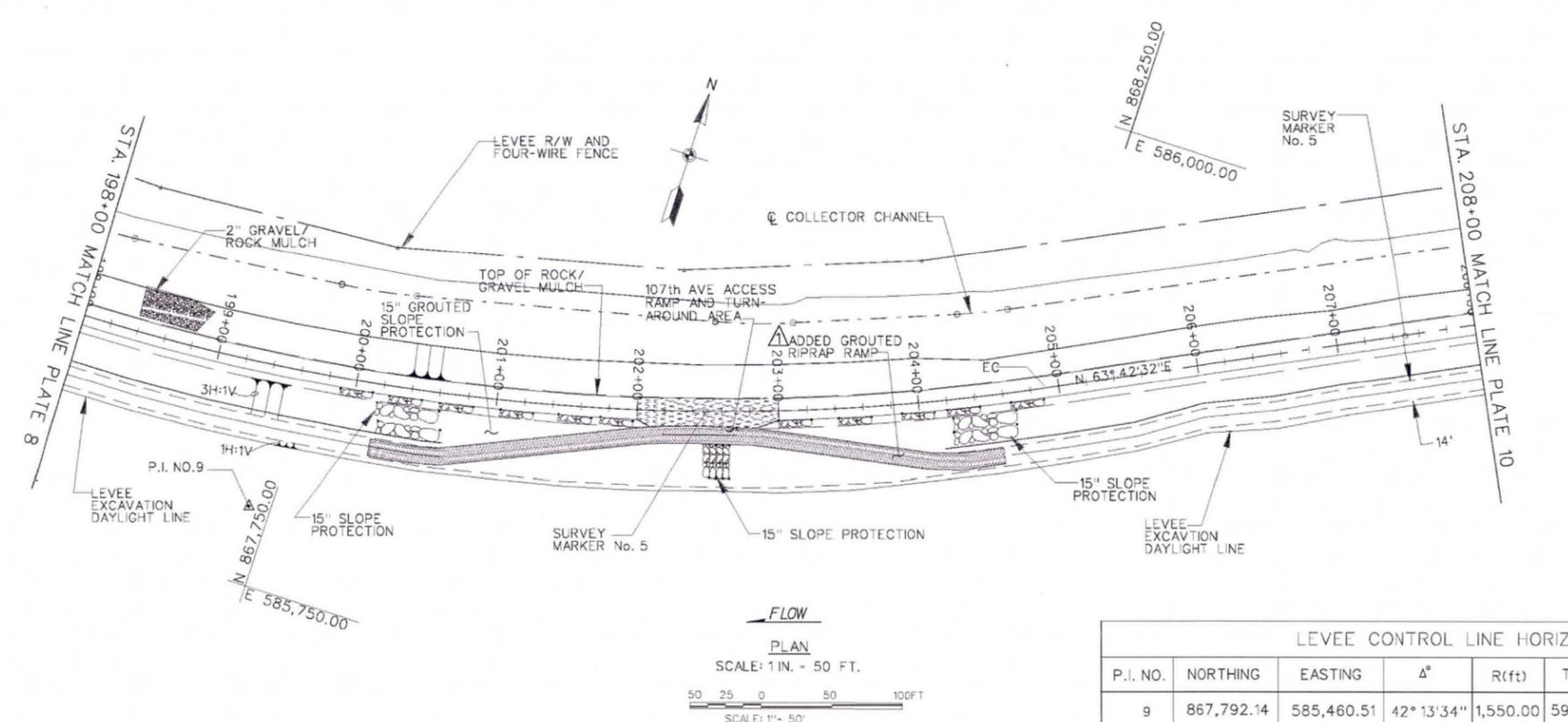
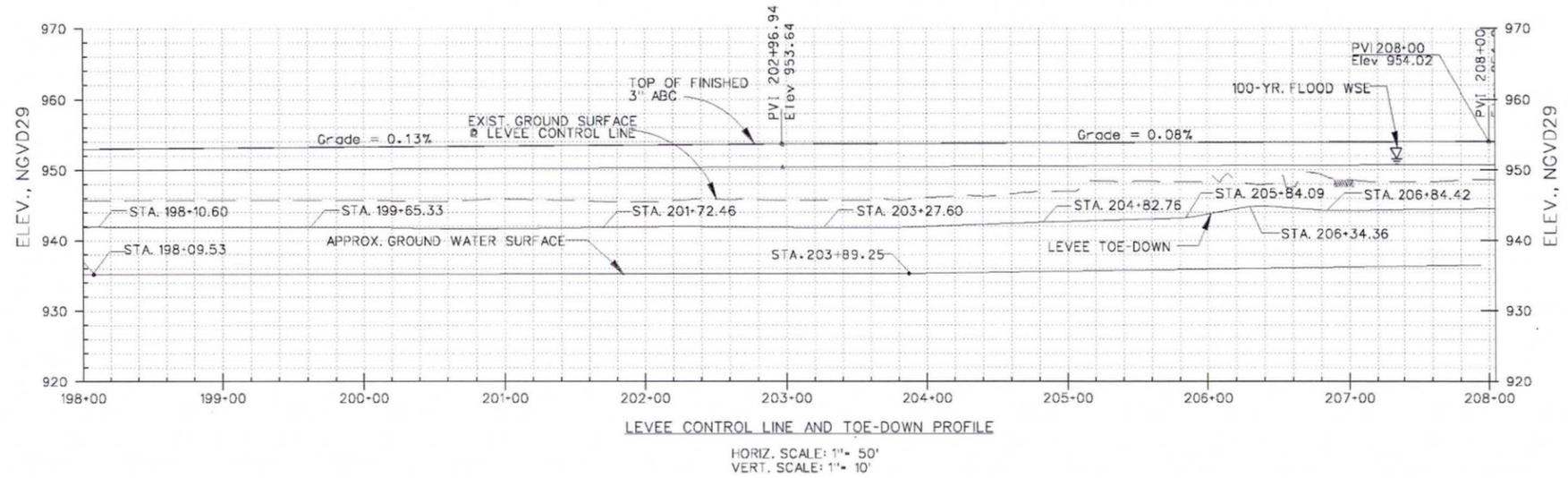
345-PGT-TO2

DATE

September 2012

FIGURE I-6g

PHASE 1A
(STA 208+00 to STA 218+00)



P.I. NO.	NORTHING	EASTING	Δ°	R(ft)	T(ft.)	L(ft)	B.C. Sta.	E.C. Sta.
9	867,792.14	585,460.51	42° 13' 34"	1,550.00	598.50	1142.33	193+47.54	204+89.67

REVISED AS-BUILT

MAH			
Added Grouded Riprap Ramp			
Removed Grouded Slope Protection Notes			
SYMBOL		DESCRIPTIONS	DATE
			APPROVAL
TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) LEVEE PLAN AND PROFILE STA. 198+00 TO 208+00			
U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS			
SCALE: 50:1			
PLATE	9		
DISTRICT FILE No.	203/327	SPEC. NO.	W192PL-05-B004

Reference: Plate 9 of the O&M Manual dated 2007, which provided the As-Built Plans dated February 2005.

U.S. Army Corps of Engineers
Los Angeles District



Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona

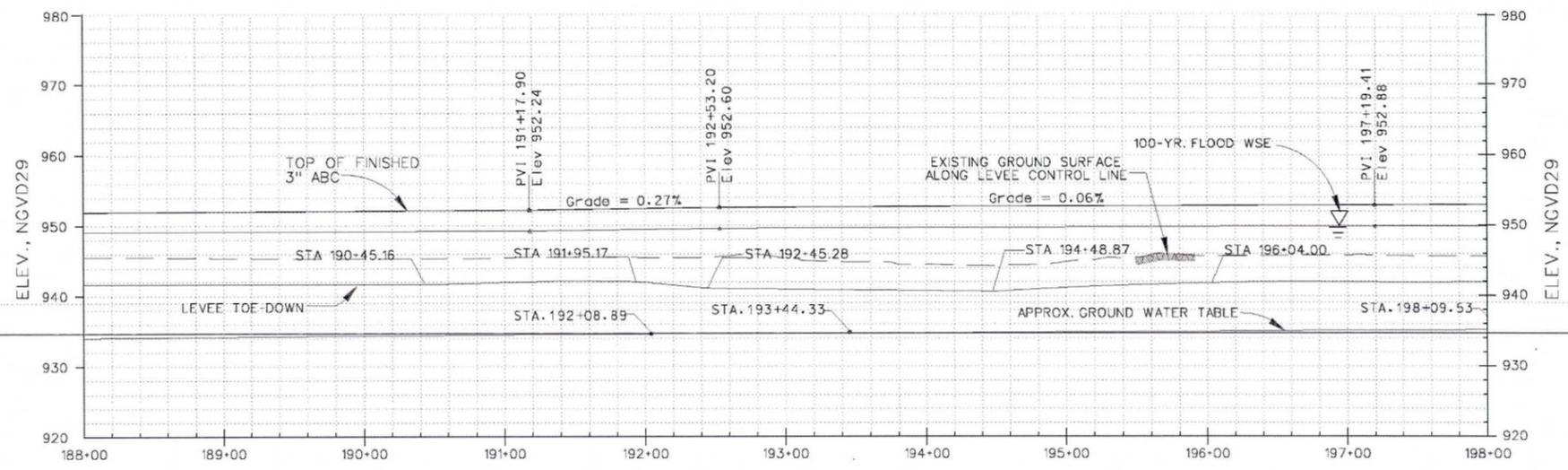


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PROJECT NO.
345-PGT-TO2

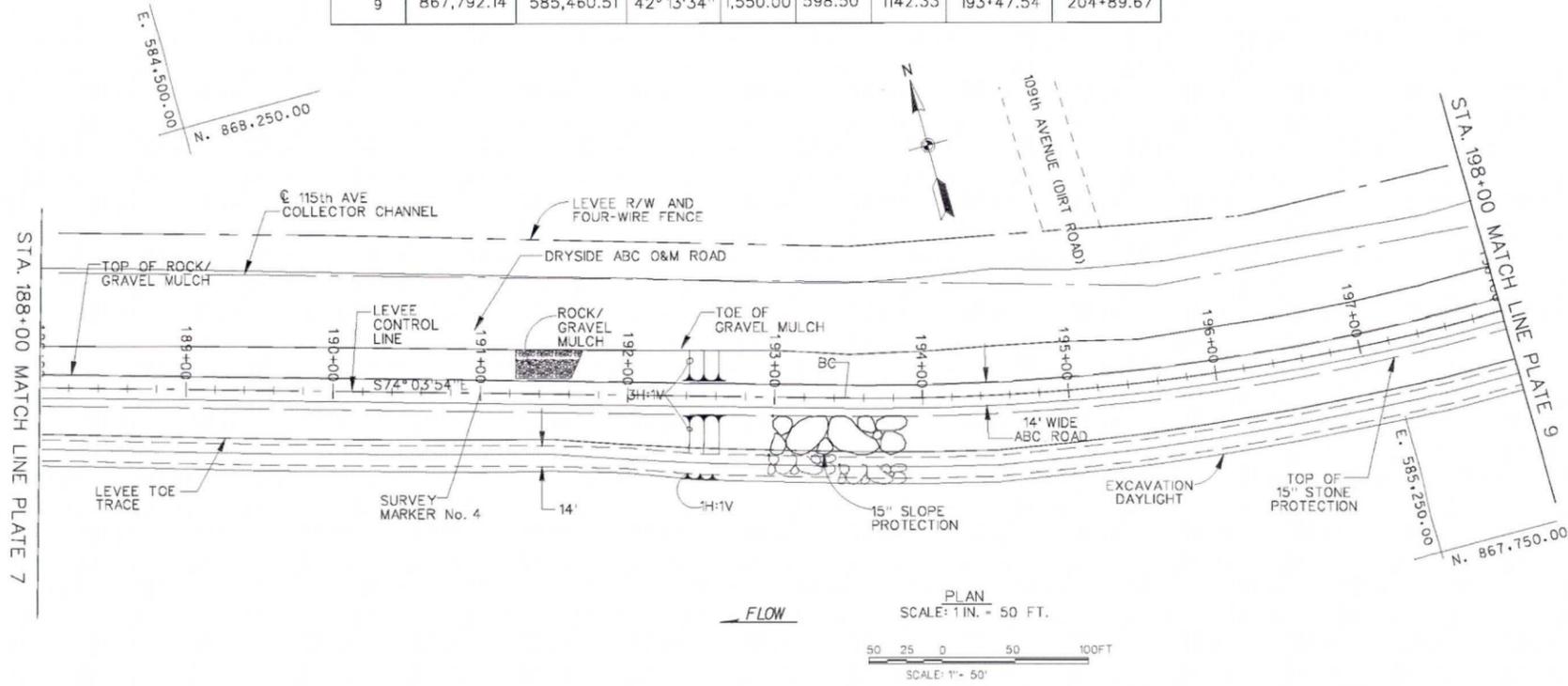
DATE
September 2012

FIGURE I-6f
PHASE 1A
(STA 198+00 to STA 208+00)



LEVEE CONTROL LINE AND TOE-DOWN PROFILE
 HORIZ. SCALE: 1" = 50'
 VERT. SCALE: 1" = 10'

LEVEE CONTROL LINE HORIZONTAL CURVE DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(ft)	T(ft.)	L(ft)	B.C. Sta.	E.C. Sta.
9	867,792.14	585,460.51	42° 13' 34"	1,550.00	598.50	1142.33	193+47.54	204+89.67



AS-BUILT

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) LEVEE PLAN AND PROFILE STA. 188+00 TO STA. 198+00	SYMBOL	DESCRIPTIONS	DATE	APPROVAL
U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	DISTRICT FILE No. 203/326 SPEC. NO. W92PL-05-90004			
SCALE: 50:1	PLATE 8			

Reference: Plate 8 of the O&M Manual dated 2007, which provided the As-Built Plans dated February 2005.

U.S. Army Corps of Engineers
 Los Angeles District



Tres Rios Restoration Project
 Phases 1A and 1B, North Levee
 Maricopa County, Phoenix, Arizona

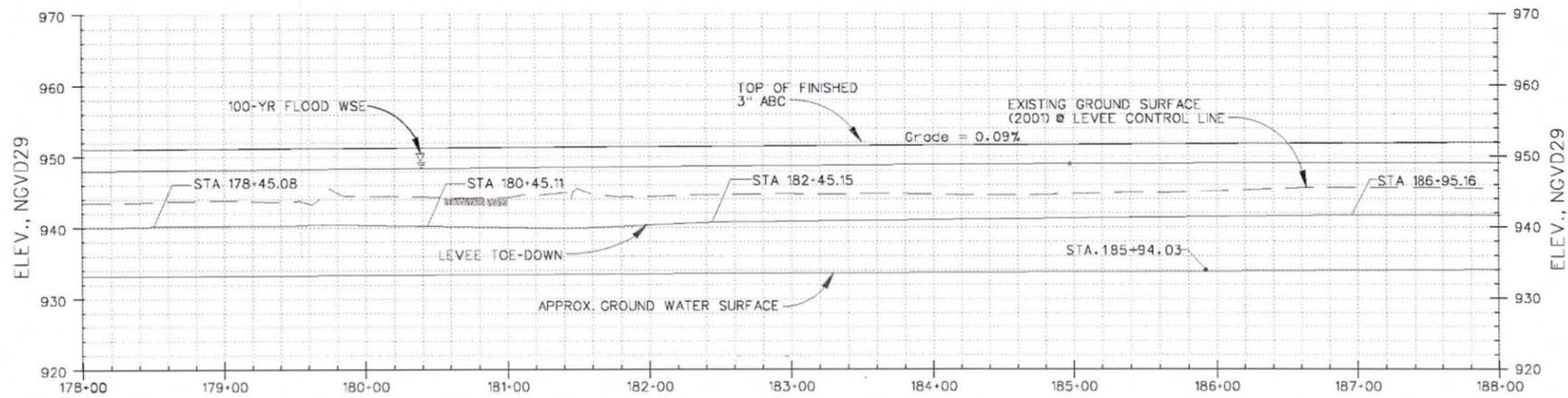


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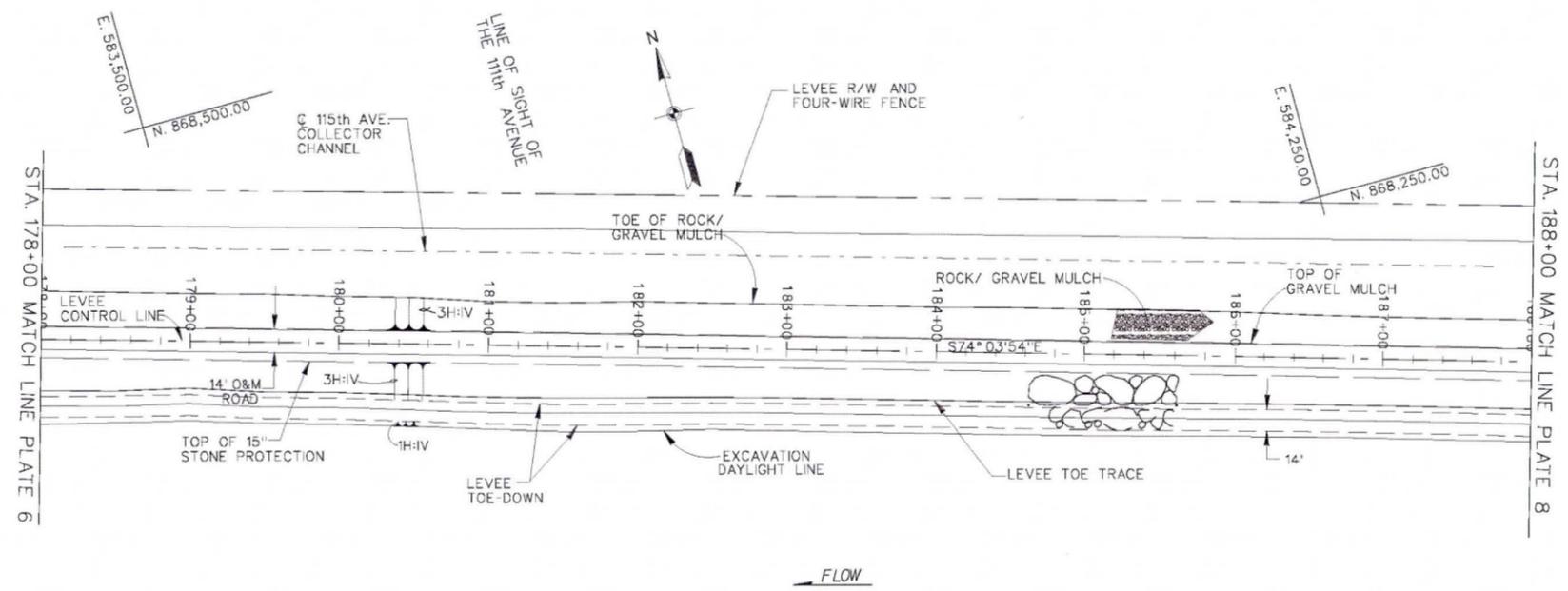
PROJECT NO.
 345-PGT-TO2

DATE
 September 2012

FIGURE I-6e
 PHASE 1A
 (STA 188+00 to STA 198+00)



LEVEE CONTROL LINE AND TOE-DOWN PROFILE
 VERT. SCALE: 1" = 10'
 HORIZ. SCALE: 1" = 50'



PLAN
 SCALE: 1" = 50 FT.
 SCALE: 1" = 50'

AS-BUILT

SCALE: 50'	U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	DISTRICT FILE No. 203/325	SPEC. NO. WBEP-05-0004	SYMBOL	DESCRIPTIONS	DATE	APPROVAL
				PLATE 7	TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) LEVEE PLAN AND PROFILE STA. 178+00 TO STA. 188+00		

Reference: Plate 7 of the O&M Manual dated 2007, which provided the As-Built Plans dated February 2005.

U.S. Army Corps of Engineers
Los Angeles District



Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona

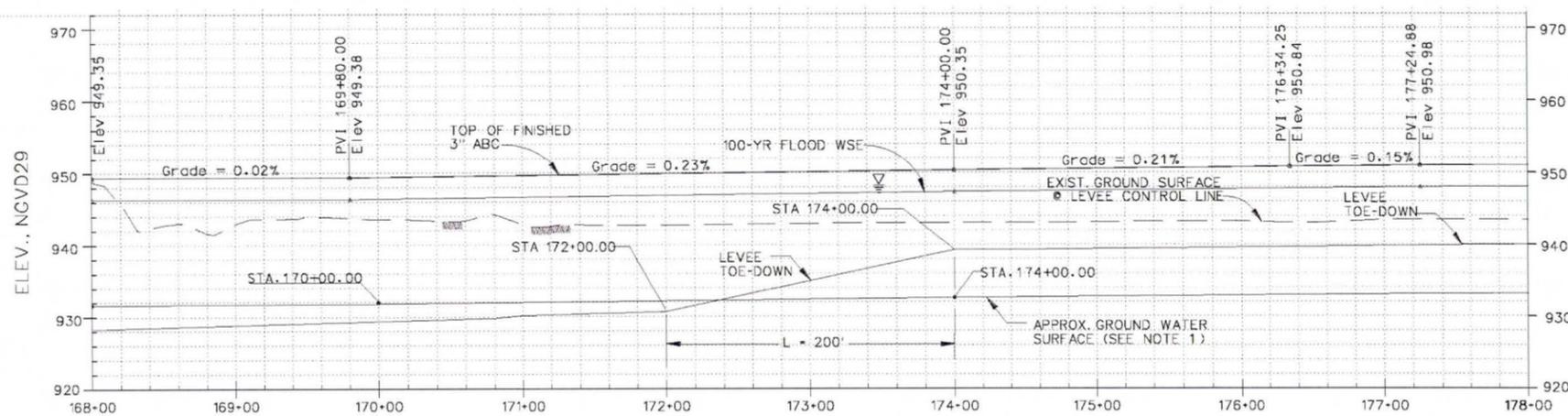


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PROJECT NO.
345-PGT-TO2

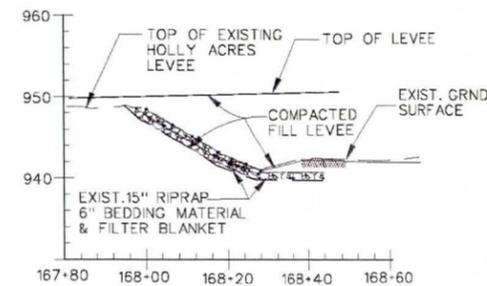
DATE
September 2012

FIGURE I-6d
PHASE 1A
(STA 178+00 to STA 188+00)

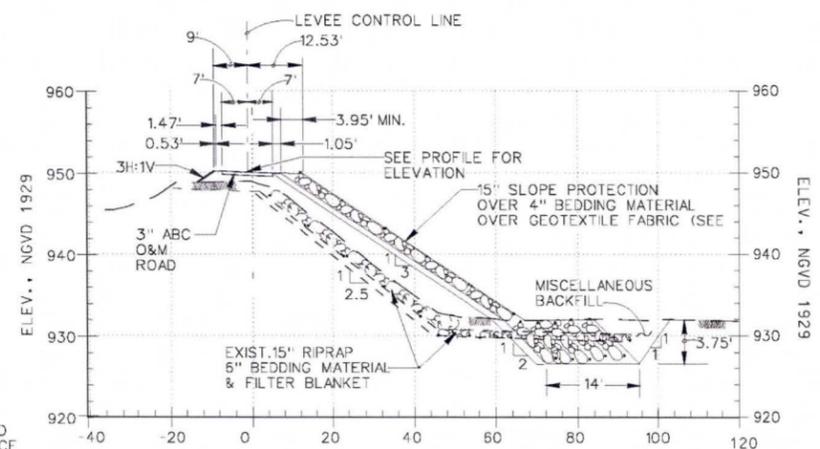


LEVEE CONTROL LINE AND TOE-DOWN PROFILE

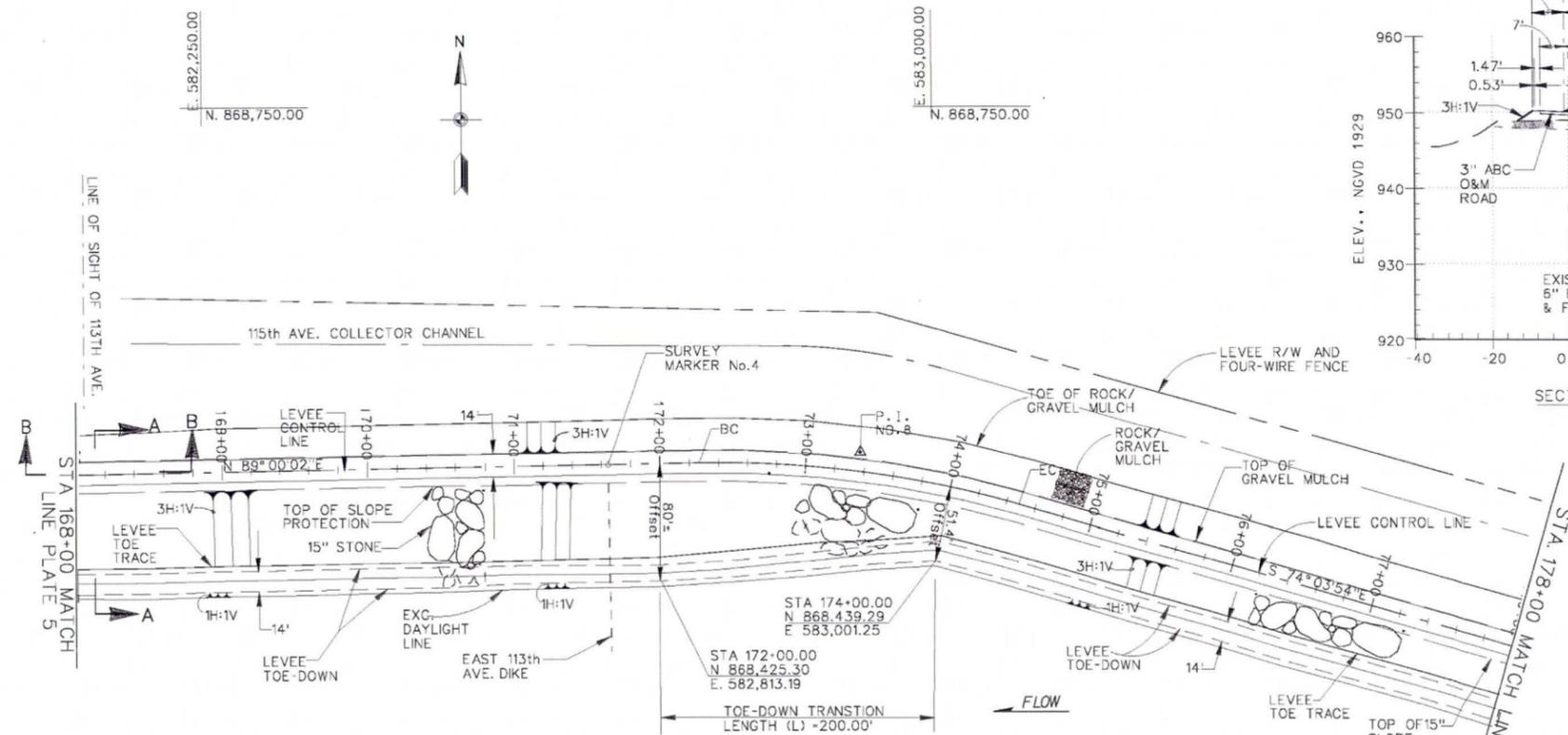
HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 50'



SECTION B-B
N.T.S.



SECTION A-A TYP (STA 168+00 TO STA 168+40)



PLAN
SCALE: 1 IN. = 50 FT.
SCALE: 1" = 50'

LEVEE HORIZONTAL CONTROL CURVE DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(FT)	T(FT.)	L(FT.)	B.C. Sta.	E.C. Sta.
8	868,508.21	582,952.54	16° 56' 03"	750.00	111.65'	221.67'	172+27.54	174+49.31

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA
ENVIRONMENTAL RESTORATION
FLOOD CONTROL NORTH LEVEE
PHASE 1A (115TH AVE. TO 105TH AVE.)
LEVEE PLAN, PROFILE AND SECTIONS
STA. 168+00 TO STA. 178+00

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

DISTRICT FILE NO. 203.224
SPEC. NO. W912PL-05-R0004

SCALE:
50:1
PLATE
6

Reference: Plate 6 of the O&M Manual dated 2007, which provided the As-Built Plans dated February 2005.

AS-BUILT

U.S. Army Corps of Engineers
Los Angeles District

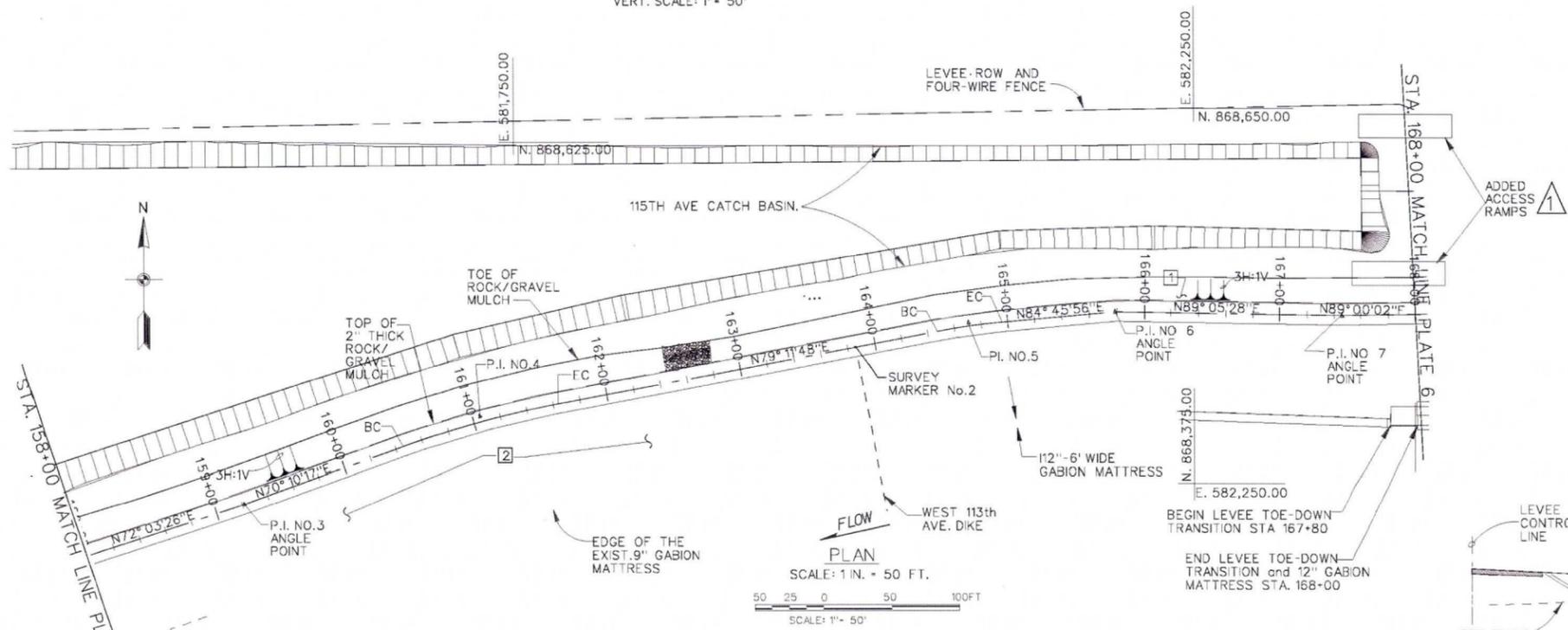
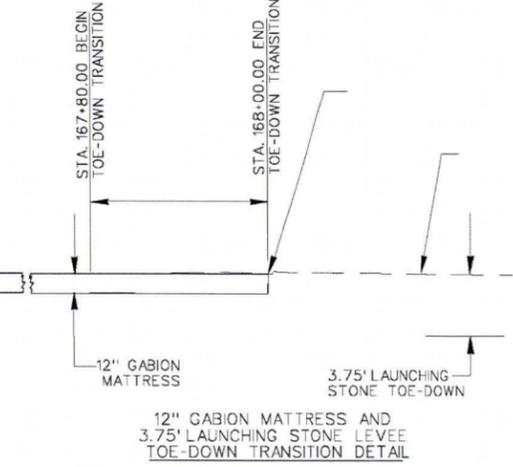
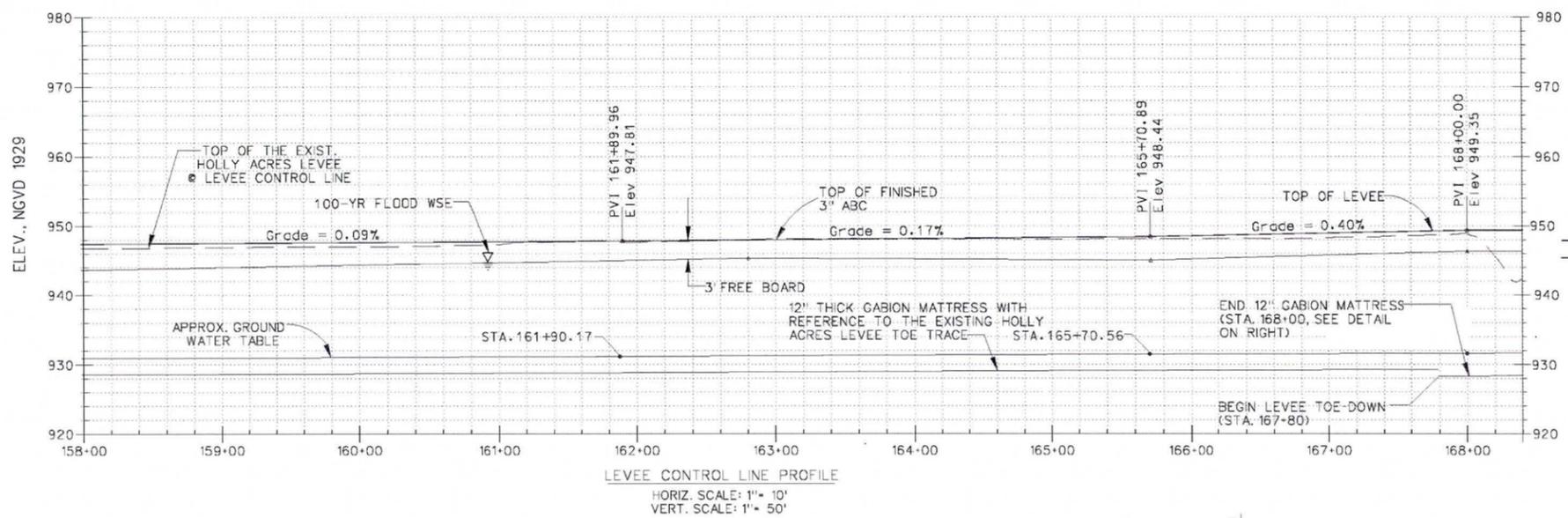
Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona

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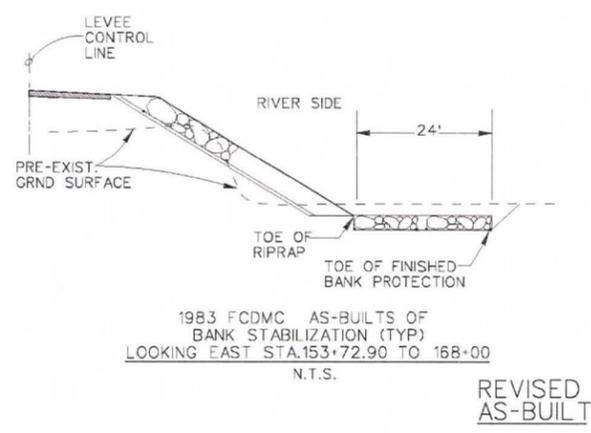
PROJECT NO.
345-PGT-TO2

DATE
September 2012

FIGURE I-6c
PHASE 1A
(STA 168+00 to STA 178+00)



LEVEE CONTROL LINE HORIZ. CURVE AND ANGLE POINT DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(FT.)	T(FT.)	L(FT.)	B.C. Sta	E.C. Sta
3 Sta. 159+21.75	868,359.84	581,552.63	ANGLE PT.	0.00	0.00	0.00	N/A	N/A
4	868,421.86	581,724.61	9° 01'31" RT	750.00'	59.19'	118.14'	160+45.38	161+63.52
5	868,490.69	582,085.30	5° 34'08" RT	500.00'	24.32'	48.60'	164+47.21	164+95.80
6 Sta. 165+78.87	868,500.48	582,192.24	ANGLE PT.	0.00	0.00	0.00	N/A	N/A
7 Sta. 167+45.13	868,497.85	582,358.48	ANGLE PT.	0.00	0.00	0.00	N/A	N/A



TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) LEVEE PLAN, PROFILE AND SECTIONS STA. 158+00 TO STA. 168+00	
U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	SCALE: 50'
PLATE 5	DISTRICT FILE No. 2037333
	SPEC. NO. W92PPL-05-80004

Reference: Plate 5 of the O&M Manual dated 2007, which provided the As-Built Plans dated February 2005.

U.S. Army Corps of Engineers
Los Angeles District



Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona

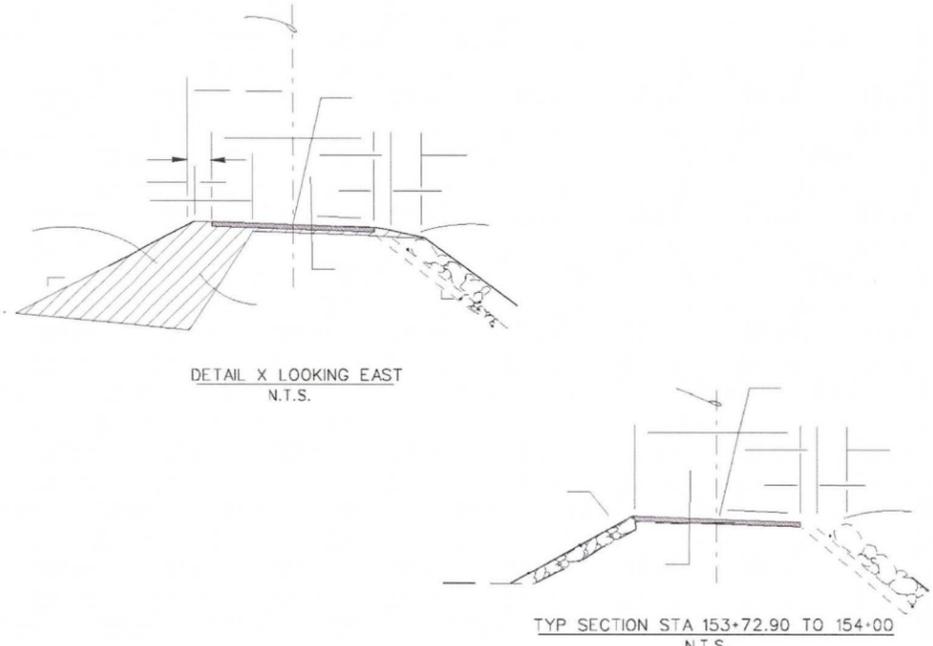
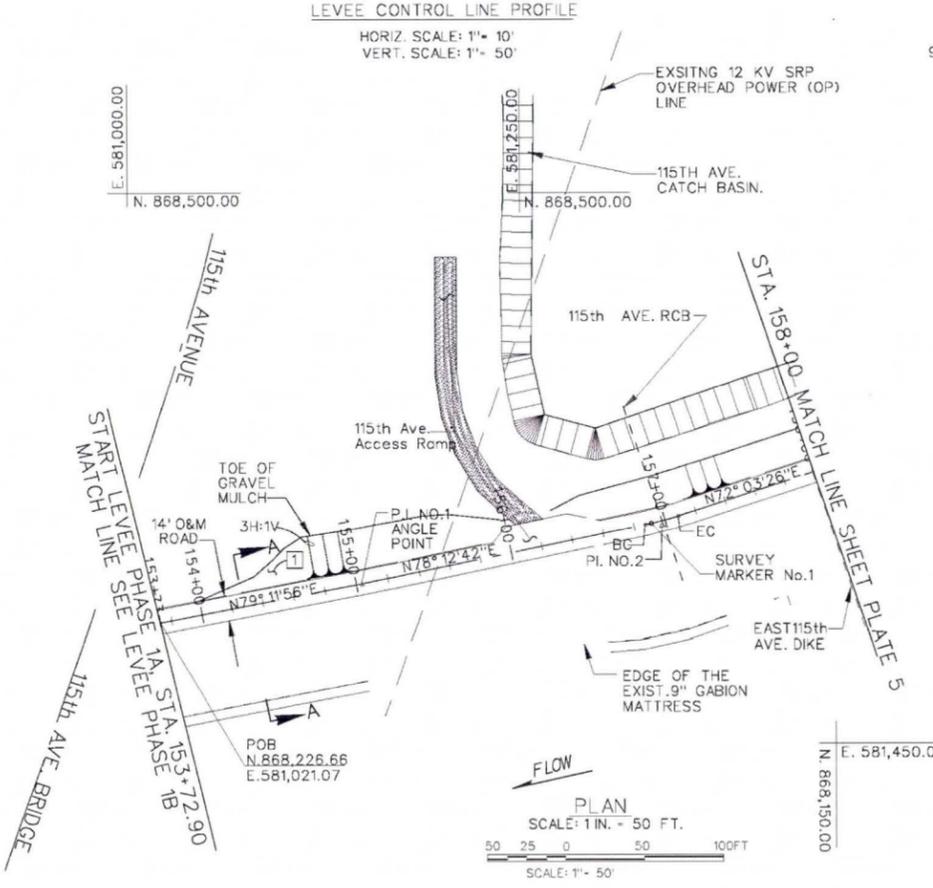
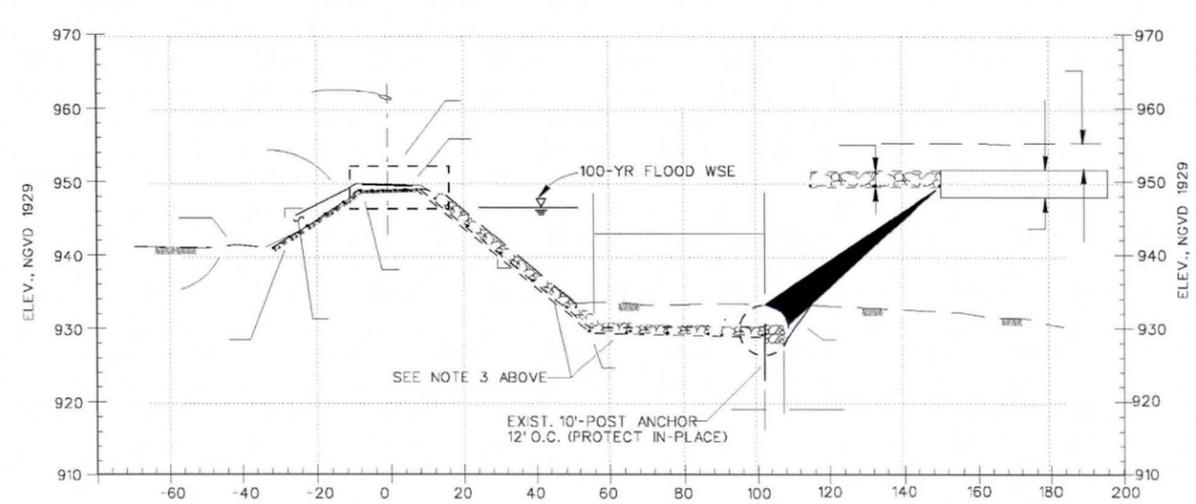
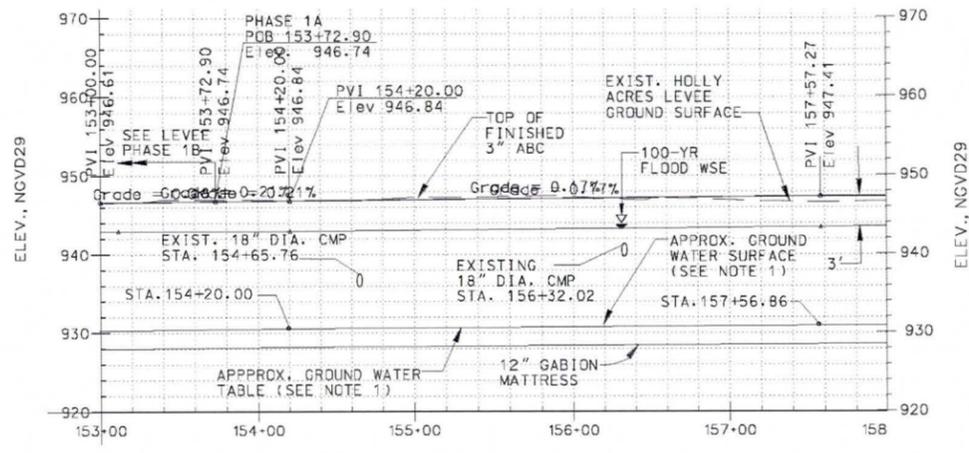


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FIGURE I-6b
PHASE 1A
(STA 158+00 to STA 168+00)



LEVEE HORIZONTAL CONTROL CURVE AND ANGLE POINT DATA								
P.I. NO.	NORTHING	EASTING	Δ°	R(FT.)	T(FT.)	L(FT.)	B.C. Sta	E.C. Sta
1	868,251.07	581,149.04	ANGLE PT.	0.00	0.00	0.00	N/A	N/A
2	868,290.80	581,339.41	6° 09' 15" LT	200.00'	10.75'	21.48'	156+86.90	157+08.38

AS-BUILT

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) LEVEE PLAN, PROFILE, TYPICAL SECTIONS AND DETAIL STA. 153+72.90 TO STA. 158+00		DATE	APPROVAL
SYMBOL	DESCRIPTIONS		
SCALE: 50'	U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	URRC:dp	
PLATE 4	DISTRICT FILE No. 203/322 SPEC. No. W192PL-05-0004		

Reference: Plate 4 of the O&M Manual dated 2007, which provided the As-Built Plans dated February 2005.

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Los Angeles District



Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



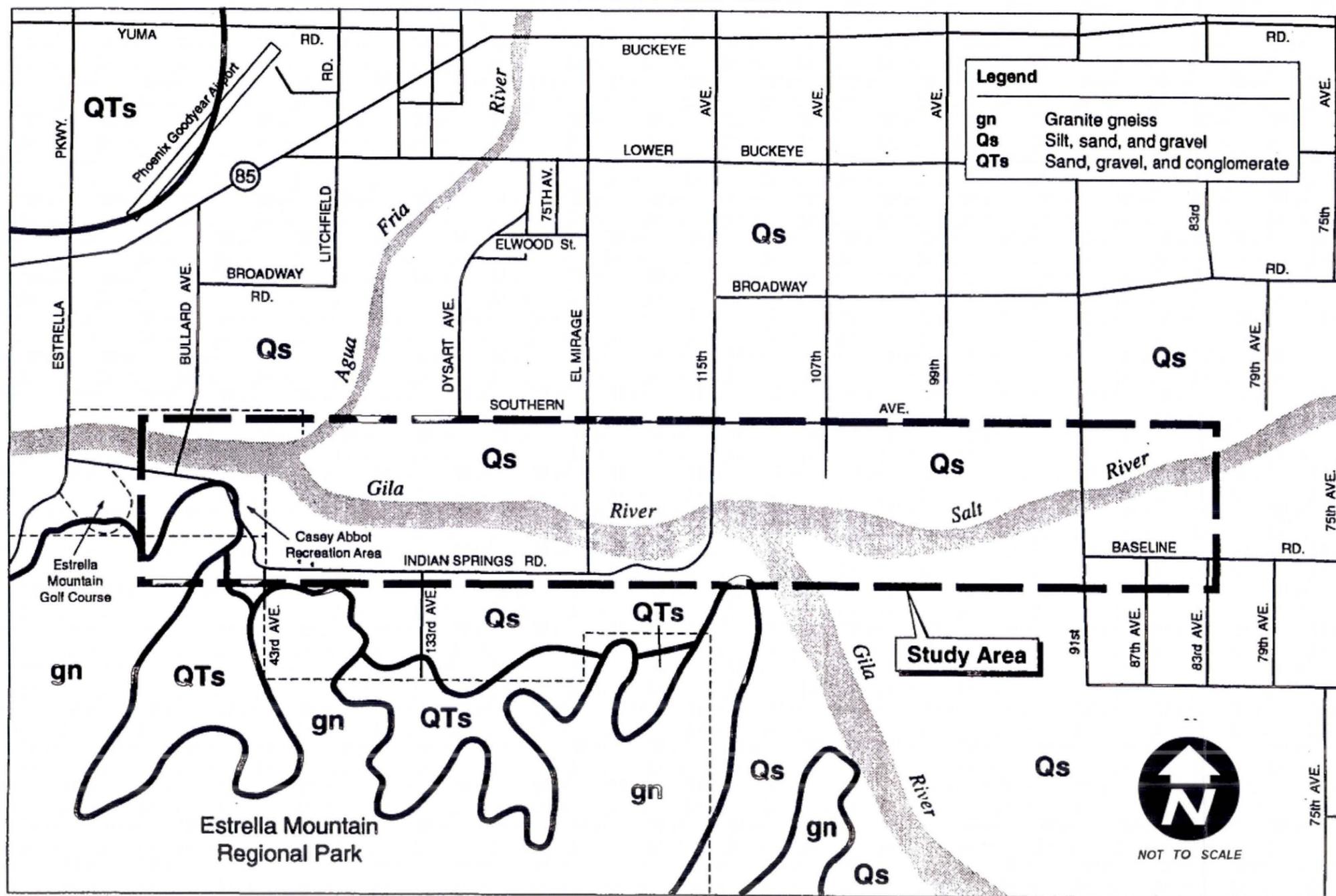
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DATE
September 2012

FIGURE I-6a
PHASE 1A
(STA 153+72.90 to STA 158+00)

GEOLOGIC MAP



REFERENCE: Taken from Jones & Stokes Associates, Inc. Figure 3.2-1 of the Environmental Impact Statement for the Tres Rios Feasibility Study Project, dated March 2000. Geologic source is Arizona Bureau of Mines, 1957.



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Los Angeles District

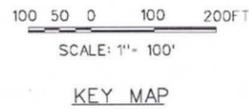
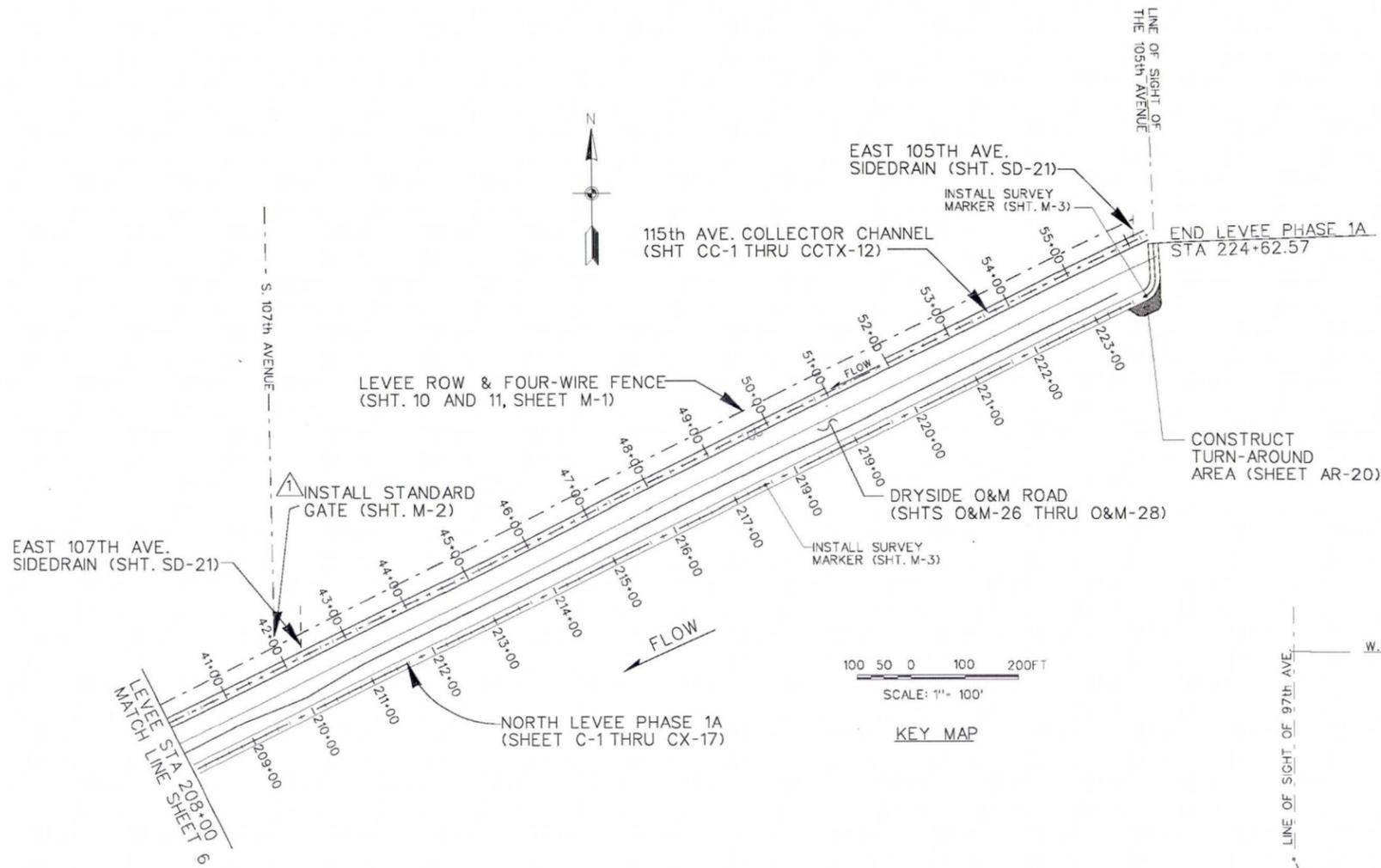


Project No. 345-PGT-TO2

Date: September 2012

FIGURE I-5

Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



REVISED
AS-BUILT

SCALE: 100:1	U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	DISTRICT FILE NO. 2032/317	SPEC. NO. W92PL-05-00004	K9ym92	TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA ENVIRONMENTAL RESTORATION FLOOD CONTROL NORTH LEVEE PHASE 1A (115TH AVE. TO 105TH AVE.) KEP MAP SHEET 2	APPROVAL
						DATE
PLATE 3						SYMBOL
						DESCRIPTIONS
						DATE
						APPROVAL
						MH
						Moved Standard Gate to 107th Ave. Phase 1

Reference: Plate 3 of the O&M Manual dated April 2009, which provided the As-Built Plans dated October 2006.

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Los Angeles District



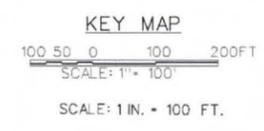
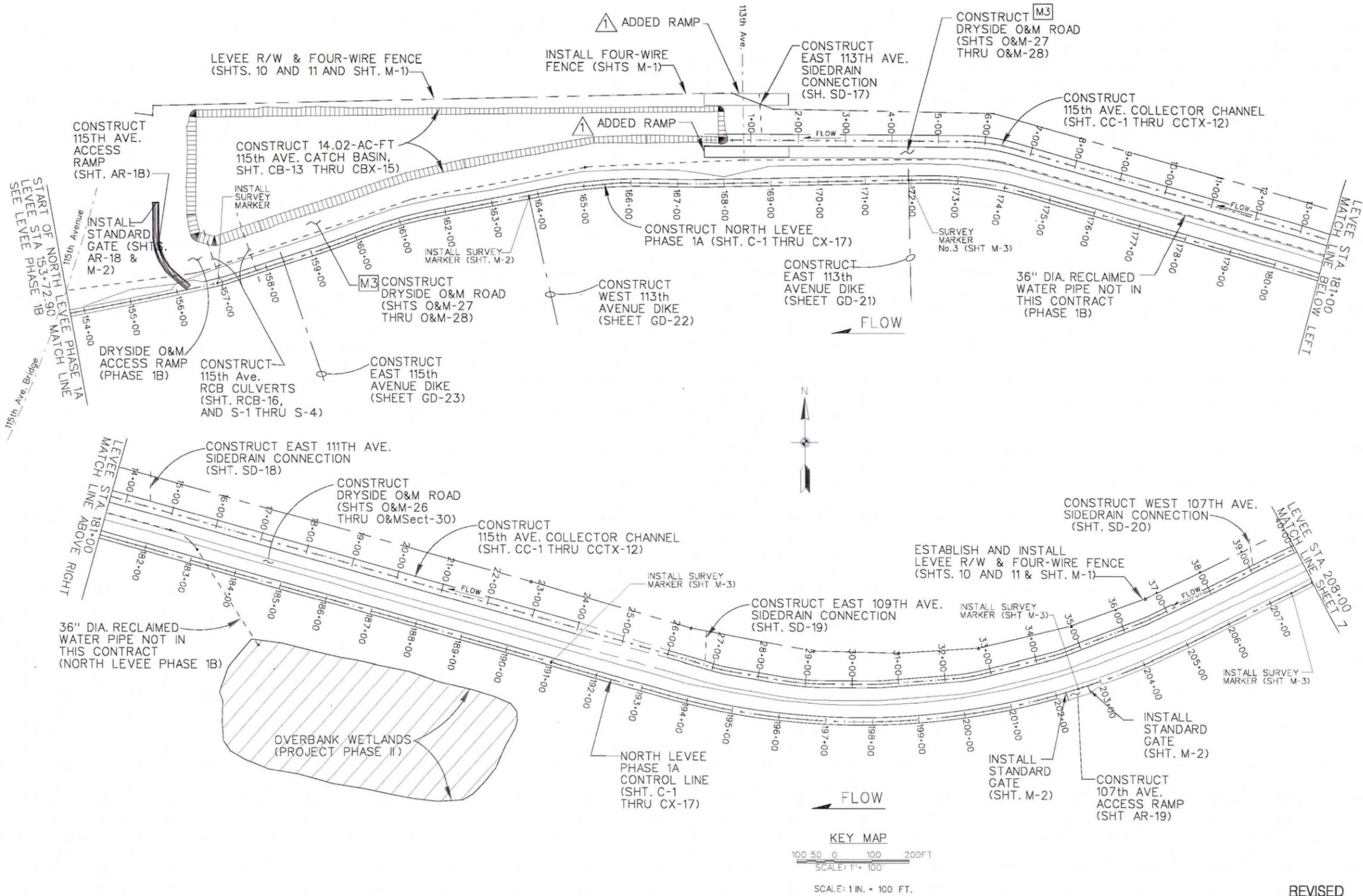
Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



PROJECT NO.
345-PGT-TO2

DATE
September 2012

FIGURE I-3b
PHASE 1A SITE PLAN



SCALE	100:1
PLATE	2

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
⊖	Deleted the Original Call-out Note and Inserted the New One		
⊕	Added Ramps		

TRES RIOS-RIVER, MARICOPA COUNTY, ARIZONA	
ENVIRONMENTAL RESTORATION	
FLOOD CONTROL NORTH LEVEE	
PHASE 1A (115TH AVE. TO 105TH AVE.)	
KEY MAP SHEET 1	

U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS	KeyMap1
DISTRICT F.L.C. No. 203/316	SPEC. NO. WSP/L-05-90004

Reference: Plate 2 of the O&M Manual dated April 2009, which provided the As-Built Plans dated October 2006.

REVISED AS-BUILT

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Los Angeles District



Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



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PROJECT NO.
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FIGURE I-3a
PHASE 1A SITE PLAN



U.S. Army Corps of Engineers
Los Angeles District

Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



Project No.

345-PGT-TO2

Date

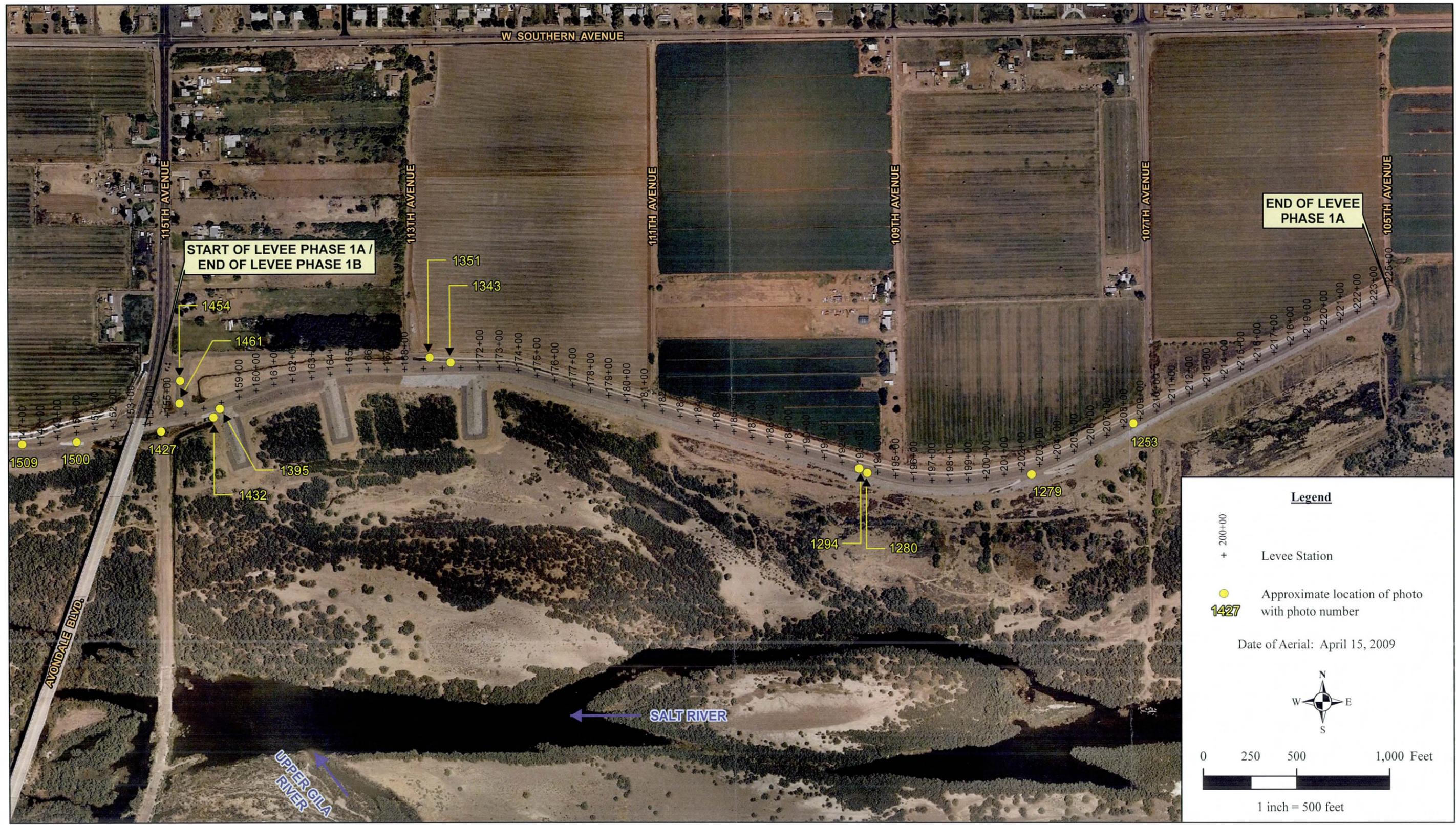
September 2012

FIGURE I-2

AERIAL SITE MAP

APPENDIX II - PHOTOGRAPHS

G:\PROJECTS\0399\345-PGT-TO2-TresRiosLeves\Documents\Final Report\112-Appendix II-Photographs\Phase I A-PhotoMap\345-PGT-TO2_Phase I A Photos.mxd



U.S. Army Corps of Engineers
Los Angeles District

**Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona**



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FIGURE II-1a
PHASE 1A PHOTO
LOCATION MAP

G:\PROJECT\0-399\345-PGT-TO2-TresRiosLevee\Documents\Final_Repo\412\Appendix II-Photographs\Phase 1B-PhotoMap\345-PGT-TO2_Phase 1BPhotos.mxd



U.S. Army Corps of Engineers
Los Angeles District

Tres Rios Restoration Project
Phases 1A and 1B, North Levee
Maricopa County, Phoenix, Arizona



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September 2012

FIGURE II-1b
PHASE 1B PHOTO
LOCATION MAP

TRES RIOS LEVEE FIELD VISIT PHOTOGRAPH SHEETS

Owner Name: USACE Los Angeles District	Inspection Date: July 31, 2012	Page II-1
Project Name: Tres Rios Environmental Restoration Project, Phases 1A and 1B, North Levee	City/County: Phoenix/Maricopa	State: AZ
		Photo No: 1253
		Location: Tres Rios Levee Station 208+50, Phase 1A
		Description: Looking northeast at transverse cracking and resealed joints in Concrete Irrigation Channel (typical).
		Photo No: 1279
		Location: Tres Rios Levee Station 202+50, Phase 1A
		Description: Looking north at erosion caused by farmland irrigation (typical).

TRES RIOS LEVEE FIELD VISIT PHOTOGRAPH SHEETS

Owner Name: USACE Los Angeles District	Inspection Date: July 31, 2012	Page II-2
Project Name: Tres Rios Environmental Restoration Project, Phases 1A and 1B, North Levee	City/County: Phoenix/Maricopa	State: AZ

Photo No: 1280

Location: Tres Rios Levee Station 193+50, Phase 1A

Description: Looking northeast at 109th Ave. side drain obstructed by vegetation (typical).



Photo No: 1294

Location: Tres Rios Levee Station 193+00, Phase 1A

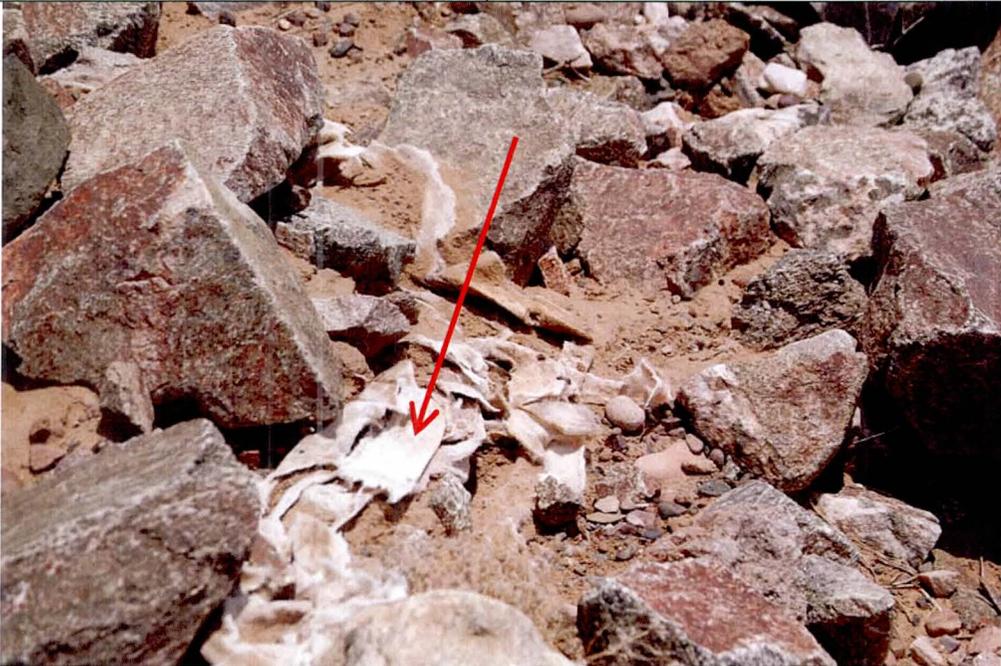
Description: Looking northwest at patching of concrete joints in Concrete Irrigation Channel (typical).



TRES RIOS LEVEE FIELD VISIT PHOTOGRAPH SHEETS

Owner Name: USACE Los Angeles District	Inspection Date: July 31, 2012	Page II-3
Project Name: Tres Rios Environmental Restoration Project, Phases 1A and 1B, North Levee	City/County: Phoenix/Maricopa	State: AZ
		Photo No: 1343
		Location: Tres Rios Levee Station 170+50, Phase 1A
		Description: Looking northwest at 113 th Ave. box culvert obstructed by silt and vegetation.
		Photo No: 1351
		Location: Tres Rios Levee Station 169+50, Phase 1A
		Description: Looking west at concrete disjuncting in the 113 th Ave. box culvert.

TRES RIOS LEVEE FIELD VISIT PHOTOGRAPH SHEETS

Owner Name: USACE Los Angeles District	Inspection Date: July 31, 2012	Page II-4
Project Name: Tres Rios Environmental Restoration Project, Phases 1A and 1B, North Levee	City/County: Phoenix/Maricopa	State: AZ
		Photo No: 1395
		Location: Tres Rios Levee Station 158+00, Phase 1A
		Description: Looking at exposed woven geotextile filter fabric near East 115 th Ave. Guide Dike.
		Photo No: 1427
		Location: Tres Rios Levee Station 154+50, Phase 1A
		Description: Looking northwest at 30" CMP through levee upstream of 115 th Ave. bridge. CMP is not shown on the plans.

TRES RIOS LEVEE FIELD VISIT PHOTOGRAPH SHEETS

Owner Name: USACE Los Angeles District	Inspection Date: July 31, 2012	Page II-5
Project Name: Tres Rios Environmental Restoration Project, Phases 1A and 1B, North Levee	City/County: Phoenix/Maricopa	State: AZ

Photo No: 1432

Location: Tres Rios Levee Station 157+50, Phase 1A

Description: Looking north at concrete cracking in 115th Ave. RCB Culvert.



Photo No: 1454

Location: Tres Rios Levee Station 156+00, Phase 1A

Description: Looking northwest at catch basin and RCP inlet upstream of 115th Ave. bridge. They are not shown on the plans.



TRES RIOS LEVEE FIELD VISIT PHOTOGRAPH SHEETS

Owner Name: USACE Los Angeles District	Inspection Date: July 31, 2012	Page II-6
Project Name: Tres Rios Environmental Restoration Project, Phases 1A and 1B, North Levee	City/County: Phoenix/Maricopa	State: AZ
		Photo No: 1461
		Location: Tres Rios Levee Station 156+00, Phase 1A
		Description: Looking southwest at catch basin outlet structure upstream of 115 th Ave. bridge which is not shown on the plans. Photo No. 1427 shows the 30" CMP outlet on the waterside of levee.
		Photo No: 1500
		Location: Tres Rios Levee Station 150+00, Phase 1B
		Description: Looking east at oversteeped slope at 115 th Ave. bridge.

TRES RIOS LEVEE FIELD VISIT PHOTOGRAPH SHEETS

Owner Name: USACE Los Angeles District	Inspection Date: July 31, 2012	Page II-7
Project Name: Tres Rios Environmental Restoration Project, Phases 1A and 1B, North Levee	City/County: Phoenix/Maricopa	State: AZ
		Photo No: 1509
		Location: Tres Rios Levee Station 147+00, Phase 1B
		Description: Looking north at cracks in Concrete Irrigation Channel (typical).
		Photo No: 1517
		Location: Tres Rios Levee Station 141+10, Phase 1B
		Description: Looking north at 117 th Ave. side drain obstructed with vegetation (typical). Pipe side drain is not constructed as shown on plans.

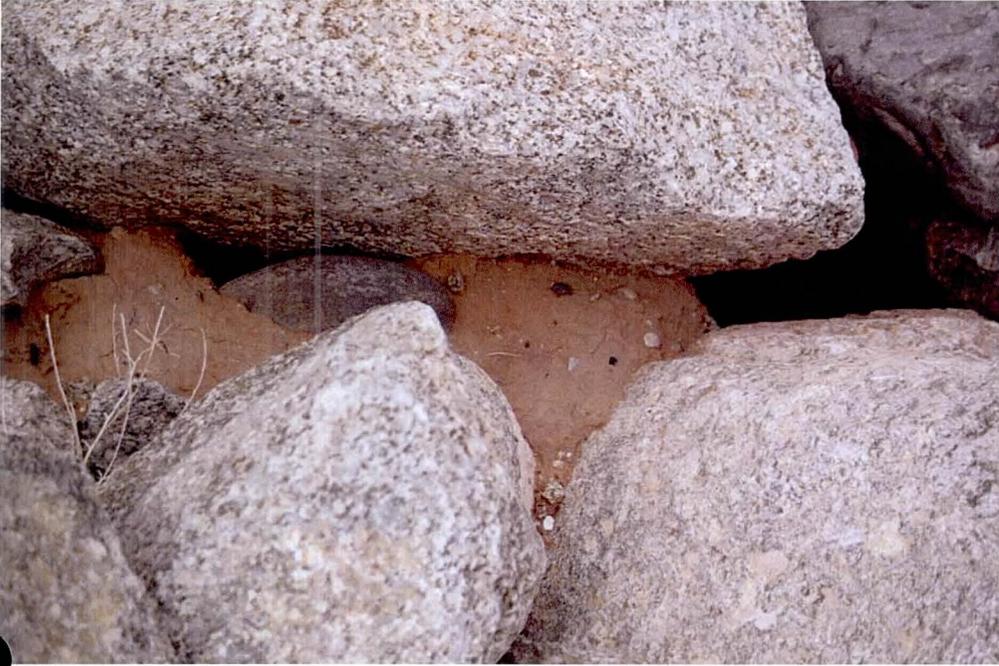
TRES RIOS LEVEE FIELD VISIT PHOTOGRAPH SHEETS

Owner Name: USACE Los Angeles District	Inspection Date: July 31, 2012	Page II-8
Project Name: Tres Rios Environmental Restoration Project, Phases 1A and 1B, North Levee	City/County: Phoenix/Maricopa	State: AZ
		Photo No: 1521
		Location: Tres Rios Levee Station 142+10, Phase 1B
		Description: Looking east (upstream) at rounded river rock riprap on waterside levee slope downstream of 115 th Ave. bridge.
		Photo No: 1539
		Location: Tres Rios Levee Station 140+00, Phase 1B
		Description: Looking southeast at West 117 th Ave. Guide Dike. Soil was observed covering the gabion mattress along the toe of dike.

TRES RIOS LEVEE FIELD VISIT PHOTOGRAPH SHEETS

Owner Name: USACE Los Angeles District	Inspection Date: July 31, 2012	Page II-9
Project Name: Tres Rios Environmental Restoration Project, Phases 1A and 1B, North Levee	City/County: Phoenix/Maricopa	State: AZ
		Photo No: 1586
		Location: Tres Rios Levee Station 122+00, Phase 1B
		Description: Looking southeast at East 119 th Ave. Guide Dike. Soil was observed covering the gabion mattress along the toe of dike.
		Photo No: 1594
		Location: Tres Rios Levee Station 121+50, Phase 1B
		Description: Looking southeast at levee toe. Soil was observed covering portions of the gabion mattress along the toe of levee.

TRES RIOS LEVEE FIELD VISIT PHOTOGRAPH SHEETS

Owner Name: USACE Los Angeles District	Inspection Date: July 31, 2012	Page II-10
Project Name: Tres Rios Environmental Restoration Project, Phases 1A and 1B, North Levee	City/County: Phoenix/Maricopa	State: AZ
		Photo No: 1602
		Location: Tres Rios Levee Station 119+80, Phase 1B
		Description: Looking at West 119 th Ave. Guide Dike. Soil was observed in between riprap voids of the guide dike.
		Photo No: 1649
		Location: Tres Rios Levee Station 103+50, Phase 1B
		Description: Looking southwest at Diversion Channel, single 48" RCP structure under El Mirage Rd, and gates. The single RCP is not as designed in plans (4-RCP). Signs of recent construction activity were observed in this area. Grouted riprap protection was observed.

TRES RIOS LEVEE FIELD VISIT PHOTOGRAPH SHEETS

Owner Name: USACE Los Angeles District	Inspection Date: July 31, 2012	Page II-11
Project Name: Tres Rios Environmental Restoration Project, Phases 1A and 1B, North Levee	City/County: Phoenix/Maricopa	State: AZ
		Photo No: 1660
		Location: Tres Rios Levee Station 104+50, Phase 1B
		Description: Looking south at Diversion Channel near El Mirage Rd. Access ramp with 2-CMPs are not as shown on the plans.
		Photo No: 1685
		Location: Tres Rios Levee Station 105+00, Phase 1B
		Description: Looking north at two small slippages in the south facing slope of the 8.5-Ac-Ft Catch Basin near El Mirage Rd. Dense vegetation on the farmland side was observed.

TRES RIOS LEVEE FIELD VISIT PHOTOGRAPH SHEETS

Owner Name: USACE Los Angeles District	Inspection Date: July 31, 2012	Page II-12
Project Name: Tres Rios Environmental Restoration Project, Phases 1A and 1B, North Levee	City/County: Phoenix/Maricopa	State: AZ
		Photo No: 1699
		Location: Tres Rios Levee Station 105+00, Phase 1B
		Description: Looking north at close up view of slope slippage in the northwest corner of 8.5 Ac-Ft Catch Basin near El Mirage Rd. Rodent activity was observed in the slope slippage. Dense vegetation on the farmland side was observed.
		Photo No: 1687
		Location: Tres Rios Levee Station 105+500, Phase 1B
		Description: Looking north at the 8.5 Ac-Ft Catch Basin near El Mirage Rd. A single RCP and power pole guide wire were observed and are not shown on the plans.

APPENDIX III - TABLES, PLOTS, AND GRAPHS

APPENDIX III - TABLES, PLOTS, AND GRAPHS

a. Embankment Placement Quantities

The quantities of fill soil, concrete, and/or other construction materials for Phase 1A were not provided in the daily reports. The available quantities for Phase 1B for some of the materials used for the project are summarized in the following table:

Project	Material	Quantity
Phase 1B	Concrete	5,373 Cubic Yards
	27-inch Riprap	2,795.31 Tons
	15-inch Riprap	6,859.85 Tons
	River Rock	4,517.93 Tons
	Rock Mulch	1,093.31 Tons
	Concrete Grout	167.50 Cubic Yards

b. Embankment Design Placement Requirements Compared with Summary of Field Control Test Data Results

Acceptance criteria

Requirements for placement can be found in Section 02300, Paragraphs 3.13 and 3.14 of the technical specifications for Phase 1A, and in Section 02300, Paragraph 3.4 for Phase 1B. The requirements are the same for both Phases 1A and 1B. These requirements include the following:

- Compacted fill shall be placed with suitable equipment in horizontal layers which before compaction, shall not exceed 12 inches in depth for rubber-tired or vibratory rollers, 8 inches in depth for tamping rollers, and 4 inches in depth when mechanical tampers are used. Fill material shall not be placed against concrete which has not been in place at least 14 days or until the concrete has attained a strength of at least 3,000 psi.
- The fill materials for the levee shall be compacted to not less than 95 percent of maximum density, per ASTM D 698. The compaction for RCB Culverts or CIC/IP shall be not less than 90 percent of the maximum dry density per ASTM D 1557. Fill for roadways shall be compacted to no less than 95 percent of the maximum dry density per ASTM D 1557. Subgrade shall be scarified to a depth of 6 inches, moisture conditioned and proof rolled by 4 passes of the equipment and smoothed with a steel-wheeled roller after trimming.

- One test per 1,000 cubic yards for the first 10,000 cubic yards of material and one test for each 2,000 cubic yards thereafter, or fraction thereof, shall be made of each lift of fill or backfill areas compacted by other than hand-operated machines. At least one test shall be made in each two foot layer of compacted fill or backfill and not less than one test shall be made in each area.

In-Place Density Test Results

- The compaction tests were primarily performed using the Nuclear Gauge method (ASTM D 2922) and supplemented with the Sand Cone method (ASTM D 1556).
- Subgrades were scarified to a depth of 6 inches, moisture conditioned, and compacted to not less than 95 percent of maximum density per ASTM D 1557.
- Levee fill materials were moisture conditioned to within two percent of optimum moisture content, placed in 12-inch-thick loose lifts, and compacted to not less than 95 percent of the maximum dry density per ASTM D 698.
- The backfill materials for RCB Culverts or CIC/IP were compacted to not less than 90 percent of the maximum dry density per ASTM D 1557.

In-Place Density Test Frequency

Phase 1A

- Subgrade: After scarification and compaction, the compaction tests for the subgrade of levee, guide dike, collector channel, RCB culverts, and access and maintenance roads were performed. For the subgrade of the levee, the contractor performed a compaction test at an interval of approximately 200 feet for each lift (Ref. QCR 133, 135, 139, and 147 for Phase 1A). This corresponds to one test for no more than 500 cubic yards of material. Two to three compaction tests were performed on each guide dike's subgrade (Ref. QCR 156 for Phase 1A). Compaction tests were performed on the subgrade of the collector channel at an interval of 400 to 500 feet (Ref. QCR 266 and 327 for Phase 1A). The compaction tests on subgrade and ABC base of the RCB culverts were reported in daily reports (Ref. QCR 327, 405 for Phase 1A). Compaction tests on the catch basin access road were reported at an interval of 100 to 200 feet (Ref. QCR 385 for Phase 1A). The compaction tests on the O&M road were reported in daily reports (Ref. QCR 407, 413, 460 for Phase 1A) at an interval of 200 to 500 feet. Tests on the wingwall foundation were reported (Ref. QCR 460 for Phase 1A).
- Levee Embankment: The contractor took a compaction test at intervals of 200 feet for each one-foot-thick lift (Ref. QCR 140, 141, 145, and 145 for Phase 1A). This corresponds to one test for no more than 500 cubic yards of material.
- Guide Dike Embankment: A compaction test was taken at intervals ranging from 25 to 100 feet (Ref. QCR 148, 153, 154, and 159 for Phase 1A).
- One compaction test on each lift of backfill of the RCB was reported (Ref. QCR 407 for Phase 1A).

Phase 1B

- Subgrade: After scarification and compaction, the compaction tests for the subgrade of levee, guide dike, collector channel, RCB culverts, and O&M road were performed. For the subgrade of the enlarged existing levee, the contractor performed a compaction test at an interval of approximately 1,000 feet (Ref. QCR 75, 76 and QAR 76 for Phase 1B) and approximately 200 feet for the subgrade of the new levee (QCR 110). This corresponds to one compaction test for no more than 500 cubic yards of material. Two to three compaction tests were performed on each guide dike's subgrade (Ref. QCR 83 for Phase 1B). Compaction tests were performed on the subgrade of the collector channel at an interval of 200 to 500 feet (Ref. QCR 84, 98 and QAR 98 for Phase 1B). The compaction tests on subgrade of RCB and fill materials above RCB were reported (Ref. QAR 90, 231). The compaction tests on the O&M road were reported in daily reports (Ref. QCR 210, 216, 218, 225, 239, and 260 for Phase 1B) at an interval of 300 feet.
- Levee Embankment: The contractor took a compaction test at intervals of approximately 100 to 200 feet for each one-foot-thick lift (Ref. QCR 103, 133, 139, 197, 201, 231 and 238 for Phase 1B). This corresponds to one test for no more than 500 cubic yards of material.
- Guide Dike Embankment: A compaction test was taken at intervals ranging from 25 to 100 feet (Ref. QCR 91 for Phase 1B).
- One compaction test on each lift of backfill of the RCB was reported (Ref. QCR 407 for Phase 1B).

The placement of embankment generally meets the requirements stated in the technical specifications. It should be noted that most of the test data sheets were not available, and some retests for failed tests were not available.

APPENDIX IV - DATA SUMMARY SHEETS

TABLE IV-1
Phase 1A Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control							Checked by GENTERRA			
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
1	Hoque	1A	1	3/1/2006	1+00	At CL of East 113th Ave Dike	943	110.3	14.4	110.2	12.5	99.9	Pass	N		99.9	YES	
2	Hoque	1A	2	3/1/2006	0+75	At CL of East 113th Ave Dike	944	110.3	14.4	110.7	12.4	100.4	Pass	N		100.4	YES	
3	Hoque	1A	3	3/1/2006	1+25	At CL of East 113th Ave Dike	945	117.0	13.5	115.6	11.6	98.8	Pass	N		98.8	YES	
4	Hoque	1A	4	3/1/2006	197+80	20' S from CL of N levee	946	117.0	13.5	109.2	11.8	93.4	Fail	N	Retested by Test No. 4A	93.3	NO	Retested by Sequential Test No. 5
5	Hoque	1A	4A	3/1/2006	197+80	20' S from CL of N levee	946	117.0	13.5	111.2	11.9	95.1	Pass	N	Retest of Test No. 4	95.0	YES	Retest of Sequential Test No. 4
6	Hoque	1A	5	3/1/2006	196+80	20' S from CL N levee	946	115.5	14.1	110.1	12.2	95.3	Pass	N		95.3	YES	
7	Hoque	1A	1	3/2/2006	196+50	10' S from CL of levee	947	115.5	14.1	110.4	12.7	95.6	Pass	N		95.6	YES	
8	Hoque	1A	2	3/2/2006	199+00	15' S from CL of levee	948	115.5	14.1	112.6	12.0	97.5	Pass	N	Retested by Test No. 2A	97.5	YES	Retested by Sequential Test No. 9
9	Hoque	1A	2A	3/2/2006	199+00	15' S from CL of levee	948	115.5	14.1	110.9	12.2	96.0	Pass	S	Retest of Test No. 2	96.0	YES	Retest of Sequential Test No. 8
10	Hoque	1A	3	3/2/2006	200+00	At CL of levee	949	115.5	14.1	109.8	12.2	95.1	Pass	N		95.1	YES	
11	Hoque	1A	4	3/2/2006	204+00	At CL of levee	946	115.5	14.1	110.0	12.1	95.3	Pass	N		95.2	YES	
12	Hoque	1A	1	3/7/2006	204+00	At CL of levee	947	115.5	14.1	116.6	12.0	101.0	Pass	N		101.0	YES	(2)

Notes:

- (1) Location description provided in QCR/QAR.
- (2) Moisture Content within +/- 2.5%.
- (3) Relative Compaction above 94.5 %, rounded up.
- (4) Test results not provided in QCR/QAR.

TABLE IV-1
Phase 1A Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control							Checked by GENTERRA			
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
13	Hoque	1A	2	3/7/2006	202+75	20' S from CL of levee	948	115.5	14.1	110.1	12.2	95.3	Pass	N		95.3	YES	
14	Hoque	1A	3	3/7/2006	202+35	20' S from CL of levee	949	115.5	14.1	113.7	13.3	98.5	Pass	N		98.4	YES	
15	Hoque	1A	4	3/7/2006	202+15	10' N from CL of levee	949	115.5	14.1	112.9	14.0	97.8	Pass	N		97.7	YES	
16	Hoque	1A	1	3/8/2006	191+00	At CL of levee	945	115.5	14.1	109.6	13.1	94.9	Pass	N		94.9	YES	(3)
17	Hoque	1A	2	3/8/2006	194+50	20' S from CL of levee	946	115.5	14.1	111.5	12.0	96.6	Pass	N	Retested by Test No. 2A	96.5	YES	Retested by Sequential Test No. 18
18	Hoque	1A	2A	3/8/2006	194+50	20' S from CL of levee	946	115.5	14.1	110.5	12.4	95.7	Pass	S	Retest of Test No. 2	95.7	YES	Retest of Sequential Test No. 17
19	Hoque	1A	3	3/8/2006	202+75	2' S from CL of levee	950	115.5	14.1	116.4	12.3	100.8	Pass	N		100.8	YES	
20	Hoque	1A	1	3/9/2006	195+50	At CL of levee	947	115.5	14.1	110.7	12.6	95.9	Pass	N		95.8	YES	
21	Hoque	1A	2	3/9/2006	189+00	10' S from CL of levee	947	115.5	14.1	110.9	12.7	96.0	Pass	N		96.0	YES	
22	Hoque	1A	3	3/9/2006	190+75	10' N from CL of levee	948	115.5	14.1	110.0	12.0	95.2	Pass	N		95.2	YES	(2)
23	Hoque	1A	4	3/9/2006	188+75	10' N from CL of levee	948	115.5	14.1	109.7	12.4	95.0	Pass	N		95.0	YES	
24	Hoque	1A	1	3/10/2006	188+05	10' N from CL of levee	949	115.5	14.1	113.4	12.2	98.2	Pass	N		98.2	YES	

Notes:

- (1) Location description provided in QCR/QAR.
(2) Moisture Content within +/- 2.5%.
(3) Relative Compaction above 94.5 %, rounded up.
(4) Test results not provided in QCR/QAR.

TABLE IV-1
Phase 1A Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control							Checked by GENTERRA			
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
25	Hoque	1A	2	3/10/2006	190+00	10' N from CL of levee	949	115.5	14.1	110.5	12.1	95.7	Pass	N		95.7	YES	
26	Hoque	1A	1	3/15/2006	200+95	10' N from CL of levee	951	115.5	14.1	114.5	12.0	99.2	Pass	N		99.1	YES	(2)
27	Hoque	1A	2	3/15/2006	203+25	10' N from CL of levee	951	115.5	14.1	105.9	15.2	91.7	Fail	N	Retested by Test No. 2A	91.7	NO	Retested by Sequential Test No. 28
28	Hoque	1A	2A	3/15/2006	203+25	10' N from CL of levee	951	115.5	14.1	111.9	12.2	96.9	Pass	N	Retest of Test No. 2	96.9	YES	Retest of Sequential Test No. 27
29	Hoque	1A	1	3/16/2006	182+75	10' S from CL of levee	950	115.5	14.1	116.7	12.0	101.1	Pass	N	Retested by Test No. 1A	101.0	YES	Retested by Sequential Test No. 30
30	Hoque	1A	1A	3/16/2006	182+75	10' S from CL of levee	950	115.5	14.1	111.9	12.6	96.9	Pass	N	Retest of Test No. 1	96.9	YES	Retest of Sequential Test No. 29
31	Hoque	1A	2	3/16/2006	184+50	At CL of levee	950	115.5	14.1	109.9	12.1	95.2	Pass	N		95.2	YES	
32	Hoque	1A	1	3/17/2006	189+05	10' N from CL of levee	951	115.5	14.1	110.4	12.4	95.5	Pass	N		95.6	YES	
33	Hoque	1A	2	3/17/2006	188+00	At CL of levee	951	115.5	14.1	109.6	12.4	94.9	Pass	N		94.9	YES	(3)
34	Hoque	1A	1	3/18/2006	200+65	10' S from CL of levee	952	115.5	14.1	116.6	12.0	100.9	Pass	N		101.0	YES	(2)
35	Hoque	1A	2	3/18/2006	201+75	10' S from CL of levee	952	115.5	14.1	114.7	12.5	99.3	Pass	N		99.3	YES	
36	Hoque	1A	1	3/21/2006	186+25	At CL of levee	952	115.5	14.1	116.5	12.6	100.8	Pass	N		100.9	YES	

Notes:

- (1) Location description provided in QCR/QAR.
(2) Moisture Content within +/- 2.5%.
(3) Relative Compaction above 94.5 %, rounded up.
(4) Test results not provided in QCR/QAR.

TABLE IV-1
Phase 1A Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control							Checked by GENTERRA			
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
37	Hoque	1A	2	3/21/2006	190+25	At CL of levee	952	115.5	14.1	116.5	12.0	100.9	Pass	N		100.9	YES	(2)
38	Hoque	1A	1	3/22/2006	203+60	5' S from CL of levee	953	115.5	14.1	111.9	12.8	96.9	Pass	N		96.9	YES	
39	Hoque	1A	2	3/22/2006	201+80	At CL of levee	953	115.5	14.1	111.7	12.9	96.7	Pass	N		96.7	YES	
40	Hoque	1A	1	3/23/2006	180+50	At CL of levee	950	115.5	14.1	109.6	15.0	94.9	Pass	N	Retested by Test No. 1A	94.9	YES	Retested by Sequential Test No. 41
41	Hoque	1A	1A	3/23/2006	180+50	At CL of levee	950	115.5	14.1	110.4	15.9	95.6	Pass	S	Retest of Test No. 1	95.6	YES	Retest of Sequential Test No. 40
42	Hoque	1A	2	3/23/2006	174+00	At CL of levee	950	115.5	14.1	109.8	14.8	95.1	Pass	N		95.1	YES	
43	Hoque	1A	1	5/1/2006	205+75	At CL of levee	953	115.5	14.1	111.1	12.3	95.9	Pass	N		96.2	YES	
44	Hoque	1A	1	5/10/2006	209+50	At CL of levee	950	115.5	14.1	112.8	12.0	97.7	Pass	N		97.7	YES	(2)
45	Hoque	1A	1	5/11/2006	209+75	At CL of N levee	951	115.5	14.1	114.3	12.3	99.2	Pass	N		99.0	YES	
46	Hoque	1A	2	5/11/2006	210+00	At CL of N levee	952	115.1	14.1	113.3	12.4	98.1	Pass	N		98.4	YES	
47	Hoque	1A	3	5/11/2006	38+75	At CL of CIC	SG	108.7	14.1	103.4	12.1	95.1	Pass	N		95.1	YES	
48	Hoque	1A	1	5/17/2006	55+20	3' S from CL of CIC	-	110.3	14.4	105.1	12.3	95.3	Pass	N		95.3	YES	(2)

Notes:

- (1) Location description provided in QCR/QAR.
(2) Moisture Content within +/- 2.5%.
(3) Relative Compaction above 94.5 %, rounded up.
(4) Test results not provided in QCR/QAR.

TABLE IV-1
Phase 1A Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control							Checked by GENTERRA			
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
49	Hoque	1A	2	5/17/2006	51+25	At CL of CIC	-	110.3	14.4	108.0	12.5	97.9	Pass	N		97.9	YES	
50	Hoque	1A	3	5/17/2006	46+00	3' N from CL of CIC	-	110.3	14.4	105.3	15.6	95.4	Pass	N		95.5	YES	
51	Hoque	1A	1	8/7/2006	2+00	At CL of Canal	-	108.7	14.1	108.0	12.4	99.4	Pass	N		99.4	YES	
52	Hoque	1A	2	8/7/2006	7+00	3' N from CL of Canal	-	108.7	14.1	107.7	12.0	99.1	Pass	N		99.1	YES	(2)
53	Hoque	1A	1	10/3/2006	-	15' W at 10' N from SEC of RCB	938.871	117.7	11.6	111.8	9.8	95.0	Pass	N		95.0	YES	
54	Hoque	1A	2	10/3/2006	-	6' W at 5' N from of SEC of RCB base	937.371	136.9	6.7	134.0	4.7	97.9	Pass	N	Retested by Test No. 2A	97.9	YES	Retested by Sequential Test No. 55
55	Hoque	1A	2A	10/3/2006	-	6' W at 5' N from of SEC of RCB base	937.371	136.9	6.7	130.3	5.0	95.2	Pass	S	Retest of Test No. 2	95.2	YES	Retest of Sequential Test No. 54
56	Hoque	1A	1	10/5/2006	53+88	2' S from CL of road	-	115.5	14.1	112.6	12.1	97.5	Pass	N		97.5	YES	
57	Hoque	1A	1	10/5/2006	-	20' S from N end head wall at CL of levee RCB	1' above RCB	115.5	14.1	116.4	13.5	100.8	Pass	N		100.8	YES	
58	Hoque	1A	2	10/5/2006	51+43	5' N from CL of road	-	115.5	14.1	112.0	14.0	97.0	Pass	N		97.0	YES	
59	Hoque	1A	2	10/5/2006	-	At CL of levee & also CL of RCB	2' above RCB	115.5	14.1	116.9	12.8	101.2	Pass	N		101.2	YES	
60	Hoque	1A	3	10/5/2006	45+50	1' N from CL of road	-	115.5	14.1	111.0	12.0	96.1	Pass	N		96.1	YES	(2)

Notes:

- (1) Location description provided in QCR/QAR.
- (2) Moisture Content within +/- 2.5%.
- (3) Relative Compaction above 94.5 %, rounded up.
- (4) Test results not provided in QCR/QAR.

TABLE IV-1
Phase 1A Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control								Checked by GENTERRA		
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
61	Hoque	1A	1	10/9/2006	157+00	At CL of levee & also CL of RCB	946	115.5	14.1	109.8	12.0	95.1	Pass	N		95.1	YES	(2)
62	Hoque	1A	1	10/11/2006	70+00	At CL of road	-	136.9	6.7	-	-	95.0	Pass	N	Aggregate Base Course	-	-	(4)
63	Hoque	1A	2	10/11/2006	68+00	At N end of road	-	136.9	6.7	-	-	95.9	Pass	N	Aggregate Base Course	-	-	(4)
64	Hoque	1A	3	10/11/2006	75+00	At S end of road	-	136.9	6.7	-	-	100.1	Pass	N	Aggregate Base Course	-	-	(4)
65	Hoque	1A	1	10/12/2006	72+00	At CL of road	-	-	-	-	-	-	-	N	Aggregate Base Course	-	-	(4)
66	Hoque	1A	2	10/12/2006	74+00	At CL of road	-	-	-	-	-	-	-	N	Aggregate Base Course	-	-	(4)
67	Hoque	1A	3	10/12/2006	70+00	At CL of road	-	-	-	-	-	-	-	N	Aggregate Base Course	-	-	(4)
68	Hoque	1A	1	10/24/2006	-	12' W of CL of west end box culvert	-	110.3	14.4	110.2	12.1	99.9	Pass	N		99.9	YES	(2)
69	Hoque	1A	2	10/24/2006	-	20' E of 2' N form CL of east end of box culvert	-	110.3	14.4	109.9	12.5	99.6	Pass	N		99.6	YES	
70	Hoque	1A	1	10/26/2006	42+00	1' S from CL of road	-	115.5	14.1	110.5	12.0	-	Pass	N		95.7	YES	(2)
71	Hoque	1A	2	10/26/2006	36+00	At CL of road	-	115.5	14.1	112.5	12.4	-	Pass	N		97.4	YES	
72	Hoque	1A	3	10/26/2006	31+00	At CL of road	-	115.5	14.1	115.6	12.8	-	Pass	N		100.1	YES	(3)

Notes:

- (1) Location description provided in QCR/QAR.
(2) Moisture Content within +/- 2.5%.
(3) Relative Compaction above 94.5 %, rounded up.
(4) Test results not provided in QCR/QAR.

TABLE IV-1
Phase 1A Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control							Checked by GENTERRA			
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
73	Hoque	1A	4	10/26/2006	26+50	At CL of road	-	115.5	14.1	109.7	13.0	-	Pass	N		95.0	YES	
74	Hoque	1A	5	10/26/2006	21+00	At CL of road	-	115.5	14.1	113.7	12.1	-	Pass	N		98.4	YES	
75	Hoque	1A	6	10/26/2006	16+00	1' S from CL of road	-	115.5	14.1	111.9	13.1	-	Pass	N		96.9	YES	
76	Hoque	1A	7	10/26/2006	11+00	At CL of road	-	115.5	14.1	109.6	12.2	-	Pass	N		94.9	YES	(3)
77	Hoque	1A	8	10/26/2006	6+00	At CL of road	-	115.5	14.1	110.0	12.5	-	Pass	N		95.2	YES	
78	Hoque	1A	9	10/26/2006	2+00	6' S from S end of collector channel	-	110.3	14.4	104.8	12.3	95.0	Pass	N	Retested by Test No. 9A	95.0	YES	Retested by Sequential Test No. 79
79	Hoque	1A	9A	10/26/2006	2+00	6' S from end of collector channel	-	114.5	12.7	109.2	10.5	95.4	Pass	S	Retest of Test No. 9	95.4	YES	Retest of Sequential Test No. 78; (2)
80	Hoque	1A	1	10/31/2006	-	2' N from N wall at CL of RCB	3' B top slab	110.3	14.4	105.9	14.1	96.0	Pass	N		96.0	YES	
81	Hoque	1A	2	10/31/2006	-	3' S from S wall at CL of RCB	2' B top slab	110.3	14.4	105.7	14.6	95.8	Pass	N		95.8	YES	
82	Hoque	1A	3	10/31/2006	-	15' W from NEC at 2' N from N wall of RCB	1' B top slab	110.3	14.4	109.2	12.1	95.0	Pass	N		99.0	YES	(2)
83	Hoque	1A	4	10/31/2006	-	12' W from SEC at 1' S from S wall of RCB	-	110.3	14.4	106.1	12.2	96.2	Pass	N		96.2	YES	(2)

Notes:

- (1) Location description provided in QCR/QAR.
(2) Moisture Content within +/- 2.5%.
(3) Relative Compaction above 94.5 %, rounded up.
(4) Test results not provided in QCR/QAR.

TABLE IV-1
Phase 1A Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control								Checked by GENTERRA		
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
84	Hoque	1A	1	11/1/2006	209+75	At CL of levee 1' BFG	953	110.3	14.4	111.0	12.3	100.6	Pass	N		100.6	YES	(2)
85	Hoque	1A	2	11/1/2006	209+70	At CL of levee 0' BFG	954	110.3	14.4	104.5	12.8	94.8	Pass	S		94.7	YES	(3)
86	Hoque	1A	1	11/9/2006	-	1' from S end of road at CL of S end of dike	SG	110.3	14.4	-	12.0	95.7	Pass	N		-	YES	(2)
87	Hoque	1A	2	11/9/2006	-	5' N from CL of road at CL of S end of dike	3" base	136.9	6.7	-	-	-	Pass	N	Aggregate Base Course	-	-	(4)
88	Hoque	1A	1	11/13/2006	41+50	CL of road	FG	133.4	6.3	-	-	-	-	N	Aggregate Base Course	-	-	(4)
89	Hoque	1A	2	11/13/2006	36+00	CL of road	FG	133.4	6.3	-	-	-	-	N	Aggregate Base Course	-	-	(4)
90	Hoque	1A	3	11/13/2006	31+00	2'S of CL of road	FG	133.4	6.3	-	-	-	-	N	Aggregate Base Course	-	-	(4)
91	Hoque	1A	4	11/13/2006	26+00	2'S of CL of road	FG	133.4	6.3	-	-	-	-	N	Aggregate Base Course	-	-	(4)
92	Hoque	1A	5	11/13/2006	21+00	2'S of CL of road	FG	133.4	6.7	-	-	-	-	N	Aggregate Base Course	-	-	(4)
93	Hoque	1A	6	11/13/2006	16+00	CL of road	FG	133.4	6.7	-	-	-	-	N	Aggregate Base Course	-	-	(4)
94	Hoque	1A	7	11/13/2006	11+00	2'N of CL of road	FG	133.4	6.7	-	-	-	-	N	Aggregate Base Course	-	-	(4)
95	Hoque	1A	8	11/13/2006	6+00	2'S of CL of road	FG	133.4	6.7	-	-	-	-	N	Aggregate Base Course	-	-	(4)

Notes:

- (1) Location description provided in QCR/QAR.
(2) Moisture Content within +/- 2.5%.
(3) Relative Compaction above 94.5 %, rounded up.
(4) Test results not provided in QCR/QAR.

TABLE IV-1
Phase 1A Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control								Checked by GENTERRA		
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
96	Hoque	1A	9	11/13/2006	3+00	2' N of CL of road	FG	133.4	6.7	-	-	-	-	N	Aggregate Base Course	-	-	(4)
97	Hoque	1A	1	11/22/2006	-	20' E at 5' N from NOC of RCB wing wall	-	110.3	14.4	106.0	12.9	96.1	Pass	N		96.1	YES	
98	Hoque	1A	2	11/22/2006	-	25' E at 6' N from NOC of wing wall	-	110.3	14.4	108.0	13.0	97.9	Pass	N		97.9	YES	
99	Hoque	1A	1	11/27/2006	-	18' E at 5' S from SEC of RCB	-	110.3	14.4	105.3	12.6	95.5	Pass	S		95.5	YES	
100	Hoque	1A	1	11/27/2006	206+00	At CL of road	-	133.4	6.3	127.9	3.4	95.9	Pass	N	Aggregate Base Course	95.9	NO	Moisture not within specs.; No retest
101	Hoque	1A	2	11/27/2006	-	20' E at 6' S from SEC of RCB	-	110.3	14.4	107.1	12.2	97.1	Pass	N		97.1	YES	(2)
102	Hoque	1A	2	11/27/2006	201+00	At 4' S from CL of road	-	133.4	6.3	127.9	3.3	95.9	Pass	N	Aggregate Base Course	95.9	NO	Moisture not within specs.; No retest
103	Hoque	1A	3	11/27/2006	196+00	At CL of road	-	133.4	6.3	126.9	3.0	95.1	Pass	N	Aggregate Base Course	95.1	NO	Moisture not within specs.; No retest
104	Hoque	1A	4	11/27/2006	191+00	At 4' S from CL of road	-	133.4	6.3	126.7	3.0	95.0	Pass	N	Aggregate Base Course	95.0	NO	Moisture not within specs.; No retest
105	Hoque	1A	5	11/27/2006	186+00	At 3' S from CL of road	-	133.4	6.3	126.7	3.1	95.1	Pass	N	Aggregate Base Course	95.0	NO	Moisture not within specs.; No retest

Notes:

- (1) Location description provided in QCR/QAR.
(2) Moisture Content within +/- 2.5%.
(3) Relative Compaction above 94.5 %, rounded up.
(4) Test results not provided in QCR/QAR.

TABLE IV-1
Phase 1A Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control								Checked by GENTERRA		
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
106	Hoque	1A	6	11/27/2006	181+00	At CL of road	-	133.4	6.3	126.5	2.9	94.8	Pass	N	Aggregate Base Course	94.8	NO	Moisture not within specs.; No retest
107	Hoque	1A	7	11/27/2006	176+00	At 2' N from CL road	-	133.4	6.3	126.5	2.9	94.8	Pass	N	Aggregate Base Course	94.8	NO	Moisture not within specs.; No retest
108	Hoque	1A	8	11/27/2006	171+00	At 3' from CL of road	-	133.4	6.3	127.0	3.1	95.2	Pass	N	Aggregate Base Course	95.2	NO	Moisture not within specs.; No retest
109	Hoque	1A	9	11/27/2006	166+00	At 2' N from CL of road	-	133.4	6.3	126.7	2.7	95.0	Pass	N	Aggregate Base Course	95.0	NO	Moisture not within specs.; No retest
110	Hoque	1A	10	11/27/2006	161+00	At 3' N from CL of road	-	133.4	6.3	126.6	2.8	94.9	Pass	N	Aggregate Base Course	94.9	NO	Moisture not within specs.; No retest
111	Hoque	1A	1	11/28/2006	-	At CL of RCB 113th Ave. & at CL of levee	1' above top slab	110.3	14.4	109.7	11.8	99.5	Pass	N		99.5	NO	Moisture not within specs.; No retest
112	Hoque	1A	2	11/28/2006	-	6' E at 2' N from NEC of 113th Ave. RCB	0' at top of GL	110.3	14.4	106.9	11.9	96.9	Pass	N		96.9	YES	(2)

Notes:

- (1) Location description provided in QCR/QAR.
(2) Moisture Content within +/- 2.5%.
(3) Relative Compaction above 94.5 %, rounded up.
(4) Test results not provided in QCR/QAR.

TABLE IV-2
Phase 1B Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control								Checked by GENTERRA		
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
1	Hoque	1B	1	2/11/2008	135+00	15' S from N end of North levee	3' BFG	113.3	15.0	113.4	15.6	100.1	Pass	N		100.1	YES	
2	Hoque	1B	2	2/11/2008	144+95	15' S from N end of North levee	3' BFG	113.3	15.0	110.6	17.5	97.6	Pass	N		97.6	YES	(2)
3	Hoque	1B	3	2/11/2008	148+00	15' S from N end of North levee	3' BFG	113.3	15.0	109.6	14.6	96.7	Pass	N		96.7	YES	
4	Hoque	1B	1	2/12/2008	148+00	15' S from N end of North levee	3' BFG	113.3	15.0	111.8	14.7	98.7	Pass	N		98.7	YES	
5	Hoque	1B	2	2/12/2008	114+95	15' S from N end of North levee	3' BFG	113.3	15.0	115.1	12.9	101.6	Pass	N		101.6	YES	(2)
6	Hoque	1B	3	2/12/2008	135+00	15' S from N end of North levee	3' BFG	113.3	15.0	115.2	13.1	101.7	Pass	N		101.7	YES	
7	Hoque	1B	4	2/12/2008	127+10	15' S from N end of North levee	3' BFG	113.3	15.0	108.8	15.0	96.1	Pass	N		96.0	YES	
8	Hoque	1B	5	2/12/2008	117+20	10' S from N end of North levee	5' BFG	113.3	15.0	113.3	13.2	100.0	Pass	N		100.0	YES	
9	Hoque	1B	1	2/13/2008	133+43	2' N from CL of levee	942	113.3	15.0	110.7	16.3	97.7	Pass	N		97.7	YES	
10	Hoque	1B	2	2/13/2008	143+40	20' S from N end of levee	942	113.3	15.0	105.1	15.4	92.8	Fail	N		92.8	NO	Compaction not within specs.; No retest
11	Hoque	1B	3	2/13/2008	123+00	20' S from N end of levee	942	113.3	15.0	116.0	14.0	102.4	Pass	N		102.4	YES	

Notes:

- (1) Location description provided in QCR/QAR.
(2) Moisture Content within +/- 2.5%.
(3) Relative Compaction above 94.5 %, rounded up.
(4) Test results not provided in QCR/QAR.

TABLE IV-2
Phase 1B Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control							Checked by GENTERRA			
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
12	AMEC	1B	1	2/14/2008	143+40	At CL of levee	942	131.7	14.2	120.0	11.5	91.1	Fail	N	Retested by Test No. 1A from 2/20/08	91.1	NO	Retested by Sequential Test No. 13
13	AMEC	1B	1A	2/20/2008	143+40	At CL of levee	942	115.2	14.2	109.9	12.6	95.2	Pass	N	Retest of Test No. 1 from 2/14/08	95.4	YES	Retest of Sequential Test No. 12
14	AMEC	1B	2	2/20/2008	147+00	3'	944	115.2	14.2	109.8	13.1	95.1	Pass	N		95.3	YES	
15	Hoque	1B	1	2/26/2008	141+15	3' S from N end of levee	0' BFG	113.3	15.0	113.3	12.3	98.2	Pass	N		100.0	NO	Moisture not within specs.; No retest
16	Hoque	1B	2	2/26/2008	114+25	20' S from N end of levee	3' BFG	116.5	14.0	116.5	12.0	95.0	Pass	N		100.0	YES	
17	Hoque	1B	1	2/26/2008	1+30	10' W from E end of W 119th Ave Dike	10' BFG	113.3	15.0	113.0	13.2	99.8	Pass	N		99.7	YES	
18	Hoque	1B	1	2/28/2008	0+50	25' W from E end of W 121st Ave Dike	SG	113.3	15.0	109.9	13.7	96.9	Pass	N		97.0	YES	
19	Hoque	1B	2	2/28/2008	1+00	At CL of W 121st Ave Dike	10' BFG	113.3	15.0	110.8	14.0	97.8	Pass	N		97.8	YES	
20	Hoque	1B	3	2/28/2008	0+95	At CL of W 119th Ave Dike	8' BFG	113.3	15.0	109.0	13.0	98.2	Pass	N		96.2	YES	
21	AMEC	1B	1	3/6/2008	6+50	At CL of N levee	925	104.3	16.8	96.7	12.1	92.8	Fail	N	Retested by Test No. 1A from 3/10/08	92.7	NO	Retested by Sequential Test No. 22

Notes:

- (1) Location description provided in QCR/QAR.
- (2) Moisture Content within +/- 2.5%.
- (3) Relative Compaction above 94.5 %, rounded up.
- (4) Test results not provided in QCR/QAR.

TABLE IV-2
Phase 1B Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control								Checked by GENTERRA		
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
22	AMEC	1B	1A	3/10/2008	6+50	At CL of N levee	925	104.3	16.8	104.0	16.5	99.7	Pass	N	Retest of Test No. 1 from 3/6/08	99.7	YES	Retest of Sequential Test No. 21
23	Hoque	1B	1	4/2/2008	1+80	119th Ave Guide Dike	0' BFG	108.4	13.5	107.8	--	99.4	Pass	N		99.4	--	(4)
24	Hoque	1B	2	4/2/2008	6+50	40' N of S edge	0' BFG	117.5	13.7	113.5	11.5	96.7	Pass	N		96.6	YES	(2)
25	Hoque	1B	3	4/2/2008	1+25	25' in from E edge of W 121st Ave Guide Dike	6' BFG	100.1	16.3	100.3	15.7	100.0	Pass	N		100.2	YES	
26	Hoque	1B	1	4/8/2008	4+80	40' N of S toe of levee	8' BFG	108.7	15.2	105.7	13.3	97.0	Pass	N		97.2	YES	
27	Hoque	1B	2	4/8/2008	2+50	W 121st Ave Guide Dike centerline	5' BFG	100.7	17.0	99.5	18.3	99.0	Pass	N		98.8	YES	
28	Hoque	1B	1	4/15/2008	4+50	At CL of levee	5' BFG	116.5	14.0	112.1	9.5	96.2	Fail	N	Failed in M/C only; Density pass; Retested by Test No. 1A	96.2	NO	Retested by Sequential Test No. 30
29	Hoque	1B	2	4/15/2008	3+01	15' S from CL of O&M road	3' BFG	106.3	15.5	104.4	10.9	98.2	Fail	--	Retested by Test No. 2A	98.2	NO	Retested by Sequential Test No. 31
30	Hoque	1B	1A	4/16/2008	4+50	At CL of levee	5' BFG	106.3	15.5	102.8	16.5	96.7	Pass	N	Retest of Test No. 1	96.7	YES	Retest of Sequential Test No. 28
31	Hoque	1B	2A	4/16/2008	3+01	15' S from CL of O&M road	3' BFG	106.3	15.5	104.1	17.6	97.9	Pass	N	Retest of Test No. 2	97.9	YES	Retest of Sequential Test No. 29; (2)

Notes:

- (1) Location description provided in QCR/QAR.
(2) Moisture Content within +/- 2.5%.
(3) Relative Compaction above 94.5 %, rounded up.
(4) Test results not provided in QCR/QAR.

TABLE IV-2
Phase 1B Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control							Checked by GENTERRA			
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
32	Hoque	1B	3	4/16/2008	7+50	10' N from CL of new levee	3' BFG	106.3	15.5	104.3	15.2	98.1	Pass	N		98.1	YES	
33	Hoque	1B	4	4/16/2008	5+50	At CL of O&M road next to new levee	0' BFG	106.3	15.5	105.5	16.3	99.3	Pass	N		99.2	YES	
34	Hoque	1B	1	4/18/2008	4+25	5' N of CL of new levee	2' BFG	118.7	15.2	106.0	16.366	98.0	Pass	N		89.3	NO	Compaction not within specs.; No retest
35	Hoque	1B	1	4/21/2008	4+80	New levee	1' BFG	108.4	17.0	102.5	15.5	95.0	Pass	N		94.6	YES	
36	Hoque	1B	2	4/21/2008	4+80	New levee	1' BFG	108.4	17.0	103.5	16.0	95.0	Pass	S		95.5	YES	
37	Hoque	1B	1	6/12/2008	1+75	New levee	SG	136.3	6.5	117.5	6.45	86.0	Fail	N	Retested by Test No. 1 from 6/16/08	86.2	NO	Retested by Sequential Test No. 38
38	Hoque	1B	1	6/16/2008	1+75	New levee	SG	127.2	12.2	122.3	11.41	96.0	Pass	N	Retest of Test No. 1 from 6/12/08	96.1	YES	Retest of Sequential Test No. 37
39	Hoque	1B	2	6/16/2008	2+00	New levee	1' above SG	100.5	17.0	106.7	18.65	100.0	Pass	N		106.2	YES	
40	Hoque	1B	1	6/18/2008	1+75	New levee	3' above SG	100.5	17.0	108.4	16.25	100.0	Pass	N		107.9	YES	
41	Hoque	1B	1	6/25/2008	1+49	Upper Levee O&M Road 3'N of CL	0' BFG	133.8	5.6	137.3	5.19	103.0	--	--	Aggregate Base Course	102.6	YES	
42	Hoque	1B	2	6/25/2008	1+46	Upper Levee O&M Road 3'N of CL	0' BFG	133.8	5.6	135.7	5.8	101.0	--	--	Aggregate Base Course	101.4	YES	

Notes:

- (1) Location description provided in QCR/QAR.
- (2) Moisture Content within +/- 2.5%.
- (3) Relative Compaction above 94.5 %, rounded up.
- (4) Test results not provided in QCR/QAR.

TABLE IV-2
Phase 1B Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control								Checked by GENTERRA		
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
43	Hoque	1B	3	6/25/2008	1+43	Upper Levee O&M Road CL	0' BFG	133.8	5.6	138.2	5.61	103.0	--	--	Aggregate Base Course	103.3	YES	
44	Hoque	1B	4	6/25/2008	1+40	Upper Levee O&M Road CL	0' BFG	133.8	5.6	140.8	6.96	105.0	--	--	Aggregate Base Course	105.2	YES	
45	Hoque	1B	5	6/25/2008	1+37	Upper Levee O&M Road CL	0' BFG	133.8	5.6	134.5	5.71	100.0	Pass	N	Aggregate Base Course	100.5	YES	
46	Hoque	1B	6	6/25/2008	2+00	New levee CL	8' BFG	100.5	17.0	109.4	15.13	100.0	Pass	N		108.9	YES	
47	Hoque	1B	1	7/1/2008	47+00	CL of Lower O&M road	0' BFG	133.8	5.6	141.9	4.23	105.0	Pass	N	Aggregate Base Course	106.1	YES	
48	Hoque	1B	2	7/1/2008	41+00	CL of Lower O&M road	0' BFG	133.8	5.6	134.6	3.3	100.0	Pass	N	Aggregate Base Course	100.6	YES	(2)
49	Hoque	1B	3	7/1/2008	2+00	CL of new levee	7' BFG	100.5	17.0	102.1	15.06	100.0	Pass	N		101.6	YES	
50	Hoque	1B	1	7/3/2008	44+00	Lower O&M road CL	0' BFG	133.8	5.6	133.8	4.13	100.0	Pass	N	Aggregate Base Course	100.0	YES	
51	Hoque	1B	2	7/3/2008	36+00	Lower O&M road CL	0' BFG	133.8	5.6	139.8	3.72	104.0	Pass	N	Aggregate Base Course	104.5	YES	
52	Hoque	1B	3	7/3/2008	35+00	Lower O&M road CL	0' BFG	133.8	5.6	142.7	4.32	107.0	Pass	N	Aggregate Base Course	106.7	YES	
53	Hoque	1B	4	7/3/2008	32+00	Lower O&M road CL	0' BFG	133.8	5.6	140.1	4.28	106.0	Pass	N	Aggregate Base Course	104.7	YES	

Notes:

- (1) Location description provided in QCR/QAR.
(2) Moisture Content within +/- 2.5%.
(3) Relative Compaction above 94.5 %, rounded up.
(4) Test results not provided in QCR/QAR.

TABLE IV-2
Phase 1B Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control								Checked by GENTERRA		
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
54	Hoque	1B	1	7/7/2008	1+00	At CL of new levee	7' BFG	100.5	17.0	114.72	16.0	100.0	Pass	S		114.1	YES	
55	Hoque	1B	2	7/7/2008	1+50	At CL of new levee	12' BFG	100.5	17.0	114.13	18.0	100.0	Pass	S		113.6	YES	
56	Hoque	1B	1	7/9/2008	2+00	At CL of new levee	10' BFG	107.8	16.0	106.2	14.73	99.0	Pass	N		98.5	YES	
57	Hoque	1B	2	7/9/2008	3+00	At CL of new levee	12' BFG	107.8	16.0	109.0	18.0	100.0	Pass	N		101.1	YES	
58	Hoque	1B	1	7/10/2008	28+00	CL of Upper O&M road	0' BFG	133.8	5.6	133.8	5.6	100.0	Pass	N	Aggregate Base Course	100.0	YES	
59	Hoque	1B	2	7/10/2008	25+00	CL of Upper O&M road	0' BFG	133.8	5.6	135.2	6.7	100.0	Pass	N	Aggregate Base Course	101.0	YES	
60	Hoque	1B	3	7/10/2008	22+00	CL of Upper O&M road	0' BFG	133.8	5.6	135.8	7.2	100.0	Pass	N	Aggregate Base Course	101.5	YES	
61	Hoque	1B	4	7/10/2008	19+00	CL of Upper O&M road	0' BFG	133.8	5.6	133.9	5.4	100.0	Pass	N	Aggregate Base Course	100.1	YES	
62	Hoque	1B	5	7/10/2008	16+00	CL of Upper O&M road	0' BFG	133.8	5.6	137.9	5.74	100.0	Pass	N	Aggregate Base Course	103.1	YES	
63	Hoque	1B	6	7/10/2008	13+00	CL of Upper O&M road	0' BFG	133.8	5.6	133.2	4.7	100.0	Pass	N	Aggregate Base Course	99.6	YES	
64	Hoque	1B	1	7/10/2008	3+00	At CL of new levee	11' BFG	107.8	16.0	106.8	17.24	99.0	Pass	N		99.1	YES	

Notes:

- (1) Location description provided in QCR/QAR.
- (2) Moisture Content within +/- 2.5%.
- (3) Relative Compaction above 94.5 %, rounded up.
- (4) Test results not provided in QCR/QAR.

TABLE IV-2
Phase 1B Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control							Checked by GENTERRA			
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
65	Hoque	1B	1	7/24/2008	112+00	Lower O&M road	0' BFG	133.8	5.6	132.1	5.2	99.0	Fail	N	Aggregate Base Course; Retested by Test No. 2	98.7	YES	Retested by Sequential Test No. 66
66	Hoque	1B	2	7/24/2008	112+00	Lower O&M road	0' BFG	133.8	5.6	134.2	7.2	100.0	Pass	N	Retest of Test No. 1	100.3	YES	Retest of Sequential Test No. 65
67	Hoque	1B	3	7/24/2008	114+50	Lower O&M road	0' BFG	133.8	5.6	134.0	4.9	100.0	Pass	N	Aggregate Base Course	100.1	YES	
68	Hoque	1B	4	7/24/2008	117+00	Lower O&M road	0' BFG	133.8	5.6	134.7	6.0	101.0	Pass	N	Aggregate Base Course	100.7	YES	
69	Hoque	1B	5	7/24/2008	119+50	Lower O&M road	0' BFG	133.8	5.6	139.6	6.0	--	Pass	N	Aggregate Base Course	104.3	YES	
70	Hoque	1B	6	7/24/2008	122+00	Lower O&M road	0' BFG	133.8	5.6	136.7	5.0	--	Pass	N	Aggregate Base Course	102.2	YES	
71	Hoque	1B	7	7/24/2008	124+50	Lower O&M road	0' BFG	133.8	5.9	136.5	5.5	--	Pass	N	Aggregate Base Course	102.0	YES	
72	Hoque	1B	8	7/24/2008	127+00	Lower O&M road	0' BFG	133.8	5.9	134.1	4.1	--	Pass	N	Aggregate Base Course	100.2	YES	
73	Hoque	1B	1	7/29/2008	3+25	10' S from CL of Levee	2' BFG	107.8	16.0	108.9	16.1	101.0	Pass	N		101.0	YES	
74	Hoque	1B	2	7/29/2008	1+75	At CL of levee	2' BFG	113.3	15.0	113.4	14.9	100.1	Pass	N		100.1	YES	
75	Hoque	1B	1	8/14/2008	130+00	5' S from CL of road	Top of Compacted Base	133.8	5.6	137.9	3.4	103.1	Pass	N	Aggregate Base Course	103.1	YES	(2)

Notes:

- (1) Location description provided in QCR/QAR.
- (2) Moisture Content within +/- 2.5%.
- (3) Relative Compaction above 94.5 %, rounded up.
- (4) Test results not provided in QCR/QAR.

TABLE IV-2
Phase 1B Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control								Checked by GENTERRA		
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
76	Hoque	1B	2	8/14/2008	5+00	2' N from CL of road	Top of Compacted Base	133.8	5.6	135.6	5.5	101.4	Pass	N	Aggregate Base Course	101.3	YES	
77	Hoque	1B	3	8/14/2008	0+00	From starting point of channel & from 2' S from CL of road	Top of Compacted Base	133.8	5.6	138.8	3.7	103.7	Pass	N	Aggregate Base Course	103.7	YES	
78	Hoque	1B	4	8/14/2008	4+00	At CL of new levee	Top of Compacted Base	133.8	5.6	135.1	4.6	101.0	Pass	N	Aggregate Base Course	101.0	YES	
79	Hoque	1B	5	8/14/2008	7+00	At CL of new levee	Top of Compacted Base	133.8	5.6	138.9	4.9	103.8	Pass	N	Aggregate Base Course	103.8	YES	
80	Hoque	1B	6	8/14/2008	9+00	2' N from CL of new levee	Top of Compacted Base	133.8	5.6	139.6	4.1	104.3	Pass	N	Aggregate Base Course	104.3	YES	
81	Hoque	1B	1	8/14/2008	--	Middle & CL of ramp Detention Basin	6" BFG	117.3	13.7	118.7	6.8	101.2	Pass	N	Failed in moisture	101.2	NO	Moisture not within specs.; No retest
82	Hoque	1B	1	8/26/2008		Center of Turnaround Pad North of levee on West side of 115th Ave	100	109.8	13.6	111.6	14.19	101.8	Pass	N		101.6	YES	
83	Hoque	1B	1	9/4/2008	3+00	4' N of CL Upper Road	FG	133.8	5.6	133.4	4.2	100.0	Pass	N	Aggregate Base Course	99.7	YES	
84	Hoque	1B	2	9/4/2008	1+00	2' S of CL Upper Road	FG	133.8	5.6	133.2	3.8	100.0	Pass	N	Aggregate Base Course	99.6	YES	
85	Hoque	1B	3	9/4/2008	0+75	1' S of CL Upper Road	FG	133.8	5.6	133.9	4.4	100.0	Pass	N	Aggregate Base Course	100.1	YES	
86	Hoque	1B	4	9/4/2008	3+25	1' N of CL Upper Road	FG	133.8	5.6	133.5	4.1	100.0	Pass	N	Aggregate Base Course	99.8	YES	

Notes:

- (1) Location description provided in QCR/QAR.
(2) Moisture Content within +/- 2.5%.
(3) Relative Compaction above 94.5 %, rounded up.
(4) Test results not provided in QCR/QAR.

TABLE IV-2
Phase 1B Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control							Checked by GENTERRA			
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
87	Hoque	1B	1	9/28/2008	--	2' E & 2' S from W end & CL of Dyson Road	5' BFG	137.9	5.6	138.0	4.0	100.1	Pass	N	Aggregate Base Course	100.1	YES	
88	Hoque	1B	2	9/28/2008	--	Same line of E end & at CL of Dyson Road	5' BFG	133.8	5.6	139.5	4.0	101.2	Pass	N	Aggregate Base Course	104.3	YES	
89	Hoque	1B	1	10/8/2008	--	40' N from N end of RCC Pipe Culvert at CL of O&M road	0' BFG	--	--	--	3.8	99.5	Pass	N	Aggregate Base Course	--	--	(4)
90	Hoque	1B	2	10/8/2008	--	8' W from W end of 115th Ave at 10' N from CL of pad (O&M road)	4" BFG	133.8	5.8	136.2	3.5	101.8	Pass	N	Aggregate Base Course	101.8	YES	(2)
91	Hoque	1B	1	10/9/2008	--	40' E from E end of El Mirage Rd at CL of 24"RCC Pipe Box Culvert (channel)	2.5' BFG	117.3	13.7	114	15.7	97.1	Pass	N		97.2	YES	
92	Hoque	1B	1	10/9/2008	--	Along the CL of El Mirage Road & middle of pipe culvert	0' BFG	143.7	--	--	--	95.0	Pass	N	Asphalt	--	--	(4)
93	Hoque	1B	2	10/9/2008	--	10' W from W end of 115th Ave at CL of pad	0' BFG	143.7	--	--	--	96.3	Pass	N	Asphalt	--	--	(4)
94	Hoque	1B	1	10/23/2008	--	30' W 10' N from NWL of Pipe Culvert of El Mirage Rd	0' BFG	140.6	5.6	141.0	5.1	100.3	Pass	N	Aggregate Base Course	100.3	YES	
95	Hoque	1B	2	10/23/2008	--	30' W 10' S from SWL of Pipe Culvert of El Mirage Rd	0' BFG	140.6	3.5	142.1	5.5	101.1	Pass	N	Aggregate Base Course	101.1	YES	
96	Hoque	1B	3	10/23/2008	--	10' S 25' E from SEC of Pipe Culvert of El Mirage Rd	0' BFG	140.6	3.5	141.3	5.4	100.4	Pass	N	Aggregate Base Course	100.5	YES	
97	Hoque	1B	4	10/23/2008	--	25' S 10' W from SWC of RCB Culvert	0' BFG	140.6	3.5	141.6	5.0	100.7	Pass	N	Aggregate Base Course	100.7	YES	

Notes:

- (1) Location description provided in QCR/QAR.
(2) Moisture Content within +/- 2.5%.
(3) Relative Compaction above 94.5 %, rounded up.
(4) Test results not provided in QCR/QAR.

TABLE IV-2
Phase 1B Compaction Tests

Assigned Sequential Test No.	Tested By	Phase	Test No.	Date	Station	Location ⁽¹⁾	Elevation (ft)	Quality Assurance Control								Checked by GENTERRA		
								Proctor Density (lb/ft ³)	Optimum Moisture Content (%)	Dry Density (lb/ft ³)	Moisture Content (%)	Relative Compaction (%)	Relative Compaction (Pass/Fail)	Test Type (N=Nuclear, S=Sand Cone)	Comments	Recalc. Relative Compaction (%)	Meets Specs. (YES/NO)	Comments
98	Hoque	1B	5	10/23/2008	--	15' S from N end of turnaround of El Mirage Rd	0' BFG	140.6	3.5	140.7	5.1	100.1	Pass	N	Aggregate Base Course	100.1	YES	
99	Hoque	1B	1	Not Recorded	2+75	New levee	7' BFG	100.1	16.3	99.4	16.6	99.0	Pass	N		99.3	YES	
100	Hoque	1B	2	Not Recorded	1+25	New levee	6' BFG	100.1	16.3	97.0	18.1	97.0	Pass	N		96.9	YES	
101	Hoque	1B	1	Not Recorded	3+00	CL of new levee	0' BFG	113.3	15.0	112.8	13.4	99.5	Pass	N		99.6	YES	
102	Hoque	1B	1A	Not Recorded	3+00	CL of new levee	0' BFG	113.3	15.0	112.4	14.2	99.2	Pass	S		99.2	YES	
103	Hoque	1B	2	Not Recorded	2+00	CL of O&M road	0' BFG	113.3	15.0	115.1	13.7	101.6	Pass	--		101.6	YES	

Notes:

- (1) Location description provided in QCR/QAR.
(2) Moisture Content within +/- 2.5%.
(3) Relative Compaction above 94.5 %, rounded up.
(4) Test results not provided in QCR/QAR.

**TABLE IV-3
Summary of Materials Tested**

Tested By	Phase	Sample Date	Location	Max Dry (Proctor) Density (lb/ft ³)	Optimum Moisture Content (%)	Rock Corrected Max Dry (Proctor) Density (lb/ft ³)	Rock Corrected Optimum Moisture Content (%)	Method	Proctor Type	Material	% Passing 1.5" Sieve (=100%) (%)	% Passing No. 4 Sieve (38-65%) (%)	% Passing No. 8 Sieve (25-60%) (%)	% Passing No. 30 Sieve (10-40%) (%)	% Passing No. 200 Sieve (3-12%) (%)	Plasticity Index
Hoque	1A	4/6/2006	95th Ave Dike Borrow Pit	106.6	17.4	--	--	A	D-698	Native (Sandy Silt)	100	100	100	99	63.7	NP
Hoque	1A	7/10/2006	115th Ave Box Culvert	133.4	7.4	--	--	C	D-1557 Modified	ABC	100	54	43	23	5.5	NP
Hoque	1A	8/8/2006	Stockpile west of 107th Ave (Rinker)	136.9	6.7	--	--	C	D-1557 Modified	ABC	100	43	39	22	3.4	NP
Hoque	1A	10/10/2006	West of 107th Ave	133.4	6.3	--	--	C	D-1557 Modified	ABC, well graded sand with silt (SW-SM)	100	48	44	28	5.1	NP
Hoque	1B	1/30/2008	STA 135+00, Collector Channel	113.3	15.0	113.3	15.0	A	D-698	Silty Sand (SM)	-- ⁽³⁾	97	97	93	47.6	NP
Hoque	1B	1/30/2008	STA 120+75, Collector Channel	108.4	13.5	108.4	13.5	A	D-698	Silty Sand (ML)	-- ⁽³⁾	98	97	96	65.4	NP
Hoque	1B	1/30/2008	E of El Mirage, STA 107+00, Detention Basin	107.8	16.0	107.8	16.0	A	D-698	Silt with sand (ML)	-- ⁽³⁾	100	100	100	75.3	NP
Hoque	1B	1/30/2008	STA 1+50, Diversion Channel	106.3	15.5	106.3	15.5	A	D-698	Silty Sand (SM)	-- ⁽³⁾	100	100	98	39.6	NP
AMEC	1B	2/14/2008	STA 143+40, Center of N Levee	115.2	14.2	--	--	A	D-698	(SM)	84	80	79	77	42.0	1
Hoque	1B	2/19/2008	STA 109+00, Existing Levee	120.7	11.4	131.1	7.6	A	D-698	Silty Sand with gravel (SM)	-- ⁽³⁾	63	61	49	16.5	NP
Hoque	1B	2/26/2008	STA 33+20, Collector Channel	117.3	13.7	117.3	13.7	A	Modified	Silty Sand (SM)	-- ⁽³⁾	100	100	100	45.2	NP
Hoque	1B	2/26/2008	STA 24+50, Collector Channel	110.0	17.0	110.0	17.0	A	Modified	Native Soil (unclassified)	--	--	--	--	--	--
Hoque	1B	2/29/2008	Diversion Channel, STA 2+00, Pit #1	108.7	15.2	108.7	15.2	A	D-1557	Silty Sand (SM)	-- ⁽³⁾	100	100	99	41.9	NP
Hoque	1B	2/29/2008	Diversion Channel, STA 3+00, Pit #2, 4' Below Grade	106.3	15.7	106.3	15.7	A	D-1557	Silty Sand (SM)	-- ⁽³⁾	100	100	100	42.1	NP
Hoque	1B	2/29/2008	STA 4+50, Diversion Channel, Pit #3, 8' Below Grade	132.8	5.7	132.8	5.7	A	D-1557	Native Soil (unclassified)	--	--	--	--	--	--
Hoque	1B	3/25/2008	100' W of SWC of 121st Ave. Dike	100.5	17.0	100.5	17.0	A	D-698	Silty Sand (SM)	-- ⁽³⁾	100	100	100	36.4	NP
Hoque	1B	3/25/2008	50' S of S End @ CL of 121st Ave. Dike	100.1	16.3	100.1	16.3	A	D-698	Silty Sand (SM)	-- ⁽³⁾	100	100	100	24.4	NP

Notes:

- 1) "--" indicates no information was provided.
- 2) "NP" indicates no plasticity.
- 3) "--⁽³⁾" indicates test was not performed.

**TABLE IV-4
Aggregate Riprap Gradation Tests**

Location = SWC of Box Culvert				
Test Date = 9/28/2008				
Type of Stone = 15" Stone Granite Riprap				
Test Type = Field				
Diameter Range (in)	Number Passing	Retained (%)	Cumulative (%)	Specifications
11-15	6		60	100
9-10	3		30	50
6-8	1		10	15
Rocks = 10				
Max Stone Size = 15"				
Meets Specifications = Yes				

TABLE IV-4 Aggregate Riprap Gradation Tests

Quarry Name = Kilauen Crusher South Estrella Plant					
Test Date = 4/27/2006					
Type of Stone = 15" Stone Granite Riprap					
Testing Rate = 2 Nos. (B)					
Stone Size (in)	Weight Retained (lbs)	Individual Retained (%)	Cumulative Pass (%)	Specifications	
				Stone Diameter (in)	Passing by Weight (%)
11	0	0	100	11-15	100
10	160	38	62	11-10	50
9	140	33	29		
8	65	15	14	6-8	15
7	25	6	8		
6	30	7	1		
Total Weight = 420					
Max Stone Size = 15"					
Meets Specifications = Yes					

Aggregate Riprap Gradation Tests

Quarry Name = Kilauen Crusher South Estrella Plant					
Test Date = 4/27/2006					
Type of Stone = 27" Stone Granite Riprap					
Testing Rate = 2 Nos. (B)					
Stone Size (in)	Weight Retained (lbs)	Individual Retained (%)	Cumulative Pass (%)	Specifications	
				Stone Diameter (in)	Passing by Weight (%)
20	0	0	100	20-27	100
18	200	15	85	16-18	50
17	560	42	43		
16	270	20	23		
15	80	6	17	11-15	15
14	95	7	10		
12	65	4	6		
11	60	5	1		
Total Weight = 1330					
Max Stone Size = 27"					
Meets Specifications = Yes					

TABLE IV-4 Aggregate Riprap Gradation Tests

Quarry Name = Kilauen Crusher South Estrella Plant					
Test Date = 4/27/2006					
Type of Stone = 33" Stone Granite Riprap					
Testing Rate = 2 Nos. (B)					
Stone Size (in)	Weight Retained (lbs)	Individual Retained (%)	Cumulative Pass (%)	Specifications	
				Stone Weight (in)	Passing by Weight (%)
33	0	0	100	1688-675	100
26	1100	36	64		
24	680	22	42		
23	640	21	21	500-378	50
22	660	21	0	250-105	15
Total Weight = 3080					
Max Stone Size = 33"					
Meets Specifications = Yes					

TABLE IV-5
Concrete Strength Tests

Tested By	Sample Date	Supplier	Source of Sample	Age (Days)	Batch Size (ft ³)	Compressive Strength (psi)	Design Strength (psi)	Average Compressive Strength (psi)	Mix Identification	Cross Section Area (in ²)	Exceeds Design Strength (YES/NO)	Comments
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	7	11	3720	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	29	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	29	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	7	11	3840	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	7	11	3750	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	28	11	5280	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	28	11	5411	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	7	11	3870	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	28	11	5454	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	28	11	5560	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	7	11	3210	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	28	11	4500	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	28	11	4150	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	7	11	3400	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	28	11	4890	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	28	11	4910	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	7	11	3700	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	28	11	4310	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	28	11	4150	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	7	11	4000	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	28	11	5060	3000		1332583 MAG A #57 AIR ASH	12.56	YES	

TABLE IV-5 Concrete Strength Tests

Tested By	Sample Date	Supplier	Source of Sample	Age (Days)	Batch Size (ft ³)	Compressive Strength (psi)	Design Strength (psi)	Average Compressive Strength (psi)	Mix Identification	Cross Section Area (in ²)	Exceeds Design Strength (YES/NO)	Comments
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	28	11	4970	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	7	11	2800	3000	4073.3	1332583 MAG A #57 AIR ASH	12.56	NO	Test passes average acceptance test compressive strength exceeds design strength.
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	28	11	4760	3000	4073.3	1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	28	11	4660	3000	4073.3	1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	7	11	3610	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	28	11	5170	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	28	11	4710	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	7	11	3610	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	28	11	5170	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	28	11	4710	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	7	11	3980	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	28	11	4940	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	28	11	5000	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	7	11	3180	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	28	11	4150	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	28	11	4110	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	7	11	3330	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	28	11	4690	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	28	11	4670	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	7	11	3790	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	7	11	4160	3000		1332583 MAG A #57 AIR ASH	12.56	YES	

TABLE IV-5 Concrete Strength Tests

Tested By	Sample Date	Supplier	Source of Sample	Age (Days)	Batch Size (ft ³)	Compressive Strength (psi)	Design Strength (psi)	Average Compressive Strength (psi)	Mix Identification	Cross Section Area (in ²)	Exceeds Design Strength (YES/NO)	Comments
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	7	11	4160	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	7	11	4160	4000		1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	28	11	--	4000		1333126 MAG AA #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	28	11	--	4000		1333126 MAG AA #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	7	11	3770	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	7	11	4010	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	7	11	3990	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	7	11	4370	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	28	11	5320	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	28	11	5270	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	7	11	3530	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	28	11	4450	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	28	11	4210	3000		1332583 MAG A #57 AIR ASH	12.56	YES	

TABLE IV-5
Concrete Strength Tests

Tested By	Sample Date	Supplier	Source of Sample	Age (Days)	Batch Size (ft ³)	Compressive Strength (psi)	Design Strength (psi)	Average Compressive Strength (psi)	Mix Identification	Cross Section Area (in ²)	Exceeds Design Strength (YES/NO)	Comments
Hoque	8/18/2006	Rinker Plant	RCB Structure	7	11	3540	4000	4450.0	1333126 MAG AA #57 AIR ASH	12.56	NO	Test passes average acceptance test compressive strength exceeds design strength.
Hoque	8/18/2006	Rinker Plant	RCB Structure	28	11	5030	4000	4450.0	1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	8/18/2006	Rinker Plant	RCB Structure	28	11	4780	4000	4450.0	1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	7	11	4490	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	5080	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	5300	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	7	11	4490	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	5080	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	5300	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	7	11	3630	4000	4473.3	1333126 MAG AA #57 AIR ASH	12.56	NO	Test passes average acceptance test compressive strength exceeds design strength.
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	16	11	4320	4000	4473.3	1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	28	11	5470	4000	4473.3	1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	7	11	3200	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	28	11	4910	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	28	11	5470	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	7	11	3150	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	28	11	4960	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	28	11	4690	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	7	11	3340	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	28	11	4140	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	28	11	4260	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	7	11	3450	4000	4323.3	1333126 MAG AA #57 AIR ASH	12.56	NO	Test passes average acceptance test compressive strength exceeds design strength.
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	28	11	4800	4000	4323.3	1333126 MAG AA #57 AIR ASH	12.56	YES	

TABLE IV-5
Concrete Strength Tests

Tested By	Sample Date	Supplier	Source of Sample	Age (Days)	Batch Size (ft ³)	Compressive Strength (psi)	Design Strength (psi)	Average Compressive Strength (psi)	Mix Identification	Cross Section Area (in ²)	Exceeds Design Strength (YES/NO)	Comments
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	28	11	4720	4000	4323.3	1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	7	11	3540	4000	4450.0	1333126 MAG AA #57 AIR ASH	12.56	NO	Test passes average acceptance test compressive strength exceeds design strength.
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	28	11	5030	4000	4450.0	1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	28	11	4780	4000	4450.0	1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	7	11	3530	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	28	11	4450	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	28	11	4210	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	7	11	3710	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	28	11	4320	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	28	11	4180	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	7	11	3720	4000	4840.0	1333126 MAG AA #57 AIR ASH	12.56	NO	Test passes average acceptance test compressive strength exceeds design strength.
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	28	11	5280	4000	4840.0	1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	28	11	5520	4000	4840.0	1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	7	11	4460	4000		1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	28	11	5020	4000		1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	28	11	5250	4000		1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	7	11	3630	4000	4593.3	1333126 MAG AA #57 AIR ASH	12.56	NO	Test passes average acceptance test compressive strength exceeds design strength.
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	28	11	5060	4000	4593.3	1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	28	11	5090	4000	4593.3	1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	7	11	1080	2500		1332856 #8, 7.5SK GROUT AIR ASH STD	10.56	NO	Informational test more than 500 psi below design strength. Test failed. No additional testing was recorded.
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	28	11	--	2500		1332856 #8, 7.5SK GROUT AIR ASH STD	10.56		Compressive strength data was not recorded.
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	28	11	--	2500		1332856 #8, 7.5SK GROUT AIR ASH STD	10.56		Compressive strength data was not recorded.
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	H	11	3580	2500		1332856 #8, 7.5SK GROUT AIR ASH STD	10.56	YES	

TABLE IV-5
Concrete Strength Tests

Tested By	Sample Date	Supplier	Source of Sample	Age (Days)	Batch Size (ft ³)	Compressive Strength (psi)	Design Strength (psi)	Average Compressive Strength (psi)	Mix Identification	Cross Section Area (in ²)	Exceeds Design Strength (YES/NO)	Comments
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	7	11	4680	4000		1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	28	11	--	4000		1333126 MAG AA #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	28	11	--	4000		1333126 MAG AA #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	7	10	3010	4000		1333126 MAG AA #57 AIR ASH	12.56	NO	Informational test more than 500 psi below design strength. Test failed. No additional testing was recorded.
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	28	10	--	4000		1333126 MAG AA #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	28	10	--	4000		1333126 MAG AA #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	7	11	3550	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	7	11	4550	3000		1332583 MAG A #57 AIR ASH	12.56	YES	
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	28	11	--	3000		1332583 MAG A #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	7	11	4340	4000		1333126 MAG AA #57 AIR ASH	12.56	YES	
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	28	11	--	4000		1333126 MAG AA #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	28	11	--	4000		1333126 MAG AA #57 AIR ASH	12.56		Compressive strength data was not recorded.
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	7	11	3330	4000		Not identified	12.56	NO	Informational test more than 500 psi below design strength. Test failed. No additional testing was recorded.
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	28	11	--	4000		Not identified	12.56		Compressive strength data was not recorded.
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	28	11	--	4000		Not identified	12.56		Compressive strength data was not recorded.
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	7	11	4440	4000		Not identified	12.56	YES	
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	28	11	--	4000		Not identified	12.56		Compressive strength data was not recorded.
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	28	11	--	4000		Not identified	12.56		Compressive strength data was not recorded.

Table IV-6
Air Content Tests

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (ft ³)	Air Content (%)	Mix Identification	Air Content meets specification (YES/NO)	Comments
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	7	11	4.1	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	29	11	4.1	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	29	11	4.1	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	7	11	3.6	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	28	11	3.6	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	28	11	3.6	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	7	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	28	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	28	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	7	11	5.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	28	11	5.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	28	11	5.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	7	11	4.6	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	28	11	4.6	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	28	11	4.6	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	7	11	5.2	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	28	11	5.2	1332583 MAG A #57 AIR ASH	YES	
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	28	11	5.2	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	7	11	4.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	28	11	4.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	28	11	4.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	7	11	4.6	1332583 MAG A #57 AIR ASH	YES	

**Table IV-6
Air Content Tests**

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (ft ³)	Air Content (%)	Mix Identification	Air Content meets specification (YES/NO)	Comments
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	28	11	4.6	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	28	11	4.6	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	7	11	4.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	28	11	4.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	28	11	4.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	7	11	4.8	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	28	11	4.8	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	28	11	4.8	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	7	11	4.8	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	28	11	4.8	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	28	11	4.8	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	7	11	4.8	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	28	11	4.8	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	28	11	4.8	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	7	11	5.9	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	28	11	5.9	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	28	11	5.9	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	7	11	4.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	28	11	4.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	28	11	4.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	7	11	4.4	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	28	11	4.4	1332583 MAG A #57 AIR ASH	YES	

**Table IV-6
Air Content Tests**

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (ft ³)	Air Content (%)	Mix Identification	Air Content meets specification (YES/NO)	Comments
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	28	11	4.4	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	7	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	28	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	28	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	7	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	28	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	28	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	7	11	4.4	1333126 MAG AA #57 AIR ASH	YES	
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	28	11	4.4	1333126 MAG AA #57 AIR ASH	YES	
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	28	11	4.4	1333126 MAG AA #57 AIR ASH	YES	
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	7	11	4.3	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	28	11	4.3	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	28	11	4.3	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	7	11	4.9	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	28	11	4.9	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	28	11	4.9	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	7	11	4.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	28	11	4.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	28	11	4.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	7	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	28	11	5	1332583 MAG A #57 AIR ASH	YES	

Table IV-6 Air Content Tests

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (ft ³)	Air Content (%)	Mix Identification	Air Content meets specification (YES/NO)	Comments
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	28	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	7	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	28	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	28	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/18/2006	Rinker Plant	RCB Structure	7	11	5	1333126 MAG AA #57 AIR ASH	YES	
Hoque	8/18/2006	Rinker Plant	RCB Structure	28	11	5	1333126 MAG AA #57 AIR ASH	YES	
Hoque	8/18/2006	Rinker Plant	RCB Structure	28	11	5	1333126 MAG AA #57 AIR ASH	YES	
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	7	11	4.4	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	4.4	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	4.4	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	7	11	4.4	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	4.4	1332583 MAG A #57 AIR ASH	YES	
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	4.4	1332583 MAG A #57 AIR ASH	YES	
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	7	11	4.3	1333126 MAG AA #57 AIR ASH	YES	
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	16	11	4.3	1333126 MAG AA #57 AIR ASH	YES	
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	28	11	4.3	1333126 MAG AA #57 AIR ASH	YES	
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	7	11	4.4	1332583 MAG A #57 AIR ASH	YES	
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	28	11	4.4	1332583 MAG A #57 AIR ASH	YES	
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	28	11	4.4	1332583 MAG A #57 AIR ASH	YES	
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	7	11	4.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	28	11	4.5	1332583 MAG A #57 AIR ASH	YES	
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	28	11	4.5	1332583 MAG A #57 AIR ASH	YES	

Table IV-6
Air Content Tests

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (ft ³)	Air Content (%)	Mix Identification	Air Content meets specification (YES/NO)	Comments
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	7	11	4.3	1332583 MAG A #57 AIR ASH	YES	
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	28	11	4.3	1332583 MAG A #57 AIR ASH	YES	
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	28	11	4.3	1332583 MAG A #57 AIR ASH	YES	
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	7	11	4.8	1333126 MAG AA #57 AIR ASH	YES	
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	28	11	4.8	1333126 MAG AA #57 AIR ASH	YES	
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	28	11	4.8	1333126 MAG AA #57 AIR ASH	YES	
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	7	11	--	1333126 MAG AA #57 AIR ASH		Air content not recorded.
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	28	11	--	1333126 MAG AA #57 AIR ASH		Air content not recorded.
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	28	11	--	1333126 MAG AA #57 AIR ASH		Air content not recorded.
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	7	11	--	1332583 MAG A #57 AIR ASH		Air content not recorded.
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	28	11	--	1332583 MAG A #57 AIR ASH		Air content not recorded.
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	28	11	--	1332583 MAG A #57 AIR ASH		Air content not recorded.
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	7	11	5.2	1332583 MAG A #57 AIR ASH	YES	
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	28	11	5.2	1332583 MAG A #57 AIR ASH	YES	
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	28	11	5.2	1332583 MAG A #57 AIR ASH	YES	
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	7	11	4.2	1333126 MAG AA #57 AIR ASH	YES	
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	28	11	4.2	1333126 MAG AA #57 AIR ASH	YES	
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	28	11	4.2	1333126 MAG AA #57 AIR ASH	YES	
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	7	11	5	1333126 MAG AA #57 AIR ASH	YES	
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	28	11	5	1333126 MAG AA #57 AIR ASH	YES	
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	28	11	5	1333126 MAG AA #57 AIR ASH	YES	
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	7	11	4.5	1333126 MAG AA #57 AIR ASH	YES	

Table IV-6
Air Content Tests

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (ft ³)	Air Content (%)	Mix Identification	Air Content meets specification (YES/NO)	Comments
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	28	11	4.5	1333126 MAG AA #57 AIR ASH	YES	
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	28	11	4.5	1333126 MAG AA #57 AIR ASH	YES	
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	7	11	--	1332856 #8, 7.5SK GROUT AIR ASH STD		Air content not recorded.
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	28	11	--	1332856 #8, 7.5SK GROUT AIR ASH STD		Air content not recorded.
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	28	11	--	1332856 #8, 7.5SK GROUT AIR ASH STD		Air content not recorded.
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	H	11	--	1332856 #8, 7.5SK GROUT AIR ASH STD		Air content not recorded.
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	7	11	--	1333126 MAG AA #57 AIR ASH		Air content not recorded.
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	28	11	--	1333126 MAG AA #57 AIR ASH		Air content not recorded.
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	28	11	--	1333126 MAG AA #57 AIR ASH		Air content not recorded.
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	7	10	4.2	1333126 MAG AA #57 AIR ASH	YES	
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	28	10	4.2	1333126 MAG AA #57 AIR ASH	YES	
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	28	10	4.2	1333126 MAG AA #57 AIR ASH	YES	
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	7	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	28	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	28	11	5	1332583 MAG A #57 AIR ASH	YES	
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	7	11	5.4	1332583 MAG A #57 AIR ASH	YES	
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	28	11	5.4	1332583 MAG A #57 AIR ASH	YES	
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	28	11	5.4	1332583 MAG A #57 AIR ASH	YES	
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	7	11	4.5	1333126 MAG AA #57 AIR ASH	YES	
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	28	11	4.5	1333126 MAG AA #57 AIR ASH	YES	
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	28	11	4.5	1333126 MAG AA #57 AIR ASH	YES	

Table IV-6
Air Content Tests

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (ft ³)	Air Content (%)	Mix Identification	Air Content meets specification (YES/NO)	Comments
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	7	11	3.5	Not identified	YES	
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	28	11	3.5	Not identified	YES	
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	28	11	3.5	Not identified	YES	
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	7	11	3.2	Not identified	NO	Air content not within specifications.
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	28	11	3.2	Not identified	NO	Air content not within specifications.
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	28	11	3.2	Not identified	NO	Air content not within specifications.

TABLE IV-7 Slump Tests

Tested By	Sample Date	Supplier	Source of Sample	Age (Days)	Batch Size (ft ³)	Slump (in)	Mix Identification	Slump meets specification (YES/NO)	Slump meets specification Placement by pump (YES/NO)	Comments
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	7	11	3	1332583 MAG A #57 AIR ASH	YES		
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	29	11	3	1332583 MAG A #57 AIR ASH	YES		
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	29	11	3	1332583 MAG A #57 AIR ASH	YES		
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	7	11	3.25	1332583 MAG A #57 AIR ASH	YES		
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	28	11	3.25	1332583 MAG A #57 AIR ASH	YES		
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	28	11	3.25	1332583 MAG A #57 AIR ASH	YES		
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	7	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	7	11	4.5	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	28	11	4.5	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	28	11	4.5	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	7	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	7	11	4.5	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	28	11	4.5	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	28	11	4.5	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	7	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	7	11	3	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	28	11	3	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	28	11	3	1332583 MAG A #57 AIR ASH	YES		

TABLE IV-7 Slump Tests

Tested By	Sample Date	Supplier	Source of Sample	Age (Days)	Batch Size (ft ³)	Slump (in)	Mix Identification	Slump meets specification (YES/NO)	Slump meets specification Placement by pump (YES/NO)	Comments
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	7	11	3	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	28	11	3	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	28	11	3	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	7	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	7	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	7	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	7	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	7	11	3.25	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	28	11	3.25	1332583 MAG A #57 AIR ASH	YES		
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	28	11	3.25	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	7	11	3.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	28	11	3.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	28	11	3.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	7	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		

TABLE IV-7 Slump Tests

Tested By	Sample Date	Supplier	Source of Sample	Age (Days)	Batch Size (ft ³)	Slump (in)	Mix Identification	Slump meets specification (YES/NO)	Slump meets specification Placement by pump (YES/NO)	Comments
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	7	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	7	11	4.75	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	28	11	4.75	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	28	11	4.75	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	7	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	7	11	3	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	28	11	3	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	28	11	3	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	7	11	3.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	28	11	3.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	28	11	3.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	7	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	7	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/18/2006	Rinker Plant	RCB Structure	7	11	3	1333126 MAG AA #57 AIR ASH	YES		
Hoque	8/18/2006	Rinker Plant	RCB Structure	28	11	3	1333126 MAG AA #57 AIR ASH	YES		

TABLE IV-7 Slump Tests

Tested By	Sample Date	Supplier	Source of Sample	Age (Days)	Batch Size (ft ³)	Slump (in)	Mix Identification	Slump meets specification (YES/NO)	Slump meets specification Placement by pump (YES/NO)	Comments
Hoque	8/18/2006	Rinker Plant	RCB Structure	28	11	3	1333126 MAG AA #57 AIR ASH	YES		
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	7	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	7	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	7	11	3.5	1333126 MAG AA #57 AIR ASH	YES		
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	16	11	3.5	1333126 MAG AA #57 AIR ASH	YES		
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	28	11	3.5	1333126 MAG AA #57 AIR ASH	YES		
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	7	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	7	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	28	11	2.75	1332583 MAG A #57 AIR ASH	YES		
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	7	11	3	1332583 MAG A #57 AIR ASH	YES		
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	28	11	3	1332583 MAG A #57 AIR ASH	YES		
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	28	11	3	1332583 MAG A #57 AIR ASH	YES		
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	7	11	3	1333126 MAG AA #57 AIR ASH	YES		
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	28	11	3	1333126 MAG AA #57 AIR ASH	YES		
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	28	11	3	1333126 MAG AA #57 AIR ASH	YES		
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	7	11	3	1333126 MAG AA #57 AIR ASH	YES		
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	28	11	3	1333126 MAG AA #57 AIR ASH	YES		

TABLE IV-7 Slump Tests

Tested By	Sample Date	Supplier	Source of Sample	Age (Days)	Batch Size (ft ³)	Slump (in)	Mix Identification	Slump meets specification (YES/NO)	Slump meets specification Placement by pump (YES/NO)	Comments
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	28	11	3	1333126 MAG AA #57 AIR ASH	YES		
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	7	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	28	11	2.5	1332583 MAG A #57 AIR ASH	YES		
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	7	11	5	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	28	11	5	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	28	11	5	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	7	11	4.25	1333126 MAG AA #57 AIR ASH	YES		
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	28	11	4.25	1333126 MAG AA #57 AIR ASH	YES		
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	28	11	4.25	1333126 MAG AA #57 AIR ASH	YES		
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	7	11	5	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	28	11	5	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	28	11	5	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	7	11	6	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	28	11	6	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	28	11	6	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	7	11	8	1332856 #8, 7.5SK GROUT AIR ASH STD	NO	NO	Slump does not meet specifications.
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	28	11	8	1332856 #8, 7.5SK GROUT AIR ASH STD	NO	NO	Slump does not meet specifications.
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	28	11	8	1332856 #8, 7.5SK GROUT AIR ASH STD	NO	NO	Slump does not meet specifications.
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	H	11	8	1332856 #8, 7.5SK GROUT AIR ASH STD	NO	NO	Slump does not meet specifications.
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	7	11	4.5	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	28	11	4.5	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	28	11	4.5	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	7	10	5.25	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).

TABLE IV-7 Slump Tests

Tested By	Sample Date	Supplier	Source of Sample	Age (Days)	Batch Size (ft ³)	Slump (in)	Mix Identification	Slump meets specification (YES/NO)	Slump meets specification Placement by pump (YES/NO)	Comments
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	28	10	5.25	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	28	10	5.25	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	7	11	5.25	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	28	11	5.25	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	28	11	5.25	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	7	11	5	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	28	11	5	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	28	11	5	1332583 MAG A #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	7	11	5	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	28	11	5	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	28	11	5	1333126 MAG AA #57 AIR ASH	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	7	11	4.75	Not identified	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	28	11	4.75	Not identified	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	28	11	4.75	Not identified	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	7	11	2.75	Not identified	YES		
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	28	11	2.75	Not identified	YES		
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	28	11	2.75	Not identified	YES		

TABLE IV-8
Placement Temperature

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (ft ³)	Ambient Temp (°F)	Concrete Temp (°F)	Mix Identification
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	7	11	72	75	1332583 MAG A #57 AIR ASH
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	29	11	72	75	1332583 MAG A #57 AIR ASH
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	29	11	72	75	1332583 MAG A #57 AIR ASH
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	7	11	74	74	1332583 MAG A #57 AIR ASH
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	28	11	74	74	1332583 MAG A #57 AIR ASH
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	28	11	74	74	1332583 MAG A #57 AIR ASH
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	7	11	74	75	1332583 MAG A #57 AIR ASH
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	28	11	74	75	1332583 MAG A #57 AIR ASH
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	28	11	74	75	1332583 MAG A #57 AIR ASH
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	7	11	72	76	1332583 MAG A #57 AIR ASH
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	28	11	72	76	1332583 MAG A #57 AIR ASH
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	28	11	72	76	1332583 MAG A #57 AIR ASH
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	7	11	68	66	1332583 MAG A #57 AIR ASH
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	28	11	68	66	1332583 MAG A #57 AIR ASH
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	28	11	68	66	1332583 MAG A #57 AIR ASH
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	7	11	72	76	1332583 MAG A #57 AIR ASH
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	28	11	72	76	1332583 MAG A #57 AIR ASH
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	28	11	72	76	1332583 MAG A #57 AIR ASH
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	7	11	76	78	1332583 MAG A #57 AIR ASH
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	28	11	76	78	1332583 MAG A #57 AIR ASH
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	28	11	76	78	1332583 MAG A #57 AIR ASH
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	7	11	80	80	1332583 MAG A #57 AIR ASH
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	28	11	80	80	1332583 MAG A #57 AIR ASH

TABLE IV-8
Placement Temperature

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (ft ³)	Ambient Temp (°F)	Concrete Temp (°F)	Mix Identification
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	28	11	80	80	1332583 MAG A #57 AIR ASH
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	7	11	83	72	1332583 MAG A #57 AIR ASH
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	28	11	83	72	1332583 MAG A #57 AIR ASH
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	28	11	83	72	1332583 MAG A #57 AIR ASH
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	7	11	81	81	1332583 MAG A #57 AIR ASH
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	28	11	81	81	1332583 MAG A #57 AIR ASH
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	28	11	81	81	1332583 MAG A #57 AIR ASH
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	7	11	81	81	1332583 MAG A #57 AIR ASH
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	28	11	81	81	1332583 MAG A #57 AIR ASH
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	28	11	81	81	1332583 MAG A #57 AIR ASH
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	7	11	75	76	1332583 MAG A #57 AIR ASH
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	28	11	75	76	1332583 MAG A #57 AIR ASH
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	28	11	75	76	1332583 MAG A #57 AIR ASH
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	7	11	79	77	1332583 MAG A #57 AIR ASH
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	28	11	79	77	1332583 MAG A #57 AIR ASH
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	28	11	79	77	1332583 MAG A #57 AIR ASH
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	7	11	77	80	1332583 MAG A #57 AIR ASH
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	28	11	77	80	1332583 MAG A #57 AIR ASH
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	28	11	77	80	1332583 MAG A #57 AIR ASH
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	7	11	82	79	1332583 MAG A #57 AIR ASH
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	28	11	82	79	1332583 MAG A #57 AIR ASH
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	28	11	82	79	1332583 MAG A #57 AIR ASH
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	7	11	79	84	1332583 MAG A #57 AIR ASH

TABLE IV-8
Placement Temperature

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (ft ³)	Ambient Temp (°F)	Concrete Temp (°F)	Mix Identification
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	28	11	79	84	1332583 MAG A #57 AIR ASH
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	28	11	79	84	1332583 MAG A #57 AIR ASH
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	7	11	80	84	1332583 MAG A #57 AIR ASH
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	28	11	80	84	1332583 MAG A #57 AIR ASH
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	28	11	80	84	1332583 MAG A #57 AIR ASH
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	7	11	83	83	1333126 MAG AA #57 AIR ASH
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	28	11	83	83	1333126 MAG AA #57 AIR ASH
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	28	11	83	83	1333126 MAG AA #57 AIR ASH
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	7	11	81	84	1332583 MAG A #57 AIR ASH
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	28	11	81	84	1332583 MAG A #57 AIR ASH
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	28	11	81	84	1332583 MAG A #57 AIR ASH
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	7	11	82	85	1332583 MAG A #57 AIR ASH
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	28	11	82	85	1332583 MAG A #57 AIR ASH
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	28	11	82	85	1332583 MAG A #57 AIR ASH
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	7	11	80	82	1332583 MAG A #57 AIR ASH
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	28	11	80	82	1332583 MAG A #57 AIR ASH
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	28	11	80	82	1332583 MAG A #57 AIR ASH
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	7	11	78	79	1332583 MAG A #57 AIR ASH
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	28	11	78	79	1332583 MAG A #57 AIR ASH
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	28	11	78	79	1332583 MAG A #57 AIR ASH
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	7	11	62	72	1332583 MAG A #57 AIR ASH
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	28	11	62	72	1332583 MAG A #57 AIR ASH
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	28	11	62	72	1332583 MAG A #57 AIR ASH

TABLE IV-8
Placement Temperature

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (ft ³)	Ambient Temp (°F)	Concrete Temp (°F)	Mix Identification
Hoque	8/18/2006	Rinker Plant	RCB Structure	7	11	98	78	1333126 MAG AA #57 AIR ASH
Hoque	8/18/2006	Rinker Plant	RCB Structure	28	11	98	78	1333126 MAG AA #57 AIR ASH
Hoque	8/18/2006	Rinker Plant	RCB Structure	28	11	98	78	1333126 MAG AA #57 AIR ASH
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	7	11	80	79	1332583 MAG A #57 AIR ASH
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	80	79	1332583 MAG A #57 AIR ASH
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	80	79	1332583 MAG A #57 AIR ASH
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	7	11	80	79	1332583 MAG A #57 AIR ASH
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	80	79	1332583 MAG A #57 AIR ASH
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	80	79	1332583 MAG A #57 AIR ASH
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	7	11	76	80	1333126 MAG AA #57 AIR ASH
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	16	11	76	80	1333126 MAG AA #57 AIR ASH
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	28	11	76	80	1333126 MAG AA #57 AIR ASH
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	7	11	80	79	1332583 MAG A #57 AIR ASH
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	28	11	80	79	1332583 MAG A #57 AIR ASH
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	28	11	80	79	1332583 MAG A #57 AIR ASH
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	7	11	72	78	1332583 MAG A #57 AIR ASH
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	28	11	72	78	1332583 MAG A #57 AIR ASH
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	28	11	72	78	1332583 MAG A #57 AIR ASH
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	7	11	78	78	1332583 MAG A #57 AIR ASH
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	28	11	78	78	1332583 MAG A #57 AIR ASH
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	28	11	78	78	1332583 MAG A #57 AIR ASH
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	7	11	92	79	1333126 MAG AA #57 AIR ASH
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	28	11	92	79	1333126 MAG AA #57 AIR ASH

TABLE IV-8
Placement Temperature

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (ft ³)	Ambient Temp (°F)	Concrete Temp (°F)	Mix Identification
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	28	11	92	79	1333126 MAG AA #57 AIR ASH
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	7	11	98	78	1333126 MAG AA #57 AIR ASH
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	28	11	98	78	1333126 MAG AA #57 AIR ASH
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	28	11	98	78	1333126 MAG AA #57 AIR ASH
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	7	11	62	72	1332583 MAG A #57 AIR ASH
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	28	11	62	72	1332583 MAG A #57 AIR ASH
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	28	11	62	72	1332583 MAG A #57 AIR ASH
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	7	11	63	72	1332583 MAG A #57 AIR ASH
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	28	11	63	72	1332583 MAG A #57 AIR ASH
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	28	11	63	72	1332583 MAG A #57 AIR ASH
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	7	11	81	78	1333126 MAG AA #57 AIR ASH
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	28	11	81	78	1333126 MAG AA #57 AIR ASH
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	28	11	81	78	1333126 MAG AA #57 AIR ASH
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	7	11	68	70	1333126 MAG AA #57 AIR ASH
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	28	11	68	70	1333126 MAG AA #57 AIR ASH
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	28	11	68	70	1333126 MAG AA #57 AIR ASH
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	7	11	62	72	1333126 MAG AA #57 AIR ASH
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	28	11	62	72	1333126 MAG AA #57 AIR ASH
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	28	11	62	72	1333126 MAG AA #57 AIR ASH
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	7	11	70	78	1332830 #8, 7.5SK GROUT AIR ASH
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	28	11	70	78	1332830 #8, 7.5SK GROUT AIR ASH
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	28	11	70	78	1332830 #8, 7.5SK GROUT AIR ASH
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	H	11	70	78	1332830 #8, 7.5SK GROUT AIR ASH

TABLE IV-8
Placement Temperature

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (ft ³)	Ambient Temp (°F)	Concrete Temp (°F)	Mix Identification
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	7	11	80	82	1333126 MAG AA #57 AIR ASH
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	28	11	80	82	1333126 MAG AA #57 AIR ASH
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	28	11	80	82	1333126 MAG AA #57 AIR ASH
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	7	10	72	72	1333126 MAG AA #57 AIR ASH
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	28	10	72	72	1333126 MAG AA #57 AIR ASH
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	28	10	72	72	1333126 MAG AA #57 AIR ASH
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	7	11	60	70	1332583 MAG A #57 AIR ASH
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	28	11	60	70	1332583 MAG A #57 AIR ASH
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	28	11	60	70	1332583 MAG A #57 AIR ASH
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	7	11	78	77	1332583 MAG A #57 AIR ASH
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	28	11	78	77	1332583 MAG A #57 AIR ASH
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	28	11	78	77	1332583 MAG A #57 AIR ASH
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	7	11	85	80	1333126 MAG AA #57 AIR ASH
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	28	11	85	80	1333126 MAG AA #57 AIR ASH
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	28	11	85	80	1333126 MAG AA #57 AIR ASH
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	7	11	80	76	Not identified
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	28	11	80	76	Not identified
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	28	11	80	76	Not identified
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	7	11	96	82	Not identified
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	28	11	96	82	Not identified
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	28	11	96	82	Not identified

TABLE IV-9
Summary of Concrete Testing

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (cu ft)	Compressive Strength (psi)	Design Strength (psi)	Air Content (%)	Slump (in)	Ambient Temp (°F)	Concrete temp (°F)	Mix Identification	Cross Section Area (in ²)	Exceeds Design Strength (YES/NO)	Average Compressive Strength (psi)	Air Content meets specification (YES/NO)	Slump meets specification (YES/NO)	Slump meets specification Placement by pump (YES/NO)	Comments
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	7	11	3720	3000	4.1	3.0	72	75	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	29	11	--	3000	4.1	3.0	72	75	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	6/6/2006	Rinker Plant	CIC STA 54+25	29	11	--	3000	4.1	3.0	72	75	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	7	11	3840	3000	3.6	3.3	74	74	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	28	11	--	3000	3.6	3.3	74	74	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	6/7/2006	Rinker Plant	CIC STA 54+10	28	11	--	3000	3.6	3.3	74	74	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	7	11	3750	3000	5.0	2.8	74	75	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	28	11	5280	3000	5.0	2.8	74	75	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	6/16/2006	Rinker Plant	CIC STA 49+65	28	11	5411	3000	5.0	2.8	74	75	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	7	11	3870	3000	5.5	4.5	72	76	1332583 MAG A #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	28	11	5454	3000	5.5	4.5	72	76	1332583 MAG A #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	6/19/2006	Rinker Plant	CIC STA 49+50	28	11	5560	3000	5.5	4.5	72	76	1332583 MAG A #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	7	11	3210	3000	4.6	2.8	68	66	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	28	11	4500	3000	4.6	2.8	68	66	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	6/22/2006	Rinker Plant	CIC STA 49+35	28	11	4150	3000	4.6	2.8	68	66	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	7	11	3400	3000	5.2	4.5	72	76	1332583 MAG A #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	28	11	4890	3000	5.2	4.5	72	76	1332583 MAG A #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	6/23/2006	Rinker Plant	CIC STA 42+40	28	11	4910	3000	5.2	4.5	72	76	1332583 MAG A #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	7	11	3700	3000	4.5	2.8	76	78	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	28	11	4310	3000	4.5	2.8	76	78	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/11/2006	Rinker Plant	CIC STA 39+90	28	11	4150	3000	4.5	2.8	76	78	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	7	11	4000	3000	4.6	3.0	80	80	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	28	11	5060	3000	4.6	3.0	80	80	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/12/2006	Rinker Plant	CIC STA 35+20	28	11	4970	3000	4.6	3.0	80	80	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	7	11	2800	3000	4.5	3.0	83	72	1332583 MAG A #57 AIR ASH	12.56	NO	4073.33	YES	YES		Test passes average acceptance test compressive strength exceeds design strength.
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	28	11	4760	3000	4.5	3.0	83	72	1332583 MAG A #57 AIR ASH	12.56	YES	4073.33	YES	YES		
Hoque	7/13/2006	Rinker Plant	CIC STA 39+80	28	11	4660	3000	4.5	3.0	83	72	1332583 MAG A #57 AIR ASH	12.56	YES	4073.33	YES	YES		
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	7	11	3610	3000	4.8	2.8	81	81	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		

TABLE IV-9
Summary of Concrete Testing

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (cu ft)	Compressive Strength (psi)	Design Strength (psi)	Air Content (%)	Slump (in)	Ambient Temp (°F)	Concrete temp (°F)	Mix Identification	Cross Section Area (in ²)	Exceeds Design Strength (YES/NO)	Average Compressive Strength (psi)	Air Content meets specification (YES/NO)	Slump meets specification (YES/NO)	Slump meets specification Placement by pump (YES/NO)	Comments
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	28	11	5170	3000	4.8	2.8	81	81	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/20/2006	Rinker Plant	CIC STA 32+00	28	11	4710	3000	4.8	2.8	81	81	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	7	11	3610	3000	4.8	2.8	81	81	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	28	11	5170	3000	4.8	2.8	81	81	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/20/2006	Rinker Plant	CIC STA 39+90	28	11	4710	3000	4.8	2.8	81	81	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	7	11	3980	3000	4.8	2.8	75	76	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	28	11	4940	3000	4.8	2.8	75	76	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/21/2006	Rinker Plant	CIC STA 31+80	28	11	5000	3000	4.8	2.8	75	76	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	7	11	3180	3000	5.9	2.8	79	77	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	28	11	4150	3000	5.9	2.8	79	77	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/27/2006	Rinker Plant	CIC STA 27+50	28	11	4110	3000	5.9	2.8	79	77	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	7	11	3330	3000	4.5	3.3	77	80	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	28	11	4690	3000	4.5	3.3	77	80	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	7/28/2006	Rinker Plant	CIC STA 34+65	28	11	4670	3000	4.5	3.3	77	80	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	7	11	3790	3000	4.4	3.8	82	79	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	28	11	--	3000	4.4	3.8	82	79	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	8/3/2006	Rinker Plant	CIC STA 25+90	28	11	--	3000	4.4	3.8	82	79	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	7	11	4160	3000	5.0	2.5	79	84	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	28	11	--	3000	5.0	2.5	79	84	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	8/4/2006	Rinker Plant	CIC STA 25+90	28	11	--	3000	5.0	2.5	79	84	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	7	11	4160	3000	5.0	2.5	80	84	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	28	11	--	3000	5.0	2.5	80	84	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	8/4/2006	Rinker Plant	CIC STA 24+15	28	11	--	3000	5.0	2.5	80	84	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	7	11	4160	4000	4.4	4.8	83	83	1333126 MAG AA #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	28	11	--	4000	4.4	4.8	83	83	1333126 MAG AA #57 AIR ASH	12.56	YES		YES	NO	YES	Compressive strength data was not recorded. Slump meets specifications (placed by pump).
Hoque	8/8/2006	Rinker Plant	115th Ave Box Culvert middle floor slab	28	11	--	4000	4.4	4.8	83	83	1333126 MAG AA #57 AIR ASH	12.56	YES		YES	NO	YES	Compressive strength data was not recorded. Slump meets specifications (placed by pump).

TABLE IV-9
Summary of Concrete Testing

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (cu ft)	Compressive Strength (psi)	Design Strength (psi)	Air Content (%)	Slump (in)	Ambient Temp (°F)	Concrete temp (°F)	Mix Identification	Cross Section Area (in ²)	Exceeds Design Strength (YES/NO)	Average Compressive Strength (psi)	Air Content meets specification (YES/NO)	Slump meets specification (YES/NO)	Slump meets specification Placement by pump (YES/NO)	Comments
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	7	11	3770	3000	4.3	2.8	81	84	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	28	11	--	3000	4.3	2.8	81	84	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	8/10/2006	Rinker Plant	CIC STA 22+90	28	11	--	3000	4.3	2.8	81	84	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	7	11	4010	3000	4.9	3.0	82	85	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	28	11	--	3000	4.9	3.0	82	85	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	8/11/2006	Rinker Plant	CIC STA 20+25	28	11	--	3000	4.9	3.0	82	85	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	7	11	3990	3000	4.5	3.5	80	82	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	28	11	--	3000	4.5	3.5	80	82	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	8/17/2006	Rinker Plant	CIC STA 19+05	28	11	--	3000	4.5	3.5	80	82	1332583 MAG A #57 AIR ASH	12.56			YES	YES		Compressive strength data was not recorded.
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	7	11	4370	3000	5.0	2.5	78	79	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	28	11	5320	3000	5.0	2.5	78	79	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/18/2006	Rinker Plant	CIC STA 15+85	28	11	5270	3000	5.0	2.5	78	79	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	7	11	3530	3000	5.0	2.5	62	72	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	28	11	4450	3000	5.0	2.5	62	72	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/18/2006	Rinker Plant	CIC STA 6+95	28	11	4210	3000	5.0	2.5	62	72	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/18/2006	Rinker Plant	RCB Structure	7	11	3540	4000	5.0	3.0	98	78	1333126 MAG AA #57 AIR ASH	12.56	NO	4450.00	YES	YES		Test passes average acceptance test compressive strength exceeds design strength.
Hoque	8/18/2006	Rinker Plant	RCB Structure	28	11	5030	4000	5.0	3.0	98	78	1333126 MAG AA #57 AIR ASH	12.56	YES	4450.00	YES	YES		
Hoque	8/18/2006	Rinker Plant	RCB Structure	28	11	4780	4000	5.0	3.0	98	78	1333126 MAG AA #57 AIR ASH	12.56	YES	4450.00	YES	YES		
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	7	11	4490	3000	4.4	2.5	80	79	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	5080	3000	4.4	2.5	80	79	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	5300	3000	4.4	2.5	80	79	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	7	11	4490	3000	4.4	2.5	80	79	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	5080	3000	4.4	2.5	80	79	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	8/29/2006	Rinker Plant	CIC STA 14+90	28	11	5300	3000	4.4	2.5	80	79	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	7	11	3630	4000	4.3	3.5	76	80	1333126 MAG AA #57 AIR ASH	12.56	NO	4473.33	YES	YES		Test passes average acceptance test compressive strength exceeds design strength.
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	16	11	4320	4000	4.3	3.5	76	80	1333126 MAG AA #57 AIR ASH	12.56	YES	4473.33	YES	YES		
Hoque	9/6/2006	Rinker Plant	115th Ave Box Culvert Deck	28	11	5470	4000	4.3	3.5	76	80	1333126 MAG AA #57 AIR ASH	12.56	YES	4473.33	YES	YES		
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	7	11	3200	3000	4.4	2.5	80	79	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		

**TABLE IV-9
Summary of Concrete Testing**

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (cu ft)	Compressive Strength (psi)	Design Strength (psi)	Air Content (%)	Slump (in)	Ambient Temp (°F)	Concrete temp (°F)	Mix Identification	Cross Section Area (in ²)	Exceeds Design Strength (YES/NO)	Average Compressive Strength (psi)	Air Content meets specification (YES/NO)	Slump meets specification (YES/NO)	Slump meets specification Placement by pump (YES/NO)	Comments
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	28	11	4910	3000	4.4	2.5	80	79	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	9/1/2006	Rinker Plant	CIC STA 26+75	28	11	5470	3000	4.4	2.5	80	79	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	7	11	3150	3000	4.5	2.8	72	78	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	28	11	4960	3000	4.5	2.8	72	78	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	9/14/2006	Rinker Plant	CIC STA 10+25	28	11	4690	3000	4.5	2.8	72	78	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	7	11	3340	3000	4.3	3.0	78	78	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	28	11	4140	3000	4.3	3.0	78	78	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	9/15/2006	Rinker Plant	CIC STA 10+35	28	11	4260	3000	4.3	3.0	78	78	1332583 MAG A #57 AIR ASH	12.56	YES		YES	YES		
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	7	11	3450	4000	4.8	3.0	92	79	1333126 MAG AA #57 AIR ASH	12.56	NO	4323.33	YES	YES		Test passes average acceptance test compressive strength exceeds design strength.
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	28	11	4800	4000	4.8	3.0	92	79	1333126 MAG AA #57 AIR ASH	12.56	YES	4323.33	YES	YES		
Hoque	9/15/2006	Rinker Plant	115th Ave RCB Inlet Structure	28	11	4720	4000	4.8	3.0	92	79	1333126 MAG AA #57 AIR ASH	12.56	YES	4323.33	YES	YES		
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	7	11	3540	4000	--	3.0	98	78	1333126 MAG AA #57 AIR ASH	12.56	NO	4450.00		YES		Test passes average acceptance test compressive strength exceeds design strength. Air content not recorded.
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	28	11	5030	4000	--	3.0	98	78	1333126 MAG AA #57 AIR ASH	12.56	YES	4450.00		YES		Air content not recorded.
Hoque	9/18/2006	Rinker Plant	115th Ave RCB Outlet Structure	28	11	4780	4000	--	3.0	98	78	1333126 MAG AA #57 AIR ASH	12.56	YES	4450.00		YES		Air content not recorded.
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	7	11	3530	3000	--	2.5	62	72	1332583 MAG A #57 AIR ASH	12.56	YES			YES		Air content not recorded.
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	28	11	4450	3000	--	2.5	62	72	1332583 MAG A #57 AIR ASH	12.56	YES			YES		Air content not recorded.
Hoque	9/18/2006	Rinker Plant	CIC STA 6+95	28	11	4210	3000	--	2.5	62	72	1332583 MAG A #57 AIR ASH	12.56	YES			YES		Air content not recorded.
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	7	11	3710	3000	5.2	5.0	63	72	1332583 MAG A #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	28	11	4320	3000	5.2	5.0	63	72	1332583 MAG A #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	9/21/2006	Rinker Plant	CIC STA 5+10	28	11	4180	3000	5.2	5.0	63	72	1332583 MAG A #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	7	11	3720	4000	4.2	4.3	81	78	1333126 MAG AA #57 AIR ASH	12.56	NO	4840.00	YES	YES		Test passes average acceptance test compressive strength exceeds design strength.
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	28	11	5280	4000	4.2	4.3	81	78	1333126 MAG AA #57 AIR ASH	12.56	YES	4840.00	YES	YES		
Hoque	10/2/2006	Rinker Plant	115th Ave RCB Wing and Headwall	28	11	5520	4000	4.2	4.3	81	78	1333126 MAG AA #57 AIR ASH	12.56	YES	4840.00	YES	YES		
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	7	11	4460	4000	5.0	5.0	68	70	1333126 MAG AA #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	28	11	5020	4000	5.0	5.0	68	70	1333126 MAG AA #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/11/2006	Rinker Plant	113th Ave RCB Floor	28	11	5250	4000	5.0	5.0	68	70	1333126 MAG AA #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	7	11	3630	4000	4.5	6.0	62	72	1333126 MAG AA #57 AIR ASH	12.56	NO	4593.33	YES	NO	YES	Test passes average acceptance test compressive strength exceeds design strength. Slump meets specifications (placed by pump).

TABLE IV-9
Summary of Concrete Testing

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (cu ft)	Compressive Strength (psi)	Design Strength (psi)	Air Content (%)	Slump (in)	Ambient Temp (°F)	Concrete temp (°F)	Mix Identification	Cross Section Area (in ²)	Exceeds Design Strength (YES/NO)	Average Compressive Strength (psi)	Air Content meets specification (YES/NO)	Slump meets specification (YES/NO)	Slump meets specification Placement by pump (YES/NO)	Comments
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	28	11	5060	4000	4.5	6.0	62	72	1333126 MAG AA #57 AIR ASH	12.56	YES	4593.33	YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/19/2006	Rinker Plant	113th Ave RCB Sidewall	28	11	5090	4000	4.5	6.0	62	72	1333126 MAG AA #57 AIR ASH	12.56	YES	4593.33	YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	7	11	1080	2500	--	8.0	70	78	1332856 #8, 7.5SK GROUT AIR ASH STD	10.56	NO			NO	NO	Informational test more than 500 psi below design strength. Test failed. No additional testing was recorded. Air content not recorded. Slump does not meet specifications.
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	28	11	--	2500	--	8.0	70	78	1332856 #8, 7.5SK GROUT AIR ASH STD	10.56				NO	NO	Compressive strength data was not recorded. Air content not recorded. Slump does not meet specifications.
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	28	11	--	2500	--	8.0	70	78	1332856 #8, 7.5SK GROUT AIR ASH STD	10.56				NO	NO	Compressive strength data was not recorded. Air content not recorded. Slump does not meet specifications.
Hoque	10/25/2006	Rinker Plant	East Ramp 107th Avenue levee	H	11	3580	2500	--	8.0	70	78	1332856 #8, 7.5SK GROUT AIR ASH STD	10.56	YES			NO	NO	Air content not recorded. Slump does not meet specifications.
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	7	11	4680	4000	--	4.5	80	82	1333126 MAG AA #57 AIR ASH	12.56	YES			NO	YES	Air content not recorded. Slump meets specifications (placed by pump).
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	28	11	--	4000	--	4.5	80	82	1333126 MAG AA #57 AIR ASH	12.56				NO	YES	Compressive strength data was not recorded. Air content not recorded. Slump meets specifications (placed by pump).
Hoque	10/25/2006	Rinker Plant	113th Ave outlet floor slab	28	11	--	4000	--	4.5	80	82	1333126 MAG AA #57 AIR ASH	12.56				NO	YES	Compressive strength data was not recorded. Air content not recorded. Slump meets specifications (placed by pump).
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	7	10	3010	4000	4.2	5.3	72	72	1333126 MAG AA #57 AIR ASH	12.56	NO		YES	NO	YES	Informational test more than 500 psi below design strength. Test failed. No additional testing was recorded. Slump meets specifications (placed by pump).
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	28	10	--	4000	4.2	5.3	72	72	1333126 MAG AA #57 AIR ASH	12.56			YES	NO	YES	Compressive strength data was not recorded. Slump meets specifications (placed by pump).
Hoque	11/6/2006	Rinker Plant	113th Ave RCB Wing Wall Outlet Structure	28	10	--	4000	4.2	5.3	72	72	1333126 MAG AA #57 AIR ASH	12.56			YES	NO	YES	Compressive strength data was not recorded. Slump meets specifications (placed by pump).
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	7	11	3550	3000	5.0	5.3	60	70	1332583 MAG A #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	28	11	--	3000	5.0	5.3	60	70	1332583 MAG A #57 AIR ASH	12.56			YES	NO	YES	Compressive strength data was not recorded. Slump meets specifications (placed by pump).
Hoque	11/7/2006	Rinker Plant	CIC STA 1+65	28	11	--	3000	5.0	5.3	60	70	1332583 MAG A #57 AIR ASH	12.56			YES	NO	YES	Compressive strength data was not recorded. Slump meets specifications (placed by pump).
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	7	11	4550	3000	5.4	5.0	78	77	1332583 MAG A #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	28	11	--	3000	5.4	5.0	78	77	1332583 MAG A #57 AIR ASH	12.56			YES	NO	YES	Compressive strength data was not recorded. Slump meets specifications (placed by pump).
Hoque	11/8/2006	Rinker Plant	CIC STA 1+95	28	11	--	3000	5.4	5.0	78	77	1332583 MAG A #57 AIR ASH	12.56			YES	NO	YES	Compressive strength data was not recorded. Slump meets specifications (placed by pump).
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	7	11	4340	4000	4.5	5.0	85	80	1333126 MAG AA #57 AIR ASH	12.56	YES		YES	NO	YES	Slump meets specifications (placed by pump).
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	28	11	--	4000	4.5	5.0	85	80	1333126 MAG AA #57 AIR ASH	12.56			YES	NO	YES	Compressive strength data was not recorded. Slump meets specifications (placed by pump).
Hoque	11/8/2006	Rinker Plant	L-Footing Inlet Structure	28	11	--	4000	4.5	5.0	85	80	1333126 MAG AA #57 AIR ASH	12.56			YES	NO	YES	Compressive strength data was not recorded. Slump meets specifications (placed by pump).

TABLE IV-9
Summary of Concrete Testing

Tested By	Sample Date	Supplier	Location of Sample	Age (Days)	Batch Size (cu ft)	Compressive Strength (psi)	Design Strength (psi)	Air Content (%)	Slump (in)	Ambient Temp (°F)	Concrete temp (°F)	Mix Identification	Cross Section Area (in ²)	Exceeds Design Strength (YES/NO)	Average Compressive Strength (psi)	Air Content meets specification (YES/NO)	Slump meets specification (YES/NO)	Slump meets specification Placement by pump (YES/NO)	Comments
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	7	11	3330	4000	3.5	4.8	80	76	Not identified	12.56	NO		YES	NO	YES	Informational test more than 500 psi below design strength. Test failed. No additional testing was recorded. Slump meets specifications (placed by pump).
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	28	11	--	4000	3.5	4.8	80	76	Not identified	12.56			YES	NO	YES	Compressive strength data was not recorded. Slump meets specifications (placed by pump).
Hoque	10/1/2008	Imix	West of Drain Pipe Turndown	28	11	--	4000	3.5	4.8	80	76	Not identified	12.56			YES	NO	YES	Compressive strength data was not recorded. Slump meets specifications (placed by pump).
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	7	11	4440	4000	3.2	2.8	96	82	Not identified	12.56	YES		NO	YES		Air content not within specifications.
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	28	11	--	4000	3.2	2.8	96	82	Not identified	12.56			NO	YES		Compressive strength data was not recorded. Air content not within specifications.
Hoque	10/1/2008	Imix	East of Drain Pipe Turndown	28	11	--	4000	3.2	2.8	96	82	Not identified	12.56			NO	YES		Compressive strength data was not recorded. Air content not within specifications.

Summary of Aggregate (Riprap) Sources

Size Rock	Source	Pit/Quarry	Remarks
3" to 6" River Rock	Pioneer Landscaping Materials, Inc.	ABC	Based on delivery tickets dated 5/1/2008. Location address of pit/quarry was not provided on the delivery tickets.
		HASSY	Based on delivery tickets dated 10/7, 15, 16, & 23/2008. Location address of pit/quarry was not provided on the delivery tickets.
3" to 6" Rock	Phoenix San-Man, Inc.	?	Based on delivery tickets dated in May, June, & July of 2008. Location address of pit/quarry was not provided on the delivery tickets.
3" to 8" Natural Rock	ABC Sand & Rock, Inc.	?	Based on delivery tickets dated in 5/5/2008 and 5/6/2008. Location address of pit/quarry was not provided on the delivery tickets.
8" to 18" Rock	Kilauea Crushers, Inc.	Estrella North Plant	Based on delivery tickets dated in June, July, August, & September of 2008. Location address of pit/quarry was not provided on the delivery tickets.
	Sunrise Construction, Inc.	Kilauea Tuthill (Jackrabbit Trail & Tuthill Rd, past Ray Rd)	Based on delivery tickets dated in June and July of 2008. The cross street of S. Jackrabbit Trail and Tuthill Rd in Buckeye, AZ is approximately 10 miles northwest of the Tres Rios Project site.
12" to 36" Rock	Kilauea Crushers, Inc.	Estrella North Plant	Based on delivery tickets dated in May and June of 2008. Location address of pit/quarry was not provided on the delivery tickets.
18" to 24" Rock	Sunrise Construction, Inc.	Kilauea Estrella Plant	Based on delivery tickets dated 5/27/2008. This is likely the Estrella North Plant. Location address of pit/quarry was not provided on the delivery tickets.
18" to 36" Rock	Sunrise Construction, Inc.	Kilauea Tuthill (Jackrabbit Trail south past Ray Rd)	Based on delivery tickets dated 5/21/2008 and 5/22/2008. The cross street of S. Jackrabbit Trail and Tuthill Rd in Buckeye, AZ is approximately 10 miles northwest of the Tres Rios Project site.
Leach Rock	Phoenix San-Man, Inc.	?	Based on delivery tickets dated in June & August of 2008. Location address of pit/quarry was not provided on the delivery tickets.
3/4" Base Coarse	Cemex	41711-4120	Based on delivery tickets dated in June, July, August, & October of 2008. Location address of pit/quarry was not provided on the delivery tickets.
		12111-1371	Based on delivery tickets dated in August, September, & October of 2008. Location address of pit/quarry was not provided on the delivery tickets.

TABLE IV-11
Summary of Concrete Sources

Material	Source	Plant No.	Remarks
Concrete	iMix Group LLC	130	Based on delivery tickets dated May through October 2008. Location of plant was not provided on the delivery tickets.
	iMix Group LLC	132	Based on delivery tickets dated March through October 2008. Location of plant was not provided on the delivery tickets.
	iMix Group LLC	Unknown	Based on delivery tickets dated 6/30/2008. Location of plant was not provided on the delivery tickets.
Concrete	Rinker Materials, Inc.	951 / 1951	Based on delivery tickets dated June through November 2006. Location of plant was not provided on the delivery tickets.
	Rinker Materials, Inc.	956 / 1956	Based on delivery tickets dated June through November 2006. Location of plant was not provided on the delivery tickets.
	Rinker Materials, Inc.	957 / 1957	Based on delivery tickets dated September through October 2006. Location of plant was not provided on the delivery tickets.

Summary of Construction Issues for Phase 1A

Issue No.	Date of Quality Assurance Report	Quality Assurance Report No.	Description of Issue	Status/Resolution	Reference
1	13-Dec-05	111	A box culvert was installed through the levee at 115th Ave.	Resolved; Temporary drainage condition box culverts installed as planned.	As-Built Sheets RCB-16 and S-1 through S-4.
2	21-Dec-05	119	Double box culvert through levee at 111th Ave. is not shown on As-Built Plans.	Resolved; Typo in QAR. No plans for culvert in at 111th Ave. Verified by GENTERRA during site visit on July 31, 2012.	As-Built Sheets RCB-16 and S-1 through S-4.
3	3-Jan-06	132	Land owner concerned with irrigation drainage from his property due to construction between 113th and 115th Ave.	A meeting took place between the land owner, the City, the contractor, and others. The issue is a general comment from a land owner that will not be resolved.	3-Jan-06 QAR No. 132, 9-Jan-06 QAR No. 138, 28-Nov-06 QAR No. 461, and 7-Dec-06 QAR No. 470.
4	5-Jan-06	134	Contractor installed 14" pipe through the levee at 113th Ave. (water diversion from SRP irrigation canals) and is not shown on As-Built Plans.	Resolved; Not observed by GENTERRA during site visit on July 31, 2012.	5-Jan-06 QAR No. 134, and As-Built Sheets C-3 and C-4.
5	9-Jan-06	138	Trench was cut to drain the CIC at 113th Ave.	Resolved; Temporary drainage condition before CIC box culvert was installed.	9-Jan-06 Qar No. 138.
6	1-Mar-06	189	Pumping subgrade, inconsistent moisture, and excessive vegetation west of 107th Ave. Contractor removed and reworked areas. Check for potential long term moisture accumulation in this area.	Resolved; No issue reported in USACE Periodic Levee Inspection (April 2012) and no issue observed by GENTERRA during site visit on July 31, 2012.	1-Mar-06 QAR No. 189.
7	22-Mar-06	210	Rain occurred over the weekend. 1) Embankment fill pumping between STA 189+00 and 202+00, and 2) Concerns over riprap gradation at dikes, which may lead to erosion and exposed fabric.	Resolved; 1) Contractor agreed to "scarify area and dry out." 2) USACE to verify the gradation. Hoque suggested filling in any riprap voids with smaller gradation of riprap or even cobble. USACE observed installation of 27" riprap and felt process was adequate with necessary CQC testing. Contractor to arrange special sieve sizes to determine rock gradation.	22-Mar-06 QAR No. 210, 6-Apr-06 QAR No. 225, and 12-Apr-06 QAR No. 231.

TABLE IV-12
Summary of Construction Issues for Phase 1A

Issue No.	Date of Quality Assurance Report	Quality Assurance Report No.	Description of Issue	Status/Resolution	Reference
8	28-Mar-06	216	Excessive moisture in levee embankment at 107th to 111th Ave. Areas were bladed to seal the surface from anticipated rain.	Resolved; Contractor scarified upper 2' and bladed to seal the surface from anticipated rain.	28-Mar-06 QAR No. 216 and 29-Mar-06 QAR No. 217.
9	3-Apr-06	222	Flooding by farmers irrigation.	Resolved; Contractor responsible for keeping the CIC open for draining irrigation.	3-Apr-06 QAR No. 222.
10	6-Apr-06	225	Installation of 27" riprap on guide dikes. Concerns about bedding being washed out over time and use of alternate filter fabric.	Resolved; USACE Geotechnical Section Chief felt riprap was adequate with necessary CQC testing. Contractor to arrange special sieve sizes to determine rock gradation.	22-Mar-06 QAR No. 210, 6-Apr-06 QAR No. 225, and 12-Apr-06 QAR No. 231.
11	12-Apr-06	231	Relocation of 95th Ave Guide Dike due to existence of eucalyptus trees.	Resolved; USACE agreed to address relocation issue.	12-Apr-06 QAR No. 231.
12	14-Apr-06	233	Farmer at 113th Ave began irrigation of his crops between 111th and 113th Ave. A large volume of water was wasted runoff that flooded the east side of West 113th Ave Guide Dike.	Resolved; Contractor excavated a drainage ditch to the south.	14-Apr-06 QAR No. 233.
13	26-Apr-06	245	Embankment fill between STA 205+00 to 210+00 was saturated by farmers field runoff.	Resolved; Contractor removed 1' below subgrade, and replaced with 3" minus rock mixed with backfill material. All density tests passed in this area.	26-Apr-06 QAR No. 245.
14	4-May-06	253	Two soft spots in the subgrade for the collector channel 20' in length, at approx. 300' and 150' west of 107th Ave. Hoque is monitoring area and will possibly remove and mix aggregate to bridge these areas.	No resolution was reported.	4-May-06 QAR No. 253.
15	9-May-06	258	Culvert pipe, placed across 107th Ave. for drainage from farmers fields, is not shown on As-Built Plans.	Resolved; Pipe was not observed by GENTERRA during site visit on July 31, 2012.	9-May-06 QAR No. 258.

TABLE IV-12
Summary of Construction Issues for Phase 1A

Issue No.	Date of Quality Assurance Report	Quality Assurance Report No.	Description of Issue	Status/Resolution	Reference
16	17-May-06	266	Contractor requested to substitute the 15" riprap with the 24" riprap due to availability.	Resolved; Approved by CQA field engineer based on visual observation of a well graded sample.	17-May-06 QAR No. 266.
17	24-May-06	273	Viewed existing gabions along existing levee (115th Ave to west side of 113th Ave East Guide Dike). Gabions are virtually non-existent due to rusting and soil corrosion.	Resolved; Decision was made by USACE to delete the gabions between 115th Ave. bridge and west side of 115th Ave. Guide Dike.	24-May-06 QAR No. 273.
18	6-Jun-06	286	Concrete placement along the collector channel east of 107th Ave was placed during extreme heat advisory (84 to 104 degrees).	Resolved; There is no mention of concrete curing method used as required by specifications.	6-Jun-06 QAR No. 286, 7-Jun-06 QAR No. 287, and Specifications 03307 Concrete for Minor Structures.
19	19-Jun-06	299	1) Revisited prior concrete placement of the collector channel. Two panel sections have longitudinal cracks at the vertical hinge point. 2) Inspected rebar for the day's concrete pour and found numerous areas requiring rebar clearances to be fixed (i.e. too close to the surface).	1) No resolution was reported. 2) Resolved; Contractor made corrections prior to placement of concrete for the day.	19-Jun-06 QAR No. 299, 22-Jun-06 QAR No. 302, 23-Jun-06 QAR No. 303, 5-Jul-06 QAR No. 315, and 11-Jul-06 QAR No. 321.
20	22-Jun-06	302	John Mallin (CQC) inspected collector channel (STA 37+50 to 42+00) prior to placement of concrete and noted several areas requiring rebar clearances and removal of loose material from footing and slope.	Resolved; On June 23rd, contractor and CQC had concrete workers skip work on the concrete placement so that clearance issue can be resolved.	19-Jun-06 QAR No. 299, 22-Jun-06 QAR No. 302, 23-Jun-06 QAR No. 303, and 5-Jul-06 QAR No. 315.
21	5-Jul-06	315	Senior project manager was informed that sections of the collector channel where rebar was exposed needed to be removed. Two other sections with cracking require core drilling to determine rebar clearance.	No resolution was reported.	19-Jun-06 QAR No. 299, 22-Jun-06 QAR No. 302, 23-Jun-06 QAR No. 303, 5-Jul-06 QAR No. 315, and 11-Jul-06 QAR No. 321.
22	7-Jul-06	317	Contractor cleaned collector channel east of 107th Ave. to observe cracking and to check flow.	No resolution was reported.	7-Jul-06 QAR No. 317.
23	10-Jul-06	320	John Mallin (CQC) observed considerable amounts of organic and unblended fill material at 95th Ave Guide Dike.	Resolved; On July 12th three density tests were taken at the 95th Ave Guide Dike. All tests passed.	10-Jul-06 QAR No. 320, 12-Jul-06 QAR No. 322, 13-Jul-06 QAR No. 323, and QA Test No. AT-00008.

TABLE IV-12
Summary of Construction Issues for Phase 1A

Issue No.	Date of Quality Assurance Report	Quality Assurance Report No.	Description of Issue	Status/Resolution	Reference
24	11-Jul-06	321	From 105th to 107th Ave, the collector channel was observed having intermediate cracks through several 16' sections. Rashid (CQC) stated cracks occurred where #5 longitudinal bar laps are.	No resolution was reported.	11-Jul-06 QAR No. 321.
25	19-Jul-06	329	Inspected collector channel prior to next day's scheduled concrete placement and noted unacceptable work. Lacked rebar clearances, missing a few bar sections, concrete slobber not removed, form stakes embedded in concrete slobber, and footings not cleaned.	Resolved; Jack Kash (superintendent) had addressed these concerns already with contractor. It was decided that concrete would not be poured for the day.	19-Jul-06 QAR No. 329.
26	25-Jul-06	335	Possible change order for 14' access along north side of catch basin.	Resolved; On September 7th, change order was executed to extend the road on north side of catch basin and tie into the O&M road east of 113th Ave.	25-Jul-06 QAR No. 335, 7-Sep-06 QAR No. 379, 18-Sep-06 QAR No. 390, 19-Sep-06 QAR No. 391, 20-Sep-06 QAR No. 392, and 21-Sep-06 QAR No. 393.
27	2-Aug-06	343	Concerns on tying into existing gabion mattresses between W 113th Ave and East 113th Ave Guide Dikes. Should the mattresses be installed at a consistent elevation, or tied into the existing mattress elevations.	Resolved; Tied into existing gabion mattresses per drawings, which indicate variation in depth.	2-Aug-06 QAR No. 343.
28	9-Aug-06	350	Contractor installed 36" size riprap for the 95th Ave Guide Dike. As-Built Sheet GD-21 required 33" riprap.	Resolved; QCR No. 350 stated placement of 33" riprap at 95th Ave Guide Dike. Possibly a typo in the QAR's.	21-Jul-06 QAR No. 331, 4-Aug-06 QAR No. 345, 9-Aug-06 QAR No. 350, and 9-Aug-06 QCR No. 350.
29	23-Aug-06	364	Land owner irrigation water overflows into the catch basin and erodes the slopes.	No resolution was reported. Based on USACE Periodic Levee Inspection (April 2012), erosion is present on the basin slopes.	23-Aug-06 QAR No. 364, and during site visit on July 31, 2012, GENTERRA verified erosion is present on the basin slopes.
30	5-Sep-06	377	Inspected collector channel and found too much standing water and mud for concrete placement (between 111th and 113th Ave). On September 6th & 7th area was still too muddy with standing water.	Resolved; No concrete was placed for those dates.	5-Sep-06 QAR No. 377, 6-Sep-06 QAR No. 378, and 7-Sep-06 QAR No. 379.

TABLE IV-12
Summary of Construction Issues for Phase 1A

Issue No.	Date of Quality Assurance Report	Quality Assurance Report No.	Description of Issue	Status/Resolution	Reference
31	7-Sep-06	379	Change order to be issued to extend O&M road on the north side of the catch basin and tie it into the O&M road east side of 113th Ave.	Resolved; Contractor performed change order work for O&M road on the north side of catch basin.	25-Jul-06 QAR No. 335, 7-Sep-06 QAR No. 379, 18-Sep-06 QAR No. 390, 19-Sep-06 QAR No. 391, 20-Sep-06 QAR No. 392, and 21-Sep-06 QAR No. 393.
32	2-Oct-06	404	Saturation issues at subgrade of box culvert at 113th Ave. Area has some unsuitable material due to rain saturation and runoff from the collector channel.	Resolved; Contractor worked area. On October 4th, density tests were performed and all passed.	2-Oct-06 QAR No. 404 and 4-Oct-06 QAR No. 406.
33	1-Nov-06	434	Checked between 107th and 113th Ave to make sure farmers tail water were flowing properly. Some water diversion was required at 109th and 111th Ave. City of Phoenix changes will be presented in an email.	Resolved; City of Phoenix will address changes in email.	1-Nov-06 QAR No. 434.
34	28-Nov-06	461	Land owner concerned that catch basin does not have a concrete low flow outlet, which causes the development of weeds and mosquitos. Land owner wants a concrete low flow from 113th Ave culvert to 115th Ave culvert.	The issue is a general comment from a land owner that will not be resolved. On December 7th, meeting took place and issue was not resolved.	3-Jan-06 QAR No. 132, 9-Jan-06 QAR No. 138, 28-Nov-06 QAR No. 461, and 7-Dec-06 QAR No. 470.
35	6-Feb-07	531	Phase 1A final inspection; Several modifications were requested by Maricopa Co. Flood Control District. One item was the grouted riprap at 113th Ave appearing to block flow from the culvert.	No resolution was reported.	6-Feb-07 QAR No. 531 and QA-00035.

Summary of Construction Issues for Phase 1B

Issue No.	Date of Quality Assurance Report	Quality Assurance Report No.	Description of Issue	Status/Resolution	Reference
1	28-Feb-08	92	Low spots encountered at 117th Ave Guide Dike are filled with 15" rock. Low spots at 121st Ave Guide Dike. 115th Ave Access Ramp was designed during construction.	Resolved; Design in Process. USACE Los Angeles District was on the job to look at "bog" at end of 121st Ave Guide Dike. Paul Beaver (USACE) said to drain the bog and fill with rock that is on site and build dike over the top of rock.	28-Feb-08 QAR No. 92 and 20-Mar-08 QAR No. 113.
2	14-Mar-08	107	Minor design revision. CIC channel invert possibly changed from 2% to 0%.	Resolved; Pham (USACE) changed design to "flat" from 2%.	14-Mar-08 QAR No. 107.
3	2-Apr-08	126	Materials excavated from north end of 121st Ave Guide Dike was used to build 119th Ave and 121st Ave Guide Dikes.	Resolved; Contractor was excavating water flow around north end of 121st Ave Guide Dike and used material to build 119th and 121st Ave Guide Dikes.	2-Apr-08 QAR No. 126.
4	15-Apr-08	139	Check retest results on density tests STA 4+50 centerline 5' below grade.	Resolved; Test failed and retest passed.	15-Apr-08 QAR No. 139 and 16-Apr-08 QAR No. 140.
5	23-Apr-08	147	Blaine Brillhart requested to place 24" RCP used for side drain in lieu of V-ditch.	Resolved; David Pham (USACE) informed Blaine Brillhart that this was acceptable.	23-Apr-08 QAR No. 147.
6	6-May-08	160	Encountered groundwater during excavation of the cutoff wall of the outlet structure immediately downstream of the box culvert. The turndown extends 4' 10" below the bottom of the outlet structure's slab. Contractor plans to pump water and place concrete at the same time.	No resolution was reported. From May 6th through August 6th, "placing and compacting fill material for new levee around box culvert" was reported.	6-May-08 QAR No. 160 through 6-Aug-08 QAR No. 252 and As-Built Sheets S-2 and S-3.
7	12-Jun-08	197	Three issues were informed to David Pham (USACE): 1) Diversion channel not working as designed, 2) Need to acquire land in order to build 115th Ave Access Ramp, and 3) Contractor would like to leave out approx. 300' of gabion mattress on far upstream end.	No resolution was reported. No mention of land acquisition but they are "starting clearing for 115th Ave Access Road."	12-Jun-08 QAR No. 197, 19-Jun-08 QAR No. 204, and 18-Aug-08 QAR No. 264.
8	28-Aug-08	274	Contractor removed pumping area on O&M road and replaced it with Aggregate Base Course.	No resolution was reported. No clear response, but it appears work was done with no backfilling of this area mentioned in QAR.	28-Aug-08 QAR No. 274 and As-Built Sheet O&MR-21 through O&MR-24.

TABLE IV-13
Summary of Construction Issues for Phase 1B

Issue No.	Date of Quality Assurance Report	Quality Assurance Report No.	Description of Issue	Status/Resolution	Reference
9	3-Sep-08	280	Silt has washed down from levee slope into approximately 2' of Aggregate Base Course on the Lower O&M Road.	No resolution was reported.	3-Sep-08 QAR No. 280 and QA-00005.
10	9-Sep-08	286	QA Comments listed several items to be corrected: 1) Wrong size riprap on guide dikes were installed, 2) Grouted culverts have been buried in levee, 3) Install flapper gates, and 4) Install trash racks.	1) Resolved. Fixed riprap on guide dikes; 2) No resolution was reported; 3) No resolution was reported; and 4) Resolved. Installed trash racks.	1) 16-Sep-08 QAR No. 293, 17-Sep-08 QAR No. 294, and 18-Sep-08 QAR No. 295; 2) None; 3) None; and, 4) 30-Oct-08 QAR No. 337.
11	17-Sep-08	294	Contractor cleaned up after irrigation water flooded site.	Resolved.	17-Sep-08 QAR No. 294.
12	30-Sep-08	307	RCP across El Mirage Road. Groundwater encountered during excavation.	Resolved; "Contractor went ahead and excavated area, then filled with 2 sack slurry. Tomorrow he will excavate the toe down thur the harden slurry."	30-Sep-08 QAR No. 307.
13	6-Oct-08	313	Diversion Channel and turnaround area were constructed with changes from design per Modification No. 0006. Issue with the elevations being below the water level of the river.	No resolution was reported. Contractor requested USACE to re-evaluate the design plans with the field conditions. Contractor performed work per Modification No. 0006.	6-Oct-08 QAR No. 313 through 15-Oct-08 QAR No. 322, Modification No. 0006 (unable to locate), RFI No. RFI-0006, and As-Built Sheet DIVC-41.
14	15-Oct-08	322	From 119th Ave and 122nd Ave, extra gates were installed along the side of the road (right-of-way) per MCFCD's request.	Resolved.	15-Oct-08 QAR No. 322 and 21-Oct-08 QAR No. 328.

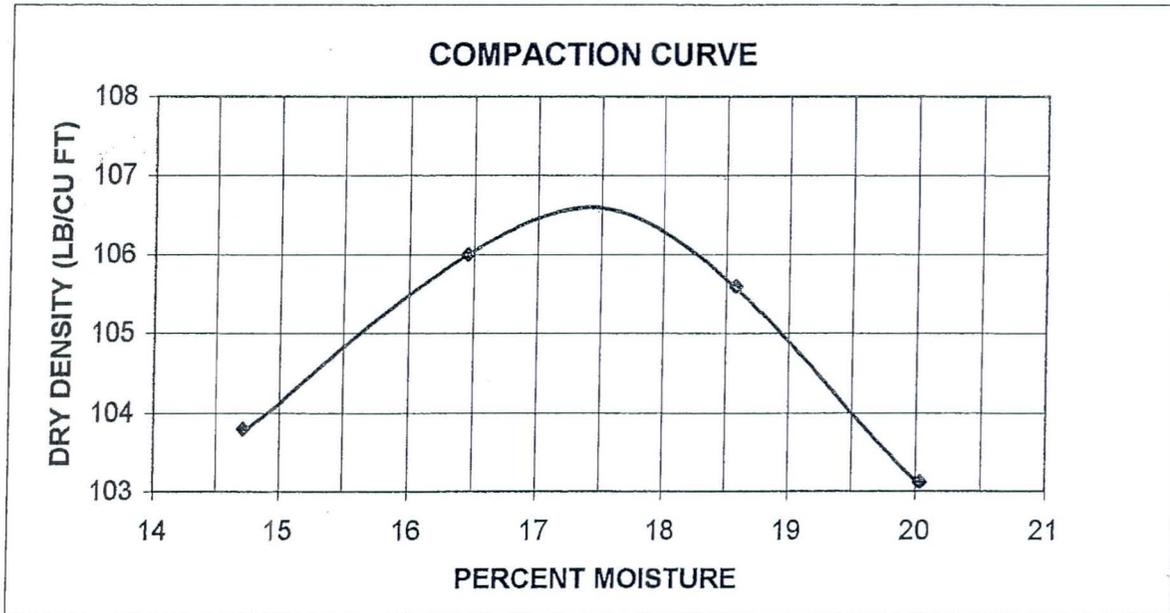
PROCTOR

HOQUE & ASSOCIATES	
4325 South 34th Street	
Phoenix, Arizona 85040	
Tel : 480-921-1368	
Fax : 480-921-0194	

Client :	TPA-CKY Joint Venture	HA Project No. :	05173
Project :	Tres Rios Env. Rest. Phase 1A	HA Lab No.:	06L0836A
Location:	105th -115th Ave on Salt River	Date Received :	4/7/06
	Phoenix, Arizona	Proctor Type	Standard
Material :	Native	Method	D698 A
Mat. Source :	95th Ave Dike Borrow Pit		
Sampled By :	AR	Tested By :	AR
Sampled Date :	4/6/06	Test Dates :	4/12/06
Submitted by :	AR		

Point No.	1	2	3	4	5
WM+WS (g)	6374.5	6440.6	6467.5	6445.7	
WW (g)	537.8	235.7	208.7	224.7	
DW (g)	468.8	202.4	176.0	187.2	
Moisture (%)	14.7	16.5	18.6	20.0	
WM (g)	4570.4				
VM (cu. ft.)	0.0334				
Rock (%)					

MOISTURE	14.7	16.5	18.6	20.0
DRY DENSITY	103.8	106.0	105.6	103.1



LAB	
Max. Dry Density (lb/cu. ft.)	106.6
Opt. Moisture Content (%)	17.4

ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	
Opt. Moisture Content (%)	

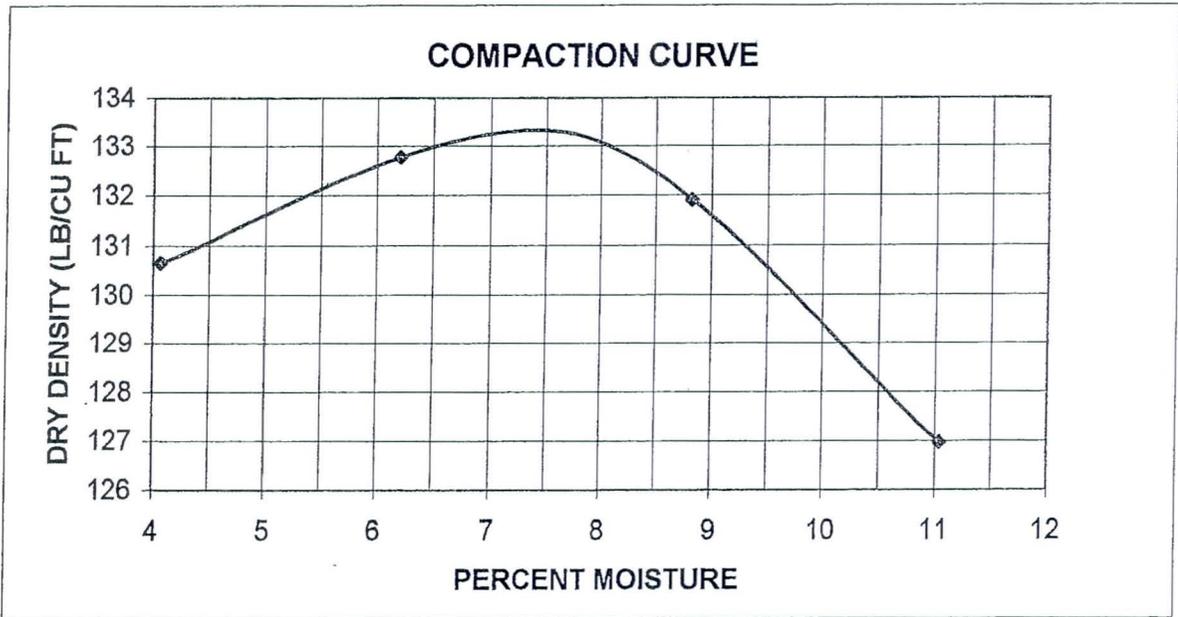
PROCTOR

HOQUE & ASSOCIATES
4325 South 34th Street Phoenix, Arizona 85040 Tel : 480-921-1368 Fax : 480-921-0194

Client : TPA-CKY Joint Venture	HA Project No. : 05173
Project : Tres Rios Env. Rest. Phase 1A	HA Lab No.: 05L1092
Location: 105th -115th Ave on Salt River Phoenix, Arizona	Date Received : 7/12/06
Material : ABC	Proctor Type Modified
Mat. Source : 115th Ave Box Culvert	Method D1557 C
Sampled By : AR	
Sampled Date : 7/11/06	Tested By : GR
Submitted by : AR	Test Dates : 7/17/06

Point No.	1	2	3	4	5
WM+WS (g)	11009.9	11181.5	11268.1	11180.5	
WW (g)	714.6	639.8	544.8	543.1	
DW (g)	686.7	602.4	500.6	489.1	
Moisture (%)	4.1	6.2	8.8	11.0	
WM (g)	6384.1				
VM (cu. ft.)	0.075				
Rock (%)					

MOISTURE	4.1	6.2	8.8	11.0
DRY DENSITY	130.7	132.8	131.9	127.0



LAB	
Max. Dry Density (lb/cu. ft.)	133.4
Opt. Moisture Content (%)	7.4

ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	
Opt. Moisture Content (%)	

PROCTOR

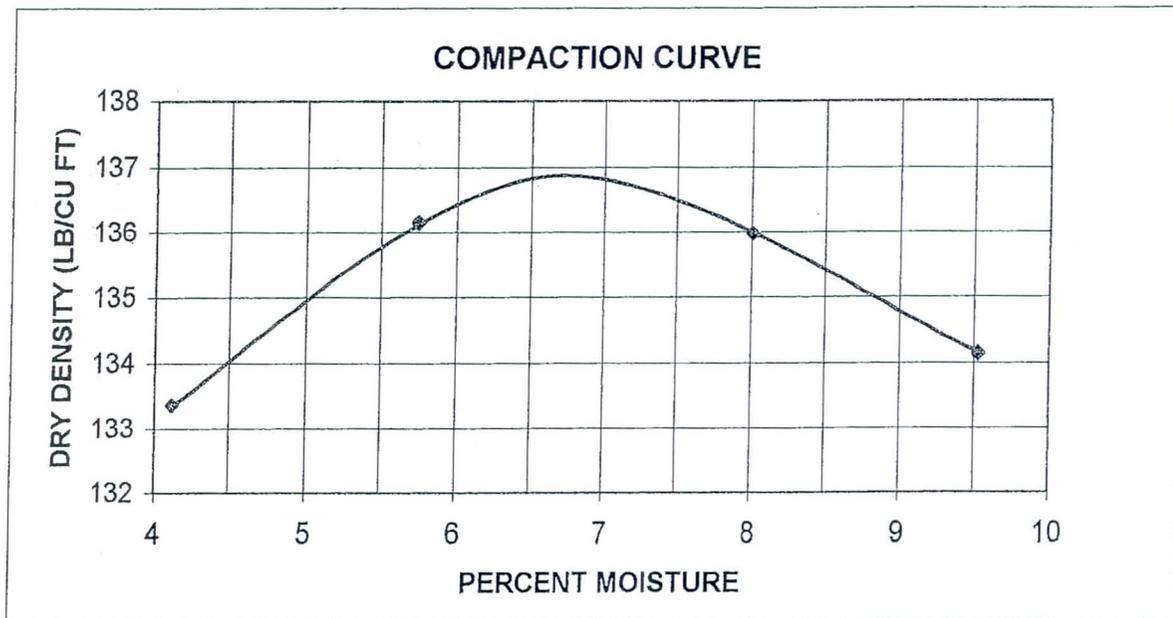
HOQUE & ASSOCIATES

4325 South 34th Street
 Phoenix, Arizona 85040
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 Fax : 480-921-0194

Client : TPA-CKY Joint Venture	HA Project No. : 05173
Project : Tres Rios Env. Rest. Phase 1A	HA Lab No.: 05L1742 06L1441
Location: 105th -115th Ave on Salt River Phoenix, Arizona	Date Received : 11/29/05 8/8/06
Material : ABC	Proctor Type Modified
Mat. Source : Stockpile west of 107th Ave (Rinker)	Method D1557 C
Sampled By : AR	
Sampled Date : 8/8/06	Tested By : TL
Submitted by : AR	Test Dates : 8/14/06

Point No.	1	2	3	4	5
WM+WS (g)	11106.1	11280.0	11378.6	11380.4	
WW (g)	801.3	710.6	4959.1	4834.0	
DW (g)	769.6	672.0	4591.3	4413.3	
Moisture (%)	4.1	5.7	8.0	9.5	
WM (g)	6381.7				
VM (cu. ft.)	0.075				
Rock (%)					

MOISTURE	4.1	5.7	8.0	9.5
DRY DENSITY	133.4	136.2	136.0	134.1



LAB	
Max. Dry Density (lb/cu. ft.)	136.9
Opt. Moisture Content (%)	6.7

ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	
Opt. Moisture Content (%)	

PROCTOR

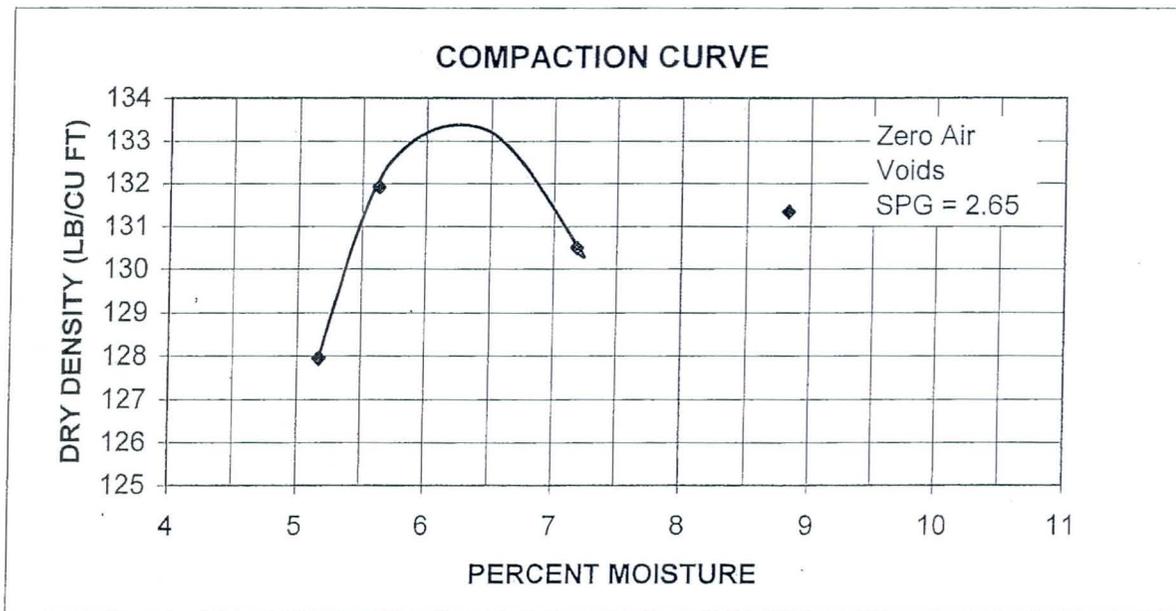
HOQUE & ASSOCIATES
4325 South 34th Street Phoenix, Arizona 85040 Tel : 480-921-1368 Fax : 480-921-0194

Client : USACE	HA Project No. : 05173
Project : Tres Rios Enviroment Res Phase 1A	HA Lab No.: 06L1809
Location: 115th to 105th ave @ Salt River Phoenix, Arizona	Date Received : 10/10/06
Material : ABC	Proctor Type <u>Standard</u>
Mat. Source : West @107th ave stockpile	Method <u>D698-A</u>
Sampled By : AR	Tested By : AR
Sampled Date : 10/10/06	Test Dates : 10/17/06
Submitted by : AR	

*Modified
D-1557 C*

Point No.	1	2	3	4	5
WM+WS (g)	10971.9	11135.4	11153.4	11258.1	
WW (g)	810.0	744.8	805.8	4860.8	
DW (g)	770.2	705.1	751.8	4466.5	
Moisture (%)	5.2	5.6	7.2	8.8	
WM (g)	6376.0				
VM (cu. ft.)	0.0753				
Rock (%)					

MOISTURE	5.2	5.6	7.2	8.8
DRY DENSITY	127.9	131.9	130.5	131.3



LAB	
Max. Dry Density (lb/cu. ft.)	133.4
Opt. Moisture Content (%)	6.3

ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	
Opt. Moisture Content (%)	

PROCTOR

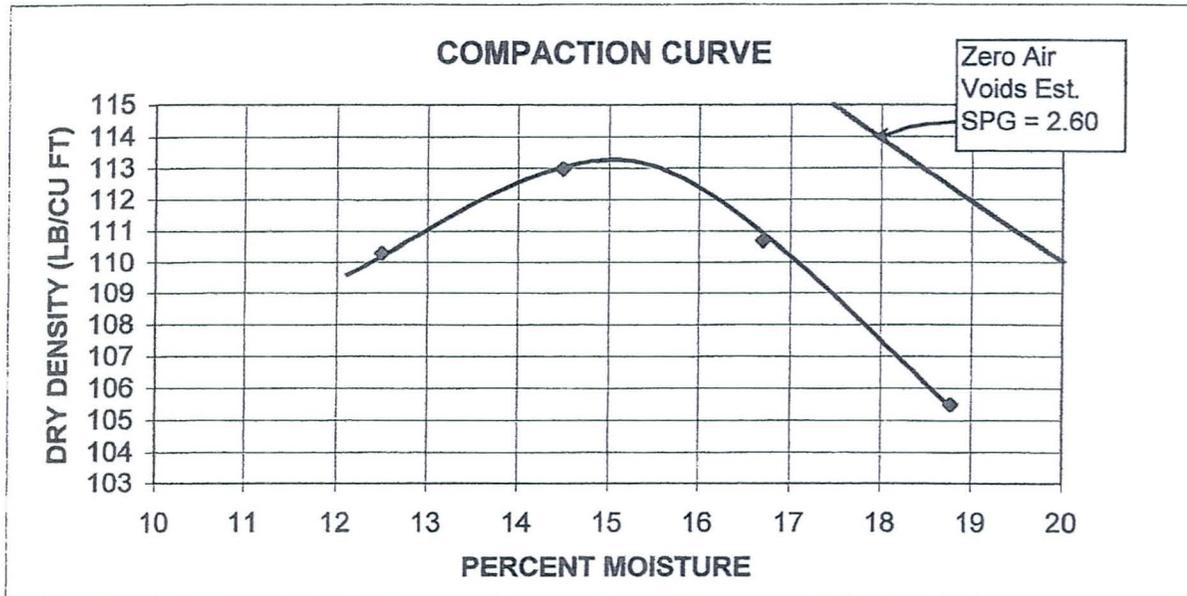
HOQUE & ASSOCIATES
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ERS

Client :	Tres-Rios Environmental Restoration	HA Project No. :	08021
Project :	Flood Control North Levee Phase 1B	HA Lab No.:	08L0060
Location:	El Mirage Road to 115th Avenue	Date Received :	1/30/08
Material :	Silty Sand, SM	Proctor Type	D-698
Source:	Sta. 135+00, Collector Channel	Method	A
Sampled By :	AR		
Sampled Date :	1/30/08	Tested By :	FR
Submitted By :	AR	Test Dates	2/1/2008

Point No.	1	2	3	4	5
WM+WS (g)	6090.3	6169.7	6167.0	6108.3	
WW (g)	467	451.8	434.7	477.0	
DW (g)	415.1	394.6	372.5	401.6	
Moisture (%)	12.5	14.5	16.7	18.8	
WM (g)	4216.0				
VM (cu. ft.)	0.0333				
Rock (%)					

MOISTURE	12.5	14.5	16.7	18.8
DRY DENSITY	110.3	113.0	110.7	105.5



LAB	
Max. Dry Density (lb/cu. ft.)	113.3
Opt. Moisture Content (%)	15.0

ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	113.3
Opt. Moisture Content (%)	15.0

PROCTOR

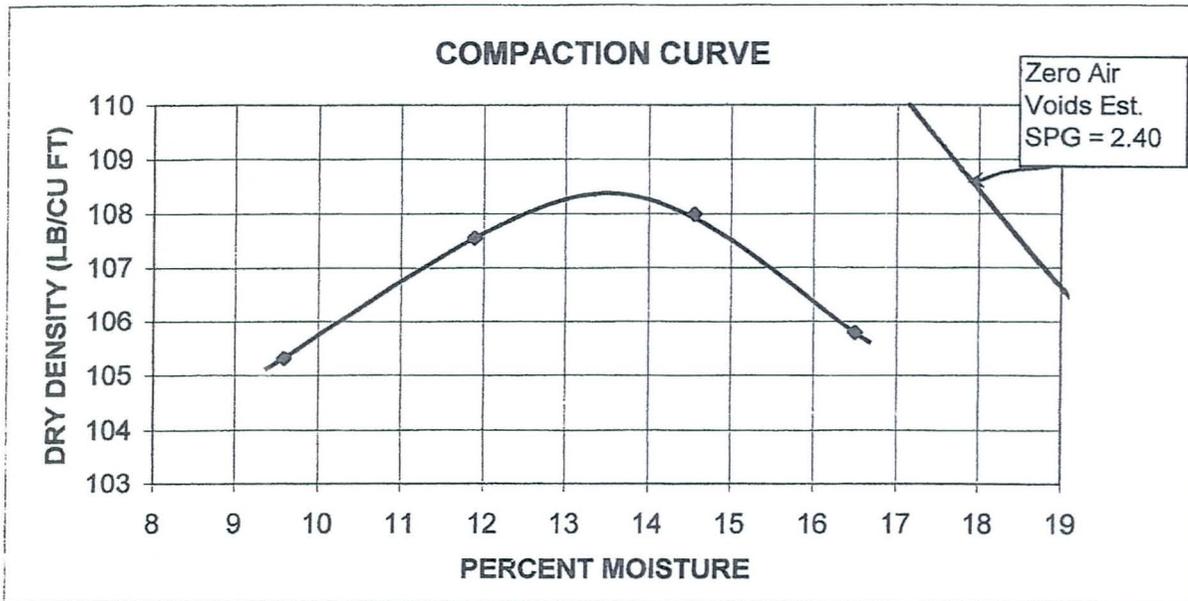
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 Fax : 480-921-0194

ERS

Client :	Tres-Rios Environmental Restoration	HA Project No. :	08021
Project :	Flood Control North Levee Phase 1B	HA Lab No.:	08L0059
Location:	El Mirage Road to 115th Avenue	Date Received :	1/30/08
Material :	Sany Silt, ML	Proctor Type	D-698
Source:	Sta 120+75, Collector Channel	Method	A
Sampled By :	AR	Tested By :	
Sampled Date :	1/30/08	Test Dates	
Submitted By :	AR		

Point No.	1	2	3	4	5
WM+WS (g)	5952	6026.0	6077.0	6070.0	
WW (g)	482.5	536.5	479.2	526.7	
DW (g)	440.3	479.5	418.3	452.1	
Moisture (%)	9.6	11.9	14.6	16.5	
WM (g)	4214.0				
VM (cu. ft.)	0.0332				
Rock (%)					

MOISTURE	9.6	11.9	14.6	16.5
DRY DENSITY	105.3	107.5	108.0	105.8



LAB	
Max. Dry Density (lb/cu. ft.)	108.4
Opt. Moisture Content (%)	13.5

ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	108.4
Opt. Moisture Content (%)	13.5

PROCTOR

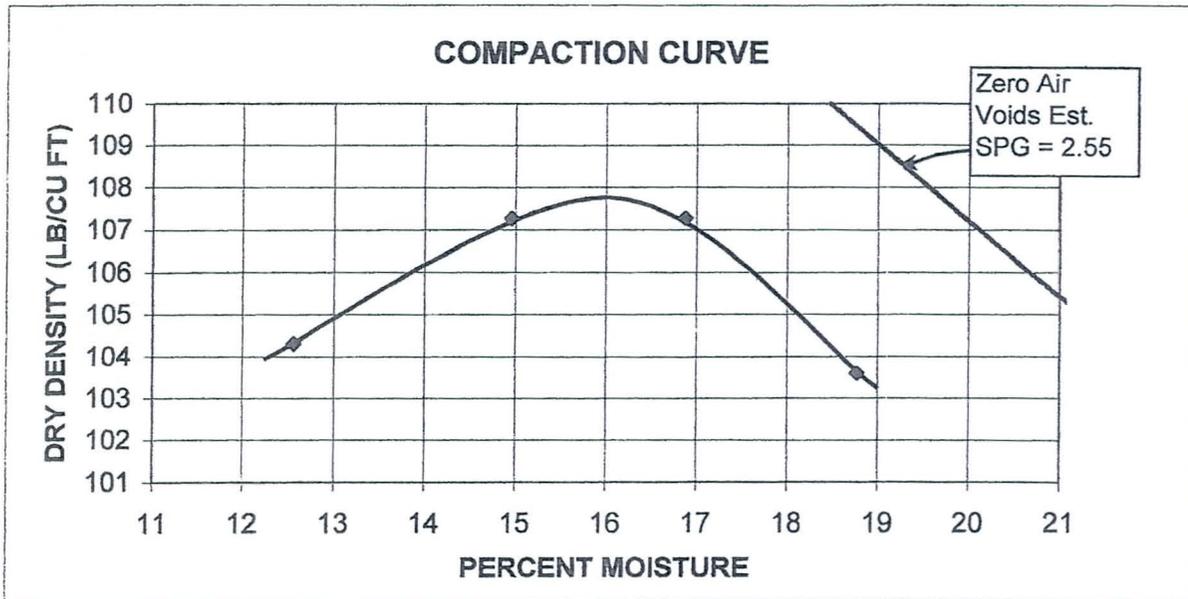
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 Phoenix, Arizona 85040
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ERS

Client :	Tres-Rios Environmental Restoration	HA Project No. :	08021
Project :	Flood Control North Levee Phase 1B	HA Lab No.:	08L0057
Location:	El Mirage Road to 115th Avenue	Date Received :	1/30/08
Material :	Silt with Sand, ML	Proctor Type	D-698
Source:	E of El Mirage, Sta. 107+00, Detention Basin	Method	A
Sampled By :	AR	Tested By :	
Sampled Date :	1/30/08	Test Dates	
Submitted By :	AR		

Point No.	1	2	3	4	5
WM+WS (g)	5982	6071.0	6102.0	6067.0	
WW (g)	534.2	542.5	540.2	503.6	
DW (g)	474.6	471.9	462.2	424.0	
Moisture (%)	12.6	15.0	16.9	18.8	
WM (g)	4214.0				
VM (cu. ft.)	0.0332				
Rock (%)					

MOISTURE	12.6	15.0	16.9	18.8
DRY DENSITY	104.3	107.3	107.3	103.6



LAB	
Max. Dry Density (lb/cu. ft.)	107.8
Opt. Moisture Content (%)	16.0

ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	107.8
Opt. Moisture Content (%)	16.0

PROCTOR

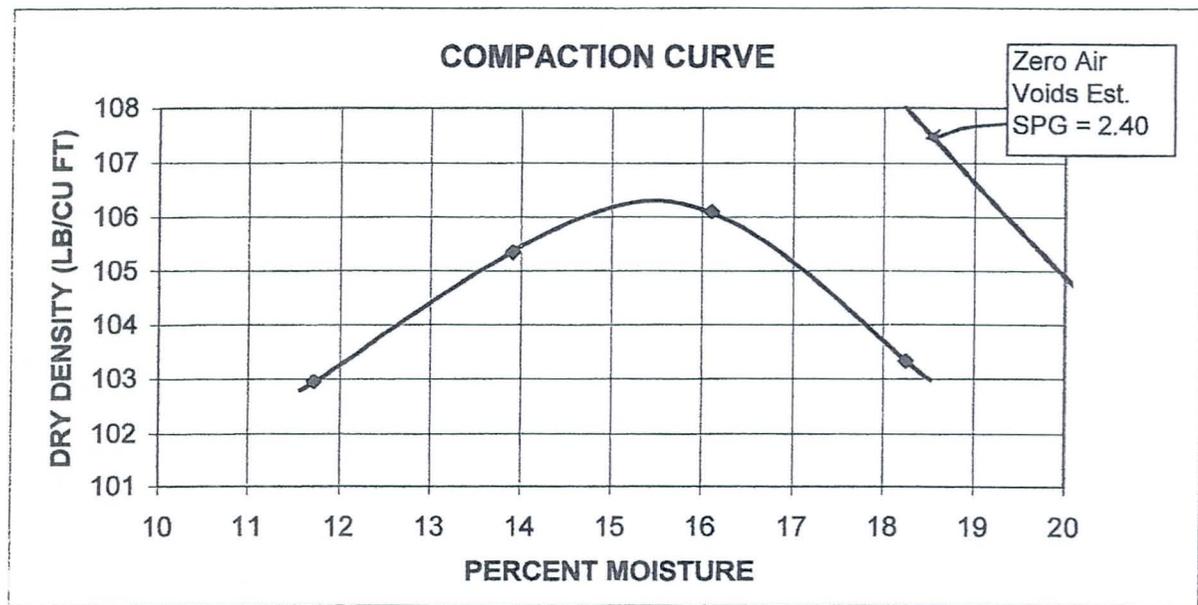
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ERS

Client :	Tres-Rios Environmental Restoration	HA Project No. :	08021
Project :	Flood Control North Levee Phase 1B	HA Lab No.:	08L0058
Location:	El Mirage Road to 115th Avenue	Date Received :	1/30/08
Material :	Silty Sand, SM	Proctor Type	D-698
Source:	Sta. 1+ 50, Diversion Channel	Method	A
Sampled By :	AR	Tested By :	PF
Sampled Date :	1/30/08	Test Dates	2/1/2008
Submitted By :	AR		

Point No.	1	2	3	4	5
WM+WS (g)	6021	6069.0	6054.0	5946.0	
WW (g)	483.3	509.0	514.5	487.3	
DW (g)	424.3	438.4	435.1	436.2	
Moisture (%)	13.9	16.1	18.2	11.7	
WM (g)	4214.0				
VM (cu. ft.)	0.0332				
Rock (%)					

MOISTURE	13.9	16.1	18.2	11.7
DRY DENSITY	105.3	106.1	103.3	102.9



LAB	
Max. Dry Density (lb/cu. ft.)	106.3
Opt. Moisture Content (%)	15.5

ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	106.3
Opt. Moisture Content (%)	15.5

Laboratory Compaction Curves for Phase 1B



PROJECT: Tres Rios North Levee
 LOCATION: 107th Avenue and Southern Avenue
 MATERIAL: Soil
 SAMPLE SOURCE: Sta. 143+40, Center of N Levee

JOB NO: 3-119-000072
 WORK ORDER NO: 35
 LAB NO: 150
 DATE SAMPLED: 2/14/08

**LABORATORY COMPACTION CHARACTERISTICS OF SOILS USING
 STANDARD EFFORTS (12,400ft-lb-ft/cu.ft) (ASTMD698A)
 SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES (ASTM C136/C117)
 DETERMINING PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS (AASHTO T89 & T90)**

CURVE:
 MAXIMUM DRY DENSITY (pcf):
 OPTIMUM MOISTURE (%):

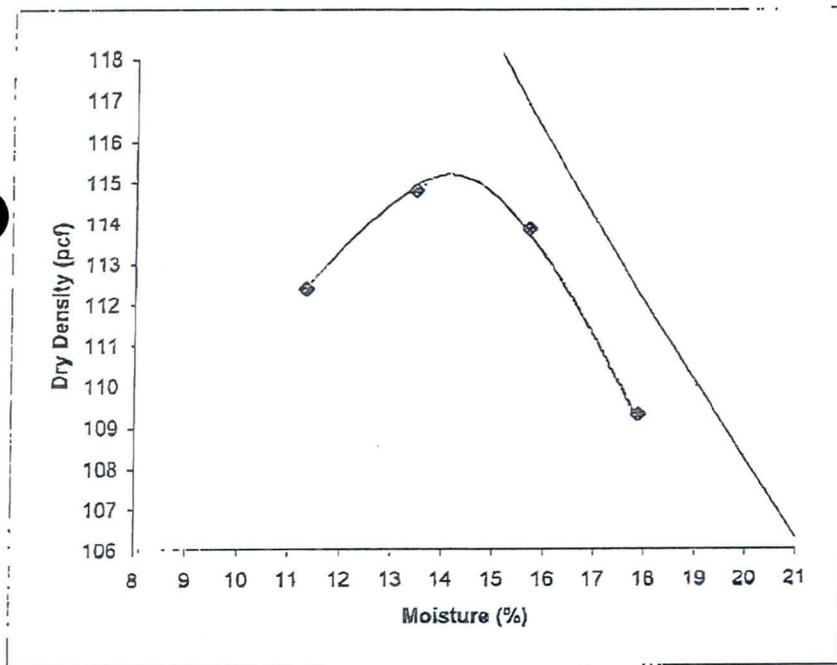
EE	
115.2	
14.2	

SIEVE SIZE PERCENT PASSING

6"	100
4"	100
3"	92
2"	85
1 1/2"	84
1 1/4"	84
1"	83
3/4"	83
1/2"	82
3/8"	81
1/4"	80
#4	80
#8	79
#10	79
#16	79
#30	77
#40	75
#50	73
#100	61
#200	42

ATTERBERG LIMITS

LL: 22
 PL: 21
 PI: 1
 USCS: SM



NOTE: THE ZERO AIR VOIDS CURVE REPRESENTS A SPECIFIC GRAVITY OF: 2.651 ASSUMED.

THIS IS A SUMMARIZED REPORT OF THE REFERENCED PROCEDURES AND DOES NOT INCLUDE ALL REPORTING REQUIREMENTS. ADDITIONAL DATA CAN BE PROVIDED AT CLIENT'S REQUEST.



REVIEWED BY Cy

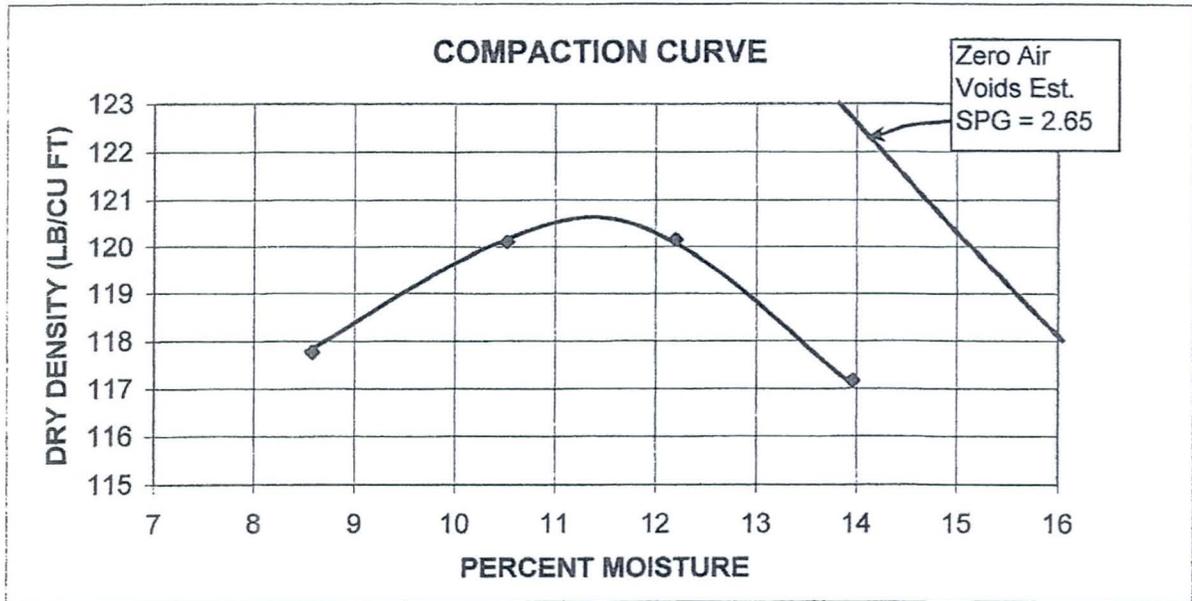
PROCTOR

HOQUE & ASSOCIATES	
4325 South 34th Street	
Phoenix, Arizona 85040	
Tel : 480-921-1368	
Fax : 480-921-0194	

Client :	ERS	HA Project No. :	08021
Project :	Tres-Rios Environmental Restoration	HA Lab No.:	08L0118
Location:	Flood Control North Levee Phase 1B	Date Received :	2/20/08
	El Mirage Road to 115th Avenue	Proctor Type	D-698
Material :	Silty Sand with Gravel, SM	Method	A
Source:	Existing Levee, Sta 109+00		
Sampled By :	AR	Tested By :	TL
Sampled Date :	2/19/08	Test Dates	2/20/2008
Submitted By :	AR		

Point No.	1	2	3	4	5
WM+WS (g)	6139.9	6213.2	6244.5	6224.9	
WW (g)	335.3	348.8	336.5	452.2	
DW (g)	308.8	315.6	299.9	396.8	
Moisture (%)	8.6	10.5	12.2	14.0	
WM (g)	4214.2				
VM (cu. ft.)	0.0332				
Rock (%)	37				

MOISTURE	8.6	10.5	12.2	14.0
DRY DENSITY	117.8	120.1	120.2	117.2



LAB	
Max. Dry Density (lb/cu. ft.)	120.7
Opt. Moisture Content (%)	11.4

ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	131.1
Opt. Moisture Content (%)	7.6

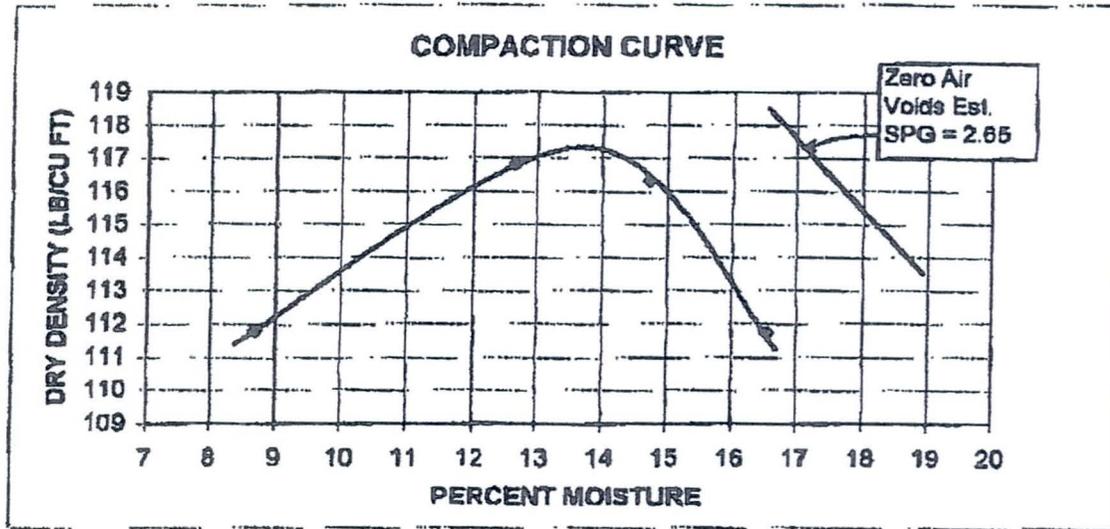
PROCTOR

HOQUE & ASSOCIATES
4325 South 34th Street
Phoenix, Arizona 85040
Tel : 480-921-1368
Fax : 480-921-0194

Client :	ERS	HA Project No. :	08021
Project :	Tres-Rios Environmental Restoration	HA Lab No.:	08L0137
Location:	Flood Control North Levee Phase 1B	Date Received :	2/27/08
	El Mirage Road to 115th Avenue	Proctor Type	Modified
Material :	Silty Sand, SM	Method	A
Source:	Collector Channel, Sta. 33+20		
Sampled By :	AR	Tested By :	FR
Sampled Date :	2/26/08	Test Dates	2/27/2008
Submitted By :	AR		

Point No.	1	2	3	4	5
WM+WS (g)	6199.9	6227.4	6178.8	6047.1	
WW (g)	587.1	461.8	463.5	562.9	
DW (g)	521.1	402.5	397.7	517.9	
Moisture (%)	12.7	14.7	16.5	8.7	
WM (g)	4212.1				
VM (cu. ft.)	0.0333				
Rock (%)					

MOISTURE	12.7	14.7	16.5	8.7
DRY DENSITY	116.8	116.3	111.7	111.8



LAB		ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	117.3	Max. Dry Density (lb/cu. ft.)	117.3
Opt. Moisture Content (%)	13.7	Opt. Moisture Content (%)	13.7

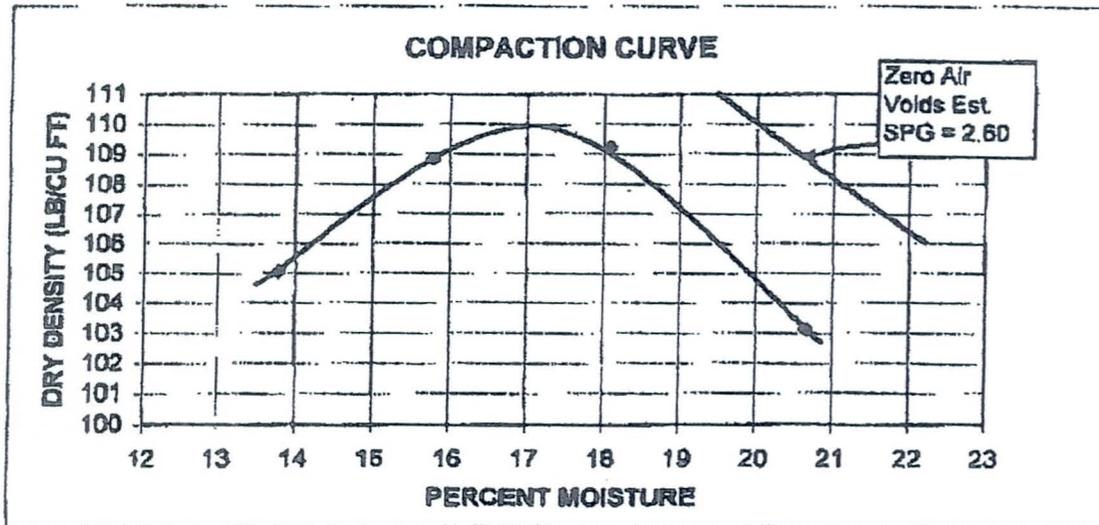
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 Fax: 480-921-0194

Client:	ERS	HA Project No.:	08021
Project:	Tres-Rios Environmental Restoration	HA Lab No.:	08L0136
Location:	Flood Control North Levee Phase 1B	Date Received:	2/27/08
	El Mirage Road to 115th Avenue	Proctor Type	Modified
Material:	Native Soil	Method	A
Source:	Sta 24+50, Collector Channel		
Sampled By:	AR	Tested By:	TL
Sampled Date:	2/26/08	Test Dates	2/27/2008
Submitted By:	AR		

Point No.	1	2	3	4	5
WM+WVS (g)	6156.3	6087.8	6111.8	6014.2	
WV (g)	345.4	341.1	378.6	347.5	
DW (g)	292.5	282.7	327.0	305.4	
Moisture (%)	18.1	20.7	15.8	13.8	
WM (g)	4214.2				
VM (cu. ft.)	0.0332				
Rock (%)					

MOISTURE	18.1	20.7	15.8	13.8
DRY DENSITY	109.2	103.1	108.8	105.0



LAB	
Max. Dry Density (lb/cu. ft.)	110.0
Opt. Moisture Content (%)	17.0

ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	110.0
Opt. Moisture Content (%)	17.0

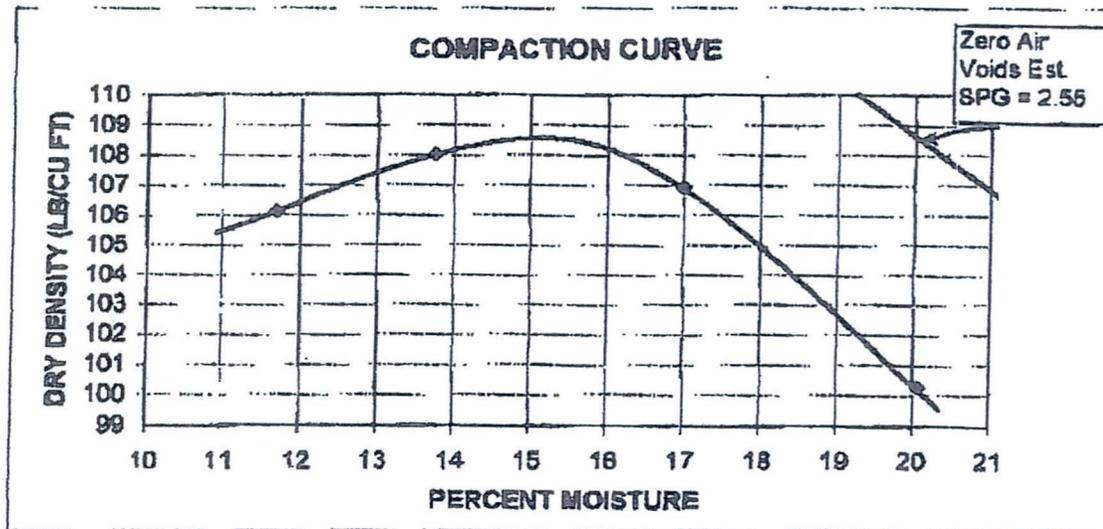
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 Fax : 480-821-0194

Client :	ERS	HA Project No. :	08021
Project :	Tres-Rios Environmental Restoration	HA Lab No. :	08L0179
Location :	Flood Control North Levee Phase 1B	Date Received :	3/3/08
	El Mirage Road to 115th Avenue	Proctor Type	D-1557
Material :	Silty Sand, SM	Method	A
Source :	Diversion Channel, Sta 2+00, Pit #1		
Sampled By :	AR	Tested By :	TL
Sampled Date :	2/29/08	Test Dates	3/4/2008
Submitted By :	AR		

Point No.	1	2	3	4	5
WM+WVS (g)	6084.4	6026.7	6097.8	5899.0	
WW (g)	485.4	490.7	497.4	482.1	
DW (g)	426.7	408.7	425.1	431.6	
Moisture (%)	13.8	20.1	17.0	11.7	
WM (g)	4214.2				
VM (cu. ft.)	0.0332				
Rock (%)					

MOISTURE	13.8	20.1	17.0	11.7
DRY DENSITY	108.0	100.2	106.9	106.1



LAB		ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	108.7	Max. Dry Density (lb/cu. ft.)	108.7
Opt. Moisture Content (%)	15.2	Opt. Moisture Content (%)	15.2

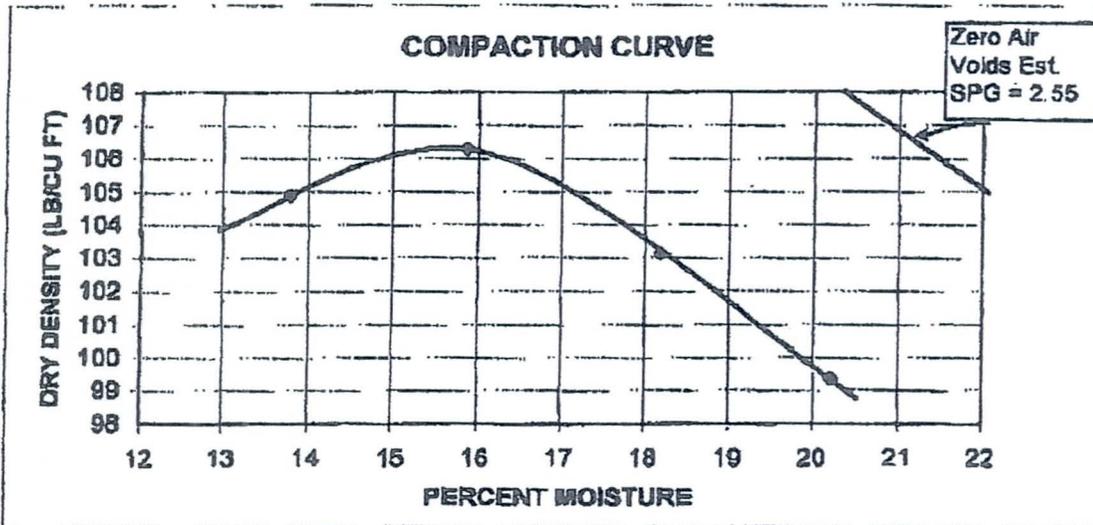
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HOGUE & ASSOCIATES
 4325 South 34th Street
 Phoenix, Arizona 85040
 Tel : 480-921-1368
 Fax : 480-921-0194

Client :	ERS	HA Project No. :	08021
Project :	Tree-Rios Environmental Restoration	HA Lab No. :	08L0180
Location :	Flood Control North Levee Phase 1B	Date Received :	3/3/08
	El Mirage Road to 115th Avenue	Proctor Type	D1557
Material :	Silty Sand, SM	Method	A
Source :	Diversion Channel, Sta. 3+00, Pit #2, 4' Below Grade		
Sampled By :	AR	Tested By :	TL
Sampled Date :	2/29/08	Test Dates	3/4/2008
Submitted By :	AR		

Point No.	1	2	3	4	5
WM+WS (g)	6049.3	6012.5	6088.8	6011.5	
WW (g)	417.8	432.3	470.0	439.0	
DW (g)	353.5	359.8	405.6	385.8	
Moisture (%)	18.2	20.2	15.9	13.8	
WM (g)	4214.2				
VM (cu. ft.)	0.0332				
Rock (%)					

MOISTURE	18.2	20.2	15.9	13.8
DRY DENSITY	103.1	99.3	106.3	104.9



LAB		ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	106.3	Max. Dry Density (lb/cu. ft.)	106.3
Opt. Moisture Content (%)	15.7	Opt. Moisture Content (%)	15.7

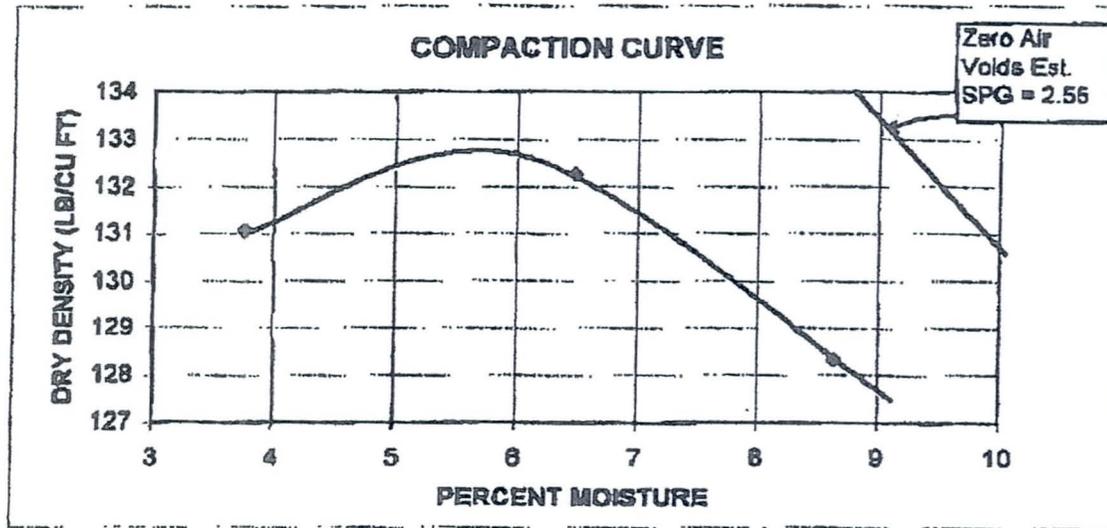
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 4325 South 34th Street
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 Fax : 480-921-0194

Client :	ERS	HA Project No. :	08021
Project :	Tres-Rios Environmental Restoration	HA Lab No.:	08L0101
Location:	Flood Control North Levee Phase 1B	Date Received :	3/3/08
	El Mirage Road to 115th Avenue	Proctor Type	D1557
Material :	Native Soil, Not Classified	Method	A
Source:	Sta 4+50, Diversion Channel; PH #3, 8' Below Grade		
Sampled By :	AR	Tested By :	FR
Sampled Date :	2/29/08	Test Dates	3/3/2008
Submitted By :	AR		

Point No.	1	2	3	4	5
WM+WS (g)	11112.2	11160.7	10995.5		
WW (g)	1080.7	1208.9	1204.3		
DW (g)	994.8	1133.4	1160.6		
Moisture (%)	8.6	6.5	3.8		
WM (g)	6369.6				
VM (cu. ft.)	0.075				
Rock (%)					

MOISTURE	8.6	6.5	3.8
DRY DENSITY	128.3	132.3	131.0



LAB		ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	132.8	Max. Dry Density (lb/cu. ft.)	132.8
Opt. Moisture Content (%)	5.7	Opt. Moisture Content (%)	5.7

Laboratory Compaction Curves for Phase 1B

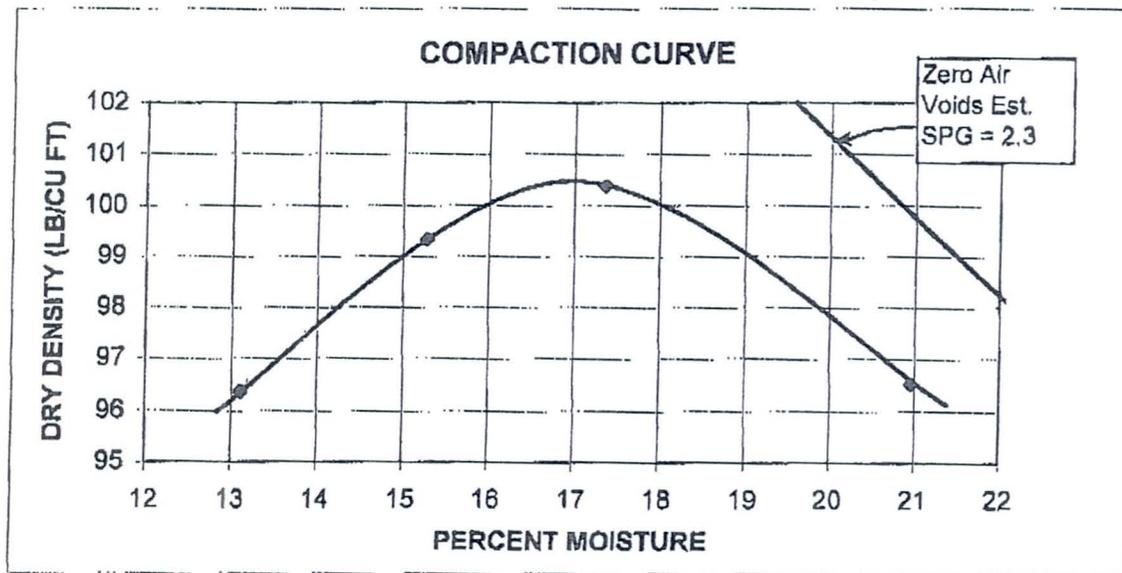
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 Fax : 480-921-0194

Client :	ERS	HA Project No. :	08021
Project :	Tres-Rios Environmental Restoration	HA Lab No.:	08L0240
Location:	Flood Control North Levee Phase 1B	Date Received :	3/25/08
	El Mirage Road to 115th Avenue	Proctor Type	D698
Material :	Silty Sand, SM	Method	A
Source:	100' West of SWC of 121st Ave Dike		
Sampled By :	AR		
Sampled Date :	3/25/08	Tested By :	PF
Submitted By :	AR	Test Dates	3/26/2008

Point No.	1	2	3	4	5
WM+WS (g)	5936	5986.0	5853.0	5970.0	
WW (g)	344.2	303.4	314.1	340.0	
DW (g)	298.6	258.5	277.7	281.1	
Moisture (%)	15.3	17.4	13.1	21.0	
WM (g)	4212.0				
VM (cu. ft.)	0.0332				
Rock (%)	0				

MOISTURE	15.3	17.4	13.1	21.0
DRY DENSITY	99.3	100.4	96.3	96.5



LAB	
Max. Dry Density (lb/cu. ft.)	100.5
Opt. Moisture Content (%)	17.0

ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	100.5
Opt. Moisture Content (%)	17.0

Laboratory Compaction Curves for Phase 1B

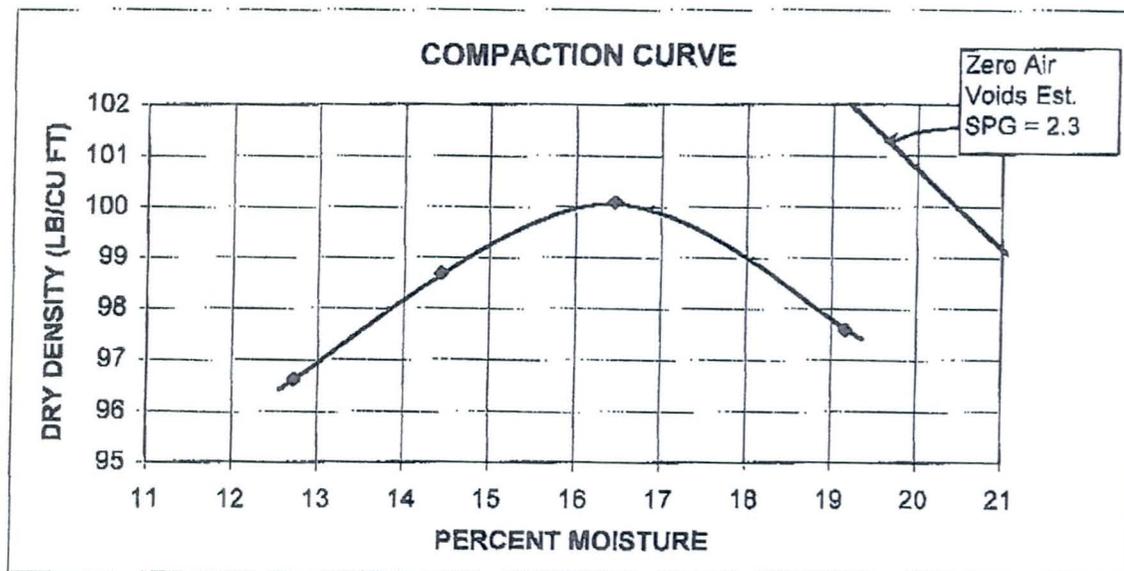
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 Phoenix, Arizona 85040
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 Fax : 480-921-0194

Client :	ERS	HA Project No. :	08021
Project :	Tres-Rios Environmental Restoration	HA Lab No.:	08L0239
Location:	Flood Control North Levee Phase 1B El Mirage Road to 115th Avenue	Date Received :	3/25/08
Material :	Silty Sand, SM	Proctor Type	D698
Source:	50' South of S End @ C/L Of 121 Ave Dike	Method	A
Sampled By :	AR	Tested By :	TL
Sampled Date :	3/25/08	Test Dates	3/25/2008
Submitted By :	AR		

Point No.	1	2	3	4	5
WM+WS (g)	5854	5914.7	5969.3	5965.3	
WW (g)	168.3	186.3	200.3	200.8	
DW (g)	149.3	162.8	172.0	168.5	
Moisture (%)	12.7	14.4	16.5	19.2	
WM (g)	4214.2				
VM (cu. ft.)	0.0332				
Rock (%)	0				

MOISTURE	12.7	14.4	16.5	19.2
DRY DENSITY	96.6	98.7	100.1	97.6



LAB	
Max. Dry Density (lb/cu. ft.)	100.1
Opt. Moisture Content (%)	16.3

ROCK CORRECTED	
Max. Dry Density (lb/cu. ft.)	100.1
Opt. Moisture Content (%)	16.3