A REPORT ON THE WBV14C.2 LEVEE

Report by the
WBV14C.2 QA Tiger Team

Submitted
11 June, 2012

EXECUTIVE SUMMARY

The New Orleans District Corps of Engineers (CEMVN) is improving and adding facilities to the Hurricane and Storm Damage Reduction System in the Greater New Orleans area on the West Bank of the Mississippi River to reduce risk from a storm event having a one percent chance of occurring in any given year. Multiple construction contracts have been issued and completed, including the WBV14C.2 contract entitled: "Westwego Pump Station to Orleans Village Levee Enlargement (2nd Lift)".

During construction of the WBV14C.2 project, inspectors from the Southern Louisiana Flood Protection Authority – West Bank Board of Commissioners (SLFPA-W) and State of Louisiana Coastal Protection and Restoration Authority (CPRA) reported excess amounts of woody and non-woody debris being incorporated into the WBV14C.2 levee fill. USACE quality assurance representatives and inspectors from SLFPA-W and CPRA reported excessive amounts of woody debris in the earthen borrow materials coming mainly from an offsite borrow pit. The primary source of non-woody debris was the excavation and reuse of existing levee materials. The SLFPA-W and CPRA inspectors raised the issue repeatedly in weekly reports to the USACE representatives, but perceived no apparent improvement in the situation. By July, 2011, the Non-Federal Sponsors (NFS) expressed grave concerns about the integrity of the constructed earth fill and its ability to meet the design intent.

In recognition of the NFS' concerns, in August 2011 Col Fleming (Commander, CEMVN) issued a letter to the Honorable Susan Maclay (President of the Southeast Louisiana Flood Protection Authority-West Bank Board of Commissioners) stating a plan to establish and engage a "Tiger Team" of USACE engineers from outside the New Orleans District and experts from the Non-Federal Sponsors to evaluate the levee.

The Tiger Team was formed in August 2011 and initiated meetings to review all design and construction documents, and interviewed engineers and inspectors associated with the project. The Tiger Team created a scope of work and an investigation plan including protocols for excavating, inspecting, and testing the cuttings from inspection trenches located in the levee embankment, flood side and protected side berms. Two phases of trench excavations were completed between September and November 2011. All laboratory testing was completed by January 2012. Tiger Team members were present during all aspects of the work including trench excavation, cuttings inspection, and laboratory testing.

The team met via teleconference and webinar as well as multiple on site meetings to discuss the findings, develop its conclusions and recommendations, and prepare this report. Although the Tiger Team reached common ground and consensus on many conclusions and recommendations, it remains divided on others.

Based on its interpretations and review of quantitative measurements from the investigation plan, the Tiger Team concludes that the as-built levee is in compliance with the specifications.

The following conclusion is subject to a partial limitation: Based on its interpretations and review of quantitative measurements from the investigation plan, a design verification exploration and testing program, and additional engineering analyses, the Tiger Team concludes that the as-built levee, excepting that part in the vicinity of the Central Avenue dump site where a buried debris field exists, will meet functional design intents. Tiger Team members feel there are significant uncertainties regarding the debris field's influence on levee performance. The technical issues associated with the debris necessitate a comprehensive and conservative assessment to develop appropriate remedial measures.

The Tiger Team agrees that surficial woody and non-woody debris pose a potential safety hazard to maintenance workers and the general public but remain divided on the scope of appropriate measures necessary to guarantee safety.

The Tiger Team remains divided on the impact of the woody debris on the performance of a proposed Turf Reinforcement Mat system.

The Tiger Team identified a number of shortcomings in the USACE earthwork specification and recommended remedies for these.

Tiger Team member, Michael Louis Merritt, M.S., M.B.A., C.P.G., has determined he cannot, in good conscience, agree to the findings of many of the other team members in regard to Chapters 7, 8, 10, 11, and 12, of the final Tiger Team report. To avoid further delay of the report he is issuing this "statement of non-concurrence." Mr. Merritt's individual findings and conclusions may be reviewed in Appendices Y and Y1 of this report.

The Tiger Team's conclusions and recommendations are presented in Chapters 11 and 12.

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CHAPTER 1: WBV 14C.2 PROJECT BACKGROUND

Project History

The New Orleans District Corps of Engineers (CEMVN) is improving and adding facilities to the Hurricane and Storm Damage Reduction System in the Greater New Orleans area on the West Bank of the Mississippi River to reduce risk from a storm event having a one percent chance of occurring in any given year. Multiple construction contracts have been issued and completed, including the WBV14C.2 contract entitled: "Westwego Pump Station to Orleans Village Levee Enlargement (2nd Lift)". The WBV14C.2 project regional location, on the Mississippi West Bank, is shown in Figure 1-1. A closer view of the project area is shown in Figure 1-2.

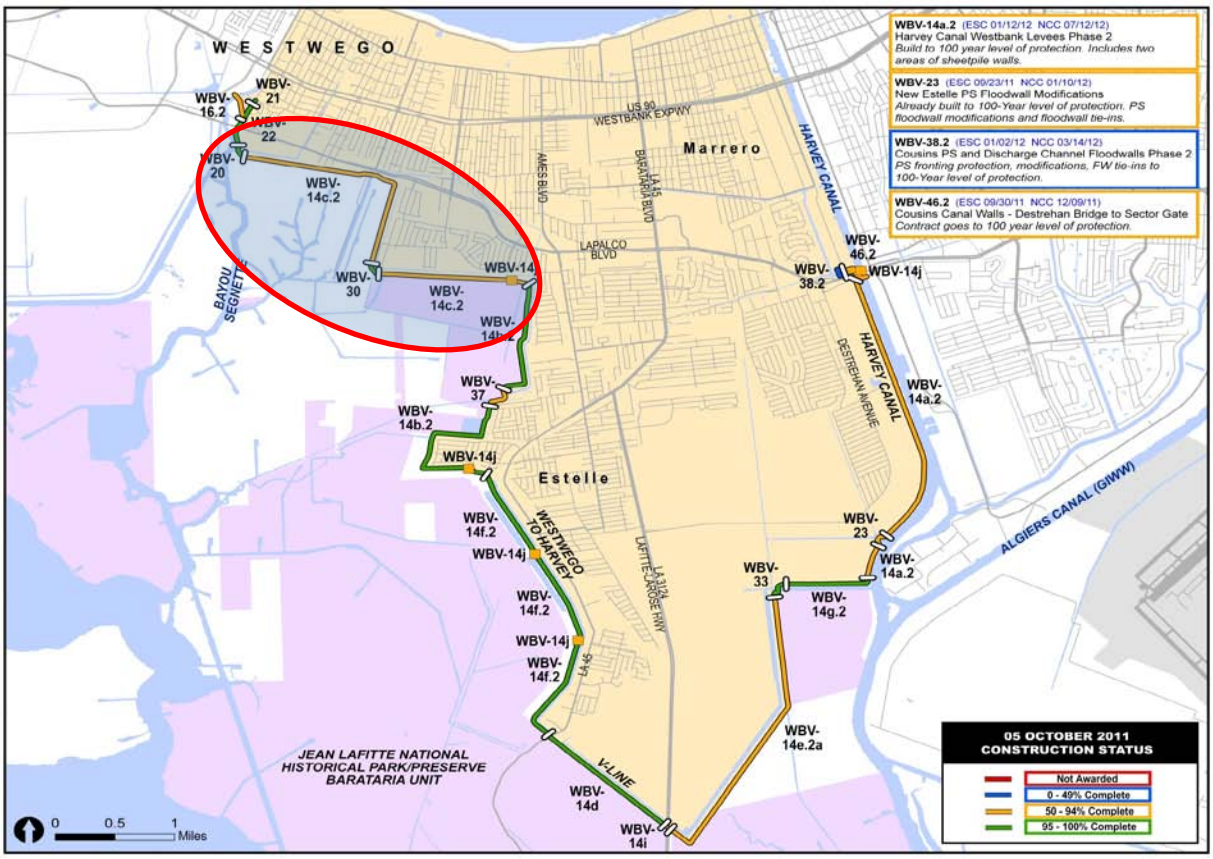


Figure 1-1 – WBV14C.2 Regional Project Location

The first levee built along the general alignment of the WBV 14C.2 levee was an undocumented tidal protection levee constructed by local developers. The original levee was constructed of spoil materials from excavation of the existing drainage canal. The WBV 14C.2 levee is generally divided into three segments: Westwego East-West levee (extending east from Westwego Pump Station to north-south segment), Westminster North-South levee (extending south from east end of Westwego East-West levee to Westminster Pump Station), and Westminster East-West levee (extending from Westminster Pump Station to east end of current 14C.2 project).

Figure 1-2: WBV14C.2 Detailed Project Location

The original Westwego East-West and Westminster East-West levees overtopped during Hurricane Juan in 1985. The original Westwego East-West levee breached at multiple locations during Hurricane Juan. An interim levee was constructed on both east-west segments by the Non-Federal agencies (Jefferson Parish, West Jefferson Levee District and Louisiana Department of Transportation and Development (LDOTD) in 1987. The interim levee was a floodside shift of the levee centerline. The interim levees were raised to EL +7.0 and EL +7.5 along the Westwego East-West and Westminster East-West levee segments, respectively. Various borrow sources were used for construction of the interim levees, including degraded material from the existing levee used in the protected side berm. The first Federal enlargement of the east-west levees was in 1996 to EL +10.0. The Westwego East-West levee and Westminster East-West levee were shifted floodside 130 feet and 170 feet, respectively. During this contract the levees were raised to about EL +6.0 using material from a Highway 45 borrow pit and topped-off to EL +10.0 using material from the interim and original levee. The next levee construction was in 2000-2002 by the West Jefferson Levee Board to raise the grade due to settlement.

The original Westminster North-South levee overtopped but did not breach during Hurricane Juan. An interim levee was constructed by LDOTD in 1988-1999. The interim levee was a 130-feet floodside shift of the levee centerline raised to EL +10.0. Various borrow sources were used for construction of the interim levees, including degraded material from the existing levee used in the protected side berm. Two layers of geogrid were used for construction of the interim levee. The first Federal enlargement of the Westminster North-South levee was in 1996 to EL +10.0. A raise of this levee probably did not occur in 2000-2002 since the settlement of the levee was not as significant as the two east-west reaches.

Centerline straddle raises to all three levee segments were constructed by USACE in 2008-2009 (the WBV 14C.1 contract) to EL +12.5.

The 14 C.2 contract raised and/or relocated approximately 3.5 miles of the existing levees and floodwalls between the New Westwego Pumping Station and the Orleans Village Subdivision to elevation +13.5 feet North American Vertical Datum 1988 (NAVD88). This work included placement of 1,005,900 cubic yards of embankment materials, and concrete floodwall. The new levee was built on or alongside the alignment of a pre-existing levee, with a 40-foot shift to the floodside (to allow for the enlarged cross-section of the new post-Katrina Hurricane and Storm Damage Risk Reduction System Design Guidance (HSDRRS) levee design standards). Portions of the levees were not shifted floodside where there was pre-existing sheetpiles and for construction of floodwalls.

The $26,541,332.60 contract was awarded to Phylway Construction, LLC, of Thibodaux, LA, on June 14, 2010. The contract scope of work consisted of: clearing and grubbing; degrading existing levee; placement of compacted fill; installation of geotextile; fertilizing, seeding and mulching; maintenance of access roads; windrowing for erosion control; construction of reinforced concrete floodwalls; levee tie-in construction; painting; concrete scour protection, driving steel sheet piling and steel H-piles; structural excavation and backfill; temporary flood protection and other, incidental, work.

Notice to proceed was effective on June 21, 2010. Original required completion date was June 29, 2011. Preconstruction surveys began on site on July 6, 2010. Equipment mobilization and clearing operations began on July 13, 2010. To date, more than $5.5 Million in contract modifications have been issued on this contract. The contract was considered substantially complete on December 9, 2011. Permanent turfing and other items of closeout work remain to be completed.

Earthen borrow was contractor furnished from two offsite borrow pits known as the River Birch Borrow Pit and the Willow Bend Borrow Pit. Additional offsite borrow materials were obtained from work on the adjacent WBV 14B.2 project. Onsite fill materials were obtained from the excavation of the existing levee.

As required by federal statute, CEMVN partnered with two Non-Federal Sponsors (NFS): the Southeast Louisiana Flood Protection Authority-West Bank Board of Commissioners (SLFPA-W) and the State of Louisiana's Coastal Protection and Restoration Authority (CPRA).

Problems During Recent Construction Contract

During construction, USACE quality assurance (QA) representatives and inspectors from SLFPA-W and CPRA reported excessive amounts of woody debris in the earthen borrow materials coming mainly from the River Birch borrow pit. The SLFPA-W and CPRA reported excess amounts of woody and non-woody debris being incorporated into the WBV14C.2 levee fill. The primary source of non-woody debris was the excavation and reuse of existing levee materials.

The SLFPA-W and CPRA (Non-Federal Sponsors/Stakeholders or NFS) inspectors raised the issue repeatedly in weekly reports to the USACE representatives, but perceived no apparent improvement in the situation. The USACE representatives maintained efforts were being taken to remove both woody and non-woody debris and the Contractor was in compliance with the project plans and specifications. By July 25, 2011, the issue was raised to the highest levels within the three organizations with the Non-Federal Stakeholders expressing grave concerns about the integrity of the constructed earth fill and its ability to meet the design intent.

Tiger Team

In recognition of the Non-Federal Stakeholders' concerns and to formally address the situation regarding the WBV 14C.2 project, CEMVN leadership began assembly of a Tiger Team in early August 2011 to investigate problems identified during construction and to provide any necessary remedial recommendations for the current project. On August 26, 2011 Col Fleming (Commander, CEMVN) issued a letter to the Honorable Susan Maclay, President of the Southeast Louisiana Flood Protection Authority-West Bank Board of Commissioners, stating a three step plan to resolve debris concerns by increasing inspections during construction, cutting trenches to see how much wood debris is in the levee and bringing in a "Tiger Team" of USACE engineers from outside the New Orleans District to evaluate the levee. In pertinent part, the Colonel's correspondence committed to standing up:

> **". . . a QA Tiger Team of technical experts outside of the Corps' New Orleans District to review our contracts' embankment specifications, assess the contractor's quality control methods and the Corps' quality assurance procedures. This team will participate in the scope development and evaluation of the investigative inspection trenching throughout the full length the levee and make recommendations on any corrective actions, if required, based on the findings of this investigation. This team will make an independent evaluation of the levee's performance and compliance with Hurricane Storm Damage Risk Reduction System (HSDRRS) criteria. The Corps has invited the Office of Coastal Protection and Restoration (OCPR), *(Editor Note: OCPR was later called Coastal Protection and Restoration Authority or CPRA)* and SLFPA-W to participate on this team by adding non-Federal team members that have sufficient technical expertise to assess the geotechnical criteria and performance of this levee; others members, such as inspectors from OCPR *(Editor Note: CPRA)* and SLFPA-W may also participate as observers."**

A complete copy of Col. Fleming's letter may be found in Appendix A at the end of this report. The makeup of the Tiger Team was based on the model of similar QA teams, typically consisting of subject matter experts within USACE, from districts outside CEMVN or supplemented by experts from academia and/or the consulting community. In this case, this model was supplemented with experts from the Non-Federal Sponsors.

CEMVN established an initial scope of work describing the tasks to be completed by this Tiger Team and proposed details regarding the field/laboratory investigations to assess the WBV14C.2 project. The investigation plan included trenching operations at various locations along the WBV 14C.2 project to assess the volume of the objectionable debris in the levee and the impact of the objectionable debris on performance of the levee.

Using the initial scope of work, partnering with its stakeholders and working through its official chain of command, the New Orleans District Corps of Engineers (CEMVN) and its stakeholders established the final makeup Tiger Team in late August 2011 with the following individuals:

- Corps Of Engineers Vicksburg District (CEMVK)
  Mr. Brad Arcement PE, Mr. Lanny Barfield PE, and Mr. Tim Shows PE.

- Corps Of Engineers St. Louis District (CEMVS)
  Mr. Patrick Conroy PE

- Corps Of Engineers Savannah District (CESAS)
  Mr. Michael Wielputz PE

- Southeast Louisiana Flood Protection Authority-West Bank Board of Commissioners (SLFPA-W)
  Mr. Michael Merritt CPG

- Coastal Protection And Restoration Authority (CPRA)
  Mr. Rickey Brouillette PE, Mr. David St. Marie PE, (HNTB Contractor to CPRA),
  Mr. Jaskaran Singh PE, (HNTB Contractor to CPRA)

- Burns Cooley Dennis, Inc.
  Mr. Eddie Templeton PE, (Contractor to USACE)

Copies of the professional biographies submitted by each Tiger Team member may be found in Appendix B at the end of this report.

CHAPTER 2: QA TIGER TEAM WORK

This chapter summarizes the meetings and the work completed by the Tiger Team since the inception of the team. The Tiger Team members were selected in August and September 2011.

Six USACE representatives to the Tiger Team were initially selected by the U.S. Army Corps of Engineers Mississippi Valley Division (CEMVD) in the first week of August 2011. One of these representatives, Mr. Eddie Templeton, is a consulting engineer with Burns Cooley Dennis, Inc. that was placed under contract to USACE in August. The other five USACE representatives are employed by USACE in districts outside of CEMVN.

Four Non-Federal Sponsors representatives were added to the Tiger Team in September 2011. Two CPRA representatives (Mr. Ricky Brouillette and Mr. David St. Marie) were selected to the Tiger Team by CPRA on September 1, 2011. A third CPRA representative (Mr. Jaskaran Singh) was added to the team on September 12, 2011. Mr. Brouillette is a full time employee of CPRA. Mr. Singh and Mr. St. Marie are consulting engineers with HNTB under contract to CPRA.

Mr. Michael Merritt, CPG was appointed to the Tiger Team by SLFPA-W on September 9, 2011.

Individuals from private entities and government agencies are referenced in this chapter. The following is a list of individuals referenced, their role, and organization:

- Corps Of Engineers New Orleans District (CEMVN)
    - Mr. Walter Baumy, P.E. (Chief Engineering Division - CEMVN-E)
    - Mr. John Bivona, P.E. (Assistant Chief Engineering Division - CEMVN-ED)
    - Mr. Richard Pinner, P.E. (Chief Foundations Branch - CEMVN-ED-F)
    - Mr. Mark Woodward, P.E. (Section Chief Foundations Branch – CEMVN-FD)
    - Mr. Glen Gremillion, P.E. (Resident Engineer and Administrating Contracting Officer, Construction Division – CEMVN-CD)
    - Mr. Kim Tullier (Foundations Branch – CEMVN-FD)
    - Mr. Jeremy George (Quality Assurance Representative – CEMVN-CD)

- CPRA
    - Mr. John Monzon, P.E. (Operations Division Chief)

- FFEB/Fugro)
    - M. Blake Cotton, P.E.
    - Mr. David Valintine, P.G.

- Southeast Louisiana Flood Protection Board West Bank Authority (SLFPA-W)
    - Mr. Mark Morgan, P.E. (SLFPA-W Commissioner)
    - Mr. David Rourke (SLFPA-W Operations Chief)

Tiger Team Assembly.

Although some NFS members of the Tiger Team were generally aware of previous correspondence, agreements, and history related to the WBV14C.2 project, the USACE and contractor members of the Team had no previous project knowledge, and were not provided a detailed, set scope of work by MVN and stakeholder leadership. Instead, the Tiger Team was given a basic, general scope and asked to modify and finalize it. Due to the various backgrounds and degrees of previous involvement with the project, much time was spent by the Tiger Team debating the various tasks to be included in the final Tiger Team scope of work.

The first official meeting of the entire Tiger Team was on September 12, 2011. Prior to this meeting, all of the Tiger Team representatives had never met as a group face-to-face or conducted a group teleconference. The USACE representatives to the Tiger Team were selected by CEMVD in the first week of August 2011. Before non-federal sponsor representatives were added to the Tiger Team the USACE Tiger Team representatives were engaged by CEMVN to review and comment on the initial scope of work, trenching activities and proposed geophysical testing for trenching activities to investigate the WBV 14C.2 project. The CPRA and SLFPA-W representatives were assigned to the team by their respective organizations after the USACE representatives.

Assessment of Initial Scope of Work

Some members of the CPRA and SLFPA-W perceived shortcomings in the original scope of work that was used to establish the team. Specific shortcomings identified by CPRA and SLFPA-W included:

- The scope of work did not require the Tiger Team to determine if the levee was constructed according to the contract plans and specifications.

- The scope of work did not require a decision process defining how the Tiger Team would conduct its tasks, make decisions and develop recommendations, or a defined arbitration process should the Tiger Team became deadlocked on any issue.

- The scope of work did not include an inspection/boring plan that addressed all of the Non-Federal-Sponsor's expressed areas of concern.

- The scope of work did not require that detailed procedures on trenching, cuttings inspection, sampling, and testing be finalized prior to the initial trenching.

- The scope of work did not organize the Tiger Team, develop business processes (decision tree, arbitration, rules of consensus) and separate them from technical requirements (trench locations, trench depths, sampling and testing protocols).

- The scope of work did not require the Tiger team develop recommendations for levee remediation prior to initiating field and laboratory investigations.

- The scope of work did not describe CEMVN's rationale for choice of geophysical methodology nor specify how geophysical scanning would relate to other inspection/testing.

Some of the USACE Tiger Team representatives did not share the non-federal sponsor's concerns regarding the original scope of work as provided by CEMVN. At the request of CEMVN, the USACE and non-Corp consultant provided opinions regarding the questions/concerns raised by CPRA and SLFPA-W. Some of the reasons for not sharing the same concerns were as follows:

- Their original understanding was the WBV 14C.2 levee would be evaluated primarily from a performance perspective. The intent of the investigation would not be to determine whether the levee was constructed contractually in accordance with the P&S but whether the as-built levee would perform as designed. A determination of whether or not the Tiger Team was tasked with evaluating both P&S compliance and performance was a decision that should be made by CEMVN in consultation of their stakeholders.

- The need for an arbitration process for the Tiger Team was not deemed necessary by the initial Tiger Team as the USACE and non-Corp consultant were independent of CEMVN's discussions of issues with the Non-Federal Sponsors. The need for an arbitration process developed as the full Tiger Team was given responsibly for the scope of work and investigation plan and was unable to reach consensus on some issues

- CEMVN was responsible for preparing the original trenching plan and gaining concurrence with the non-Federal sponsor regarding the suitability of the plan to satisfy non-Federal sponsor concerns. This was not originally believed to be a function of the Tiger Team, although the Tiger Team was eventually asked by CEMVN to comment on the concerns raised by CPRA and SLFPA-W.

- Detailed trenching, sampling and testing procedures were developed by CEMVN and commented on by the original Tiger Team. The original team members believed the plan could be further refined and adjusted as appropriate based on information gathered during the initial investigations.

- Many members of the Tiger Team did not agree that prescribed "fixes" should be determined prior to conducting the field/laboratory investigation. An "if this is found then this should be done" approach was not considered to be useful or efficient.

- There was no need for the Tiger Team to determine in advance of the geophysical testing how the information would be used in relation to the other inspection/testing until reviewing the results. Some members of the Tiger Team did not believe that the geophysical testing would be able to locate small amounts of woody debris but would be capable of locating larger masses of debris.

The discussion above highlights some of the issues that were discussed by representatives of the Tiger Team prior to the first official meeting of the team. It also highlights some of the reasons for the apparent different viewpoints of the various Tiger Team members. Ultimately, the entire Tiger Team was tasked by CEMVN with developing a scope of work that would address the

concerns of all team members including the CPRA and SLFPA-W. A significant portion of the discussion to follow highlights the efforts undertaken to address these issues.

12 September, 2011 Meeting.

The Tiger Team members met for the first time on 12 September, 2011 in the District Office of the New Orleans District Corps of Engineers. The Tiger Team members began to address the issues detailed above as well as the other issues summarized below. Minutes of this meeting can be found in Appendix C at the end of this report.

Prior to the assembly of the Tiger Team, the New Orleans District (CEMVN) contracted with the joint venture of FFEB/Fugro to conduct a geophysical investigation of the entire WBV14C.2 levee surface (flood-side berm toe to protected-side berm toe) to a 5-foot depth. The intent of this geophysical investigation would be to identify wood pieces in the fill (ranging from smaller pieces to larger ones), pieces of concrete and other debris, and to estimate their depths.

CEMVN desired to rely on FFEB/Fugro's expertise in geophysical techniques, so the contract required FFEB/Fugro to recommend two methods and equipment/procedures to be used during the investigation. CEMVN conferred with FFEB/Fugro, describing the levee fill, methods of construction, and the likely types of debris present. With this information, FFEB/Fugro ultimately recommended the use of Ground Penetrating Radar (GPR) and Electro-Magnetic (EM-38) methods and equipment to complete the geophysical investigation. CEMVN then conferred with and obtained the concurrence of the USACE Geophysical experts at the Engineering Research and Development Center (ERDC) on the appropriateness of the FFEB/Fugro recommendation.

At the 12 September Tiger Team meeting, Messrs. David Valintine and Blake Cotton of FFEB/Fugro explained the basic geophysical concepts of resistivity, conductivity, resolution, and scanning contrasts and described the basic technological capabilities and limitations of the GPR and EM-38 systems proposed for use at the WBV14C.2 levee. Some members of the Tiger Team questioned the appropriateness of the methods contracted for by CEMVN, asking if the use of the "Ohm Mapper" system to measure resistivity would be more appropriate than measuring conductivity with the EM-38 system. Tiger Team members requested Fugro research the Ohm Mapping capabilities and report the findings to the team. Mr. Valintine stated he did not think the Ohm Mapper system has the necessary resolution, but he would contact GeoMatrix to get a current read on the system capabilities.

At this 12 September meeting, the Tiger Team could not reach consensus on whether its Scope of Work should include determining if the 'levee was constructed according to the contract plans and specifications. Some members contended that if the levee was built "according to the contract plans and specifications", then it would be given that the levee would perform as designed. But other members felt that if an objective assessment of the levee proved its ability to perform as designed, then the "built according to the contract plans and specifications" issue became moot relative to the primary concerns of this team. Also, stopping short of a specific determination on contract compliance might avoid the team unintentionally inserting itself into

any on-going issues between the Contractor and the Contracting Officer on this active contract. No consensus was reached on this issue on 12 September.

The team discussed the history of construction of the various flood protection projects in this area. This discussion centered on the establishment of the original "developers" levee adjacent to the drainage canal and how that levee centerline was moved further toward the marsh during subsequent USACE and NFS construction contracts. Of great interest to the Tiger Team was the origin and quality of borrow material used for the earlier levee construction as well as its disposition in later construction contracts. This discussion then centered on borrow obtained from the Willow Bend and River Birch borrow pits for the current WBV14C.2 construction.

The discussion turned to the presence of wood and other debris allegedly compacted into the levee fill and how many inspection trenches should be completed. A majority of the team agreed that initial trenches, systematically and regularly spaced on 1000-foot spacing, would provide a wide breadth of inspection across the entire levee and would be supplemented by trenches excavated at the locations determined by the geophysical survey. Mr. St. Marie identified areas of concern in the existing levee between project stations 165+00 to 175+00 where the contractor allegedly "pushed-in" debris into the levee, between project stations 70+00 to 80+00 (concrete observed), and between 100+00 to 110+00 (pieces of wood above the objectionable size observed).

The Tiger Team instructed Mr. David Valintine of FFEB/Fugro to concentrate their initial geophysical surveying in "areas of concern" described by Mr. St. Marie. The Team would follow with its initial trenching in these areas to help "ground truth" the geophysical scanning.

The Tiger Team ended its meeting with plans to reconvene on/about 26 September to observe the initial "ground truth" trenching, review/discuss trenching plans, and begin initial investigations.

26 September, 2011 Meeting.

The Tiger Team's second meeting occurred on 26 September, 2011 in New Orleans. Issues discussed at this meeting are summarized below and the minutes from the meeting can be found in Appendix D at the end of this report.

Mr. David Valintine of FFEB/Fugro reported on the progress of the geophysical scanning of the WBV14C.2 levee. Mr. Valintine reported that the GPR was ineffective due to the moisture and density of the compacted clay levee but that the EM-38 equipment was more successful. He described locations where the EM-38 equipment measured strong reflections, indicating some kind of foreign object in the fill. Mr. Valintine stated that Fugro was 70% complete with the work.

Messrs Singh, Pinner, Woodward and Tullier described how the New Orleans District completed inspection trenches in January 2011 and completed seven ground truth excavations (done on 16 Sept 2011) covering 9 areas identified by Fugro. Copies of the reports prepared by CEMVN regarding the January and September trenching are included in Appendicies E1 and E2, respectively. The ground-truth effort involved excavating at the location and to the depth indicated by the EM-38 scan and carefully inspecting the cuttings to find foreign objects buried.

These excavations yielded one or more pieces of wood 12 to 18 inches in length, one site yielded a 2-ft by 2-ft by 1-inch piece of concrete, and finally, another site yielded a 16 to 18 inch long piece of 1-inch diameter steel pipe. The Tiger Team instructed Mr. Valintine to mark three additional sites where an apparent anomaly was noted so that the Tiger Team could begin ground truth trenching on 27 September.

The entirety of the afternoon on 26 September was given over to study of the WBV14C.2 Material Source Charts and the WBV14C.2 construction drawings provided by CEMVN-CD. The Material Source Charts are presented in Appendices F1, F2, and F3 and the construction drawings in Appendix G at the end of this report. These charts indicate which borrow source was used to construct different parts of the levee and berms. It should be noted that thicknesses of materials from the various sources as shown on the charts is an approximation and these thicknesses vary along any given cross section of the levee. The Tiger Team annotated these charts with the proposed inspection trench locations and examined the construction documents to determine the prevailing elevations before and after construction, estimating the thickness of the River Birch, Willow Bend, or levee degrade borrow at each trench location. This discussion yielded a depth of inspection trench at each location. All Tiger Team members in attendance agreed to this list of initial trenches, hereafter referred to as the Phase I investigations. The need for and the scope of additional trench excavations (Phase II) would be revisited after receipt of geophysical mapping results and consideration of observations and results from Phase I investigations.

The Tiger Team then discussed proposed procedures for excavating, inspection of excavated cuttings, and testing. All Tiger Team members in attendance agreed to the draft procedures with the understanding they were subject to amendments and improvements as the work progressed.

The Tiger Team coordinated with Mr. Gremillion to begin inspection trench excavations on Tuesday morning, 27 September, 2011.

27 and 28 September, 2011 Trenching Efforts.

On September 27 and 28, 2011 the Tiger Team met at the WBV14C.2 construction site to begin its Phase I ground truthing (to check EM-38 scans) and investigative trenching (to look for wood) program as recounted in Chapter 3. With construction assistance (operator, equipment, and labor) from PhylWay Construction Co., the Tiger Team completed three ground truth trenches and nine investigative trenches. The trenches were excavated, cuttings inspected, and wood and debris collected and managed according to the investigation plan. At the end of the day, all collected wood was delivered to the New Orleans District Soils Testing Laboratory. Details on the trenching may be found in Chapter 3. Mr. Merritt stated his opinion that until detailed plans and procedures were established in writing for the trench excavation, cutting inspection, and testing, any field activities were preliminary and were for preparation (to calibrate geophysics tools) or for practice only and any data obtained should be regarded as incomplete, scientifically uncontrolled or invalid because field activity, for its own sake, would not produce optimum results. Mr. Merritt did not attend these initial trenching efforts because the excavation, sample inspection, and wood gathering and testing protocols were not finalized and there was no finalized geophysical analysis to guide activity as intended since field dates were moved up.

The USACE and non-Corps consultant did not agree with Mr. Merritt's opinion the field investigation was premature. CPRA representatives expressed some concern regarding beginning trenching operations but were willing to begin and participated fully in the operations. The Tiger Team did subsequently revise its excavation, cuttings inspection, wood gathering, and testing protocols based on its experiences during these initial trenches.

12 October, 2011 Meeting.
On 12 October, the Tiger Team joined FFEB/Fugro on a teleconference so that FFEB/Fugro could present its preliminary findings from the geophysical survey. On 18 October, 2011, FFEB/Fugro furnished their draft Geophysical Report to the New Orleans District and the Tiger Team members received copies of the report by e-mail on 19 October, 2011. The final FFEB/Fugro Geophysical Report is included in Appendix H.

20th, 21st and 24th October, 2011 Meetings.
The Tiger Team met again on the 20th, 21st and 24th of October 2011 in New Orleans to finalize its Scope of Work and to carefully study the FFEB/Fugro Geophysical Report to decide how best to incorporate those results into the Tiger Teams Investigation Plan.

Still not reaching consensus on the "built according to the contract specifications" issue, the Tiger Team elevated the issue to Mr. Walter Baumy, Chief Engineering Division, CEMVN. On the evening of 20 October, 2011, Mr. Baumy replied to the Tiger Team charging it with the responsibility to determine whether the project was constructed in accordance with the contract plans and specifications. Specific language from his written reply follows:

> *I think it is reasonable to determine if the project was constructed in accordance with plans and specifications. Such a review should consider material composition, moisture, compaction, presence of non-earthen materials and tolerances. Quality control records supplemented by the field excavations should be relied upon for needed data. Supplemental information from lab tests conducted on the excavated material should be evaluated for compliance.*
>
> *Contract requirements are specified and subject to interpretation by both the contractor and Government. The contractor is permitted a reasonable interpretation of those requirements. Government administration is by Construction Division with engineering services during construction provided by Engineering Division.*
>
> *For the subject contract, the Government's interpretation of the specification was made and accepted by Construction and Engineering Divisions. Contract compliance determination should be in accordance with that interpretation. It is clear to me that organic content of earthen material is a separate requirement from the roots, branches, etc. Efforts to combine these in some manner seem to be off task in my opinion.*
>
> *Additionally, a massive levee section should be reviewed in light of it's intended function, not 6 inch lifts. If you believe the 6 inch lift exploration adds value, I'd like to hear more.*

If there is disagreement with the specification or its interpretation, the team should make a recommendation for future spec changes.

Performance assessment should consider the material within the levee section to include earthen materials, debris and woody material discovered in a particular site.

Performance assessment is critical. Critical potential failure modes must consider your findings and determine if the levee is expected to perform as designed.

I'd anticipate the team is considering classical soil mechanics and theory as applied to levee design.

Team members are expected to bring expertise in assessing the findings. It's expected that positive or negative findings can be substantiated by individuals. The group should consider any such findings.

During these meetings, the Tiger Team "Trench Log" data form was presented, discussed, and accepted for use as a recording template for subsequent trenching.

The Tiger Team arranged for Mr. Glenn Gremillion and Mr. Jeremy George to address the team on how Section 31 24 00.00 12 "EMBANKMENT" from the contract specifications was interpreted and enforced during construction. Messrs. Gremillion and George answered many of the Tiger Team's questions related to their interpretation and enforcement of the contract documents. Subsequent to this meeting, Mr. Gremillion provided a written statement describing those interpretations and enforcement policies. Mr. Gremillion's statement has been included in Appendix I:

Mr. Gremillion described how his relationship with the construction contractor sometimes became confrontational as Gremillion enforced his interpretation of the wood removal. He indicated that these types of confrontations are common on construction projects but that the particular "hot" issue on this project revolved around the interpretation and enforcement of the specifications associated with woody debris. In the opinion of Mr. Gremillion, considering the subjective nature of the specifications, the Contractor constructed the project in accordance with the P&S per Gremillion's interpretation.

The Tiger Team questioned Mr. Gremillion and Mr. George at length about their involvements with the WBV14C.2 construction, the contractor's Quality Control Process, and the USACE Quality Assurance Process.

The Tiger Team reached consensus on many other issues and substantially finalized its scope of work. Additionally, based on its detailed study of the FFEB/Fugro Geophysical report and consideration of specific areas of most concern identified by the CPRA and SLFPA-W team members, the Tiger Team established and added additional trench locations and depths to the trenching plan, largely completing that plan. It was agreed by all Tiger Team members that the trenching plan addressed the worst suspected areas of concern, provided adequate project coverage, and at the same time targeted geophysical anomalies in these areas. Although no

minutes of this meeting were created, the results of the meeting are reflected in the completed Tiger Team's Scope of Work (in Appendix J) and the completed Investigation Plan (in Appendix K). The technical basis of the Tiger Team Investigation Plan is described near the beginning of Chapter 3.

25th to 28th October, 2011 Trenching Efforts.

Beginning on 25 October and working to the end of the day on 28 October, 2011 the Tiger Team met at the WBV14C.2 construction site to begin the Phase II investigative trenching program. With construction assistance from PhylWay Construction Company, the Tiger Team completed sixteen (16) investigative trenches of those shown in the Investigation plan. All trenches were excavated, the cuttings inspected, and wood collected and managed according to the procedures outlined in the investigation plan. Two bulk samples were also excavated, measured, and collected. These samples were taken in areas that visual inspection indicated contained the highest amounts of small wood pieces. At the end of the day, all collected wood was delivered to the New Orleans District Soils Testing Laboratory. Details on the trenching may be found in Chapter 3.

2nd to 4th November, 2011 Trenching Efforts.

The Tiger Team reconvened on 2 November and by the close of business on 4 November, had completed the thirteen (13) remaining Phase II investigative trenches shown in the Investigation Plan. Four additional bulk samples were excavated, measured, and collected. As were the previously described bulk samples, some of these samples were taken in the areas which visually appeared to have the highest levels of small wood pieces. All trenches were excavated, the cuttings inspected, and wood collected and managed according to the procedures outlined in the investigation plan. At the end of each day, all collected wood was delivered to the New Orleans District Soils Testing Laboratory. Details of the trenching are found in Chapter 3.

23rd November, 2011 Teleconference

The Tiger Team held a teleconference on 23rd November, 2011 to provide input into the CEMVN Design Verification and Soils Testing program. CEMVN typically completes such a program to obtain as-constructed geotechnical data from its completed levee projects, obtaining information from centerline borings drilled on standard 1000-foot centers. The Tiger Team made recommendations on locations and depths of such borings, and to co-locate some of the borings near the completed investigation trenches and bulk-sample locations. The scope of the Design Verification Boring and Soils Testing program recommended by the Tiger Team exceeded that originally proposed by CEMVN. The task order issued to the contract driller for the Design Verification Exploration and Testing Plan can be found in Appendix L1 of this report. The field work required to drill and sample the levee was completed by the week of 4 January, 2012. All undisturbed samples obtained from the field work were sent to the FFEB soils testing laboratory in the New Orleans regional area. One member from the Geotechnical Branch of the New Orleans District and a Tiger Team member were present in the lab to observe, measure, photograph and make test assignments on appropriate samples. All soils testing was completed the week of 18 January, 2012.

The results of the laboratory testing and the plotted boring logs from the Design Verification Exploration and Testing Plan are shown in Appendix L2. Undisturbed samples obtained from

borings co-located with the bulk sample locations were marked, sealed, and set aside for future testing. These samples were tested in the same fashion as the bulk samples obtained in the field. Other samples were marked, sealed, and set aside to be strength tested at their as-sampled size. These samples were shipped to the FFEB soils testing laboratory in Dallas, TX. After completion of the strength testing, the remains of the samples were shipped to the testing lab of the Savannah District Corps of Engineers for bulk sample testing. Bulk sample test reports are found in Appendix V.

New Orleans District Soil Laboratory Testing

The New Orleans District Soils Testing Laboratory worked to organize, inventory, measure, photograph and weigh the wood collected from the Investigation Trenches. Various Tiger Team members were present for and participated in all facets of the work completed in the New Orleans District Laboratory. The volume of wood meeting or exceeding the specified definition of "objectionable" (greater than 12-inches long and greater than 4-in^2 end area) was determined according to the procedure recorded in the investigation plan. All measurements were completed by January 12th 2012. The results of this testing is presented in Chapters 4, 5, and 6 of this report.

Tiger Team Meetings January through June, 2012

The Tiger Team divided itself into subcommittees to focus on specific areas of its investigation. Brad Arcement, Jas Singh, and Mike Wielputz volunteered to form a subcommittee to review the CQC/QA test data. Lanny Barfield, David St. Marie, and Tim Shows formed a subcommittee to review the Quality Assurance Reports. The Tiger Team held numerous meetings via teleconference and web meetings January 23rd to June 9th, 2012 discussing the results of the laboratory testing, the design verification boring program, results of additional analyses completed using this data, and proposed modifications to the Tiger Team report. The subcommittees reported on their status at each meeting.

Tiger Team Meetings in New Orleans, March 2012.

The Tiger Team reconvened in the New Orleans District Office on March 7th, 8th, 9th and the following week March 13th to the 15th. At these meetings, each subcommittee provided a detailed summary of their findings. The team reviewed, in detail, the majority of the Phase II investigative trenches. The team also discussed the results of all of the laboratory testing, the design verification borings, and results of additional analyses completed using this data collected. Team members discussed their professional opinions and conclusions as to whether the project was built in accordance with the P&S and whether the levee would perform as designed. Team members also discussed various recommendations for the current WBV 14C.2 project.

Tiger Team Meetings in Baton Rouge, May 2012.

The Tiger Team reconvened in the Baton Rouge office of HNTB Inc. on May 14th to 18th to review and recommend revisions to the Tiger Team report.

CHAPTER 3: DESCRIPTION OF WBV14C.2 TIGER TEAM FIELD TRENCHING ACTIVITIES

Based on the Tiger Team discussions during its meetings in September, the Phase I trenches were excavated on September 27th and 28th, 2011. The Tiger Team reconvened in early October and resumed trenching efforts on October 25th with the final trench being excavated on 4 November 2011.

This chapter provides details of every trench excavated by the Tiger Team. The trenches are described in order by station beginning at the West end of the project (Station 1+42) and continuing trench by trench to the East end of the project (Station 182+00). Each entry contains a narrative description of the trenching activities, including time, date, location (station and offset), depth of trench, etc. and anything unusual noted about the excavation or the excavated cuttings. This narrative is immediately followed by images of the Tiger Team composite trench log as applicable, and then followed by pictures of the operations. The composite trench log includes only field observations. Appendix R presents the original trench logs recorded by the professional engineer or professional geologist during the trenching operation and contains the opinions and observations recorded by that person. Additional photographs taken during trenching are included in Appendix U.

Tables 1a and 1b in the Tiger Team Investigation Plan (Appendix K) represent all of the planned inspection trenches. These trench locations are combined and listed on Table 3-1 and updated to reflect actual trenching operations as performed. Figure 3-1 shows the trench locations superimposed on an aerial photo of the project. The Non-Federal Sponsor's stated areas of concern (Appendix M) are highlighted in Figure 3-1. Planned trench locations were based on combinations of the following factors: Physical extents (horizontal and vertical) of the Non-Federal Sponsor's areas of concern; consistent coverage of the levee centerline, flood side and protected side berms; embankment material source; and the specific locations of the potential anomalies found in the Geophysical scanning. Field changes to individual trench locations and trench depths were made only after discussion and consensus among all Tiger Team members.

Trenches completed on September 27th and 28th are labeled as "Phase I Trenches" in the title of each trench narrative sheet. All other trenches, those excavated after September 27th and 28th, are labeled Phase II Trenches.

The Tiger Team met onsite at the PhylWay Construction trailers between 7:00 am and 8:00am to begin every day's inspection trenching. Typically, the entire Tiger Team was in attendance. At the beginning of each day, the CEMVN Area Engineer, Mr. Glenn Gremillion, his assistant, and a PhylWay representative, would provide a safety briefing to the group. The major topics during these safety briefings included:

- All individuals must remain at a safe distance from the hydraulic excavator.
- Before any Tiger Team members enter a trench for any reason, he must notify the Corps QA representative of his desire to enter the trench. At this time, the Corps QA representative would signal the operator to pause the excavation operation.
- Ladders should be used to enter/exit the trench.
- Once the trench excavation reached the 4-foot depth, OSHA and USACE regulation prevented entry into the trench.
- All individuals should consume copious amounts of water and prevent against sunburn.

This chapter provides narrative descriptions of the trenching efforts and documentation of the collected wood and debris from the excavated trenches. Every trench was carefully excavated and the cuttings spread out and methodically inspected according to the Tiger Team methods. All wood collected was stored in plastic bags or containers that were labeled with trench location and depth of excavation.

Data from Phase I trenching was not recorded on any kind of standardized log. However, a standardized "Trench Log" was established in the October Tiger Team meetings for use during Phase II trenching operations. All data from the Phase II trenching was recorded on the Trenching Field Log agreed upon by the Tiger Team.

Shear strengths reported in this chapter are based on use of the pocket penetrometer device and represent undrained shear strength (cohesion) of the soils. Since the use of the pocket penetrometer device is subject to the user's technique, the stated values should be considered estimates of the soil's undrained shear strength.

During the Phase II trenching, when the Tiger Team discussed its observations of each completed trench, Mr. Merritt reserved his comments. Mr Merritt provided his comments in writing after completion of the field work. Those reserved comments may be found in Appendix Y. Tiger Team responses to those comments, may be found in Appendix Z.

Trench Number	Station	Phase	Date Inspected	Protected Side Berm		C/L		Flood Side Berm		
				O/S	Depth		Depth		O/S	Depth
1	1+41	II	3 Nov 11						21	5
2	4+42	II	3 Nov 11	34	3					
3	9+80	II	3 Nov 11						49	4.5
4	21+95	II	3 Nov 11				6			
5	27+25	II	2 Nov 11						80	4
6	29+50	II	2 Nov 11						13	5.5
7	32+29	II	2 Nov 11						110	5
8	37+23	II	2 Nov 11	139	4					
9	39+90	II	25 Oct 11						120	4
10	40+51	II	2 Nov 11						38	5
11	48+00	I	28 Sep 11	90	3					
12	48+00	I	28 Sep 11				5			
Investigate	60+50	II	28 Oct 11						Walk Over	
Investigate	61+50	II	28 Oct 11						Walk Over	
13	66+88	II	27 Oct 11				3.5			
14	70+00	II	27 Oct 11				3.5			
15	71+39	II	4 Nov 11	36	3					
16	80+00	I	27 Sep 11						47	3
17	90+00	I	27 Sep 11				3.5			
18	97+00	II	27 Oct 11				4			
19	104+51	II	27 Oct 11	149	4					
20	108+18	II	27 Oct 11	60	3.5					
21	109+30	II	4 Nov 11	33	4					
22	120+39	II	27 Oct 11	63	4					
23	121+46	II	27 Oct 11	15	3.5					
24(GndTruth)	122+22	I	27 Sep 11	69	3					
25(GndTruth)	123+59	I	27 Sep 11						69	3.7
GndTruthOnly	124+42	I	27 Sep 11	39	3					
26	136+07	II	26 Oct 11				4			
27	140+00	I	27 Sep 11						51	3
28	141+46	II	28 Oct 11	118	4					
29	145+00	I	27 Sep 11	130	3					
30	150+00	I	28 Sep 11				6			
31	154+50	II	4 Nov 11						12	5
32	160+00	I	28 Sep 11						51	3
33	162+50	II	4 Nov 11				5			
34	165+08	II	26 Oct 11	10	2					
35	166+90	II	26 Oct 11				4			
36	170+00	I	28 Sep 11				3			
37	170+00	I	28 Sep 11	137	3					
38	172+08	II	26 Oct 11	55	4					
39	174+00	II	25 Oct 11				4			
40	179+80	II	25 Oct 11				4			
41	180+01	II	25 Oct 11	187	3					

Table 3-1: Tiger Team Investigation Trench Details as Completed

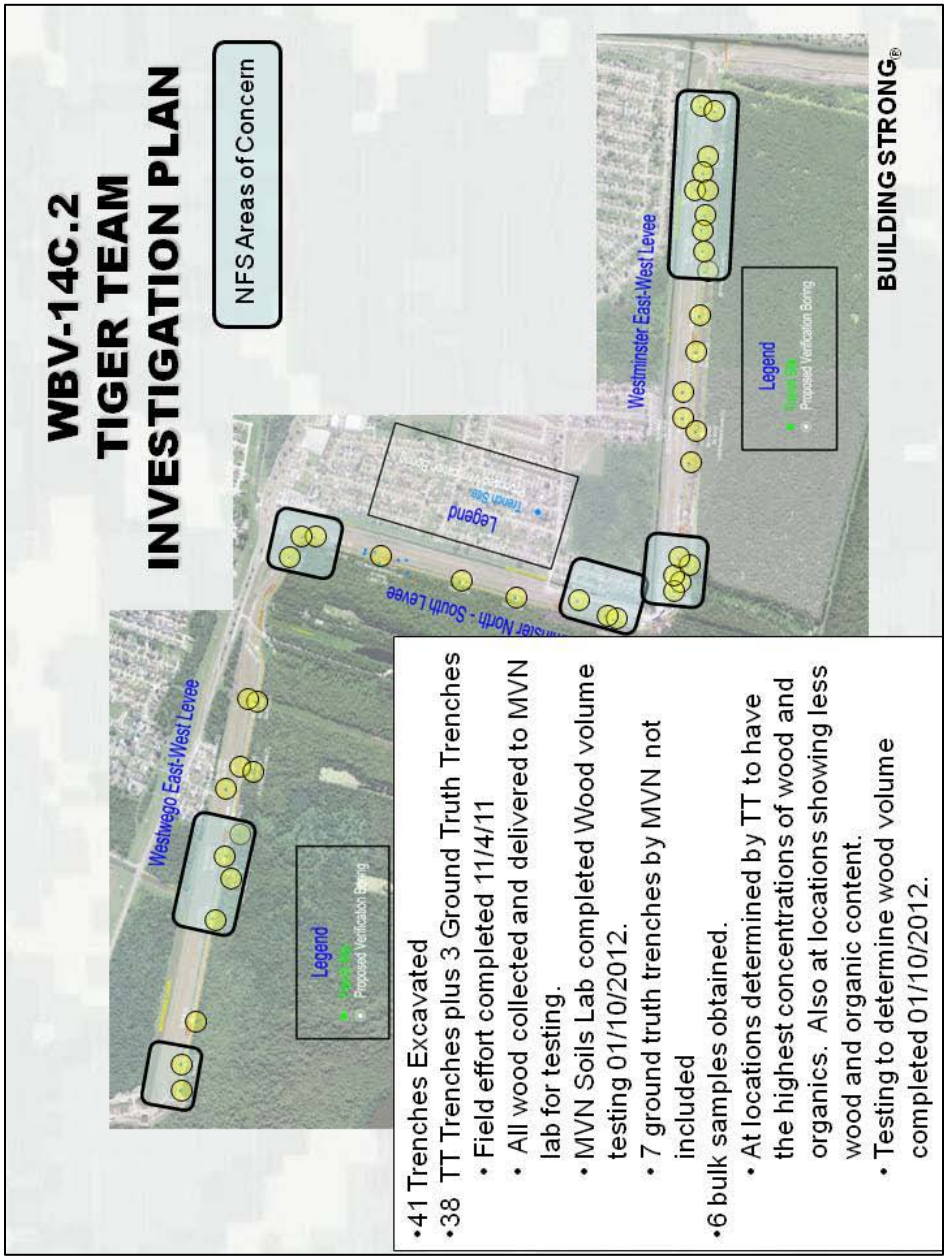


Figure 3-1: Locations of Tiger Team Investigation Trenches

STATION 1+41; O/S 21FT FLOOD SIDE; 5-FEET DEEP (FIELD CHANGE).
Phase II Trench.

Excavation commenced at 5:05 pm on 03 November 2011. The excavation and cutting placement was completed this day, but because of waning daylight, the cuttings inspection was delayed until the first thing the next day, 04 November 2011.
The team made a decision in the field to relocate this trench originally planned for Station 2+10 to Station 1+41, and target an anomaly flood side at that location.

The trench was located on the flood side slope, with the trench center at elevation +9.2, approximately 4.3 feet below the levee crown. If the trench was located on the levee centerline, the materials disposition charts indicated the team could reasonably expect to encounter 2-feet of Willow Bend, then 1.5-feet of levee degrade materials, and then 5-feet of River Birch. In order to reach the bottom of the River Birch material, and not have to excavate an 8.5-foot deep trench, the flood side slope location was chosen. The trench excavation was terminated at 60-inches when after excavating 4.5-feet of River Birch, the subjacent layer of Willow Bend material was encountered.

The trench log is shown in Figure 3-1a. Photographs of the trench during initial excavation, during cutting inspection, the completed trench, and representative photos of the wood and the piece of debris found in the cuttings are shown in Figures Fig 3-1b through 3-1i.

Within the first 6-inches of excavation, a 28” long by 3” diameter piece of pipe was recovered. This piece of pipe may be what the geophysical survey had indicated. One piece of wood met/exceeded the specified limit for objectionably sized wood was also encountered in this region. Small pieces of wood, less than the objectionable size specified by the contract, were found in the rest of the excavation. Heard sounds of the bucket encountering wood and clay to a depth of 60-inches and noted roots present from 25 to 30 inches. All wood was visually observed to be encapsulated by the well compacted clay soils.

Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 1300 to 2100 pounds per square foot (psf).

A baseball sized brick fragment was encountered from a depth of 3 ft to 4 ft. One small piece of concrete (approximately. 6”-7” diameter) was encountered from a depth of 4 ft to 5 ft. No other non-woody debris (concrete, metal, brick etc) was encountered.

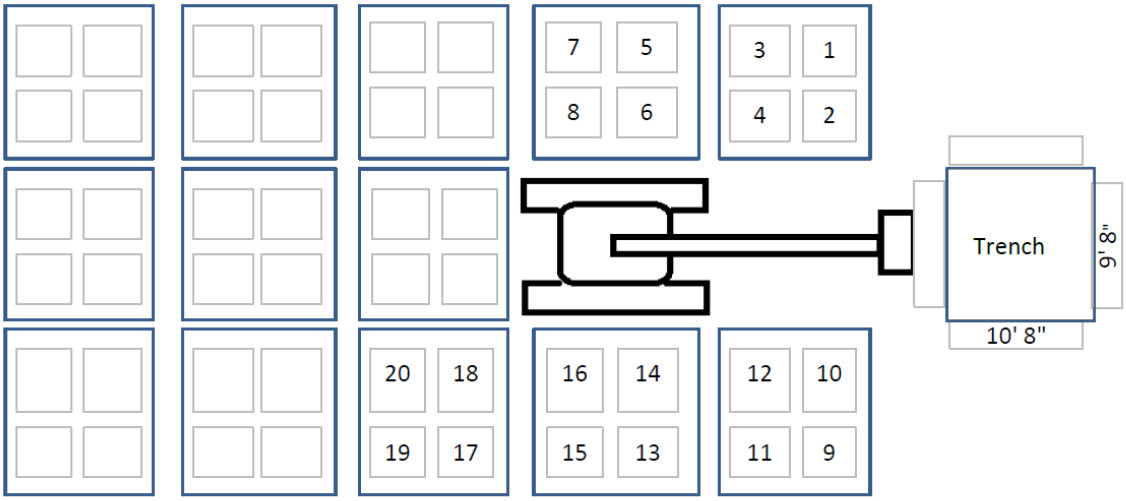
During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata, or compaction); however, Mr. Merritt reserved his comments during this field review[1].

[1] See Appendix Y for all of Mr. Merritt’s reserved comments.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	11/3/2011	LOCATION	Flood Side

STATION #	1+41	OFFSET FROM C/L	21' (Slope)
START TIME	5:05 PM	TOP ELEV	+9.2'
END TIME	6:05 PM	ORIG GROUND ELEV	+2.0
WEATHER	60 Degrees, Sunny	DEPTH	5'
NORTHING	507109.3	EASTING	3654100.2



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+8.7'	0-6"			OBJ	RB	Gray-black Fat Clay
2	+8.7'	0-6"	y	y	Metal	-	Metal pipe 3" x 28"
3	+8.1'	6-12"				-	
4	+8.1'	6-12"		Y		-	
5	+7.7'	12-18"	Y	Y		-	
6	+7.7'	12-18"		Y		-	
7	+7.1'	18-25"	Y	Y		-	
8	+7.1'	18-25"				-	
9	+6.7'	25-30"	Y			-	
10	+6.7'	25-30"	Y			-	
11	+6.2'	30-36"	y	Y		-	
12	+6.2'	30-36"		Y		-	
13	+5.7'	36-42"	Y	Y	Wood	-	
14	+5.7'	36-42"	Y	Y		-	
15	+5.2'	42-48"	Y			-	
16	+5.2'	42-48"	Y			RB	
17	+4.7'	48-52"	Y			WB	Brown Fat Clay
18	+4.7'	48-52"		Y		-	
19	+4.2'	52-60"	Y			-	
20	+4.2'	52-60"	Y			-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Figure 3-1a: Trenching Log Project Station 1+41

Fig 3-1b through 3-1i: Project Station 1+41

STATION 4+42; O/S 34-FT PROTECTED SIDE; 3-FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 3:12 pm on 03 November 2011.

At this location, the trench was located in an area of all "cut". In other words, the WBV14C.2 contractor did not place any fill in this area, only excavated existing levee section.

The trench log is shown in Figure 3-2a. Photographs of the trench during initial excavation, of the completed trench, representatives examining the trench, settlement plate encountered during trenching, and representative photos of the wood and the piece of debris found in the cuttings are shown in Figures Fig 3-2b through 3-2m.

Within the first 18-inches of the trench excavation, the team encountered a metal settlement plate (13" by 13" by 1/8") from a previous construction contract. The wooden stakes used to secure the plate in its position were still intact. At a depth of 2 to 3 feet below the protected side, prevailing ground surface elevation, the excavation yielded numerous pieces of wood and concrete. Abundant shells were noted at this level. Some of the wood pieces appeared to meet the specified dimensions for objectionable but were in pre-existing fill materials, and not there due to the actions of the WBV14C.2 contractor. The concrete pieces were on the order of 8" to 14" inches and were also in pre-existing fill materials. Evidence of a decaying piece of wood was found at the same depth as the concrete. All debris was encapsulated in the in-situ clays. Details of the wood and debris follow:

2 objectionable in Wedge Section from El. 7.4 to 5.5 ft (18"x3"x3", 17"x4"x2")
Settlement Plate and Wooden Stakes in Wedge Section from El. 7.4 to 5.5 ft
Small pieces of Brick from El. 5.5 to 4.5 ft
1 objectionable from El. 4.5 to 3.5 ft (15"x3"x4")
Small piece of Stone from El. 4.5 to 3.5 ft
3 objectionable from El. 3.5 to 2.5 ft (14"x2.5"x2", 13"x3.5"x4", 13"x3.5"x4")
3 large pieces of concrete from El. 3.5 to 2.5 ft (12"x4"x9", 7"x4"x7", 8"x4"x5")

Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 750 psf to 1500 psf.

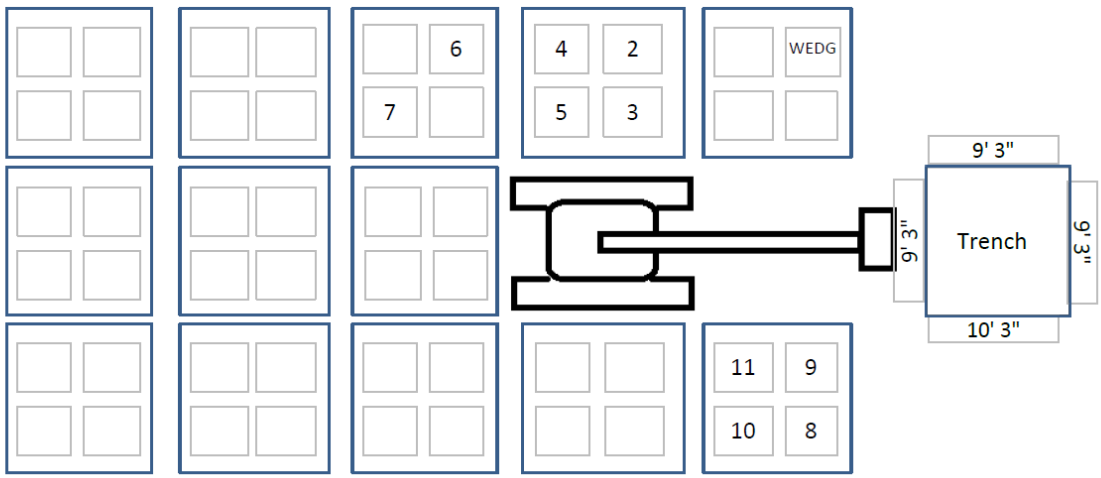
No other debris (concrete, metal, brick etc) was encountered. During the review of the excavation bottom, side walls, and cuttings, the team discussed the significance of the decayed piece of wood. The presence of the piece of decayed wood caused much discussion among the Tiger Team about whether or not wood encapsulated in the levee fill could/would decay. Based on the Tiger Team's observations of wood in all manner of condition (wet, dry, light weight, dense, solid, decayed) in other excavations, there is no clear consensus on how wood decays when placed inside of a compacted clay levee. The condition of the decayed piece of wood encountered in this trench at the time the fill was originally placed is unknown.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata, or compaction); however, Mr. Merritt reserved his comments during this field review but later expressed a concern regarding shear strengths measured with pocket penetrometers.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	11/3/2011	LOCATION	Protected side

STATION #	4+42	OFFSET FROM C/L	34' (Toe)
START TIME	3:13 PM	TOP ELEV	+6.1'
END TIME	4:45 PM	ORIG GROUND ELEV	+11.0'
WEATHER	65 Degrees, Sunny	DEPTH	3.0'
NORTHING	507107.38	EASTING	3654407.21



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	*ELEVATION*	*DEPTH*	*VISUAL*	*HEARD*	*DEBRIS*	*SOIL TYPE*	*NOTES:*
1	+5.5'	wedge				EL	Old settlement plate
2	+5.0'	0-6"			OBJ	-	Dark Grey Fat Clay with Shells
3	+5.0'	0-6"	Y	Y		-	
4	+4.5'	6-12"				-	
5	+4.5'	6-12"			OBJ	-	Rotten wood
6	+3.5'	12-24"	Y		Glass	-	
7	+3.5'	12-24"				-	
8	+3.0'	24-30"				-	
9	+3.0'	24-30"		Y		-	Shells
10	+2.5'	30-36"	Y			-	
11	+2.5'	30-36"		Y	OBJ	-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-2a: Trenching Log Project Station 4+42

Fig 3-2b through 3-2i: Project Station 4+42

Fig 3-2j through 3-2m: Project Station 4+42

STATION 9+80; O/S 49-FT FLOOD SIDE BERM; 4.5-FEET DEEP (FIELD CHANGE). Phase II Trench.

Excavation commenced at 1:30 pm on 03 November 2011.

This trench was originally located on the protected side berm based on an anomaly found in the Fugro Geophysical survey but was moved flood side and closer to the levee centerline to keep trench excavation out of the zone of uncompacted fill. This location represents an area where the WBV14C.2 contractor placed 4-feet of fill. The material disposition charts predict the trench would encounter 0.5-feet of Willow Bend material, then 1-foot of River Birch, then material placed by the previous WBV14B contractor. A similar stratigraphy was actually encountered in the trench.

The trench log is shown in Figure 3-3a. Representative photos of the initial trench excavation, Tiger Team members inspecting trench, and the wood and the piece of debris found in the cuttings are shown in Figures 3-3b through 3-3k. Non-woody debris encountered consisted of a small brick fragment. One piece of wood appearing to exceed the specified limit for objectionably sized wood was recovered from the 2.0 to 3.0 foot depth. Various pieces of wood, smaller than the specified objectionable size were encountered in the trench. The sounds of the excavator bucket encountering small pieces of wood were audible. No other debris (concrete, metal, brick etc) was encountered.

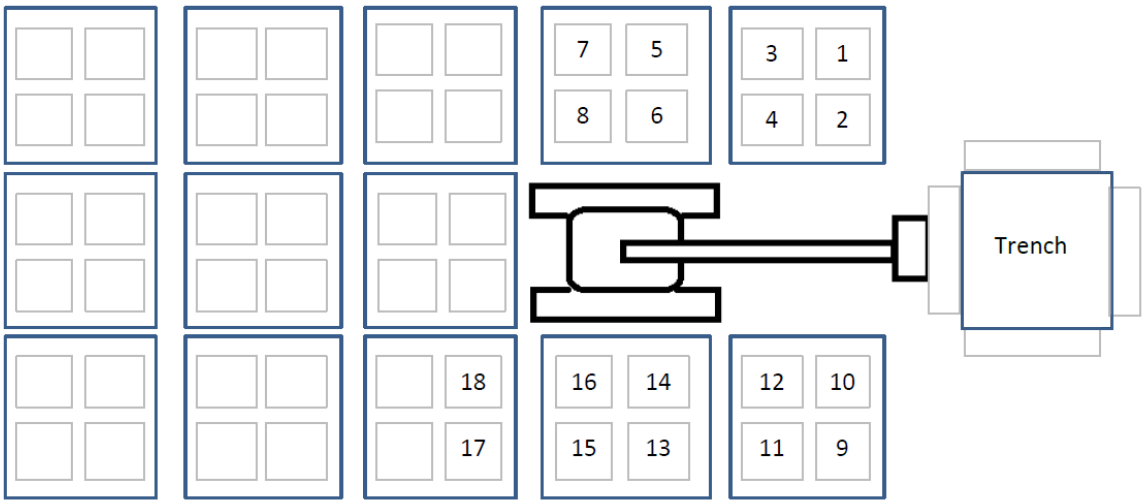
Pocket penetrometer results of 1700 to 3700 psf were measured in the side wall of the excavated trench.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata, or compaction); however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	11/3/2011	LOCATION	Flood side

STATION #	09+80	OFFSET FROM C/L	49'
START TIME	1:30 PM	TOP ELEV	+6.0
END TIME		ORIG GROUND ELEV	+2.0
WEATHER	58 Degrees, Cloudy	DEPTH	4.5'
NORTHING	506921.9	EASTING	3654918.8



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+5.5'	0-6"				WB	Lean Brown Clay
2	+5.5'	0-6"				-	
3	+5.0'	6-12"	Y	Y		RB	
4	+5.0'	6-12"	Y			-	
5	+4.5'	12-18"	Y	Y	OBJ	-	
6	+4.5'	12-18"				-	
7	+4.0'	18-24"	Y	Y	OBJ	-	
8	+4.0'	18-24"		Y		-	
9	+3.5'	24-30"	Y	Y		14b.2	Tan, Brown, Lean to Fat Clay
10	+3.5'	24-30"	Y	Y	OBJ	-	
11	+3.0'	30-36"	Y			-	
12	+3.0'	30-36"				-	Gray Fat Clay
13	+2.5'	36-42"				-	
14	+2.5'	36-42"	Y	Y		-	
15	+2.0'	42-48"				-	
16	+2.0'	42-48"				-	
17	+1.5'	48-54"				EL	Gray fat Clay
18	+1.5'	48-54"	Y		OBJ	-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-3a: Trenching Log Project Station 9+80

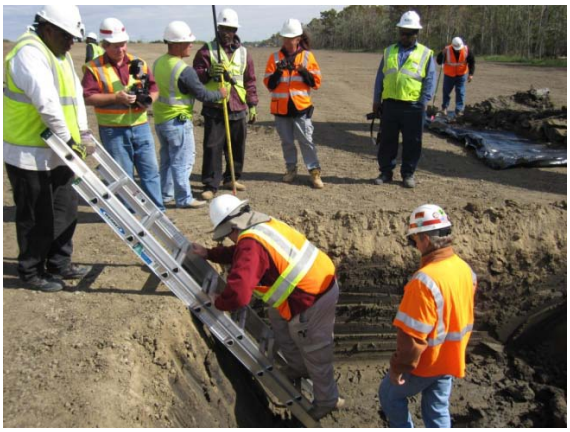


Fig 3-3b to 3-3i: Project Station 9+80

Fig 3-3j to 3-3k: Project Station 9+80

STATION 21+95; LEVEE CENTERLINE; 6-FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 8:00 am on 03 November 2011.

The material disposition charts indicated the contractor placed (from the levee centerline down) 2-feet of Willow Bend material, then 1.5-feet of levee degrade, and finally 5-feet of River Birch. The 6-foot deep trench encountered 2.0 feet of Willow Bend, 2.0 feet of levee degrade, and then 2-feet of River Birch.

At a depth of 2.5 to 3.0 feet, the excavation encountered a piece of rubble concrete about 8 to 10-inches in size. It is unknown whether the concrete debris encountered may have accounted for the geophysical anomaly. Three pieces of wood appearing to exceed the specified limit for objectionably sized wood were recovered and various small pieces of wood, less than the objectionable size specified by the contract were found in the excavation. Details on the recovered objects follow. The sounds of the excavator bucket encountering small pieces of wood were audible. Other than the concrete observed, no other non-woody debris was found.

1 objectionable @ 2.0 to 3.0 ft depth (19”x4”x3”)
1 piece of concrete @ 2.0 to 3.0 ft depth (12”x5”x7”)
1 objectionable @ 3.0 to 4.0 ft depth (14”x2.5”x2”)
Small piece of concrete @ 2.0 to 3.0 ft depth
1 objectionable @ 5.0 to 6.0 ft depth (19”x3”x3”)
Small piece of stone @ 5.0 to 6.0 ft depth

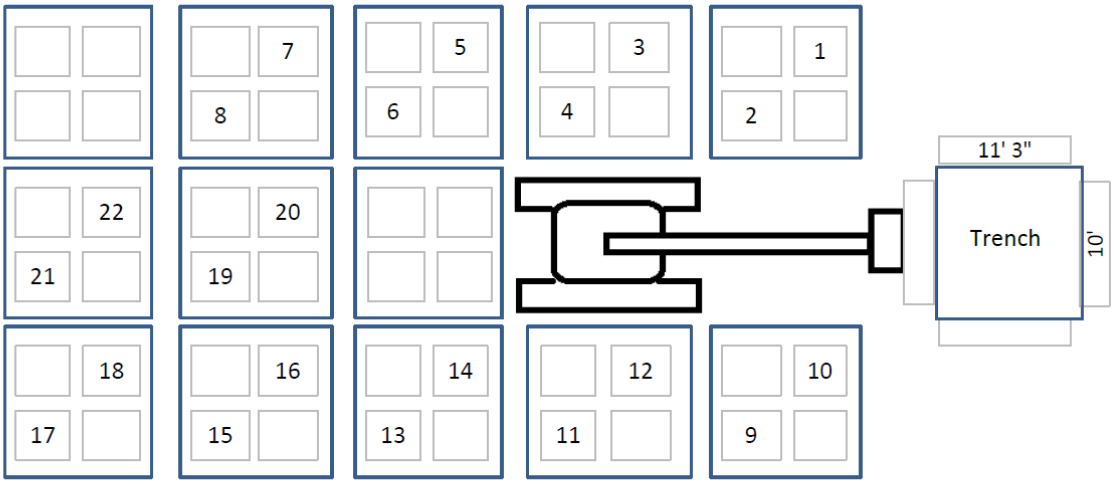
The composite trench log is shown in Figure 3-4a and representative photos of the initial trench excavation, completed trench, overview of the excavated cuttings, wood, and the piece of concrete found in the cuttings are shown in Figures 3-4b through 3-4m.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata, or compaction); however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	11/3/2011	LOCATION	Center Line

STATION #	21+95	OFFSET FROM C/L	-
START TIME	8:00 AM	TOP ELEV	+13.5
END TIME		ORIG GROUND ELEV	+4.6
WEATHER	65 Degrees, Sunny	DEPTH	6.0'
NORTHING	506736.9	EASTING	3656120.5



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+13.0'	0-6"				WB	Dry Brown Lean Clay
2	+13.0'	0-6"				-	
3	+12.5'	6-12"		Y		-	
4	+12.5'	6-12"				-	
5	+12.0'	12-18"	Y	Y		-	
6	+12.0'	12-18"				-	
7	+11.5'	18-24"				-	
8	+11.5'	18-24"			Concrete	-	
9	+11.0'	24-30"				LD	Black Brown Fat Clay with Shells
10	+11.0'	24-30"				-	
11	+10.5'	30-36"				-	
12	+10.5'	30-36"				-	
13	+10.0'	36-42"		Y		-	
14	+10.0'	36-42"				-	
15	+9.5'	42-48"				-	
16	+9.5'	42-48"				-	
17	+8.5'	48-60"				RB	Black Brown Fat Clay
18	+8.5'	48-60"				-	
19	+8.0'	60-66"				-	
20	+8.0'	60-66"				-	
21	+7.5'	66-72"	Y	Y		-	
22	+7.5'	66-72"				-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-4a: Trenching Log Project Station 21+95

Fig 3-4b to 3-4i: Project Station 21+95

Fig 3-4j to 3-4m: Project Station 21+95

STATION 27+25; O/S 80-FT FLOOD SIDE; 4-FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 4:28 pm on 02 November 2011.

This location was based on multiple anomalies found in the Fugro Geophysical survey. Per the material disposition charts, the Tiger Team expected to encounter (from the surface down) 1.5-feet of River Birch, 1.5-feet of WBV 14b.2, underlain by River Birch. This trench encountered 4-feet River Birch material. The trench excavation was terminated at 48-inches when the subjacent layer of Willow Bend material was observed below the River Birch.

Within the top foot of the excavation, a small rock, and a waste piece of geotextile fabric (not part of this construction) were encountered. Two pieces of wood which appeared to exceed the specified requirements for objectionable size were recovered in the 1.0 to 2.0 foot depth and in the 2.0 to 3.0 foot depth. Various other small pieces of wood (2" by 6"), less than the objectionable size, were found in the rest of the excavation.

The composite trench log is shown in Figure 3-5a and representative photos of the wood, the rock, and the piece of fabric found in the cuttings are shown in Figures 3-5b through 3-5i.

Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 600 psf to 1700 psf.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction); however, Mr. Merritt reserved his comments during this field review.

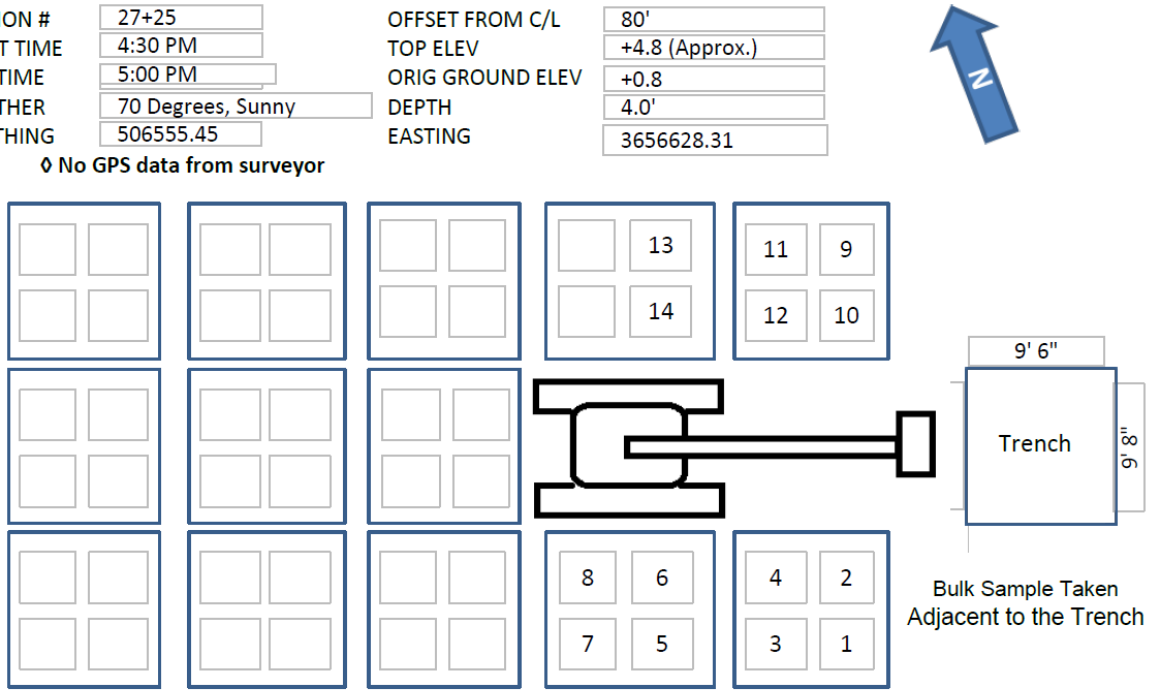
No GPS data was obtained during trenching; however, locations were verified the day after trenching operations with GPS survey equipment.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	11/2/2011	LOCATION	Flood Side

STATION #	27+25	OFFSET FROM C/L	80'
START TIME	4:30 PM	TOP ELEV	+4.8 (Approx.)
END TIME	5:00 PM	ORIG GROUND ELEV	+0.8
WEATHER	70 Degrees, Sunny	DEPTH	4.0'
NORTHING	506555.45	EASTING	3656628.31

◊ No GPS data from surveyor



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	◊	0-6"				RB	**◊ No GPS data from surveyor**
2		0-6"				-	Dark Gray Brown Fat Clay
3		6-12"				-	
4		6-12"				-	
5		12-18"				-	
6		12-18"				-	
7		18-24"				-	
8		18-24"	Y	Y	OBJ	-	
9		24-30"				-	
10		24-30"				-	
11		30-36"				-	
12		30-36"				-	
13		36-48"	Y			-	
14		36-48"	Y	Y		-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-5a: Trenching Log Project Station 27+25

Fig 3-5b to 3-5i: Project Station 27+25

STATION 29+50; O/S 13-FT FLOOD SIDE; 5.5-FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 3:15 pm on 02 November 2011.

The trench was located on the flood side slope, with the trench center at elevation +11.5, approximately 2.0 feet below the levee crown. If the trench was located on the levee centerline, the materials disposition charts indicated the team could reasonably expect to encounter (from the ground surface downward) 2.0-feet of Willow Bend, then 1.5-feet of Levee Degrade and then 5.0-feet of River Birch materials. In order to reach the bottom of the River Birch material, and not have to excavate an 8.5-foot deep trench, the flood side slope location was chosen. The trench excavation was terminated at 60-inches when after excavating 1.0-feet of Willow Bend, 2.5-feet of Levee Degrade, and 2.5-feet of River Birch.

At a depth of 1.0 foot, in the levee degrade material, the excavation encountered a piece of rubble concrete about 10 to 12-inches in size and a small piece of brick. Two more pieces of rubble concrete, both about 6-inches in size were found in the levee degrade material. Various small pieces of wood, less than the objectionable size specified by the contract, were found throughout the excavation. All were encapsulated by compacted clay. Shell fragments were encountered within the Levee Degrade materials observed in the trench.

The composite trench log is shown in Figure 3-6a and representative photos of the trench during exaction, completed trench under inspection, overview of excavation piles, wood, the rock, and the piece of fabric found in the cuttings are shown in Figures 3-6b through 3-6k.

Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 1000 psf to 3700 psf.

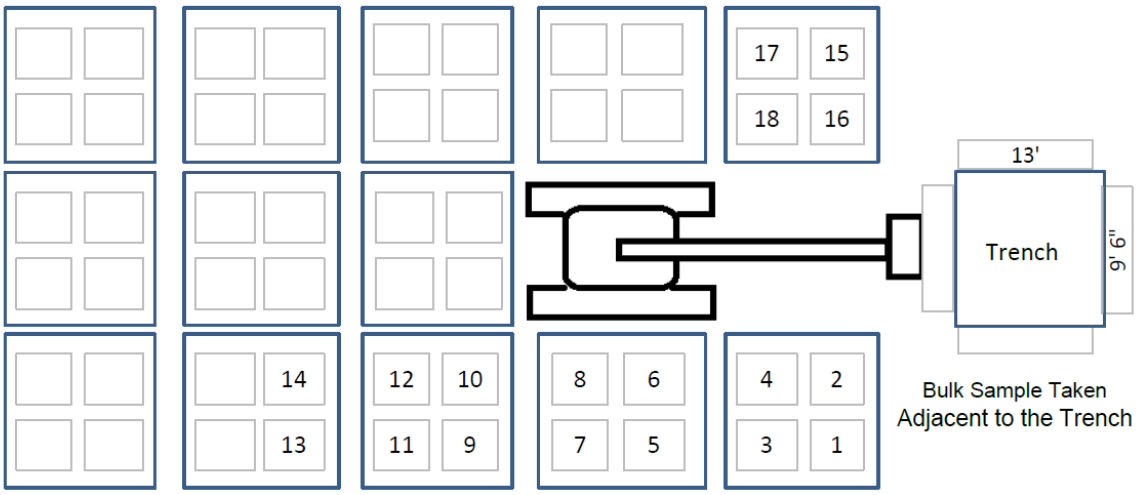
During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction); however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	11/2/2011	LOCATION	Flood Side

STATION #	29+50	OFFSET FROM C/L	13'
START TIME	3:11PM	TOP ELEV	+11.5 (Slope Approx.)
END TIME		ORIG GROUND ELEV	+3.4
WEATHER	72 Degrees, Sunny	DEPTH	5.5'
NORTHING	506579.27	EASTING	3656859.43

◊ No GPS data from surveyor



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	*ELEVATION*	*DEPTH*	*VISUAL*	*HEARD*	*DEBRIS*	*SOIL TYPE*	*NOTES:*
1	◊	0-6"	Y		Near OBJ	WB	**◊ No GPS data from surveyor**
2		0-6"		Y		-	Brown Fat Clay
3		6-12"	Y	Y		-	
4		6-12"		Y	OBJ	-	Concrete
5		12-18"	Y		Concrete	LD	Dark Gray Fat Clay with Shells
6		12-18"				-	
7		18-24"				-	
8		18-24"				-	
9		24-30"	Y			-	
10		24-30"				-	
11		30-36"	Y	Y		-	
12	+8.5	30-36"		Y		-	**GPS Data Available**
13	+7.0	36-54"	Y	Y		RB	Dark Gray Black Fat Clay
14	+7.0	36-54"	Y			-	
15	+6.5	54-60"	Y	Y	Near OBJ	-	
16	+6.5	54-60"	Y	Y	OBJ	-	
17	+6.0	60-66"	Y	Y		-	
18	+6.0	60-66"				-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-6a: Trenching Log Project Station 29+50

Fig 3-6b to 3-6i: Project Station 29+50

Fig 3-6j to 3-6k: Project Station 29+50

STATION 32+29; O/S 110-FT FLOOD SIDE; 5 FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 1:48 pm on 02 November 2011.

This location was based on multiple anomalies found in the Fugro Geophysical survey. This location is in the vicinity of Central Avenue, which was a known road leading to the "Old Westwego Dump" located well flood side of the current levee.

At this location, the WBV14C.2 contractor had placed 2.0 to 2.5 feet of compacted River Birch material over 1.0-foot of uncompacted River Birch. The trench excavation was carried through the entire berm thickness and encountered the in-situ, natural material at the 3.0 foot depth (as indicated by tree roots). The trench excavation was terminated at 60-inches. After completion of the excavation groundwater was observed entering from the bottom of the trench.

One piece of wood encountered between depths of 2.0 to 3.0 feet appeared to be objectionable in size. Small pieces of wood, less than the objectionable size specified by the contract, were also found in the River Birch fill. The sound of the excavator bucket encountering small pieces of wood was audible. The excavation encountered roots, some small stones and groundwater at and below the natural soil horizon. The excavation below the natural soil produced a piece of terra cotta drain tile, a 5-foot long timber, and various pieces of brick , concrete, metal pieces, all accompanied by a shoe. This debris was exposed at and below EL +0.2 ft.

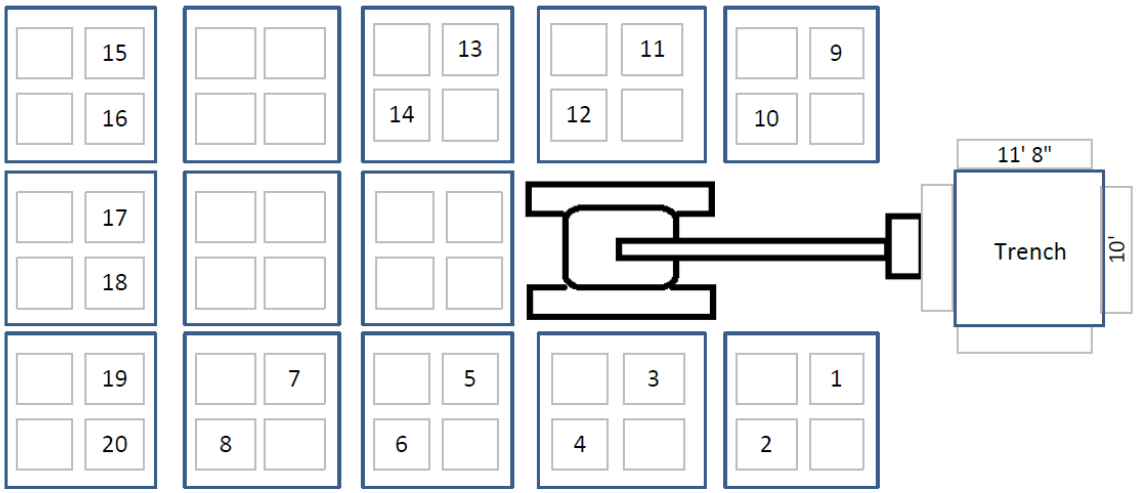
The composite trench log is shown in Figure 3-7a. Representative photos of the initial trench excavation, excavation penetrating through uncompacted clay into "natural" soils, close-up of organic material and wood in bottom of trench below uncompacted clay, wood from trench excavation, the rock, and the piece of fabric found in the cuttings, other debris, and the completed trench with groundwater seepage are shown in Figures 3-7b through 3-7o.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for the fill placed by the WBV14C.2 contractor. The team concluded the debris in this trench was within the apparent debris field mapped by the geophysical survey.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	11/2/2011	LOCATION	Flood Side

STATION #	32+29	OFFSET FROM C/L	110'
START TIME	1:43 PM	TOP ELEV	+4.2
END TIME	3:00 PM	ORIG GROUND ELEV	+0.9
WEATHER	68 Degrees, Sunny	DEPTH	5'
NORTHING	506429.82	EASTING	3657113.73



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+3.7	0-6"				RB	Brown Fat Clay
2	+3.7	0-6"	Y			-	
3	+3.2	6-12"	Y	Y		-	
4	+3.2	6-12"	Y	Y		-	
5	+2.7	12-18"	Y	Y		-	
6	+2.7	12-18"	Y	Y	near OBJ	-	
7	+2.2	18-24"	Y	Y		-	
8	+2.2	18-24"		Y		-	
9	+1.7	24-30"	Y	Y	OBJ	RB	Grey Uncompacted Fill
10	+1.7	24-30"	Y	Y		-	
11	+1.2	30-36"	Y	Y	OBJ	-	
12	+1.2	30-36"	Y	Y		-	
13	+0.7	36-42"	Y	Y		NG	Root Mass
14	+0.7	36-42"					
15	+0.2	42-48"					
16	+0.2	42-48"	Y		OBJ		
17	-0.3	48-54"		Y			Gravel; Debris (terra cotta tiles)
18	-0.3	48-54"	Y		OBJ		Concrete, Brick, Wood, Shoes, Metal Sheets
19	-0.8	54-60"					
20	-0.8	54-60"			OBJ		Ground water seepage at bottom of the pit

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place, NG - Natural Ground
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS seepage: Y stability concerns: Y
sand stratas: N good compaction: Y (New Fill)

Fig 3-7a: Trenching Log Project Station 32+29

Fig 3-7b to 3-7i: Project Station 32+29

Fig 3-7j to 3-7o: Project Station 32+29

STATION 37+23; O/S 139-FT PROTECTED SIDE; 4 FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 11:35 am on 02 November 2011.

This location was based on a cluster of anomalies found in the Fugro Geophysical survey. In this particular part of the levee, a very high density of anomalies was reported by the Geophysical survey. This location is just one of many potential targets. This location is in the vicinity of Central Avenue, which was a known road leading to the "Old Westwego Dump" located well flood side of the current levee.

Inspection of the material disposition charts indicate that, at the thickest part of the berm, the contractor placed (starting at the ground surface) 2.0-feet of Willow Bend material, then 2.0 feet of River Birch, all underlain by Willow Bend borrow material. Per the survey information at the trench location, the contractor placed about 2.5-feet of fill.

The entirety of the fill was determined to be Willow Bend material. From zero to 2-feet, one larger piece of wood appeared to exceed the specified limit for objectionably sized wood was recovered. The rest of the WBV14C.2 fill cuttings were very clean, yielding few, very small pieces of wood. But at a depth of 2.5-feet, below the WBV14C.2 fill, the excavation began to produce debris including tires, wheel covers, concrete slabs, metal pieces, timber, metal tank, plastic, shoes, wire and various other things. Pockets of free water were encountered within certain pieces of debris (i.e. metal tank) and surrounding various individual pieces of debris. There did not appear to be any active seepage compared with the floodside trench at Sta. 32+29. The excavation extended 1.5-feet into this debris field to a total depth of 4.0 feet and was terminated.

Some members of the Tiger Team expressed concern the Corps "Grubbing" specification, requiring the WBV14C.2 contractor to remove buried debris, was not properly addressed once the debris was encountered during construction. Although the abandoned dump site location is annotated on Sheet C-06 of the WBV 14c.2 plans and specifications, there are no special provisions within this contract to specifically address removal and disposal of debris in the abandoned dump site.

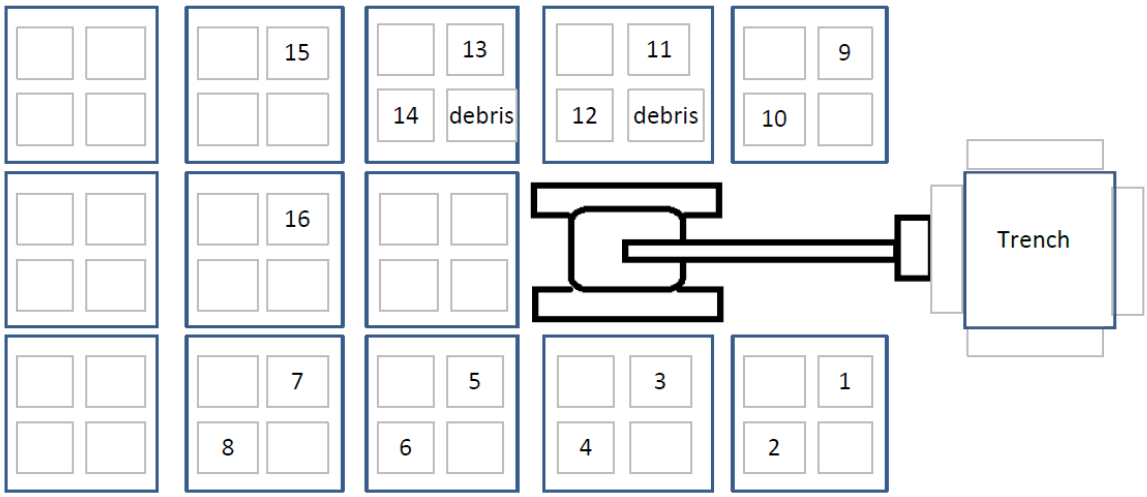
Once the debris field was encountered, no Tiger Team member touched any of the cuttings and the construction representative immediately erected safety fencing around the cuttings. The trench log is shown in Figure 3-8a. Photographs shown in Figures 3-8b through 3-8s include: overview of trench during start of excavation, completed trench within relatively clean Willow Bend fill before encountering debris at a depth of 2.5 feet, representative wood recovered from Willow Bend materials, surveying elevation of debris in trench, and debris found in the cuttings below a depth of 2.5 feet.

During the review of the excavation the Tiger Team members expressed concerns for potential seepage and stability issues. The Tiger Team briefly discussed the possible failure mechanisms the debris field could present. In subsequent discussions, the Tiger Team decided any detailed determination of failure mechanisms and potential engineering/technical solutions were beyond the Team's scope, would require further investigation and assessments, and are the responsibility of the New Orleans District Corps of Engineers in coordination with the Non-Federal Sponsors.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	11/2/2011	LOCATION	Protected Side

STATION #	37+23	OFFSET FROM C/L	139'
START TIME	11:35 AM	TOP ELEV	+2.9
END TIME	12:25 PM	ORIG GROUND ELEV	+0.4
WEATHER	sunny & windy	DEPTH	4'
NORTHING	506580.65	EASTING	3657646.77



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+2.4	0-6"				WB	Brown Fat Clay
2	+2.4	0-6"				-	
3	+1.9	6-12"	Y			-	
4	+1.9	6-12"		Y		-	
5	+1.5	12-18"				-	
6	+1.5	12-18"				-	
7	+0.9	18-24"				-	
8	+0.9	18-24"	Y	Y		-	
9	+0.4	24-30"				-	wet, entire bucket fell as a slab
10	+0.4	24-30"				-	
11	-0.1	30-36"			Concrete	EL	Start of Debris Field
12	-0.1	30-36"				-	metal pipe, large concrete chunk
13	-0.6	36-42"				-	angle iron, car tire
14	-0.6	36-42"			Y	-	wood, concrete, rebar, wire, metal, rubber
15	-1.1	42-48"			Y	-	shoe, chunks of concrete
16	-1.1	42-48"			Y	-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place

OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	Y	stability concerns:	Y
	sand stratas:	N	good compaction:	Y (New Fill)

Fig 3-8a: Trenching Log Project Station 37+23

Fig 3-8b to 3-8i: Project Station 37+23

Fig 3-8j to 3-8q: Project Station 37+23

Fig 3-8r to 3-8s: Project Station 37+23

STATION 39+90; O/S 120-FT FLOOD SIDE; 4 FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 11:50 am on Tuesday, 25 October 2011.

This location was based on an anomaly found in the Fugro Geophysical survey and provided systematic coverage of the levee floodside berm. At this location near the toe of the floodside berm, the WBV14C.2 contractor had placed 3 to 4-feet of uncompacted River Birch materials. The trench excavation was carried through the entire berm thickness and encountered the in-situ, natural material at the 4.0 foot depth. The trench excavation was terminated at 48-inches.

The trench encountered gray, soft to medium stiff, fat clays representative of uncompacted River Birch material. The cuttings contained few pieces of small wood. No anomaly was encountered.

Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength of about 500 psf.

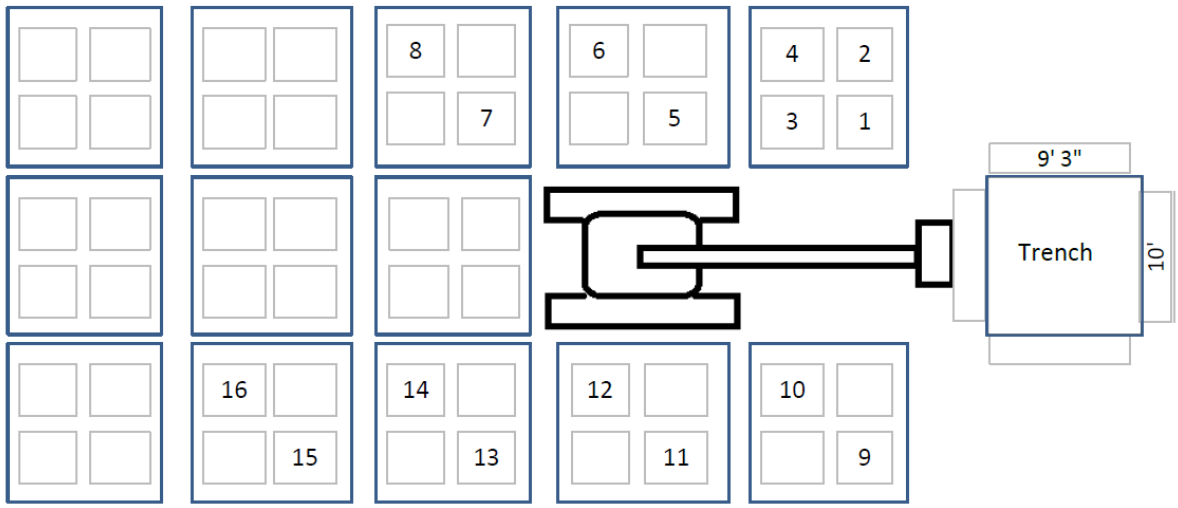
The trench log is shown in Figure 3-9a and representative photos of the overall trenching operation, completed trench, Tiger Team members inspecting the trench, and the wood found in the cuttings are shown in Figures 3-9b through 3-9i.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction); however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	11/2/2011	LOCATION	Flood Side

STATION #	39+90	OFFSET FROM C/L	120'
START TIME	10:15 AM	TOP ELEV	+3.8
END TIME	11:20 AM	ORIG GROUND ELEV	+0.4
WEATHER	65° & sunny	DEPTH	4'
NORTHING	506273.14	EASTING	3657859.28



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+3.2'	0-6"				RB	Grey Uncompacted Fat Clay
2	+3.2'	0-6"				-	
3	+2.8'	6-12"				-	
4	+2.8'	6-12"				-	
5	+2.8'	6-12"				-	
6	+2.3'	12-18"		Y		-	
7	+2.3'	12-18"		Y		-	
8	+1.2'	18-30"				-	
9	+1.2'	18-30"				-	
10	+1.8'	24-30"				-	
11	+1.2'	30-36"				-	
12	+1.2'	30-36"				-	
13	+0.8'	36-42"				-	
14	+0.8'	36-42"				-	
15	+0.3	42-48"		Y		-	
16	+0.3	42-48"				-	
17	-0.8	48-54"				-	
18	-0.8	48-54"				-	

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Uncompacted Fill

Fig 3-9a: Trenching Log Project Station 39+90

Figs 3-9b to 3-9i: Project Station 39+90

STATION 40+51; O/S 38-FT FLOOD SIDE; 5-FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 8:15 am on 02 November 2011.

The material disposition charts indicated the contractor had placed (from the ground surface down) 1.50-feet of River Birch, underlain by 1.50-feet of excess fill hauled from WBV 14b.2 and then 2.0-feet of River Birch. The trench was terminated 5.6 feet deep when the WBV14C.1 berm materials were encountered.

Wood was encountered throughout the excavation with the three pieces being obtained in the first foot of the excavation and a 4th piece from the 2.0 to 3.0 foot depth. The sound of the excavator bucket encountering small pieces of wood was audible. The size and volume of observed wood got smaller as the excavation progressed deeper. Iron stains were noted on some of the cuttings at depths of 2 to 3'. Some discussion ensued if the staining indicated seepage. All wood was encapsulated in the fat, well compacted clay.

The trench log is shown in Figure 3-10a and representative photos of the initial trench excavation, completed trench, and wood collected from the cuttings are shown in Figures 3-10b through 3-10o.

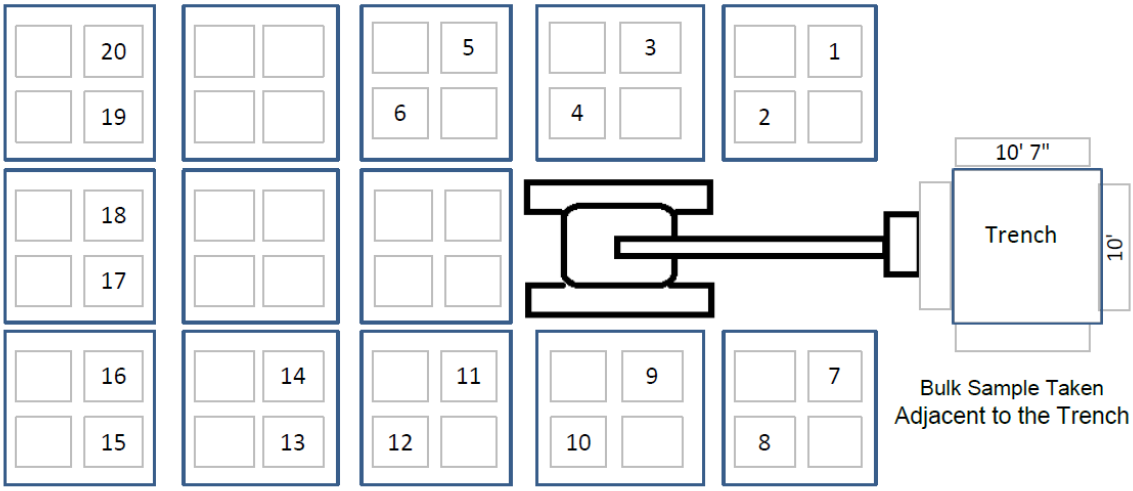
Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 800 psf to 2500 psf.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction); however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	11/2/2011	LOCATION	Flood Side

STATION #	40+51	OFFSET FROM C/L	38'
START TIME	8:12 AM	TOP ELEV	+6.4'
END TIME	9:54 AM	ORIG GROUND ELEV	-2.0'
WEATHER	60 Degrees, Sunny	DEPTH	5'
NORTHING	506342.3	EASTING	3657934.4



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+5.9	0-6"	Y	Y	OBJ	RB	Grey Fat Clay
2	+5.9	0-6"	Y	Y		-	
3	+5.4	6-12"	Y	Y		-	
4	+5.4	6-12"		Y		-	
5	+4.9	12-18"	Y	Y		-	
6	+4.9	12-18"	Y	Y		-	
7	+4.4	18-24"		Y		14b.2	Brown Grey Fat Clay
8	+4.4	18-24"	Y	Y	OBJ	-	
9	+3.9	24-30"	Y	Y	OBJ	-	
10	+3.9	24-30"	Y	Y		-	
11	+3.4	30-36"	Y	Y		RB	Brown Grey Fat Clay
12	+3.4	30-36"	Y	Y	OBJ	-	
13	+2.7	36-44"		Y		-	
14	+2.7	36-44"				-	
15	+2.4	44-48"				-	
16	+2.4	44-48"	Y	Y	OBJ	-	
17	+1.8	48-55"		Y		WB	Brown Fat Clay
18	+1.8	48-55"		Y		-	
19	+0.8	55-67"				-	
20	+0.8	55-67"				-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-10a: Trenching Log Project Station 40+51

Fig 3-10b to 3-10i: Project Station 40+51

Fig 3-10j to 3-10o: Project Station 40+51

STATION 48+00; O/S 90-FT PROTECTED SIDE; 3-FEET DEEP (FIELD CHANGE).
Phase I Trench.

Excavation commenced at about 4:00 pm on Wednesday, 28 September 2011.

This location was adjusted by 200-feet from station 50+00 due to overhead power lines existing at the original site.

No trench log exists for this excavation. Figures 3-11a to 3-11f show the trench location, the excavation, wood-picking process, and the collected wood . The work by the current contractor at this location included filling the berm from elevation +1.40 to the existing elevation of +5.0. As reasonably expected from the borrow disposition charts, the excavation showed 2-feet of Willow Bend borrow material, underlain by River Birch borrow material. The River Birch borrow was underlain by very stiff to hard clays (CH) with shell fragments at the bottom of the trench excavation at a depth of 3 feet.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction).

Figures 3-11a to 3-11f: Project Station 48+00

STATION 48+00; LEVEE CENTERLINE; 5-FEET DEEP (FIELD CHANGE).
Phase I Trench.

Excavation commenced at about 4:00pm on Wednesday, 28 September 2011.

This location was adjusted by 200-feet from station 50+00 due to overhead power lines existing at the original site.

No trench log exists for this excavation. Photographs of the trench location, the excavation, wood-picking process, and the collected wood are shown on at Figures 3-12a to 3-12f. Excavation encountered high plasticity clays (CH).

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction).

Figures 3-12a to 3-12f: Project Station 48+00

STATION 60+50 and 61+50; FLOOD SIDE; FIELD INVESTIGATE (PER PLAN).
Phase II

The Tiger Team's study of the FFEB/Fugro's Geophysical report created an interest, to some members, in large areas of strong changes in phase contrast (blue and red/orange) located at/beyond the flood side protected toe at stations 60+50 and 61+50. The team decided to perform a walk-over, field inspection to see if it could discern any reasons for these broad, non point-source, areas.

The Team completed these field inspections on the morning of 28 October 2011. The team investigated the area at the flood side toe as well as the heavily vegetated/treed area further flood side beyond the construction limits near the old sea-plane landing "strip". The team found several dilapidated and falling down wooden shelters, masonry slabs, scraps of sheet metal, and much debris and trash scattered among the trees.

The blue location on the geophysical in-phase response at station 60+50 corresponds to the area where the team observed the debris, beyond the WBV14C.2 construction limits. Two settlement plates cause a strong localized response within this blue area.

The orange/red location on the geophysical in-phase response at station 61+50 corresponds to an abandoned road. Likely, the use of this road compacted the soils causing the positive phase response noted in the geophysical study.

STATION 66+88; LEVEE CENTERLINE; 3.5-FEET DEEP (Field Change from 3.0-FT). Phase II Trench.

Excavation commenced at 4:55 pm on 27 October 2011.

This location was based on an anomaly found in the Fugro Geophysical survey. At this location, the material disposition charts indicated the contractor placed (from the ground surface and extending downward) 0.5-feet of River Birch, 4-feet of levee degrade material, all underlain by Willow Bend. The trench was terminated at a depth of 3.5-feet. All fill was well compacted, light brown clay.

The sound of the excavator bucket encountering small pieces of wood was audible although the excavated cuttings produced a small amount of wood pieces, none exceeded the specified objectionable size. A small piece of metal and concrete recovered from the zero to 1.0-foot depth may account for the geophysical anomaly.

The trench log is shown in Figure 3-13a and representative photos of the wood collected from the cuttings are shown in Figures 3-13b through 3-13j.

Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 2000 psf to greater than 4500 psf.

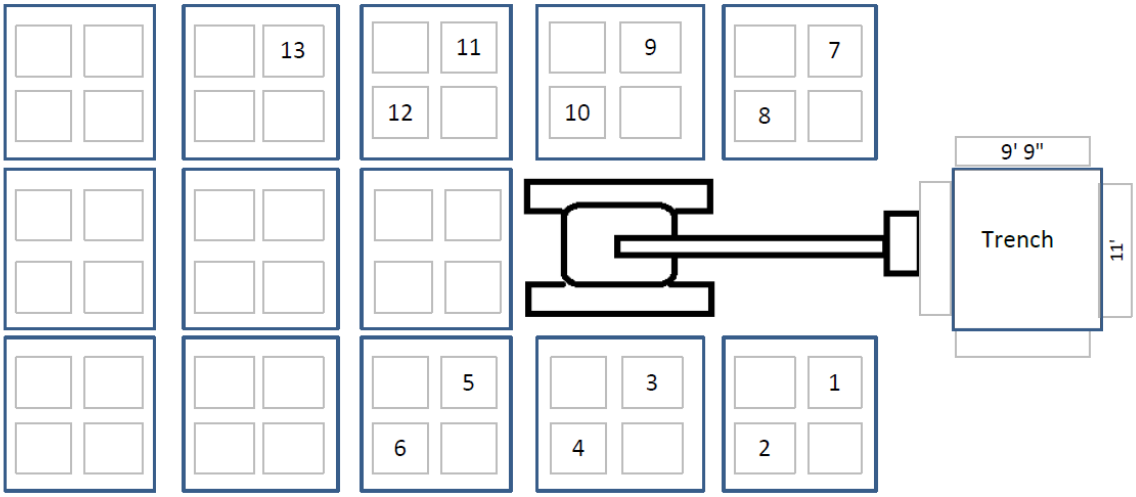
During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction); however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR: Composite Log
DATE: 10/27/2011
LOCATION: Center Line

STATION #: 66+88
START TIME: 4:55 PM
END TIME: 5:25 PM
WEATHER: 75 Degrees, Sunny
NORTHING: 505807.9
EM GROUND TRUTHING?

OFFSET FROM C/L: none
TOP ELEV: +13.5'
ORIG GROUND ELEV: +4.6'
DEPTH: 3.5'
EASTING: 3660414.5



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+13'	0-6"				WB	Dry Brown Fat Clay
2	+13'	0-6"	Y			-	
3	+12.5'	6-12"				LD	Dry Brown Fat Clay
4	+12.5'	6-12"				-	
5	+12.0'	12-18"		Y		-	
6	+12.0'	12-18"	Y	Y		-	
7	+11.5'	18-24"	Y	Y	OBJ	very dry	
8	+11.5'	18-24"				-	
9	+11.0'	24-30"				-	
10	+11.0'	24-30"				-	
11	+10.5'	30-36"	Y	Y		-	
12	+10.5'	30-36"		Y		-	
13	+10.0'	36-44"		Y		-	Dark Grey Brown Fat Clay

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS seepage: N stability concerns: N
sand stratas: N good compaction: Y

Fig 3-13a: Trenching Log Project Station 66+88

Fig 3-13b to 3-13i: Project Station 66+88

Fig 3-13j: Project Station 66+88

STATION 70+00; LEVEE CENTERLINE; 3.5-FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 4:04 pm on 27 October 2011.

At this location, the material disposition charts indicated the contractor placed (from the levee crown and extending downward) 0.5-feet of River Birch, 3-feet of levee degrade material, all underlain by Willow Bend. The trench was terminated at a depth of 3.5-feet. All excavated cuttings revealed well-compacted, light brown clay.

The cuttings produced one piece of wood (from the 2 to 3 foot depth) close to being classified as objectionably sized. Remaining collected wood did not exceed the specified objectionable size. A small (2 to 3 inch) piece of concrete was collected in the 3 to 3.5-foot depth. No reason for the metallic anomaly was discovered.

The trench log is shown in Figure 3-14a and representative photos of the wood collected from the cuttings are shown in Figures 3-14b through 3-14k.

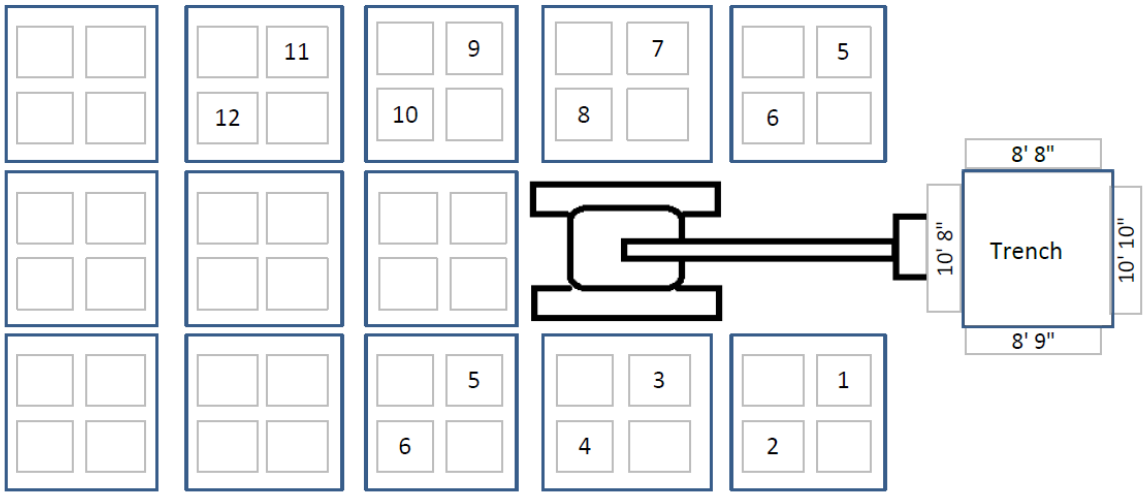
Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 1600 psf to 4500 psf.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction); however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	10/27/2011	LOCATION	Center Line

STATION #	70+00	OFFSET FROM C/L	none
START TIME	4:04 PM	TOP ELEV	+13.5'
END TIME	4:45 PM	ORIG GROUND ELEV	+5.0'
WEATHER	72 Degrees, Sunny	DEPTH	3.5'
NORTHING	505653.3	EASTING	3660659.7



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+12.5'	0-6"				RB	Dry Brown Fat Clay
2	+12.5'	0-6"				-	
3	+12.0'	6-12"				-	
4	+12.0'	6-12"				-	
5	+11.5'	12-18"				LD	Dry Brown Fat Clay
6	+11.5'	12-18"				-	
7	+11.0'	18-24"				-	
8	+11.0'	18-24"				-	
9	+10.5'	24-30"				-	
10	+10.5'	24-30"	Y	Y	Y	-	
11	+10.0'	30-36"				-	
12	+10.0'	30-36"				-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-14a: Trenching Log Project Station 70+00

Fig 3-14b to 3-14i: Project Station 70+00

Fig 3-14j to 3-14k: Project Station 70+00

STATION 71+39; O/S 36-FT PROTECTED SIDE; 3-FEET DEEP (Field Change). Phase II Trench.

Excavation commenced at 8:20am on 04 November, 2011.

This location was selected to provide systematic coverage of the protected side berm. A field decision was made to move it 19-feet closer to the protected side levee toe.

The trench was located in an area of all "cut". In other words, the WBV14C.2 contractor did not place any fill in this area, only excavated existing levee section.

The excavation produced small amounts of concrete, bits of wire, and pieces of wood throughout the entire depth of excavation. One piece of wood larger than the specified limit for objectionably sized wood was recovered from the first foot of the excavation. The concrete pieces ranged from 3-inches to 8-inches in size with the highest concentration of debris being produced by the 2 to 3 foot deep excavation. Details of the wood and debris are shown below. All debris was encapsulated in the well compacted clay. Pocket penetrometer results measured in the side wall ranged between 1500 and 2800 psf.

2 small pieces of concrete in Wedge
1 objectionable @ 0.0 to 1.0 ft depth (24"x8"x4")
2 pieces of concrete @ 1.0 to 2.0 ft depth (9"x5", 8"x8")
2 pieces of concrete @ 2.0 to 3.0 ft depth (15"x9"x3.5", 22"x15"x6")
4 small pieces of concrete and a glass bottle @ 2.0 to 3.0 ft depth

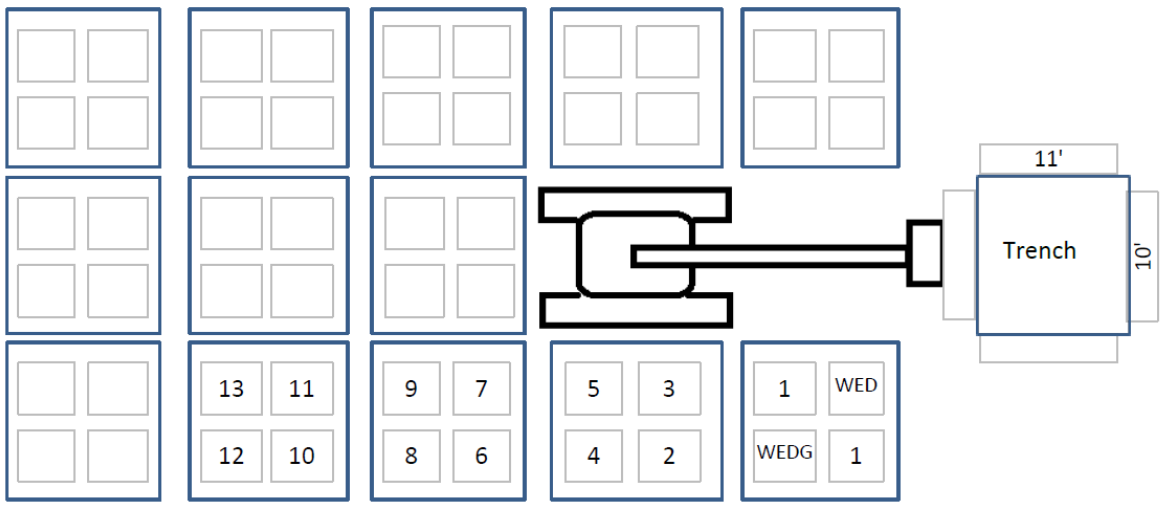
The trench log is shown in Figure 3-15a and representative photos of the trench at start of excavation, completed trench excavation, wood collected from the cuttings, and the picking process are shown in Figures 3-15b through 3-15k.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction); however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	11/4/2011	LOCATION	Protected Side

STATION #	71+39	OFFSET FROM C/L	36'
START TIME	8:34 AM	TOP ELEV	+5.7' (Toe)
END TIME	9:17 AM	ORIG GROUND ELEV	+11.3'
WEATHER	50 Degrees, Sunny	DEPTH	3.0'
NORTHING	505508.8	EASTING	3660659.2



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
Wedge	+5.5	0-6"	Y	Y	Concrete	EL	Dry Dark Brown Fat Clay
1	+5.0	0-6"				-	
2	+5.0	6-12"	Y	Y	OBJ	-	
3	+4.5	6-12"				-	
4	+4.5	12-18"				-	Dark Brown Fat Clay
5	+4.0	12-18"			Concrete	-	
6	+4.0	18-24"				-	
7	+3.5	18-24"				-	
8	+3.5	24-30"		Y	Concrete	-	
9	+3.0	24-30"	Y	Y		-	
10	+3.0	30-36"	Y			-	
11	+2.5	30-36"	Y	Y		-	
12	+2.6	30-36"	Y		OBJ	-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-15a: Trenching Log Project Station 71+39

Fig 3-15b to 3-15i: Project Station 71+39

Fig 3-15j to 3-15k: Project Station 71+39

STATION 80+00; O/S 47-FT FLOOD SIDE; 3-FEET DEEP; (PER PLAN).
Phase I Trench.

Excavation commenced at 8:35 am on Tuesday, 27 September 2011.

Photographs of the trench location, the excavation and the wood collected are shown in Figures 3-16a and 3-16b. The material disposition charts indicated all fill originated from the Willow Bend borrow pit. The total amount of wood collected is relatively small as shown in Fig 3-16e and 3-16i.

No trench log exists for this excavation.

The trench location, completed excavation, wood encountered, and excavation process are shown on Figures 3-16a to 3-16i. All wood was encapsulated within the well compacted fill material.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction).

Figures 3-16a to 3-15i: Project Station 80+00

PROJECT STATION 90+00; LEVEE CENTERLINE; 3.5-FEET DEEP (PER PLAN).
Phase I Trench.

Excavation commenced at 2:00 pm on Tuesday, 27 September 2011.

Photographs of the trench location, the excavation and the wood collected are shown in Figures 3-17a through 3-17i. As reasonably expected from the borrow disposition charts, the excavation showed approximately 1-foot of River Birch borrow material, followed by 1.5 to 2.5-feet of levee degrade material all underlain by the Willow Bend borrow.

No trench log exists for this excavation.

One piece of wood collected from the trench appeared to meet the specified objectionable definition. All wood was encapsulated within the well compacted fill material.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction).

Figures 3-17a and 3-17i: Project Station 90+00

STATION 97+00; LEVEE CENTERLINE; 4 FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 2:35 pm on 27 October 2011.

The material disposition sheets indicate the contractor placed 2-feet of River Birch, 0.5-feet of Willow Bend, 1.5-feet of Levee Degrade material, (extending downward from the levee crown), all underlain by Willow Bend. This trench was planned to extend to the bottom of the Levee Degrade materials. Trenching at this location revealed approximately 1.5 ft of River Birch fill (Brown Clay – CH) placed on top of 1.5 ft of levee degrade fill (Brown Clay – CH) followed by 1.0 ft of River Birch fill (Brown Clay – CH). Fill appeared to be visually drier than other trenches.

Five (5) apparent objectionable sized pieces of wood were encountered in the River Birch fill and one (1) objectionable piece of wood was recovered from levee degrade fill. Pieces of brick and small rocks found in the levee degrade material. Detailed information on the objectionable material is listed below.

1 objectionable @ 0.0 to 1.0 ft depth (14”x4.5”x2.5”)
1 objectionable @ 2.0 to 3.0 ft depth (18”x7”x4”)
4 objectionable @ 3.0 to 4.0 ft depth (12”x5.5”x3”, 13”x3”x3”, 13”x2.5”x3”, 13”x2”x2”)

The trench log is shown in Figure 3-18a and representative photos of the completed trench and wood collected from the cuttings are shown in Figures 3-18b through 3-18g. All wood was encapsulated within the well compacted fill material.

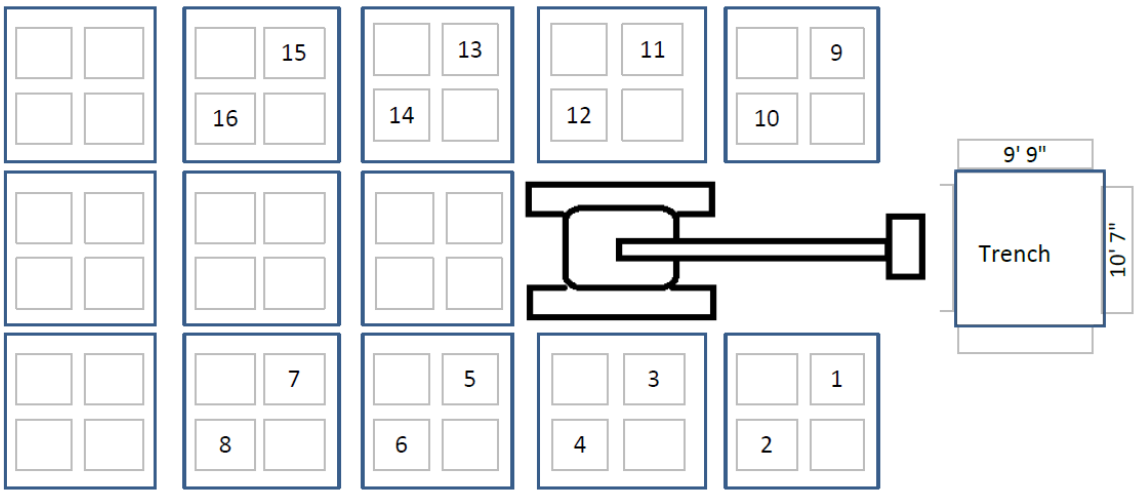
The dry nature of the clay might be the cause of the blue coloration of the EM mapping in the geophysical report. Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength exceeds 1500 psf.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction); however, Mr. Merritt reserved his comments during the field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	10/27/2011	LOCATION	Center Line

STATION #	97+00	OFFSET FROM C/L	NONE
START TIME	2:30 PM	TOP ELEV	+13.6'
END TIME	3:30 PM	ORIG GROUND ELEV	+4.6'
WEATHER	72 Degrees, Sunny	DEPTH	4.0'
NORTHING	503056.18	EASTING	3659919.12



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+13.1'	0-6"				RB	Dry Brown Fat Clay
2	+13.1'	0-6"				-	
3	+12.6'	6-12"	Y		OBJ	-	shells
4	+12.6'	6-12"				-	
5	+12.0'	12-18"			OBJ	-	
6	+12.0'	12-18"	Y	Y		-	
7	+11.5'	18-24"	Y		Rock, Brick	LD	Dry Brown Fat Clay
8	+11.5'	18-24"	Y			-	
9	+11.0'	24-30"			OBJ	-	
10	+11.0'	24-30"				-	
11	+10.5'	30-36"				-	
12	+10.5'	30-36"	Y		Stone	-	
13	+10.0'	36-44"				RB	Brown Fat Clay
14	+10.0'	36-44"				-	
15	+9.5'	44-48"				-	
16	+9.5'	44-48"				-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-18a: Trenching Log Project Station 97+00

Fig 3-18b and 3-18i: Project Station 97+00

Fig 3-18j and 3-18p: Project Station 97+00

STATION 104+51; O/S 149-FT PROTECTED SIDE; 4-FEET DEEP (FIELD CHANGE).
Phase II Trench.

Excavation commenced at 1:30 pm on Tuesday, 27 October 2011.

This trench was moved by the team an additional 49-feet further to the protected side.

The material disposition charts indicate that, at the thickest part of the berm, the contractor placed (extending downward from the ground surface) 1.5-feet of levee degrade underlain by River Birch material. At this location, surveys indicate the contractor placed approximately 3.5 feet of fill and trenching indicated 4 feet.

The sound of the excavator bucket encountering small pieces of wood was audible in the lower depths of the excavation. Five (5) possible objectionable sized pieces of wood were encountered in the River Birch fill. Detailed information on the objectionable material is listed below. A small, thin piece of tin metal, (approximately 5” by 5” by 1/8”) was recovered from the hole. This could possibly be the noted geophysical anomaly.

1 Metal Strip @ 0.0 to 1.0 ft depth (4”x3”)
4 objectionable @ 2.0 to 3.0 ft depth (15”x4”x2”, 14”x5”x2”, 15”x5”x5”, 12”x3”x3”)
1 objectionable @ 3.0 to 4.0 ft depth (13”x4”x2.5”)

Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 800 psf to 4500 psf.

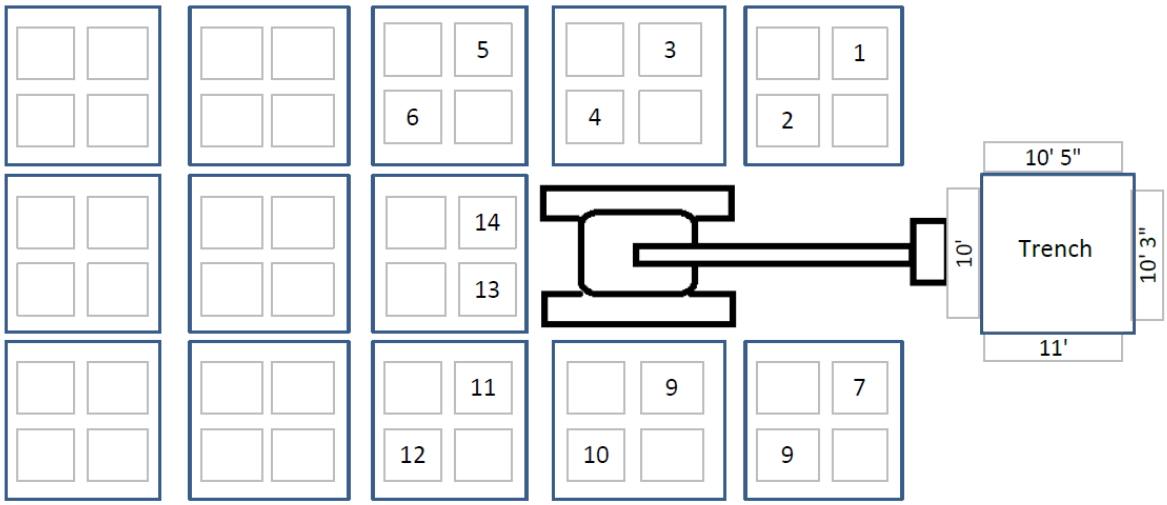
The composite trench log is shown in Figure 3-19a and representative photos of the completed trench, wood picking process, and wood collected from the cuttings are shown in Figures 3-19b through 3-19h.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	10/27/2011	LOCATION	Protected Side

STATION #	104+51	OFFSET FROM C/L	+149'
START TIME	1:30 PM	TOP ELEV	+2.5'
END TIME	2:25 PM	ORIG GROUND ELEV	-1.0'
WEATHER	70 Degrees, Sunny	DEPTH	4'
NORTHING	502293.62	EASTING	3659879.77



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+2.0'	0-6"				LD	Dark Brown Fat Clay
2	+2.0'	0-6"	Y	Y	Metal	-	
3	+1.5'	6-12"				-	
4	+1.5'	6-12"				-	
5	+1.0'	12-18"	Y	Y		-	
6	+1.0'	12-18"		Y		-	
7	+0.5'	18-24"		Y		RB	Brown Fat Clay
8	+0.5'	18-24"				-	
9	0'	24-30"				-	
10	0'	24-30"	Y		3 OBJ	-	
11	-0.5'	30-36"	Y	Y		-	
12	-0.5'	30-36"	Y		OBJ	-	
13	-1.5'	36-48"		Y		-	
14	-1.5'	36-48"		Y		-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-19a: Trenching Log Project Station 104+51

Fig 3-19b to 3-19i: Project Station 104+51

Fig 3-19j to 3-19m: Project Station 104+51

STATION 108+18; O/S 60-FT PROTECTED SIDE; 3.5 FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 11:13 am on 27 October 2011.

The material disposition charts indicate that, at the thickest part of the berm, the contractor placed (extending downward from the ground surface) 0.5-feet of levee degrade, 0.5-feet of Willow Bend, all underlain by River Birch material.
.
The plans indicate entire area is cut section. Approximately 1.5 feet of material placed during the Phase I construction and the remainder under previous contracts.

The first 12-inches of the excavation yielded 5 pieces of wood which appeared to exceed the specified limits for objectionably sized wood. Detailed information on the objectionable material is listed below. The remainder of the excavation was very clean fill. The trench excavation was terminated at 42-inches.

5 objectionable @ 0.0 to 1.0 ft depth (field measurements of 18”x7”x4”, 19”x3”x2”, 18”x4”x3”, 15”x4”x3”, 21”x4”x3”)

The composite trench log is shown in Figure 3-20a and representative photos of the wood collected from the cuttings are shown in Figures 3-20b through 3-20k.

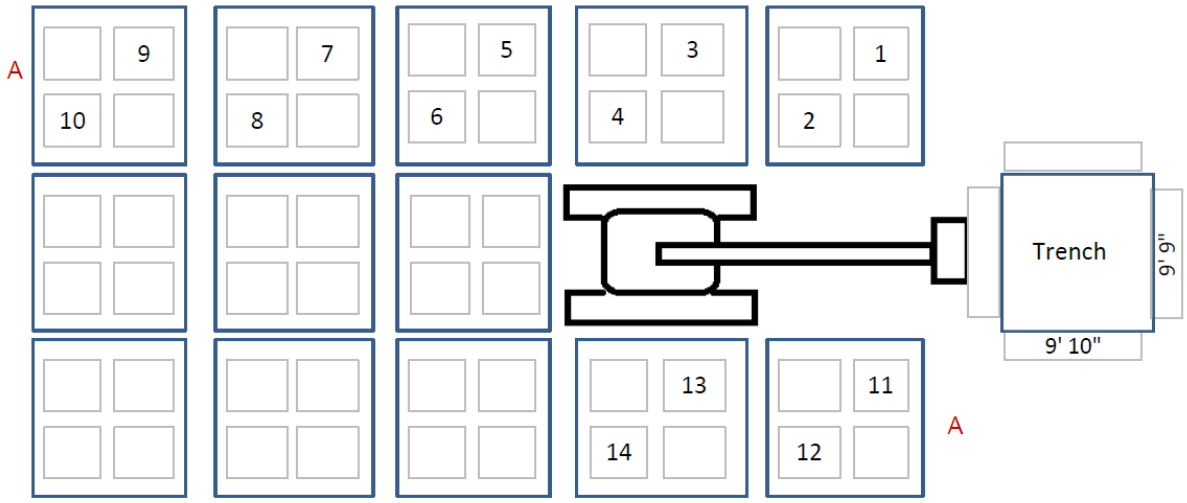
Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 1000 psf to 1300 psf.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during the field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	10/27/2011	LOCATION	Protected Side

STATION #	108+18	OFFSET FROM C/L	60'
START TIME	11:13 AM	TOP ELEV	+5.0'
END TIME	11:46 AM	ORIG GROUND ELEV	+7.6'
WEATHER	70 Degrees, Sunny	DEPTH	3.5'
NORTHING	501957.99	EASTING	3659705.98



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+4.5'	0-6"	Y	Y	2 OBJ	EL	Brown Grey Fat Clay
2	+4.5'	0-6"	Y	Y	OBJ	-	
3	+4.0'	6-12"	Y	Y		-	
4	+4.0'	6-12"		Y		-	
5	+3.5'	12-18"				-	
6	+3.5'	12-18"		Y		-	Tan to Light Brown
9	+2.9'	18-27"				-	
10	+2.9'	18-27"		Y		-	
11	+2.4'	27-36"				-	
12	+2.4'	27-36"				-	
13	+2.0'	36-42"				-	
14	+2.0'	36-42"	Y	Y	OBJ	-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-20a: Trenching Log Project Station 108+18

Fig 3-20b to 3-20i: Project Station 108+18

Fig 3-20j and 3-20k: Project Station 108+18

STATION 109+30; O/S 33-FT PROTECTED SIDE; 4-FEET DEEP (FIELD CHANGE). Phase II Trench.

Excavation commenced at 9:27 am on 4 November 2011.

This trench was moved from the planned station of 110+00 to 109+30 to remain outside of the specified 100-foot exclusion zone related to freshly placed concrete. Based on previous experience with trench at 108+18, this trench location was moved from the centerline to the protected side toe.

At this location, the trench was in an area of all "cut". In other words, the WBV14C.2 contractor did not place any fill in this area, only excavated existing levee section.

The excavation produced waste scraps of geogrid and cloth, and pieces of wood within the first 18-inches of excavation. Below this depth, the fill was very clean. Three pieces of the wood appeared to exceed the specified limits for objectionably sized wood. Detailed information on the objectionable woody material is listed below.

1 objectionable in Wedge from El. 6.3 to 5.7 ft (12"x4"x3")
2 objectionable from El. 5.7 to 4.5 ft (17"x4"x2", 13"x4"x2")

A piece of geogrid was recovered from the excavated wedge (protected side levee toe) from El. 6.3 to 5.7 ft
Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 800 psf to 2200 psf.

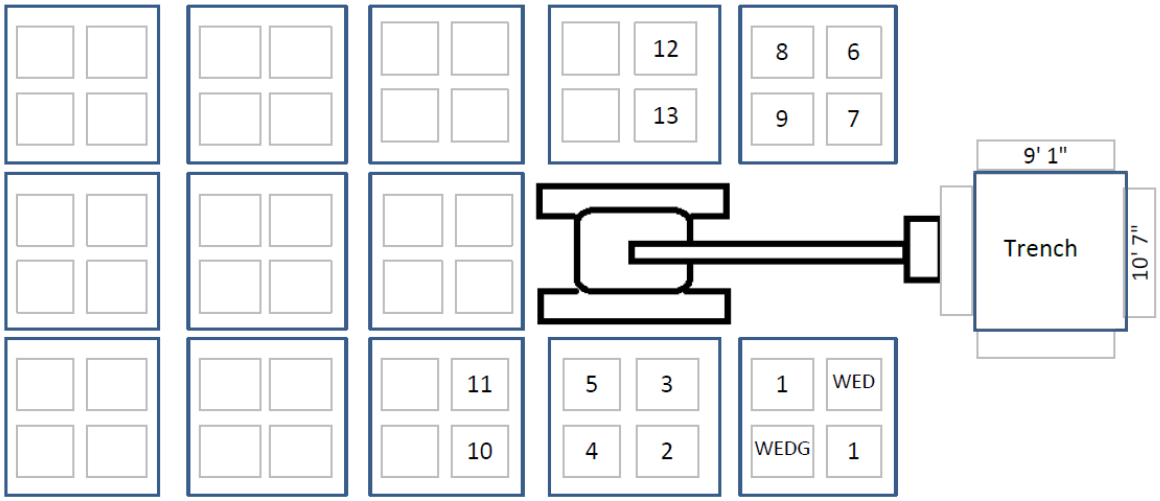
The composite trench log is shown in Figure 3-21a and representative photos of the wood collected from the cuttings are shown in Figures 3-21b through 3-21i.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during the field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	11/4/2011	LOCATION	Protected Side

STATION #	109+30	OFFSET FROM C/L	33'
START TIME	9:27 AM	TOP ELEV	+6.3
END TIME	10:30 AM	ORIG GROUND ELEV	+11.3
WEATHER	50 Degrees, Sunny	DEPTH	4'
NORTHING	501855.8	EASTING	3659653.7



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+5.7'	Wedge	Y	Y	OBJ	EL	Grey Fat Clay
2	+5.0'	0-6"				-	
3	+5.0'	0-6"	Y		OBJ	-	
4	+4.5'	6-12"				-	
5	+4.5'	6-12"		Y	Concrete	-	
6	+4.0'	12-18"				-	
7	+4.0'	12-18"				-	
8	+3.5'	18-24"				-	Dry Brown Clay
9	+3.5'	18-24"				-	
10	+3.0'	24-30"				-	
11	+3.0'	24-30"	Y		OBJ	-	
12	+2.5'	30-36"	Y			-	
13	+2.5'	30-36"				-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-21a: Trenching Log Project Station 109+30

Fig 3-21b to 3-21i: Project Station 109+30

STATION 120+39; O/S 63-FT PROTECTED SIDE; 4 FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 9:20 am on 27 October 2011.

The material disposition charts indicate, at the thickest part of the berm, the contractor placed (progressing downward from the berm surface) 5-feet of River Birch material then 2-feet of Willow Bend. However, the detailed survey information shows the trench was located in an area of all "cut". In other words, the WBV14C.2 contractor did not place any fill in this area, only excavated existing levee section.

The entire depth of excavation yielded wood and a few pieces of non-woody debris. Non-woody debris consisted of a 3-in. nominal diameter piece of brick from 0 to 1 ft, a 3-inch (approximate) diameter piece of concrete from 1 to 2 ft, and two pieces of stone with estimated diameter of 3-inches from 3 to 4 ft. Some of the wood already in place appeared to exceed the specified limits for objectionable material. Detailed field measurements on the possible objectionable material is listed below.

7 objectionable @ 0.0 to 1.0 ft depth
(24"x6"x2", 12"x2"x2", 20"x3"x3", 18"x3"x2", 18"x3"x2", 12"x6"x2", 26"x3"x2")
1 objectionable @ 1.0 to 2.0 ft depth (15"x3"x2")
3 objectionable @ 2.0 to 3.0 ft depth (20"x5"x2", 22"x2"x5", 16"x3"x2")
3 objectionable @ 3.0 to 4.0 ft depth (20"x2"x2", 22"x2"x3", 17"x2"x2")

Tiger Team members noted a soil seam with shear strength lower than the surrounding soils in the west wall of the excavation. Pocket penetrometer readings taken at the site follow:

2.5 ft from Bottom - 1100 psf
1.5 ft from Bottom -1000 psf
1 ft from Bottom - 500 psf
Near Bottom of Trench (approximate elev +3.0 and +2.5): 500 psf, 375 psf, 250 psf, 500 psf, 250 psf.

The pit was carefully excavated, the cuttings laid out and methodically inspected and data was recorded on the Trenching Field Log. The trench log is shown in Figure 3-21a and photos of the wood collected from the cuttings are shown in Figures 3-22b through 3-22k.

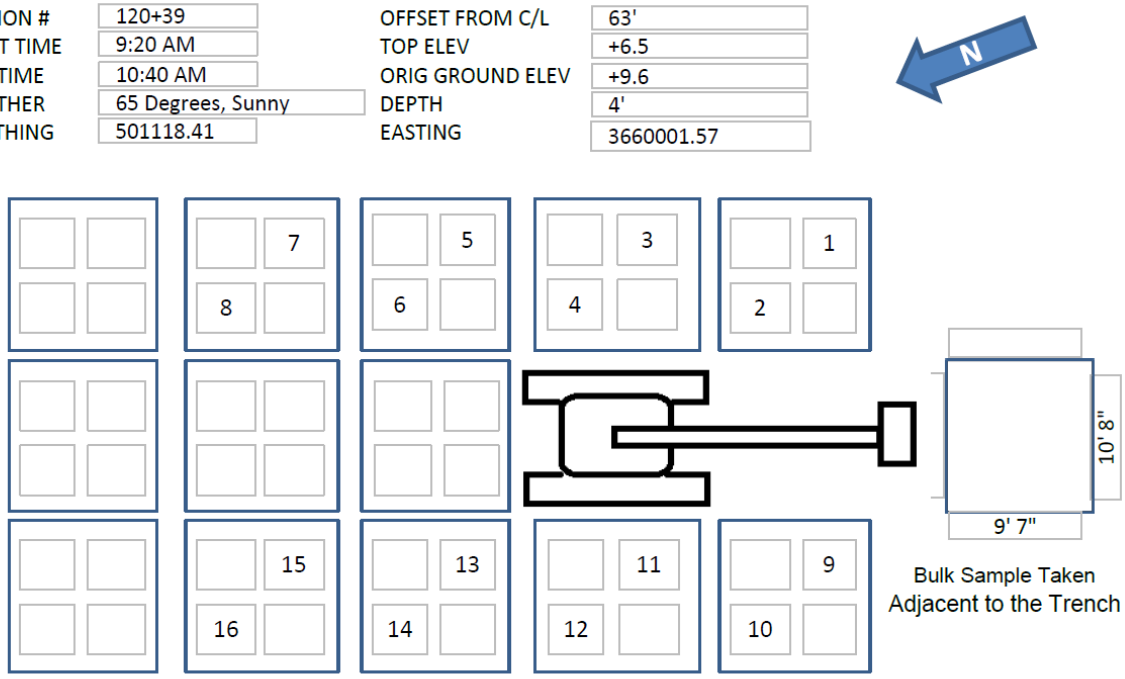
During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee seepage, sand strata or compaction based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during this field review.

The team agreed the design documents would be reviewed to ascertain what assumptions were made about the stratigraphy and shear strength in this project vicinity. This Tiger Team review may be found in Chapter 10. The team also agreed a design verification boring would be co-located with this trench.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	10/27/2011	LOCATION	Protected Side

STATION #	120+39	OFFSET FROM C/L	63'
START TIME	9:20 AM	TOP ELEV	+6.5
END TIME	10:40 AM	ORIG GROUND ELEV	+9.6
WEATHER	65 Degrees, Sunny	DEPTH	4'
NORTHING	501118.41	EASTING	3660001.57



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+6.0'	0-6"	Y			WB	Dry Brown Fat Clay
2	+6.0'	0-6"	Y	Y	2 OBJ	-	
3	+5.5'	6-12"				EL	Brown Grey Fat Clay
4	+5.5'	6-12"	Y	Y		-	
5	+5.0'	12-18"	Y		OBJ	-	
6	+5.0'	12-18"	Y	Y		-	
7	+4.5'	18-24"	Y		Brick	-	
8	+4.5'	18-24"				-	
9	+4.0'	24-30"	Y		OBJ	-	Grey Fat Clay
10	+4.0'	24-30"		Y		-	
11	+3.5'	30-36"	Y		2 OBJ	-	
12	+3.5'	30-36"				-	
13	+3.0'	36-42"				-	
14	+3.0'	36-42"				-	
15	+2.5'	42-48"				-	
16	+2.5'	42-48"		Y		-	Wet Soft Grey Fay Clay

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	-
	sand stratas:	N	good compaction:	Y

Fig 3-22a: Trenching Log Project Station 120+39

Fig 3-22b to 3-22i: Project Station 120+39

Fig 3-22j to 3-22k: Project Station 120+39

STATION 121+46; O/S 15-FT PROTECTED SIDE; 3.5-FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 7:40 am on 27 October 2011.

Based on the material disposition sheets, (from the levee crown and going deeper) the contractor placed 1.0-feet of River Birch, underlain by 1.0-feet of levee degrade, underlain by 2.0-feet of River Birch. Materials actually encountered consisted of 1.0-feet of River Birch, underlain by 1.0-feet of levee degrade, underlain by 1.5-feet of River Birch, followed by Willow Bend at the bottom of the excavation.

Small pieces of wood, less than the objectionable size specified by the contract, were found throughout the excavation. A total of three pieces of wood appeared to exceed the specified limits for objectionably sized wood. Detailed field measurements of the objectionable material are listed below.

1 objectionable @ 0.0 to 1.0 ft depth (16”x3”x3”)
1 Metal Hook @ 0.0 to 1.0 ft depth
1 objectionable @ 1.0 to 2.0 ft depth (14”x4”x3”)
1 objectionable @ 2.0 to 3.0 ft depth (17”x3”x3”)

A specific concern was raised in the field by the Non-Federal Sponsor regarding the discovery of a crane hook within the first foot of excavation posing a safety hazard during mowing operations.

Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 600 psf to 1300 psf.

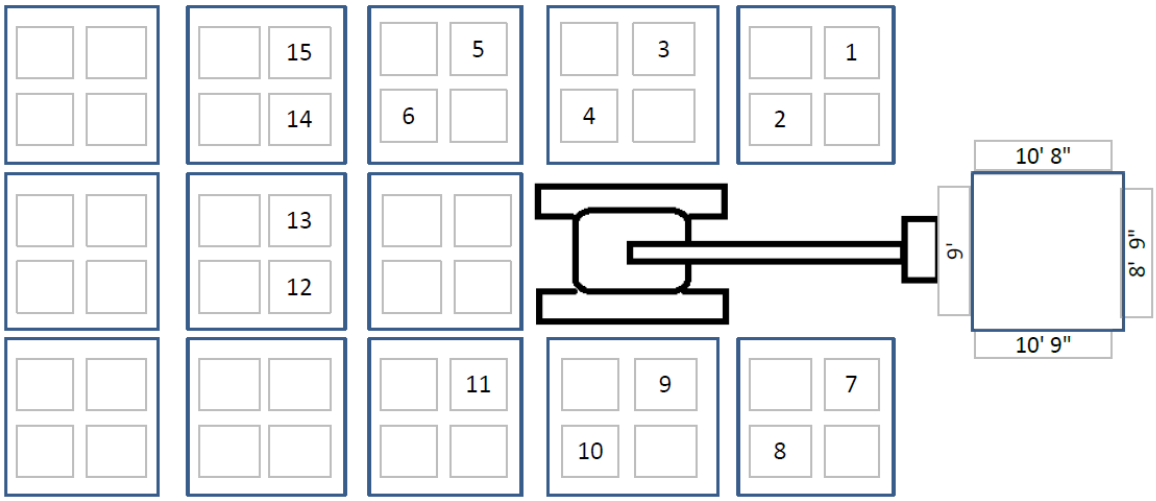
The composite trench log is shown in Figure 3-23a and representative photos of the initial excavation of the trench, inspection of the trench, wood picking operations, and wood/debris collected from the cuttings are shown in Figures 3-23b through 3-23o.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	10/27/2011	LOCATION	Protected Side

STATION #	121+46	OFFSET FROM C/L	15'
START TIME	7:40 AM	TOP ELEV	+10.8' (Slope)
END TIME	9:10 AM	ORIG GROUND ELEV	+8'
WEATHER	61 Degrees, Sunny	DEPTH	3.5 ft
NORTHING	501062.4	EASTING	3660104.28



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+11.1-8.9	0-6"	Y	Y	OBJ	RB	Brown Fat Clay
2	+11.1-8.9	0-6"	Y	Y	Metal	-	
3	+10.7-8.4	6-12"				-	
4	+10.7-8.4	6-12"				-	
5	+10.1-7.9	12-18"				LD	Grey Black Fat Clay
6	+10.1-7.9	12-18"			OBJ	-	
7		0-18"				-	Mixture of 0-18"
8	+9.7-7.3	18-24"	Y			-	
9	+9.7-7.3	18-24"			OBJ	-	
10	+9.1-6.6	24-30"				RB	Grey Black Fat Clay
11	+9.1-6.6	24-30"				-	
12	+8.7-6.1	30-36"				-	
13	+8.7-6.1	30-36"		Y		-	
14	+8.1-5.7	36-42"		Y		-	
15	+8.1-5.7	36-42"	Y			-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-23a: Trenching Log Project Station 121+46

Fig 3-23b to 3-23i: Project Station 121+46

Fig 3-23j to 3-23o: Project Station 121+46

STATION 122+22; O/S 69-FT PROTECTED SIDE; 3-FEET DEEP (PER PLAN).
Phase I Trench.

Excavation commenced at 10:00 am on 27 September 2011.

This location was selected by the Tiger Team as a "Ground Truth" Trench. The information gained from the trench would be used by FFEB/Fugro to help them "calibrate" their geophysical work

No trench log exists for this ground truth trench.

The WBV14C.2 contractor placed about 0.7-feet of clay fill, raising the protected side berm from elevation +5.8 to the existing elevation of +6.5. Fugro's EM Geophysical scanning showed potential anomalies in the fill from 2.5 to 3-feet deep. Photographs of the trench location, excavated trench, wood debris collected, and the wood picking operation are shown on Figures 3-24a to 3-24f.

The material disposition charts indicate the contractor used River Birch to build the 0.7-feet of fill. A piece of wood exceeding the specified size for objectionable wood was collected from below the contractor's fill placement.

Figures 3-24a to 3-24f: Project Station 122+22

STATION 123+59; O/S 69-FT FLOOD SIDE; 3.7-FEET DEEP (PER PLAN).
Phase I Trench.

Excavation commenced at 11:23 am on 27 September 2011.

This location was selected by the Tiger Team as a "Ground Truth" Trench. The information gained from the trench would be used by FFEB/Fugro to help them "calibrate" their geophysical work. At this location, the geophysical scanning showed potential anomalies present in the fill at 2.5 to 3-feet deep.

The work by the WBV14C.2 contractor at this location included building the flood side berm from elevation +2.3 to the existing elevation of +5.4. The material disposition charts indicate the contractor placed 1.5-feet of River Birch over Willow Bend material.

No trench log exists for this excavation.

Photographs of the trench location, initial trench excavation, wood collected, and sorted clay piles during picking are shown in Figures 3-25a to 3-25f.

The wood collected from the trench excavation yielded three pieces meeting the specified objectionable definition. All wood was encapsulated within the well compacted fill material. No member of the Tiger Team expressed any concerns for levee integrity after reviewing the cuttings and the side walls and bottom of the excavation.

Figures 3-25a to 3-25f: Project Station 123+59

STATION 124+42; O/S 39-FT PROTECTED SIDE; 3-FEET DEEP (PER PLAN).
Phase I Trench.

Excavation commenced at 11:00 am on 27 September 2011.

This location was selected by the Tiger Team as a "Ground Truth" Trench (only). The information gained from the trench would be used by FFEB/Fugro to help them "calibrate" their geophysical work.

No trench log exists for this ground truth trench.

The only work by the WBV14C.2 contractor at this location was cutting the existing levee from elevation +12.1 down to the existing elevation of +7.2. The contractor did not place any fill in this area. Soils encountered in the trench consisted of high plasticity clay (CH) with shell fragments, consistent with existing levee material encountered in other trenches.

Fugro's EM Geophysical scanning showed potential anomalies present in the fill at 2.5 to 3-feet deep. Photographs of the trench location, and the excavated remnants of corrugated metal and plastic pipe unearthed from a depth of 2-feet are shown on Figures 3-26a through 3-26d. The remnants of the corrugated metal may be the anomaly detected by the geophysical survey.

Figures 3-26a to 3-26d: Fugro Ground Truth Trench at Project Station 124+42

STATION 136+07; LEVEE CENTERLINE; 4-FEET DEEP (PER PLAN).
Phase II Trench.

The excavation commenced at 3:45 pm on Wednesday 26 October 2011.

The top 6-inches was in River Birch borrow material, next underlain by 3-feet of levee degrade material, then Willow Bend material.

The trench excavation was terminated at 48-inches. Trenching revealed one (1) possible objectionable sized (12”x6”x6”) piece of wood at depth of 0.0 to 1.0 ft and a small piece of concrete in the levee degrade fill at depth of 1.0 to 2.0 ft. Two small pieces of concrete (approximately. 3” to 4” long) were encountered from 1 to 2 ft and 3 ft to 5 ft. The team decided to extend the floodside half of the trench one additional foot to find an anomaly mapped by the geophysical survey. Degraded and re-used levee material was observed as having a powdered white coating on the clay, origin of which is unknown. Relatively few, small pieces of wood were found throughout the excavation.

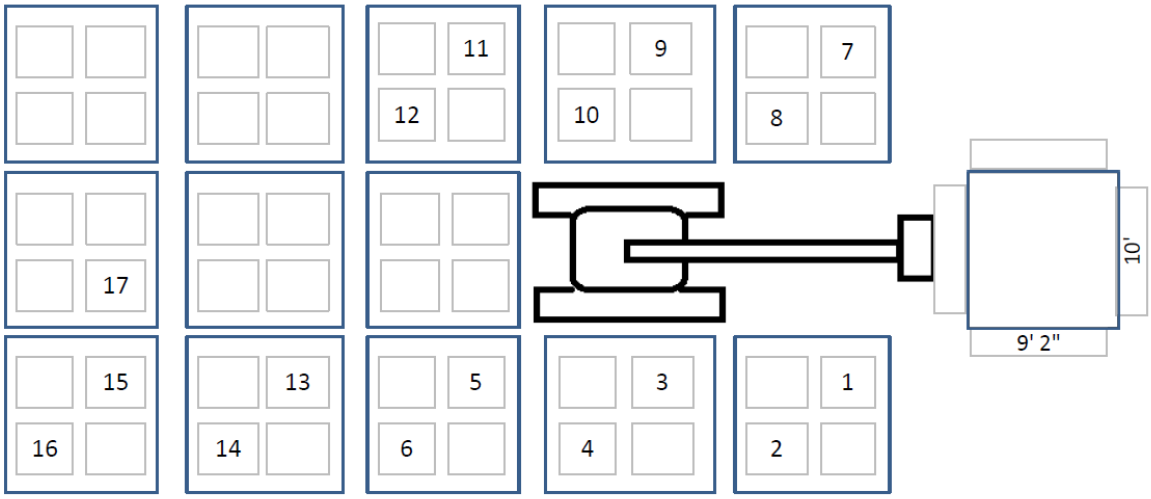
The composite trench log is shown in Figure 3-27a and representative photos of the initial trench excavation, picking process, completed trench, and wood collected from the cuttings are shown in Figures 3-27b through 3-27m.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during the field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	10/26/2011	LOCATION	Center Line

STATION #	136+07	OFFSET FROM C/L	none
START TIME	3:45 PM	TOP ELEV	+13.5
END TIME	5:10 PM	ORIG GROUND ELEV	+5.8
WEATHER	75 Degrees, Sunny	DEPTH	4'
NORTHING	500937.9	EASTING	3661559.7



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+13.0'	0-6"	Y		OBJ	RB	Brown Grey Fat Clay
2	+13.0'	0-6"				-	
3	+12.5'	6-12"				LD	Dry Brown Fat Clay
4	+12.5'	6-12"	Y	Y	Wood	-	
5	+12.0'	12-18"				-	
6	+12.0'	12-18"	Y	Y	Concrete	-	
7	+11.5'	18-24"				-	Gravel or Shells
8	+11.5'	18-24"				-	Shells
9	+11.0'	24-30"				-	
10	+11.0'	24-30"	Y	Y		-	
11	+10.5'	30-36"				-	
12	+10.5'	30-36"				-	
13	+10.0'	36-42"	Y	Y		-	
14	+10.0'	36-42"				-	
15	+9.5'	42-48"	Y		Wood	-	
16	+9.5'	42-48"				-	
17	+9.0'	48-54"				-	
18	+9.0'	48-54"				-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Figure 3-27a: Trenching Log Project Station 136+07

Figure 3-27b to 3-27i: Project Station 136+07

Figure 3-27j to 3-27m: Project Station 136+07

STATION 140+00; O/S 51-FT FLOOD SIDE; 3-FEET DEEP (PER PLAN).
Phase I Trench.

Excavation commenced at 3:15 pm on 27 September 2011.

The work by the current contractor at this location included filling the berm from elevation +2.6 to the existing elevation of +6.1. As reasonably expected from the borrow disposition charts, the excavation showed approximately 1.5-feet of River Birch borrow material, underlain by the Willow Bend borrow.

No trench log exists for this excavation.

The trench location, the excavation, cutting, and collected wood are shown in Figures 3-28a to 3-28h. The wood collected from this trench excavation yielded three pieces meeting the specified objectionable definition. All wood was encapsulated within the well compacted fill material.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations.

Figs 3-28a to 3-28h: Project Station 140+00

STATION 141+46; O/S 118-FT PROTECTED SIDE; 4-FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 8:00 am on 28 October 2011.

During its desktop study of the geophysical report, the team noticed a thin blue line on the geophysical survey and agreed to visit and investigate the site. This location was originally included as a walkover visual inspection, but was later revised to be a full inspection trench to accommodate the concerns by the Flood Authority.

The material disposition charts indicate only River Birch material was placed in this part of the protected side berm. Detailed cross section surveys show the WBV14C.2 contractor placed 2.7-feet of fill which was generally confirmed by the trench.

The excavation yielded relatively few small pieces of wood, less than the objectionable size specified by the contract. One 3-in piece of plastic was encountered within the existing levee material below a depth of 3 feet.

Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 1200 psf to 3600 psf.

The composite trench log is shown in Figure 3-29a and representative photos of the completed trench, inspection of the trench, and wood collected from the cuttings are shown in Figures 3-29b through 3-29l.

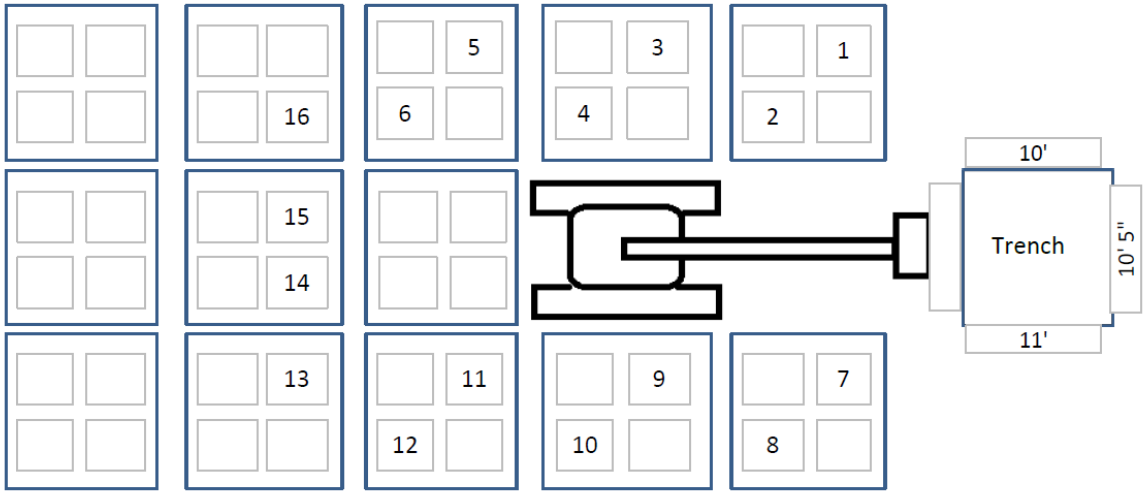
During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during the field review.

Subsequent discussion with FFEB confirmed the blue line shown in the geophysical testing was generated by processing of the geophysical data and was not an anomaly.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	10/28/2011	LOCATION	Protected Side

STATION #	141+46	OFFSET FROM C/L	118'
START TIME	7:59 AM	TOP ELEV	+5.5
END TIME	8:52 AM	ORIG GROUND ELEV	+2.8
WEATHER	62 Degrees, Sunny	DEPTH	4'
NORTHING	501016.0	EASTING	3662107.02



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+5.0	0-6"		Y		RB	Brown Fat Clay
2	+5.0	0-6"				-	
3	+4.5	6-12"	Y	Y		-	
4	+4.5	6-12"		Y		-	
5	+4.0	12-18"				-	
6	+4.0	12-18"				-	
7	+3.5	18-24"				-	
8	+3.5	18-24"				-	
9	+3.0	24-30"	Y	Y		-	
10	+3.0	24-30"		Y		-	
11	+2.5	30-36"				-	
12	+2.5	30-36"	Y	Y		-	
13	+2.0	36-42"				EL	Grey Black Fat Clay
14	+2.0	36-42"				-	
15	+1.5	42-48"				-	
16	+1.5	42-48"				-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS seepage: stability concerns:
sand stratas: good compaction:

Figure 3-29a: Trenching Log Project Station 141+46

Figure 3-29b to 3-29i: Project Station 141+46

Figure 3-29j to 3-29l: Project Station 141+46

STATION 145+00; O/S 130-FT PROTECTED SIDE; 3-FEET DEEP (PER PLAN).
Phase I Trench.

Excavation commenced at 4:20 pm on 27 September 2011.

The work by the current contractor at this location included filling the berm from elevation +2.0 to the existing elevation of +5.1. As reasonably expected from the borrow disposition charts, the excavation showed only River Birch borrow material.

No trench log exists for this excavation.

Photographs of the trench location, completed trench, collected wood, and wood picking process are shown on Figures 3-30a through 3-30g. Of the wood collected from the trench, three pieces appeared to meet the specified objectionable definition. All wood was encapsulated within the well compacted fill material.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations.

Figure 3-30a and 3-30g: Project Station 145+00

STATION 150+00; LEVEE CENTERLINE; 6-FEET DEEP (PER PLAN).
Phase I Trench.

Excavation commenced at 9:15 am on Wednesday, 28 September 2011.

As reasonably expected from the borrow disposition charts, the excavation showed 1-foot of River Birch borrow material, underlain by 2-feet of levee degrade, underlain by 3-feet of River Birch.

No trench log exists for this excavation.

Photographs of the trench location on the levee centerline, the excavation, cuttings and collected wood are shown in Figures 3-31a through 3-31g. To accommodate the greater volume of cuttings from the deeper trench, the contractor laid out plastic on the flood side and protected side levee slopes.

The team heard the excavator bucket encountering wood during the last foot of the excavation and the bottom 1-foot of this excavation yielded a large piece of wood 20-inches by 7-inches. The upper three feet of the excavation yielded zero pieces of wood meeting the specified objectionable definition and one objectionable piece was obtained from the lower half of the excavation. All wood was encapsulated within the well compacted fill material.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations.

Figs 3-31a through 3-31g: Project Station 150+00

STATION 154+50; O/S 12-FT FLOOD SIDE; 4.5-FEET DEEP (FIELD CHANGE).
Phase II Trench.

Excavation commenced at 1:45 pm on 04 November 2011.

This location is a replacement site for one originally planned for station 5+20 floodside.

Per the material disposition charts, proceeding down from the levee crown, the contractor placed 0.5-foot of Willow Bend, then1 ft of River Birch, followed by 2-feet of levee degrade, then 3-feet of River Birch all underlain by Willow Bend. The trench was located on the flood side slope with the trench center at elevation +11.6-feet and the top of the trench at elevation +12.9-feet, about 0.6-feet below the levee crown. This trench location would limit the depth needed to reach the bottom of the River Birch material. Trenching at this location revealed 1 ft of levee degrade fill (Brown Clay – CH) placed on top of 3.0 ft of River Birch fill (Brown Clay – CH) followed by Willow Bend fill (Brown Clay – CH). Two (2) small pieces of concrete (approximately. 3" diameter) were encountered from 0 to 1 ft and 1 to 2 ft. Eight (8) pieces of apparent objectionable sized wood were recovered. Detailed field measurements are listed below.

2 objectionable @ 2.0 to 3.0 ft depth (27"x6"x4", 12.5"x4"x3.5")
1 objectionable @ 3.0 to 4.0 ft depth (13"x4"x2.5")
5 objectionable @ 4.0 to 5.0 ft depth

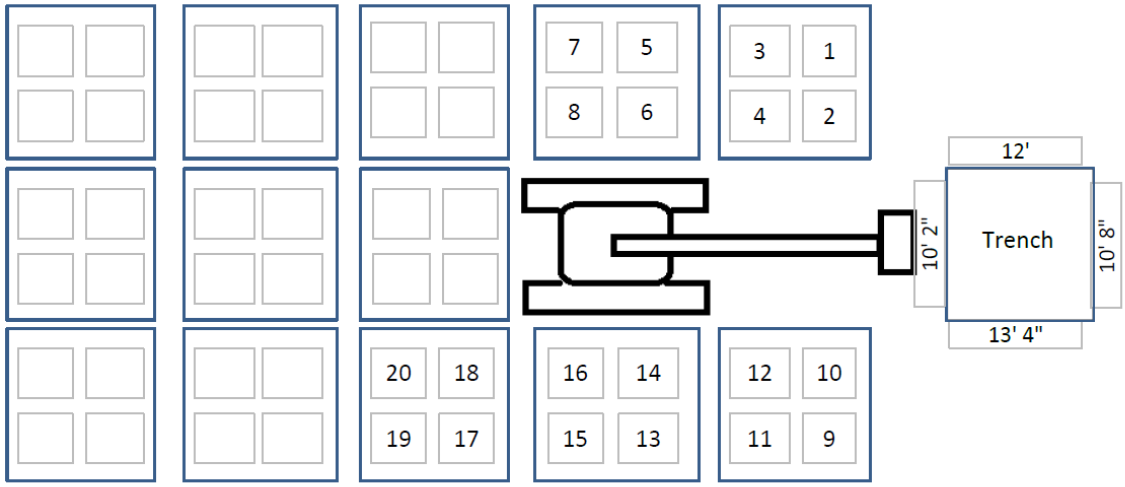
The composite trench log is shown in Figure 3-32a and representative photos of the wood collected from the cuttings are shown in Figures 3-32b through 3-32k.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during the field review. Based on field observations to date, the Tiger Team reached consensus that the River Birch fill in this eastern reach consistently produced higher amounts of objectionable materials. The Team expressed great interest in the results of the wood testing.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	Nov. 4, 2011	LOCATION	Flood Side

STATION #	154+50	OFFSET FROM C/L	+12.0'
START TIME	1:45 PM	TOP ELEV	+11.6'
END TIME	2:20 PM	ORIG GROUND ELEV	+5.1'
WEATHER	60 Degrees, Sunny	DEPTH	5'
NORTHING	500798.0	EASTING	3663398.0



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	EST. DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+11.0	0-6"				LD	
2	+11.0	0-6"	Y		Wood	-	
3	+10.5	6-12"				-	
4	+10.5	6-12"				-	
5	+10.0	12-18"		Y		-	
6	+10.0	12-18"	Y	Y		-	
7	+9.5	18-24"	Y			RB	
8	+9.5	18-24"	Y			-	
9	+9.0	24-30"	Y	Y	OBJ	-	
10	+9.0	24-30"	Y			-	
11	+8.5	30-36"				-	
12	+8.5	30-36"	Y	Y		-	
13	+8.0	36-42"	Y	Y	OBJ	-	
14	+8.0	36-42"	Y	Y		-	
15	+7.5	42-48"	Y			-	
16	+7.5	42-48"	Y	Y		-	
17	+7.0	48-54"	Y		OBJ	-	
18	+7.0	48-54"	Y			-	
19	+6.5	54-60"	Y			-	
20	+6.5	54-60"	Y		Wood	-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Figure 3-32a: Trenching Log Project Station 154+50

Figs 3-32b to 3-32i: Project Station 154+50

Figs 3-32j to 3-32k: Project Station 154+50

STATION 160+00; O/S 51-FT FLOOD SIDE; 3-FEET DEEP (PER PLAN).
Phase I Trench.

Excavation commenced at 10:35 am on Wednesday, 28 September 2011.

As reasonably expected from the borrow disposition charts, the excavation showed 0.5 to 1-foot of Willow Bend borrow material, underlain by 1-foot of River Birch, underlain by Willow Bend borrow.

No trench log exists for this excavation.

Photographs of the trench location on the flood side berm, the excavation, cuttings and recovered wood are shown on Figures 3-33a to 3-33d. The excavated soils were very clean with no pieces of wood meeting the specified objectionable definition. All wood was encapsulated within the well compacted fill material.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations.

Figs 3-33a to 3-33d: Project Station 160+00

STATION 162+50; LEVEE CENTERLINE; 5-FEET DEEP (FIELD CHANGE).
Phase II Trench.

Excavation commenced at 1:00 pm on 4 November 2011.

This site is a replacement for one originally planned for station 57+10 Centerline.

Per the material disposition charts, proceeding down from the levee crown, the contractor placed 0.5-foot of Willow Bend, then 3-foot of River Birch, all underlain by Willow Bend. The trench was located on the flood side slope with the trench center at elevation +11.6-feet and the top of the trench at elevation +12.9-feet, about 0.6-foot below the levee crown. This trench location would limit the depth needed to reach the bottom of the River Birch material. Materials actually encountered within the trench consisted of 0.5-foot of Willow Bend, underlain by 4 feet of River Birch, underlain by Willow Bend.

The excavation yielded numerous pieces of wood through the excavation. Each excavation interval from 3 to 4 feet and 4 to 5 feet deep yielded one piece of wood appearing to exceed the specified requirements for objectionable. The only non-woody debris encountered was a 6-inch piece of PVC pipe. Detailed field measurements of the objectionable wood material are listed below.

1 objectionable @ 3.0 to 4.0 ft depth (15”x4”x4”)
1 objectionable @ 4.0 to 5.0 ft depth (14”x2”x2”)

Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 1100 psf to 3000 psf.

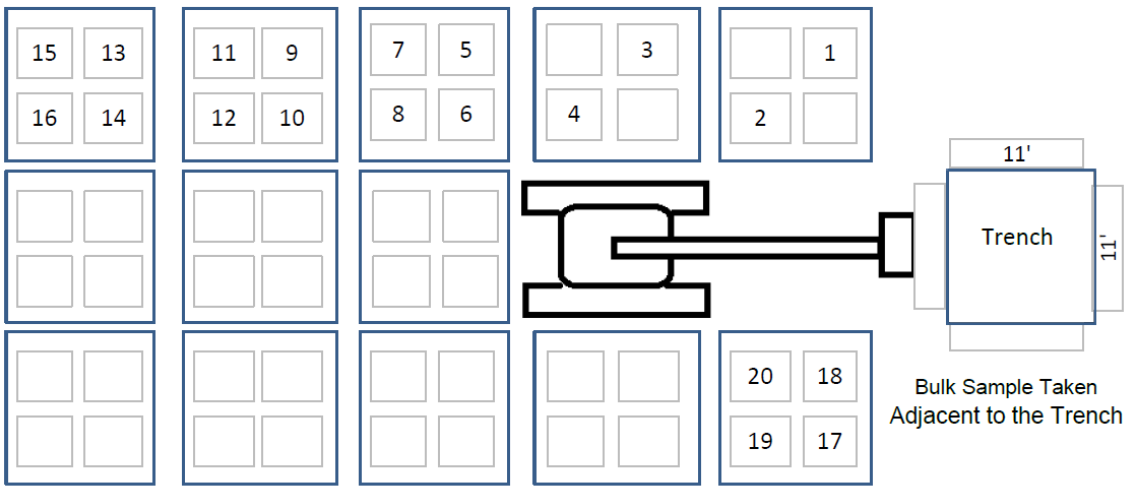
The trench log is shown in Figure 3-33a and representative photos of the initial excavation of trench, completed trench, wood collected from the cuttings, and process of picking the cuttings are shown in Figures 3-34b through 3-34i.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	11/4/2011	LOCATION	Center Line

STATION #	162+50	OFFSET FROM C/L	NONE
START TIME	11:56 AM	TOP ELEV	+13.6'
END TIME	12:55 PM	ORIG GROUND ELEV	+5.6'
WEATHER	60 Degrees, Sunny	DEPTH	5'
NORTHING	500757.6	EASTING	3664196.3



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+13.0'	0-6"				WB	Dry Brown Fat Clay
2	+13.0'	0-6"	Y			-	
3	+12.5'	6-12"	Y	Y		RB	Brown Fat Clay
4	+12.5'	6-12"	Y	Y	OBJ	-	
5	+12.0'	12-18"				-	
6	+12.0'	12-18"	Y	Y		-	
7	+11.5'	18-24"	Y	Y	WD	-	Dry Brown Fat Clay
8	+11.5'	18-24"				-	
9	+11.0'	24-30"		Y		-	
10	+11.0'	24-30"	Y		OBJ	-	
11	+10.5'	30-36"	Y		OBJ	-	
12	+10.5'	30-36"	Y	Y		-	
13	+10.5'	36-42"	Y		OBJ	-	
14	+10.0'	36-42"	Y	Y	OBJ	-	
15	+9.5'	42-48"	Y	Y	OBJ	-	
16	+9.5'	42-48"		Y		-	
17	+9.0'	48-54"	Y		OBJ	-	
18	+8.5'	48-54"				-	
19	+8.5'	54-60"	Y			-	Light Gray Fat Clay
20	+8.5'	54-60"	Y		WD	-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS seepage: stability concerns:
sand stratas: good compaction:

Figure 3-34a: Trenching Log Project Station 162+50

Figs 3-34b to 3-34i: Project Station 162+50

STATION 165+08; O/S 10-FEET PROTECTED SIDE; 2-FEET DEEP (PER PLAN).
Phase II Trench.

The excavation commenced at 1:55 pm on Wednesday 26 October 2011.

At this location, the existing levee had been degraded to create the WBV14C.2 protected side levee toe. The contract was subsequently modified to accommodate a wider levee crown plus a thicker protected side stability berm. The contractor placed 2-feet of fill over the cut area. Fill materials encountered consisted of about 6 inches of Willow Bend underlain by 1 foot of River Birch.

This trench was excavated parallel to the protected side levee slope to a depth of 2-feet. Two pieces of concrete were uncovered. The concrete pieces were located below the WBV14C.2 fill and were encapsulated in the clay material. Also between the 1st and 2nd foot of the cut, the excavation yielded a large piece of wood exceeding the objectionable size specified in the contract. Detailed field measurements on the objectionable material are listed below.

1 objectionable @ 1.0 to 1.5 ft depth (29”x6”x4”)
2 big pieces of concrete slab @ 2.0 to 3.0 ft depth (30”x26”x6”, 28”x19”x6”)

Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 1400 psf to 1600 psf.

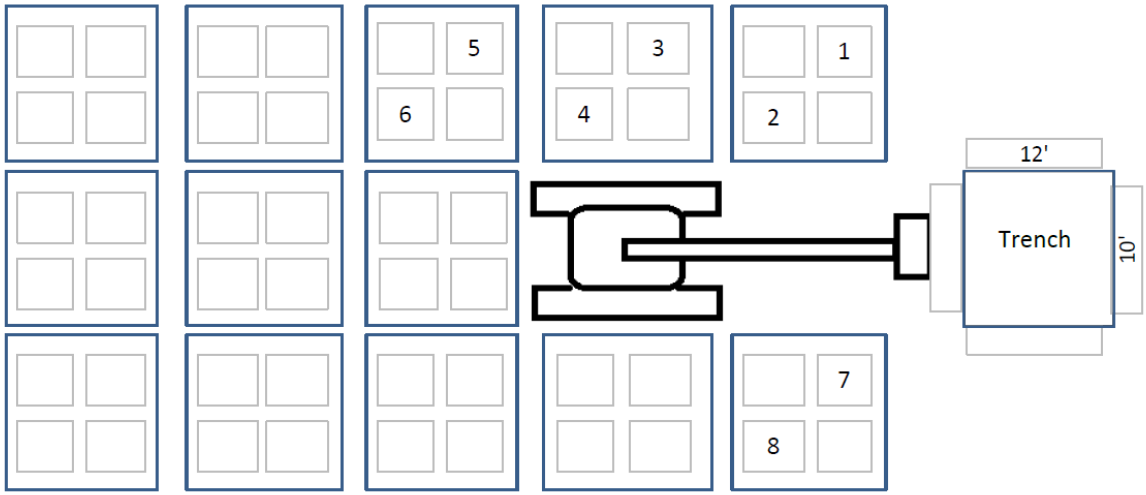
The composite trench log is shown in Figure 3-35a and representative photos of the trench location, trenching operation, completed trench, and wood collected from the cuttings are shown in Figures 3-35b through 3-35l.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	Oct. 26, 2011	LOCATION	Protected side

STATION #	165+08	OFFSET FROM C/L	10'
START TIME	2:00 PM	TOP ELEV	+8.5' (Slope)
END TIME	3:00 PM	ORIG GROUND ELEV	+12.1'
WEATHER	70 Degrees, Sunny	DEPTH	2'
NORTHING	500771.41	EASTING	3664456.57



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	*ELEVATION*	*DEPTH*	*VISUAL*	*HEARD*	*DEBRIS*	*SOIL TYPE*	*NOTES:* **elevation(s)** ***sic***
1	+9.9'-7.8'	0-6"				WB	Brown Fat Clay
2	+9.9'-7.8'	0-6"				-	
3	+8.9'-6.9'	6-12"	Y			RB	Brown Grey Fat Clay
4	+8.9'-6.9'	6-12"	Y	Y		-	
5	+8.4'-6.2'	12-18"	Y	Y	OBJ	-	
6	+8.4'-6.2'	12-18"	Y	Y		-	
7	+7.9'-5.8'	18-24"		Y	Concrete	EL	Dark Grey Fat Clay
8	+7.9'-5.8'	18-24"	Y	Y	OBJ	-	shells

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-35a: Trenching Log Project Station 165+08

Figs 3-35b to 3-35i: Project Station 165+08

Figs 3-35j to 3-35l: Project Station 165+08

STATION 166+90; LEVEE CENTERLINE; 4-FEET DEEP (PER PLAN).
Phase II Trench.

The excavation commenced at 10:50 am on 26 October 2011.

Equipment operator was unfamiliar with the Tiger Team protocols on excavation and cuttings placement. Progress was slightly delayed while the team reviewed its procedures with the USACE construction representative and the contractor.

The top 6-inches of the excavation was in Willow Bend borrow material and the remaining 42-inches was in River Birch material. The trench excavation was terminated at 48-inches when the subjacent layer of Willow Bend material was observed below the River Birch material.

The sound of the excavator bucket encountering small pieces of wood was audible. Six pieces of wood with measurements meeting/exceeding the objectionable size specified by the contract were found in the fill between the depths of 2 to 4 feet. Detailed field measurements of the objectionable material are listed below.

3 objectionable @ 1.0 to 2.0 ft depth (19”x3”x3”, 15”x3”x3”, 15”x3”x3”)
3 objectionable @ 3.0 to 4.0 ft depth

Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 1000 psf to 3500 psf.

The trench log is shown in Figure 3-36a and representative photos of the initial trench excavation, investigation of trench, cuttings piles, completed trench, and wood collected from the cuttings are shown in Figures 3-36b through 3-36k.

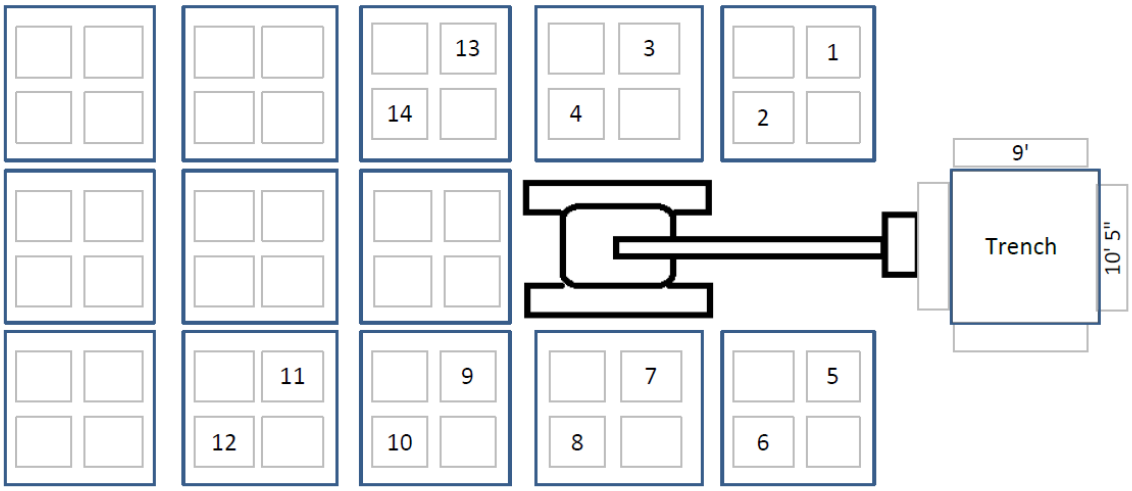
During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	Oct. 26, 2011	LOCATION	Center line

STATION #	166+90	OFFSET FROM C/L	NONE
START TIME	10:50 AM	TOP ELEV	+13.5
END TIME	12:30 PM	ORIG GROUND ELEV	+6.5
WEATHER	70 Degrees, Sunny	DEPTH	4'
NORTHING	500729.0	EASTING	3664636.1

N 500729.0
E 3664636.1



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+13.0'	0-6"				WB	Brown Fat Clay
2	+13.0'	0-6"		Y		-	
3	+12.5'	6-12"	Y	Y		RB	Grey Brown Fat Clay
4	+12.5'	6-12"	Y	Y		-	
5	+11.5'	12-24"			2 OBJ	-	
6	+11.5'	12-24"				-	
7	+11.0'	24-30"	Y	Y		-	
8	+11.0'	24-30"	Y	Y		-	
9	+10.5'	30-36"	Y	Y	OBJ	-	
10	+10.5'	30-36"	Y			-	
11	+9.5'	36-42"	Y	Y		-	
12	+9.5'	36-42"	Y	Y		-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3 - 36a: Trenching Log Project Station 166+90

Figs 3-36b to 3-36i: Project Station 166+90

Figs 3-36j to 3-36k: Project Station 166+90

STATION 170+00; LEVEE CENTERLINE; 3-FEET DEEP (PER PLAN).
Phase I Trench.

Excavation commenced at 1:00 pm on Wednesday, 28 September 2011.

As reasonably expected from the borrow disposition charts, the excavation showed 0.5 to 1-foot of Willow Bend borrow material, underlain by 3 to 3.5-feet of River Birch, underlain by Willow Bend material. By request of CPRA personnel, the trench was deepened to 3.25-feet deep on the flood side and 3.75-feet deep on the protected side. At these depths, the underlying Willow Bend material became apparent.

No official Tiger Team trench log exists for this excavation.

Photographs of the excavation, cuttings, and wood collected from the excavation are shown on Figures 3-37a to 3-37j. The team heard the excavator bucket encountering wood during the excavation. The excavated soils yielded seven pieces of wood appearing to meet/exceed the specified objectionable definition. All wood was encapsulated within the well compacted fill material.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations.

Fig 3-37a to 3-37h: Project Station 170+00

Fig 3-37i to 3-37j: Project Station 170+00

STATION 170+00; O/S 137-FT PROTECTED SIDE; 3-FEET DEEP (PER PLAN).
Phase I Trench.

Excavation commenced at 1:55 pm on Wednesday, 28 September 2011.

As reasonably expected from the borrow disposition charts, the excavation showed 0.5 to 1-foot of Willow Bend borrow material, underlain by River Birch borrow material. The work by the current contractor at this location included filling the berm from elevation +1.40 feet to the existing elevation of +5.0 feet.

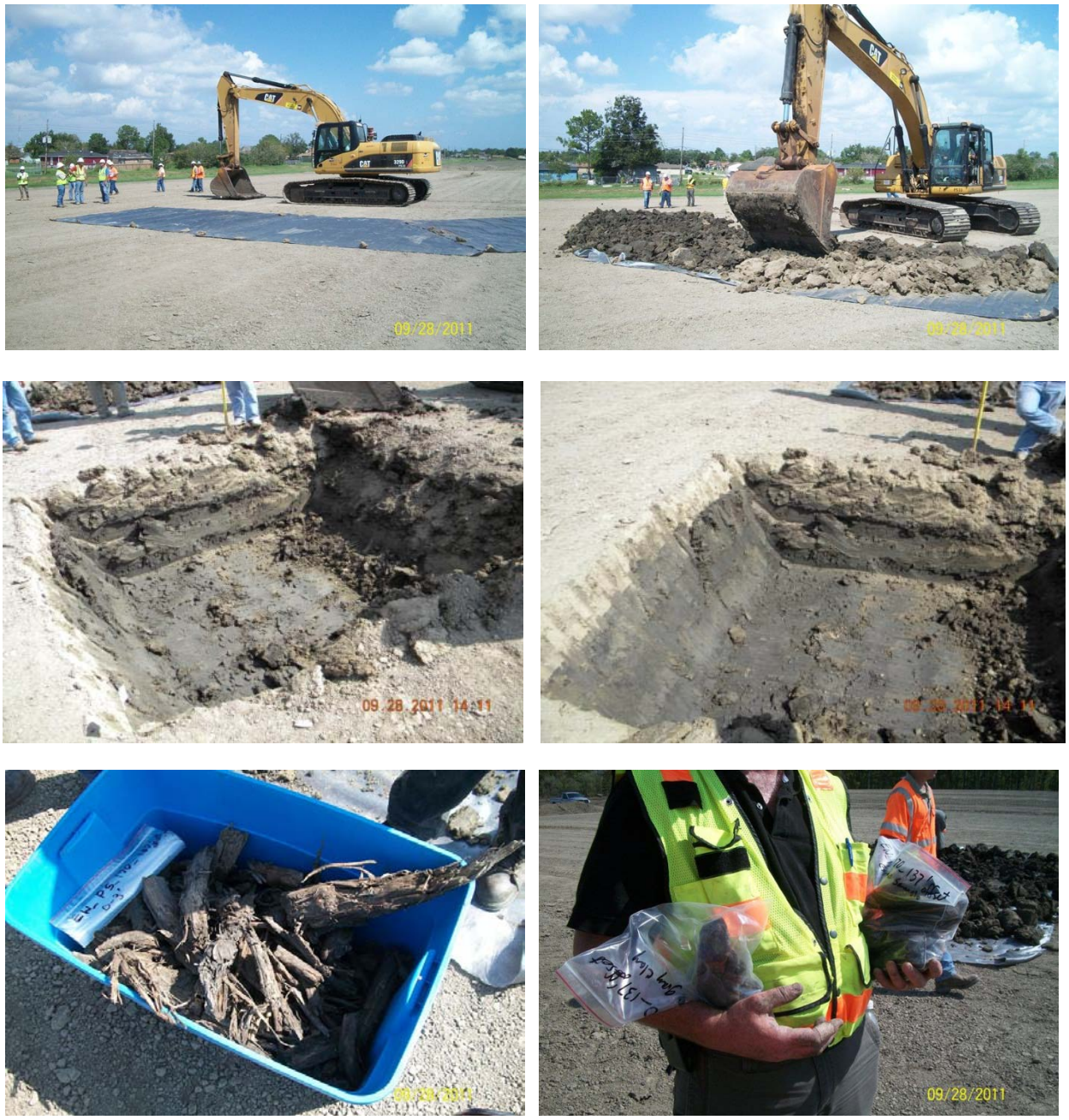
No official Tiger Team trench log exists for this excavation.

Photographs of the excavated trench, cuttings, and wood collected from the trench are shown on Figures 3-38a to 3-38f.

Throughout the excavation, the team heard the bucket encountering pieces of wood. The excavated soils yielded two pieces of wood appearing to meet/exceed the specified objectionable definition. All wood was encapsulated within the well compacted fill material.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, excess settlement or compaction).

After some discussion, Mr. Wielputz obtained a bulk sample on the protected side berm at station 170+00, adjacent to the investigation trench. The bulk sample was taken to determine the organics content and the content of small wood pieces (greater than organic but smaller than objectionable size).



Figures 3-38a to 3-38f: Project Station 170+00

STATION 172+08; O/S 55-FT PROTECTED SIDE; 3.2 FEET DEEP (PER PLAN).
Phase II Trench.

The excavation commenced at 9:00 am on Wednesday, 26 October 2011.

This location was based on an anomaly found in the FFEB/Fugro Geophysical survey.

At this location, the existing levee had been partially excavated and 2.0-feet of River Birch material placed by the WBV14C.2 contractor.

The trench was located in the protected side haul road and the initial cuts were difficult due to the extra compaction imparted to the clays by the construction traffic. The trench excavation was carried through the 2.0-feet of compacted fill and into the subjacent in-situ material.

At an elevation of +4.0-feet, the excavation revealed a mangled mass of metal tubing approximately 1.0-foot square and about 4 to 6-inches tall (see Fig 3-39e). This was obviously what the geophysical survey had found and the most agreed upon opinion was the team had unearthed some portion of a shopping cart encapsulated by compacted clay.

The sound of the excavator bucket encountering small pieces of wood was audible and two wood pieces meeting/exceeding the contractually specified dimensions for objectionably sized wood were found 2 to 3 feet deep in fill placed under a previous contract. Detailed field measurements on the objectionable material are listed below.

2 objectionable @ 2.0 to 3.0 ft depth (19”x4”x4”, 22”x4”x3”)
Old metal cart @ 2.0 to 3.0 ft depth

Other than the shopping cart and a small piece of brick, no other non-wood debris was found.

The Non Federal Sponsor expressed some concern the Corps “Grubbing” specification required the WBV14C.2 contractor to remove debris such as the shopping cart. USACE members explained the “Grubbing” specification is intended to remove surficial features, trees, and the root balls of trees removed by the contractor and any subterranean items projecting above the ground surface.

Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 500 psf to 1800 psf.

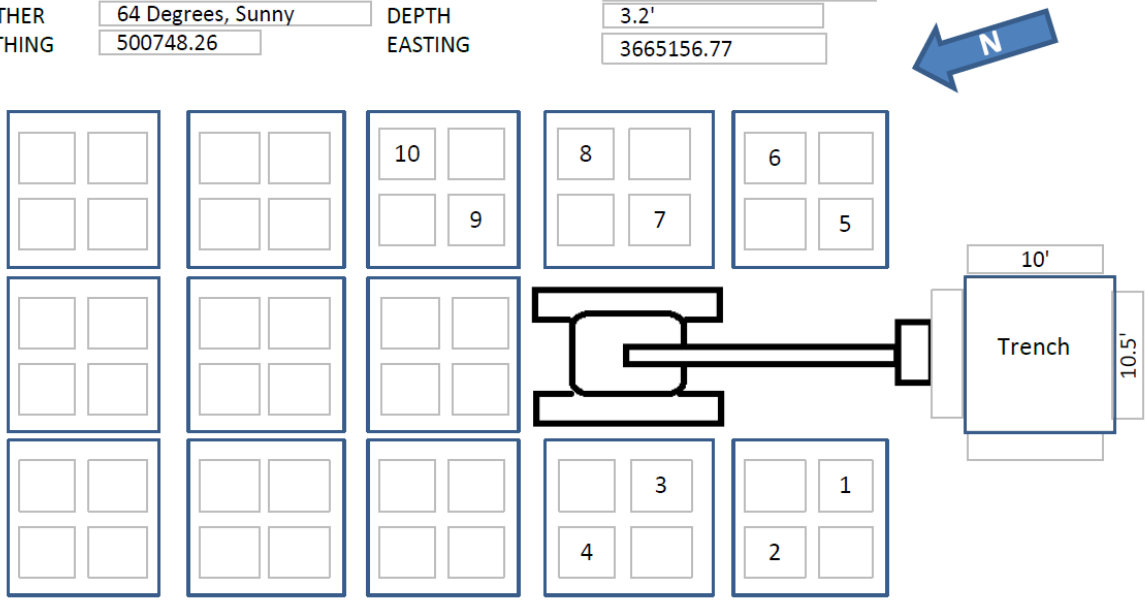
The trench log is shown in Figure 3-39a and representative photos of the metal debris, trenching operation, and wood collected from the cuttings are shown in Figures 3-39b through 3-39m.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	10/26/2011	LOCATION	Protected side

STATION #	172+08	OFFSET FROM C/L	55'
START TIME	9:00 AM	TOP ELEV	+7.2'
END TIME	10:30 AM	ORIG GROUND ELEV	+9.0' degraded to +5.5'
WEATHER	64 Degrees, Sunny	DEPTH	3.2'
NORTHING	500748.26	EASTING	3665156.77



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES:
1	+6.7'	0-6"				WB	Brown Fat Clay
2	+6.7'	0-6"				-	
3	+6.2'	6-12"				RB	Grey Fat Clay
4	+6.2'	12-24"	Y	Y		-	
5	+5.0'	12-24"	Y	Y		-	
6	+5.0'	12-24"	Y	Y		-	
7	+4.5'	24-30"				EL	
8	+4.0'	24-30"				-	
9	+4.0'	30-36"	Y	Y	Metal	-	
10	+4.0'	30-36"	Y	Y	OBJ	-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-39a: Trenching Log Project Station 172+08

Figures 3-39b to 3-39i: Project Station 172+08

Figures 3-39j to 3-39m: Project Station 172+08

STATION 174+00; LEVEE CENTERLINE; 4-FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 2:55 pm on Tuesday, 25 October 2011.

The top 6-inches of the excavation was in Willow Bend borrow material and the remaining 36-inches was in River Birch material, all underlain by Willow Bend materials. The trench excavation was terminated when the subjacent layer of in-situ material was observed below the River Birch material.

The sound of the excavator bucket encountering small pieces of wood was audible. Six pieces of wood larger than the objectionable size were collected from the excavation. Although a member of the Tiger Team reported seeing another piece of objectionably sized wood, it was not found in the cuttings. No non-wood debris (concrete, metal, brick etc) was encountered. Detailed field measurements of the objectionable material are listed below.

1 objectionable @ 1.0 to 1.5 ft depth
1 objectionable @ 2.0 to 2.5 ft depth
2 objectionable @ 2.5 to 3.0 ft depth (Maximum size 21”x4”x4”)
2 objectionable @ 3.5 to 4.0 ft depth

Pocket penetrometer tests completed in the side walls of the trench excavation indicated shear strength ranging from 750 psf to 2200 psf.

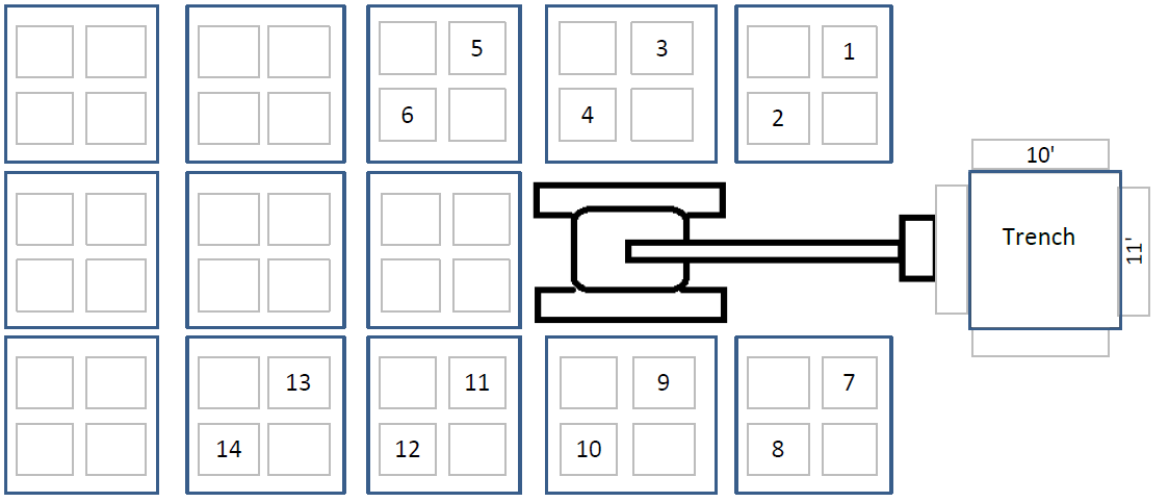
The trench log is shown in Figure 3-39a and representative photos of the initial trench excavation, inspection of trench, excavated trench, picking process, and wood debris encountered are shown in Figures 3-40b and 3-40n.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	10/25/2011	LOCATION	Center Line

STATION #	174+00	OFFSET FROM C/L	NONE
START TIME	2:55 PM	TOP ELEV	+13.6'
END TIME	4:15 PM	ORIG GROUND ELEV	+6.7'
WEATHER	80 Degrees, Sunny	DEPTH	4'
NORTHING	500681.9	EASTING	3665344.4



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	*ELEVATION*	*DEPTH*	*VISUAL*	*HEARD*	*DEBRIS*	*SOIL TYPE*	*NOTES:* elevations *sic*
1	+13.6'	0-6"				WB	Brown Fat Clay
2	+13.6'	0-6"	Y			-	
3	+13.0'	0-6"	Y	Y		-	
4	+13.0'	0-6"	Y	Y	OBJ	-	
5	+12.5'	6-12"	Y	Y		RB	Grey Fat Clay
6	+12.5'	6-12"	Y	Y		-	
7	+12.0'	12-18"	Y		Brick	-	
8	+12.0'	12-18"				-	
9	+11.1'	18-35"	Y	Y		WB	Brown Fat Clay
10	+11.1'	18-35"	Y	Y		-	
11	+10.6'	35-41"	Y	Y	OBJ	-	
12	+10.6'	35-41"	Y		2 OBJ	-	
13	+10.1'	41-46"	Y	Y		-	
14	+10.1'	41-46"	Y		Cable	-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-40a: Trenching Log Project Station 174+00

Figs 3-40b and 3-40i: Project Station 174+00

Figs 3-40j and 3-40n: Project Station 174+00

PROJECT STATION 179+80; LEVEE CENTERLINE; 4-FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 9:15 am on Tuesday, 25 October 2011.

The trench location was selected to provide systematic coverage of the levee centerline.

The top 12-inches of the excavation was in Willow Bend borrow material and the remaining 36-inches was in River Birch material. The trench was terminated when the subjacent layer of Willow Bend material was observed below the River Birch material.

The sound of the excavator bucket encountering small pieces of wood was audible. One piece of wood approximately 9" x 4" x 34" was found at a depth of 18-inches. Smaller wood pieces were collected throughout the excavation. No non-wood debris (concrete, metal, brick etc) was encountered. The wood was firmly encapsulated in the well compacted soils.

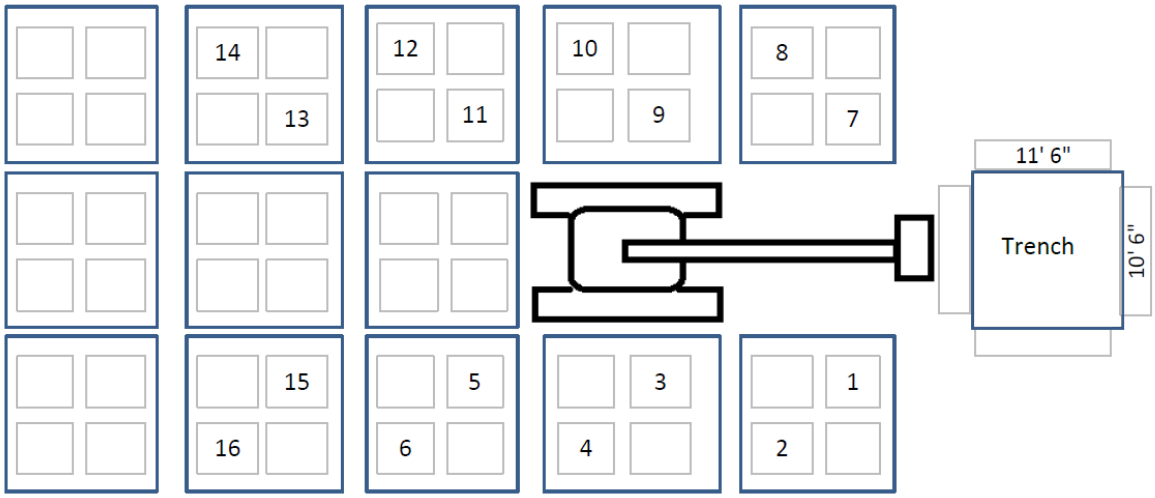
The trench log is shown in Figure 3-40a and representative photos of the initial trenching, excavated trench, inspection of excavated trench, and wood debris encountered are shown in Figures 3-41b and 3-41q.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	10/25/2011	LOCATION	Center Line

STATION #	179+80	OFFSET FROM C/L	NONE
START TIME	9:15 AM	TOP ELEV	+13.6'
END TIME	10:25 AM	ORIG GROUND ELEV	+6.2'
WEATHER	65 Degrees, Sunny	DEPTH	4'
NORTHING	500606.4	EASTING	3665918.1



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES: elevations sic
1	+13.0'	0-6"				WB	Brown Fat Clay
2	+13.0'	0-6"				-	
3	+12.4'	6-12"				RB	Brown Fat Clay
4	+12.4'	6-12"	Y			-	
5	+11.9'	12-18"	Y		Fabric	-	
6	+11.9'	12-18"	Y		OBJ	-	
7	+11.6'	18-24"				-	
8	+11.6'	18-24"				-	
9	+11.0'	24-30"	Y	Y		-	Black Grey Fat Clay
10	+11.0'	24-30"		Y		-	
11	+10.5'	30-36"	Y		Wood	-	
12	+10.5'	30-36"		Y		-	
13	+10.0'	36-42"	Y	Y	Wood	-	
14	+10.0'	36-42"	Y	Y		-	
15	+9.5'	42-48"	Y	Y	2 OBJ	-	
16	+9.5'	42-48"	Y	Y		-	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Levee Left In Place
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-41a: Trenching Log Project Station 179+80

Figs 3-41b to 3-41i: Project Station 179+80

Figs 3-41j to 3-41q: Project Station 179+80

STATION 180+01; O/S 187-FT PROTECTED SIDE; 3-FEET DEEP (PER PLAN).
Phase II Trench.

Excavation commenced at 11:50 am on Tuesday, 25 October 2011.

This trench was selected at an anomaly located by the Geophysical survey.

The material disposition charts indicate (starting from the existing ground surface and proceeding downward), the contractor placed 6-inches of Willow Bend borrow material and then 2.5-feet of River Birch material, all underlain by Willow Bend material. The entire trench was excavated to 36-inches. The Tiger Team decided to extend the western half of the trench an additional 6-inches to total depth of 3.5-feet to ensure penetration of the River Birch fill.

Two pieces of wood meeting/exceeding the specified objectionable size were found in the first 3.0-feet of excavation. Three more pieces of objectionably sized wood were recovered when the western half was deepened. Grass was noted at about 36-inches in the east side of the trench, indicating the interface between the fill placed in this contract and the previous contract. The sound of the excavator bucket encountering small pieces of wood and shells was audible. A very small piece of brick was found in the cuttings. No other non-wood debris (concrete, metal, brick etc) was encountered in this trench. Detailed information on the objectionable material is listed below.

1 objectionable @ 1.0 to 1.5 ft depth (Size 24”x5”x5”)
1 objectionable @ 2.5 to 3.0 ft depth (No field measurements obtained)
3 objectionable @ 3.0 to 3.5 ft depth (Max. size 22”x7”x5”)

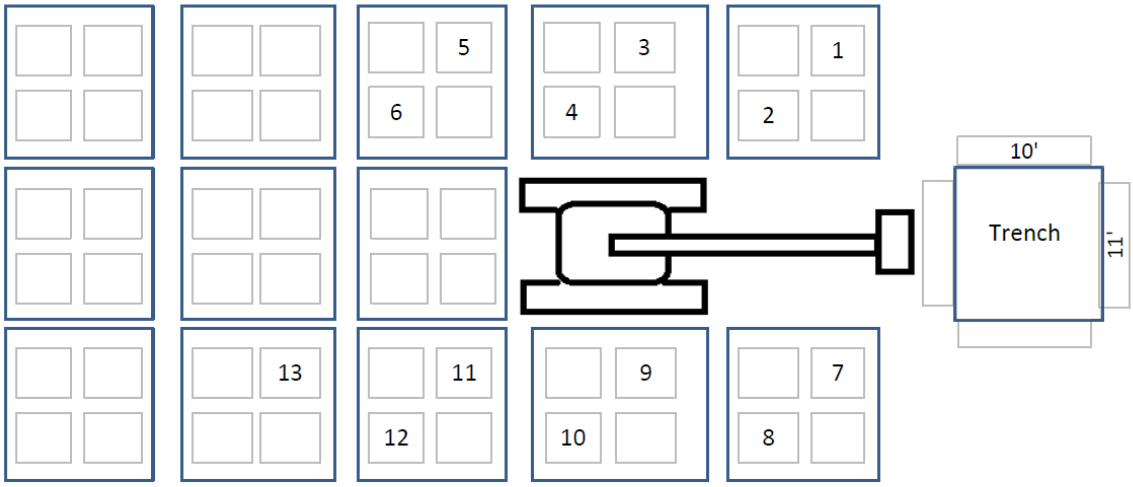
The trench log is shown in Figure 3-42a and representative photos of the excavated trench, picking operations, and wood debris encountered are shown on Figures 3-42b and 3-42o.

During the review of the excavation bottom, side walls, and cuttings, no member of the Tiger Team expressed any concerns for levee integrity (seepage, stability, sand strata or compaction) based solely on the visual observations of this trench during trenching operations; however, Mr. Merritt reserved his comments during this field review.

WBV-14c.2 TRENCHING PHASE - II
TRENCH LOG

INSPECTOR	Composite Log	DATE	10/25/2011	LOCATION	Protected Side

STATION #	180+01	OFFSET FROM C/L	187'
START TIME	12:00 NOON	TOP ELEV	+3.0'
END TIME	1:30 PM	ORIG GROUND ELEV	0
WEATHER	75 Degrees, Sunny	DEPTH	3'
NORTHING	295215.5	EASTING	900706.1



NOTE: INDICATE BUCKET No. IN EACH LOCATION OF MATERIAL PLACEMENT. MAXIMUM OF TWO BUCKET DROPS PER 15 ' X 15 ' OF GEOTEXTILE FABRIC. OPERATOR TO DISTRIBUTE MATERIAL EVENLY TO ALLOW FOR FULL INSPECTION. ABOVE LAYOUT OF FABRIC REPRESENTS 6-INCH EXCAVATION CUTTINGS PLACEMENT.

BUCKET	ELEVATION	DEPTH	VISUAL	HEARD	DEBRIS	SOIL TYPE	NOTES: elevations *sic*
1	+2.5'	0-6"				WB	Brown Fat Clay
2	+2.5'	0-6"				-	
3	+2.0'	6-12"				RB	Brown Grey Fat Clay
4	+2.0'	6-12"	Y	Y		-	
5	+1.5'	12-18"			OBJ	-	
6	+1.5'	12-18"		Y		-	
7	+1.0'	18-24"	Y	Y		-	
8	+1.0'	18-24"		Y		-	
9	+0.5'	24-30"	Y	Y		-	
10	+0.5'	24-30"	Y	Y		-	
11	0'	30-36"		Y	OBJ	-	
12	0'	30-36"	Y	Y		-	
13	-0.5'	36-42"	Y	Y	3 OBJ	EL	

RB - River Birch; WB - Willow Bend; LD - Levee Degrade Material; EL - Existing Lev
OBJ - Objectional Wood Debris

TRENCH WALL OBSERVATIONS	seepage:	N	stability concerns:	N
	sand stratas:	N	good compaction:	Y

Fig 3-42a: Trenching Log Project Station 180+01

Fig 3-42b to 3-42i: Project Station 180+01

Fig 3-42j to 3-42o: Project Station 180+01

CHAPTER 4: EXCAVATION VOLUME COMPUTATIONS

The trenching operations documented in Chapter 3 allowed the Tiger Team to evaluate the performance of the levee based on visual observations and measure the percent by volume of wood found in the trenches. The first step in determining wood volume is to measure the total volume of the excavated hole. The second step is determining the volume of wood in the excavation, shown in Chapter 5. The final step, discussed in Chapter 6, is computing of the percentage of wood by volume in the excavated trenches using data from Chapters 4 & 5.

Discussion of Precision, Accuracy and Potential Errors

Precision is recognized as the closeness of agreement between independent test results obtained under stipulated conditions. Accuracy is recognized as the degree of agreement of an individual measurement or average of measurements with an accepted reference value, or level. Precision and accuracy of various instruments were used to determine trench volumes with varying potential errors may affect final calculated results. The Tiger Team recognizes several sources of error inherent in the final calculations of trench volume including the following:

- Survey measurements
  - Probe not exactly in trench corner
  - Probe setting on a soil clod and not on very bottom
  - Precision and accuracy of GPS device
- Irregularity of the excavation
  - Uneven or irregular surfaces in trench floor/wall
  - Accumulation of spoil in trench bottom closest to excavator
  - Accumulation of spoil at top of trench closest to excavator
  - "Hole Growth" caused by excavations after initial layout surveys
- Tape Measurements
  - Determining measured limits of excavation top and bottom
- Human error
  - Recording data
  - Calculations performed

Efforts were made to record satisfactory data without exaggerating or degrading the accuracy of the values, while also recognizing limitations in some of the measurement methods. Calculations used measured values to produce calculated values, and avoided rounding of intermediate quantities within spreadsheet calculations. Overall, from the above noted potential sources of errors, the irregular shape of the excavation coupled with tape measurements were likely the limiting factors in producing accurate trench volume results. In some instances, data points were missing and linear interpolation with averaging of known data points were used to determine required measurement values for use in calculating volume. These instances of limited accuracy are noted within the calculation tables of this report. As far as practicable, calculation spreadsheets carried out calculations exactly as they occurred (no reduced digits) and any rounding was implemented on the final value or result.

Phase I Trench Excavation Volumes (September 27th and 28th Trenches)

Phase I trenching refers to trenching efforts completed on September 27th and 28th, 2011. The Phase I investigation plan intended to determine the percent by volume of the wood encountered as a percentage of the entire trench. The Tiger Team decided the trenches had to be large to provide a meaningful measurement of wood volume as a percentage of excavated volume.

The Phase I trenching completed on these days included the initial layout survey at the ground surface of the four corners of the trench and a final survey of the four corners at the bottom of the trench after the excavation was completed. Survey data for the Phase I trenches are included in Appendix N1. No intermediate surveys of excavated layers were conducted. As planned for the Phase I trenches, only a total volume of the complete excavation is available. Worksheets compute the Phase I trench excavation volumes from the survey data may be found in Appendix N2. These results are summarized in Table 4-1. Computations of excavation volumes for Phase I trenches use the same methodology described below for the Phase II trenches.

Phase II Trench Excavation Volumes using GPS Survey Coordinates

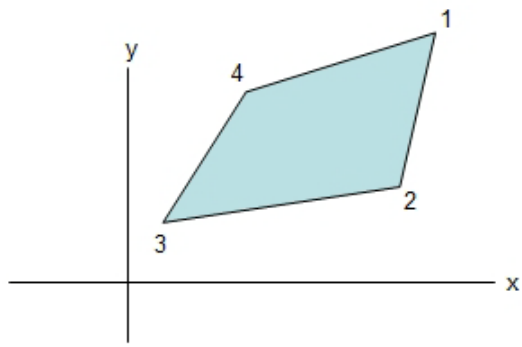
Phase II trenching refers to trenching completed in October and November 2011. After completion of the Phase I trench excavations, the Tiger Team revised its procedures so more data could be obtained in subsequent investigation trenches. At the time Phase I trenching was performed, there was not clear guidance provided by CEMVN in coordination with CPRA and SLFPA-W as to whether the mission of the Tiger Team was to assess both the performance of the as-built WBV14C.2 levee and strict contractual compliance of the Contractor with the project P&S. The changes in field procedures and volume measurement methods between Phase I and Phase II are, in part, due to the charge by CEMVN leadership prior to start of Phase II for the Tiger Team to perform an assessment of both performance and Contractor P&S compliance.

Per the Tiger Team Excavation Procedures summarized in the excavation plan, the four corners and center of the excavated trench were surveyed after every increment (typically 1-foot) of excavation. The construction contractor completed the surveys for the Tiger Team using survey grade GPS equipment. As a note, when the trench exceeded four feet of depth, the surveyor ceased entering the trench to measure the excavation center per OSHA requirements on unbraced excavations. Thus only corner measurements were obtained beyond the four foot depth. Figure 4-1 shows the surveyor's typical effort to obtain this data. The raw data obtained from the surveyor is found in Appendix N1 at the end of this report. The sheets in Appendix N1 show all survey data measured for every trench excavated on a given day. The data consists of the Northing and Easting horizontal coordinates as well as the elevation coordinate. Five points exist at every 1-foot of excavation for trenches of four feet deep or less and four points exist at every 1-foot of excavation deeper than four feet. Intermediate measurements obtained by the surveyor and included in the data are ignored in the volume computations.

Figure 4-1: Surveyor Obtaining GPS Measurement

The team used the average end area method to compute the volumes of the excavation increments. The horizontal coordinates of the corners at the top and bottom of each increment of excavation were used to determine the areas of those surfaces. Then the average area of the top and bottom surfaces of each increment of excavation was computed. For trenches excavated into horizontal or relatively flat surfaces, the five (or four) elevation coordinates obtained at the top and bottom of each increment of excavation were averaged. The average elevations of the top and bottom of the excavation were subtracted from each other to determine the average thickness of a layer or increment. For trenches excavated on slopes, the differences in elevations between subjacent points were averaged to provide an average thickness of the increment. The volume was computed by multiplying the average area by the average thickness.

Since the excavated surfaces were not of any standard geometrical shape (square, rectangular, rhombus, parallelogram, etc), the method to determine the area of any polygon (when the coordinates are known) was used. At each elevation, the horizontal (Northing and Easting) coordinates of the corners were arranged in the same order, proceeding clockwise or counterclockwise around the excavation. The area of any polygon with 'n' number of known vertices was computed using the equation shown in Figure 4-2:



The area is then given by the formula

$$\left| \frac{(x_1 y_2 - y_1 x_2) + (x_2 y_3 - y_2 x_3) \; \ldots\ldots + (x_n y_1 - y_n x_1)}{2} \right|$$

Figure 4-2: Area of Polygon with 'n' Vertices.

Worksheets compute the Phase II trench excavation volumes from the survey data may be found in Appendix N2. Table 4-2a summarizes the GPS based calculated volumes in each trench. Column labels in Table 4-2a are defined below:

Surface Area: This is the computed area (ft^2) based on the GPS coordinates of the points laid out by the surveyor on the ground surface prior to the beginning of the excavation.

Area Cut 1 (or Area Cut 2, or Area Cut 3 . . .): This is the computed area (ft^2) at the bottom of the excavation after cut. Cut 1 refers to the first increment of excavation resulting in a total 1-ft deep (nominally) excavation. The number shown is the computed area based on the GPS coordinates measured in the corners at the bottom of the cut. Cut 2 refers to the second increment of excavation resulting in a total 2-ft deep (nominally) excavation. Cuts 3, 4, and 5 represent the third, fourth, and fifth increments of excavation. If a trench did not have a Cut 3, or a Cut 4, or a Cut 5, then the "-" symbol is shown in the column. The planned depth of cut may have been adjusted in the field based on observations.

Final Cut: This is the computed area (ft^2) at the bottom of the excavation after the final cut was completed.

Cut Thickness: This is average thickness (feet) of the cut based on the GPS coordinates. This label shows multiple times in the table and represents the thickness for the excavation increment defined by the Cut labels located immediately left and right of the label. For instance: At the trench at station 1+41, the average thickness of the cut between the surface and Cut 1 is computed to be 1.15-feet. Between Cuts 3 and 4, the average thickness is 0.96-feet.

In those cases where the trench depth did not require a Cut 3, or a Cut 4, or Cut 5, the average cut thickness between the penultimate cut and the final cut is shown adjacent to the computed area of the Final Cut.

Cut Volume: This is the computed volume (yd^3) for the increment of cut. The first column of Table 4-2b "Total GPS Volume" shows the summation of these incremental volumes.

Wedge Volume: This is the computed volume of the soil excavated at the levee toe. Figure 4-3 demonstrates the locations of this wedge cut.

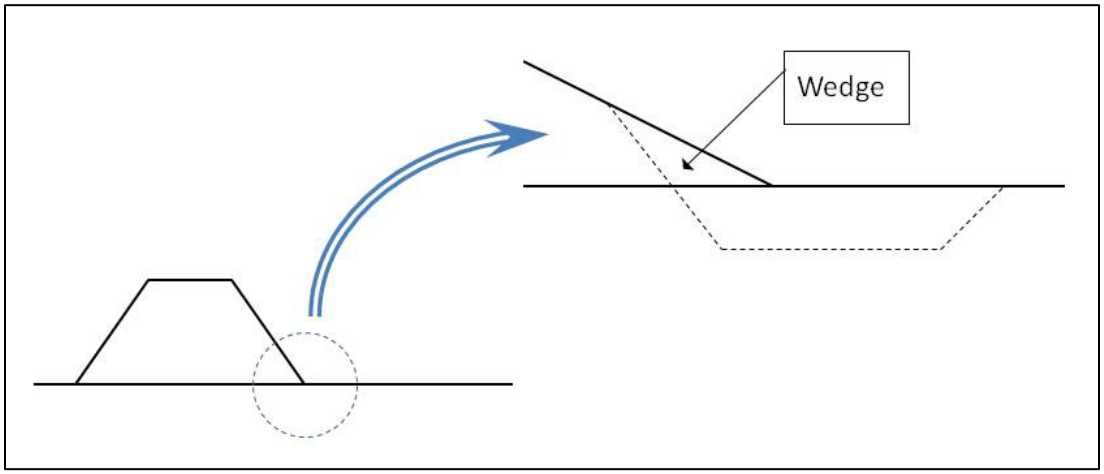


Figure 4-3: Location of Wedge

In a few cases, coordinate data for the corners of a particular excavation increment were missing or corrupted. In these cases, the team computed the average area of the increment by averaging the areas of the incremental excavation above and below the increment with the missing data.

Trenches located at stations 27+25 and 29+50 have limited GPS coordinates available. The contract surveyor located the initial trench locations on the ground surface for both trenches. But then the surveyor's GPS equipment experienced loss of signal prevented measurements from being taken during the excavations. After restoring survey capabilities, the surveyor returned to these trenches and obtained the GPS corner coordinates on the excavation bottom.

Trench Excavation Volumes using Linear Measurements

After completion of every trench excavation, members of CEMVN-ED-F (Foundations and Materials Branch of the New Orleans District Corps of Engineers) and the Tiger Team measured the dimensions of the completed excavation at the ground surface. Team members noted the area of the excavation at the ground surface (at completion of the excavation) computed with these dimensions differed from those computed on the basis of the initial GPS measurements.

The Tiger Team reasoned the finished excavations were larger than indicated by the GPS measurements because the ground surface GPS measurements were those laid out at the onset of excavation and no additional GPS measurements were made at the ground surface after excavation completion. Thus the GPS coordinates have not captured any "hole-growth" caused by the hydraulic excavator widening the sides of the excavation beyond the original layout during the excavation.

CEMVN-ED-F analyzed the excavations using a combination of the surface measurements made after completion of the excavation and the GPS coordinates taken at the bottom of the excavation. The GPS coordinates at the excavation bottom are considered valid for this analysis

because they represent the excavation bottom at the end of excavation when no additional hole growth was possible.

The method used by CEMVN-ED-F computes the area of the completed excavation at the surface (using the linear measurements) and the area at the bottom of the completed excavation (using the GPS measurements), then linearly interpolates the theoretical area at the measured depth of each incremental excavation. Volumes of the increment excavations are computed using the average end area method based on the theoretical intermediate areas and the thickness between them. The detailed computed areas and volumes of all excavations completed by CEMVN-ED-F are presented in the Trench Excavation Volume Computation spreadsheets found in Appendix P at the end of this report. The volume in Table 4-2b "Total Linear/GPS Volume" shows the computed total volume of each trench using this technique.

Comparison of GPS Based Total Trench Volume to Linear /GPS Based Total Trench Volumes

Table 4-2b also compares the total volume calculated by each method and shows the percent difference of the Linear/GPS volume over the GPS volume assuming the GPS volume is the standard. As stated earlier, the Linear/GPS volume exceeds the GPS volume in most cases, so the volume of each intermediate excavated layer will be larger. But it is unknown how the percent difference is distributed throughout the excavation. Given the GPS measurements at the bottom of the excavation are final, the error in the volume computations of the bottom-most layer is probably the smallest, while the error in the uppermost layer is the largest.

The Tiger Team decided to not attempt to distribute this error throughout the computed excavation. Rather, the computed volumes based only on the GPS coordinates will be used in subsequent computations of "percent wood volume". Using the smaller computed excavation volumes will result in a conservative (higher) estimate of the "percent wood volume".

WBV-14c.2 Levee Investigation

Phase I Trenches Excavated on 27 and 28 Sep 2011

TRENCH VOLUME CALCULATIONS

Excavation Location		Approx. Length (ft)	Approx. Width (ft)	Top of Cut Elev (ft NAVD88)	Bottom Cut Elev (ft NAVD88)	Dig Depth (ft)	GPS Computed Volume
STA. 48+00	CL	10	10	11.5	6.1	5.4	13.5
STA. 48+00	PS	10	10	4.2	1.2	3	8.0
STA. 80+00	FS	10	10	6.1	3	3.1	7.2
STA. 90+00	CL	10	10	13.2	10	3.2	11.9*
STA. 122+22 (Ground Truthing)	PS	10	13	6.5	4.1	2.4	6.8
STA. 123+59	FS	11	10	5.4	3.9	1.5	12.6
	FS	11	10	3.9	1.7	2.2	
STA. 140+00	FS	10	10	6.1	3.4	2.7	7.3
STA. 145+00	PS	10	10	5	2	3	8.0
STA. 150+00	CL	10	10	13.5	10.7	2.8	15.4
	CL	10	10	10.7	7.7	3	
STA. 160+00	FS	10	10	6.3	3.6	2.7	7.7
STA. 170+00	CL	10	10	13.7	9.9	3.8	14.1*
STA. 170+00	PS	10	10	5	1.5	3.5	10.1

Volumes calculated using GPS coordinates collected at top and bottom four corners of the trench.

Note: * Indicates partial GPS data; used area reduction method to compute the volumes.

Table 4-1: Computed Volumes of September 27th and 28th Phase I Trenches.

Phase II Excavation Volumes Based on GPS Coordinates (Table 4-2a)																Difference in Computed Volumes (Table 4-2b)			
Station		**Surface Area (ft)**	**Cut 1 Thickness (ft)**	**Area Cut 1 (ft^2)**	**Cut 2 Thickness (ft)**	**Area Cut 2 (ft^2)**	**Cut 3 Thickness (ft)**	**Area Cut 3 (ft^2)**	**Cut 4 Thickness (ft)**	**Area Cut 4 (ft^2)**	**Cut 5 Thickness (ft)**	**Area Cut 5 (ft^2)**	**Final Cut Thickness (ft)**	**Final Cut Area (ft^2)**	**Wedge Volume**	**Total GPS Volume**		**Total Linear/GPS Volume**	**Percent Difference (%)**
			Cut 1 (yd^3)		**Cut 2 (yd^3)**		**Cut 3 (yd^3)**		**Cut 3 (yd^3)**		**Cut 5 (yd^3)**		**Final Cut (yd^3)**						
1+41		94.179	1.147	73.51	0.908	66.494	0.64	66.58	0.958	61.376		---	1.269	60.778					
			3.56		2.35		1.58		2.27				2.87			12.63		14.09	11.53
4+42		94.951	1.168	53.071	1.03	38.583		---		---		---	1.108	32.1499					
			3.20		1.75								1.45		2.92[1]	9.32		8.70	-6.63
9+80		96.491	1.029	64.238	0.932	63.226	0.965	54.869	0.949	62.158		---	0.525	51.477					
			3.06		2.20		2.11		2.06				1.10			10.53		12.83	21.82
21+95		98.516	0.981	63.918	0.775	62.995	0.902	51.497	1.43	49.553	0.536	43.436	0.91	38.676					
			2.95		1.82		1.91		2.68		0.92		1.38			11.67		14.11	20.96
27+25		108.136	----------No Incremental GPS Measurements Obtained (Incremental Volumes Determined Mathematically ----------											47.719					
																11.289		11.33	0.36
29+50		128.662	----------No Incremental GPS Measurements Obtained (Incremental Volumes Determined Mathematically ----------											66.311					
																18.284		24.65	34.82
32+29		96.52	1.068	78.849	1.101	75.984	1.015	65.755	0.898	66.201			0.77	66.51					
			3.47		3.16		2.66		2.19				1.89			13.38		9.19	-31.29
37+23		95.607	1.057	71.667	0.866	52.882	1.552	52.882		---		---	0.471	49.817					
			3.27		2.00		3.04						0.90			9.21		6.23	-32.33
39+9		98.076	1.269	66.408	0.698	61.436	0.541	60.492		---		---	1.034	55.54					
			3.87		1.65		1.22						2.22			8.96		10.07	12.40
40+51		94.146	0.968	63.399	1.059	54.087	1.298	49.881	0.994	48.277			1.236	38.336					
			2.83		2.31		2.50		1.81				1.98			11.42		14.51	27.09
66+88		100.894	0.947	64.374	0.722	56.204	0.939	49.901		---		---	0.5	46.546					
			2.90		1.61		1.85						0.89			7.25		10.06	38.80
70+00		103.615	0.656	65.139	1.013	51.141	1.112	49.054[2]		---		---	0.402	46.967					
			2.05		2.18		2.06						0.72			7.01		8.91	27.14
71+39		98.03	0.975	54.2	0.938	51.199		---		---		---	1.112	46.891					
			2.75		1.83								2.02		0.77[1]	7.37		8.34	13.16
97+00		107.261	0.927	62.528	0.857	60.661	1.134	57.636		---		---	0.702	55.763[2]					
			2.91		1.96		2.49						1.48			8.83		12.74	44.30

Tables 4-2a and b: Excavation Volume of Phase II Trenches Based on GPS Coordinates

Phase II Excavation Volumes Based on GPS Coordinates (Table 4-2a)																Difference in Computed Volumes (Table 4-2b)			
Station		**Surface Area (ft)**	**Cut 1 Thickness (ft)**	**Area Cut 1 (ft^2)**	**Cut 2 Thickness (ft)**	**Area Cut 2 (ft^2)**	**Cut 3 Thickness (ft)**	**Area Cut 3 (ft^2)**	**Cut 4 Thickness (ft)**	**Area Cut 4 (ft^2)**	**Cut 5 Thickness (ft)**	**Area Cut 5 (ft^2)**	**Final Cut Thickness (ft)**	**Final Cut Area (ft^2)**	**Wedge Volume**	**Total GPS Volume**		**Total Linear/GPS Volume**	**Percent Difference (%)**
			Cut 1 (yd^3)		**Cut 2 (yd^3)**		**Cut 3 (yd^3)**		**Cut 3 (yd^3)**		**Cut 5 (yd^3)**		**Final Cut (yd^3)**						
104+51		103.674	1.121	71.504	1.056	65.946	0.926	62.58		---		---	1.006	57.233					
			3.64		2.69		2.20						2.23			10.76		15.19	41.24
108+18		98.411	1.113	75.118	1.216	66.114	0.817	63.701		---		---	0.516	62.05					
			3.58		3.18		1.96						1.20			9.92		9.93	0.09
109+30		99.626	1.349	51.378	0.858	46.71		---		---		---	0.921	43.266					
			3.77		1.56								1.54		0.90[1]	7.77		8.73	12.36
120+39		101.99	1.455	73.705	0.796	80.419	1.021	73.877		---		---	1.053	69.77					
			4.73		2.27		2.92						2.80			12.72		18.50	45.44
121+46		90.263	1.094	69.882	1.003	63.623	1.122	63.623		---		---	0.404	63.07					
			3.24		2.48		2.64						0.95			9.31		10.84	16.40
136+07		103.395	0.641	76.744	1.006	64.728	1.22	58.843		---		---	1.351	48.324					
			2.14		2.63		2.79						2.68			10.24		13.33	30.14
141+46		96.231	0.928	72.806	0.99	70.381[3]	0.714	67.957		---		---	1.052	60.143					
			2.90		2.63		1.83						2.49			9.85		11.95	21.31
154+50		97.872	0.824	96.775	1.296	80.987	1.042	80.448	0.883	77.763			1.197	77.023					
			2.97		4.27		3.12		2.59				3.43			16.37		20.44	24.89
162+50		103.964	0.961	88.005	1.089	71.663	1.049	70.963	0.959	66.994			1.057	59.285					
			3.42		3.22		2.77		2.45				2.47			14.33		16.77	17.06
165+08		98.643	0.969	90.79	0.965	90.377		---		---		---	0.433	86.455					
			3.40		3.24								1.42			8.06		10.55	30.97
166+90		103.72	1.11	68.323	0.815	60.771	1.193	60.929[3]		---		---	0.888	61.087					
			3.54		1.95		2.69						2.01			10.18		12.25	20.35
172+08		95.621	1.151	54.841	1.056	54.264		---		---		---	0.975	57.059					
			3.21		2.13								2.01			7.35		11.51	56.62
174+00		103.315	1.203	99.323	1.344	95.143[3]	1.007	90.962		---		---	0.993	86.841[3]					
			4.51		4.84		3.47						3.27			16.09		16.07	-0.14
179+80		105.404	1.102	104.6	0.883	101.26[3]	1.052	97.926		---		---	1.267	96.568					
			4.29		3.37		3.88						4.56			16.10		15.96	-0.86
180+01		98.924	1.077	93.569	0.953	92.324[2]	0.867	91.079		---		---	0.634	90.169[3]					
			3.84		3.28		2.94						2.13			12.19		13.59	11.49

Tables 4-2a and b: (continued): Excavation Volume of Phase II Trenches Based on GPS Coordinate

Notes on Table 4-2a:

1. Missing data at bottom of wedge. Used x-y coordinates from surface data point located above the missing point.
2. Missing one data point in the cut. Used average reduction in area with respect to depth to estimate the area of the cut.
3. Missing all data for the cut. Used average of area in cut above and cut below to estimate the area.
4. Missing data for additional, last ½-foot of cut. Used average reduction in area with respect to depth to estimate the area of the cut.

Although computed areas of cuts and measurements of depth are shown to the third significant digit, final volume computations area reported only to the second significant digit.

Chapter 5: Wood Volume Measurements

Chapter 4 presented and described the processes used to measure and compute the volumes of excavations completed in each of the Phase I and Phase II inspection trenches. Phase I trenching refers to trenching efforts completed on September 27th and 28th, 2011. Phase II trenching refers to trenching completed in October and November 2011. This chapter details various weight and volume measurements made on the wood pieces collected from the Phase I and Phase II inspection trenches. Chapter 6 will present the computation of the percentage of wood by volume from the excavated trenches.

Wood Collection from Each Inspection Trench

At every inspection trench, the Tiger Team generally followed the "Cuttings Inspection Procedures" under the "Procedures for Inspection Trench Excavation, Cuttings Inspection and Testing" outlined in the Tiger Team WBV-14C.2 "Tiger Team Investigation Plan". The Tiger Team carefully and methodically combed through the cuttings, inspected those cuttings and broke up the cuttings to smaller blocks likely to reveal wood of objectionable size. Also, the Team collected wood pieces of various sizes. Before beginning any field effort, most members of the Tiger Team were optimistic about collecting all of the smaller non-objectionable sized wood existing in the cuttings. The team believed it would be able to collect most objectionable wood existing in the cuttings. But, during the Phase I trenching, the Tiger Team's experience with breaking up the excavated clods of mostly stiff, high plasticity clay (CH) fill to collect all of the wood confirmed it would be practically impossible to collect all pieces of wood in the cuttings, particularly the smaller non-objectionable sized pieces. However, the Phase I trenching did confirmed objectionable sized pieces of wood could be collected in the cuttings.

Sometime during the Phase I trenching efforts, the team revised its collection goal, concentrating on those pieces of wood appearing to be "close" to the dimensions of the contract specified objectionable size. To achieve this goal, the team ensured the excavated cuttings were broken down into smaller sized clods in an attempt to reduce the chance objectionable sized wood pieces could be hidden inside of the clods. Although concentrating on objectionable sized pieces of wood, team members often collected any piece of wood that was found during this process.

All wood collected from these inspections was stored in plastic containers or bags. The container or bag was marked with the trench location and depth. At the end of a day's inspection, the collected wood was delivered to the CEMVN Soils Testing laboratory in New Orleans, Louisiana.

Photos of the collected wood from the Phase I trench at station 136+07 and the Phase II trench at station 179+80 (as organized in the laboratory) during wood volume measurement efforts are shown in Figures 5-1 through 5-4. These photos are meant to illustrate the level of detail inherent in the laboratory testing. The trench at project station 136+07 encountered River Birch material between 0 and 1-foot and existing levee degrade for the remainder of the trench below the 1-foot depth. The trench at station 179+80 encountered River Birch material for its full depth.

Fig 5-1: STA 136+07 and 179+80 - Wood Sorted 0 to 3 inches

Fig 5-2: STA 136+07 and 179+80 - Wood Sorted 3 to 6 inches

Fig 5-3: STA 136+07 and 179+80 - Wood Sorted 6 to 12 inches

Fig 5-4: STA 136+07 and 179+80 - Wood Sorted Greater than 12 inches

Phase 1 Wood Measurements

Table 5-1 summarizes the data measured in the laboratory for the wood collected from the Phase 1 trenching efforts. The various columns in this table are defined as follows.

Columns A, B and C identify the project station for the trench as well as its location on the centerline or on the flood side or protected side berm and the offset distance from the centerline.

Columns D, E and F identify the tare weight of the container, the total weight of the container with the wood, and the net weight of the wood collected from the trench.

Column G show the total weight of the wood collected from the trench sorted into categories based on three sizes of wood: Less than 6-inches of length; Between 6 and 12 inches of length; And greater than 12 inches of length.

Columns H report the number of pieces of wood collected from the trench, categorized by the length of wood: Less than 3-inches of length; Between 3 and 6 inches of length; Between 6 and 12 inches of length; And greater than 12 inches of length.

Column I reports the number of objectionable sized pieces of wood collected from the trench

Column J reports the number of non-wood pieces collected from the trench

PHASE I Excavation Location (A)		Trench Depth (ft) (B)	C/L O/S (ft) (C)	Tare Wt (lbs) (D)	Tare Plus Wood Wt (lbs) (E)	Wet Wood Total Wt (lbs) (F)	(Wet) Wood Weight (lbs) (G) _			WOOD PIECES BY LENGTH (H)					Non Wood Pieces (J)
							< 6"	6" - 12"	>12"	0-3"	3" - 6"	6" - 12"	> 12"	Objectionable (I)	
STA. 48+00	C/L	5.0		11.15	23.00	11.85	6.06	5.49	0.00	67	136	33	0	0	10
STA. 48+00	P/S	3.2	90	8.18	9.28	1.10	0.69	0.39	0.00	8	24	4	0	0	16
STA. 80+00	F/S	3.0	46.7	4.45	7.10	2.65	1.53		1.12	6	14	6	4	0	1
STA. 90+00	C/L	3.0		7.20	20.00	12.80	4.33	3.06	5.31	109	96	25	1	1	3
STA. 122+22 (Ground Truthing)	P/S	2.4	69	8.6	77.4	68.8	1.93	6.3	60.4	23	33	21	7	6	1
STA. 123+59	F/S	5.0	69	10.99	33.70	22.71	4.54	5.91	12.03	76	54	18	4	4	4
STA. 140+00	F/S	3.0	51	7.00	32.10	25.10	7.24	3.46	14.17	66	87	19	4	3	0
STA. 145+00	P/S	3.0	130	6.30	30.30	24.00	6.31	3.59	13.89	67	112	40	7	3	0
STA. 150+00	C/L	6.0	(0-3 ft deep)	9.40	22.20	12.80	4.88	6.99	0.68	90	127	40	5	0	0
			(3-6 ft deep)	9.90	34.40	24.50	7.01	7.67	9.58	134	133	35	2	1	0
STA. 160+00	F/S	3.0	51	2.32	7.93	5.61	2.05	1.76	1.73	55	46	18	3	0	0
STA. 170+00	C/L	3.5		16.30	70.70	54.40	16.90	20.10	16.30	266	232	65	9	8	0
STA. 170+00	P/S	3.8	137	10.75	44.40	33.65	15.90	12.55	4.00	169	319	85	7	2	0

Table 5-1: Summary of Phase I Wood Volume Calculations

Phase II Wood Measurements from Phase II Trench Excavations

According to the Tiger Team's established procedures for measuring the wood presented in its investigation plan (Appendix K), the CEMVN Soils Testing laboratory measured and weighed all pieces of wood categorizing them by length. The laboratory also determined the volume of the wood pieces exceeding the specified dimensions of objectionably sized wood. A Tiger Team member was present during this laboratory work.

Figures 5-5 and 5-6 Wood Volume Calibration (Phase I and Phase II)

Figures 5-7 and 5-8 Wood Volume Calibration (Phase I and Phase II)

Figures 5-9 Wood Volume Calibration (Phase I and Phase II)

Table 5-2 summarizes the results of these measurements. All data sheets created during these efforts may be found in Appendix O: Wood Measurement Laboratory Data Sheets.

Columns A and B of Table 5-2 identify the Excavation Location (by project station), the distance or offset from centerline (in feet protected side or flood side).

Column C identifies the depth (in feet) or the elevation (in feet NAVD-88) of the increment of excavation. Most entries are in feet of depth, but a few labels are prefaced with "El" indicating elevation.

Column D reports the total weight of wood while Column E reports the total weight of the wood collected from each increment of excavation and then by categories based on three sizes of wood: Less than 6-inches of length; Between 6 and 12 inches of length; And greater than 12 inches of length.

Column F reports the number of pieces of wood collected in each increment of excavation, categorized by the length of wood: Less than 3-inches of length; Between 3 and 6 inches of length; Between 6 and 12 inches of length; And greater than 12 inches of length.

Columns G and H report the number of objectionable sized pieces of wood and the number of non-wood pieces collected from each increment.

Columns I, J, and K indicate the depth (in feet) or the elevation (in feet NAVD-88) of the increment of excavation; the weight of the objectionable sized wood and the volume of the objectionable sized wood collected from the excavation.

PHASE II Excavation Location (A)		C/L O/S (ft) (B)	Depth. or Elev. (C)	Wet Wood Total Wt (lbs) (D)	Wet Wood Weight (lbs) (E)			Wood Pieces by Length (F)				# Objectionable Pieces (G)	Non-Wood Pieces (H)		Objectionable Wood Measurements		
					< 6"	6" - 12"	>12"	0-3"	3"-6"	6"-12"	> 12"				Depth. or Elev. (I)	Wt (lbs) (J)	Vol (cu-ft) (K)
1+41	F/S	21	0-1.1	2.80	0.37	0.35	1.99	2	8	5	1	1	1		0-1 ft	1.9	0.040
			1.1-2.1	10.45	1.79	2.93	5.70	6	33	16	4	1	0		1-2 ft	4.6	0.073
			2.1-3.0	5.19	2.52	2.63	0.1	16	56	23	2	0	0		-	-	-
			3-4	6.73	2.77	3.98	0.00	31	69	23	0	0	1		-	-	-
			4-5	6.62	3.07	3.29	0.39	24	47	16	2	0	1				
4+42	P/S	34	WEDGE	16.63	1.91	5.76	8.98	5	28	17	16	2	0		Wedge	1.7	0.057
			El 5.5-4.5	0.74	0.46	0.27	0.02	0	6	4	1	0	1		-	-	-
			El 4.5-3.5	3.49	0.00	0.28	3.20	0	0	1	1	1	2		EL 4.5 to 3.5	3.2	0.077
REMARKS:			El 3.5-2.5	11.30	0.79	1.86	8.58	8	11	5	5	3	4		EL 3.5 to 2.5	6.2	0.104
4+42 WEDGE - Wood stakes not part of debris, but used as a construction feature to prevent sliding of settlement plate.																	
Wood stakes from settlement plates probably used in 2nd lift construction (2001). No sign of termite damage in stakes.																	
9+80	F/S	49	0-1	2.28	1.25	1.01	0.00	11	32	6	0	0	0		-	-	-
			1-2	3.97	1.38	2.57	0.00	11	22	8	0	0	1		-	-	-
			2-3	2.44	0.81	0.93	0.69	5	13	5	1	0	0		-	-	-
			3-4	2.22	1.04	1.14	0.02	10	16	8	1	0	0		-	-	-
			4-4.5	1.10	0.44	0.43	0.24	2	8	6	2	0	0		-	-	-
21+95	CL	0	0-1	0.56	0.25	0.31	0.00	1	6	3	0	0	0		-	-	-
			1-2	0.29	0.02	0.28	0.00	0	1	3	0	0	0		-	-	-
			2-3	2.70	0.39	0.74	1.53	1	8	3	1	1	1		2-3 ft	1.3	0.043
			3-4	2.37	1.14	0.53	0.69	1	24	6	1	0	1		-	-	-
			4-5	0.32	0.32	0.00	0.00	1	4	0	0	0	1		-	-	-
			5-6	5.73	2.11	1.71	1.88	9	29	10	1	1	1		5-6 ft	1.6	0.044
27+25	F/S	80	0-1	1.84	0.44	1.39	0.00	0	12	5	0	0	1		-	-	-
			1-2	4.32	1.60	0.77	1.93	7	15	4	1	0	0		-	-	-
			2-3	3.24	1.15	0.73	1.34	1	13	5	5	1	0		2-3 ft	1.0	0.022
			3-4	3.66	1.07	1.11	1.33	8	22	9	3	0	0		-	-	-
29+50	F/S	13	0-1	0.45	0.37	0.13	0.00	4	7	2	0	0	1		-	-	-
			1-2	2.25	1.34	0.90	0.00	11	16	5	0	0	4		-	-	-
			2-3	4.38	2.33	0.94	1.07	6	42	12	2	1	4		2-3 ft	1.0	0.021
			3-4.5	3.58	0.82	2.46	0.28	6	24	12	5	0	0		-	-	-
			4.5-5	6.50	2.61	3.70	0.14	12	34	19	2	0	1		-	-	-

Table 5- 2 (continued): Summary of Wood Measurements from Phase II Trenches

PHASE II Excavation Location (A)		C/L O/S (ft) (B)	Depth. or Elev. (C)	Wet Wood Total Wt (lbs) (D)	Wet Wood Weight (lbs) (E)			Wood Pieces by Length (F)				# Objectionable Pieces (G)	Non-Wood Pieces (H)		Objectionable Wood Measurements		
					< 6"	6" - 12"	>12"	0-3"	3"-6"	6"-12"	> 12"				Depth. or Elev. (I)	Wt (lbs) (J)	Vol (cu-ft) (K)
32+29	F/S	110	0-1	4.07	1.36	2.69	0.00	5	18	13	0	0	0		-	-	-
			1-2	3.93	0.74	3.16	0.00	2	13	9	0	0	1		-	-	-
			2-3	3.38	0.22	1.16	1.98	6	8	9	2	0	1		-	-	-
			3-4	-	-	-	-	-	-	-	-	-	-		-	-	-
			4-5	-	-	-	-	-	-	-	-	-	-		-	-	-
37+23	P/S	139	0-1	0.77	0.29	0.22	0.23	1	4	3	1	0	0		-	-	-
			1-2	2.04	0.13	0.31	1.60	0	4	5	2	1	0		1-2 ft	1.4	0.026
39+90	F/S	120	0-1	0.80	0.35	0.42	0.02	4	8	4	1	0	0		-	-	-
			1-2	-	-	-	-	-	-	-	-	-	-		-	-	-
			2-3	0.06	0.00	0.00	0.06	0	0	0	1	0	0		-	-	-
			3-4	0.21	0.00	0.00	0.21	0	0	0	1	0	0		-	-	-
40+51	F/S	38	0-1	15.42	1.12	2.83	11.35	12	34	19	2	0	2		0-1 ft (1 0f 2)	5.2	0.155
			1-2	4.19	1.20	2.17	0.78	6	20	10	2	0	0		0-1 ft (2 0f 2)	2.8	0.088
			2-3	3.38	0.48	0.33	2.56	6	12	5	3	2	1		2-3 ft	2.3	0.043
			3-4	1.60	0.30	0.76	0.54	0	8	5	2	0	0		-	-	-
			4-5	0.21	0.00	0.06	0.15	0	1	3	0	0	0		-	-	-
66+88	CL	0	0-1	1.98	0.35	1.56	0.05	1	9	14	1	0	1		-	-	-
			1-2	3.59	0.06	3.19	0.31	1	2	6	1	0	1		-	-	-
			2-3	0.45	0.16	0.29	0.00	2	10	15	0	0	0		-	-	-
			3-3.5	0.60	0.07	0.00	0.52	0	1	0	2	0	1		-	-	-
70+00	CL	0	0-1	1.38	0.70	0.67	0.00	1	7	6	0	0	1		-	-	-
			1-2	0.46	0.14	0.32	0.00	0	4	2	0	0	0		-	-	-
			2-3	1.14	0.25	0.32	0.56	0	8	4	1	1	0		2-3 ft	0.5	0.021
Remarks:			3-3.5	0.99	0.17	0.80	0.00	0	4	7	0	0	0		-	-	-
70+00 CL Depth 1-2 was accidently weighed and photographed separately. The weights for both are combined here.																	
71+39	P/S	36	WEDGE	(ONLY CONCRETE PIECES)									2		-	-	-
			0-1	4.34	0.48	0.17	3.67	0	11	2	5	1	2		0-1 ft	1.9	0.077
			1-2	0.30	0.00	0.24	0.00	0	0	4	0	0	2		-	-	-
			2-3	4.60	0.27	4.29	0.00	10	8	12	0	0	11		-	-	-

Table 5- 2 (continued): Summary of Wood Measurements from Phase II Trenches

PHASE II Excavation Location (A)		C/L O/S (ft) (B)	Depth. or Elev. (C)	Wet Wood Total Wt (lbs) (D)	Wet Wood Weight (lbs) (E)			Wood Pieces by Length (F)				# Objectionable Pieces (G)	Non-Wood Pieces (H)		Objectionable Wood Measurements		
					< 6"	6" - 12"	>12"	0-3"	3"-6"	6"-12"	> 12"				Depth. or Elev. (I)	Wt (lbs) (J)	Vol (cu-ft) (K)
97+00	CL	0	0-1	3.36	0.85	1.01	1.46	3	26	14	2	1	0		0-1 ft	1.4	0.048
			1-2	3.81	1.22	1.92	0.65	2	30	19	3	1	1		1-2 ft	0.6	0.024
			2-3	10.31	0.91	4.21	5.35	15	25	19	1	1	0		2-3 ft	4.9	0.136
Remarks:			3-4	9.69	1.27	2.43	6.11	2	19	16	8	2	0		3-4 ft	3.1	0.077
97+00 CL had one bag labeled 3-4.5'																	
104+51	PS		0-1	4.02	0.93	1.87	1.17	6	23	19	2	1	2		0-1 ft	1.0	0.029
			1-2	6.41	1.74	3.78	0.87	0	32	15	1	1	2		1-2 ft	0.9	0.021
			2-3	15.75	2.24	6.4	7.22	1	22	21	4	4	1		2-3 ft	7.0	0.140
			3-4	5.24	0.77	1.56	2.90	0	11	10	3	2	0		3-4 ft	2.8	0.069
108+18	PS		0-1	31.14	0.73	8.00	22.20	2	14	29	13	5	0		0-1 ft (1 of 3)	4.6	0.150
			1-2	0.44	0.13	0.31	0.00	0	1	3	0	0	0		0-1 ft (2 of 3)	6.1	0.130
			2-3	0.16	0.08	0.08	0.00	2	1	1	0	0	0		0-1 ft (3 of 3)	3.5	0.114
			3-3.5	0.12	0.00	0.13	0.00	0	0	1	0	0	0		-	-	-
109+30	P/S	33	WEDGE	8.65	0.39	4.59	3.71	9	14	24	6	1	1		Wedge	2.0	0.043
			El 5.7-4.5	5.63	0.48	1.36	3.74	1	9	12	6	2	0		EL 5.7 to 4.5	2.8	0.060
			El 4.5-3.5	0.72	0.11	0.54	0.07	1	0	1	1	0	0		-	-	-
			El 3.5-2.5	0.16	0.02	0.01	0.13	1	1	1	1	0	0		-	-	-
120+39	P/S	63.5	0-1	36.46	1.87	16.44	18.15	4	34	61	25	4	1		0-1 ft (1 of 2)	5.0	0.104
															0-1 ft (2 of 2)	4.3	0.113
			1-2	5.33	0.06	1.10	4.15	2	3	7	4	1	1		1-2 ft	1.9	0.032
			2-3	10.80	0.12	1.98	8.60	0	5	7	5	4	0		2-3 ft	6.9	0.171
			3-4	7.96	0.83	2.53	4.57	3	9	11	4	1	2		3-4 ft	2.2	0.046

Table 5- 2 (continued): Summary of Wood Measurements from Phase II Trenches

PHASE II Excavation Location (A)		C/L O/S (ft) (B)	Depth. or Elev. (C)	Wet Wood Total Wt (lbs) (D)	Wet Wood Weight (lbs) (E)			Wood Pieces by Length (F)				# Objectionable Pieces (G)	Non-Wood Pieces (H)		Objectionable Wood Measurements		
					< 6"	6" - 12"	>12"	0-3"	3"-6"	6"-12"	> 12"				Depth. or Elev. (I)	Wt (lbs) (J)	Vol (cu-ft) (K)
121+46	PS		0-1	9.55	0.92	4.80	3.75	2	11	22	3	1	1		0-1 ft	2.4	0.060
			1-2	4.11	0.31	0.04	3.76	0	7	1	1	1	0		1-2 ft	3.7	0.051
			2-3	2.59	0.34	1.02	1.22	0	4	5	1	0	0		-	-	-
REMARKS:			3-3.5	1.18	0.07	1.10	0.00	1	0	5	0	0	0		-	-	-
121+46 PS - ONE BAG WAS LABELED FROM 0-1.5'																	
136+07	CL	0	0-1	7.35	0.55	1.15	5.62	0	10	15	7	1	0		0-1 ft	4.9	0.106
			1-2	2.53	0.13	2.38	0.01	1	5	6	1	0	1		-	-	-
			2-3	0.61	0.13	0.47	0.00	0	3	4	0	0	0		-	-	-
			3-4	0.35	0.14	0.21	0.00	2	5	2	0	0	1		-	-	-
			3-5	0.68	0.21	0.47	0.00	0	5	2	0	0	0		-	-	-
141+46	PS		0-1	0.77	0.24	0.53	0.00	1	6	7	0	0	0		-	-	-
			1-2	1.85	0.40	1.44	0.00	0	6	7	0	0	0		-	-	-
			2-3	1.87	1.17	0.69	0.00	8	19	6	0	0	0		-	-	-
			3-4	0.99	0.40	0.58	0.00	2	10	15	0	0	1		-	-	-
154+50	F/S	12	0-1	0.68	0.39	0.29	0.00	1	10	3	0	0	0		-	-	-
			1-2	2.30	1.09	1.21	0.00	16	26	9	0	0	1		-	-	-
			2-3	14.80	1.65	1.44	11.65	8	29	11	2	2	1		2-3 ft	8.4	0.191
			3-4	8.60	2.01	4.93	1.61	7	32	18	2	1	0		3-4 ft	1.3	0.034
REMARKS:			4-5	26.97	3.54	7.26	15.95	23	67	37	6	4	0		4-5 ft (1 of 2)	7.4	0.180
154+50 - Large metal pipe 28.5"Length by 3" Diameter. Weight= 13.9 lbs															4-5 ft (2 of 2)	4.2	0.133
															4-5 ft		0.313
162+50	CL	0	0-1	2.03	1.02	1.01	0.00	5	17	5	0	0	0		-	-	-
			1-2	1.38	0.36	0.73	0.29	2	10	15	1	0	0		-	-	-
			2-3	7.66	2.17	5.45	0.00	9	32	15	0	0	0		-	-	-
			3-4	17.06	4.99	8.23	3.86	17	58	30	4	1	1		3-4 ft	3.0	0.057
			4-5	16.47	5.22	6.33	4.88	18	73	43	5	1	0		4-5 ft	3.1	0.053

Table 5- 2 (continued): Summary of Wood Measurements from Phase II Trenches

PHASE II Excavation Location (A)		C/L O/S (ft) (B)	Depth. or Elev. (C)	Wet Wood Total Wt (lbs) (D)	Wet Wood Weight (lbs) (E)			Wood Pieces by Length (F)				# Objectionable Pieces (G)	Non-Wood Pieces (H)		Objectionable Wood Measurements		
					< 6"	6" - 12"	>12"	0-3"	3"-6"	6"-12"	> 12"				Depth. or Elev. (I)	Wt (lbs) (J)	Vol (cu-ft) (K)
165+08	PS		0-1	3.46	0.30	3.13	0.01	3	14	15	1	0	0		-	-	-
			1-2	13.25	1.25	2.15	10.50	4	23	21	6	1	1		1-2 ft	7.8	0.217
			2-3	1.60	0.58	1.02	0	0	4	5	0	0	0		-	-	-
166+90	CL	0	0-1	7.77	1.03	6.22	0.47	9	26	30	2	0	0		-	-	-
			1-2	4.39	0.47	1.12	2.77	4	15	12	3	1	1		1-2 ft	0.8	0.047
			2-3	4.97	1.84	2.23	0.88	4	30	8	1	1	0		2-3 ft	0.9	0.031
			3-4	14.43	1.63	7.91	4.96	1	31	29	6	2	1		3-4 ft	3.5	0.074
172+08	P/S	55.5	0-1	2.74	0.58	1.89	0.26	0	5	6	1	0	0		-	-	-
			1-2	3.18	0.59	2.06	0.50	1	10	15	3	0	0		-	-	-
			2-3	26.96	0.68	7.03	18.95	1	7	31	20	6	4		2-3 ft (1 0f 2)	4.2	0.127
															2-3 ft (2 0f 2)	4.1	0.111
174+00	CL	0	0-1	4.52	0.69	3.81	0.00	0	10	17	0	0	0		-	-	-
			1-2	8.21	1.59	4.13	2.47	2	14	14	1	1	0		1-2 ft	2.4	0.044
			2-3	30.49	5.23	15.86	9.39	7	35	33	5	3	0		2-3 ft	5.5	0.125
			3-4	13.79	2.33	7.69	3.84	3	20	27	3	2	0		3-4 ft	3.3	0.065
179+80	CL	0	0-1	9.15	1.18	1.75	6.17	5	13	8	3	1	2		0-1 ft	3.8	0.074
			1-2	17.65	1.82	3.30	12.63	1	20	11	1	1	1		1-2 ft (1 0f 2)	6.7	0.183
			2-3	12.78	2.88	7.44	2.52	9	43	30	2	1	1		1-2 ft (2 0f 2)	4.4	0.107
REMARKS:			3-4	31.93	5.46	14.75	11.64	53	121	85	11	5	3		1-2 ft Total		0.290
179+80 CL - large piece of wood 34" X 8" X 5"															3-4 ft (1 of 2)	5.9	0.128
															3-4 ft (2 of 2)	3.6	0.070
180+01	P/S	187	0-1	3.84	0.30	3.40	0.12	1	8	14	1	0	0		-	-	-
			1-2	13.18	0.36	5.28	7.57	0	6	16	8	1	0		1-2 ft	4.2	0.111
			2-3	13.26	3.03	6.67	3.64	3	42	39	5	1	1		2-3.5 ft (1 0f 2)	2.5	0.047
			3-3.5	13.21	0.69	2.00	10.66	5	12	17	4	3	0		2-3.5 ft (2 0f 2)	9.5	0.222

Table 5- 2 (continued): Summary of Wood Measurements from Phase II Trenches

Subjective Field Measurements Compared To Objective Laboratory Measurements

To illustrate the difficulty in quantifying objectionably sized wood and enforcing the current specifications, the Tiger Team offers the following discussion.

A description of one of several possible methods to assess whether the levee construction contains objectionably sized material exceeding the allowable values included in the specification follows. Individual pieces of objectionably sized wood could be sufficiently large such its volume is equal to or exceeds the 1% criteria regardless of layer in the wood debris resides (i.e., 0.27 cubic feet in a cubic yard represents 1% by volume). Two possible methods to determine objectionable wood sized volumes involving the conditions found in the trenches include either an approximation method could have been used in the field (e.g. taped dimensions) or via laboratory measurement of the wood volumes. There were a total of 124 layers investigated during trenching operations. Approximately 55 layers (about 44%) of these layers contained objectionably sized material based on field measurements and confirmed by laboratory measurements. Semi-quantitative assessments of whether individual pieces exceeded the 1% criteria using taped measurement estimates of the wood piece volume suggested 9 pieces might exceed the 1% criteria. Actual laboratory volume measurements of those specimens determined only 1 piece of wood out of the 9 pieces actually exceeded the 1% criteria. Below is a summary of the findings of the tape measured volumes compared to the laboratory measured volumes:

- 9 pieces of objectionably sized wood apparently exceeding the individual 1% criterion (by Tape Measurement) found in 124 total layers corresponds to **7.3%** of the Total Number of Layers.

- 1 piece of objectionably sized wood actually exceeding the individual 1% criterion (by Laboratory Measurement) found in 124 total layers corresponds to **0.8%** of the Total Number of Layers.

- 9 pieces of objectionably sized wood apparently exceeding the individual 1% criterion (by Tape Measurement) found in the 55 layers containing objectionable wood corresponds to **16.4%** of the Total Number of Layers with Objectionable Material..

- 1 piece of objectionably sized wood actually exceeding the individual 1% criterion (by Laboratory Measurement) found in 55 layers containing objectionable wood corresponds to **1.8%** of the Total Number of Layers with Objectionable Material..

Note at some point during the project the Contractor was directed to increase the picking effort, so the percentages presented above could have been larger prior to the date of increased effort and lower after the date.

This approach of measuring whether compliance or non-compliance of the 1% by volume of objectionable material criteria (i.e., 0.27 cubic feet in a cubic yard represents 1% by volume) was achieved indicates a small percentage of the levee could contain woody debris in excess of the 1% criterion. However, it is the opinion of this Tiger Team this will have little overall impact on this project since the small percentage of objectionable woody debris does not raise concern

about general levee performance. Further, it is possible small amounts of objectionable material of these quantities could have been unseen and accidentally covered even after the contractor was directed to pick all observed woody debris. Woody and non-woody debris in the top several feet can have implications for the effectiveness the upcoming armoring program addressing resiliency of the levee as well as overall safety concerns for maintenance operations. The armoring program had not been designed at the time of the design or construction of the WBV 14c2 project.

It should be noted that CEMVN CD enforced the contract subjectively looking at wood in compacted layers rather than by an individual cubic yard.

A comparison of various manual volume measurementswith laboratory volume measurements is summarized in Table 5-3. The table clearly shows the varying results between the two methods and shows the difference in accuracy in the two methods.

Discussion of Smaller Sized Wood

Paragraph 2.1 MATERIALS of technical section 31 24 00.00 12 "EMBANKMENT from the contract documents is repeated below:

> The embankment shall be constructed of earth materials naturally occurring or Contractor blended. Materials that are classified in accordance with ASTM D 2487 as CL or CH with less than 35% sand content are suitable for use as embankment fill. Materials classified as ML are suitable if blended to produce a material that classifies as CH or CL according to ASTM D 2487. All fill materials shall be free from masses of organic matter, sticks, branches, roots, and other debris including hazardous and regulated solid wastes. As earth from the designated excavation areas may contain excessive amounts of wood, isolated pieces of wood will not be considered objectionable in the embankment provided their length does not exceed 1 foot, their cross-sectional area is less than 4 square inches, and they are distributed throughout the fill. Not more than 1 percent (by volume) of objectionable material shall be contained in the earth material placed in each cubic yard of the levee section. Pockets and/or zones of wood shall not be placed in the embankment. The Contractor shall notify the Contracting Officer whenever the in-place Plasticity Index of the material is 15 or less. Materials placed in the section must be at or above the Plasticity Index of 10. Materials placed in the section must be at or below organic content of 9 percent by weight, as determined by ASTM D 2974, Method C. Materials placed in the section must contain less than 35 percent sand content by weight, as determined by ASTM D 1140.

In an effort to assure the fill contained no more than 1% by volume of objectionable material, the contractor was told to remove any wood from the fill that was close to or exceeded the objectionable specified size of 1 foot or more in length and a cross-sectional area of 4 square inches when the fill was initially delivered to the job site and after each disking operation.

Also as specified in paragraph 2.1, the organic content was limited to 9%.

Location			Tape Measured Obj Wood Size (inches)			Tape Measured Volume of Obj. Wood (cu. ft)	Tape Measured Total Volume of Obj Wood (cu. ft)	Lab Tested Total Volume of Obj Wood (cu. ft)	% Difference Tape Measured and Lab Wood Volumes
Sta.	Side	Offset (ft.)	L	B	D				
21+95	C/L	-	20	3.5	2.5	0.101	0.101	0.044	43.46%
37+23	P/S	139	13	2.5	2.5	0.047	0.047	0.026	55.42%
40+51	F/S	38	13.5	3	3	0.07	0.371	0.244	65.60%
			26	5	4	0.301			
104+51	P/S	149	13.5	4	2	0.063	0.133	0.069	52.00%
			14	3.5	2.5	0.071			
120+39	P/S	69	13	5.5	1	0.041	0.257	0.171	66.58%
			17	4	1	0.039			
			23	5	1.5	0.1			
			25	3.5	1.5	0.076			
154+50	F/S	12	14	4	3.5	0.113	0.499	0.313	62.59%
			16	4.5	2.5	0.101			
			20	5.5	3.5	0.223			
			21	3.5	1.5	0.062			
162+50	C/L	-	17	4	3	0.118	0.118	0.057	48.08%
174+00	C/L	-	23	3.5	2.5	0.116	0.214	0.125	58.43%
			12.5	3.5	2	0.051			
			13.5	3	2	0.047			
179+80	C/L	-	12.5	4	5	0.145	0.535	0.198	37.01%
			18	4	2.5	0.104			
			12.5	5	3	0.109			
			12.5	5.5	2	0.08			
			17	5	2	0.098			
180+01	P/S	187	15	5	3	0.13	0.13	0.27	39.45%
180+01	P/S	187	21.5	7.5	4	0.373	0.553		
			22.5	4.5	2	0.117			
			13.5	4	2	0.063			

Table 5-3: Comparison of Various Field Volume Measurements and Laboratory Volume Measurements

During the Phase 1 investigation of trenches, the organic content of the soil for some of the samples of fat clay seen with higher amounts of wood or fibrous materials was determined from samples collected by ASTM D 2974 Method C. These samples were collected to represent the "extreme" samples exhibiting the greatest amount of visible, minus No. 4, organic matter. A number of "clean samples" were collected for reference against the visibly "extreme" samples collected from Phase 1 trenching. The testing results for these samples are shown in Table 5-4 below, with supporting results found in Appendix V, Bulk Sample Data Reports. It should be noted the couple of what were thought to be "clean" samples (free from visible organics) had similar organic content results to of some of the "extreme" samples (about 5-6% organics). Only one of the "extreme" samples exceeded the specified 9%.

Given these two above mentioned technical requirements, the Tiger Team confirmed the specifications were silent or vague on the allowable volume of wood between the organic size and the objectionable size. Figure 5-9 illustrates one interpretation of the allowable percentages of wood allowed by Paragraph 2-1 of the specification. The left circle represents the defined allowable percentage of organic materials. Organic pieces up to the #4 Standard ASTM sieve size (0.187 inches) are allowed. The specification also identifies the allowable percentage of "objectionably sized" wood. The right circle in Figure 5-9 represents this percentage. But the specification is silent on the allowable percentage of wood larger than #4 sieve but smaller than objectionable size.

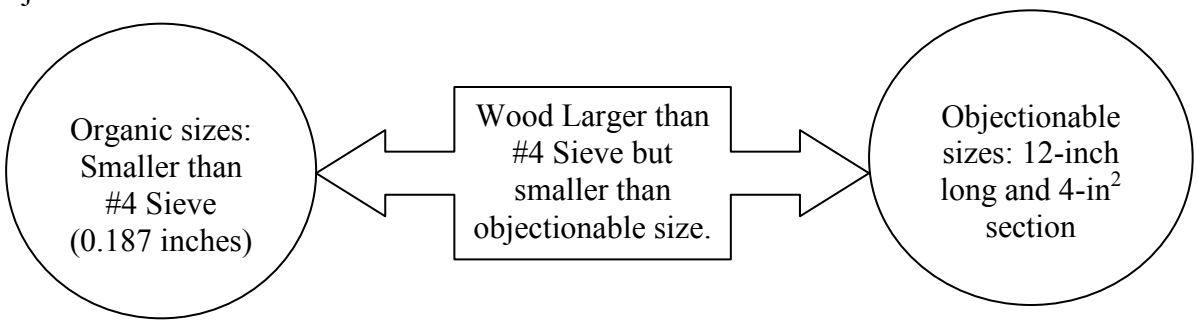


Figure 5-9: Material Size Flow Chart based on Contract Specification

Since its field experience proved that the Tiger Team was unable to collect all of the smaller sized pieces of wood, the team decided to obtain more complete sampling with a number of "Bulk Soil Samples". The volume of the excavations for the bulk samples would be precisely measured using procedures outlined in ASTM D-4914 "Density by Sand in Test Pit". All material obtained from the bulk samples were processed across the #4 sieve to separate the wood pieces into organic sized pieces and pieces greater than the organic size and the results are shown in Table 5-5: Results of Bulk Sample Testing of Test Pits. The volume of the wood larger than the #4 sieve would be determined by the protocols described in the "Laboratory Determination of Wood Volume for Levee Fill" found in Appendix K under "Procedures For Inspection Trench Excavation, Cuttings Inspection and Testing" in the WBV-14C.2 "Tiger Team Investigation Plan". This volume determination work was completed at the Savannah District Corps of Engineers testing laboratory.

The results of this bulk sample testing are summarized in Table 5-5 and the complete report may be found in Appendix V. These results show the bulk samples collocated near the inspection

trenches at stations 40+34 and 120+38 yielded the smallest percent volume of wood 0.45% and 0.05% respectively. The samples collocated with the inspection trenches at stations 27+46 and 29+04 yielded an intermediate percent volume 0.62% and 0.59% respectively. The bulk samples at stations 162+68 and 170+00 yielded the greatest percent volume 1.31% and 1.27% respectively.

Following Phase 2 trenching, design verification borings were identified for additional sampling and testing. Some of the design verification boring samples were visually inspected during extrusion and selected for further determination of plus No. 4 size wood volume determination, as well as, organic content determination. These "select" samples were chosen to represent potentially higher organic and wood contents. The results of the select samples from the design verification borings are included in Table 5-6 and the supporting documents are included in Appendix V. All but one sample were less than 1.2% by volume of plus No. 4 wood content. The single sample above this amount resulted in 8.5% by volume of plus No. 4 wood content containing an obvious,large, piece of wood within the tube sample. This larger content of wood would have likely been better represented by a larger sampling size of surrounding clay. The highest organic content determined from these samples was 6.8% by weight per ASTM D 2974 Method C.

Identifying Wood Below Objectionable Sizes – Summary of Results

The process of the investigation to identify the amount of wood and debris in the constructed levee and berms was conducted by using three methods: (1) large volume trenching (10 to 20 cubic yard size), (2) bulk sampling and testing (1 to 3 cubic feet size), and (3) undisturbed sample testing (0.06 to 0.10 cubic foot size). The first method established trenching in areas suspected to contain significant amounts of wood or debris. The trench sites were selected on a basis of field observations noting excessive wood, geophysical results, and from locations where borrow materials containing higher quantities of wood were known to have been placed. Trenching targeted the objectionable and near objectionable sized wood or debris. Observable wood that was smaller than objectionable size was also of concern. Initial phase I trenching had observed some clay materials having visibly higher wood or organic contents. A series of selected samples of clay with visibly high organic contents and some with visibly no organic content were sent for testing in order to determine an organic content for higher "extreme" samples and visibly "clean" samples of clay. The specifications allowed for up to 9% by weight organic content on the minus No. 4 soil. The results for "extreme" samples ranged from 5.3% to 10.2%, while the "clean" sample ranged from 5.3% to 5.5%. This random sampling effort was used to calibrate our visual ability to identify the clays with higher organic content. It is important to note that this selective process of sampling was not representative of the entire trench, yet can be attributed to specific sampling locations having the highest visible organic content.

The next two efforts to identify wood smaller than objectionable size were to conduct bulk sampling of areas that had visibly higher contents of plus No. 4 wood or debris and to selectively pick some of the extruded verification boring samples. The bulk sample sizes were larger to be representative of potential wood encountered (1 to 3 cubic feet).

The bulk sample process designed by the Tiger Team represented a field sampling method and laboratory procedure for determining the percentage volume of wood in a sample of clay. The volume of wood and the volume of bulk sample excavation were precisely measured to accurately determine the percentage of wood contained in the samples. However, the process was labor and time intensive, especially the process requiring sample to be pushed through the No. 4 sieve. From these bulk samples, the plus No. 4 wood or debris ranged from 0.05 to 1.31 % by volume of wood. The organic content of minus No. 4 clay ranged from 3.6 to 6.2% by weight (9% limit). Again, it is important to note that this selective process of bulk sampling was not representative of the entire trench area, yet can be attributed to specific sampling locations having the highest visible organic content.

Verification boring samples selected for determining wood and debris content were also visually identified as samples with higher concentrations of wood or debris. From these undisturbed samples, the plus No. 4 wood or debris ranged from 0.1 to 1.18 % by volume, with one additional sample identified with 8.48% by volume of wood. This single sample of higher plus No. 4 wood content represented a small sample size with a larger chunk of wood cut into the undisturbed tube and is likely not representative of the larger encapsulated area of clay surrounding the wood. The organic content of minus No. 4 clay for these undisturbed samples ranged from 3.7 to 6.8% by weight (9% limit).

WBV14C.2 Tiger Team Investigation - Extreme Grab Samples Taken 27-28 Sept 2011									
USACE Quality Assurance Laboratory Data									
Trench Data	Depth (ft)	Type Sample	Lab No.	(1)Wet Weight (gms)	(6)ASTM D2216 MC%	Total Dry Weight (gms)	(5)Dry Plus No. 4 (gms)	% by dry weight Plus No.4 Wood or Debris	(7)ASTM D2974 %Organic
EW_FS_Sta 140_51' Offset	0 - 3	"Extreme"	MVN Lab	6789.6	38.98	4885.5	25.9	0.53	5.3
EW_CL_Sta 48	4 - 5	"Extreme"	B2/2227	3490.0	35.62	2573.3	5.8	0.23	5.5
EW_PS_Sta 48_90' Offset	2 - 3	"Extreme"	B2/2228	3080.0	24.78	2468.3	15.8	0.64	5.1
EW_CL_Sta 150	5 - 6	"Extreme"	B2/2229	6233.3	40.79	4427.4	12.3	0.28	7.4
EW_CL_Sta 170	2 - 3	"Extreme"	B2/2230	4637.0	35.84	3413.6	7.3	0.21	6.1
EW_CL_Sta 170	2 - 3	"Clean"	B2/2231	1410.0	40.16	1006.0	0.0	0.00	5.5
EW_PS_Sta 170_137' Offset	0 - 3	"Extreme"	B2/2232	3987.1	58.85	2510.0	0.5	0.02	10.2
EW_PS_Sta 170_137' Offset	0 - 3	"Clean"	B2/2233	1150.0	38.89	828.0	0.0	0.00	5.3

The samples were hand selected grab samples taken as the worst (most fibrous woody debris) blend of finer wood pieces with clay. These samples do not represent the total trench excavation. All samples were: (1) weighed as-received moist condition, (2) photographed, (3) processed over a No. 4 sieve (4.76 mm), (4) retaining the plus No. 4 wood & debris, (5) rinsing, oven drying & weighing the dry plus No. 4 wood & debris, (6) determining moisture content on minus No. 4 sample (ASTM D2216), and (7) determining organic content of minus No. 4 sample (ASTM D2974 Method C).

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Table 5-4: Results of Sample Testing on Extreme Grab Samples

WBV14C.2 Tiger Team Investigation - Bulk Samples Using ASTM D4914 Density by Sand in Test Pit													
USACE Quality Assurance Laboratory Data													
Bulk Sample Data	Depth (ft)	Lab No.	(1)Hole Volume (cu.ft.)	(2)Wet Weight (lbs)	(3)ASTM D2216 MC%	(1)Wet Density (pcf)	(1)Dry Density (pcf)	Total Dry Weight (lbs)	(7)Dry Wt Plus No. 4 (lbs)	% by dry weight + No.4 Wood or Debris	(8)Volume +No. 4 Wood (cu.ft.)	% by Volume + No.4 Wood or Debris	(9)ASTM D2974 %Organic
Sta 27+46_FS_81' Offset	3 - 4	B2/2299	1.467	160.2	44.5	109.2	75.6	110.9	0.20	0.18	0.0090	0.61	4.6
Sta 29+04_FS_16' Offset	1 - 2	B2/2298	1.693	184.2	43.8	108.8	75.7	128.1	0.60	0.47	0.0100	0.59	6.2
Sta 40+34_FS_41' Offset	1 - 2	B2/2300	1.220	148.6	32.8	121.8	91.7	111.9	0.13	0.12	0.0055	0.45	5.6
Sta 120+38_PS_84' Offset	0.5 - 1.5	B2/2239	1.215	154.8	16.2	127.4	109.6	133.2	0.01	0.01	0.0006	0.05	3.6
Sta 162+68_CL	4 - 5	B2/2302	1.581	169.6	42.8	107.3	75.1	118.8	0.33	0.28	0.0207	1.31	5.8
Sta 170+00_PS_137' Offset	2 - 3	B2/2301	2.460	285.5	32.7	116.1	87.5	215.1	0.53	0.25	0.0312	1.27	5.1

The samples do not represent the total trench excavation but do represent selected sampling sites adjacent to trenches. All samples were: (1) taken in-place selected locations per ASTM D4914, (2) weighed as-received moist sample from bulk sampling, (3) determining moisture content on minus No. 4 sample (ASTM D2216), (4) photographed, (5) processed over a No. 4 sieve (4.76 mm), (6) retaining the plus No. 4 wood & debris, (7) rinsing, oven drying & weighing the dry plus No. 4 wood & debris, (8) determining wood and debris volume by in-house procedure for Wood Volume Determination by Densified Sand Method, and (9) determining organic content of minus No. 4 sample (ASTM D2974 Method C).

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Table 5-5: Results of Bulk Sample Testing of Test Pits

WBV14C.2 Tiger Team Investigation - UD Tube Samples from Verification Borings - Wood Volume Determination													
USACE Quality Assurance Laboratory Data													
Undisturbed Sample Data	Depth (ft)	Lab No.	(1)Tube Sample Volume (cu.ft.)	(2)Wet Weight (lbs)	(3)ASTM D2216 MC%	(1)Wet Density (pcf)	(1)Dry Density (pcf)	Total Dry Weight (lbs)	(6)Dry Wt Plus No. 4 (lbs)	% by dry weight + No.4 Wood or Debris	(7)Volume +No. 4 Wood (cu.ft.)	% by Volume + No.4 Wood or Debris	(8)ASTM D2974 %Organic
VWW4-B-1D, Sta 27+25 FS 80'	3 - 4	B2/2305	0.114	11.97	24.3	105.3	84.7	9.63	0.02	0.20	0.0013	1.18	3.7
VWW5-B-2A, Sta 29+50 FS 16'	2 - 3	B2/2306(9)	0.080	7.86	27.0	98.3	77.4	6.19	0.07	1.10	0.0009	1.08	6.6
VWW8-B-1B, Sta 40+51 FS 38'	1 - 2	B2/2307(9)	0.100	11.00	28.7	110.0	85.5	8.55	0.07	0.88	0.0001	0.10	4.4
VWW19-2A, Sta 120+39 PS 63'	4 - 5	B2/2308	0.089	9.70	28.8	109.3	84.9	7.53	0.24	3.19	0.0008	0.86	6.8
VWW20-B-1A	0 - 1	B2/2309	0.087	11.02	20.5	126.7	105.1	9.14	0.10	1.08	0.0010	1.10	5.4
VWW28-B-3A, Sta 162+00 CL	4 - 5	B2/2310	0.085	8.95	36.0	105.1	77.3	6.58	0.02	0.23	0.0008	0.90	6.3
VWW29-B-3A, Sta 170+00 PS 137'	2 - 3	B2/2311	0.084	9.47	31.0	112.5	85.9	7.23	0.04	0.60	0.0004	0.46	5.7
VWW30-2A, Sta 174+50 CL	4 - 5	B2/2312	0.101	10.29	29.7	102.2	78.8	7.93	0.03	0.39	0.0010	0.95	5.5
VWW31-2A, Sta 179+80 CL	2 - 3	B2/2313(10)	0.090	10.96	31.8	121.9	92.5	8.32	0.52	6.25	0.0076	8.48	4.8
VWW1, Sta 4+42 PS 34'	2 - 2.5	B2/2337(9)	0.100	11.00	33.0	110.0	82.7	8.27	0.04	0.45	0.0012	1.15	4.5
VWW19-1B, Sta 120+39 PS 63'	1.0	B2/2338	0.108	13.22	35.3	122.8	90.8	9.77	0.05	0.52	0.0008	0.71	3.8
VWW21-5B, Sta 139+00 CL	8.8	B2/2339	0.106	12.68	31.24	119.4	91.0	9.66	0.06	0.63	0.0007	0.63	4.2

The samples represent undisturbed soil specimens from 5 inch diameter design verification borings. All samples were: (1) selected from extruded 5 inch diameter shelby tubes, (2) weighed as-received moist sample from tube samples, (3) determining moisture content on minus No. 4 sample (ASTM D2216), (4) processed over a No. 4 sieve (4.76 mm), (5) retaining the plus No. 4 wood & debris, (6) rinsing, oven drying & weighing the dry plus No. 4 wood & debris, (7) determining wood and debris volume by in-house procedure for Wood Volume Determination by Densified Sand Method, and (8) determining organic content of minus No. 4 sample (ASTM D2974 Method C). Note(9): Cells highlighted in yellow with red text identified data that was estimated due to the lack of determining those dimension and weights needed for % weight and %volume calculations. Note(10): This particular sample resulted in a calculated % by volume >8% and was the result of a large chunk of wood captured within the tube that broke up during removal and processing. Such a large piece or pieces of wood would have been more accurately represented by a much larger sampling size.

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Table 5-6: Results of Sample Testing on Undisturbed Tube Samples

Chapter 6: Wood Volume as Percentage of Excavation Volume and Discussion of Non-Woody Debris

This chapter presents the results of calculations of wood volume as percentage of excavated volumes. In this chapter, laboratory measured wood volume (determined in chapter 5) is compared to the computed excavation volumes (determined in chapter 4) to develop various measures of percentage (by volume) of woody debris. These calculations are presented to explore a range of potential interpretations of the specified allowable percentage of woody debris. Summaries of non-woody debris collected during the trench excavations are presented.

Total Volumes of Different Borrow Materials Excavated from Investigation Trenches.
Various sources of borrow material were used to construct the WBV14C.2 levee and the investigation trenches encountered each of these differing materials. The borrow materials include River Birch (RB), Willow Bend (WB), Levee Degrade (LD), Existing Levee (EL), or Original Ground (OG). River Birch and Willow Bend materials originated from either of two offsite borrow pits. Levee Degrade refers to materials from the existing levee or berms excavated and reused elsewhere on the WBV14C.2 project. Existing Levee refers to cuttings obtained when a trench was excavated in a portion of the existing, uncut levee or berm. And Original Ground refers to trench materials excavated from original grounds below any embankment fill from any contact.

Figure 6-1 summarizes the total, cumulative volume of materials excavated during the Tiger Team investigation program. Because the Tiger Team's investigation plan concentrated on testing the River Birch borrow materials, it is not surprising the cumulative volume of excavated River Birch materials is approximately three times the excavated volumes of all other types of borrow materials. Excavated volumes of Willow Bend, Levee Degrade, and Existing Levee are similar. The least volume of excavated material encountered was Original Ground.

Wood Volume as Percentage of Total Trench Volume Phase I Trench.
Table 6-1 summarizes the volumes and percentage volumes of wood recovered from Phase I trenches. Since incremental excavation and surveys were not completed during the Phase I trenching, the data on the table represent the percentage volume of the recovered wood compared to the total volume of trench. Depending on the amount of wood collected, there may be one or more lines shown for the trench. At minimum, a small volume of wood, which would fit into one container for measurement, will require only one line be entered into Table 6-1. Trenches producing more wood may require more than one container and thus, more than one line entered into the table.

Column headings in Table 6-1 include Wood Type either labeled as objectionable or non-objectionable. At the end of the entries for each trench, the total volume of objectionable (if found) and total volume of wood is summed for that trench. The total trench volume for each trench is taken from Table 4-1. Percentages by volume of objectionably sized wood and all wood (both based on total trench volume) is shown. Lab data sheets for wood volume determination may be found in Appendix O. Detailed tables describing the wood recovered from the Phase I trenching may be found in Appendix X.

The highest percent of objectionably sized wood (0.12% based on total trench volume) found during the Phase I excavations occurred in trenches at project stations 123+59 and 140+00. The highest percent of total wood (0.32% based on total trench volume) found in the Phase I excavations occurred in the trench at station 170+00.

Objectionably Sized Wood Volume as Percentage of Incremental Trench Volume Phase II.
Table 6-2 summarizes the volumes of wood and percentage volumes of wood recovered from layers excavated during Phase II trenching. For example: Table 6-2 shows each layer of incremental excavation and the volume of objectionable wood found, the surveyed layer volume, the percent of objectionable wood and the total trench volume. The calculated percentages are based on the volume of wood and the volume of the layer, or increment exhumed as trench excavation continued. Figure 6-2 plots the maximum percentage by project station of objectionably sized wood found in any layer of each trench in fill placed by the WBV14C.2 contractor. Lab data sheets for wood volume determination may be found in Appendix O. Detailed tables describing the wood recovered from the Phase II trenching may be found in Appendix X.

These data show the largest percentage volume of objectionably sized woody material in fill placed by the WBV14C.2 contractor was measured in the first foot of the excavation at project station 108+18, offset 60 feet to the protected side. In this excavation increment, the percentage of objectionable wood is measured to be 0.41 percent. This volume of objectionably sized wood is less than the 1.0 percent allowed by the current specification.

The largest percentage volume of objectionably sized wood found in this investigation occurred in the material below the fill placed by the WBV14C.2 contractor. In the 2 to 3 foot excavation depth located at project station 172+08, offset 55-feet to the protected side, the percentage of objectionable wood is measured to be 0.44 percent. This wood was found in fill material existing before the WBV14C.2 contract.

Normalized Number of Objectionable Wood Pieces by Excavated Material Phase II Trenches
Figure 6-3 presents the number of objectionably sized wood pieces normalized to the excavated volume of the various excavated materials. As used here, “normalized” is the total number of pieces of objectionably sized wood found in a given type of material divided by the total excavated volume (in cu-yds) of that material. The values shown in the plot are not absolute values but are relative values used only for comparison between the various materials. As expected, the River Birch material produced the most objectionably sized woody debris when compared to the Willow Bend or Levee Degrade materials. But investigation trenches in Existing Levee materials produced a higher relative amount of objectionably wood possibly indicating a less effective picking operation when those materials were placed.

Individual, Objectionable Sized Pieces of Wood Phase II Trenches
Another interpretation of the contract specifications is any piece of wood whose volume exceeds 1% of a cubic yard (0.27 cu-ft) is a specification violation. The assumption being the individual piece of wood exceeds the allowable specified percentage when compared to the cubic yard of clay encapsulating it. The Tiger Team discussed this interpretation at length. Some team members argued that the phrase “placed in each cubic yard of the levee section” at the end of

paragraph 2.1 "Materials", of Section 31 24 00.00 12 "EMBANKMENT, creates this contractual obligation. Other members countered that levees are built by compacted lifts and not by the cubic yard. The specification paragraph is repeated below:

> "As earth from the designated excavation areas may contain excessive amounts of wood, isolated pieces of wood will not be considered objectionable in the embankment provided their length does not exceed 1 foot, their cross-sectional area is less than 4 square inches, and they are distributed throughout the fill. Not more than 1 percent (by volume) of objectionable material shall be contained in the earth material placed in each cubic yard of the levee section."

This investigation found one individual objectionably sized piece of wood greater than 0.27 cu-ft. It was found at project station 179+80, on the centerline at a depth of 1 to 2 feet. Its volume was measured to be 0.29 cu-ft in the laboratory testing, or 1.07% of a cu-yd.

A second large piece was found at project station 180+00, offset 187-feet to the protected side. Its measured volume is 0.27 cu-ft and does not exceed the 1 percent limit.

Objectionably Sized Pieces of Wood Potentially Cut by Disking Operations

The non-federal sponsor members of the Tiger Team expressed concern that the contractor's disking operations during the fill placement procedures might have cut objectionable sized pieces of wood rendering them smaller than the specified objectionable size limit. (Editor's note: Disking of clay borrow to reduce the placement moisture content is a typical construction method used in all manner of earthwork.)

To investigate this matter, the team summed the weight of all wood pieces in each excavation increment. The volume of the total wood weight was estimated by dividing the weight by a conservative wood density of 35 pcf. This estimated volume was divided by the volume of the excavation increment to determine the percent of wood by total volume of excavation. These values are presented in Table 6-3. Figure 6-4 plots the maximum percent by station of all wood collected in any layer of a given trench including objectionable and non-objectionable size wood.

The maximum percentage of wood calculated in this fashion and found in fill placed by the WBV14C.2 contractor occurred at project station 174+00, on the centerline. In the increment of excavation between 2 to 3 feet deep, the percentage of all wood by volume of excavation volume is 0.93 percent. The maximum percentage of wood calculated in this fashion is 1.4 percent and occurs at project station 172+08, offset 55-feet to the protected side, at a depth of 2 to 3 feet in material existing before the WBV14C.2 contract.

Normalized Weight of All Wood by Excavated Material Phase II Trenches

Figure 6-5 presents the weight of all wood normalized to the excavated volume of the various excavated materials. The values shown in the plot are not absolute values but are relative values only for comparison between the various materials. As expected, the River Birch material produced the most wood when compared to the Willow Bend or Levee Degrade materials. But investigation trenches in Existing Levee materials produced a higher relative amount of objectionably wood possibly indicating a less effective standard when those materials were placed.

Wood Weight by Volume per Station and Fill Type
Figure 6-6 presents total wood weight by volume per station and fill type throughout the project. This chart indicates the locations of the higher wood concentrations encountered by the Tiger Team investigation. The trends shown in this plot are similar to the trends indicated on figures 6-2 and 6-4.

Non-Woody Debris.
During the inspection trench excavation, numerous pieces of isolated non-woody debris were recovered from the inspection trench cuttings including pieces of brick, stones, shards of concrete pavement and pipe, lengths of plastic pipe and metal pipe and a variety of pieces of metal. The smaller pieces of debris were taken to the New Orleans testing laboratory for inventory while the large pieces were left on-site. Tables 6-4a and 6-4b summarize the non-woody debris recovered from the Phase I and Phase II trenches including the trench location, the depth of excavation in the trench and description of the debris. Table 6-4b includes the type of fill yielding the debris.

While the data identifies occurrences of all fill types yielding non-woody debris, a closer study of table 6-4b indicates largest pieces of non-woody debris tending to be recovered from excavations in Existing Levee and Original Ground materials. The debris field in the vicinity of project station 30+00 to 39+00 exists in Original Ground.

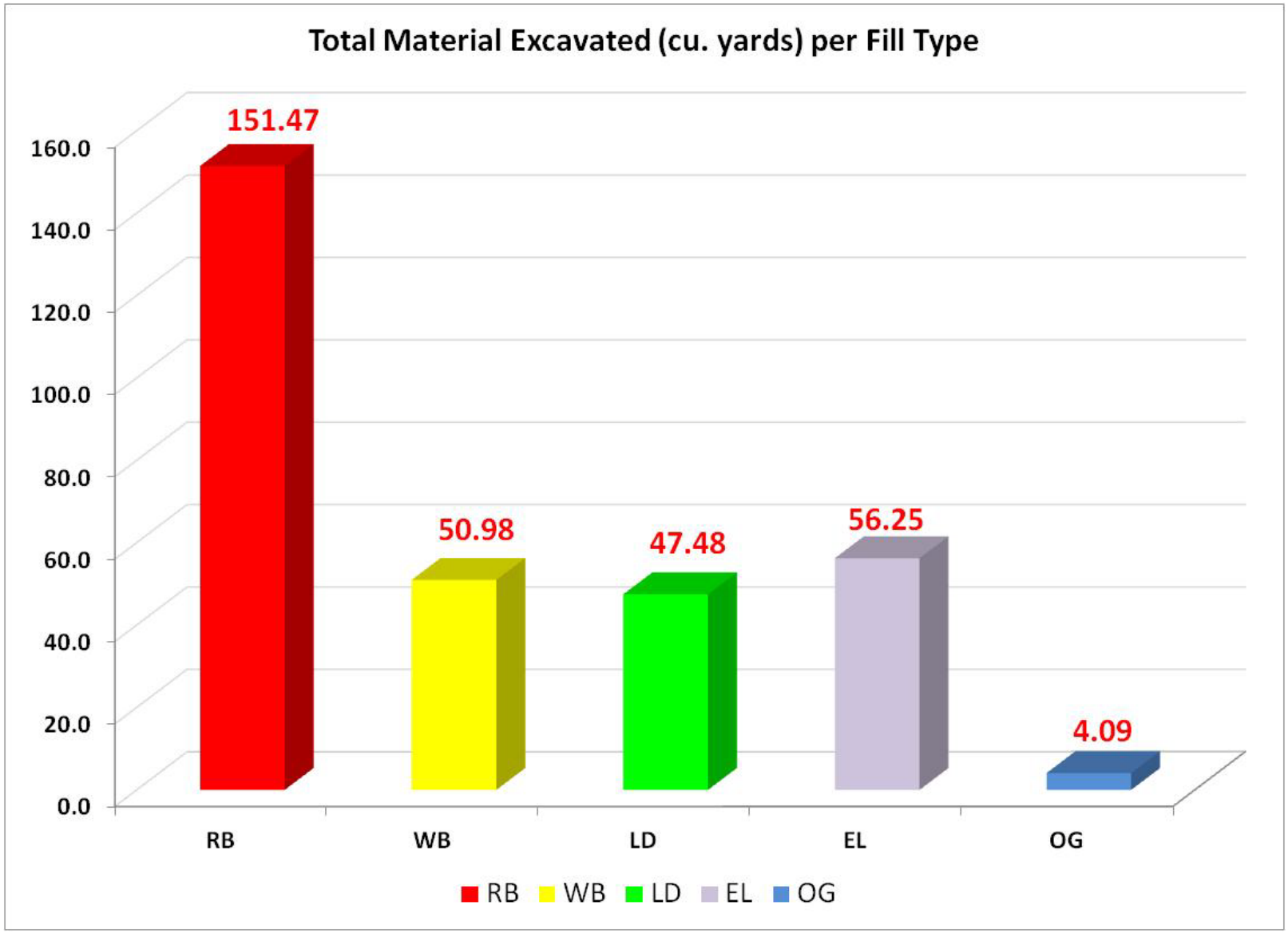


Figure 6-1: Cumulative Excavated Volumes of Different Borrow Materials in Investigation Trenches. (Material Types; RB-River Birch WB-Willow Bend, LD-Levee Degrade, EL-Existing Levee, OG-Original Ground)

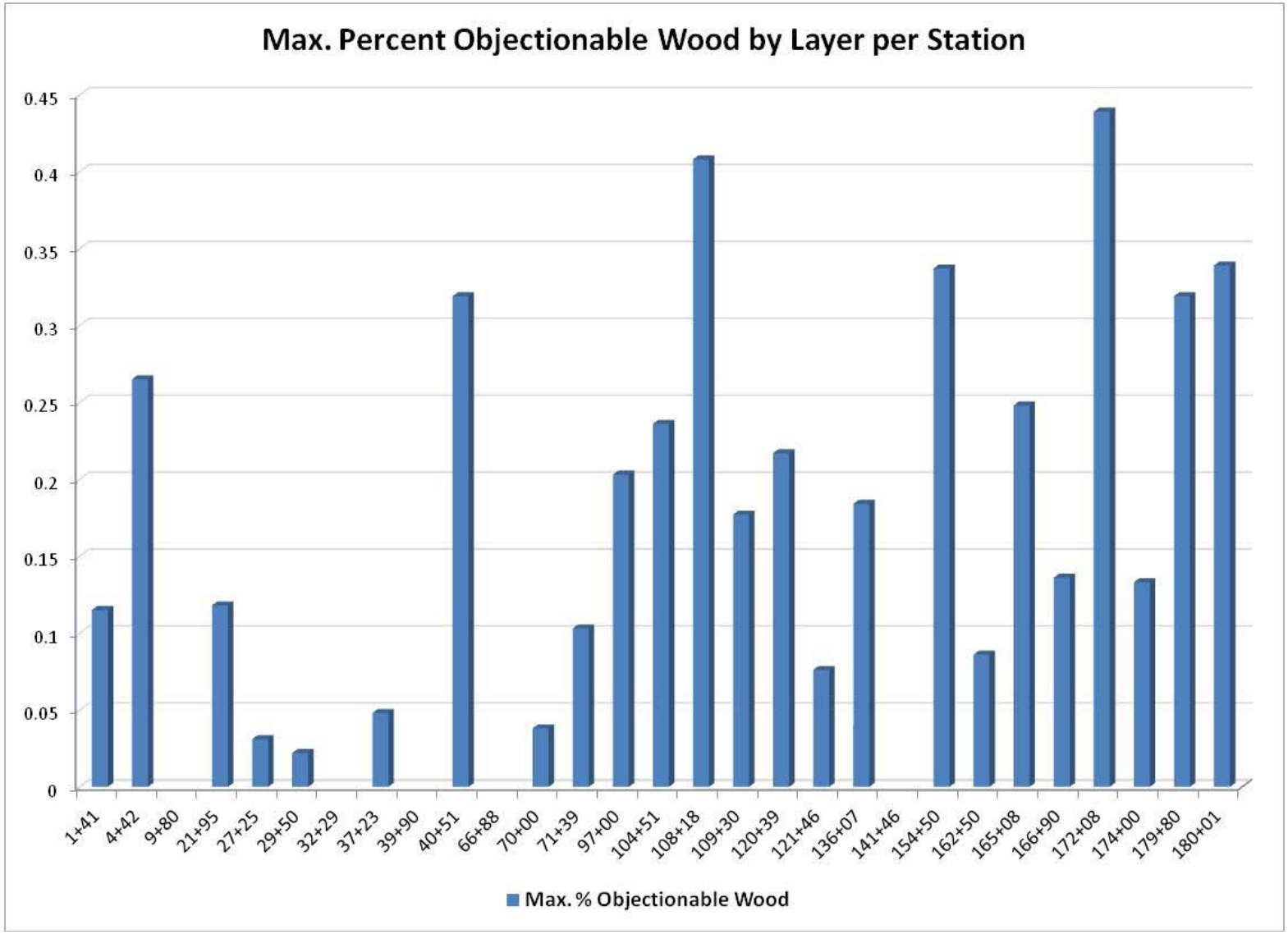


Figure 6-2: Maximum Percent of Objectionably Sized Wood Collected by Tiger Team per Layer per Station (Investigation Trench)

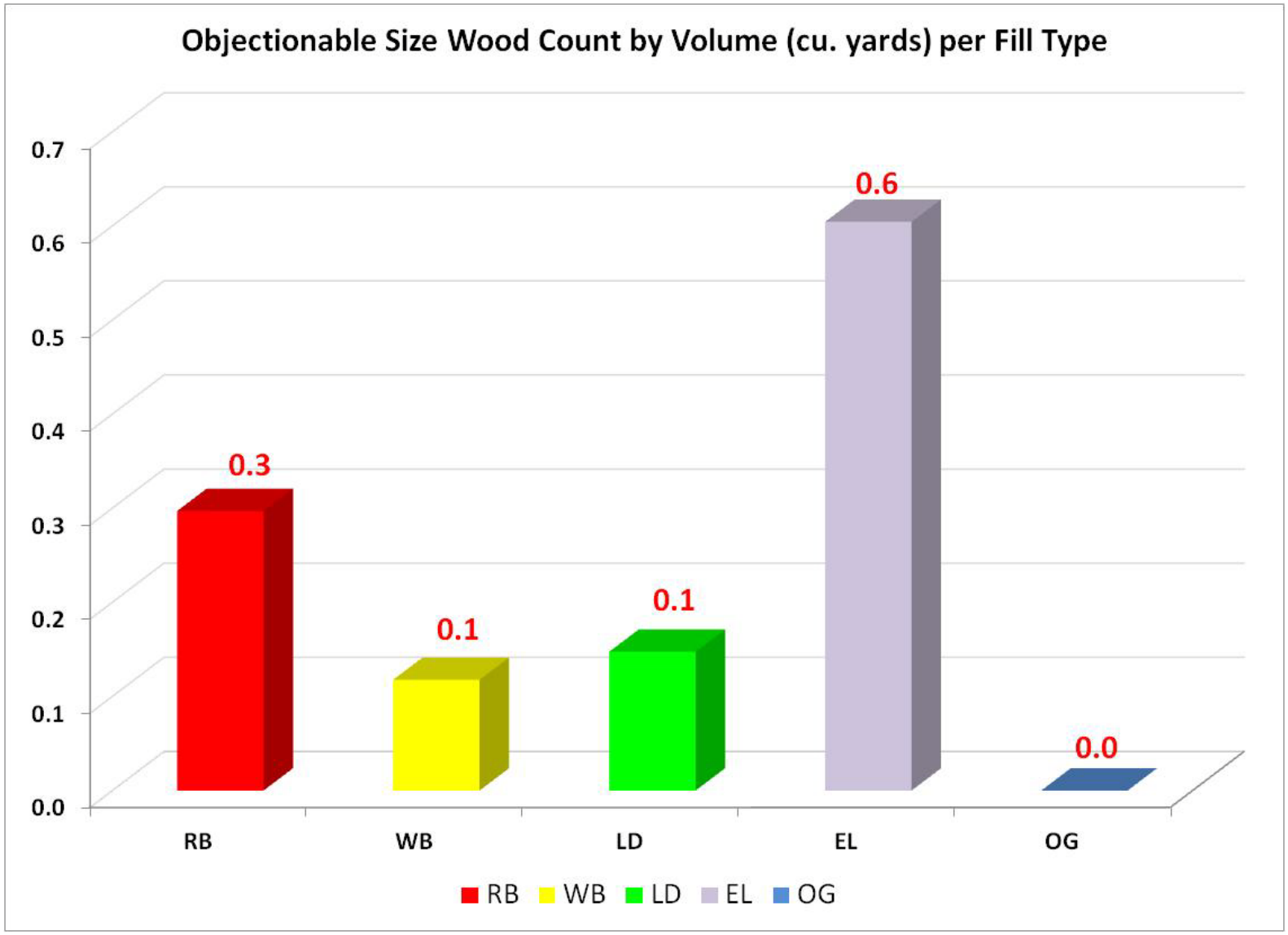


Figure 6-3: Number of Wood Pieces Collected by Volume in Different Borrow Materials (Values Shown Are Not Absolute Values, but For Relative Comparison Only)

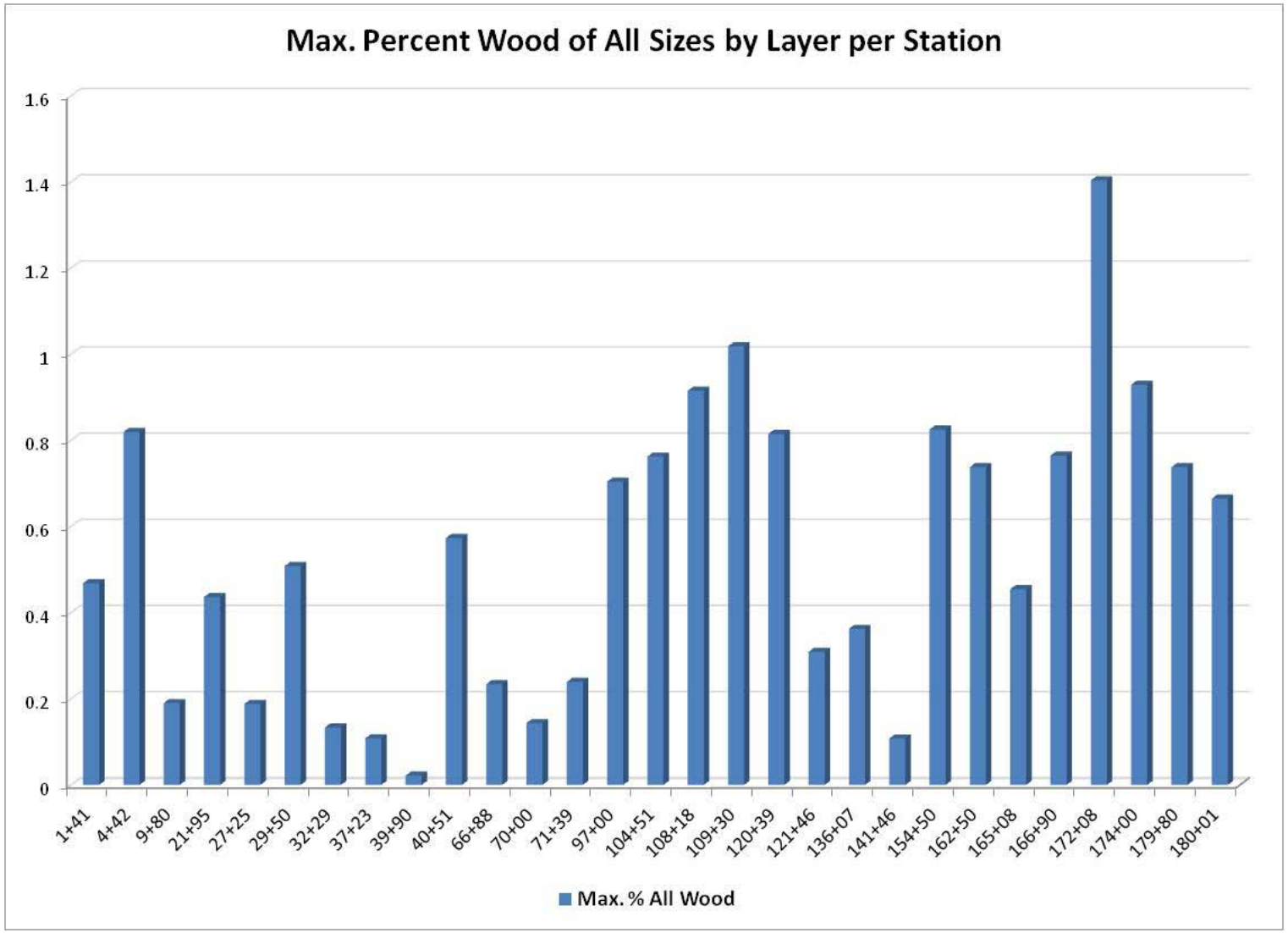


Figure 6-4: Maximum Percent of All Wood Collected by Tiger Team per Layer per Station (Trench) (Includes Objectionable and Non-Objectionable)

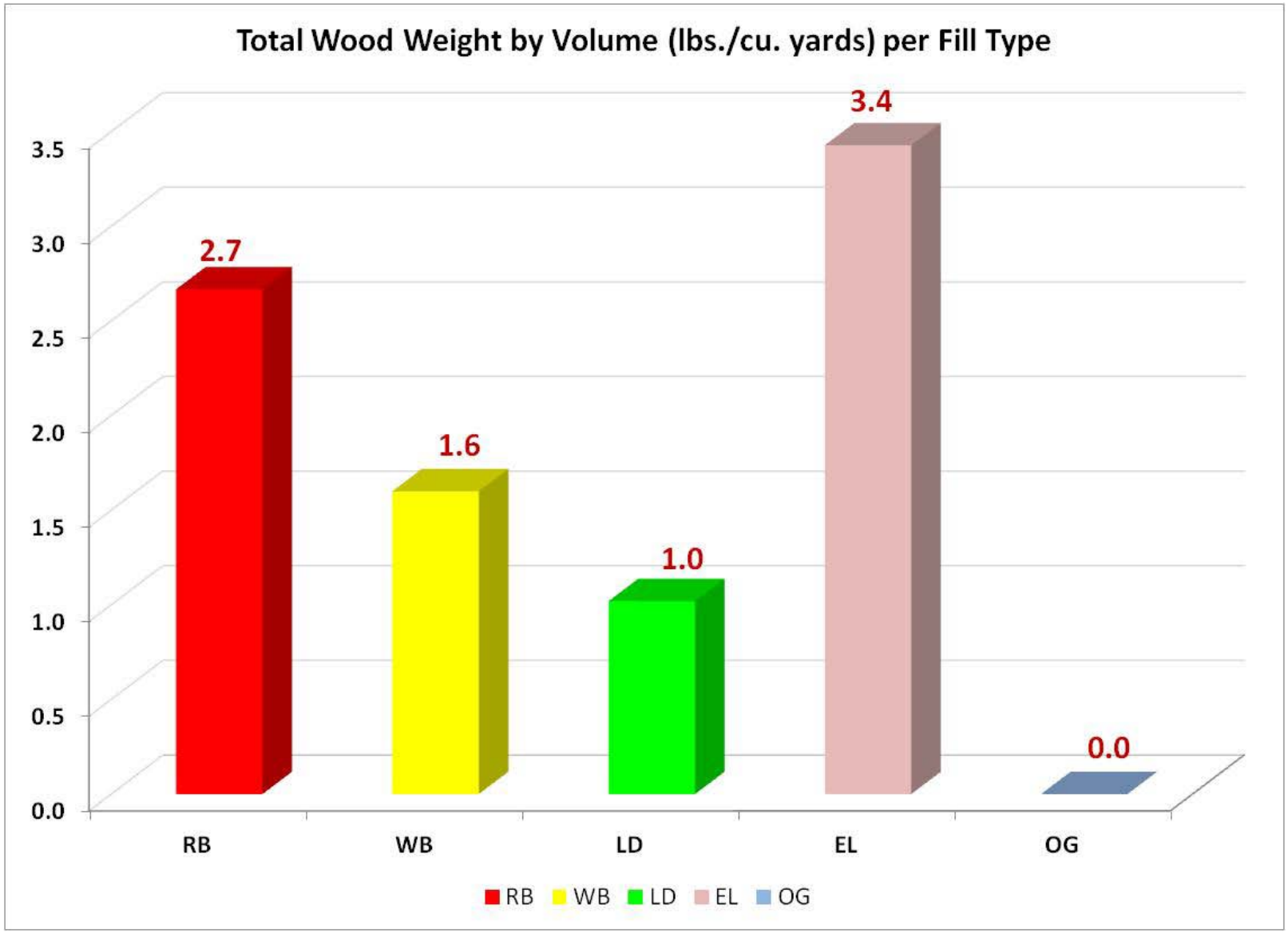


Figure 6-5: Total Wood Weight by Volume per Fill Type
(Values Shown Are Not Absolute Values, but For Relative Comparison Only)

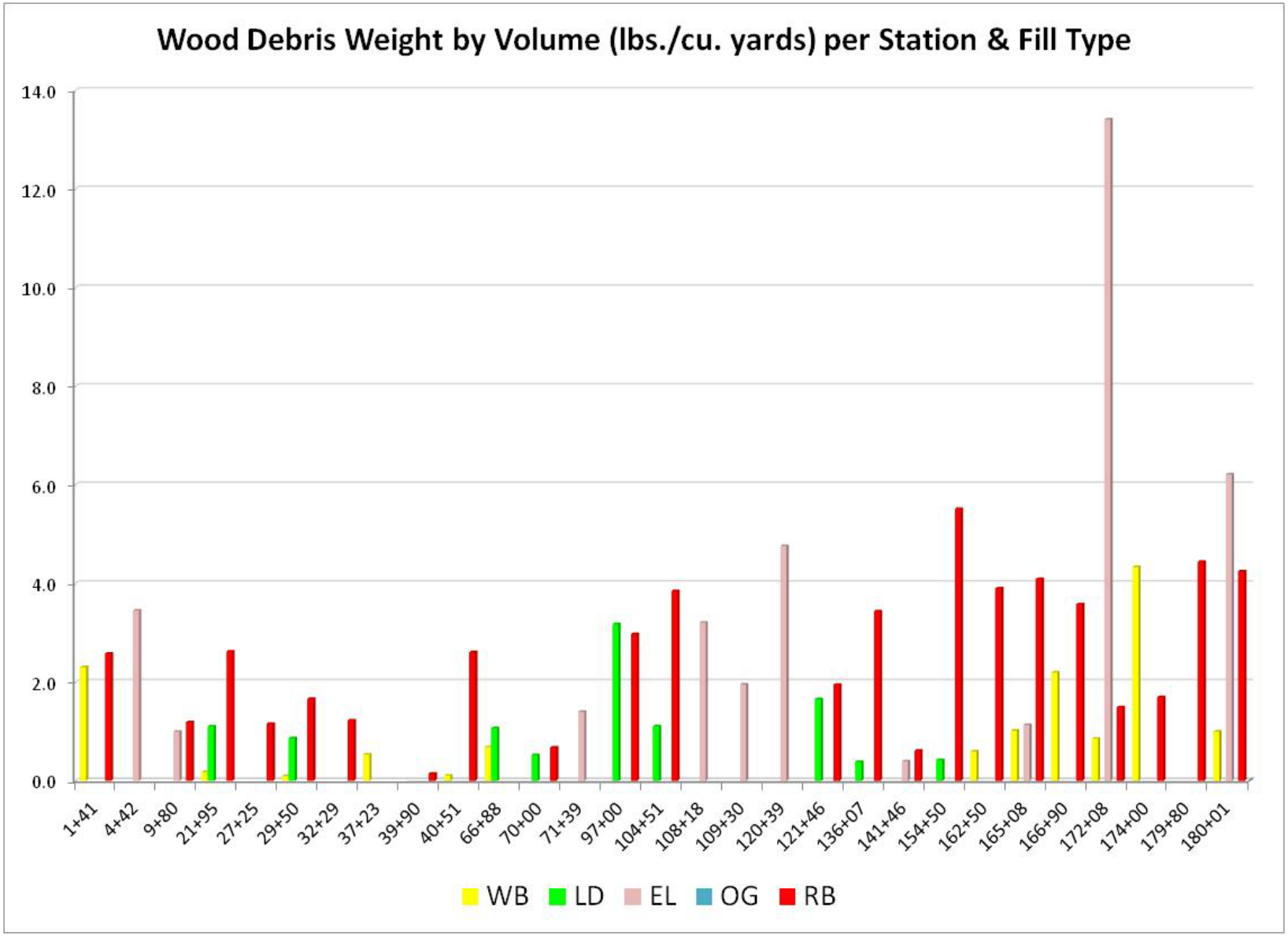


Figure 6-6: Wood Weight by Volume per Station and Fill Type

Location				
Wood Type	Wood Volume (cf)	Wood Density (pcf)	Trench Volume (cu-yds)	Wood Percentage
Sta. 48+00 C/L			13.5	
Not Objectionable	0.1610	39.12		
Not Objectionable	0.1331	36.06		
TOTAL WOOD	0.294			0.08
Sta. 48+00 P/S			8.0	
Not Objectionable	0.0348	29.89		
TOTAL WOOD	0.035			0.02
Sta. 80+00 F/S			7.2	
Not Objectionable	0.0524	50.59		
TOTAL WOOD	0.052			0.03
Sta. 90+00 C/L			11.9*	
Objectionable	0.1288	40.39		
Not Objectionable	0.1326	33.26		
Not Objectionable	0.0928	33.93		
TOTAL OBJECTIONABLE	0.1288			0.04
TOTAL WOOD	0.354			0.11
Sta. 123+59 F/S			12.6	
Objectionable (0-1.5)	0.2106	55.57		
Not Objectionable	0.1485	41.74		
Not Objectionable	0.1178	41.59		
Objectionable (1.5-3.7)	0.1904	48.32		
Not Objectionable	0.0901	41.05		
Not Objectionable	0.0929	34.44		
Not Objectionable	0.0193	41.97		
TOTAL OBJECTIONABLE	0.401			0.12
TOTAL WOOD	0.870			0.26

Table 6-1: Wood Volume Measurements Phase I Trenches.

Note: * Indicates partial GPS data; used area reduction method to compute the volumes.

Location				
Wood Type	Wood Volume (cf)	Wood Density (pcf)	Trench Volume (cu-yds)	Wood Percentage
Sta. 140+00 F/S			7.3	
Objectionable (1)	0.1340	55.95		
Objectionable (2)	0.1014	58.19		
Not Objectionable	0.1541	37.63		
Not Objectionable	0.1299	37.71		
TOTAL OBJECTIONABLE	0.235			.12
TOTAL WOOD	.5194			.26
Sta. 145+00 P/S			8.0	
Objectionable (1)	0.1714	53.10		
Objectionable (2)	0.0762	42.00		
Not Objectionable	0.1681	35.70		
Not Objectionable	0.1364	33.71		
TOTAL OBJECTIONABLE	0.248			.11
TOTAL WOOD	0.552			.26
Sta. 150+00 C/L			15.4	
(0-2.8')				
Not Objectionable	0.2206	28.10		
Not Objectionable	0.1201	26.65		
Not Objectionable	0.0596	25.19		
Objectionable (2.8'-5.8')	0.1527	55.01		
Not Objectionable	0.1830	40.45		
Not Objectionable	0.1690	37.87		
TOTAL OBJECTIONABLE	0.1527			.04
TOTAL WOOD	0.905			.22
Sta. 160+00 F/S			7.7	
Not Objectionable	0.1424	38.62		
TOTAL WOOD	0.142			.07

Table 6-1 (con't): Wood Volume Measurements Phase I Trenches. Note:
* Indicates partial GPS data; used area reduction method to compute the volumes.

Location				
Wood Type	Wood Volume (cf)	Wood Density (pcf)	Trench Volume (cu-yds)	Wood Percentage
Sta. 170+00 C/L			14.1*	
Objectionable (1)	0.1284	57.61		
Objectionable (2)	0.1546	49.17		
Non-Objectionable (1)	0.2230	35.87		
Non-Objectionable (2)	0.1886	38.18		
Non-Objectionable (3)	0.1914	40.24		
Non-Objectionable (4)	0.1904	38.33		
Non-Objectionable (5)	0.1523	34.14		
TOTAL OBJECTIONABLE	0.2830			.07
TOTAL WOOD	1.229			.32
Sta. 170+00 P/S			10.1	
Objectionable	0.0551	46.09		
Non-Objectionable (1)	0.1670	38.33		
Non-Objectionable (2)	0.1707	39.25		
Non-Objectionable (3)	0.1679	42.29		
Non-Objectionable (4)	0.1679	37.52		
Non-Objectionable (5)	0.0824	35.19		
TOTAL OBJECTIONABLE	0.0551			.02
TOTAL WOOD	0.811			.3

Table 6-1 (con't): Wood Volume Measurements Phase I Trenches.

Note: * Indicates partial GPS data; used area reduction method to compute the volumes.

Depth Range **Sta/Side/OS**	Lab Tested Total Volume of Objectionable Wood (cu yd)	Surveyed volume of Layer (cu yd)	Lab Tested Objectionable Wood % of Tot Layer Volume	Surveyed Total Trench Volume (cu yd)
1+41, FS 21'				
0' - 1.1'	0.001	3.562	0.042	12.632
1.1' - 2.1'	0.003	2.354	0.115	
2.1' - 3'		1.577		
3' - 4'		2.269		
4' - 5'		2.871		
4+42, PS 24'				
Wedge	0.002	2.918	0.072	9.318
0' - 1'		3.201		
1' - 2'	0.003	1.748	0.164	
2' - 3'	0.004	1.451	0.265	
9+80, FS 49'				
0' - 1'		3.062		10.532
1' - 2'		2.201		
2' - 3'		2.110		
3' - 4'		2.056		
4' - 5'		1.104		
21+95, CL				
0' - 1'		2.950		11.666
1' - 2'		1.822		
2' - 3'	0.002	1.912	0.082	
3' - 4'		2.675		
4' - 5'		0.923		
5' - 6'	0.002	1.383	0.118	

Table 6-2: Percent Objectionably Sized Wood (by Volume) Phase II Trenches

Depth Range **Sta.**	Lab Tested Total Volume of Objectionable Wood (cu yd)	Surveyed volume of Layer (cu yd)	Lab Tested Objectionable Wood % of Tot Layer Volume	Surveyed Total Trench Volume (cu yd)
27+25, FS, 80'				
0' - 1'		3.577		11.259
1' - 2'		3.152		
2' - 3'	0.001	2.583	0.031	
3' - 4'		1.977		
29+50, FS, 13'				
0' - 1'		4.534		19.176
1' - 2'		4.072		
2' - 3'	0.001	3.611	0.022	
3' - 4.5'		4.723		
4.5' - 5'		1.343		
32+29, FS, 110'				
0' - 1'		3.467		13.374
1' - 2'		3.158		
2' - 3'		2.663		
3' - 4'		2.194		
4' - 5'		1.893		
37+23, PS 139'				
0' - 1'		3.273		9.206
1' - 2'	0.001	1.998	0.048	
2'-3'		3.039		
3'-4'		0.896		
39+90, FS, 120				
0' - 1'		3.865		8.960
1'-2'		1.653		
2' - 3'		1.220		
3' - 4'		2.221		

Table 6-2 (con't): Percent Objectionably Sized Wood (by Volume) Phase II Trenches

Depth Range **Sta.**	Lab Tested Total Volume of Objectionable Wood (cu yd)	Surveyed volume of Layer (cu yd)	Lab Tested Objectionable Wood % of Tot Layer Volume	Surveyed Total Trench Volume (cu yd)
40+51, FS, 38'				
0' - 1'	0.009	2.825	0.319	11.417
1' - 2'		2.305		
2' - 3'	0.002	2.498	0.064	
3' - 4'		1.806		
4' -5'		1.983		
66+88, CL				
0' - 1'		2.898		7.246
1' - 2'		1.612		
2' - 3'		1.845		
3' - 3.5'		0.890		
70+00, CL				
0' - 1'		2.049		7.009
1' - 2'		2.181		
2' - 3'	0.001	2.063	0.038	
3' - 4'		0.715		
71+39, PS 36				
Wedge		0.771		7.370
0' - 1'	0.003	2.748	0.103	
1' - 2'		1.831		
2' - 3'		2.020		
97+00, CL				
0' - 1'	0.002	2.914	0.061	8.828
1' - 2'	0.001	1.954	0.046	
2' - 3'	0.005	2.485	0.203	
3' - 4'	0.003	1.475	0.193	

Table 6-2 (con't): Percent Objectionably Sized Wood (by Volume) Phase II Trenches

Depth Range **Sta.**	Lab Tested Total Volume of Objectionable Wood (cu yd)	Surveyed volume of Layer (cu yd)	Lab Tested Objectionable Wood % of Tot Layer Volume	Surveyed Total Trench Volume (cu yd)
104+51, PS, 149'				
0' - 1'	0.001	3.635	0.030	10.755
1' - 2'	0.001	2.689	0.028	
2' - 3'	0.005	2.202	0.236	
3' - 4'	0.003	2.230	0.115	
108+18, PS, 60'				
0' -1'	0.015	3.577	0.408	9.923
1' - 2'		3.180		
2' - 3'		1.963		
3' - 3.5'		1.202		
109+3, PS, 33'				
Wedge	0.002	0.903	0.177	7.770
0' - 1'	0.002	3.773	0.059	
1' - 2'		1.559		
2' - 3'		1.535		
120+39, PS, 69				
0 - 1'	0.008	4.734	0.170	12.720
1' - 2'	0.001	2.270	0.052	
2' - 3'	0.006	2.916	0.217	
3' - 4'	0.002	2.800	0.061	

Table 6-2 (con't): Percent Objectionably Sized Wood (by Volume) Phase II Trenches

Depth Range **Sta.**	Lab Tested Total Volume of Objectionable Wood (cu yd)	Surveyed volume of Layer (cu yd)	Lab Tested Objectionable Wood % of Tot Layer Volume	Surveyed Total Trench Volume (cu yd)
121+46, PS, 15'				
0 - 1'	0.002	3.243	0.068	9.314
1' - 2'	0.002	2.480	0.076	
2' - 3'		2.643		
3' - 3.5'		0.947		
136+07, CL,				
0 - 1'	0.004	2.138	0.184	10.245
1' - 2'		2.634		
2' - 3'		2.792		
3' - 4' (left)		2.681		
3' - 5' (right)		"no survey"		
141+46, FS, 118'				
0' - 1'		2.904		9.851
1' - 2'		2.625		
2' - 3'		1.828		
3' - 4'		2.494		
154+50, FS, 12'				
0' - 1'		2.970		16.368
1' - 2'		4.265		
2' - 3'	0.007	3.116	0.227	
3' - 4'	0.001	2.587	0.049	
4' - 5'	0.012	3.430	0.337	

Table 6-2 (con't): Percent Objectionably Sized Wood (by Volume) Phase II Trenches

Depth Range **Sta.**	Lab Tested Total Volume of Objectionable Wood (cu yd)	Surveyed volume of Layer (cu yd)	Lab Tested Objectionable Wood % of Tot Layer Volume	Surveyed Total Trench Volume (cu yd)
162+50, CL				
0' - 1'		3.416		14.327
1' - 2'		3.219		
2' - 3'		2.770		
3' - 4'	0.002	2.449	0.086	
4' - 5'	0.002	2.472		
165+08, PS, 31'				
0 - 1'		3.400		8.055
1' - 2'	0.008	3.238	0.248	
2' - 3'		1.417		
166+90, CL				
0' - 1'		3.536		10.179
1' - 2'	0.002	1.948	0.089	
2' - 3'	0.001	2.689	0.043	
3' - 4'	0.003	2.006	0.136	
172+08, PS, 55'				
0 - 1'		3.206		7.348
1' - 2'		2.133		
2' - 3'	0.009	2.010	0.439	

Table 6-2 (con't): Percent Objectionably Sized Wood (by Volume) Phase II Trenches

Depth Range **Sta.**	Lab Tested Total Volume of Objectionable Wood (cu yd)	Surveyed volume of Layer (cu yd)	Lab Tested Objectionable Wood % of Tot Layer Volume	Surveyed Total Trench Volume (cu yd)
174+00, CL				
0 - 1'		4.514		16.093
1' - 2'	0.002	4.838	0.033	
2' - 3'	0.005	3.471	0.133	
3' - 4'	0.002	3.269	0.073	
179+80, CL				
0 - 1'	0.003	4.287	0.064	16.098
1' - 2'	0.011	3.367	0.319	
2' - 3'	0.002	3.881	0.045	
3' - 4'	0.007	4.563	0.161	
180+01, PS, 187'				
0 - 1'		3.839		12.189
1' - 2'	0.004	3.281	0.125	
2' - 3'	0.010	2.943	0.339	
	0.000			
3' - 3.5'	0.000			

Table 6-2 (con't): Percent Objectionably Sized Wood (by Volume) Phase II Trenches

Depth Range **Sta/Side/OS**	Tot Wood Wt	Wood Vol (cu-ft) assuming density equals 35 pcf	All Wood as % of Total Layer Volume
1+41, FS 21'			
0' - 1.1'	2.71	0.077	0.0805
1.1' - 2.1'	10.42	0.298	0.4684
2.1' - 3'	5.25	0.150	0.3524
3' - 4'	6.75	0.193	0.3148
4' - 5'	6.75	0.193	0.2488
4+42, PS 24'			
Wedge	16.65	0.476	0.6037
0' - 1'	0.75	0.021	0.0248
1' - 2'	3.48	0.099	0.2107
2' - 3'	11.23	0.321	0.8192
9+80, FS 49'			
0' - 1'	2.26	0.065	0.0781
1' - 2'	3.95	0.113	0.1899
2' - 3'	2.43	0.069	0.1218
3' - 4'	2.2	0.063	0.1133
4' - 5'	1.11	0.032	0.1064
21+95, CL			
0' - 1'	0.56	0.016	0.0201
1' - 2'	0.3	0.009	0.0174
2' - 3'	2.66	0.076	0.1472
3' - 4'	2.36	0.067	0.0933
4' - 5'	0.32	0.009	0.0367
5' - 6'	5.7	0.163	0.4361

Table 6-3: Percent All Collected Wood by (by Volume) Phase II Trenches

Depth Range **Sta.**	Tot Wood Wt >= 6-inches long (lbs)	Wood Vol (cu-ft) assuming density equals 35 pcf	All Wood > = 6-inches as % of Total Layer Volume
27+25, FS, 80'			
0' - 1'	1.83	0.052	0.0541
1' - 2'	4.3	0.123	0.1444
2' - 3'	3.22	0.092	0.1319
3' - 4'	3.51	0.100	0.1879
29+50, FS, 13'			
0' - 1'	0.5	0.014	0.0117
1' - 2'	2.24	0.064	0.0582
2' - 3'	4.34	0.124	0.1272
3' - 4.5'	3.56	0.102	0.0798
4.5' - 5'	6.45	0.184	0.5082
32+29, FS, 110'			
0' - 1'	4.05	0.116	0.1236
1' - 2'	3.9	0.111	0.1307
2' - 3'	3.36	0.096	0.1335
3' - 4'	0	0.000	0.0000
4' - 5'	0	0.000	0.0000
37+23, PS 139'			
0' - 1'	0.74	0.021	0.0239
1' - 2'	2.04	0.058	0.1080
2'-3'	0	0.000	0.0000
3'-4'	0	0.000	0.0000
39+90, FS, 120			
0' - 1'	0.79	0.023	0.0216
1'-2'	0	0.000	0.0000
2' - 3'	0.06	0.002	0.0052
3' - 4'	0.21	0.006	0.0100

Table 6-3 (con't): Percent All Collected Wood by (by Volume) Phase II Trenches

Depth Range **Sta.**	Tot Wood Wt >= 6-inches long (lbs)	Wood Vol (cu-ft) assuming density equals 35 pcf	All Wood > = 6-inches as % of Total Layer Volume
40+51, FS, 38'			
0' - 1'	15.3	0.437	0.5731
1' - 2'	4.15	0.119	0.1906
2' - 3'	3.37	0.096	0.1428
3' - 4'	1.6	0.046	0.0937
4' -5'	0.21	0.006	0.0112
66+88, CL			
0' - 1'	1.96	0.056	0.0716
1' - 2'	3.56	0.102	0.2337
2' - 3'	0.45	0.013	0.0258
3' - 3.5'	0.59	0.017	0.0702
70+00, CL			
0' - 1'	1.37	0.039	0.0707
1' - 2'	0.46	0.013	0.0223
2' - 3'	1.13	0.032	0.0580
3' - 4'	0.97	0.028	0.1436
71+39, PS 36			
Wedge	0	0.000	0.0000
0' - 1'	4.32	0.123	0.1664
1' - 2'	0.24	0.007	0.0139
2' - 3'	4.56	0.130	0.2389
97+00, CL			
0' - 1'	3.32	0.095	0.1206
1' - 2'	3.79	0.108	0.2052
2' - 3'	10.47	0.299	0.4459
3' - 4'	9.81	0.280	0.7039

Table 6-3 (con't): Percent All Collected Wood by (by Volume) Phase II Trenches

Depth Range **Sta.**	Tot Wood Wt >= 6-inches long (lbs)	Wood Vol (cu-ft) assuming density equals 35 pcf	All Wood > = 6-inches as % of Total Layer Volume
104+51, PS, 149'			
0' - 1'	3.97	0.113	0.1156
1' - 2'	6.39	0.183	0.2515
2' - 3'	15.86	0.453	0.7623
3' - 4'	5.23	0.149	0.2482
108+18, PS, 60'			
0' -1'	30.93	0.884	0.9151
1' - 2'	0.44	0.013	0.0146
2' - 3'	0.16	0.005	0.0086
3' - 3.5'	0.13	0.004	0.0114
109+3, PS, 33'			
Wedge	8.69	0.248	1.0183
0' - 1'	5.58	0.159	0.1565
1' - 2'	0.72	0.021	0.0489
2' - 3'	0.16	0.005	0.0110
120+39, PS, 69			
0 - 1'	36.46	1.042	0.8150
1' - 2'	5.31	0.152	0.2475
2' - 3'	10.7	0.306	0.3883
3' - 4'	7.93	0.227	0.2997

Table 6-3 (con't): Percent All Collected Wood by (by Volume) Phase II Trenches

Depth Range **Sta.**	Tot Wood Wt >= 6-inches long (lbs)	Wood Vol (cu-ft) assuming density equals 35 pcf	All Wood > = 6-inches as % of Total Layer Volume
121+46, PS, 15'			
0 - 1'	9.47	0.271	0.3090
1' - 2'	4.11	0.117	0.1753
2' - 3'	2.58	0.074	0.1033
3' - 3.5'	1.17	0.033	0.1307
136+07, CL,			
0 - 1'	7.32	0.209	0.3622
1' - 2'	2.52	0.072	0.1012
2' - 3'	0.6	0.017	0.0227
3' - 4' (left)	0.68	0.019	0.0268
3' - 5' (right)	-	-	-
141+46, FS, 118'			
0' - 1'	0.77	0.022	0.0281
1' - 2'	1.84	0.053	0.0742
2' - 3'	1.86	0.053	0.1077
3' - 4'	0.98	0.028	0.0416
154+50, FS, 12'			
0' - 1'	0.68	0.019	0.0242
1' - 2'	2.3	0.066	0.0571
2' - 3'	14.74	0.421	0.5006
3' - 4'	8.55	0.244	0.3497
4' - 5'	26.75	0.764	0.8252

Table 6-3 (con't): Percent All Collected Wood by (by Volume) Phase II Trenches

Depth Range **Sta.**	Tot Wood Wt >= 6-inches long (lbs)	Wood Vol (cu-ft) assuming density equals 35 pcf	All Wood > = 6-inches as % of Total Layer Volume
162+50, CL			
0' - 1'	2.03	0.058	0.0629
1' - 2'	1.38	0.039	0.0454
2' - 3'	7.62	0.218	0.2911
3' - 4'	17.08	0.488	0.7379
4' - 5'	16.43	0.469	0.7032
165+08, PS, 31'			
0 - 1'	3.44	0.098	0.1071
1' - 2'	13.9	0.397	0.4543
2' - 3'	1.6	0.046	0.1195
166+90, CL			
0' - 1'	7.72	0.221	0.2311
1' - 2'	4.36	0.125	0.2369
2' - 3'	4.95	0.141	0.1948
3' - 4'	14.5	0.414	0.7647
172+08, PS, 55'			
0 - 1'	2.73	0.078	0.0901
1' - 2'	3.15	0.090	0.1563
2' - 3'	26.66	0.762	1.4036

Table 6-3 (con't): Percent All Collected Wood by (by Volume) Phase II Trenches

Depth Range **Sta.**	Tot Wood Wt >= 6-inches long (lbs)	Wood Vol (cu-ft) assuming density equals 35 pcf	All Wood > = 6-inches as % of Total Layer Volume
174+00, CL			
0 - 1'	4.5	0.129	0.1055
1' - 2'	8.19	0.234	0.1791
2' - 3'	30.48	0.871	0.9291
3' - 4'	13.86	0.396	0.4487
179+80, CL			
0 - 1'	9.1	0.260	0.2246
1' - 2'	17.75	0.507	0.5578
2' - 3'	12.84	0.367	0.3501
3' - 4'	31.8	0.909	0.7376
180+01, PS, 187'			
0 - 1'	3.82	0.109	0.1053
1' - 2'	13.21	0.377	0.4261
2' - 3'	13.34	0.381	0.4797
3' - 3.5'	13.35	0.381	0.6645

Table 6-3 (con't): Percent All Collected Wood by (by Volume) Phase II Trenches

WBV-14c.2 Levee Investigation Phase-I Trenches Excavated on 27 and 28 Sep 2011 **Non-Woody Debris**					
Excavation Location		Top of Cut Elev (ft NAVD88)	Dig Depth (ft)	Non Wood Debris	
				Count	Type
STA. 48+00	CL	11.5	5.4	9	Small 3" to 6" Pieces of Concrete, Brick, Metal Strip
STA. 48+00	PS	4.2	3	16	Brick, Small Pieces of Concrete, Wire, Tile
STA. 80+00	FS	6.1	3.1	1	Small Piece of Stone
STA. 90+00	CL	13.2	3.2	3	Small Pieces of Stone, Geogrid
STA. 122+22 (Ground Truthing)	PS	6.5	2.4	1	Metal Angle (15”x1.5”x1.5”)
STA. 123+59	FS	5.4	1.5	2	Metal Cable (18"x2"), Small Piece of Stone
	FS	3.9	2.2		
STA. 124+42 (Ground Truthing	PS	7.2	3.1	4	Large Metal Sheet, Hose, Small Pieces of Concrete
STA. 140+00	FS	6.1	2.7		
STA. 145+00	PS	5	3		
STA. 150+00	CL	13.5	2.8		
	CL	10.7	3		
STA. 160+00	FS	6.3	2.7		
STA. 170+00	CL	13.7	3.8		
STA. 170+00	PS	5	3.5		

Table 6-4a: Non Woody Debris Recovered from Phase I Trenches

WBV-14c.2 Levee Investigation								
Phase-II Trenches								
Non-Wood Debris								
1+41	F/S	21	0' - 1.1'	9.1	8	RB	1	Steel Pipe (28"x3")
1+41	F/S	21	1.1' - 2.1'	8	7	RB		
1+41	F/S	21	2.1' - 3'	7	6.4	RB		
1+41	F/S	21	3' - 4'	6.4	5.4	RB	1	Small Piece of Brick
1+41	F/S	21	4' - 5'	5.4	4.2	WB	1	6" Stone
4+42	P/S	34	Wedge	7.4	5.5	EL	1	Settlement Plate
4+42	P/S	34	0' - 1'	5.5	4.3	EL	1	Small Piece of Brick
4+42	P/S	34	1' - 2'	4.3	3.3	EL	2	Small Pieces of Brick & Stone
4+42	P/S	34	2' - 3'	3.3	2.2	EL	4	Sand Bag, Concrete (12”x4”x9”, 7”x4”x7”, 8”x4”x5”)
9+80	F/S	49	0' - 1'	6	5	RB		
9+80	F/S	49	1' - 2'	5	4.1	RB	1	Small Piece of Brick
9+80	F/S	49	2' - 3'	4.1	3.1	14B.2		
9+80	F/S	49	3' - 4'	3.1	2.1	14B.2		
9+80	F/S	49	4' - 5'	2.1	1.6	EL		
21+95	C/L		0' - 1'	13.4	12.4	WB		
21+95	C/L		1' - 2'	12.4	11.6	WB		
21+95	C/L		2' - 3'	11.6	10.7	LD	1	Concrete (12”x5”x7”)
21+95	C/L		3' - 4'	10.7	9.3	LD	1	Small Piece of Brick
21+95	C/L		4' - 5'	9.3	8.8	RB	1	Small Piece of Brick
21+95	C/L		5' - 6'	8.8	7.9	RB	1	Small Piece of Stone
27+25	F/S	80	0' - 1'	4.8	3.8	RB	1	6" Stone
27+25	F/S	80	1' - 2'	3.8	2.8	RB		
27+25	F/S	80	2' - 3'	2.8	1.8	RB		
27+25	F/S	80	3' - 4'	1.8	0.8	RB		
29+50	F/S	13	0' - 1'	11.5	10.5	WB	1	Concrete (12”x10”x5”)
29+50	F/S	13	1' - 2'	10.5	9.5	LD	4	6" Concrete & Stone
29+50	F/S	13	2' - 3'	9.5	8.5	LD	4	Small Pieces of Stones, Tar Paper, Plastic Bottle
29+50	F/S	13	3' - 4.5'	8.5	7	RB		
29+50	F/S	13	4.5' - 5'	7	6.5	RB		
32+29	F/S	110	0' - 1'	4.3	3.2	RB		
32+29	F/S	110	1' - 2'	3.2	2.1	RB	1	Metal Strip
32+29	F/S	110	2' - 3'	2.1	1.1	RB	1	6" Piece of Plastic
32+29	F/S	110	3' - 4'	1.1	0.2	OG		**DEBRIS FIELD**: Brick, Concrete, Shoes, Metal Strips, Tiles, Gravel, 5-ft long wooden post, etc.
32+29	F/S	110	4' - 5'	0.2	-0.5	OG		
37+23	P/S	139	0' - 1'	3	1.9	WB		
37+23	P/S	139	1' - 2'	1.9	1	WB		
37+23	P/S	139	2'-3'	1	-0.5	OG		**DEBRIS FIELD:** Concrete Slabs, Tires, Metal, Hammer, Glass, Net, Metal Wheel, Hub Caps, Gas Tank, Shoes, etc.
37+23	P/S	139	3'-4'	-0.5	-1	OG		

Table 6-4b: Non Woody Debris Recovered from Phase II Trenches

WBV-14c.2 Levee Investigation								
Phase-II Trenches								
Non-Wood Debris								
39+90	F/S	120	2' - 3'	0	1.2	RB		
39+90	F/S	120	3' - 4'	1.2	0.2	RB		
40+51	F/S	38	0' - 1'	6.4	5.4	RB	2	3" Stones
40+51	F/S	38	1' - 2'	5.4	4.4	RB		
40+51	F/S	38	2' - 3'	4.4	3.1	RB	1	6" Piece of Metal
40+51	F/S	38	3' - 4'	3.1	2.1	RB		
40+51	F/S	38	4' -5'	2.1	0.9	WB		
66+88	C/L		0' - 1'	13.3	12.3	WB	1	Small Piece of Metal
66+88	C/L		1' - 2'	12.3	11.6	LD	1	Shell
66+88	C/L		2' - 3'	11.6	10.7	LD		
66+88	C/L		3' - 3.5'	10.7	10.2	LD	1	3" Stone
70+00	C/L		0' - 1'	13.3	12.6	RB	1	Shell
70+00	C/L		1' - 2'	12.6	11.6	LD		
70+00	C/L		2' - 3'	11.6	10.5	LD		
70+00	C/L		3' - 4'	10.5	10.1	LD	1	3" Concrete
71+39	P/S	36	Wedge	6.5	5.6	EL	2	6" & 12" Pieces of Concrete
71+39	P/S	36	0' - 1'	5.6	4.6	EL	2	Wire, Tile
71+39	P/S	36	1' - 2'	4.6	3.6	EL	2	Concrete (9”x5”, 8”x8”)
71+39	P/S	36	2' - 3'	3.6	2.5	EL	13	Seven 3" to 12" Pieces and 2 Large Pieces (15”x9”x3.5”, 22”x15”x6”) of Concrete, Glass Bottle, Shell, Broken Pipe, Plastic Bag
97+00	C/L		0' - 1'	13.1	12.2	RB	1	
97+00	C/L		1' - 2'	12.2	11.3	LD	1	Small Piece of Brick
97+00	C/L		2' - 3'	11.3	10.2	LD		
97+00	C/L		3' - 4'	10.2	9.5	RB		
104+51	P/S	149	0' - 1'	2.6	1.5	LD	2	Small Pieces of Metal
104+51	P/S	149	1' - 2'	1.5	0.5	RB	2	Small Pieces of Brick
104+51	P/S	149	2' - 3'	0.5	-0.5	RB	1	Small Piece of Brick
104+51	P/S	149	3' - 4'	-0.5	-1.5	RB		
10818	P/S	60	0' -1'	5.1	4	EL		
108+18	P/S	60	1' - 2'	4	2.8	EL		
108+18	P/S	60	2' - 3'	2.8	2	EL		
108+18	P/S	60	3' - 3.5'	2	1.4	EL		
109+30	P/S	33	Wedge	6.3	5.7	EL	1	Piece of Cloth
109+30	P/S	33	0' - 1'	5.7	4.3	EL		
109+30	P/S	33	1' - 2'	4.3	3.5	EL		
109+30	P/S	33	2' - 3'	3.5	2.6	EL		
120+39	P/S	63	2' - 3'	0	3.5	EL		
120+39	P/S	63	3' - 4'	3.5	2.4	EL	2	3" Stones

Table 6-4b (continued): Non Woody Debris Recovered from Phase II Trenches

WBV-14c.2 Levee Investigation								
Phase-II Trenches								
Non-Wood Debris								
121+46	P/S	15	0 - 1'	11.8	10.8	-	1	12" Metal Hook (Left by Contractor)
121+46	P/S	15	1' - 2'	10.8	9.7	LD		
121+46	P/S	15	2' - 3'	9.7	8.7	RB		
121+46	P/S	15	3' - 3.5'	8.7	8.2	RB		
136+07	C/L		0 - 1'	13.4	12.7	RB		
136+07	C/L		1' - 2'	12.7	11.7	LD	1	3" Concrete
136+07	C/L		2' - 3'	11.7	10.5	LD		
136+07	C/L		3' - 4' (left)	10.5	9.2	LD		
136+07	C/L		3' - 5' (right)	10.5	9.2	LD	1	3" Concrete
141+46	P/S	118	0' - 1'	5.4	4.5	RB		
141+46	P/S	118	1' - 2'	4.5	3.5	RB		
141+46	P/S	118	2' - 3'	3.5	2.8	RB		
141+46	P/S	118	3' - 4'	2.8	1.7	EL	1	3" Plastic Hose
154+50	F/S	12	0' - 1'	11.7	10.9	LD		
154+50	F/S	12	1' - 2'	10.9	9.6	LD	1	Small Piece of Stone
154+50	F/S	12	2' - 3'	9.6	8.5	RB	1	3" Stone
154+50	F/S	12	3' - 4'	8.5	7.7	RB		
154+50	F/S	12	4' - 5'	7.7	6.5	RB		
162+50	C/L		0' - 1'	13.6	12.6	WB		
162+50	C/L		1' - 2'	12.6	11.6	RB		
162+50	C/L		2' - 3'	11.6	10.5	RB		
162+50	C/L		3' - 4'	10.5	9.5	RB	1	Small Piece of PVC Pipe
162+50	C/L		4' - 5'	9.5	8.5	RB		
165+08	P/S	31	0 - 1'	9.9	9	WB		
165+08	P/S	31	1' - 2'	9	8.1	RB	1	6" Concrete
165+08	P/S	31	2' - 3'	8.1	7.7	EL	2	Pieces of Concrete Slab (30”x26”x6”, 28”x19”x6”)
166+90	C/L		0' - 1'	13.6	12.5	WB		
166+90	C/L		1' - 2'	12.5	11.7	RB	1	Small Piece of Metal
166+90	C/L		2' - 3'	11.7	10.5	RB		
166+90	C/L		3' - 4'	10.5	9.6	RB	1	Small Piece of Brick
172+08	P/S	55	0 - 1'	7.3	6.1	WB		
172+08	P/S	55	1' - 2'	6.1	5.1	RB		
172+08	P/S	55	2' - 3'	5.1	4.1	EL	4	6" Concrete, Metal Cart, Piece of Brick, Hose
174+00	C/L		0 - 1'	13.6	12.4	WB		
174+00	C/L		1' - 2'	12.4	11.1	RB		
174+00	C/L		2' - 3'	11.1	10.1	WB		
174+00	C/L		3' - 4'	10.1	9.1	WB		
179+80	C/L		0 - 1'	13.6	12.5	RB	2	Shells
179+80	C/L		1' - 2'	12.5	11.6	RB	1	Piece of Brick
179+80	C/L		2' - 3'	11.6	10.5	RB	1	6" Concrete
179+80	C/L		3' - 4'	10.5	9.3	RB	3	3" Concrete & Small pieces of Brick
180+01	P/S	187	0 - 1'	3	2	WB		
180+01	P/S	187	1' - 2'	2	1	RB		
180+01	P/S	187	2' - 3'	1	0.1	RB	1	Small Piece of Brick
180+01	P/S	187	3' - 3.5'	0.1	-0.5	EL		

Table 6-4b (continued): Non Woody Debris Recovered from Phase II Trenches

Chapter 7 – Review of Contractor QC Testing and USACE QA Testing

The Contractor Quality Control (CQC) and USACE Quality Assurance (QA) testing are integral components of the WBV 14c.2 levee project. A review of the CQC and QA testing documentation was completed for this project to aid in the evaluation of the performance of the as-built levee, to determine whether the project has been constructed in general accordance with the plans and specifications (P&S), and to evaluate the CQC and QA testing processes during construction.

The P&S for this project, "New Westwego P.S. to New Orleans Village, Phase 2, First Levee and Floodwalls at Westminster Pumping Station WBV 14C.2," are dated April 2010 and outline the CQC and QA requirements for the project. The P&S are included in Appendix G. The following sections of the P&S document the CQC methods, frequencies, and reporting requirements as they pertain to CQC and QA testing:

1.) Section 01 45 04.00 10 Contractor Quality Control
2.) New Orleans District Construction Control Manual (NODCC Manual) - 1 June 2008
3.) Section 31 24 00.00 12 Embankment

The CQC and QA testing review focused on the following tests that are required by the P&S:

1.) Field Density – Sand Cone Method (ASTM D 1556)
2.) Field Density – Nuclear Method (ASTM D 6938) with Oven Moisture Content (ASTM D 2216) or Microwave Moisture Content (ASTM D 4643)
3.) Moisture/Density Determinations (ASTM D 698)
4.) One-Point Proctor Verification (ASTM D 698)
5.) Moisture Content (ASTM D 2216 or ASTM D 4643)
6.) Organic Content (ASTM D 2974 – Method C)
7.) Materials Classification (ASTM D 2487)
8.) Material Finer than No. 200 (75 µm) (ASTM D1140)
9.) Grain-size Determination (ASTM D422 or D6913)

10.) Atterberg Limits (ASTM D4318)

The individual test report forms completed for the project were provided to the Tiger Team by MVN Construction Division representatives and are included in Appendix T. Database spreadsheets summarizing the results of all the tests were provided to the Tiger Team by the MVN Construction Division Quality Assurance Branch. The Tiger Team used this information to summarize the test results of all CQC and QA testing for the project. Summary tables of all CQC and QA test data are provided as Tables 7-1 through 7-4 at the end of this chapter. Following the evaluation of the CQC and QA test documentation, recommendations have been developed by the Tiger Team for possible improvements to future CQC and QA testing programs.

CQC and QA Testing Laboratories

The Contractor retained the firm Tolunay-Wong Engineers, Inc. to complete CQC testing for the project. USACE retained the firm Ardaman & Associates, LLC to perform QA testing. Both laboratories currently have an active validation by the Materials Testing Center, Corps of Engineers as required by the P&S in Appendix B of the NODCC Manual. The laboratories were both verified to have active validations during the time period of this contract.

Reporting Consistency

Evaluation of the consistency of test reports included such factors as: utilization of required reporting forms, completeness of test reports, correctness of computations, and compliance of test methods with applicable ASTM standards.

The NODCC Manual requires that approved USACE forms be used for recording laboratory CQC/QA test results. The CQC laboratory used the required reporting forms for the majority of the project. During the first six weeks of earthwork construction, the CQC and QA laboratories used their own “versions” of the USACE test forms but switched to the “official” forms for the remainder of the project. The early “version” used by the CQC laboratory was noticeably similar

to the “official” form. The early version of the QA laboratory reporting form was less like the “official” USACE form, however the critical information was clearly presented.

Both CQC and QA test reports were generally complete with sufficient information to properly track test locations and results (i.e. test station number, offset distance protected side or flood side from centerline, lift number, test elevation, and test coordinates).

CQC tests completed on the same day are assigned the same unique “Report No.” QA tests completed on the same date are assigned a separate, but unique “Report No.” The appropriate “Report No.” for CQC and QA testing appears to have been properly reported on all test results.

Each set of CQC and QA test was also given a unique test number. This means that a field moisture/density test would be assigned the same test number as any sample collected for testing (i.e. classification, moisture content, organic content, sand cone, etc.). There were some minor discrepancies between how the test numbers were reported for both the CQC and QA tests throughout the course of the project. At the onset of the project prior to the use of the “official” USACE test reporting form, the CQC test numbers were combined with the daily “Report No.”. For example, the first CQC field moisture/density test was assigned the “Test No. 2653-6”. The 2653 is actually the daily CQC “Report No.” and the actual test number is “6”. Once the “official” forms were used, the actual “Test No.” would have simply been “6”. A similar type of nomenclature difference existed for the reported “Test No.” for the QA tests. For example, the first QA field moisture/density test was assigned “Test No. T-1.” The majority of the QA tests were given the letter “T” prior to the actual number; however, a few select tests were assigned the letter “C” prior to the number. The reason for the change in lettering is unknown. These minor discrepancies between the report numbers and test numbers made it more difficult to correlate all test results; however, ultimately the CQC and QA tests could be correlated with the information provided on the test forms.

The major reporting improvement that could have been made was more detailed documentation of the “Material Source” on both the CQC and QA reporting forms. The majority of the test forms reported in the “Material Source” blank that the source was the “Borrow Pit”. Several

material sources were used for the project (Willow Bend, River Birch, Existing Levee Degrade Material, WBV 14b.2 Levee Fill) yet the laboratory forms routinely reported the source as "Borrow Pit". It is recommended that more detailed borrow source information be included on the test forms in the "Material Source" blank, such as: actual material source, location of borrow material within the pit, and source elevation from the pit. Some of this information may not always be known, such as source elevation of borrow from the pit, on a large earthwork project; however, the material source should always be well defined. Fortunately, the material source associated with every CQC and QA test is documented on this project in the form of the reference "Proctor No." The reference "Proctor No." is documented for every test form. The material source, general location of the material within the pit, and approximate elevation of the material from the pit is recorded for each Proctor test. Since the laboratory forms always provide the reference "Proctor No." the material source of every test is known and can be back-tracked.

Another reporting issue that should be improved is the use of more details in the "Remarks" section of the CQC forms, especially to document re-tests of failing moisture/density tests. Failing moisture/density tests are tracked by the MVN Construction Division Quality Assurance Branch to ensure that re-tests are completed; however, re-tests are not specifically noted on the CQC forms submitted by the Contractor. It is recommended that re-tests be called out on the individual report forms in the future.

A random sampling of the CQC and QA laboratory report forms was performed to determine if the computations for the various tests are being performed accurately and in accordance with ASTM standards. This review of the laboratory forms did not reveal any computational errors that required correction. A handful of clerical errors were observed; however, these errors did not affect the accuracy of the computations and were able to be rectified by the CQC laboratory during the course of this investigation. These handful of errors consisted of typographical errors that were easily identified and corrected.

The most noticeable issue in regards to potential errors of test results is with the interpretation of CQC Proctor tests (ASTM D 698). The errors in the CQC Proctor interpretation are discussed in a subsequent section of this chapter and are relatively minor in regards to the actual impact to

this project. Other than these minor errors in CQC Proctor test interpretation, review of the CQC and QA laboratory test reports indicate that testing was done in general compliance with ASTM standards (i.e. proper sample sizes were used for the tests, etc.).

One of the more difficult construction monitoring aspects of large earthwork projects like WBV 14c.2 is the selection of the correct and proper reference Proctor for evaluation of the percent compaction of CQC field density tests. An evaluation of the potential errors in selection of the appropriate reference Proctor for this project is included in this chapter. Recommendations are also provided to improve selection of reference Proctors on future projects.

Materials Classification Tests (ASTM D 2487, ASTM D 1140 and ASTM D 4318)

Section 31 24 00.00 12 "Embankment" of the WBV 14c.2 P&S requires:

> "The embankment materials shall be constructed of earth materials naturally occurring or Contractor blended. Materials that are classified in accordance with ASTM D 2487 as CL or CH with less than 35% sand content are suitable for use as embankment material…..Materials placed in the section must be at or above a Plasticity Index of 10."

CQC and QA testing required to assure compliance with these specifications include: Atterberg Limits Tests in accordance with ASTM D 4318 and Grain-Size Determination Tests as determined by ASTM D 1140, D 422, or D 6913. The P&S requires these classification tests be completed for each control compaction curve and for each in-place density test of compacted fill. Classification tests are also required on uncompacted berm fill material.

CQC materials classification tests were completed on 1220 samples of compacted fill and 46 samples of uncompacted fill for the WBV 14c.2 project. Classification tests were also completed on 16 samples from on-site existing levee material re-used as compacted fill for this project. QA materials classification tests were completed on 82 samples. Summary tables of the CQC and QA results are below:

Table 7-5 CQC Material Classification Test Results – Compacted Fill					
Results Range	LL	PL	PI	% Sand	Classification
Maximum	99	36	68	21.5	1218 CH Samples
Minimum	38	16	14	0.4	2 CL Samples
Average	69	23	46	4.9	1220 Total Samples
Required	NA	NA	≥ 10	< 35	CH or CL

Table 7-6 CQC Material Classification Test Results – Uncompacted Fill					
Results Range	LL	PL	PI	% Sand	Classification
Maximum	76	32	50	8.4	33 CH Samples
Minimum	39	16	17	0.3	13 CL Samples
Average	60	25	35	3.6	46 Total Samples
Required	NA	NA	≥ 10	< 35	CH or CL

Table 7-7 CQC Material Classification Test Results – Existing Levee					
Results Range	LL	PL	PI	% Sand	Classification
Maximum	92	37	56	26.6	16 CH Samples
Minimum	50	20	28	4.7	0 CL Samples
Average	65	27	38	14.2	16 Total Samples
Required	NA	NA	≥ 10	< 35	CH or CL

Table 7-8 QA Material Classification Test Results					
Results Range	LL	PL	PI	% Sand	Classification
Maximum	100	28	72	11.6	82 CH Samples
Minimum	52	15	36	0.9	0 CL Samples
Average	74	20	54	3.8	82 Total Samples
Required	NA	NA	≥ 10	< 35	CH or CL

Review of the CQC and QA material classification test results indicates that the materials used are in compliance with the WBV 14c.2 project specifications.

Organic Content Test (ASTM D 2974 Method C)

Section 31 24 00.00 12 "Embankment" of the WBV 14c.2 P&S requires:

> "Materials placed in the section must be at or below organic content of 9 percent by weight, as determined by ASTM D 2974, Method C."

The P&S require organic content tests be completed for each control compaction curve and for each in-place density test of compacted fill. Organic content tests are also required on uncompacted berm fill material.

Table 7-9
CQC Organic Content Test Results – Compacted Fill (1221 Tests)

Results Range	Organic Content %
Maximum	9.4
Minimum	0.0
Average	3.6
Required	≤ 9

Table 7-10
CQC Organic Content Test Results – Uncompacted Fill (46 Tests)

Results Range	Organic Content %
Maximum	6.1
Minimum	1.7
Average	3.1
Required	≤ 9

Table 7-11
CQC Organic Content Test Results – Existing Levee (16 Tests)

Results Range	Organic Content %
Maximum	7.3
Minimum	3.3
Average	4.4
Required	≤ 9

Table 7-12 QA Organic Content Test Results – (79 Tests)	
Results Range	Organic Content %
Maximum	8.0
Minimum	3.1
Average	4.7
Required	≤ 9

The maximum organic content measured was 9.4 percent from a sample at Station 170+01 offset 138 feet from the centerline on the protected side berm. This was the only CQC test that exceeded the maximum 9 percent organic content requirement. A retest of this sample resulted in an organic content of 8.7 percent, and the Contractor was allowed to proceed with construction. Including the failed test and retest above, only 5 of 1362 CQC and QA tests on compacted fill, uncompacted fill, and existing levee material had measured organic contents greater than 8 percent. Review of the CQC and QA organic content test results indicates that the materials used are in compliance with the WBV 14c.2 project specifications.

Moisture/Density Determinations (ASTM D 698)

Section 31 24 00.00 12 "Embankment" of the WBV 14c.2 P&S requires:

> "Control compaction curves shall be established in accordance with ASTM D 698 (Standard Proctor Density Test). Two control compaction curves will be required for each type of material from each source….The average of the two tests shall be the controlling optimum moisture content and maximum density."

A total of 32 sets of CQC Proctors and 8 sets of QA Proctors were completed for this project. A summary of the CQC Proctors is provided on Tables 7-13 at the end of this chapter. The CQC and QA Proctors were reviewed and the three areas evaluated were plotting/data entry errors, moisture range of Proctor points, and selection of optimum water content and maximum dry density.

Evaluation of these three areas revealed several errors, primarily occurring in the CQC Proctors. The primary source of these areas appears to be how the CQC laboratory initially plotted and interpreted the Proctor data. The CQC laboratory initially used a commercial software package for plotting and selection of the optimum water content and maximum dry density for each Proctor test. A copy of the initial Proctor results completed by the CQC laboratory is presented in Appendix T. The CQC laboratory likely used the commercial software for this function because it is part of their internal routine on non-USACE projects. Local and regional geotechnical materials testing laboratories typically do not utilize the standard Proctor forms required by the NODCC Manual on non-USACE project. Consequently, it is more efficient for most private laboratories to utilize the routine Proctor software for interpretation of the Proctor data than to use the NODCC Manual forms.

The CQC firm on this project appears to have generated the Proctor plots using their routine software and later transferred the information to the NODCC Manual forms for formal presentation to the CEMVN Quality Assurance Branch. The majority of the errors identified during this review of the CQC Proctor data appear to be caused by inconsistencies between the Proctor plots generated by the CQC laboratory software and the NODCC Manual forms submitted to USACE. These inconsistencies should have been identified by the CQC laboratory and CEMVN during the construction process. Similar inconsistencies were not noted during review of the QA laboratory Proctor test results. Recommendations for improvement to the process to eliminate these inconsistencies are included in this report. A more detailed discussion of errors identified during this review is included in the following paragraphs.

Plotting/Data Entry Errors

The initial review of the CQC Proctors revealed several plotting/data entry errors on 8 data sets. The primary error was the plotting scales of the Proctor graphs were out of range of the data set and the actual curve could not be reviewed. An example of this error is provided on Figure 7-1 at the end of this chapter. Subsequent to the initial Tiger Team review, these plots were corrected and resubmitted for our review. The corrected versions are in Appendix T. These errors should have been identified by CQC and QA personnel during construction.

Another error in plotting data encountered on the CQC Proctors was the development of 2 sets of S-shaped curves as shown on Figures 7-2 and 7-3 at the end of this chapter. These errors are likely due to the curve fitting functions used by the USACE Proctor spreadsheet. The initial Proctor curves plotted by the CQC laboratory did not show these drastic S-shaped curves. While these errors did not significantly affect the average optimum water content and maximum dry density selected for the project, such S-shaped Proctor curves of the high plasticity clay soils used for this project are unrealistic and should not have been reported by the Contractor or accepted by CEMVN during the QA review.

The curve fitting function used on the USACE Proctor spreadsheet would not generate an S-shaped curve if the Proctor points were close enough together to preclude the development of an abnormal shape. S-shaped curves may be an indication of an insufficient number of moisture/density test points or errors in individual moisture/density test points that should be noted, questioned, and documented by the Contractor's CQC laboratory and the USACE QA review.

Moisture Range of Proctor Points

Development of a smooth Proctor curve requires a sufficient number of Proctor points compacted at reasonably close moisture contents to clearly determine the optimum water content and maximum dry density. ASTM D 698 recommends the difference in water content between Proctor points be approximately 2 percent and not greater than about 4 percent. The QA Proctor curves did not have any two data points with a difference greater than 4 percent. Seven (7) of the 64 individual CQC Proctor curves were found to have at least two data points with a difference greater than 4 percent. Review of these Proctor curves indicates a closer spacing of the Proctor points would likely have resulted in minor changes to the selected optimum water content and maximum dry density of individual Proctor tests. It should be noted, since an average of two Proctor curves is used, the effect of these minor changes on the final reported values of optimum water content and maximum dry density for the "set" is reduced.

Selection of Optimum Water Content and Maximum Dry Density

A consistent problem with the majority of the CQC Proctors and some of the QA Proctors for this project is the optimum water contents and maximum dry densities presented on the reporting forms do not match the peaks as drawn. ASTM D 698 requires that the optimum water content and maximum dry density be obtained directly from the curve, so the observed errors should not exist. These errors were more significant for the CQC Proctors compared to the QA Proctors. The Tiger Team edited versions of all CQC Proctors to illustrate the differences between reported optimum water contents/maximum dry densities with the actual graphs. These edited versions are presented as Figures 7-4 through 7-67 at the end of this chapter. The causes of these differences are unknown although some of the errors are likely due to either software selected points or user error in the selection of the optimum water content/maximum dry density using the USACE Proctor spreadsheet. A primary cause of the error is the CQC/QA laboratories using alternative software to initially enter the lab data and to select the optimum water content/maximum dry density and then reporting those values on the USACE Proctor spreadsheet. Regardless of the source of the error, it is recommended that modifications be made to the USACE Proctor spreadsheet or that it be used properly by CQC and QA laboratories to eliminate discrepancies between the reported optimum water content/maximum dry density and the Proctor curve.

In order to evaluate potential impact of these errors, the values of optimum water contents and maximum dry densities were selected for all 32 sets of CQC Proctor curves directly from the plotted curves provided by MVN. These "corrected" optimum water contents/maximum dry densities are also reported on Table 7-13. The general trend (27 of 32 CQC data sets) was that if the "corrected" maximum dry density was selected directly from the graph the reported maximum dry density would increase by an average of about 0.5 pounds per cubic foot (pcf) with a maximum increase of 1.2 pcf. The differences between the corrected and originally reported optimum water contents was more variable, but the general trend (20 of 32 CQC data sets) was an average decrease of optimum water content of about -0.7 percent with a maximum decrease of -2.7 percent.

The significance of these data corrections should be considered in light of the acceptable range of test results allowed by ASTM D 698, whether changes outside of the acceptable range could have impacted the passing or failing of CQC field moisture/density test results, and whether these changes would have any functional impact on the performance of the as-built levee and compliance with the P&S.

For CH soils, ASTM D 698 recommends an acceptable range of 1.3 pcf for maximum dry density and ±0.7 percent for optimum water content between two test results on the same sample at the same lab. The maximum error between "corrected" and "reported" maximum dry density was 1.2 pcf which falls within the acceptable ASTM D 698 range of 1.3 pcf. Consequently, the overall impact to the maximum dry densities used for field control is within the normal variations of Proctor tests and has no functional impact to the WBV 14c.2 project. Recommendations are made later in this report to improve the CQC and QA process to eliminate these errors in future projects.

The average error between "corrected" and "reported" optimum water content was -0.7 percent and the maximum error was -2.7 percent. Twenty-three (23) of 32 CQC Proctor data sets have differences between "corrected" and "reported" optimum water content within the ±0.7 percent recommended by ASTM D 698 as within laboratory acceptable variability. Nine CQC Proctor data sets have differences between "corrected" and "reported" optimum water content greater than the ±0.7 percent recommended by ASTM D 698, and in 7 of the 9 cases the "corrected" optimum water content was lower than originally "reported". A discussion of the potential impacts of these reporting errors in optimum water content for these 9 cases is included later in the chapter in the discussion of field moisture density test results.

Field Density – Nuclear Method (ASTM D 6938) & Moisture Content (ASTM D 2216)

Section 31 24 00.00 12 "Embankment" of the WBV 14c.2 P&S requires:

> "In-place density tests for compacted fill shall be made in accordance with ASTM D 2922 (Nuclear Method) or ASTM D 1556 and shall be made at a minimum frequency of one density test per lift per 500 cubic yards of compacted fill placed in the levee per lift,

> but not less than one density test per 500 feet per lift…….The first and each successive layer of compacted fill material shall be compacted to at least 90 percent of the maximum dry density as determined by ASTM D 698 (Standard Proctor Compaction Test) at a moisture content within the limits of plus 5 to minus 3 percentage points of optimum moisture content determined from ASTM D 698"

ASTM D 2922 has been replaced with ASTM D 6938. Field density testing for this project was performed following ASTM D 6938 which is referenced as the appropriate test in the NODCC Manual. In-place dry densities for this project were determined using the wet density from ASTM D 6938 test and the oven moisture content from ASTM D 2216 on a sample collected at each field test location. In-place density tests were only required of compacted fill.

Tracking of Failing Tests and Retests

The CQC data was reviewed to determine whether all moisture/density tests out of compliance with project P&S have documented passing retests after failing areas were reworked by the Contractor. A total of 1220 CQC moisture/density tests were completed for this project. Ninety-eight (98) of the 1220 CQC test failed the moisture and/or density requirements. Review of the CQC data shows 97 of the 98 failing tests have passing CQC retests, as is shown on Table 7-1. The test did not have a matching CQC retest (Report-Test # 4675-741) had QA test performed at the same location that passed. Construction was allowed to continue by USACE CD based on the results of the passing QA test. The CQC information indicates that all failing moisture/density tests have been properly documented with passing or acceptable tests.

Summary of Passing CQC Moisture/Density Test Results

A total of 1121 passing moisture/density CQC tests are recorded for the project. A summary of the results of these tests are as follows:

	Table 7-14 Summary of All CQC Moisture/Density Test Results				
	Wet Density γ_T (pcf)	Dry Density γ_d (pcf)	Moisture Content (%)	% Compaction	Measured Water Content minus Optimum
Maximum	127.4	104.3	38.9	105.7	5.0
Minimum	102.4	76.0	17.1	90.0	-3.0
Average	114.1	89.6	27.5	96.9	1.0

Additional review of the passing CQC moisture/density test results indicates that 19.9% had a percent compaction greater than 100 percent, 70.2% had a percent compaction greater than 95 percent, and only 2.4% had a percent compaction less than 91 percent. The CQC compaction data indicates that the WBV 14c.2 levee project has been compacted with an average percent compaction of 96.9%, which is well above the minimum requirement of 90.0 percent.

The Tiger Team reviewed the 223 compaction tests having a percent compaction greater than 100 percent. Compaction above the 100 percent of the maximum density as determined by ASTM D 698 is not uncommon; however, as a matter of practice values above 102 percent compaction should be reviewed. Fifty-six (56) of the 223 tests had a percent compaction greater than 102 percent, 20 tests had greater than 103 percent compaction, 3 tests had greater than 104 percent compaction, and 1 test had greater than 105 percent compaction. Compaction percentages above 102 percent compaction can still be valid test results; however, it can sometimes be a sign that either an incorrect reference Proctor was selected or there is an error in the field measurements.

Summary of Passing QA Moisture/Density Test Results

A total of 49 passing moisture/density QA tests are recorded for the project. A summary of the results of these tests are as follows:

	Table 7-15 Summary of All CQC Moisture/Density Test Results				
	Wet Density γ_T (pcf)	Dry Density γ_d (pcf)	Moisture Content (%)	% Compaction	Measured Water Content minus Optimum
Maximum	121.1	98.3	34.8	104.9	4.1
Minimum	102.3	79.8	21.9	90.0	-2.8
Average	113.1	88.7	27.5	97.8	0.2

Additional review of the passing CQC moisture/density test results indicates that 24.5% had a percent compaction greater than 100 percent, 79.6% had a percent compaction greater than 95 percent, and only 2.0% had a percent compaction less than 91 percent. The QA compaction data compares favorably to the CQC compaction data previously submitted.

The Tiger Team reviewed the 12 compaction tests having a percent compaction greater than 100 percent. Compaction above the 100 percent of the maximum density as determined by ASTM D 698 is not uncommon; however, as a matter of practice values above 102 percent compaction should be reviewed. Five (5) of 12 tests had a percent compaction greater than 102 percent and 1 test greater than 104 percent compaction. This QA data also compares favorably to the CQC compaction data.

Summary of CQC Moisture/Density Data by Levee Reaches

The data was also reviewed to determine whether there were any specific areas of the project that had consistently higher or lower degrees of compaction. The data was evaluated for the three major reaches of the project:

1.) East-west reach from Sta. 0+44 at New Westwego Pump Station to Sta. 70+00
2.) North-south reach from Sta. 70+00 to Sta. 112+66 at Westminster Pump Station
3.) East-west reach from Sta. 120+00 at Westminster Pump Station to Sta. 182+15

A summary of these results is presented in the tables below:

	Table 7-16 Summary of 362 CQC Moisture/Density Test Results from Sta. 0+44 to Sta. 70+00				
	Wet Density γ_T (pcf)	Dry Density γ_d (pcf)	Moisture Content (%)	% Compaction	Measured Water Content minus Optimum
Maximum	125.7	103.5	38.9	103.8	4.9
Minimum	102.7	76.6	20.1	90.0	-3.0
Average	113.8	89.2	27.8	97.2	1.1

	Table 7-17 Summary of 295 CQC Moisture/Density Test Results from Sta. 70+00 to Sta. 112+66				
	Wet Density γ_T (pcf)	Dry Density γ_d (pcf)	Moisture Content (%)	% Compaction	Measured Water Content minus Optimum
Maximum	123.6	101.6	38.2	105.7	5.0
Minimum	102.7	77.0	19.9	90.0	-2.9
Average	113.6	89.4	27.2	96.6	0.9

	Table 7-18 Summary of 464 CQC Moisture/Density Test Results from Sta. 112+66 to Sta. 182+15				
	Wet Density γ_T (pcf)	Dry Density γ_d (pcf)	Moisture Content (%)	% Compaction	Measured Water Content minus Optimum
Maximum	127.4	104.3	38.7	104.7	5.0
Minimum	102.4	76.0	17.1	90.0	-3.0
Average	114.5	90.0	27.4	96.9	1.1

Based on a review of the summary information of moisture/density tests by reach, there is no significant difference in the percent compaction between design reaches.

Summary of Passing CQC Moisture/Density Test Results – River Birch Material

The River Birch borrow pit caused the greatest amount of concern regarding excessive woody debris placed in the levee. A total of 332 passing moisture/density CQC tests are recorded for the project on materials from the River Birch borrow pit. A summary of the results of these tests are as follows:

	Table 7-19 Summary of All CQC Moisture/Density Test Results on Tests on Materials from River Birch Borrow Pit				
	Wet Density γ_T (pcf)	Dry Density γ_d (pcf)	Moisture Content (%)	% Compaction	Measured Water Content minus Optimum
Maximum	121.4	97.3	38.7	103.9	5.0
Minimum	102.4	76.0	21.8	90.0	-3.0
Average	112.3	86.8	29.5	96.4	1.0

Additional review of the passing CQC moisture/density test results from materials from the River Birch borrow pit indicates 15.1% had a percent compaction greater than 100 percent, 64.5% had a percent compaction greater than 95 percent, and only 2.4% had a percent compaction less than 91 percent. The CQC compaction data indicates materials from the River Birch borrow pit on the WBV 14c.2 levee project have been compacted with an average percent compaction of 96.4%, which is well above the minimum requirement of 90.0 percent.

Summary of Impacts of Corrected CQC Standard Proctor Tests

The impacts of using the "corrected" maximum dry density and optimum water content on all CQC test data are summarized on Table 7-20 at the end of this chapter. However, as previously discussed, our evaluation focused on the 9 CQC Proctor data sets that have differences between "corrected" and "reported" optimum water contents greater than the ±0.7 percent recommended by ASTMD D 698. These CQC Proctors according to report number are as follows: 2653, 3094, 3178, 3179, 3291, 3745, 3804, 3815, and 4716. The potential impacts of these errors was evaluated by determining whether the measured field moisture content would still be within the P&S moisture tolerances with the "corrected" water content. There were 356 field moisture/density tests that passed using these 9 CQC Proctors as reference Proctors. The "corrected" maximum dry density was also applied to the 356. A summary of the 356 "corrected" tests is in the tables below:

	Table 7- 21 Summary of 356 CQC Moisture/Density Test Results Out of Compliance of Moisture Requirements Based on "Corrected" Optimum Water Content				
	Wet Density γ_T (pcf)	Dry Density γ_d (pcf)	Moisture Content (%)	% Compaction	Measured Water Content minus Optimum
Maximum	127.4	104.3	38.9	104.9	7.7
Minimum	102.7	76.6	17.1	89.0	-4.0
Average	114.2	90.1	27.0	96.2	1.7

Utilizing the "corrected" optimum water content for these 356 moisture/density tests resulted in 47 tests would have fallen out of compliance with the moisture tolerance. Using the "corrected" maximum dry density for the 356 tests results in 10 tests with compaction less than 90 percent compaction. The average percent compaction of the 10 low compaction tests was 89.5 percent. Further evaluation of the 47 CQC tests out of compliance with the moisture requirements based on the "corrected" optimum water content shows 39 of the 47 CQC tests are out of compliance on the wet side of the moisture tolerances. Three of the 39 wet tests were also found to have "corrected" percent compaction less than 90 percent. The tables below summarize the impacts of the "corrected" 39 tests wet and 8 tests dry of moisture requirements.

	Table 7-22 Summary of 39 CQC Moisture/Density Test Results WET of Optimum Moisture Requirements Based on "Corrected" Optimum Water Content				
	Moisture Content (%)	% Compaction		Difference Between Optimum and Measured Water Content	
		"Reported"	"Corrected"	"Reported"	"Corrected"
Maximum	38.9	102.7	102.9	5.0	7.7
Minimum	25.5	90.0	89.4	2.4	5.1
Average	32.9	95.0	94.5	4.2	6.0

	Table 7-23 Summary of 8 CQC Moisture/Density Test Results DRY of Optimum Moisture Requirements Based on "Corrected" Optimum Water Content				
	Moisture Content (%)	% Compaction		Difference Between Optimum and Measured Water Content	
		"Reported"	"Corrected"	"Reported"	"Corrected"
Maximum	24.2	101.7	101.3	-2.0	-3.1
Minimum	17.1	98.1	97.7	-2.9	-4.0
Average	23.0	100.4	100.0	-2.4	-3.5

Review of these 47 tests indicates 20.5% had a percent compaction greater than 100 percent, 56.4% had a percent compaction greater than 95 percent, and 10.6% had a percent compaction less than 91 percent. Only 3 of the 47 tests have a percent compaction less than 90 percent with a minimum percent compaction of 89.4 percent. The data indicates that although 47 field moisture/density tests are out of compliance with the moisture requirements for the project that the impact to the degree of compaction across the levee is minimal at best.

Sand Cone Density Tests (ASTM D 1556)

Section 31 24 00.00 12 "Embankment" of the WBV 14c.2 P&S requires:

> "The Sand Cone Method shall be used to confirm the accuracy of the Nuclear Method. This can be accomplished by performing an initial comparison test of the two methods at the start of construction. If the Nuclear Method wet density is within 3 percent of the Sand Cone Method, no correction of the Nuclear Method wet density will be required and the testing may continue with the Nuclear Method. The Nuclear Method wet density shall be verified throughout the project at a rate of one Sand Cone test for every ten nuclear tests thereafter. If the variance at any time exceeds 3 percent, a correction factor will be required to be determined prior to any further testing….."

A total of 122 CQC sand cone density tests were completed on the WBV 14c.2 project. The variance in wet density as determined from the Nuclear Method and the Sand Cone Method did

not exceed 3 percent for any CQC tests completed for the WBV 14c.2 project; therefore, in accordance with the P&S no wet density correction was required for this project for the Nuclear Method.

It should be noted that there are 2 QA sand cone density tests with a variance in wet density as determined from the Nuclear Method and the Sand Cone Method exceeded 5 percent.

One Point Proctors (ASTM D 698)

Section 31 24 00.00 12 "Embankment" of the WBV 14c.2 P&S requires:

> "As a minimum, the Contractor shall perform a one-point compaction test at every fifth (5th) in-place density test. If the Nuclear Method is used for in-place testing, every other one-point compaction tests shall be performed at the sand-cone verification test location on a sample from the same material ……The material shall be compacted at the same water content as the field test if it is estimated to be on the dry side of optimum laboratory water content. If the field water content is estimated to be above the optimum water content, the corresponding lab sample shall be dried to an estimated water content which is not more than 3 percent dry of the actual optimum water content. The water content/dry density point on the one-point compaction test shall be plotted on the family of curves for the same soil type from the same borrow source. The compaction control curve is estimated by projecting a curve that is parallel to the adjacent compaction curves. The optimum water content and maximum dry density shall be estimated from the control compaction curve. If the laboratory data plots outside of the available family of compaction curves, the Contractor shall perform a complete compaction test in accordance with ASTM D 698."

A total of 246 one-point compaction tests were completed during construction of the WBV 14c.2 project. One-point compaction tests were completed adjacent to every sand cone density test. The frequency of required one-point testing completed for the WBV 14c.2 project is in compliance with the project P&S.

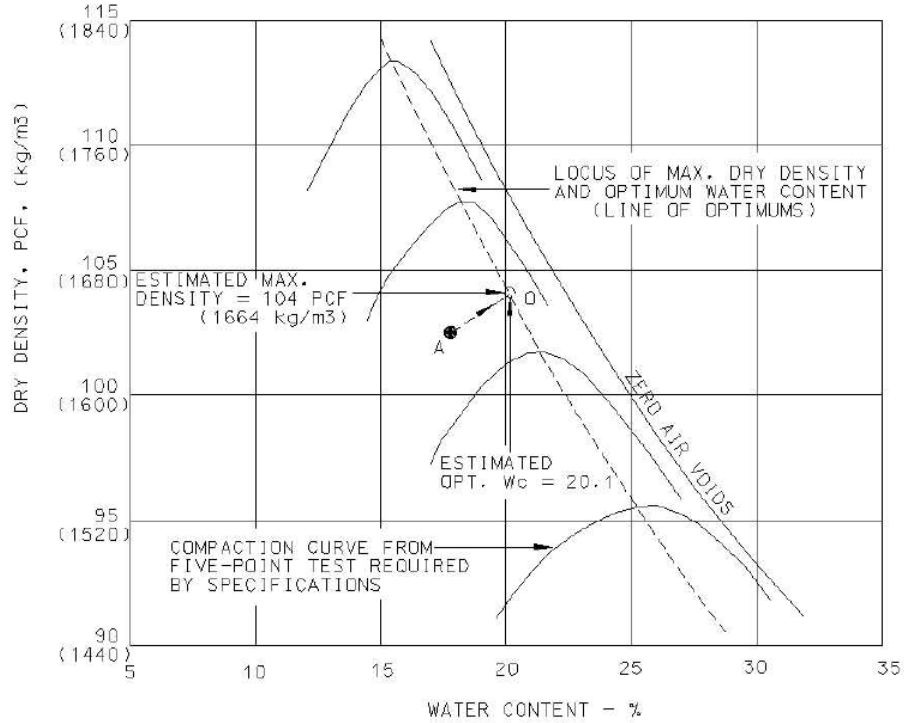
Based on the review of the CQC test data all one-point samples were not dried to the moisture requirements outlined in the P&S. Approximately 25 percent of the one-point tests were compacted at moisture contents greater than 2 percent wet of the optimum water content. Although the moisture requirement was not strictly followed based on the "final" data, it should be noted that the specifications are subjective and rely on "estimated" water contents in lieu of measured values so determination of strict compliance with the current specifications is not possible.

The CQC data available for review does not have the water content/dry density point of the one-point compaction test plotted on the family of curves as required in the P&S. The lack of this information highlights a problem with the existing P&S in regards to the one-point compaction tests. The P&S only require the Contractor to submit the one-point compaction test data on the same form as a complete five-point Proctor. The submittal does not require the Contractor to submit the data plotted on the "family of curves" or even to the reference Proctor the one-point Proctor sample was supposed to represent. The lack of this information makes it impossible to determine how the CQC or QA personnel used the one-point compaction test data for the WBV 14c.2 project using the formal documentation available. It is unlikely a true "family of curves" was used as outlined in the "Embankment" specification since the maximum dry densities and optimum water content tests on all CQC and QA field density tests are all referenced to maximum dry densities and optimum water contents of specific CQC Proctor tests, rather than adjusted values of maximum dry density and optimum water content based on "family of curves" concept. Recommendations are made later in this report to better incorporate the "family of curves" concept into the CQC and QA programs.

Although the P&S clearly provide requirements for the Contractor to follow to use the one-point compaction data with a "family of curves", there are no submittal requirements in the "Embankment" section of the P&S or in the NODCC Manual that require the Contractor to submit this information to USACE. The lack of a submittal requirement and more detailed guidance for reporting and using the one-point compaction tests data in the P&S and NODCC Manual makes it difficult to enforce the proper application of the one-point compaction requirements during construction. It is recommended that future P&S and the NODCC Manual

be modified to provide clearer guidance on how one-point compaction test data is to be used and reported by Contractors on future project.

The practice of averaging proctors further complicates the selection process for determining an appropriate maximum dry density and optimum moisture content. As shown in Figures 7-68 and 7-69 below, the procedures for determining the appropriate maximum dry density and optimum moisture content utilize existing compaction results to define a line of optimums that is used as a reference point for plotting field one and two point compaction data. These examples explain proper methods for more accurately selecting maximum dry density and optimum moisture content that is based upon behavior of the in-place soil (using the one or two point method) as opposed to selection of past compaction curve data that may introduce errors for calculating the representative percent compaction. It should be noted that samples tested for one and two point methods shall be performed on the dry side of the expected optimum moisture content.



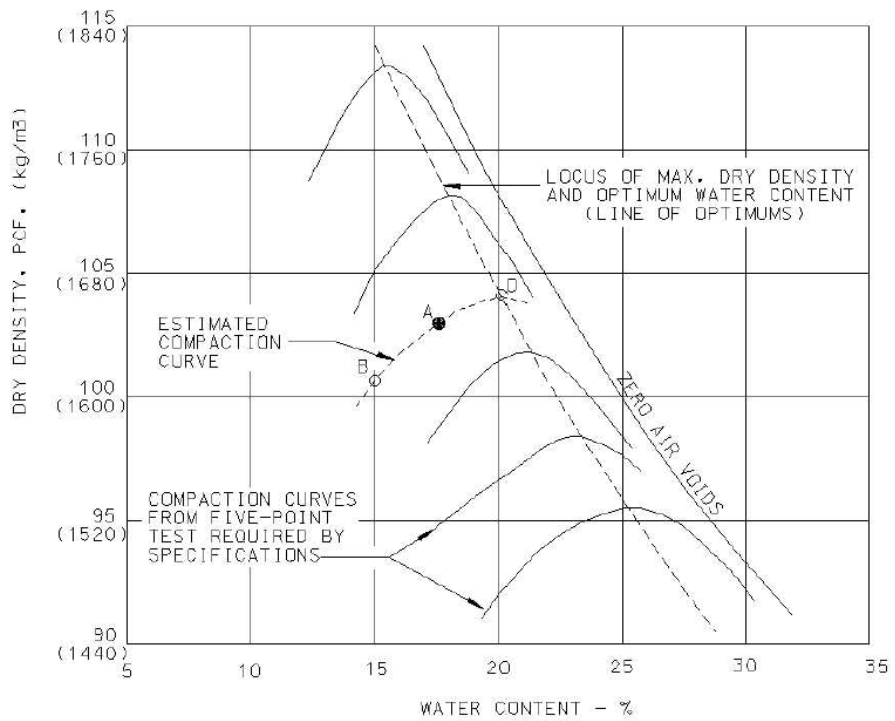
PROCEDURE:

1. Point A is the result of a one-point compaction test on material from field density test. This point must be on the dry side of optimum water content.

2. Point O is the estimated optimum water content and maximum density of the fill material based on a projection of point A approximately parallel to the adjacent compaction curves.

3. Point A must plot within 3 percent of the line of optimums.

Figure 7-68 One-Point Proctor Procedure



PROCEDURE:

1. Points A and B are results of a two-point compaction test on material from field density test. Points A and B must be on the dry side of optimum water content.

2. The estimated compaction curve based on Points A and B establishes Point O on the locus, which is the estimated maximum dry density and optimum water content of the fill material.

3. One point must plot within 3 percent of the line of optimums.

Figure 7-69 Two-Point Proctor Procedure

Selection of Appropriate Proctor

All testing discussed in this chapter should be used by CQC and QA personnel to determine the appropriate reference Proctor for verifying compaction and moisture requirements of compacted fill. The previous discussion regarding one-point Proctor tests highlights some of the difficulties in selection of appropriate reference Proctors for CQC and QA testing. As previously discussed, it is unknown and unlikely a true "family of curves" was officially developed to select reference Proctors for this project since there is no official documentation and none required by the P&S. The likely method for selection of reference Proctors was using the Atterberg Limits, percent

fines, and borrow source information to determine reference Proctors with little or no consideration of the one-point Proctors. Based on the number of Proctor tests completed for this project combined with the fact that Atterberg limits and fines contents are determined at every field density test location the use of that information alone is a reasonable approach and generally consistent with the normal standard of practice of geotechnical testing laboratories in the southeast region of the United States.

Considering the likely method of selecting reference Proctors was based on Atterberg Limit and percent fines data, the Tiger Team evaluated how well the measured data from each passing field density test location sample correlated with the Atterberg limit and percent fines data from the reference Proctor. Obviously some differences in the information are to be expected due to material and testing variability, so the Tiger Team focused on differences in Atterberg limits (plasticity index and/or liquid limit) values between the field samples and reference Proctor greater than 10 and differences in sand contents greater than 7.

The results of this evaluation indicate over 90 percent of the passing field moisture/density tests appear to have used an appropriate reference Proctor based solely on Atterberg Limits and percent fines data. About 9.3 percent (104 out of 1121) of the passing field moisture/density test results apparently used an incorrect reference Proctor based on the Atterberg Limit and percent fines data. The causes of these potential errors are unknown and cannot readily be determined with the information available. Possible causes of these potential errors include: clerical errors (recording incorrect value in field or lab), incorrect borrow source (field technician thought material came from a different source and set of Proctors), sample preparation and testing errors, and intentional selection of reference Proctor by CQC personnel to pass an otherwise failing test. Whether these are the causes of the potential improper selection of the tests identified on the WBV 14c.2 project is unknown and cannot be determined with any degree of confidence after-the-fact without additional corroborating documentation.

In order to evaluate the impact and affect on the as-built levee of the 9.3 percent of field moisture/density tests that may have used the incorrect reference Proctor an analysis was made to select “new” reference Proctors for each of those tests based solely on the Atterberg Limit data.

This analysis was completed by using engineering judgement for selection of the "new" reference Proctor. It is likely that other engineers may make different evaluations and that should be considered when reviewing this analysis. The results of this analysis are presented in Table 7-24 at the end of this chapter. The results of this exercise are summarized in the table below:

Table 7-25 Summary of 104 CQC Moisture/Density Test Results Based on "New" Reference Proctors

	Wet Density γ_T (pcf)	Dry Density γ_d (pcf)	Moisture Content (%)	% Compaction		Difference Between Optimum and Measured Water Content	
				"Reported"	"Corrected"	"Reported"	"Corrected"
Maximum	125.7	104.3	38.9	104.7	108.5	5.0	9.4
Minimum	103.4	77.0	18.7	90.1	85.7	-3.0	-4.8
Average	115.3	91.0	26.8	97.5	97.2	1.4	1.8

Review of these 104 tests indicates 32.8% had a percent compaction greater than 100 percent, 65.4% had a percent compaction greater than 95 percent, and 7.7% had a percent compaction less than 91 percent. Using the corrected reference Proctors, only 3 of the 104 tests have a percent compaction less than 90 percent with an average percent compaction of 88.2 percent. In terms of the total number of "passing" tests currently reported, this would be 3 out of 1121 tests or 0.3 percent.

The corrected reference Proctor would result in 23 of the 104 tests (22.1 percent) being out of compliance with the allowable moisture tolerances. In relation to the total number of passing tests currently reported, this would be 23 out of 1121 or 2.1 percent. The tables below summarize the impacts of the "corrected" 18 tests wet and 5 tests dry of moisture requirements.

	Table 7-26 Summary of 18 CQC Moisture/Density Test Results Wet of Optimum Moisture Requirements Based on "New" Reference Proctors				
	Moisture Content (%)	% Compaction		Difference Between Optimum and Measured Water Content	
		"Reported"	"Corrected"	"Reported"	"Corrected"
Maximum	38.9	102.7	102.9	5.0	9.4
Minimum	24.1	90.1	88.4	-2.3	5.1
Average	30.2	98.4	94.6	2.6	6.5

	Table 7-27 Summary of 5 CQC Moisture/Density Test Results Dry of Optimum Moisture Requirements Based on "New" Optimum Water Content				
	Moisture Content (%)	% Compaction		Difference Between Optimum and Measured Water Content	
		"Reported"	"Corrected"	"Reported"	"Corrected"
Maximum	27.3	103.4	108.5	3.4	-3.5
Minimum	18.7	96.9	100.5	-2.8	-4.8
Average	22.4	99.9	103.4	-0.5	-4.2

Review of these 23 tests indicates 34.8% had a percent compaction greater than 100 percent, 47.8% had a percent compaction greater than 95 percent, and 13.0% had a percent compaction less than 91 percent. The three tests below 91 percent compaction were also less than 90 percent compaction with a minimum percent compaction of 88.4 percent. The data indicates that although 23 field moisture/density tests would be out of compliance with the moisture requirements for the project if a more correct reference Proctor was selected the impact to the degree of compaction across the WBV 14c.2 project would not be significant.

Assessment of Corrected Moisture/Density Tests Wet of Moisture Requirements

As discussed in preceding sections of this chapter, the analyses completed by the Tiger Team CQC materials testing reviewers identified as many as 39 field moisture/density tests that may have been compacted "wet" of the moisture tolerance in the specifications. These analyses considered 1) corrections to the selected maximum dry density and optimum water content based on the Tiger Teams assessment of the plotted Proctor curves and 2) assignment of new reference Proctors based on the Tiger Teams comparison of Atterberg Limit test data from the in-place density tests and the Proctor samples. These analyses indicated that, when compacted "wet" of the moisture tolerance, the average percent compaction was about 94.5 percent, which is less than the 96.9 percent average for all CQC tests. Laboratory test data from the design verification borings, presented in Chapter 9, was analyzed to develop a relationship between liquidity index and undrained shear strength of the compacted levee fill. The results of this analysis are presented on Figure 7-68 as a plot of liquidity index versus cohesion. Lines marking the lower bound cohesion from the design verification borings and the design shear strength of the levee fill (400 psf) are included on Figure 7-68 for reference. This analysis indicates that the compacted fill will exhibit a cohesion of 400 psf or greater for liquidity index values less than 0.42. The maximum liquidity index is 0.28 for those moisture/density tests that may have been compacted "wet" of the specification tolerance. The lower bound cohesion line shown on Figure 7-68 shows that, for a liquidity index of 0.28, the shear strength would be about 675 psf. Based on this evaluation, it is the opinion of the Tiger Team reviewers that those samples compacted wet of the specification tolerance have shear strengths greater than the 400 psf value used in design.

Summary of Findings Based on CQC/QA Data Review

It is the opinion of Tiger Team representatives familiar with materials testing in the region that the CQC and QA materials testing has been completed on the WBV 14c.2 project following typical regional industry standards. Review of the CQC and QA testing data provided to the Tiger Team indicates that the materials quality control has been completed in general accordance with the P&S and NODCC Manual. Errors have been identified from several sources that based

on the evaluations completed for this investigation could result in non-compliance of a maximum of 4.2 percent of all CQC tests for moisture requirements and 0.9 percent of all CQC tests for density requirements. However, it is the opinion of this Tiger Team that these errors have little overall impact on this project since the small percentage of potentially failing tests does not raise concern about levee performance and does not indicate general non-compliance of the Contractor with respect to compaction and moisture control of the completed embankment. No evidence was found that these possible errors were the result of falsification of field/laboratory data on the part of the Contractor or USACE QA personnel.

Recommendations Based on CQC/QA Data Review

The following recommendations are included to mitigate the potential for similar errors on future projects.

- Improved documentation of borrow source locations are needed on applicable field/lab forms. This could be accomplished by properly filling out the "Material Source" lines with the exact borrow source location rather than generic terms such as "Borrow Pit". Additionally, clarification of borrow source location (i.e. such as excavation elevation from pit, more detailed pit location, etc.) could be accomplished by better use of the "Remarks" section of the standard reporting forms.

- QC and QA laboratories should not report Proctor curves with obvious incorrect shapes (i.e. S-shaped curves, etc.). Such shapes should quickly be identified and any errors in development of incorrectly shaped Proctor curves identified and corrected. Where required due to difficulty in plotting some curves, the laboratory should plot "points only" for interpretation of curve fitting by others while still providing their interpretation of maximum dry density and optimum water content.

- The maximum dry density and optimum water content reported should be obtained directly from the graph of the smooth Proctor curve as dictated by ASTM. There should be no discrepancy between the reported values and the smooth Proctor graph values.

Discrepancies may occur because QC/QA laboratories initially use their own proprietary software to develop the Proctor curves for determination of the maximum dry density and optimum water content. Later the laboratories input the data on the official USACE forms. The reported maximum dry density and optimum water content should match the official QC and QA forms that are part of the permanent record for the project. The use of the proprietary software by the QC/QA laboratories could be approved by the CEMVN Quality Assurance Branch provided they are satisfactory for official reporting and provide all information requested on the official USACE forms.

- As a matter of practice, QC and QA personnel should be trained to conduct a more thorough review of all tests with a percent compaction greater than 102 percent for potential errors in testing or to determine whether the appropriate material source and reference Proctor has been selected.

- One-point Proctor tests should be compacted at the moisture content ranges specified in the P&S.

- The formal use and presentation of a true "family of Proctor curves" should be used for levee construction. The current NODCC Manual and P&S require the use of a family of Proctor curves; however, there are no formal submittals of the family of curves required. The one-point Proctors should be used in conjunction with the family of curves that is based on individual proctor curves and not based on averaged values. The attached document discusses how the one-point Proctors should be used in conjunction with the family of Proctor curves.

- Eliminate the use of averaging two separate Proctor curves for determination of maximum dry density and optimum water content. Contractors are inconsistent with how they average the data and the effect of the averaging has a negative impact on the use of a true family of Proctor curves and the one-point Proctor data.

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear $w_{Meas} - w_{Opt}$	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC $w_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone $w_{Meas} - w_{Opt}$	Difference Within 3%
2653	8/2/2010	6	Pass	1	181+43	FS	6	6.3			2609	95.1	26.4	64	23	41	98.2	26.2	93.7	118.2	120.6	95.9	25.8	100.8	-0.6		59	24	35	CH	2.7	97.3		2.9	119.6	95.1	25.8	100.0	1.0	-0.6	YES
2657	8/2/2010	7	Pass	1	175+00	FS	15	5.7			2609	95.1	26.4	64	23	41	98.2				116.4	92.8	25.4	97.6	-1.0		59	24	35	CH	3.1	96.9		2.9							
2690	8/6/2010	16	Pass	1	154+92.5	PS	-77.5	4.8			2609	95.1	26.4	64	23	41	98.2	30.1	90.5	117.7	116.9	90.1	29.7	94.7	3.3		63	29	34	CH	4.0	96.0		5.4	117.8	90.9	29.6	95.5	0.9	3.2	YES
2690	8/6/2010	11	Pass	1	180+73.1	PS	-86.9	5.1			2609	95.1	26.4	64	23	41	98.2	26.2	95.6	120.7	121.9	96.4	26.4	101.4	0.0		57	25	32	CH	2.3	97.7		2.1							
2690	8/6/2010	21	Pass	1	129+97.3	PS	-82.5	4.9			2609	95.1	26.4	64	23	41	98.2	25.4	96.0	120.4	122.1	96.4	26.7	101.4	0.3		53	25	28	CH	2.4	97.6		3.1							
2690	8/6/2010	17	Pass	1	149+86	PS	-76.4	4.9			2609	95.1	26.4	64	23	41	98.2				123.6	99.6	24.1	104.7	-2.3		58	28	30	CH	2.4	97.6		3.8							
2690	8/6/2010	20	Pass	1	134+96.2	PS	-80.7	4.6			2609	95.1	26.4	64	23	41	98.2				122.6	98.1	25.0	103.2	-1.4		64	32	32	CH	3.9	96.1		5.1							
2690	8/6/2010	15	Pass	1	159+93.8	PS	-77.3	4.9			2609	95.1	26.4	64	23	41	98.2				121.8	98.7	23.4	103.8	-3.0		59	29	30	CH	3.4	96.6		3.9							
2690	8/6/2010	18	Pass	1	145+01	PS	-78.7	4.9			2609	95.1	26.4	64	23	41	98.2				121.7	96.6	26.0	101.6	-0.4		53	23	35	CH	4.4	95.6		5.0							
2690	8/6/2010	23	Pass	1	120+99.2	PS	-79.6	5.4			2609	95.1	26.4	64	23	41	98.2				121.6	97.9	24.2	102.9	-2.2		48	27	21	CH	3.0	97.0		2.9							
2690	8/6/2010	19	Pass	1	139+99.4	PS	-78.9	4.8			2609	95.1	26.4	64	23	41	98.2				121.5	98.1	23.9	103.2	-2.5		60	29	31	CH	2.0	98.0		6.5							
2690	8/6/2010	9	Pass	1	168+84.1	FS	13.8	5.9			2609	95.1	26.4	64	23	41	98.2				119.9	92.8	29.2	97.6	2.8		61	25	36	CH	2.6	97.4		3.8							
2690	8/6/2010	14	Fail	1	164+82.8	PS	-83.3	5.0		4316+577	2609	95.1	26.4	64	23	41	98.2				119.8	98.9	21.1	104.0	-5.3		61	26	35	CH	7.7	92.3		4.2							
2690	8/6/2010	13	Pass	1	169+76.5	PS	-83.3	4.9			2609	95.1	26.4	64	23	41	98.2				118.7	94.9	25.1	99.8	-1.3		61	24	37	CH	8.1	91.9		4.5							
2690	8/6/2010	12	Pass	1	175+05	PS	-80.5	4.8			2609	95.1	26.4	64	23	41	98.2				117.9	94.9	24.2	99.8	-2.2		67	27	40	CH	3.7	96.3		4.3							
2690	8/6/2010	22	Fail	1	124+98.7	PS	-80	5.0		4171+497	2609	95.1	26.4	64	23	41	98.2				117.1	87.5	33.8	92.0	7.4		74	36	38	CH	3.4	96.6		3.1							
2690	8/6/2010	10	Pass	1	161+04.7	FS	27.9	4.9			2609	95.1	26.4	64	23	41	98.2				115.6	93.2	24.1	98.0	-2.3		38	24	14	CL	11.8	88.2		2.5							
2783	8/26/2010	25	Pass	1	156+60	FS	15	5.8			2609	95.1	26.4	64	23	41	98.2				115.6	90.7	27.4	95.4	1.0		62	25	37	CH	6.2	93.8		2.9							
2783	8/26/2010	26	Pass	1	151+30	FS	20	5.2			2609	95.1	26.4	64	23	41	98.2				113.6	87.3	30.2	91.8	3.8		66	25	41	CH	2.9	97.1		3.0							
2796	8/27/2010	27	Fail	1	145+08	FS	21	5.0		2834+32	2653	99.7	23.1	59	24	35	96.3	26.0	96.0	120.9	116.6	90.5	28.8	90.8	5.7		61	18	43	CH	3.3	96.7		2.1	118.4	91.9	28.8	92.2	1.8	5.7	YES
2796	8/27/2010	28	Fail	1	139+03	FS	22	4.8		2868+41	2653	99.7	23.1	59	24	35	96.3				115.1	88.0	30.8	88.3	7.7		52	17	35	CH	4.2	95.8		2.4							
2830	9/3/2010	29	Pass	1	119+30	PS	-4	4.6			2609	95.1	26.4	64	23	41	98.2				112.9	87.6	28.9	92.1	2.5		57	19	38	CH	2.4	97.6		2.7							
2830	9/3/2010	30	Fail	2	119+65	PS	-2	5.7		2834+31	2653	99.7	23.1	59	24	35	96.3				112.2	89.0	26.1	89.3	3.0		62	19	43	CH	6.3	93.7		3.5							
2834	9/5/2010	32	Pass	1	145+08	FS	21	5.0	2796+27		2653	99.7	23.1	59	24	35	96.3	23.5	95.9	118.5	113.5	93.6	21.2	93.9	-1.9		61	19	42	CH	3.5	96.5		3.9	114.8	94.7	21.2	95.0	1.3	-1.9	YES
2834	9/5/2010	31	Pass	2	119+49	PS	-6.1	5.3	2830+30		2653	99.7	23.1	59	24	35	96.3				116.9	91.7	27.4	92.1	4.3		67	22	45	CH	6.1	93.9		3.0							
2834	9/5/2010	33	Fail	1	139+03	FS	22	4.8	2796-28	2868+41	2653	99.7	23.1	59	24	35	96.3				106.8	84.9	25.8	85.2	2.7		62	23	39	CH	3.1	96.9		4.3							
2836	9/6/2010	34	Pass	1	110+76	PS	-11	5.2			2609	95.1	26.4	64	23	41	98.2				115.9	88.3	31.3	92.8	4.9		68	22	46	CH	3.3	96.7		2.6							
2836	9/6/2010	35	Pass	3	119+44	FS	1	6.0			2609	95.1	26.4	64	23	41	98.2				113.0	88.5	27.7	93.1	1.3		63	23	40	CH	4.8	95.2		2.9							
2854	9/8/2010	37	Fail	4	119+36	FS	12	6.8		2928+48	2609	95.1	26.4	64	23	41	98.2	24.7	95.8	119.5	113.5	92.1	23.2	96.8	-3.2		65	22	43	CH	4.0	96.0		4.0	115.1	93.5	23.2	98.3	1.6	-3.2	YES
2854	9/8/2010	36	Pass	2	110+96	FS	15	5.6			2609	95.1	26.4	64	23	41	98.2				118.1	93.4	26.5	98.2	0.1		64	25	40	CH	4.6	95.4		4.4							
2854	9/8/2010	39	Fail	1	163+28	FS	21	5.6		2935+55	2653	99.7	23.1	59	24	35	96.3				116.3	90.5	28.5	90.8	5.4		59	24	35	CH	3.4	96.6		4.0							
2854	9/8/2010	38	Pass	1	121+99	FS	5	5.0			2609	95.1	26.4	64	23	41	98.2				115.7	90.0	28.6	94.6	2.2		63	25	38	CH	3.2	96.8		4.2							
2868	9/9/2010	43	Pass	1	129+99	FS	17.6	5.5			2653	99.7	23.1	59	24	35	96.3	26.3	95.0	120.0	117.6	93.7	25.5	94.0	2.4		61	22	39	CH	5.5	94.5		3.9							
2868	9/9/2010	42	Pass	1	135+05	FS	16.4	5.6			2653	99.7	23.1	59	24	35	96.3				119.0	95.0	25.2	95.3	2.1		57	22	35	CH	4.3	95.7		2.4							
2868	9/9/2010	45	Pass	2	181+43	FS	12	6.5			2653	99.7	23.1	59	24	35	96.3				118.0	92.1	28.1	92.4	5.0		64	25	39	CH	1.5	98.5		3.8							
2868	9/9/2010	44	Fail	1	124+97	FS	18.8	5.5		2926+50	2653	99.7	23.1	59	24	35	96.3				113.4	87.8	29.1	88.1	6.0		64	26	38	CH	4.0	96.0		3.3							
2868	9/9/2010	46	Fail	2	175+01	FS	25.4	5.9		2942+59	2653	99.7	23.1	59	24	35	96.3				112.6	87.8	28.3	88.1	5.2		60	24	36	CH	2.7	97.3		3.2							
2868	9/9/2010	41	Fail	1	139+03	FS	22	4.8	2868-33	2868+41	2653	99.7	23.1	59	24	35	96.3				110.0	89.4	23.1	89.7	-0.1		60	23	37	CH	3.6	96.4		2.3							
2926	9/15/2010	50	Pass	1	124+97	FS	18.8	5.5	2868+44		2653	99.7	23.1	59	24	35	96.3				115.5	92.5	24.8	92.8	1.7		64	22	42	CH	3.2	96.8		4.4							
2926	9/15/2010	51	Pass	5	119+33	CL	-3.7	7.8			2854	95.9	23.9	62	24	40	97.0				115.4	91.0	26.8	94.9	2.9		69	24	45	CH	3.2	96.8		4.5							
2926	9/15/2010	52	Fail	2	175+01	FS	25.4	5.9	2868-46	2942+59	2854	95.9	23.9	62	24	40	97.0				112.8	86.4	30.5	90.1	6.6		63	24	39	CH	2.9	97.1		3.8							
2928	9/14/2010	48	Pass	4	119+36	FS	12	6.8	2854+37		2609	95.1	26.4	64	23	41	98.2	26.8	94.0	119.2	115.0	92.3	24.6	97.1	-1.8		68	23	45	CH	7.6	92.4		3.2	112.1	90.0	24.6	94.6	2.9	-1.8	YES
2928	9/14/2010	47	Pass	1	139+03	FS	22	4.8	2868+41		2653	99.7	23.1	59	24	35	96.3				119.1	96.6	23.3	96.9	0.2		61	24	37	CH	3.2	96.8		2.9							
2928	9/14/2010	49	Pass	3	110+68	FS	1	6.9			2854	95.9	23.9	62	24	40	97.0				117.8	95.2	23.7	99.3	-0.2		64	22	42	CH	4.1	95.9		5.1							
2935	9/16/2010	53	Pass	4	110+91	FS	23.5	6.8			2854	95.9	23.9	62	24	40	97.0	24.0	97.0	120.2	110.1	89.6	22.9	93.4	-1.0		61	21	40	CH	3.5	96.5		4.1							
2935	9/16/2010	55	Pass	1	163+28	FS	21	5.9	2854+39		2653	99.7	23.1	59	24	35	96.3				117.4	91.6	28.1	91.9	5.0		64	24	40	CH	4.5	95.5		4.2							
2935	9/16/2010	56	Fail	2	175+01	FS	25.4	5.9	2926-52	2942+59	2854	95.9	23.9	62	24	40	97.0				116.5	89.1	30.8	92.9	6.9		63	25	38	CH	2.9	97.1		3.8							
2935	9/16/2010	54	Fail	6	119+13	CL	2.5	8.3		2942+61	2854	95.9	23.9	62	24	40	97.0				107.0	82.9	29.7	86.0	5.8		73	27	46	CH	2.5	97.5		5.3							
2942	9/17/2010	59	Pass	2	175+01	FS	25.4	5.7	2935+56		2854	95.9	23.9	62	24	40	97.0	24.8	95.0	118.5	115.9	90.0	28.8	93.8	4.9		64	21	44	CH	3.2	96.8		5.5	115.7	90.0	28.8	94.5	0.2	2.4	YES
2942	9/17/2010	58	Pass	5	110+81	CL	-3.2	8.2			2854	95.9	23.9	62	24	40	97.0				116.3	93.8	24.0	97.8	0.1		65	18	47	CH	3.4	96.6		4.0							
2942	9/17/2010	60	Pass	2	170+03	FS	28.6	5.8			2854	95.9	23.9	62	24	40	97.0				116.1	90.6	28.1	94.5	4.2		63	21	42	CH	2.6	97.4		4.7							
2942	9/17/2010	61	Pass	6	119+13	CL	2.5	8.3	2942+54		2854	95.9	23.9	62	24	40	97.0				114.9	92.9	23.7	96.9	-0.2		58	20	38	CH	4.4	95.6		3.7							
2942	9/17/2010	62	Pass	7	119+59	PS	-8.2	10.9			2854	95.9	23.9	62	24	40	97.0				114.3	89.4	27.9	93.1	4.0		50	27	23	CH	3.7	96.3		4.1							
2968	9/18/2010	64	Pass	8	119+26	CL	2.9	12.2			2854	95.9	23.9	62	24	40	97.0	25.3	95.4	119.5	113.2	90.9	24.6	94.8	0.7		68	20	48	CH	3.2	96.8		3.8							
2968	9/18/2010	65	Pass	1	119+84	PS	-126	2.6			2854	95.9	23.9	62	24	40	97.0				118.1	92.1	28.2	96.0	4.3		74	21	53	CH	7.9	92.1		4.1							
2968	9/18/2010	63	Pass	6	110+75	FS	8.4	9.2			2854	95.9	23.9	62	24	40	97.0				107.2	87.3	22.8	90.9	-1.1		64	17	47	CH	5.8	94.2		3.6							
2970	9/20/2010	70	Pass	7	110+84	PS	-6	9.8			2854	95.9	23.9	62	24	40	97.0	25.8	94.8	119.2	112.7	90.4	24.7	94.3	0.8	DT 150	68	25	43	CH	4.7	95.3	24.7	3.4	114.0	91.4	24.7	95.3	1.1	0.8	YES

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear $w_{Meas} - w_{Opt}$	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC $w_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone $w_{Meas} - w_{Opt}$	Difference Within 3%
2970	9/20/2010	68	Pass	2	120+97	FS	20.5	5.6			2854	95.9	23.9	62	24	40	97.0				122.9	97.9	25.6	102.1	1.7	DT 150	66	23	43	CH	4.3	95.7	25.6	3.5							
2970	9/20/2010	66	Pass	9	119+47	CL	3.7	13.5			2854	95.9	23.9	62	24	40	97.0				109.9	90.8	21.0	94.7	-2.9	DT 150	65	22	43	CH	3.4	96.6	21.0	3.7							
2970	9/20/2010	67	Pass	2	119+42	PS	-104	3.7			2854	95.9	23.9	62	24	40	97.0				108.9	87.6	24.3	91.3	0.4	DT 150	69	23	46	CH	4.3	95.7	24.3	3.8							
2987	9/22/2010	75	Pass	11	119+20	CL	1.7	14.0			2854	95.9	23.9	62	24	40	97.0	21.9	94.8	115.5	116.7	94.9	23.0	99.0	-0.9	DT 150	65	21	44	CH	4.9	95.1	23.0	3.5							
2987	9/22/2010	77	Pass	2	129+99	FS	28	5.2			2854	95.9	23.9	62	24	40	97.0				121.7	95.2	27.8	99.3	3.9	DT 150	68	24	44	CH	4.5	95.5	27.8	3.1							
2987	9/22/2010	72	Pass	10	119+60	CL	3.2	13.2			2854	95.9	23.9	62	24	40	97.0				121.4	98.1	23.7	102.3	-0.2	DT 150	64	21	43	CH	11.8	88.2	23.7	3.9							
2987	9/22/2010	73	Pass	3	119+92	FS	133.9	3.4			2854	95.9	23.9	62	24	40	97.0				118.8	94.2	26.1	98.2	2.2	DT 150	73	25	48	CH	6.4	93.6	26.1	4.1							
2987	9/22/2010	76	Pass	2	125+02	FS	43	4.6			2854	95.9	23.9	62	24	40	97.0				117.5	93.3	26.0	97.3	2.1	DT 150	65	22	43	CH	5.3	94.7	26.0	4.5							
2987	9/22/2010	78	Pass	10	110+95	CL	4.5	13.0			2854	95.9	23.9	62	24	40	97.0				116.1	96.0	21.0	100.1	-2.9	DT 150	64	20	44	CH	4.3	95.7	21.0	3.1							
2987	9/22/2010	71	Pass	8	111+17	FS	14	10.4			2854	95.9	23.9	62	24	40	97.0				113.6	90.5	25.5	94.4	1.6	DT 150	62	21	41	CH	6.3	93.7	25.5	3.4							
2987	9/22/2010	74	Pass	9	110+91	CL	1.4	12.1			2854	95.9	23.9	62	24	40	97.0				111.4	90.6	22.9	94.5	-1.0	DT 150	64	21	43	CH	7.2	92.8	22.9	3.3							
3002	9/23/2010	81	Fail	1	103+06	CL	2.5	5.8		3094+106	2854	95.9	23.9	62	24	40	97.0	25.2	93.4	116.9	104.1	80.9	28.7	84.4	4.8	DT 150	89	26	63	CH	2.9	97.1	28.7	4.3	101.4	78.8	28.7	82.2	2.7	4.8	YES
3002	9/23/2010	85	Pass	12	110+93	FS	4.6	14.0			2854	95.9	23.9	62	24	40	97.0	21.7	96.8	117.8	117.9	96.2	22.5	100.3	-1.4	DT 150	63	22	41	CH	3.9	96.1	22.5	3.0							
3002	9/23/2010	82	Pass	2	135+97	FS	22	5.3			2854	95.9	23.9	62	24	40	97.0				118.2	94.1	25.6	98.1	1.7	DT 150	80	24	56	CH	3.0	97.0	25.6	4.0							
3002	9/23/2010	79	Pass	11	110+56	CL	0	3.6			2854	95.9	23.9	62	24	40	97.0				116.1	95.5	21.6	99.6	-2.3	DT 150	63	23	40	CH	2.1	97.9	21.6	3.1							
3002	9/23/2010	80	Fail	1	107+05	FS	8.8	5.0		3028+87	2854	95.9	23.9	62	24	40	97.0				113.0	86.5	30.6	90.2	6.7	DT 150	84	28	56	CH	8.1	91.9	30.6	3.9							
3002	9/23/2010	86	Fail	1	107+05	FS	8.8	5.0	3002-80	3028+87	2854	95.9	23.9	62	24	40	97.0				112.6	87.0	29.4	90.7	5.5	DT 150	82	27	55	CH	2.8	97.2	29.4	3.9							
3002	9/23/2010	83	Pass	2	140+02	FS	26.5	4.7			2854	95.9	23.9	62	24	40	97.0				110.3	90.6	21.7	94.5	-2.2	DT 150	64	16	48	CH	2.9	97.1	21.7	3.1							
3002	9/23/2010	84	Pass	3	110+94	FS	89	4.9			2854	95.9	23.9	62	24	40	97.0				107.5	87.5	22.9	91.2	-1.0	DT 150	62	23	39	CH	3.6	96.4	22.9	3.1							
3028	9/28/2010	90	Pass	2	149+98	FS	31.9	4.9			2854	95.9	23.9	62	24	40	97.0	26.8	93.2	118.2	118.2	92.9	27.3	96.9	3.4	DT 150	75	25	50	CH	3.6	96.4	27.3	4.2	115.0	90.3	27.3	94.2	2.8	3.4	YES
3028	9/28/2010	89	Pass	1	143+97	FS	8.3	5.4			2854	95.9	23.9	62	24	40	97.0				119.0	93.0	28.0	97.0	4.1	DT 150	65	24	41	CH	2.6	97.4	28.0	3.4							
3028	9/28/2010	88	Pass	1	97+57	FS	14	4.6			2854	95.9	23.9	62	24	40	97.0				115.1	95.0	21.1	99.1	-2.8	DT 150	60	21	39	CH	4.7	95.3	21.1	3.5							
3028	9/28/2010	87	Pass	1	107+05	FS	8.8	5.0	3002+86		2854	95.9	23.9	62	24	40	97.0				114.4	91.4	25.2	95.3	1.3	DT 150	69	23	46	CH	5.4	94.6	25.2	4.3							
3034	9/29/2010	95	Pass	1	128+03	FS	76.8	4.3			2854	95.9	23.9	62	24	40	97.0				118.8	92.8	28.0	96.8	4.1	DT 150	76	31	45	CH	4.2	95.8	28.0	4.9							
3034	9/29/2010	94	Pass	1	126+23	FS	78	4.1			2854	95.9	23.9	62	24	40	97.0				117.6	95.2	23.5	99.3	-0.4	DT 150	70	26	44	CH	2.9	97.1	23.5	4.0							
3034	9/29/2010	93	Pass	1	121+92	FS	78	4.7			2854	95.9	23.9	62	24	40	97.0				114.1	93.7	21.8	97.7	-2.1	DT 150	68	24	44	CH	4.3	95.7	21.8	4.0							
3059	9/30/2010	96	Pass	1	93+17	FS	15.6	4.5			2854	95.9	23.9	62	24	40	97.0	22.5	98.0	120.0	117.0	96.1	21.8	100.2	-2.1	DT 150	61	23	38	CH	3.5	96.5	21.8	3.5							
3059	9/30/2010	98	Pass	2	154+88	FS	37	5.5			2854	95.9	23.9	62	24	40	97.0				112.3	91.5	22.7	95.4	-1.2	DT 150	63	24	39	CH	4.7	95.3	22.7	4.0							
3059	9/30/2010	97	Fail	1	103+06	CL	2.5	5.8	3002-81	3094+106	2854	95.9	23.9	62	24	40	97.0				108.4	84.4	28.4	88.0	4.5	DT 150	86	29	57	CH	4.2	95.8	28.4	5.0							
3066	10/1/2010	100	Pass	3	121+99	FS	42.5	6.7			2854	95.9	23.9	62	24	40	97.0				117.3	93.5	25.4	97.5	1.5	DT 150	70	25	45	CH	4.3	95.7	25.4	3.6							
3094	10/2/2010	103	Pass	2	131+00	FS	68	5.0			2854	95.9	23.9	62	24	40	97.0	23.6	95.5	118.0	113.3	92.4	22.6	96.4	-1.3	DT 150	64	21	43	CH	3.6	96.4	22.6	3.3	110.7	90.3	22.6	94.2	2.3	-1.3	YES
3094	10/2/2010	107	Pass	1	88+02	FS	36	3.1			2854	95.9	23.9	62	24	40	97.0				120.9	97.7	23.7	101.9	-0.2	DT 150	65	22	43	CH	3.4	96.6	23.7	3.4							
3094	10/2/2010	102	Pass	2	128+00	FS	63	5.3			2854	95.9	23.9	62	24	40	97.0				111.1	88.8	25.1	92.6	1.2	DT 150	68	23	45	CH	3.7	96.3	25.1	3.2							
3094	10/2/2010	104	Pass	1	133+05	FS	70	4.2			2854	95.9	23.9	62	24	40	97.0				109.9	87.5	25.6	91.2	1.7	DT 150	66	24	42	CH	3.2	96.8	25.6	3.3							
3094	10/2/2010	106	Pass	1	103+06	CL	2.5	5.8	3002+81		2611	87.9	30.6	78	28	50	97.5				109.3	82.1	33.1	93.4	2.5	DT 150	91	31	60	CH	4.4	95.6	33.1	4.9							
3095	10/3/2010	110	Pass	2	110+37	PS	-147	1.6			2854	95.9	23.9	62	24	40	97.0	22.8	95.2	116.9	113.9	91.3	24.7	95.2	0.8	DT 150	67	23	44	CH	4.0	96.0	24.7	3.5							
3095	10/3/2010	109	Pass	1	110+93	PS	-160	0.1			2854	95.9	23.9	62	24	40	97.0				115.3	91.4	26.2	95.3	2.3	DT 150	77	24	53	CH	4.3	95.7	26.2	3.4							
3097	10/4/2010	113	Pass	1	82+58	FS	35.5	3.2			2854	95.9	23.9	62	24	40	97.0				118.0	91.8	28.6	95.7	4.7	DT 150	67	28	39	CH	3.1	96.9	28.6	3.6							
3097	10/4/2010	114	Pass	4	110+50	PS	-130	3.3			2854	95.9	23.9	62	24	40	97.0				117.6	95.1	23.6	99.2	-0.3	DT 150	65	23	42	CH	4.2	95.8	23.6	3.1							
3097	10/4/2010	112	Pass	3	110+69	PS	-155	1.9			2854	95.9	23.9	62	24	40	97.0				110.9	89.6	23.8	93.4	-0.1	DT 150	66	23	43	CH	5.3	94.7	23.8	3.3							
3131	10/7/2010	122	Pass	2	96+00	FS	18	5.1			2854	95.9	23.9	62	24	40	97.0	25.9	92.7	116.7	119.3	93.3	27.8	97.3	3.9	DT 150	71	24	47	CH	3.3	96.7	27.8	4.0	116.3	91.0	27.8	94.9	2.6	3.9	YES
3131	10/7/2010	121	Pass	2	105+96	FS	37	4.1			2854	95.9	23.9	62	24	40	97.0				117.0	92.5	26.5	96.5	2.6	DT 150	68	25	43	CH	4.6	95.4	26.5	3.4							
3177	10/13/2010	137	Pass	1	63+00	FS	22	4.2			2854	95.9	23.9	62	24	40	97.0				121.5	96.7	25.7	100.8	1.8	DT 150	66	23	43	CH	4.1	95.9	25.7	4.3							
3177	10/13/2010	134	Pass	1	77+94	FS	22	4.4			2854	95.9	23.9	62	24	40	97.0				115.8	90.0	28.6	93.8	4.7	DT 150	79	27	52	CH	3.7	96.3	28.6	3.7							
3177	10/13/2010	135	Pass	1	72+98	FS	21	4.5			2854	95.9	23.9	62	24	40	97.0				115.6	93.7	23.4	97.7	-0.5	DT 150	66	22	44	CH	4.1	95.9	23.4	3.4							
3177	10/13/2010	136	Pass	1	67+92	FS	46	3.0			2854	95.9	23.9	62	24	40	97.0				106.4	86.4	23.1	90.1	-0.8	DT 150	63	21	42	CH	6.7	93.3	23.1	4.1							
3183	10/14/2010	138	Pass	2	159+45	FS	54	4.5			2854	95.9	23.9	62	24	40	97.0	24.7	95.4	119.0	119.6	93.7	27.6	97.7	3.7	DT 150	68	25	43	CH	4.7	95.3	27.6	3.7							
3200	10/16/2010	150	Pass	2	164+53	FS	46	4.5			2854	95.9	23.9	62	24	40	97.0	25.1	92.1	115.3	112.9	88.3	27.8	92.1	3.9	DT 150	85	28	57	CH	2.3	97.7	27.8	3.9	115.8	90.6	27.8	94.5	2.5	3.9	YES
3200	10/16/2010	146	Pass	1	55+69	FS	57	4.0			2854	95.9	23.9	62	24	40	97.0				119.1	94.9	25.5	99.0	1.6	DT 150	66	23	43	CH	7.0	93.0	25.5	2.9							
3200	10/16/2010	147	Pass	1	52+23	FS	4	5.1			2854	95.9	23.9	62	24	40	97.0				118.3	95.1	24.4	99.2	0.5	DT 150	54	21	33	CH	5.1	94.9	24.4	2.2							
3200	10/16/2010	148	Pass	1	48+62	FS	14	4.1			2854	95.9	23.9	62	24	40	97.0				115.3	90.6	27.2	94.5	3.3	DT 150	62	23	39	CH	4.1	95.9	27.2	2.7							
3200	10/16/2010	149	Pass	1	42+43	FS	18	4.5			2854	95.9	23.9	62	24	40	97.0				112.1	87.1	28.7	90.8	4.8	DT 150	71	25	46	CH	1.5	98.5	28.7	2.8							
3202	10/17/2010	153	Pass	1	38+02	FS	8	4.6			2854	95.9	23.9	62	24	40	97.0				111.2	87.8	26.7	91.6	2.8	DT 150	73	25	48	CH	3.1	96.9	26.7	4.2							
3202	10/17/2010	154	Pass	1	32+16	FS	10	4.3			2854	95.9	23.9	62	24	40	97.0				110.6	87.7	26.1	91.4	2.2	DT 150	73	24	49	CH	2.4	97.6	26.1	4.0							
3218	10/19/2010	160	Pass	2	81+04	FS	25	5.0			3094	90.1	24.0	78	26	52	96.8	25.1	96.9	121.2	105.3	84.4	24.7	93.7	0.7	DT 150	60	22	38	CH	6.5	93.5	24.7	3.0							
3218	10/19/2010	159	Pass	2	71+99	FS	36	4.8			2854	95.9	23.9	62	24	40	97.0				115.9	95.5	21.4	99.6	-2.5	DT 150	52	20	32	CH	4.2	95.8	21.4	2.1							
3218	10/19/2010	161	Pass	1	28+07	FS	34	4.1			2854	95.9	23.9	62	24	40	97.0				112.7	89.4	26.0	93.2	2.1	DT 150	68	23	45	CH	2.5	97.5	26.0	3.2							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w $_{Meas}$	% Compaction Nuclear	Nuclear w $_{Meas}$ - w_{Opt}	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC w $_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w $_{Meas}$	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w $_{Meas}$ - w $_{Opt}$	Difference Within 3%
3218	10/19/2010	158	Pass	2	77+07	FS	16.8	5.6			3094	90.1	24.0	78	26	52	96.8				104.5	81.9	27.6	90.9	3.6	DT 150	74	24	50	CH	2.3	97.7	27.6	3.7							
3236	10/21/2010	164	Pass	1	22+54	FS	30	3.0			2653	99.7	23.1	59	24	35	96.3				119.4	99.4	20.1	99.7	-3.0	DT 150	58	22	36	CH	4.6	95.4	20.1	4.9							
3236	10/21/2010	165	Pass	1	17+89	FS	22	4.0			2854	95.9	23.9	62	24	40	97.0				114.7	89.3	28.5	93.1	4.6	DT 150	78	28	50	CH	3.4	96.6	28.5	5.8							
3266	10/26/2010	169	Pass	1	174+35	FS	65	4.2			3179	100.9	19.6	44	19	25	97.1	19.3	94.2	112.4	117.5	99.0	18.7	98.1	-0.9	DT 150	62	21	41	CH	3.7	96.3	18.7	2.8	117.7	99.2	18.7	98.3	0.2	-0.9	YES
3266	10/26/2010	173	Pass	2	86+05	FS	24	5.1			3179	100.9	19.6	44	19	25	97.1				121.0	98.9	22.4	98.0	2.8	DT 150	61	25	36	CH	6.1	93.9	22.4	3.5							
3266	10/26/2010	170	Pass	1	169+78	FS	82	4.5			3179	100.9	19.6	44	19	25	97.1				119.6	97.3	22.9	96.4	3.3	DT 150	68	23	45	CH	6.2	93.8	22.9	3.3							
3266	10/26/2010	175	Pass	2	61+98	FS	14	5.5			3179	100.9	19.6	44	19	25	97.1				118.5	96.5	22.8	95.6	3.2	DT 150	56	22	34	CH	4.0	96.0	22.8	2.8							
3266	10/26/2010	168	Pass	1	179+04	FS	67	3.8			3179	100.9	19.6	44	19	25	97.1				118.3	97.0	21.9	96.1	2.3	DT 150	59	22	37	CH	4.0	96.0	21.9	3.2							
3266	10/26/2010	174	Pass	2	66+64	FS	26	4.9			3179	100.9	19.6	44	19	25	97.1				115.9	96.2	20.5	95.3	0.9	DT 150	56	22	34	CH	7.1	92.9	20.5	2.6							
3266	10/26/2010	171	Pass	2	101+97	FS	26	4.7			2854	95.9	23.9	62	24	40	97.0				115.7	92.3	25.3	96.2	1.4	DT 150	64	23	41	CH	3.4	96.6	25.3	2.9							
3266	10/26/2010	172	Pass	2	91+01	FS	28	4.4			3183	87.5	27.6	81	25	56	99.6				112.5	85.1	32.2	97.3	4.6	DT 150	85	30	55	CH	4.3	95.7	32.2	4.0							
3284	10/28/2010	182	Pass	1	7+41	FS	9	5.4			3180	95.8	24.0	60	21	39	97.8	23.4	96.4	118.9	116.8	90.8	28.6	94.8	4.6	DT 150	59	25	34	CH	4.9	95.1	28.6	3.4	113.7	88.4	28.6	92.3	2.7	4.6	YES
3284	10/28/2010	179	Pass	1	51+37	PS	-92	2.5			3179	100.9	19.6	44	19	25	97.1				125.7	103.5	21.4	102.6	1.8	DT 150	55	20	35	CH	7.2	92.8	21.4	2.4							
3284	10/28/2010	181	Pass	1	41+60	PS	-90	2.0			3179	100.9	19.6	44	19	25	97.1				123.8	101.1	22.5	100.2	2.9	DT 150	52	21	31	CH	6.2	93.8	22.5	2.7							
3284	10/28/2010	183	Pass	1	12+45	FS	9	4.9			3180	95.8	24.0	60	21	39	97.8				117.6	93.9	25.3	98.0	1.3	DT 150	75	27	48	CH	4.8	95.2	25.3	3.0							
3284	10/28/2010	180	Pass	1	46+43	PS	-93	1.8			3180	95.8	24.0	60	21	39	97.8				117.3	93.5	25.5	97.6	1.5	DT 150	57	25	32	CH	5.0	95.0	25.5	2.9							
3291	10/29/2010	185	Pass	2	180+00	FS	69	4.7			3180	95.8	24.0	60	21	39	97.8				110.6	88.6	24.8	92.5	0.8	DT 150	59	21	38	CH	4.2	95.8	24.8	3.0							
3297	10/30/2010	193	Pass	2	35+96	FS	11.1	5.0			3180	95.8	24.0	60	21	39	97.8	23.6	95.8	118.4	119.7	95.8	25.0	100.0	1.0	DT 150	55	22	33	CH	5.4	94.6	25.0	2.6	117.0	93.6	25.0	97.7	2.3	1.0	YES
3297	10/30/2010	188	Pass	1	161+00	FS	66	4.4			3179	100.9	19.6	44	19	25	97.1	23.3	98.6	121.5	120.7	98.9	22.1	98.0	2.5	DT 150	56	19	37	CH	5.1	94.9	22.1	2.3							
3297	10/30/2010	187	Pass	1	160+00	FS	45	5.0			3179	100.9	19.6	44	19	25	97.1				125.1	104.3	20.0	103.4	0.4	DT 150	55	17	38	CH	4.4	95.6	20.0	3.0							
3297	10/30/2010	186	Pass	1	3+41	FS	17	4.4			3179	100.9	19.6	44	19	25	97.1				122.7	98.9	24.1	98.0	4.5	DT 150	59	21	38	CH	3.9	96.1	24.1	2.6							
3297	10/30/2010	189	Pass	2	58+34	FS	60	4.7			3180	95.8	24.0	60	21	39	97.8				118.0	94.2	25.2	98.3	1.2	DT 150	61	22	39	CH	9.1	90.9	25.2	3.3							
3297	10/30/2010	195	Pass	2	26+76	FS	26	4.6			3179	100.9	19.6	44	19	25	97.1				117.8	96.8	21.7	95.9	2.1	DT 150	54	19	35	CH	4.4	95.6	21.7	2.8							
3297	10/30/2010	196	Pass	2	24+02	FS	30	4.8			3180	95.8	24.0	60	21	39	97.8				117.5	93.0	26.4	97.1	2.4	DT 150	54	24	30	CH	4.6	95.4	26.4	3.2							
3297	10/30/2010	192	Pass	2	42+93	FS	25	5.2			3180	95.8	24.0	60	21	39	97.8				116.6	92.7	25.8	96.8	1.8	DT 150	62	23	39	CH	3.5	96.5	25.8	3.2							
3297	10/30/2010	191	Fail	2	47+92	FS	26	4.5		3827+384	3178	91.7	26.2	68	20	48	98.1				116.2	87.2	33.3	95.1	7.1	DT 150	77	29	48	CH	2.8	97.2	33.3	3.9							
3297	10/30/2010	194	Pass	2	34+01	FS	20	4.8			3180	95.8	24.0	60	21	39	97.8				115.6	90.9	27.2	94.9	3.2	DT 150	58	23	35	CH	4.3	95.7	27.2	3.3							
3297	10/30/2010	190	Pass	2	51+92	FS	27	4.1			3180	95.8	24.0	60	21	39	97.8				115.0	92.6	24.2	96.7	0.2	DT 150	60	22	38	CH	4.3	95.7	24.2	3.3							
3299	10/31/2010	209	Pass	2	3+00	FS	24	4.8			3180	95.8	24.0	60	21	39	97.8	22.8	96.4	118.4	115.7	93.5	23.8	97.6	-0.2	DT 150	59	20	39	CH	6.8	93.2	23.8	2.6	115.0	92.9	23.8	97.0	0.6	-0.2	YES
3299	10/31/2010	204	Pass	2	166+13	FS	83	4.8			3180	95.8	24.0	60	21	39	97.8	23.9	95.8	118.7	115.9	92.6	25.2	96.7	1.2	DT 150	54	25	29	CH	3.5	96.5	25.2	2.5							
3299	10/31/2010	206	Pass	2	165+02	FS	92	4.1			3180	95.8	24.0	60	21	39	97.8				115.4	90.1	28.1	94.1	4.1	DT 150	66	23	43	CH	2.8	97.2	28.1	3.2							
3299	10/31/2010	205	Pass	2	161+05	FS	94	4.1			3180	95.8	24.0	60	21	39	97.8				115.1	91.5	25.8	95.5	1.8	DT 150	60	20	40	CH	4.4	95.6	25.8	2.9							
3299	10/31/2010	208	Pass	2	7+98	FS	22	4.9			3180	95.8	24.0	60	21	39	97.8				113.9	90.0	26.6	93.9	2.6	DT 150	60	22	38	CH	4.6	95.4	26.6	3.2							
3299	10/31/2010	207	Pass	2	13+00	FS	24	4.9			3180	95.8	24.0	60	21	39	97.8				112.6	89.4	25.9	93.3	1.9	DT 150	61	21	40	CH	4.3	95.7	25.9	2.8							
3299	10/31/2010	210	Pass	2	17+95	FS	19	5.2			3180	95.8	24.0	60	21	39	97.8				112.0	87.4	28.2	91.2	4.2	DT 150	80	30	50	CH	2.5	97.5	28.2	4.4							
3299	10/31/2010	203	Pass	2	173+01	FS	100	4.2			3178	91.7	26.2	68	20	48	98.1				109.5	85.1	28.7	92.8	2.5	DT 150	61	22	39	CH	4.3	95.7	28.7	3.0							
3301	11/1/2010	215	Pass	1	93+99	FS	75	4.0			3180	95.8	24.0	60	21	39	97.8	26.5	95.1	120.3	117.2	91.3	28.3	95.3	4.3	DT 150	60	24	36	CH	4.0	96.0	26.1	3.1							
3301	11/1/2010	213	Pass	1	103+92	FS	89	3.5			3180	95.8	24.0	60	21	39	97.8				120.9	96.3	25.6	100.5	1.6	DT 150	55	22	33	CH	4.8	95.2	27.1	3.2							
3301	11/1/2010	212	Pass	1	108+99	FS	82	4.1			3179	100.9	19.6	44	19	25	97.1				120.8	97.7	23.6	96.8	4.0	DT 150	53	20	33	CH	4.9	95.1	25.6	2.6							
3301	11/1/2010	216	Pass	1	153+09	FS	80	4.7			3180	95.8	24.0	60	21	39	97.8				119.0	94.4	26.1	98.5	2.1	DT 150	56	21	35	CH	4.8	95.2	28.6	2.8							
3301	11/1/2010	214	Pass	1	98+86	FS	82	3.7			3180	95.8	24.0	60	21	39	97.8				118.8	93.5	27.1	97.6	3.1	DT 150	64	24	40	CH	4.0	96.0	28.3	4.8							
3354	11/6/2010	219	Pass	1	82+10	FS	77	4.3			3186	91.6	26.5	67	23	44	98.9				116.5	89.5	30.1	97.7	3.6	DT 150	58	25	33	CH	3.9	96.1	30.1	3.4							
3354	11/6/2010	218	Pass	1	86+96	FS	83	4.1			2653	99.7	23.1	59	24	35	96.3				113.6	90.0	26.2	90.3	3.1	DT 150	52	21	31	CH	4.5	95.5	26.2	3.1							
3354	11/6/2010	217	Pass	2	124+84	FS	91	4.3			3186	91.6	26.5	67	23	44	98.9				108.1	85.1	27.0	92.9	0.5	DT 150	66	24	42	CH	7.5	92.5	27.0	4.3							
3356	11/7/2010	220	Pass	1	75+98	FS	77	4.6			3180	95.8	24.0	60	21	39	97.8	24.6	96.2	119.9	116.0	93.2	24.4	97.3	0.4	DT 150	54	22	32	CH	4.5	95.5	24.4	2.8	115.8	93.1	24.4	97.2	0.2	0.4	YES
3356	11/7/2010	225	Pass	3	178+39	FS	74	6.2			3180	95.8	24.0	60	21	39	97.8	24.4	98.6	122.6	110.5	87.9	25.7	91.8	1.7	DT 150	52	22	30	CH	4.0	96.0	25.7	3.2							
3356	11/7/2010	223	Pass	1	62+95	FS	53	5.0			3180	95.8	24.0	60	21	39	97.8				120.3	94.9	26.8	99.1	2.8	DT 150	57	22	35	CH	5.3	94.7	26.8	2.8							
3356	11/7/2010	224	Pass	1	58+90	FS	85	4.4			3180	95.8	24.0	60	21	39	97.8				117.7	94.7	24.3	98.9	0.3	DT 150	58	22	36	CH	5.2	94.8	24.3	3.3							
3356	11/7/2010	226	Pass	3	180+58	FS	69	6.1			3180	95.8	24.0	60	21	39	97.8				117.3	93.6	25.3	97.7	1.3	DT 150	53	21	32	CH	4.4	95.6	25.3	2.7							
3356	11/7/2010	222	Pass	1	67+99	FS	72	4.3			3180	95.8	24.0	60	21	39	97.8				116.4	90.6	28.5	94.6	4.5	DT 150	66	25	41	CH	2.8	97.2	28.5	3.8							
3356	11/7/2010	221	Pass	1	74+05	FS	67	4.8			3180	95.8	24.0	60	21	39	97.8				112.1	88.6	26.5	92.5	2.5	DT 150	58	24	34	CH	5.2	94.8	26.5	3.0							
3363	11/9/2010	230	Pass	1	147+88	FS	88	3.8			3180	95.8	24.0	60	21	39	97.8	25.3	95.4	119.5	118.1	94.4	25.1	98.5	1.1	DT 150	64	21	43	CH	4.6	95.4	25.1	3.4	119.8	95.8	25.1	100.0	1.4	1.1	YES
3363	11/9/2010	228	Pass	2	101+91	FS	96	4.8			3180	95.8	24.0	60	21	39	97.8				119.5	93.8	27.4	97.9	3.4	DT 150	52	23	29	CH	4.5	95.5	27.4	2.6							
3363	11/9/2010	229	Pass	3	175+72	FS	56	6.6			3180	95.8	24.0	60	21	39	97.8				115.2	90.1	27.9	94.1	3.9	DT 150	61	24	37	CH	3.8	96.2	27.9	3.2							
3363	11/9/2010	227	Pass	2	107+60	FS	91	5.2			3180	95.8	24.0	60	21	39	97.8				112.1	88.3	26.9	92.2	2.9	DT 150	67	24	43	CH	4.2	95.8	26.9	3.0							
3371	11/10/2010	233	Pass	1	143+72	FS	101	3.4			3180	95.8	24.0	60	21	39	97.8				118.8	92.3	28.7	96.3	4.7	DT 150	65	23	42	CH	4.7	95.3	28.7	3.4							
3371	11/10/2010	234	Pass	1	137+67	FS	84	4.7			3178	91.7	26.2	68	20	48	98.1				118.6	91.4	29.7	99.7	3.5	DT 150	62	20	42	CH	3.6	96.4	29.7	3.2							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear w_{Meas} - w_{Opt}	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC $w_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w_{Meas} - w_{Opt}	Difference Within 3%
3371	11/10/2010	231	Pass	2	96+83	FS	64	5.5			3180	95.8	24.0	60	21	39	97.8				117.9	93.1	26.6	97.2	2.6	DT 150	58	21	37	CH	4.7	95.3	26.6	3.3							
3371	11/10/2010	232	Pass	2	92+31	FS	53	6.0			3182	88.2	29.4	87	25	62	99.8				115.7	87.8	31.8	99.5	2.4	DT 150	74	28	46	CH	6.3	93.7	31.8	3.7							
3379	11/11/2010	242	Pass	3	66+06	FS	55	5.6			3178	91.7	26.2	68	20	48	98.1	28.4	92.9	119.3	116.7	89.8	30.0	97.9	3.8	DT 150	64	23	41	CH	3.2	96.8	30.0	3.5	113.8	87.5	30.0	95.4	2.5	3.8	YES
3379	11/11/2010	237	Pass	3	172+24	FS	63	6.3			3178	91.7	26.2	68	20	48	98.1	25.7	89.9	113.0	118.8	91.6	29.7	99.9	3.5	DT 150	75	26	49	CH	6.2	93.8	29.7	2.0							
3379	11/11/2010	239	Pass	3	167+25	FS	51	6.2			3178	91.7	26.2	68	20	48	98.1				119.2	91.0	31.0	99.2	4.8	DT 150	65	23	42	CH	7.4	92.6	31.0	2.6							
3379	11/11/2010	244	Pass	3	61+12	FS	85	5.6			3178	91.7	26.2	68	20	48	98.1				118.9	91.5	30.0	99.8	3.8	DT 150	66	26	40	CH	7.8	92.2	30.0	3.3							
3379	11/11/2010	240	Pass	3	164+71	FS	76	5.3			3180	95.8	24.0	60	21	39	97.8				118.4	93.2	27.1	97.3	3.1	DT 150	60	21	39	CH	6.1	93.9	27.1	1.8							
3379	11/11/2010	238	Pass	3	169+75	FS	55	6.2			3178	91.7	26.2	68	20	48	98.1				117.8	89.8	31.2	97.9	5.0	DT 150	71	24	47	CH	4.7	95.3	31.2	2.0							
3379	11/11/2010	243	Pass	3	63+50	FS	42	5.9			3178	91.7	26.2	68	20	48	98.1				116.0	91.0	27.5	99.2	1.3	DT 150	68	21	47	CH	8.3	91.7	27.5	4.8							
3379	11/11/2010	241	Pass	3	68+46	FS	86	4.8			3185	90.0	28.5	74	23	51	99.2				115.8	87.2	32.8	96.9	4.3	DT 150	70	26	44	CH	11.3	88.7	32.8	3.3							
3384	11/12/2010	252	Pass	4	169+06	CL	0	8.4			3180	95.8	24.0	60	21	39	97.8	27.6	94.5	120.6	113.0	88.1	28.3	92.0	4.3	DT 150	56	25	31	CH	6.7	93.3	28.3	2.9	110.9	86.4	28.3	90.2	1.9	4.3	YES
3384	11/12/2010	247	Pass	3	160+16	FS	81	5.2			3178	91.7	26.2	68	20	48	98.1	28.9	91.9	118.4	115.4	88.0	31.2	96.0	5.0	DT 150	57	22	35	CH	14.0	86.0	31.2	2.9							
3384	11/12/2010	250	Pass	2	84+02	FS	50	6.1			3180	95.8	24.0	60	21	39	97.8				120.5	96.0	25.5	100.2	1.5	DT 150	62	23	39	CH	4.2	95.8	25.5	3.7							
3384	11/12/2010	246	Pass	3	162+97	FS	77	5.3			3180	95.8	24.0	60	21	39	97.8				118.2	93.9	25.9	98.0	1.9	DT 150	60	25	35	CH	4.0	96.0	25.9	3.0							
3384	11/12/2010	254	Pass	2	71+99	FS	71	5.8			3180	95.8	24.0	60	21	39	97.8				118.1	93.7	26.1	97.8	2.1	DT 150	58	21	37	CH	3.4	96.6	26.1	3.0							
3384	11/12/2010	253	Pass	4	164+04	CL	0	8.2			3180	95.8	24.0	60	21	39	97.8				117.9	92.7	27.2	96.8	3.2	DT 150	54	21	33	CH	6.5	93.5	27.2	2.4							
3384	11/12/2010	251	Pass	4	175+12	PS	-10	8.7			3180	95.8	24.0	60	21	39	97.8				116.8	92.6	26.2	96.7	2.2	DT 150	64	24	40	CH	3.9	96.1	26.2	3.6							
3384	11/12/2010	249	Pass	2	85+43	FS	62	6.1			3185	90.0	28.5	74	23	51	99.2				116.2	87.4	32.9	97.1	4.4	DT 150	76	26	50	CH	2.8	97.2	32.9	3.8							
3384	11/12/2010	255	Pass	2	78+03	FS	61	5.1			3178	91.7	26.2	68	20	48	98.1				113.9	90.0	26.6	98.1	0.4	DT 150	52	20	32	CH	4.7	95.3	26.6	2.7							
3384	11/12/2010	248	Fail	3	158+50	FS	71	5.5		4019+440	3178	91.7	26.2	68	20	48	98.1				113.5	84.6	34.2	92.3	8.0	DT 150	73	26	47	CH	5.9	94.1	34.2	3.9							
3384	11/12/2010	245	Fail	4	181+02	CL	0	9.1		3391+263	3178	91.7	26.2	68	20	48	98.1				113.1	83.9	34.8	91.5	8.6	DT 150	73	27	46	CH	2.5	97.5	34.8	4.4							
3388	11/13/2010	257	Pass	3	106+28	FS	50	6.4			3180	95.8	24.0	60	21	39	97.8	25.6	95.4	119.6	116.6	91.8	27.0	95.8	3.0	DT 150	64	24	40	CH	5.6	94.4	27.0	3.1							
3388	11/13/2010	256	Pass	3	108+70	FS	70	5.7			3180	95.8	24.0	60	21	39	97.8				121.9	94.6	28.8	98.7	4.8	DT 150	66	24	42	CH	5.0	95.0	28.8	5.4							
3388	11/13/2010	259	Pass	3	101+06	CL	0	7.3			3180	95.8	24.0	60	21	39	97.8				120.8	95.9	26.0	100.1	2.0	DT 150	42	25	17	CH	6.9	93.1	26.0	2.7							
3388	11/13/2010	258	Pass	3	103+72	CL	0	7.1			3178	91.7	26.2	68	20	48	98.1				116.4	89.6	29.9	97.7	3.7	DT 150	55	22	33	CH	4.0	96.0	29.9	3.4							
3388	11/13/2010	261	Pass	3	95+48	CL	0	7.2			3178	91.7	26.2	68	20	48	98.1				114.0	90.7	25.7	98.9	-0.5	DT 150	70	21	49	CH	5.4	94.6	25.7	2.7							
3388	11/13/2010	260	Fail	3	98+48	CL	2	7.2		3433+292	3180	95.8	24.0	60	21	39	97.8				112.5	83.1	35.4	86.7	11.4	DT 150	56	29	27	CH	2.4	97.6	35.4	3.9							
3391	11/14/2010	262	PASS	3	94+00	CL	0	7.4			3178	91.7	26.2	68	20	48	98.1	28.7	92.0	118.4	117.8	91.1	29.3	99.3	3.1	DT 300	56	22	34	CH	5.4	94.6	29.3	1.9	116.3	89.9	29.3	98.0	1.3	3.1	YES
3391	11/14/2010	267	Fail	3	82+90	CL	0	7.2		3485+311	3180	95.8	24.0	60	21	39	97.8	28.5	93.3	119.9	109.4	84.8	29.0	88.5	5.0	DT 300	61	24	37	CH	3.6	96.4	29.0	1.9							
3391	11/14/2010	268	PASS	3	81+25	CL	0	7.4			3184	93.8	21.9	71	23	48	99.2				121.6	96.0	26.7	102.3	4.8	DT 300	76	30	46	CH	4.6	95.4	26.7	2.6							
3391	11/14/2010	263	Pass	4	181+02	CL	0	5.6	3384+245		3180	95.8	24.0	60	21	39	97.8				119.0	93.5	27.3	97.6	3.3	DT 300	65	24	41	CH	4.3	95.7	27.3	2.7							
3391	11/14/2010	271	Fail	3	126+51	CL	0	8.4		3492+316	3180	95.8	24.0	60	21	39	97.8				117.8	90.6	30.0	94.6	6.0	DT 300	60	24	36	CH	4.5	95.5	30.0	1.6							
3391	11/14/2010	264	PASS	3	91+92	CL	0	7.6			3178	91.7	26.2	68	20	48	98.1				116.6	89.3	30.6	97.4	4.4	DT 300	71	25	46	CH	4.5	95.5	30.6	2.5							
3391	11/14/2010	266	Pass	3	87+49	CL	0	7.4			3180	95.8	24.0	60	21	39	97.8				115.8	91.0	27.2	95.0	3.2	DT 300	61	24	37	CH	3.2	96.8	27.2	1.7							
3391	11/14/2010	270	PASS	3	124+50	PS	-13	8.0			3180	95.8	24.0	60	21	39	97.8				112.2	88.0	27.5	91.9	3.5	DT 300	56	24	32	CH	5.4	94.6	27.5	1.7							
3391	11/14/2010	265	Pass	3	89+13	CL	0	7.4			3178	91.7	26.2	68	20	48	98.1				107.8	85.2	26.6	92.9	0.4	DT 300	72	25	47	CH	2.9	97.1	26.6	2.9							
3391	11/14/2010	269	PASS	4	122+96	CL	0	8.4			3185	90.0	28.5	74	23	51	99.2				107.1	82.4	29.9	91.6	1.4	DT 300	77	26	51	CH	3.3	96.7	29.9	2.6							
3423	11/19/2010	272	Pass	3	127+62	CL	0	8.1			3180	95.8	24.0	60	21	39	97.8	27.5	94.7	120.8	119.3	93.9	27.0	98.0	3.0	DT 150	53	22	31	CH	5.8	94.2	27.0	3.2	115.9	91.3	27.0	95.3	2.9	3.0	YES
3423	11/19/2010	277	Pass	3	139+96	CL	0	7.9			2611	87.9	30.6	78	28	50	97.5	33.1	86.0	114.5	113.9	85.6	33.0	97.4	2.4	DT 300	71	26	45	CH	2.7	97.3	33.0	4.7							
3423	11/19/2010	276	Pass	3	137+52	CL	0	8.2			3180	95.8	24.0	60	21	39	97.8				116.1	90.2	28.7	94.2	4.7	DT 300	62	24	38	CH	3.0	97.0	28.7	3.6							
3423	11/19/2010	273	Pass	3	130+00	CL	0	8.3			3178	91.7	26.2	68	20	48	98.1				114.9	88.2	30.3	96.2	4.1	DT 300	64	24	40	CH	4.9	95.1	30.3	3.6							
3423	11/19/2010	274	Pass	3	132+50	CL	0	8.6			2611	87.9	30.6	78	28	50	97.5				114.1	84.5	35.0	96.1	4.4	DT 300	76	30	46	CH	6.5	93.5	35.0	4.5							
3423	11/19/2010	275	Fail	3	135+03	PS	-6	8.3		3492+315	3186	91.6	26.5	67	23	44	98.9				110.4	83.6	32.0	91.3	5.5	DT 300	67	25	42	CH	3.0	97.0	32.0	3.6							
3429	11/21/2010	282	Fail	3	79+00	FS	9	8.4		3485+312	3186	91.6	26.5	67	23	44	98.9	27.8	90.4	115.6	120.0	90.2	33.0	98.5	6.5	DT 150	69	29	40	CH	4.0	96.0	33.0	3.1	120.6	90.7	33.0	99.0	0.5	6.5	YES
3429	11/21/2010	287	Pass	4	103+27	CL	0	7.9			3180	95.8	24.0	60	21	39	97.8	26.5	95.6	121.0	118.4	94.0	25.9	98.1	1.9	DT 300	55	21	34	CH	5.8	95.0	25.9	1.5							
3429	11/21/2010	279	Pass	3	71+22	CL	0	8.1			3186	91.6	26.5	67	23	44	98.9				118.8	91.8	29.4	100.2	2.9	DT 300	71	25	46	CH	2.4	97.6	29.4	2.3							
3429	11/21/2010	286	Fail	3	98+48	CL	-2	7.2	3388-260	3433+292	3186	91.6	26.5	67	23	44	98.9				118.1	89.0	32.7	97.2	6.2	DT 300	69	26	43	CH	4.4	96.9	32.7	2.7							
3429	11/21/2010	288	Fail	4	108+13	FS	12	8.4		3533+339	3184	93.8	21.9	71	23	48	99.2				118.0	86.8	35.9	92.5	14.0	DT 300	73	28	45	CH	3.9	96.1	35.9	2.8							
3429	11/21/2010	285	Fail	4	94+58	CL	0	8.0		3433+293	3185	90.0	28.5	74	23	51	99.2				116.3	86.0	35.3	95.6	6.8	DT 300	81	31	50	CH	3.8	96.2	35.3	3.8							
3429	11/21/2010	278	Fail	4	64+00	CL	0	7.4		3439+299	3186	91.6	26.5	67	23	44	98.9				115.2	85.4	34.9	93.2	8.4	DT 300	71	28	43	CH	4.0	96.0	34.9	2.5							
3429	11/21/2010	284	Fail	4	87+54	PS	-12	8.0		3439+294	3186	91.6	26.5	67	23	44	98.9				113.6	84.0	35.3	91.7	8.8	DT 300	79	33	46	CH	3.1	95.6	35.3	3.1							
3429	11/21/2010	281	Fail	3	76+53	CL	0	7.8		3485+313	3185	90.0	28.5	74	23	51	99.2				113.5	83.2	36.4	92.4	7.9	DT 300	75	31	44	CH	3.8	96.2	36.4	2.8							
3429	11/21/2010	283	Fail	3	82+90	CL	0	7.2	3391-267	3485+311	3186	91.6	26.5	67	23	44	98.9				113.0	84.5	33.7	92.2	7.2	DT 300	72	28	44	CH	5.0	94.2	33.7	2.8							
3429	11/21/2010	289	Pass	1	98+91	PS	-152	-0.1			3185	90.0	28.5	74	23	51	99.2				111.8	86.1	29.9	95.7	1.4	DT 150	76	27	49	CH	3.6	96.4	29.9	4.0							
3429	11/21/2010	280	Pass	3	73+25	CL	0	8.0			3185	90.0	28.5	74	23	51	99.2				111.2	84.8	31.1	94.2	2.6	DT 300	75	27	48	CH	6.7	93.3	31.1	3.7							
3429	11/21/2010	290	Fail	1	94+59	PS	-152	-1.4		3485+310	3186	91.6	26.5	67	23	44	98.9				110.5	81.4	35.8	88.9	9.3	DT 150	70	29	41	CH	5.0	95.0	35.8	4.0							
3433	11/22/2010	292	Pass	3	98+48	CL	0	7.2	3388+260		3180	95.8	24.0	60	21	39	97.8	25.2	97.9	122.6	120.8	97.0	24.5	101.3	0.5	DT 150	60	22	38	CH	4.9	95.1	24.5	2.7	118.6	95.3	24.5	99.5	1.9	0.5	YES

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear w_{Meas} - w_{Opt}	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC $w_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w_{Meas} - w_{Opt}	Difference Within 3%
3433	11/22/2010	291	Fail	4	108+13	FS	12	8.4	3429-288	3533+339	3184	93.8	21.9	71	23	48	99.2				117.7	91.2	29.0	97.2	7.1	DT 300	71	24	47	CH	3.6	96.4	29.0	3.7							
3433	11/22/2010	293	Pass	4	94+58	CL	0	8.0	3429+285		3185	90.0	28.5	74	23	51	99.2				112.9	89.4	26.3	99.3	-2.2	DT 300	69	24	45	CH	3.2	96.8	26.3	3.8							
3439	11/23/2010	297	Fail	3	76+53	CL	0	7.8	3429-281	3485+313	3183	87.5	27.6	81	25	56	99.6	33.8	85.2	114.0	112.4	80.3	40.0	91.8	12.4	DT 300	88	31	57	CH	2.2	97.8	40.0	3.2							
3439	11/23/2010	298	Fail	4	69+06	FS	39	6.3		3485+314	3184	93.8	21.9	71	23	48	99.2				117.1	90.6	29.2	96.6	7.3	DT 300	71	23	48	CH	6.1	93.9	29.2	2.5							
3439	11/23/2010	296	Fail	3	79+00	FS	19	8.4	3429-282	3485+312	3183	87.5	27.6	81	25	56	99.6				115.4	85.3	35.3	97.5	7.7	DT 300	82	28	54	CH	3.4	96.6	35.3	3.3							
3439	11/23/2010	294	Pass	4	87+54	PS	-12	8.0	3429+284		3185	90.0	28.5	74	23	51	99.2				114.7	88.3	29.9	98.1	1.4	DT 300	78	25	53	CH	9.6	90.4	29.9	3.5							
3439	11/23/2010	299	Pass	4	64+00	CL	0	7.4	3429-278		3185	90.0	28.5	74	23	51	99.2				114.2	87.4	30.6	97.1	2.1	DT 300	77	24	53	CH	3.0	97.0	30.6	3.1							
3439	11/23/2010	295	Fail	3	82+90	CL	0	7.2	3429-283	3485+311	3183	87.5	27.6	81	25	56	99.6				111.8	82.0	36.4	93.7	8.8	DT 300	82	28	54	CH	3.7	96.3	36.4	3.3							
3448	11/24/2010	302	Pass	1	88+03	PS	-143	-1.1			3185	90.0	28.5	74	23	51	99.2	31.3	87.0	114.2	112.0	84.7	32.2	94.1	3.7	DT 150	79	31	48	CH	8.3	91.7	32.2	5.3	112.6	85.2	32.2	94.7	0.5	3.7	YES
3448	11/24/2010	300	Fail	3	135+03	PS	-6	8.3	3423-275	3492+315	3186	91.6	26.5	67	23	44	98.9				115.5	87.5	32.0	95.5	5.5	DT 300	68	27	41	CH	4.0	96.0	32.0	2.6							
3448	11/24/2010	305	Fail	1	73+08	PS	-141	-0.1		3485+309	3186	91.6	26.5	67	23	44	98.9				113.2	84.8	33.5	92.6	7.0	DT 150	71	28	43	CH	4.1	95.9	33.5	2.9							
3448	11/24/2010	304	Pass	1	78+02	PS	-142	-0.4			3180	95.8	24.0	60	21	39	97.8				112.2	87.7	27.9	91.5	3.9	DT 150	59	24	35	CH	4.7	95.3	27.9	2.7							
3448	11/24/2010	303	Pass	1	83+07	PS	-151	-0.8			3185	90.0	28.5	74	23	51	99.2				109.3	85.3	28.2	94.8	-0.3	DT 150	79	30	49	CH	3.4	96.6	28.2	3.2							
3448	11/24/2010	306	Pass	4	71+50	CL	0	9.1			3186	91.6	26.5	67	23	44	98.9				109.0	83.6	30.4	91.3	3.9	DT 300	71	27	44	CH	0.9	99.1	30.4	3.0							
3448	11/24/2010	301	Fail	1	94+59	PS	-152	-1.4	3429-290	3485+310	3183	87.5	27.6	81	25	56	99.6				107.8	77.0	40.0	88.0	12.4	DT 150	83	33	50	CH	3.2	96.8	40.0	4.1							
3485	12/3/2010	314	Pass	4	69+06	FS	39	6.3	3439+298		3186	91.6	26.5	67	23	44	98.9	27.9	91.8	117.4	115.4	88.2	30.8	96.3	4.3	DT 300	70	26	44	CH	3.9	96.1	30.8	2.3	116.0	88.7	30.8	96.8	0.5	4.3	YES
3485	12/3/2010	309	Pass	1	73+08	PS	-141	-0.1	3448-305		3185	90.0	28.5	74	23	51	99.2	32.4	86.2	114.2	114.5	85.8	33.4	95.3	4.9	DT 150	75	26	49	CH	2.5	97.5	33.4	2.1							
3485	12/3/2010	312	Pass	3	79+00	FS	9	8.4	3439+296		3186	91.6	26.5	67	23	44	98.9				119.6	92.7	29.0	101.2	2.5	DT 300	68	23	45	CH	3.9	96.1	29.0	2.3							
3485	12/3/2010	313	Pass	3	76+53	CL	0	7.8	3439+297		3183	87.5	27.6	81	25	56	99.6				117.5	89.2	31.8	101.9	4.2	DT 300	81	28	53	CH	3.0	97.0	31.8	2.6							
3485	12/3/2010	311	Pass	3	82+90	CL	0	7.2	3439+295		3185	90.0	28.5	74	23	51	99.2				113.8	87.2	30.5	96.9	2.0	DT 300	72	24	48	CH	3.3	96.7	30.5	2.6							
3485	12/3/2010	310	Pass	1	94+59	PS	-152	-1.4	3448+301		3186	91.6	26.5	67	23	44	98.9				113.5	87.8	29.2	95.9	2.7	DT 150	67	23	44	CH	4.7	95.3	29.2	2.5							
3492	12/4/2010	316	Pass	3	126+51	CL	0	8.4	3391+271		3034	94.8	24.8	67	24	43	95.5				119.9	96.1	24.8	101.4	0.0	DT 300	68	23	45	CH	8.0	92.0	24.8	4.1							
3492	12/4/2010	315	Pass	3	135+03	PS	-6	8.3	3448+300		3034	94.8	24.8	67	24	43	95.5				116.5	92.0	26.6	97.0	1.8	DT 300	69	22	47	CH	3.0	97.0	26.6	3.5							
3499	12/6/2010	319	Pass	4	96+06	CL	0	8.5			3182	88.2	29.4	87	25	62	99.8	31.7	88.2	116.2	121.3	90.5	34.1	102.6	4.7	DT 300	86	27	59	CH	4.2	95.8	34.1	3.9							
3499	12/6/2010	317	Pass	4	126+01	CL	0	9.0			3181	92.8	22.5	78	23	55	99.6				116.2	91.6	26.9	98.7	4.4	DT 300	77	25	52	CH	6.6	93.4	26.9	3.9							
3499	12/6/2010	318	Fail	4	133+02	CL	0	9.6		5474+894	3183	87.5	27.6	81	25	56	99.6				114.8	86.2	33.2	98.5	5.6	DT 300	81	27	54	CH	2.6	97.4	33.2	3.7							
3506	12/7/2010	324	Fail	2	72+03	PS	-141	0.4		3533+343	3180	95.8	24.0	60	21	39	97.8	22.4	97.9	119.8	106.1	84.9	25.0	88.6	1.0	DT 150	59	22	37	CH	4.1	95.9	25.0	2.8	108.8	87.0	25.0	90.8	2.5	1.0	YES
3506	12/7/2010	325	Pass	4	83+07	CL	0	9.2			3180	95.8	24.0	60	21	39	97.8				118.3	93.0	27.2	97.1	3.2	DT 300	60	22	38	CH	3.1	96.9	27.2	3.3							
3506	12/7/2010	321	Fail	2	87+00	PS	-143	0.2		3533+340	3291	99.5	21.9	64	22	42	97.8				114.9	89.1	28.9	89.5	7.0	DT 300	64	22	42	CH	4.3	95.7	28.9	3.4							
3506	12/7/2010	328	Pass	5	64+55	FS	-11	9.0			3180	95.8	24.0	60	21	39	97.8				114.4	89.4	28.0	93.3	4.0	DT 300	61	22	39	CH	5.4	94.6	28.0	3.2							
3506	12/7/2010	320	Fail	2	92+72	PS	-148	-0.8		4019+445	3185	90.0	28.5	74	23	51	99.2				114.4	85.1	34.5	94.6	6.0	DT 300	73	25	48	CH	4.8	95.2	34.5	3.7							
3506	12/7/2010	327	Pass	5	67+00	FS	-15	9.1			3180	95.8	24.0	60	21	39	97.8				114.2	90.2	26.6	94.2	2.6	DT 300	56	22	34	CH	7.5	92.5	26.6	2.8							
3506	12/7/2010	326	Pass	4	78+03	CL	0	9.0			3180	95.8	24.0	60	21	39	97.8				109.5	87.0	25.8	90.8	1.8	DT 300	62	23	39	CH	3.5	96.5	25.8	3.1							
3506	12/7/2010	322	Fail	2	82+03	PS	-140	0.5		3533+341	3180	95.8	24.0	60	21	39	97.8				106.9	83.8	27.6	87.5	3.6	DT 300	58	21	37	CH	4.4	95.6	27.6	3.0							
3506	12/7/2010	323	Fail	2	77+00	PS	-138	0.6		4019+442	3034	94.8	24.8	67	24	43	95.5				105.4	80.6	30.7	85.0	5.9	DT 300	66	25	41	CH	5.0	95.0	30.7	3.9							
3510	12/8/2010	329	Fail	5	73+02	CL	0	9.8		3974+418	3094	90.1	24.0	78	26	52	96.8	26.8	91.0	115.4	113.3	85.5	32.5	94.9	8.5	DT 300	78	26	52	CH	2.5	97.5	32.5	4.0							
3520	12/9/2010	338	Pass	1	31+76	PS	-126	1.0			3180	95.8	24.0	60	21	39	97.8	28.5	92.9	119.4	119.2	92.5	28.9	96.6	4.9	DT 150	63	23	40	CH	8.5	91.5	28.9	2.7	119.5	92.7	28.9	96.8	0.3	4.9	YES
3520	12/9/2010	336	Pass	1	42+55	PS	-145	0.5			3180	95.8	24.0	60	21	39	97.8				116.9	92.9	25.8	97.0	1.8	DT 300	60	23	37	CH	5.8	94.2	25.8	2.7							
3520	12/9/2010	337	Pass	1	37+48	PS	-152	0.7			3180	95.8	24.0	60	21	39	97.8				114.8	91.4	25.6	95.4	1.6	DT 300	64	22	42	CH	5.4	94.6	25.6	3.2							
3520	12/9/2010	335	Pass	1	47+63	PS	-156	0.4			3180	95.8	24.0	60	21	39	97.8				112.5	91.5	22.9	95.5	-1.1	DT 300	63	21	42	CH	7.7	92.3	22.9	3.1							
3520	12/9/2010	334	Pass	1	52+58	PS	-141	1.2			3180	95.8	24.0	60	21	39	97.8				112.3	90.5	24.1	94.5	0.1	DT 300	60	22	38	CH	5.1	94.9	24.1	2.8							
3533	12/10/2010	344	Pass	1	27+51	PS	-151	0.2			2854	95.9	23.9	62	24	40	97.0	24.7	96.9	120.9	118.4	92.4	28.2	96.4	4.3	DT 150	63	24	39	CH	4.7	95.3	28.2	2.7							
3533	12/10/2010	345	Pass	1	22+50	PS	-145	0.5			3180	95.8	24.0	60	21	39	97.8				118.7	93.1	27.5	97.2	3.5	DT 150	58	24	34	CH	4.2	95.8	27.5	2.5							
3533	12/10/2010	343	Pass	2	72+03	PS	-141	0.4	3506+324		3291	99.5	21.9	64	22	42	97.8				117.9	93.8	25.7	94.3	3.8	DT 150	64	23	41	CH	3.8	96.2	25.7	2.5							
3533	12/10/2010	341	Pass	2	82+03	PS	-140	0.5	3506+322		3180	95.8	24.0	60	21	39	97.8				116.1	94.7	22.6	98.9	-1.4	DT 300	61	21	40	CH	4.5	95.5	22.6	2.9							
3533	12/10/2010	340	Pass	2	87+00	PS	-143	0.2	3506+321		3186	91.6	26.5	67	23	44	98.9				113.4	88.4	28.3	96.5	1.8	DT 300	65	26	39	CH	3.7	96.3	28.3	2.5							
3533	12/10/2010	346	Pass	1	17+51	PS	-152	0.5			2854	95.9	23.9	62	24	40	97.0				110.6	87.3	26.7	91.0	2.8	DT 150	64	23	41	CH	3.5	96.5	26.7	2.6							
3533	12/10/2010	339	Pass	4	108+13	FS	12	8.4	3433+291		3185	90.0	28.5	74	23	51	99.2				110.5	83.5	32.3	92.8	3.8	DT 300	74	26	48	CH	4.0	96.0	32.3	3.9							
3533	12/10/2010	342	Fail	2	77+00	PS	-138	0.6	3506-323	4019+442	3186	91.6	26.5	67	23	44	98.9				104.5	81.5	28.2	89.0	1.7	DT 300	68	27	41	CH	3.5	96.5	28.2	3.0							
3544	12/13/2010	349	Pass	1	12+53	PS	-150.2	0.3			3291	99.5	21.9	64	22	42	97.8	22.4	98.0	120.0	112.4	90.3	24.5	90.8	2.6	DT 150	61	22	39	CH	5.2	94.8	24.5	3.1	112.1	90.0	24.5	90.5	0.3	2.6	YES
3544	12/13/2010	348	Pass	1	47+52	FS	69.6	4.5			3462	89.1	28.8	65	23	42	94.5				113.7	88.4	28.6	99.2	-0.2	DT 150	64	24	40	CH	0.5	99.5	28.6	3.5							
3544	12/13/2010	350	Pass	1	7+51	PS	-136.6	0.4			3034	94.8	24.8	67	24	43	95.5				109.8	88.1	24.7	92.9	-0.1	DT 150	67	23	44	CH	4.6	95.4	24.7	3.2							
3544	12/13/2010	351	Pass	1	2+50	PS	-139.8	0.2			3034	94.8	24.8	67	24	43	95.5				109.0	87.8	24.1	92.6	-0.7	DT 150	65	23	42	CH	5.1	94.9	24.1	3.1							
3544	12/13/2010	347	Fail	1	52+44	FS	63.3	4.6		3603+360	3462	89.1	28.8	65	23	42	94.5				105.4	86.1	22.4	96.6	-6.4	DT 150	62	21	41	CH	4.9	95.1	22.4	3.2							
3570	12/16/2010	359	Pass	2	45+00	PS	-145	1.4			3034	94.8	24.8	67	24	43	95.5	27.0	93.3	118.4	112.6	90.3	24.7	95.3	-0.1	DT 300	67	24	43	CH	4.4	95.6	24.7	3.8							
3570	12/16/2010	357	Pass	2	53+01	PS	-146	1.7			3180	95.8	24.0	60	21	39	97.8				118.7	93.2	27.4	97.3	3.4	DT 300	64	27	37	CH	4.2	95.8	27.4	3.7							
3570	12/16/2010	356	Pass	1	32+48	FS	57	4.1			3462	89.1	28.8	65	23	42	94.5				116.5	91.2	27.7	102.4	-1.1	DT 150	64	27	37	CH	4.4	95.6	27.7	3.6							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w $_{Meas}$	% Compaction Nuclear	Nuclear w $_{Meas}$ - w_{Opt}	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC w $_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w $_{Meas}$	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w $_{Meas}$ - w $_{Opt}$	Difference Within 3%
3570	12/16/2010	355	Pass	1	37+50	FS	64	4.5			3462	89.1	28.8	65	23	42	94.5				115.7	87.9	31.7	98.7	2.9	DT 150	66	24	42	CH	2.9	97.1	31.7	3.5							
3570	12/16/2010	354	Pass	1	42+51	FS	61	4.4			3462	89.1	28.8	65	23	42	94.5				115.2	89.9	28.2	100.9	-0.6	DT 150	69	26	43	CH	3.7	96.3	28.2	3.8							
3570	12/16/2010	358	Pass	2	48+95	PS	-149	1.5			3178	91.7	26.2	68	20	48	98.1				112.2	87.5	28.3	95.4	2.1	DT 300	74	28	46	CH	2.8	97.2	98.3	3.9							
3603	12/21/2010	360	Pass	1	52+44	FS	63.3	4.6	3544+347		3467	97.8	22.6	55	20	35	91.7				118.9	96.6	23.1	98.8	0.5	DT 150	61	21	40	CH	3.6	96.4	23.1	2.8							
3712	1/8/2011	363	Pass	1	27+49	FS	59	4.4			3467	97.8	22.6	55	20	35	91.7	26.8	94.9	120.3	118.7	93.2	27.4	95.3	4.8	DT 150	65	22	43	CH	3.7	96.3	27.4	3.0	117.9	92.5	27.4	94.6	0.7	4.8	YES
3712	1/8/2011	364	Fail	1	17+53	FS	56.6	4.6		3754+367	3467	97.8	22.6	55	20	35	91.7				116.0	86.4	34.2	88.3	11.6	DT 150	57	22	35	CH	4.4	95.6	34.2	2.9							
3754	1/14/2011	367	Pass	1	17+53	FS	56.6	4.6	3712+364		3467	97.8	22.6	55	20	35	91.7				116.0	91.2	27.2	93.3	4.6	DT 150	56	23	33	CH	5.6	94.4	97.2	2.9							
3754	1/14/2011	366	Pass	1	22+49	FS	64	4.3			3467	97.8	22.6	55	20	35	91.7				115.5	90.9	27.0	92.9	4.4	DT 150	60	23	37	CH	7.1	92.9	27.0	3.2							
3754	1/14/2011	368	Pass	1	12+65	FS	44.6	4.6			3467	97.8	22.6	55	20	35	91.7				115.0	91.9	25.1	94.0	2.5	DT 150	54	22	32	CH	6.6	93.4	25.1	2.8							
3772	1/17/2011	374	Pass	4	160+03	FS	6.4	8.0			3555	86.6	30.0	78	28	50	94.1	28.4	87.0	111.7	109.1	81.9	33.2	94.6	3.2	DT 300	77	26	51	CH	6.7	93.3	33.2	5.4	111.9	84.0	33.2	97.0	2.5	3.2	YES
3772	1/17/2011	369	Pass	1	7+54	FS	40	5.1			3467	97.8	22.6	55	20	35	91.7	22.6	97.5	119.5	121.1	98.7	22.7	100.9	0.1	DT 150	58	20	38	CH	5.7	94.3	22.7	3.5							
3772	1/17/2011	378	Fail	5	180+02	CL	0	10.2		4004+421	2854	95.9	23.9	62	24	40	97.0	26.2	92.7	117.0	113.4	85.7	32.3	89.4	8.4	DT 300	65	24	41	CH	4.4	95.6	32.3	3.9							
3772	1/17/2011	380	Fail	2	49+50	FS	36	5.4		3827+383	3467	97.8	22.6	55	20	35	91.7				121.5	94.8	28.1	96.9	5.5	DT 300	58	22	36	CH	14.1	85.9	28.1	3.6							
3772	1/17/2011	377	Pass	5	175+03	PS	-8	10.1			3180	95.8	24.0	60	21	39	97.8				116.9	91.3	28.1	95.3	4.1	DT 300	54	21	33	CH	5.0	95.0	28.1	4.7							
3772	1/17/2011	375	Fail	5	165+03	PS	-10.1	10.1		4004+423	3180	95.8	24.0	60	21	39	97.8				116.6	90.2	29.2	94.2	5.2	DT 300	58	23	35	CH	3.0	97.0	29.2	3.8							
3772	1/17/2011	372	Pass	3	150+03	FS	7	8.0			3555	86.6	30.0	78	28	50	94.1				114.6	85.8	33.6	99.1	3.6	DT 300	76	24	52	CH	6.9	93.1	33.6	4.8							
3772	1/17/2011	370	Pass	1	2+49	FS	48	5.1			3745	95.8	23.5	63	21	42	91.9				113.7	89.4	27.2	93.3	3.7	DT 150	62	21	41	CH	5.6	94.4	27.2	3.5							
3772	1/17/2011	381	Fail	2	46+50	FS	31	5.3	3297+191	3827+384	3467	97.8	22.6	55	20	35	91.7				113.6	86.5	31.4	88.4	8.8	DT 300	59	23	36	CH	4.6	95.4	31.4	4.0							
3772	1/17/2011	371	Fail	3	145+04	CL	0	8.0		3827+382	2762	92.1	26.6	72	29	43	97.1				112.6	84.4	33.4	91.6	6.8	DT 300	70	25	47	CH	9.4	90.6	33.4	4.4							
3772	1/17/2011	376	Fail	5	170+03	PS	-10.8	10.1		4004+422	3180	95.8	24.0	60	21	39	97.8				111.0	82.3	34.9	85.9	10.9	DT 300	56	20	36	CH	10.7	89.3	34.9	3.6							
3772	1/17/2011	379	Pass	2	53+00	FS	36.7	5.7			3745	95.8	23.5	63	21	42	91.9				110.8	87.2	27.1	91.0	3.6	DT 300	58	18	40	CH	8.6	91.4	27.1	3.8							
3772	1/17/2011	373	Fail	3	155+06	CL	0	8.1		4103+470	3555	86.6	30.0	78	28	50	94.1				101.1	73.2	38.1	84.5	8.1	DT 300	81	29	52	CH	5.7	94.3	38.1	6.4							
3827	1/23/2011	384	Pass	2	46+50	FS	31	5.3	3772+381		3745	95.8	23.5	63	21	42	91.9	24.4	94.2	117.2	111.4	89.5	24.4	93.4	0.9	DT 150	63	24	39	CH	10.1	89.9	24.4	3.8	109.9	88.3	24.4	92.2	1.4	0.9	YES
3827	1/23/2011	382	Pass	4	145+04	CL	0	8.0	3772+371		2762	92.1	26.6	72	29	43	97.1				117.5	90.5	29.8	98.3	3.2	DT 300	68	25	43	CH	4.9	95.1	29.8	4.3							
3827	1/23/2011	383	Pass	2	49+50	FS	36	5.4	3772+380		3467	97.8	22.6	55	20	35	91.7				115.6	91.5	26.4	93.6	3.8	DT 300	55	21	34	CH	6.9	93.1	26.4	3.5							
3830	1/24/2011	386	Pass	2	9+92	FS	54	6.1			3467	97.8	22.6	55	20	35	91.7				118.1	93.5	26.3	95.6	3.7	DT 300	57	21	36	CH	7.4	92.6	26.3	3.8							
3830	1/24/2011	385	Pass	2	12+95	FS	23.5	6.3			3462	89.1	28.8	65	23	42	94.5				110.6	86.8	27.4	97.4	-1.4	DT 300	77	25	52	CH	5.2	94.8	27.4	4.3							
3873	1/29/2011	408	Pass	2	2+02	FS	64	5.7			3815	88.9	29.6	75	21	54	95.4	32.8	82.8	110.0	115.2	86.7	32.9	97.5	3.3	DT 300	76	25	51	CH	6.6	93.4	32.9	5.1							
3873	1/29/2011	410	Pass	2	38+06	FS	56	5.3			3815	88.9	29.6	75	21	54	95.4				115.3	86.0	34.1	96.7	4.5	DT 300	77	27	50	CH	5.4	94.6	34.1	4.1							
3873	1/29/2011	407	Fail	2	5+04	CL	0	7.4		4004+419	3815	88.9	29.6	75	21	54	95.4				113.5	82.8	37.0	93.1	7.4	DT 300	77	24	53	CH	3.3	96.7	37.0	4.6							
3873	1/29/2011	406	Fail	2	6+92	FS	32	6.7		4004+420	3649	94.8	24.1	59	23	36	94.0				113.0	87.1	29.7	91.9	5.6	DT 300	59	25	34	CH	10.9	89.1	29.7	4.9							
3873	1/29/2011	409	Pass	2	40+95	FS	27	5.6			3815	88.9	29.6	75	21	54	95.4				112.9	84.6	33.5	95.2	3.9	DT 300	73	23	50	CH	4.0	96.0	33.5	3.9							
3974	2/14/2011	413	Pass	5	98+05	CL	0	9.7			3185	90.0	28.5	74	23	51	99.2	29.3	90.9	117.5	112.8	84.5	33.5	93.9	5.0	DT 300	72	24	48	CH	3.1	96.9	33.5	2.7	110.4	82.7	33.5	91.9	2.2	5.0	YES
3974	2/14/2011	418	Pass	5	73+02	CL	0	9.8	3510+329		3178	91.7	26.2	68	20	48	98.1	25.9	93.9	118.3	113.6	89.2	27.4	97.3	1.2	DT 300	68	22	46	CH	5.2	94.8	27.4	2.7							
3974	2/14/2011	416	Pass	5	80+97	PS	-8.5	9.7			3185	90.0	28.5	74	23	51	99.2				120.3	93.5	28.7	103.9	0.2	DT 300	71	24	47	CH	4.6	95.4	28.7	2.4							
3974	2/14/2011	414	Pass	5	93+01	CL	0	9.3			3185	90.0	28.5	74	23	51	99.2				116.6	89.9	29.7	99.9	1.2	DT 300	71	24	47	CH	2.9	97.1	29.7	2.9							
3974	2/14/2011	417	Pass	5	76+00	PS	-10.3	9.7			3178	91.7	26.2	68	20	48	98.1				115.2	87.9	31.1	95.9	4.9	DT 300	69	25	44	CH	2.9	97.1	31.1	2.6							
3974	2/14/2011	415	Pass	5	85+97	CL	0	9.5			3185	90.0	28.5	74	23	51	99.2				113.8	90.2	26.2	100.2	-2.3	DT 300	72	24	48	CH	6.7	93.3	26.2	3.0							
3974	2/14/2011	411	Pass	5	106+02	CL	0	9.1			3178	91.7	26.2	68	20	48	98.1				111.8	88.6	26.2	96.6	0.0	DT 300	70	22	48	CH	6.2	93.8	26.2	2.7							
3974	2/14/2011	412	Pass	5	100+97	CL	0	9.6			3186	91.6	26.5	67	23	44	98.9				110.7	88.5	25.1	96.6	-1.4	DT 300	68	23	45	CH	2.7	97.3	25.1	2.7							
4004	2/17/2011	423	Pass	5	165+03	PS	-10.1	10.1	3773+375		3185	90.0	28.5	74	23	51	99.2	29.4	89.3	115.6	117.7	88.2	33.4	98.0	4.9	DT 300	71	23	48	CH	4.4	95.6	33.4	5.4	115.8	86.8	33.4	96.4	1.6	4.9	YES
4004	2/17/2011	428	Pass	2	136+02	FS	68	4.6			3291	99.5	21.9	64	22	42	97.8	25.5	95.7	120.1	118.7	93.6	26.8	94.1	4.9	DT 300	65	24	41	CH	3.5	96.5	26.8	4.2							
4004	2/17/2011	424	Pass	2	156+00	FS	62	4.1			3291	99.5	21.9	64	22	42	97.8				124.0	98.5	25.9	99.0	4.0	DT 300	57	21	36	CH	6.3	93.7	25.9	2.9							
4004	2/17/2011	421	Pass	5	180+02	CL	0	10.2	3772+378		3291	99.5	21.9	64	22	42	97.8				122.4	97.8	25.2	98.3	3.3	DT 300	64	21	43	CH	3.6	96.4	25.2	3.3							
4004	2/17/2011	427	PASS	2	141+05	FS	78	4.0			3291	99.5	21.9	64	22	42	97.8				121.1	95.6	26.7	96.1	4.8	DT 300	67	22	45	CH	3.3	96.7	26.7	3.2							
4004	2/17/2011	422	Pass	5	170+03	PS	-10.8	10.1	3772+376		3291	99.5	21.9	64	22	42	97.8				120.4	97.4	23.6	97.9	1.7	DT 300	68	21	47	CH	2.1	97.9	23.6	4.2							
4004	2/17/2011	426	PASS	2	145+99	FS	70	4.4			3291	99.5	21.9	64	22	42	97.8				120.0	96.5	24.4	97.0	2.5	DT 300	65	21	44	CH	4.4	95.6	24.4	3.6							
4004	2/17/2011	425	Pass	2	150+92	FS	69	4.8			3034	94.8	24.8	67	24	43	95.5				119.6	92.2	29.7	97.3	4.9	DT 300	66	22	44	CH	5.0	95.0	29.7	3.3							
4004	2/17/2011	420	Pass	2	6+92	FS	32	6.7	3873+406		3649	94.8	24.1	59	23	36	94.0				115.7	91.3	26.7	96.3	2.6	DT 300	61	23	38	CH	5.6	94.4	26.7	4.3							
4004	2/17/2011	429	Pass	2	15+98	FS	68	4.6			3815	88.9	29.6	75	21	54	95.4				115.1	88.7	29.8	99.8	0.2	DT 300	79	25	54	CH	5.1	94.9	29.8	3.8							
4004	2/17/2011	419	Pass	2	5+04	CL	0	7.4	3873+407		3815	88.9	29.6	75	21	54	95.4				114.1	86.0	32.6	96.7	3.0	DT 300	77	25	52	CH	4.8	95.2	32.6	5.2							
4012	2/18/2011	433	Pass	6	77+01	CL	0	10.7			3555	86.6	30.0	78	28	50	94.1	29.8	85.4	110.8	108.8	82.1	32.5	94.8	2.5	DT 300	83	30	53	CH	5.9	94.1	32.5	6.0	109.0	82.3	32.5	95.0	0.2	2.5	YES
4012	2/18/2011	434	Pass	6	83+96	PS	-11	10.7			3555	86.6	30.0	78	28	50	94.1				109.5	82.8	32.2	95.6	2.2	DT 300	78	29	49	CH	3.9	96.1	32.2	5.1							
4012	2/18/2011	430	Pass	6	62+41	CL	0	10.5			2762	92.1	26.6	72	29	43	97.1				109.0	82.9	31.5	90.0	4.9	DT 300	73	28	45	CH	8.9	91.1	31.5	5.9							
4012	2/18/2011	431	Pass	6	68+00	CL	0	10.7			2762	92.1	26.6	72	29	43	97.1				106.7	83.3	28.1	90.4	1.5	DT 300	71	26	45	CH	7.1	92.9	28.1	4.4							
4012	2/18/2011	432	Pass	6	72+01	CL	0	10.7			3555	86.6	30.0	78	28	50	94.1				103.8	81.0	28.2	93.5	-1.8	DT 300	75	25	50	CH	3.4	96.6	28.2	4.7							
4017	2/20/2011	438	Pass	2	44+50	FS	57	5.2			3824	82.9	33.7	92	31	61	93.7	32.9	82.1	109.2	108.8	78.5	38.6	94.7	4.9	DT 300	98	31	67	CH	1.7	98.3	38.6	4.2							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear w_{Meas} - w_{Opt}	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC $w_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w_{Meas} - w_{Opt}	Difference Within 3%
4017	2/20/2011	435	Pass	2	29+00	FS	57	4.9			3815	88.9	29.6	75	21	54	95.4				117.5	87.7	34.0	98.7	4.4	DT 300	75	25	50	CH	6.3	93.7	34.0	3.6							
4017	2/20/2011	436	Pass	2	31+00	FS	48	4.6			3815	88.9	29.6	75	21	54	95.4				117.3	88.8	32.1	99.9	2.5	DT 300	71	25	46	CH	4.0	96.0	32.1	3.3							
4017	2/20/2011	437	Pass	2	35+00	FS	55	4.7			3815	88.9	29.6	75	21	54	95.4				114.1	84.9	34.4	95.5	4.8	DT 300	78	27	51	CH	3.7	96.3	34.4	3.8							
4019	2/21/2011	444	Pass	3	85+93	PS	-139	1.2			3815	88.9	29.6	75	21	54	95.4	29.5	88.2	114.3	110.2	85.4	29.0	96.1	-0.6	DT 150	76	27	49	CH	6.4	93.6	29.0	5.5	110.7	85.7	29.1	96.4	0.5	-0.5	YES
4019	2/21/2011	440	Pass	3	158+50	FS	71	5.5	3384+248		3291	99.5	21.9	64	22	42	97.8				122.5	97.2	26.0	97.7	4.1	DT 300	64	23	41	CH	3.9	96.1	26.0	3.0							
4019	2/21/2011	442	Pass	2	77+00	PS	-138	0.6	3506+323		3180	95.8	24.0	60	21	39	97.8				117.5	93.7	25.4	97.8	1.4	DT 300	60	22	38	CH	3.8	96.2	25.4	3.6							
4019	2/21/2011	446	Pass	2	97+00	PS	-138	1.1			3649	94.8	24.1	59	23	36	94.0				115.0	89.1	29.1	94.0	5.0	DT 300	58	24	34	CH	3.5	96.5	29.1	4.9							
4019	2/21/2011	447	Pass	6	94+05	CL	0	10.8			2762	92.1	26.6	72	29	43	97.1				112.6	86.0	31.0	93.4	4.4	DT 300	69	28	41	CH	7.2	92.8	31.0	5.5							
4019	2/21/2011	441	Pass	3	71+04	PS	-141	1.6			3804	85.5	31.1	84	27	57	94.9				112.4	82.9	35.6	97.0	4.5	DT 300	80	28	52	CH	3.6	96.4	35.6	5.4							
4019	2/21/2011	448	Pass	6	89+03	CL	0	10.8			3550	92.3	26.0	63	19	44	95.0				112.0	89.8	24.7	97.3	-1.3	DT 300	64	23	41	CH	4.1	95.9	24.7	4.3							
4019	2/21/2011	445	Pass	2	92+72	PS	-148	-0.8	3506+320		3178	91.7	26.2	68	20	48	98.1				111.9	87.8	27.5	95.7	1.3	DT 300	72	24	48	CH	3.6	96.4	27.5	3.9							
4019	2/21/2011	443	Pass	3	81+00	PS	-139	1.6			3815	88.9	29.6	75	21	54	95.4				110.6	84.2	31.3	94.7	1.7	DT 300	75	27	48	CH	3.9	96.1	31.3	6.0							
4049	2/22/2011	449	Pass	2	26+01	FS	6	5.9			3815	88.9	29.6	75	21	54	95.4	33.3	84.4	112.5	110.2	83.4	32.2	93.8	2.6	DT 300	77	27	50	CH	3.6	96.4	32.2	2.8							
4049	2/22/2011	453	Pass	7	87+01	CL	0	11.7			3550	92.3	26.0	63	19	44	95.0				121.1	94.4	28.3	102.3	2.3	DT 300	74	23	51	CH	4.8	95.2	28.3	3.8							
4049	2/22/2011	451	Fail	2	20+07	FS	42	5.4		4049+461	3824	82.9	33.7	92	31	61	93.7				112.2	79.1	41.8	95.4	8.1	DT 300	93	33	60	CH	2.8	97.2	41.8	7.9							
4049	2/22/2011	450	Pass	2	23+06	FS	24	5.9			3824	82.9	33.7	92	31	61	93.7				111.0	80.8	37.4	97.5	3.7	DT 300	92	29	63	CH	4.8	95.2	37.4	3.8							
4049	2/22/2011	452	Pass	7	91+98	CL	0	11.7			3555	86.6	30.0	78	28	50	94.1				109.0	83.3	30.8	96.2	0.8	DT 300	74	25	49	CH	4.0	96.0	30.8	3.4							
4051	2/23/2011	454	Pass	7	77+91	CL	0	11.7			2762	92.1	26.6	72	29	43	97.1	26.6	92.4	117.0	104.5	83.3	25.4	90.4	-1.2	DT 300	73	22	51	CH	4.8	95.2	25.4	4.9	105.5	84.1	25.4	91.3	0.9	-1.2	YES
4051	2/23/2011	457	Pass	7	65+95	CL	0	11.7			3550	92.3	26.0	63	19	44	95.0				114.9	91.7	25.3	99.3	-0.7	DT 300	62	19	43	CH	6.1	93.9	25.3	3.3							
4051	2/23/2011	458	Pass	7	62+50	CL	0	11.5			2762	92.1	26.6	72	29	43	97.1				110.4	87.6	26.0	95.1	-0.6	DT 300	69	23	46	CH	6.5	93.5	26.0	4.3							
4051	2/23/2011	455	Pass	7	82+96	CL	0	11.7			2762	92.1	26.6	72	29	43	97.1				107.3	85.2	25.9	92.5	-0.7	DT 300	71	22	49	CH	6.4	93.6	25.9	4.5							
4051	2/23/2011	456	Pass	7	73+05	CL	0	11.7			3555	86.6	30.0	78	28	50	94.1				105.4	80.4	31.1	92.8	1.1	DT 300	78	27	51	CH	4.3	95.7	31.1	4.7							
4057	2/24/2011	459	Pass	1	103+01	PS	-131	1.2			3815	88.9	29.6	75	21	54	95.4	32.5	85.8	113.7	112.1	83.9	33.6	94.4	4.0	DT 150	79	25	54	CH	3.4	96.6	33.6	3.1							
4057	2/24/2011	460	Pass	1	108+02	PS	-138	0.8			3804	85.5	31.1	84	27	57	94.9				106.8	79.7	34.0	93.2	2.9	DT 150	85	27	58	CH	3.4	96.6	34.0	5.1							
4094	3/1/2011	461	Pass	2	20+07	FS	42	5.4	4049+451		3804	85.5	31.1	84	27	57	94.9				110.9	83.6	32.7	97.8	1.6	DT 300	84	32	52	CH	2.7	97.3	32.7	5.0							
4103	3/2/2011	465	Pass	3	143+96	FS	16	6.8			3034	94.8	24.8	67	24	43	95.5	28.6	93.0	119.6	123.0	94.8	29.7	100.0	4.9	DT 150	65	20	45	CH	3.1	96.9	29.7	1.9	120.2	92.7	29.7	97.8	2.3	4.9	YES
4103	3/2/2011	470	Pass	3	155+74	FS	23	6.6	3772+373		3178	91.7	26.2	68	20	48	98.1	29.2	91.0	117.6	118.9	93.3	27.5	101.7	1.3	DT 300	72	24	48	CH	4.4	95.6	27.5	3.4							
4103	3/2/2011	466	Pass	3	145+99	FS	16	6.8			3034	94.8	24.8	67	24	43	95.5				121.0	93.6	29.3	98.7	4.5	DT 300	65	22	43	CH	3.9	96.1	29.3	2.5							
4103	3/2/2011	468	Pass	3	150+72	FS	11	6.8			3186	91.6	26.5	67	23	44	98.9				118.9	91.5	30.0	99.9	3.5	DT 300	65	22	43	CH	3.7	96.3	30.0	2.7							
4103	3/2/2011	464	Pass	3	14+95	FS	57	6.1			3649	94.8	24.1	59	23	36	94.0				117.1	94.0	24.6	99.2	0.5	DT 300	63	22	41	CH	6.2	93.8	24.6	3.0							
4103	3/2/2011	469	Fail	3	153+22	FS	19	6.7		4143+486	3178	91.7	26.2	68	20	48	98.1				117.1	86.3	35.7	94.1	9.5	DT 300	71	25	46	CH	4.6	95.4	35.7	3.6							
4103	3/2/2011	463	Fail	3	10+13	FS	31	6.4		4281+545	3824	82.9	33.7	92	31	61	93.7				115.9	82.4	40.6	99.4	6.9	DT 300	91	30	61	CH	3.1	96.9	40.6	4.1							
4103	3/2/2011	467	Pass	3	148+24	CL	0	7.0			3186	91.6	26.5	67	23	44	98.9				113.7	91.3	24.6	99.7	-1.9	DT 300	66	22	44	CH	4.4	95.6	24.6	2.6							
4113	3/3/2011	475	Pass	2	26+01	PS	-139	1.4			3034	94.8	24.8	67	24	43	95.5	24.4	94.3	117.3	113.8	91.0	25.0	96.0	0.2	DT 150	69	24	45	CH	5.2	94.8	25.0	2.9	112.3	89.8	25.0	94.7	1.3	0.2	YES
4113	3/3/2011	477	Pass	2	17+96	PS	-141	1.5			3180	95.8	24.0	60	21	39	97.8				122.6	97.3	26.0	101.6	2.0	DT 300	57	23	34	CH	5.4	94.6	26.0	2.3							
4113	3/3/2011	471	Pass	2	42+03	PS	-153	0.9			3034	94.8	24.8	67	24	43	95.5				120.5	94.9	27.0	100.1	2.2	DT 300	67	23	44	CH	4.0	96.0	27.0	2.5							
4113	3/3/2011	476	Pass	2	21+91	PS	-136	1.5			3034	94.8	24.8	67	24	43	95.5				118.8	93.5	27.1	98.6	2.3	DT 300	67	24	43	CH	4.7	95.3	27.1	2.9							
4113	3/3/2011	473	Pass	2	32+00	PS	-142	1.1			3178	91.7	26.2	68	20	48	98.1				116.5	92.2	26.3	100.5	0.1	DT 300	72	23	49	CH	3.9	96.1	26.3	2.8							
4113	3/3/2011	472	Pass	2	37+99	PS	-142	1.3			3178	91.7	26.2	68	20	48	98.1				114.0	89.4	27.5	97.5	1.3	DT 300	71	24	47	CH	4.7	95.3	27.5	2.6							
4113	3/3/2011	474	Pass	2	29+93	PS	-142	1.4			2854	95.9	23.9	62	24	40	97.0				112.6	91.3	23.3	95.2	-0.6	DT 300	64	23	41	CH	4.2	95.8	23.3	3.0							
4113	3/3/2011	478	Pass	8	71+03	CL	0	12.8			3555	86.6	30.0	78	28	50	94.1				103.7	81.2	27.7	93.8	-2.3	DT 300	78	27	51	CH	6.9	93.1	27.7	4.2							
4143	3/13/2011	485	Pass	5	121+35	CL	0	9.3			3034	94.8	24.8	67	24	43	95.5	27.8	91.6	117.1	118.5	91.7	29.2	96.7	4.4	DT 150	71	26	45	CH	5.4	94.6	29.2	2.9	115.6	89.5	29.2	94.4	2.5	4.4	YES
4143	3/13/2011	490	Pass	9	74+53	CL	0	13.0			3550	92.3	26.0	63	19	44	95.0	25.2	94.6	118.4	114.2	90.2	26.6	97.7	0.6	DT 150	65	22	43	CH	5.8	94.2	26.6	3.5							
4143	3/13/2011	492	Pass	9	65+00	CL	0	13.0			2653	99.7	23.1	59	24	35	96.3				123.4	101.6	21.5	101.9	-1.6	DT 150	58	19	39	CH	9.9	90.1	21.5	3.2							
4143	3/13/2011	486	Pass	3	153+22	FS	19	6.7	4103+469		3034	94.8	24.8	67	24	43	95.5				118.7	91.5	29.7	96.5	4.9	DT 300	72	24	48	CH	2.8	97.2	29.7	3.8							
4143	3/13/2011	488	Pass	8	88+05	CL	0	12.3			3555	86.6	30.0	78	28	50	94.1				115.2	86.7	32.9	100.1	2.9	DT 300	77	27	50	CH	5.6	94.4	32.9	4.9							
4143	3/13/2011	482	Pass	6	98+94	CL	0	10.9			3550	92.3	26.0	63	19	44	95.0				115.0	89.4	28.7	96.9	2.7	DT 300	63	25	38	CH	11.2	88.2	28.7	4.1							
4143	3/13/2011	487	Pass	8	93+10	CL	0	12.5			3550	92.3	26.0	63	19	44	95.0				114.3	88.5	29.2	95.9	3.2	DT 300	64	22	42	CH	2.5	97.5	29.2	5.0							
4143	3/13/2011	491	Pass	9	69+98	CL	0	13.1			3550	92.3	26.0	63	19	44	95.0				112.5	89.3	26.0	96.7	0.0	DT 150	64	23	41	CH	5.7	94.3	26.0	3.6							
4143	3/13/2011	484	Pass	6	107+39	CL	0	10.8			3555	86.6	30.0	78	28	50	94.1				112.5	84.8	32.7	97.9	2.7	DT 300	83	27	56	CH	7.5	92.5	32.7	4.4							
4143	3/13/2011	483	Pass	6	103+97	CL	0	10.7			3550	92.3	26.0	63	19	44	95.0				111.3	87.8	26.8	95.1	0.8	DT 300	63	24	39	CH	4.9	95.1	26.8	5.0							
4143	3/13/2011	489	Pass	8	84+12	CL	0	12.3			3555	86.6	30.0	78	28	50	94.1				107.9	81.6	32.2	94.2	2.2	DT 300	83	30	53	CH	7.8	92.2	32.2	7.2							
4169	3/12/2011	480	Pass	8	68+93	CL	0	12.7			3550	92.3	26.0	63	19	44	95.0	25.2	94.6	118.4	113.2	89.8	26.0	97.3	0.0	DT 300	56	22	34	CH	7.9	92.1	26.0	3.0							
4169	3/12/2011	479	Pass	8	63+58	CL	0	12.6			3550	92.3	26.0	63	19	44	95.0				121.0	94.7	27.8	102.6	1.8	DT 300	58	20	38	CH	8.3	91.7	27.8	3.0							
4169	3/12/2011	481	Pass	8	75+97	CL	0	12.2			3555	86.6	30.0	78	28	50	94.1				115.0	85.9	33.9	99.2	3.9	DT 300	83	29	54	CH	5.9	94.1	33.9	5.4							
4171	3/14/2011	495	Pass	4	128+46	PS	-15	9.1			3178	91.7	26.2	68	20	48	98.1	28.6	90.4	116.2	110.7	86.8	27.5	94.7	1.3	DT 150	70	22	48	CH	3.5	96.5	27.5	3.9	107.8	84.5	27.5	92.1	2.7	1.3	YES
4171	3/14/2011	497	Pass	1	124+98	PS	-80	5.0	2690+22		3291	99.5	21.9	64	22	42	97.8				127.4	102.8	23.9	103.3	2.0	DT 150	65	18	47	CH	2.8	97.2	23.9	3.2							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w $_{Meas}$	% Compaction Nuclear	Nuclear w $_{Meas}$ - w_{Opt}	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC w $_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w $_{Meas}$	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w $_{Meas}$ - w $_{Opt}$	Difference Within 3%
4171	3/14/2011	494	Pass	3	91+00	PS	-120	2.0			3649	94.8	24.1	59	23	36	94.0				117.9	91.9	28.3	96.9	4.2	DT 300	61	22	39	CH	3.5	96.4	28.3	3.1							
4171	3/14/2011	496	Pass	4	137+93	PS	-12	9.4			3178	91.7	26.2	68	20	48	98.1				116.6	91.1	28.0	99.3	1.8	DT 300	72	23	49	CH	3.9	96.1	28.0	4.0							
4171	3/14/2011	493	Pass	3	76+06	PS	-125	2.0			3815	88.9	29.6	75	21	54	95.4				106.9	81.9	30.5	92.1	0.9	DT 300	78	26	52	CH	3.7	96.3	30.5	3.4							
4213	3/19/2011	506	Pass	6	163+09	PS	-10	10.8			3804	85.5	31.1	84	27	57	94.9	32.3	86.3	114.2	113.8	84.6	34.5	98.9	3.4	DT 150	88	27	61	CH	3.7	96.3	34.5	4.8	111.4	82.8	34.5	96.8	2.2	3.4	YES
4213	3/19/2011	501	Pass	4	153+02	FS	7.2	7.8			3824	82.9	33.7	92	31	61	93.7	36.6	79.7	108.8	107.0	80.5	32.9	97.1	-0.8	DT 300	89	26	63	CH	2.5	97.5	32.9	5.5							
4213	3/19/2011	504	Pass	6	173+03	PS	-8	10.9			3824	82.9	33.7	92	31	61	93.7				115.3	83.8	37.6	101.1	3.9	DT 300	99	35	64	CH	7.3	92.7	37.6	7.1							
4213	3/19/2011	499	Pass	4	143+00	CL	0	8.0			3824	82.9	33.7	92	31	61	93.7				111.9	83.4	34.1	100.6	0.4	DT 300	90	27	63	CH	6.6	93.4	34.1	5.4							
4213	3/19/2011	503	Pass	6	178+01	CL	0	10.9			3824	82.9	33.7	92	31	61	93.7				110.4	80.6	37.0	97.2	3.3	DT 300	90	32	58	CH	3.8	96.2	37.0	6.6							
4213	3/19/2011	505	Pass	6	168+04	CL	0	10.8			3824	82.9	33.7	92	31	61	93.7				110.4	81.2	35.9	97.9	2.2	DT 300	94	30	64	CH	2.0	98.0	35.9	6.2							
4213	3/19/2011	502	Pass	4	158+03	CL	0	7.9			3824	82.9	33.7	92	31	61	93.7				109.2	78.7	38.7	94.9	5.0	DT 300	91	28	63	CH	2.6	97.4	38.7	5.4							
4213	3/19/2011	500	Pass	4	148+08	FS	7	7.8			3824	82.9	33.7	92	31	61	93.7				104.8	79.1	32.5	95.4	-1.2	DT 300	92	27	65	CH	3.3	96.7	32.5	5.1							
4217	3/20/2011	511	Pass	5	141+01	CL	0	10.0			3815	88.9	29.6	75	21	54	95.4	28.5	91.1	117.0	115.6	87.8	31.6	98.8	2.0	DT 300	71	21	50	CH	6.2	93.8	34.8	3.6							
4217	3/20/2011	508	Pass	5	127+08	CL	0	10.2			3824	82.9	33.7	92	31	61	93.7				116.4	84.7	37.4	102.2	3.7	DT 300	91	30	61	CH	4.3	95.7	31.4	5.0							
4217	3/20/2011	509	Pass	5	132+00	CL	0	10.1			3804	85.5	31.1	84	27	57	94.9				113.7	88.6	28.3	103.6	-2.8	DT 300	84	24	60	CH	4.3	95.7	34.0	4.7							
4217	3/20/2011	512	Pass	1	122+12	PS	-142	2.0			3185	90.0	28.5	74	23	51	99.2				113.3	89.4	26.7	99.3	-1.8	DT 150	73	22	51	CH	4.0	96.0	26.7	3.0							
4217	3/20/2011	507	Pass	6	122+14	CL	0	10.2			3824	82.9	33.7	92	31	61	93.7				109.7	79.4	38.2	95.8	4.5	DT 300	88	26	62	CH	4.4	95.6	31.4	4.7							
4217	3/20/2011	510	Pass	5	136+90	PS	-6	10.1			3824	82.9	33.7	92	31	61	93.7				102.4	77.9	31.4	94.0	-2.3	DT 300	90	28	62	CH	3.8	96.2	35.8	5.5							
4240	3/23/2011	521	Pass	3	39+00	FS	28	6.6			3824	82.9	33.7	92	31	61	93.7	34.6	83.8	112.7	109.1	81.5	33.8	98.3	0.1	DT 300	87	28	59	CH	5.6	94.4	33.8	4.8							
4240	3/23/2011	520	Pass	3	44+04	FS	18	6.7			3824	82.9	33.7	92	31	61	93.7				111.6	80.7	38.3	97.3	4.6	DT 300	90	27	63	CH	4.2	95.8	38.3	4.7							
4248	3/24/2011	526	Pass	7	107+02	CL	0	11.4		4248+526	3181	92.9	22.3	78	23	55	99.6	21.8	93.7	114.1	106.9	85.2	25.4	91.7	3.1	DT 300	78	23	55	CH	6.5	93.5	25.4	4.3	110.0	87.7	25.4	94.4	2.8	3.1	YES
4248	3/24/2011	522	Pass	1	107+07	PS	-82	4.4			3181	92.9	22.3	78	23	55	99.6				120.4	95.0	26.8	102.3	4.5	DT 150	75	23	52	CH	5.1	94.9	26.8	4.1							
4248	3/24/2011	523	Pass	1	101+99	PS	-73	4.6			3183	87.5	27.6	81	25	56	99.6				115.1	87.6	31.4	100.1	3.8	DT 150	81	28	53	CH	11.8	88.2	31.4	4.9							
4248	3/24/2011	528	Pass	3	28+98	CL	0	6.4			3804	85.5	31.1	84	27	57	94.9				112.4	85.8	31.0	100.4	-0.1	DT 300	84	28	56	CH	4.4	95.6	31.0	6.1							
4248	3/24/2011	525	Fail	7	102+00	CL	0	11.4		4305+554	3178	91.7	26.2	68	20	48	98.1				110.0	90.7	21.3	98.9	-4.9	DT 300	73	26	47	CH	4.5	95.5	21.3	5.0							
4248	3/24/2011	524	Pass	7	96+99	CL	0	11.5			3183	87.5	27.6	81	25	56	99.6				108.1	84.1	28.5	96.1	0.9	DT 300	83	26	57	CH	4.2	95.8	28.5	4.7							
4248	3/24/2011	527	Pass	3	34+01	CL	0	6.7			3824	82.9	33.7	92	31	61	93.7				107.8	78.2	37.9	94.3	4.2	DT 300	98	34	64	CH	4.4	95.6	37.9	6.8							
4250	3/22/2011	516	Pass	1	91+96	PS	-73.1	4.8			3181	92.9	22.3	78	23	55	99.6	25.4	94.0	117.9	115.6	93.2	24.0	100.3	1.7	DT 150	73	21	52	CH	3.3	96.7	24.0	3.8	114.0	91.9	24.0	98.9	1.4	1.7	YES
4250	3/22/2011	519	Pass	1	77+00	PS	-77	4.6			3185	90.0	26.5	74	23	51	99.2				121.7	94.3	29.0	104.8	2.5	DT 150	74	24	50	CH	4.5	95.5	29.0	4.3							
4250	3/22/2011	518	Pass	1	82+00	PS	-77	4.6			3185	90.0	28.5	74	23	51	99.2				121.1	95.1	27.3	105.7	-1.2	DT 150	74	22	52	CH	3.6	96.4	27.3	3.4							
4250	3/22/2011	517	Pass	1	87+00	PS	-72	4.7			3181	92.9	22.3	78	23	55	99.6				118.8	95.2	24.8	102.5	2.5	DT 150	77	25	52	CH	5.5	94.5	24.8	4.0							
4250	3/22/2011	514	Pass	3	49+04	FS	20	6.7			3804	85.5	31.1	84	27	57	94.9				114.6	85.5	34.1	100.0	3.0	DT 300	84	26	58	CH	3.7	96.3	34.1	4.6							
4250	3/22/2011	515	Pass	1	97+03	PS	-83	4.6			3034	94.8	24.8	67	24	43	95.5				114.1	92.6	23.2	97.7	-1.6	DT 150	66	21	45	CH	4.3	95.7	23.2	3.1							
4250	3/22/2011	513	Pass	3	54+00	FS	39	6.4			3824	82.9	33.7	92	31	61	93.7				110.4	83.0	33.0	100.1	-0.7	DT 300	97	29	68	CH	5.3	94.7	33.0	5.9							
4256	3/25/2011	536	Fail	5	151+00	CL	0	9.1		4268+544	3804	85.5	31.1	84	27	57	94.9	31.8	84.8	111.8	100.0	75.0	33.3	87.7	2.2	DT 150	80	27	53	CH	5.4	94.6	33.3	5.7	98.1	73.6	33.3	86.1	1.9	2.2	YES
4256	3/25/2011	531	Pass	6	129+05	CL	0	11.1			3815	88.9	29.6	75	21	54	95.4	28.3	92.5	118.7	113.5	88.3	28.6	99.3	-1.0	DT 300	76	25	51	CH	3.4	96.6	28.6	3.7							
4256	3/25/2011	530	Pass	6	134+00	CL	0	11.1			3550	92.3	26.0	63	19	44	95.0				115.5	88.8	30.0	96.2	4.0	DT 300	66	24	42	CH	3.7	96.3	30.0	3.7							
4256	3/25/2011	529	Pass	6	139+10	CL	0	11.0			3550	92.3	26.0	63	19	44	95.0				114.6	89.0	28.8	96.4	2.8	DT 300	72	26	46	CH	8.6	91.4	28.8	3.9							
4256	3/25/2011	534	Pass	5	160+98	CL	0	9.2			3824	82.9	33.7	92	31	61	93.7				112.7	82.0	37.4	98.9	3.7	DT 300	85	30	55	CH	6.2	93.8	37.4	5.9							
4256	3/25/2011	533	Pass	7	121+58	CL	0	11.1			3815	88.9	29.6	75	21	54	95.4				112.2	86.6	29.6	97.4	0.0	DT 300	75	25	50	CH	4.1	95.9	29.6	3.8							
4256	3/25/2011	532	Pass	6	124+12	CL	0	11.2			3815	88.9	29.6	75	21	54	95.4				110.1	82.5	33.4	92.8	3.8	DT 300	76	26	50	CH	4.4	95.6	33.4	3.8							
4256	3/25/2011	535	Pass	5	156+16	CL	0	9.1			3804	85.5	31.1	84	27	57	94.9				105.9	79.6	33.1	93.1	2.0	DT 300	83	27	56	CH	3.7	96.3	33.1	5.7							
4256	3/25/2011	537	Pass	5	146+03	FS	10	9.0			3824	82.9	33.7	92	31	61	93.7				104.5	78.9	32.5	95.2	-1.2	DT 300	90	28	62	CH	3.3	96.7	32.5	5.6							
4264	3/26/2011	538	Pass	3	19+08	FS	7.5	7.2			3815	88.9	29.6	75	21	54	95.4				114.9	85.9	33.7	96.6	4.1	DT 300	79	26	53	CH	4.2	95.8	33.7	4.3							
4264	3/26/2011	539	Pass	3	23+97	CL	0	7.3			3824	82.9	33.7	92	31	61	93.7				107.2	81.5	31.5	98.3	-2.2	DT 300	89	27	62	CH	2.5	97.5	31.5	3.7							
4268	3/28/2011	541	Pass	9	85+00	CL	0	12.9			2762	92.1	26.6	72	29	43	97.1	22.4	94.7	115.9	103.6	83.1	24.6	90.2	-2.0	DT 150	70	21	49	CH	5.2	94.8	24.6	3.7							
4268	3/28/2011	540	Pass	9	79+93	CL	0	12.9			2762	92.1	26.6	72	29	43	97.1				114.9	90.3	27.2	98.0	0.6	DT 150	71	23	48	CH	5.0	95.0	27.2	3.2							
4268	3/28/2011	544	Pass	5	151+00	CL	0	9.1	4256+536		3804	85.5	31.1	84	27	57	94.9				114.5	86.6	32.2	101.3	1.1	DT 150	85	30	55	CH	6.7	93.3	32.2	4.6							
4268	3/28/2011	542	Pass	9	89+98	CL	0	12.9			3824	82.9	33.7	92	31	61	93.7				107.5	77.8	38.2	93.8	4.5	DT 150	93	32	61	CH	6.0	94.0	38.2	5.6							
4268	3/28/2011	543	Fail	9	94+82	CL	0	13.0		4305+553	3824	82.9	33.7	92	31	61	93.7				104.1	85.1	22.3	102.7	-11.4	DT 150	86	22	64	CH	4.5	95.5	22.3	4.1							
4281	3/29/2011	546	Fail	3	6+03	CL	0	7.5		4347+581	3804	85.5	31.1	84	27	57	94.9	33.2	83.0	110.6	98.9	71.0	39.3	83.0	8.2	DT 150	86	29	57	CH	10.6	89.4	39.3	6.1	96.9	69.6	39.3	81.4	2.1	8.2	YES
4281	3/29/2011	551	Pass	7	136+57	PS	-8	11.9			3550	92.3	26.0	63	19	44	95.0	23.0	91.0	112.0	107.9	85.4	26.3	92.5	0.3	DT 300	70	24	46	CH	6.8	93.2	26.3	4.1							
4281	3/29/2011	552	Pass	7	141+00	PS	-9	11.8			3550	92.3	26.0	63	19	44	95.0				117.4	92.2	27.4	99.9	1.4	DT 300	70	24	46	CH	7.4	92.6	27.4	4.1							
4281	3/29/2011	548	Pass	8	122+90	CL	0	12.2			3555	86.6	30.0	78	28	50	94.1				114.7	87.2	31.6	100.7	1.6	DT 300	82	27	55	CH	4.3	95.7	31.6	3.8							
4281	3/29/2011	547	Pass	3	2+98	CL	0	7.5			3824	82.9	33.7	92	31	61	93.7				111.4	83.4	33.5	100.6	-0.2	DT 300	90	30	60	CH	4.9	95.1	33.5	6.0							
4281	3/29/2011	545	Pass	3	10+13	FS	31	6.4	4103+463		3815	88.9	29.6	75	21	54	95.4				110.5	86.6	27.6	97.4	-2.0	DT 300	75	25	50	CH	4.0	96.0	27.6	4.8							
4281	3/29/2011	550	Pass	7	131+32	CL	0	12.1			3550	92.3	26.0	63	19	44	95.0				109.3	86.9	25.8	94.1	-0.2	DT 300	70	23	47	CH	4.2	95.8	25.8	5.7							
4281	3/29/2011	549	Pass	7	126+45	CL	0	12.0			3555	86.6	30.0	78	28	50	94.1				109.1	85.0	28.4	98.2	-1.6	DT 300	82	25	57	CH	3.6	96.4	28.4	3.9							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear $w_{Meas} - w_{Opt}$	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC $w_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone $w_{Meas} - w_{Opt}$	Difference Within 3%
4305	4/1/2011	555	Pass	7	107+02	CL	0	11.4	4248+526		2762	92.1	26.6	72	29	43	97.1				120.4	95.6	26.0	103.8	-0.6	DT 300	68	25	43	CH	7.7	92.3	26.0	3.9							
4305	4/1/2011	554	Pass	7	102+00	CL	0	11.4	4248+525		2762	92.1	26.6	72	29	43	97.1				119.5	92.4	29.3	100.3	2.7	DT 300	71	28	43	CH	6.1	93.9	29.3	4.5							
4305	4/1/2011	553	Pass	9	94+82	CL	0	13.0	4268+543		2762	92.1	26.6	72	29	43	97.1				114.8	91.9	24.9	99.8	-1.7	DT 150	75	29	46	CH	3.5	96.5	24.9	4.3							
4316	4/4/2011	576	Pass	1	162+01	PS	-151	1.7			3815	88.9	29.6	75	21	54	95.4	31.5	85.8	112.8	110.5	83.4	32.5	93.8	2.9	DT 150	78	29	49	CH	4.3	95.7	32.5	5.7	111.3	84.0	32.5	94.5	0.7	2.9	YES
4316	4/4/2011	566	Pass	6	144+06	PS	-15	10.1			3649	94.8	24.1	59	23	36	94.0	25.8	93.3	117.3	114.1	90.7	25.8	95.7	1.7	DT 300	65	24	41	CH	4.5	95.5	25.8	3.7	110.9	88.2	25.8	93.0	2.9	1.7	YES
4316	4/4/2011	556	Pass	1	127+38	PS	-131	2.6			3815	88.9	29.6	75	21	54	95.4	30.5	88.1	115.0	111.7	85.2	31.1	95.8	1.5	DT 150	77	28	49	CH	2.8	97.2	31.1	5.0	109.5	83.5	31.1	93.9	2.0	1.5	YES
4316	4/4/2011	571	Pass	9	122+03	CL	0	12.8			3555	86.6	30.0	78	28	50	94.1	30.2	88.9	115.8	111.8	84.8	31.8	97.9	1.8	DT 300	73	25	48	CH	2.3	97.7	31.8	3.7							
4316	4/4/2011	561	Pass	1	152+05	PS	-138	1.7			3815	88.9	29.6	75	21	54	95.4	31.5	87.1	114.6	111.2	85.0	30.8	95.6	1.2	DT 150	78	28	50	CH	2.3	97.7	30.8	4.8							
4316	4/4/2011	577	Pass	1	164+83	PS	-83	5.0	2690+14		3291	99.5	21.9	64	22	42	97.8				123.6	100.0	23.6	100.5	1.7	DT 150	63	22	41	CH	4.2	95.8	23.6	3.8							
4316	4/4/2011	563	Pass	6	158+94	PS	-20	10.1			3649	94.8	24.1	59	23	36	94.0				116.7	92.3	26.5	97.4	2.4	DT 300	63	24	39	CH	5.0	95.0	26.5	3.8							
4316	4/4/2011	567	Pass	8	138+90	FS	5	12.8			3555	86.6	30.0	78	28	50	94.1				115.3	86.8	32.8	100.2	2.8	DT 300	71	26	45	CH	4.3	95.7	32.8	5.4							
4316	4/4/2011	569	Fail	8	129+03	CL	0	13.0		4369+588	4171	96.5	22.9	60	22	38	88.2				115.1	86.7	32.7	89.8	9.8	DT 300	63	25	38	CH	2.7	97.3	32.7	3.9							
4316	4/4/2011	570	Pass	8	124+03	CL	0	12.8			4171	96.5	22.9	60	22	38	88.2				114.6	89.6	27.9	92.8	5.0	DT 300	67	25	42	CH	2.8	97.2	27.9	3.7							
4316	4/4/2011	564	Pass	6	154+03	PS	-8	10.2			3649	94.8	24.1	59	23	36	94.0				114.6	88.8	29.1	93.7	5.0	DT 300	65	23	42	CH	3.5	96.5	29.1	3.5							
4316	4/4/2011	568	Pass	8	134+08	CL	0	13.0			3555	86.6	30.0	78	28	50	94.1				113.9	87.0	30.9	100.5	0.9	DT 300	77	28	49	CH	3.3	96.7	30.9	4.8							
4316	4/4/2011	565	Pass	6	149+00	CL	0	10.1			3649	94.8	24.1	59	23	36	94.0				113.3	88.9	27.5	93.8	3.4	DT 300	69	25	44	CH	2.7	97.3	27.5	4.5							
4316	4/4/2011	562	Pass	1	157+12	PS	-140	1.8			3815	88.9	29.6	75	21	54	95.4				113.2	86.4	31.0	97.2	1.4	DT 150	74	26	48	CH	2.4	97.6	31.0	4.1							
4316	4/4/2011	559	Pass	1	142+61	PS	-143	2.1			3815	88.9	29.6	75	21	54	95.4				112.7	84.9	32.8	95.5	3.2	DT 150	73	26	47	CH	4.5	95.5	32.8	5.1							
4316	4/4/2011	578	Pass	1	167+02	PS	-130	2.1			3815	88.9	29.6	75	21	54	95.4				111.3	82.8	34.4	93.1	4.8	DT 150	74	26	48	CH	4.0	96.0	34.4	5.0							
4316	4/4/2011	572	Pass	7	179+02	CL	0	12.1			3804	85.5	31.1	84	27	57	94.9				110.0	81.6	34.8	95.4	3.7	DT 300	80	27	53	CH	2.7	97.3	34.8	5.2							
4316	4/4/2011	558	Pass	1	137+19	PS	-134	2.4			3815	88.9	29.6	75	21	54	95.4				109.8	85.9	27.8	96.6	-1.8	DT 150	79	26	53	CH	4.2	95.8	27.8	4.9							
4316	4/4/2011	560	Pass	1	147+07	PS	-141	1.8			3824	82.9	33.7	92	31	61	93.7				108.9	79.1	37.6	95.4	3.9	DT 150	90	30	60	CH	3.4	96.6	37.6	5.3							
4316	4/4/2011	574	Fail	7	169+03	CL	0	12.0		4369+586	3804	85.5	31.1	84	27	57	94.9				107.9	78.4	37.6	91.7	6.5	DT 300	81	30	51	CH	2.1	97.9	37.6	5.5							
4316	4/4/2011	579	Pass	1	172+02	PS	-131	2.2			3815	88.9	29.6	75	21	54	95.4				106.9	80.0	33.6	90.0	4.0	DT 150	74	27	47	CH	5.7	94.3	33.6	5.2							
4316	4/4/2011	573	Fail	7	174+05	CL	0	12.0		4369+585	3804	85.5	31.1	84	27	57	94.9				106.9	76.7	39.4	89.7	8.3	DT 300	81	30	51	CH	3.8	96.2	39.4	5.5							
4316	4/4/2011	557	Pass	1	132+32	PS	-136	2.4			3824	82.9	33.7	92	31	61	93.7				106.6	76.9	38.6	92.8	4.9	DT 150	88	33	55	CH	3.7	96.3	38.6	6.2							
4316	4/4/2011	575	Fail	7	164+09	CL	0	11.9		4369+587	3804	85.5	31.1	84	27	57	94.9				105.8	77.2	37.0	90.3	5.9	DT 300	83	30	53	CH	3.1	96.9	37.0	5.4							
4316	4/4/2011	580	Pass	1	177+00	PS	-130	2.3			3824	82.9	33.7	92	31	61	93.7				105.3	76.0	38.5	91.7	4.8	DT 150	90	30	60	CH	4.2	95.8	38.5	5.6							
4347	4/7/2011	581	Pass	3	6+03	CL	0	7.5	4281+546		3804	85.5	31.1	84	27	57	94.9	29.2	84.5	108.2	103.8	80.7	28.7	94.4	-2.4	DT 300	81	25	56	CH	3.9	96.1	28.7	6.8							
4347	4/7/2011	584	Pass	8	106+00	CL	0	12.0			3804	85.5	31.1	84	27	57	94.9				108.7	81.6	33.2	95.4	2.1	DT 300	84	27	57	CH	3.2	96.8	33.2	5.8							
4347	4/7/2011	582	Pass	8	96+10	CL	0	12.0			3824	82.9	33.7	92	31	61	93.7				108.3	79.3	36.6	95.7	2.9	DT 300	90	33	57	CH	9.6	90.4	36.6	7.1							
4347	4/7/2011	583	Pass	8	100+98	CL	0	12.2			3804	85.5	31.1	84	27	57	94.9				107.6	80.7	33.3	94.4	2.2	DT 300	84	27	57	CH	3.3	96.7	33.3	5.6							
4369	4/11/2011	586	Pass	7	169+03	CL	0	12.0	4316+574		3804	85.5	31.1	84	27	57	94.9	33.8	83.3	111.5	109.7	81.0	35.4	94.7	4.3	DT 150	80	28	52	CH	5.2	94.8	35.4	5.4	107.7	79.5	35.4	93.0	1.9	4.3	YES
4369	4/11/2011	591	Pass	4	28+35	CL	0	8.3			3824	82.9	33.7	92	31	61	93.7	33.2	82.3	109.5	104.6	78.6	33.1	94.8	-0.6	DT 300	93	28	65	CH	6.4	93.6	33.1	6.8							
4369	4/11/2011	585	Pass	7	174+05	CL	0	12.0	4316+573		3804	85.5	31.1	84	27	57	94.9				111.2	82.2	35.3	96.1	4.2	DT 300	79	27	52	CH	4.0	96.0	35.3	5.1							
4369	4/11/2011	590	Pass	4	20+53	FS	21	8.5			3824	82.9	33.7	92	31	61	93.7				110.9	82.1	35.1	99.0	1.4	DT 300	94	28	66	CH	5.2	94.8	35.1	6.2							
4369	4/11/2011	587	Pass	7	164+09	CL	0	11.9	4316+575		3804	85.5	31.1	84	27	57	94.9				109.2	80.5	35.7	94.2	4.6	DT 300	84	31	53	CH	5.5	94.5	35.7	4.7							
4369	4/11/2011	588	Pass	8	129+03	CL	0	13.0	4316+569		3804	85.5	31.1	84	27	57	94.9				109.0	81.2	34.3	95.0	3.2	DT 300	81	29	52	CH	7.7	92.3	34.3	5.2							
4369	4/11/2011	589	Pass	4	16+01	FS	10	8.4			3804	85.5	31.1	84	27	57	94.9				106.6	78.4	35.9	91.7	4.8	DT 300	84	28	56	CH	7.8	92.2	35.9	7.9							
4369	4/11/2011	594	Pass	4	43+02	CL	0	8.2			3824	82.9	33.7	92	31	61	93.7				105.8	78.1	35.5	94.2	1.8	DT 300	89	30	59	CH	6.8	93.2	35.5	6.1							
4369	4/11/2011	593	Pass	4	35+05	PS	-10	8.2			3824	82.9	33.7	92	31	61	93.7				105.7	79.8	32.4	96.3	-1.3	DT 300	91	23	63	CH	6.2	93.8	32.4	6.2							
4369	4/11/2011	592	Pass	4	30+47	CL	0	8.2			3824	82.9	33.7	92	31	61	93.7				105.3	78.1	34.9	94.2	1.2	DT 300	95	31	64	CH	6.1	93.9	34.9	6.9							
4400	4/14/2011	596	Pass	4	86+97	PS	-131	2.2			3815	88.9	29.6	75	21	54	95.4	28.3	90.0	115.5	112.2	86.0	30.5	96.7	0.9	DT 150	74	27	47	CH	4.6	95.4	30.5	4.3	114.7	87.9	30.5	98.9	2.2	0.9	YES
4400	4/14/2011	601	Pass	7	144+94	CL	0	11.3			3550	92.3	26.0	63	19	44	95.0	24.5	93.1	115.9	108.3	87.6	23.6	94.9	-2.4	DT 300	67	22	45	CH	1.5	98.5	23.6	4.3							
4400	4/14/2011	604	Pass	7	159+95	CL	0	11.1			3550	92.3	26.0	63	19	44	95.0				111.8	88.0	27.1	95.3	1.1	DT 300	65	24	41	CH	3.7	96.3	27.1	3.7							
4400	4/14/2011	602	Pass	7	150+00	CL	0	11.0			3550	92.3	26.0	63	19	44	95.0				108.7	88.3	23.1	95.7	-2.9	DT 300	67	24	43	CH	3.4	96.6	18.8	3.9							
4400	4/14/2011	603	Pass	7	155+00	CL	0	10.9			3550	92.3	26.0	63	19	44	95.0				108.2	87.3	24.0	94.6	-2.0	DT 300	70	21	49	CH	3.5	96.5	22.9	4.5							
4400	4/14/2011	595	Pass	4	81+98	PS	-130	2.6			3815	88.9	29.6	75	21	54	95.4				107.7	81.6	32.0	91.8	2.4	DT 300	79	28	51	CH	4.6	95.4	32.0	4.9							
4400	4/14/2011	598	Pass	3	97+00	PS	-143	1.9			3815	88.9	29.6	75	21	54	95.4				107.4	82.1	30.8	92.4	1.2	DT 300	77	27	50	CH	4.2	95.8	30.8	5.3							
4400	4/14/2011	597	Pass	4	92+01	PS	-130	2.1			3804	85.5	31.1	84	27	57	94.9				106.0	78.6	34.9	91.9	3.8	DT 300	86	32	54	CH	7.3	92.7	36.5	6.3							
4400	4/14/2011	599	Pass	2	102+00	PS	-136	1.4			3804	85.5	31.1	84	27	57	94.9				104.3	77.0	35.5	90.1	4.4	DT 300	83	29	54	CH	12.8	87.2	37.2	6.6							
4400	4/14/2011	600	Pass	2	107+02	PS	-133	1.2			3824	82.9	33.7	92	31	61	93.7				103.4	77.2	33.9	93.1	0.2	DT 300	89	31	58	CH	4.6	95.4	33.9	6.4							
4408	4/15/2011	606	Pass	4	32+96	FS	14	7.3			3824	82.9	33.7	92	31	61	93.7	34.0	82.9	111.1	107.9	80.7	33.7	97.3	0.0	DT 150	88	31	57	CH	3.3	96.7	33.7	5.7	105.8	79.1	33.7	95.4	2.0	0.0	YES
4408	4/15/2011	605	Pass	4	28+00	FS	21	7.4			3824	82.9	33.7	92	31	61	93.7				108.9	79.3	37.3	95.7	3.6	DT 300	89	32	57	CH	5.2	94.8	37.3	5.9							
4408	4/15/2011	607	Pass	4	38+02	FS	19	7.5			3804	85.5	31.1	84	27	57	94.9				107.2	79.1	35.5	92.5	4.4	DT 300	85	33	52	CH	5.1	94.9	35.5	5.2							
4408	4/15/2011	608	Pass	4	43+04	FS	18	7.5			3804	85.5	31.1	84	27	57	94.9				102.7	78.5	30.8	91.8	-0.3	DT 300	86	30	56	CH	3.0	97.0	30.8	5.9							
4413	4/17/2011	611	Pass	3	59+61	CL	0	3.0			3291	99.5	21.9	64	22	42	97.8	21.4	97.0	117.8	121.5	99.2	22.5	99.7	0.6	DT 300	66	23	43	CH	8.4	91.6	22.5	3.6							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear $w_{Meas} - w_{Opt}$	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC $w_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone $w_{Meas} - w_{Opt}$	Difference Within 3%
4413	4/17/2011	610	Pass	2	58+65	CL	0	2.3			3291	99.5	21.9	64	22	42	97.8				122.9	98.2	25.2	98.7	3.3	DT 300	67	23	44	CH	10.2	89.8	25.2	4.3							
4413	4/17/2011	609	Pass	1	58+90	CL	0	1.3			3291	99.5	21.9	64	22	42	97.8				120.5	97.1	24.1	97.6	2.2	DT 300	66	23	43	CH	9.2	90.8	24.1	4.0							
4445	4/19/2011	616	Pass	2	125+13	PS	-115.8	4.2			4502	91.6	28.2	68	23	45	95.0	28.6	92.0	118.3	108.9	84.2	29.3	91.9	1.1	DT 150	62	24	38	CH	6.2	93.8	29.3	3.6	108.1	83.6	29.3	91.3	0.7	1.1	YES
4445	4/19/2011	617	Pass	9	105+52	CL	0	13.0			4502	91.6	28.2	68	23	45	95.0				115.0	86.6	32.8	94.5	4.6	DT 300	70	24	46	CH	2.7	97.3	32.8	4.2							
4445	4/19/2011	614	Pass	2	120+22	PS	-13	4.3			4502	91.6	28.2	68	23	45	95.0				113.4	85.6	32.4	93.4	4.2	DT 300	70	24	46	CH	2.6	97.4	32.4	4.4							
4445	4/19/2011	618	Pass	9	100+52	CL	0	13.0			4502	91.6	28.2	68	23	45	95.0				112.6	87.9	28.1	96.0	-0.1	DT 300	69	26	43	CH	5.4	94.6	28.1	4.6							
4445	4/19/2011	619	Pass	9	95+55	CL	0	12.9			4502	91.6	28.2	68	23	45	95.0				112.1	86.4	29.7	94.3	1.5	DT 300	70	24	46	CH	4.9	95.1	29.7	3.5							
4445	4/19/2011	613	Pass	2	59+85	CL	0	5.3			3186	91.6	26.5	67	23	44	98.9				111.8	88.1	26.9	96.2	0.4	DT 300	70	25	45	CH	5.9	94.1	26.9	5.1							
4445	4/19/2011	612	Pass	1	59+59	CL	0	4.2			3291	99.5	21.9	64	22	42	97.8				111.1	92.0	20.8	92.5	-1.1	DT 300	65	23	42	CH	6.8	93.2	20.8	4.1							
4445	4/19/2011	615	Pass	2	122+60	PS	-109.8	5.0			4502	91.6	28.2	68	23	45	95.0				110.2	86.2	27.8	94.1	-0.4	DT 300	66	23	43	CH	3.8	96.2	27.8	4.5							
4461	4/20/2011	626	Pass	2	137+84	PS	-84	5.5			4502	91.6	28.2	68	23	45	95.0	27.4	90.7	115.5	112.7	88.9	26.8	97.1	-1.4	DT 150	70	27	43	CH	3.8	96.2	26.8	5.2	109.7	86.5	26.8	94.4	2.7	-1.4	YES
4461	4/20/2011	621	Pass	4	52+00	FS	7	7.9			3804	85.5	31.1	84	27	57	94.9	33.4	84.0	112.0	103.5	78.2	32.3	91.5	1.2	DT 300	84	29	55	CH	4.5	95.5	32.3	6.4							
4461	4/20/2011	627	Pass	2	140+02	PS	-84	5.6			4502	91.6	28.2	68	23	45	95.0				112.9	86.8	30.0	94.8	1.8	DT 300	66	26	40	CH	3.7	96.3	30.0	4.0							
4461	4/20/2011	622	PASS	2	127+60	PS	-94.2	5.3			4502	91.6	28.2	68	23	45	95.0				109.6	83.5	31.3	91.2	3.1	DT 300	70	25	45	CH	3.0	97.0	31.3	4.8							
4461	4/20/2011	629	Pass	3	58+42	CL	0	6.1			4502	91.6	28.2	68	23	45	95.0				109.1	84.3	29.4	92.0	1.2	DT 300	70	25	45	CH	6.8	93.2	29.4	4.9							
4461	4/20/2011	624	Pass	2	132+67	PS	-107	4.7			4502	91.6	28.2	68	23	45	95.0				108.7	83.0	30.9	90.6	2.7	DT 300	73	25	48	CH	6.3	93.7	30.9	4.4							
4461	4/20/2011	628	Pass	2	142+62	PS	-90	5.0			4502	91.6	28.2	68	23	45	95.0				108.1	84.5	28.0	92.2	-0.2	DT 300	68	24	44	CH	3.1	96.9	28.0	3.8							
4461	4/20/2011	625	Pass	2	135+18	PS	-98	5.0			3815	88.9	29.6	75	21	54	95.4				107.9	83.1	29.8	93.5	0.2	DT 300	76	27	49	CH	2.6	97.4	29.8	4.6							
4461	4/20/2011	623	Pass	2	130+02	PS	-100	4.8			4502	91.6	28.2	68	23	45	95.0				107.4	83.3	29.0	90.9	0.8	DT 300	69	24	45	CH	3.2	96.8	29.0	4.0							
4461	4/20/2011	620	Pass	4	47+21	CL	0	7.9			3804	85.5	31.1	84	27	57	94.9				106.9	78.9	35.5	92.3	4.4	DT 300	82	31	51	CH	4.0	96.0	35.5	6.1							
4479	4/25/2011	636	Fail	2	160+09	PS	-134	3.8		4527+662	4502	91.6	28.2	68	23	45	95.0	27.9	92.5	118.3	110.1	89.3	23.3	97.5	-4.9	DT 150	65	22	43	CH	3.6	96.4	23.3	3.3	107.6	87.3	23.3	95.3	2.3	-4.9	YES
4479	4/25/2011	631	Pass	2	147+67	PS	-111	4.5			4502	91.6	28.2	68	23	45	95.0	27.6	92.4	117.9	115.4	88.2	30.9	96.3	2.7	DT 300	67	24	43	CH	6.9	93.1	30.9	3.5							
4479	4/25/2011	633	Pass	2	152+62	PS	-106	4.4			3649	94.8	24.1	59	23	36	94.0				115.5	93.1	24.1	98.2	0.0	DT 300	61	21	40	CH	2.8	97.2	24.1	3.1							
4479	4/25/2011	634	Pass	2	155+14	PS	-121	4.0			3649	94.8	24.1	59	23	36	94.0				114.5	92.6	23.7	97.7	-0.4	DT 300	62	22	40	CH	3.7	96.3	23.7	3.6							
4479	4/25/2011	632	Pass	2	150+08	PS	-106	4.7			3649	94.8	24.1	59	23	36	94.0				113.7	88.4	28.6	93.2	4.5	DT 300	62	24	38	CH	3.8	96.2	28.6	3.3							
4479	4/25/2011	630	Pass	2	145+10	PS	-80	5.8			4502	91.6	28.2	68	23	45	95.0				113.1	88.2	28.3	96.3	0.1	DT 300	66	20	46	CH	3.1	96.9	28.3	3.1							
4479	4/25/2011	635	Pass	2	157+57	PS	-122	4.0			4502	91.6	28.2	68	23	45	95.0				111.2	85.0	30.9	92.8	2.7	DT 300	63	21	42	CH	3.5	96.5	30.9	3.3							
4486	4/26/2011	641	Pass	4	60+28	PS	-11	7.3			3550	92.3	26.0	63	19	44	95.0	27.2	92.1	117.1	115.3	91.1	26.6	98.7	0.6	DT 300	69	25	44	CH	6.4	93.6	26.6	4.1							
4486	4/26/2011	640	Pass	8	158+13	CL	0	12.2			3550	92.3	26.0	63	19	44	95.0				118.2	92.4	27.9	100.1	1.9	DT 300	69	22	47	CH	4.0	96.0	27.9	3.8							
4486	4/26/2011	637	Fail	8	143+09	CL	0	12.2		4527+660	3550	92.3	26.0	63	19	44	95.0				113.5	94.0	20.7	101.8	-5.3	DT 300	64	23	41	CH	5.0	95.0	20.7	3.8							
4486	4/26/2011	638	Pass	8	148+00	CL	0	12.3			3550	92.3	26.0	63	19	44	95.0				109.9	86.1	27.6	93.3	1.6	DT 300	70	23	47	CH	4.0	96.0	27.6	4.1							
4486	4/26/2011	639	Pass	8	153+08	CL	0	12.2		4527+661	3550	92.3	26.0	63	19	44	95.0				108.4	87.6	23.8	94.9	-2.2	DT 300	64	20	44	CH	4.3	95.7	23.8	3.4							
4502	4/27/2011	643	Pass	8	163+11	CL	0	12.8			3649	94.8	24.1	59	23	36	94.0				118.1	93.0	27.0	98.1	2.9	DT 300	60	20	40	CH	5.2	94.8	27.0	3.8							
4502	4/27/2011	645	Pass	8	173+13	CL	0	12.9			4502	91.6	28.2	68	23	45	95.0				116.4	92.7	25.6	101.2	-2.6	DT 300	66	21	45	CH	4.4	95.6	25.6	3.6							
4502	4/27/2011	644	Pass	8	168+05	CL	0	12.9			4502	91.6	28.2	68	23	45	95.0				110.7	83.7	32.2	91.4	4.0	DT 300	71	23	48	CH	3.7	96.5	32.2	4.8							
4502	4/27/2011	646	Pass	8	178+29	CL	0	12.8			4502	91.6	28.2	68	23	45	95.0				109.0	84.8	28.5	92.6	0.3	DT 300	62	22	40	CH	3.4	96.6	28.5	3.4							
4507	4/28/2011	647	Pass	5	46+00	CL	0	8.8			4502	91.6	28.2	68	23	45	95.0	27.0	89.1	113.1	106.2	83.8	26.7	91.5	-1.5	DT 150	71	24	47	CH	4.5	95.5	26.7	5.3	104.8	82.7	26.7	90.3	1.3	-1.5	YES
4507	4/28/2011	648	Pass	5	51+06	CL	0	8.9			3815	88.9	29.6	75	21	54	95.4				109.3	86.1	27.0	96.9	-2.6	DT 300	74	22	52	CH	5.6	94.4	27.0	4.9							
4518	4/29/2011	652	Pass	5	31+00	PS	-7	8.6			4502	91.6	28.2	68	23	45	95.0	30.0	90.1	117.1	112.7	89.0	26.7	97.2	-1.5	DT 300	70	23	47	CH	6.4	93.6	26.7	3.4							
4518	4/29/2011	649	Pass	5	41+05	CL	0	8.9			3815	88.9	29.6	75	21	54	95.4				111.2	83.7	32.8	94.2	3.2	DT 300	79	27	52	CH	6.7	93.3	32.8	4.1							
4518	4/29/2011	651	Pass	5	26+19	FS	8	8.5			3815	88.9	29.6	75	21	54	95.4				107.1	81.7	31.1	91.9	1.5	DT 300	79	27	52	CH	5.2	94.8	31.1	4.3							
4518	4/29/2011	650	Pass	5	36+90	CL	0	8.8			3804	85.5	31.1	84	27	57	94.9				105.5	81.2	30.0	95.0	-1.1	DT 300	80	22	58	CH	6.9	93.1	30.0	5.1							
4524	4/30/2011	657	Pass	5	22+05	CL	0	9.0			3815	88.9	29.6	75	21	54	95.4	26.0	88.6	111.6	109.7	85.9	27.7	96.6	-1.9	DT 150	75	25	50	CH	6.8	93.2	27.7	4.2	111.8	87.5	27.7	98.4	1.9	-1.9	YES
4524	4/30/2011	658	Pass	1	55+75	PS	-8	4.4			4171	96.5	22.9	60	22	38	88.2				115.3	94.5	22.0	97.9	-0.9	DT 300	56	21	35	CH	17.0	83.0	22.0	3.3							
4524	4/30/2011	655	Pass	4	10+95	FS	8	8.2			4502	91.6	28.2	68	23	45	95.0				112.1	87.8	27.7	95.9	-0.5	DT 300	69	22	47	CH	5.4	94.6	27.7	3.2							
4524	4/30/2011	654	Fail	4	6+54	PS	-6	8.4		4533+674	3815	88.9	29.6	75	21	54	95.4				109.7	88.8	23.5	99.9	-6.1	DT 300	73	21	52	CH	3.3	96.7	23.5	4.0							
4524	4/30/2011	653	Fail	4	1+40	PS	-7	8.2		4558+681	3815	88.9	29.6	75	21	54	95.4				108.6	91.7	18.4	103.1	-11.2	DT 300	74	22	52	CH	3.4	96.6	18.4	4.2							
4524	4/30/2011	656	Pass	5	16+63	CL	0	9.0			3815	88.9	29.6	75	21	54	95.4				106.2	82.5	28.7	92.8	-0.9	DT 300	73	23	50	CH	5.6	94.4	28.7	4.1							
4527	5/1/2011	667	Pass	2	170+00	PS	-61	6.6			4502	91.6	28.2	68	23	45	95.0	30.2	89.9	117.1	108.0	83.3	29.6	90.9	1.4	DT 150	70	29	41	CH	5.0	95.0	29.6	4.2	108.4	83.6	29.6	91.3	0.4	1.4	YES
4527	5/1/2011	662	Pass	2	160+09	PS	-134	3.8	4479+636		4502	91.6	28.2	68	23	45	95.0	25.3	94.3	118.2	110.6	87.8	26.0	95.9	-2.2	DT 300	65	19	46	CH	6.6	93.4	26.0	3.1							
4527	5/1/2011	660	Pass	8	143+09	CL	0	11.7	4486+637		3550	92.3	26.0	63	19	44	95.0				115.3	93.0	24.0	100.8	-2.0	DT 300	65	20	45	CH	5.4	94.6	24.0	3.2							
4527	5/1/2011	670	Pass	2	162+53	PS	-80	6.2			3815	88.9	29.6	75	21	54	95.4				115.2	88.5	30.2	99.6	0.6	DT 300	73	22	51	CH	6.9	93.1	30.2	3.9							
4527	5/1/2011	659	Pass	2	56+39	CL	0	5.2			4171	96.5	22.9	60	22	38	88.2				115.0	92.7	24.1	96.1	1.2	DT 300	59	21	38	CH	14.8	85.2	24.1	3.8							
4527	5/1/2011	668	Pass	2	167+50	PS	-84	5.8			3815	88.9	29.6	75	21	54	95.4				113.1	88.1	28.4	99.1	-1.2	DT 300	77	25	52	CH	3.9	96.1	28.4	3.7							
4527	5/1/2011	661	Pass	8	153+08	CL	0	12.0	4486+639		3550	92.3	26.0	63	19	44	95.0				111.4	90.3	23.4	97.8	-2.6	DT 300	66	19	47	CH	3.7	96.3	23.4	3.5							
4527	5/1/2011	669	Pass	2	165+02	PS	-73	6.0			3815	88.9	29.6	75	21	54	95.4				110.7	85.7	29.1	96.4	-0.5	DT 300	76	25	51	CH	4.0	96.0	29.1	3.3							
4527	5/1/2011	665	Pass	2	175+12	PS	-56	6.4			4502	91.6	28.2	68	23	45	95.0				109.4	86.8	26.1	94.8	-2.1	DT 300	67	23	44	CH	5.6	94.4	26.1	3.9							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w $_{Meas}$	% Compaction Nuclear	Nuclear w $_{Meas}$ - w_{Opt}	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC w $_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w $_{Meas}$	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w $_{Meas}$ - w $_{Opt}$	Difference Within 3%
4527	5/1/2011	664	Pass	2	177+55	PS	-67	6.6			4502	91.6	28.2	68	23	45	95.0				107.9	84.5	27.7	92.2	-0.5	DT 300	67	25	42	CH	6.8	93.2	27.7	3.5							
4527	5/1/2011	663	Pass	2	179+92	PS	-66	6.3			3815	88.9	29.6	75	21	54	95.4				107.4	84.4	27.3	94.9	-2.3	DT 300	74	21	53	CH	4.3	95.7	27.2	3.5							
4527	5/1/2011	666	Pass	2	172+64	PS	-68	6.3			4502	91.6	28.2	68	23	45	95.0				107.3	84.2	27.4	91.9	-0.8	DT 300	71	26	45	CH	9.3	90.7	27.4	5.0							
4533	5/2/2011	672	Fail	3	106+00	PS	-128	2.1		4566+695	4502	91.6	28.2	68	23	45	95.0	24.6	92.2	114.9	111.1	89.3	24.4	97.5	-3.8	DT 300	66	20	46	CH	4.4	95.6	24.4	4.1							
4533	5/2/2011	676	Pass	5	92+96	PS	-138	2.6			4502	91.6	28.2	68	23	45	95.0				114.0	86.9	31.2	94.9	3.0	DT 300	71	26	45	CH	4.2	95.8	31.2	3.9							
4533	5/2/2011	674	Pass	4	6+54	PS	-6	8.4	4524+654		3815	88.9	29.6	75	21	54	95.4				113.1	88.8	27.4	99.9	-2.2	DT 300	72	23	49	CH	3.9	96.1	27.4	4.0							
4533	5/2/2011	675	Pass	4	98+05	PS	-138	3.0			4502	91.6	28.2	68	23	45	95.0				109.5	83.4	31.3	91.0	3.1	DT 300	70	25	45	CH	4.3	95.7	31.3	4.6							
4533	5/2/2011	671	Pass	3	101+01	PS	-135	2.6			4502	91.6	28.2	68	23	45	95.0				108.6	84.6	28.4	92.4	0.2	DT 300	66	24	42	CH	5.0	95.0	28.4	3.6							
4533	5/2/2011	673	Fail	4	1+40	PS	-16	8.2	4524-653	4558+681	3815	88.9	29.6	75	21	54	95.4				105.4	88.0	19.8	99.0	-9.8	DT 300	73	26	47	CH	7.8	92.2	19.8	5.3							
4546	5/3/2011	677	Pass	5	89+01	PS	-127	2.9			4502	91.6	28.2	68	23	45	95.0	25.9	94.1	118.5	114.0	89.6	27.3	97.8	-0.9	DT 150	64	22	42	CH	5.9	94.1	27.3	4.0	111.2	87.4	27.3	95.4	2.5	-0.9	YES
4546	5/3/2011	679	Pass	4	78+97	PS	-152	1.6			4502	91.6	28.2	68	23	45	95.0				113.2	85.8	32.0	93.7	3.8	DT 300	72	26	46	CH	4.3	95.7	32.0	5.2							
4546	5/3/2011	680	Pass	3	56+60	CL	0	6.0			3550	92.3	26.0	63	19	44	95.0				111.5	89.3	24.8	96.7	-1.2	DT 300	71	23	48	CH	10.1	89.9	24.8	5.2							
4546	5/3/2011	678	Pass	5	84+02	PS	-136	2.8			4502	91.6	28.2	68	23	45	95.0				108.5	86.2	25.8	94.1	-2.4	DT 300	64	21	43	CH	4.0	96.0	25.8	3.6							
4558	5/4/2011	687	PASS	6	34+00	PS	-11	9.9			4502	91.6	28.2	68	23	45	95.0	29.2	90.6	117.1	117.0	90.0	30.0	98.3	1.8	DT 150	64	21	43	CH	3.6	96.4	30.0	4.2	116.7	89.8	30.0	98.0	0.3	1.8	YES
4558	5/4/2011	692	Pass	5	14+06	CL	0	8.9			4502	91.6	28.2	68	23	45	95.0	27.9	92.5	118.2	111.5	88.6	25.8	96.7	-2.4	DT 300	64	22	42	CH	3.6	96.4	25.8	3.7							
4558	5/4/2011	682	Pass	5	58+90	FS	14	8.1			3815	88.9	29.6	75	21	54	95.4	31.8	86.7	114.2	105.6	81.7	29.3	91.9	-0.3	DT 300	75	24	51	CH	4.9	95.1	29.3	4.0							
4558	5/4/2011	684	Pass	6	49+03	PS	-5	9.7			3649	94.8	24.1	59	23	36	94.0				117.7	93.6	25.7	98.7	1.6	DT 300	62	21	41	CH	2.9	97.1	25.7	3.3							
4558	5/4/2011	685	Pass	6	44+01	CL	0	9.8			3649	94.8	24.1	59	23	36	94.0				114.9	91.7	25.3	96.7	1.2	DT 300	63	21	42	CH	3.0	97.0	25.3	3.6							
4558	5/4/2011	693	Pass	5	9+02	CL	0	9.0			3649	94.8	24.1	59	23	36	94.0				114.4	92.3	24.0	97.4	-0.1	DT 300	57	22	35	CH	3.9	96.1	24.0	3.4							
4558	5/4/2011	683	Pass	6	54+04	CL	0	9.8			3815	88.9	29.6	75	21	54	95.4				113.2	87.5	29.3	98.4	-0.3	DT 300	73	23	50	CH	2.8	97.2	29.3	4.2							
4558	5/4/2011	688	Pass	6	29+02	PS	-8	9.8			4502	91.6	28.2	68	23	45	95.0				111.7	88.9	25.7	97.1	-2.5	DT 300	66	21	45	CH	4.4	95.6	25.7	4.2							
4558	5/4/2011	689	Pass	6	24+02	CL	0	9.8			3649	94.8	24.1	59	23	36	94.0				110.9	88.1	25.9	92.9	1.8	DT 300	68	20	48	CH	3.4	96.6	25.9	4.1							
4558	5/4/2011	686	Pass	6	39+00	PS	-11	9.7			4502	91.6	28.2	68	23	45	95.0				109.7	87.2	25.8	95.2	-2.4	DT 300	67	21	46	CH	5.2	94.8	25.8	4.1							
4558	5/4/2011	691	Pass	4	55+61	FS	6	7.1			3550	92.3	26.0	63	19	44	95.0				108.0	86.0	25.6	93.2	-0.4	DT 300	66	24	42	CH	12.0	88.0	25.6	5.0							
4558	5/4/2011	690	Pass	6	19+02	CL	0	9.9			3804	85.5	31.1	84	27	57	94.9				107.2	81.0	32.4	94.7	1.3	DT 300	86	25	61	CH	4.1	95.9	32.4	4.9							
4558	5/4/2011	681	Pass	4	1+40	PS	-16	8.2	4533+673		3815	88.9	29.6	75	21	54	95.4				107.1	84.6	26.6	95.2	-3.0	DT 300	76	22	54	CH	3.8	96.2	26.6	4.7							
4566	5/5/2011	694	Pass	1	109+54	PS	-164	-0.6			4502	91.6	28.2	68	23	45	95.0				110.1	86.8	26.9	94.8	-1.3	DT 150	67	23	44	CH	3.4	96.6	24.4	4.2							
4566	5/5/2011	695	Pass	3	106+00	FS	-128	2.1	4533+672		4502	91.6	28.2	68	23	45	95.0				109.1	86.3	26.4	94.2	-1.8	DT 300	69	24	45	CH	5.0	95.0	23.1	4.6							
4566	5/5/2011	696	Pass	4	70+95	PS	-144	2.2			4502	91.6	28.2	68	23	45	95.0				107.8	84.4	27.8	92.1	-0.4	DT 300	74	26	48	CH	4.2	95.8	27.8	5.0							
4572	5/6/2011	697	Pass	2	2+08	PS	-107	2.2			3649	94.8	24.1	59	23	36	94.0	26.6	93.9	119.0	110.2	86.4	27.6	91.1	3.5	DT 150	61	24	37	CH	3.5	96.5	27.6	2.9	109.3	85.7	27.6	90.4	0.8	3.5	YES
4572	5/6/2011	699	Pass	2	6+83	PS	-116	1.7			4502	91.6	28.2	68	23	45	95.0				114.6	90.4	26.8	98.7	-1.4	DT 300	65	25	40	CH	3.5	96.5	26.8	3.0							
4572	5/6/2011	700	Pass	2	9+50	PS	-123	1.6			4502	91.6	28.2	68	23	45	95.0				114.3	90.2	26.7	98.5	-1.5	DT 300	62	22	40	CH	3.4	96.8	26.7	2.9							
4572	5/6/2011	698	Pass	2	4+50	PS	-103	2.2			3649	94.8	24.1	59	23	36	94.0				114.2	90.3	26.4	95.3	2.3	DT 300	58	24	34	CH	3.2	96.8	26.4	2.9							
4583	5/9/2011	702	Pass	3	120+89	PS	-111	5.3			3649	94.8	24.1	59	23	36	94.0	23.5	96.1	118.7	112.8	90.7	24.3	95.7	0.2	DT 300	62	22	40	CH	3.4	96.6	24.3	2.7							
4583	5/9/2011	703	Fail	3	122+97	PS	-82	6.3		4849+800	3649	94.8	24.1	59	23	36	94.0				110.7	94.4	17.3	99.6	-6.8	DT 300	60	20	40	CH	3.5	96.5	17.3	3.4							
4583	5/9/2011	704	Pass	3	124+99	PS	-110	5.3			3649	94.8	24.1	59	23	36	94.0				109.1	86.7	25.8	91.5	1.7	DT 300	56	21	35	CH	3.6	96.4	25.8	3.4							
4583	5/9/2011	701	Pass	5	3+04	PS	-7	9.0			4502	91.6	28.2	68	23	45	95.0				105.8	84.0	25.9	91.7	-2.3	DT 300	65	22	43	CH	3.7	96.3	22.2	4.1							
4596	5/10/2011	707	Pass	6	12+93	CL	0	9.8			4502	91.6	28.2	68	23	45	95.0	29.2	92.0	118.8	113.8	87.7	29.7	95.7	1.5	DT 150	63	26	37	CH	3.2	96.8	29.7	3.6	112.7	86.9	29.7	94.9	1.0	1.5	YES
4596	5/10/2011	706	Pass	6	8+00	CL	0	9.8			3616	95.5	24.0	54	23	31	94.8				118.2	94.1	25.6	98.5	1.6	DT 300	55	23	32	CH	3.8	96.2	25.6	3.1							
4596	5/10/2011	705	Pass	6	3+00	CL	0	9.8			4502	91.6	28.2	68	23	45	95.0				114.5	86.6	32.2	94.5	4.0	DT 300	64	25	39	CH	7.2	92.8	32.2	4.3							
4605	5/11/2011	712	Pass	3	135+19	PS	-73	6.6		4762+780	3649	94.8	24.1	59	23	36	94.0	26.0	95.1	119.9	113.2	92.4	22.5	97.5	-1.6	DT 300	60	22	38	CH	3.6	96.4	22.5	3.0							
4605	5/11/2011	708	Pass	3	127+00	PS	-64	6.8			3649	94.8	24.1	59	23	36	94.0				117.4	93.8	25.2	98.9	1.1	DT 300	58	23	35	CH	3.2	96.8	25.2	2.8							
4605	5/11/2011	709	Pass	3	128+97	PS	-92	5.9			3649	94.8	24.1	59	23	36	94.0				117.4	92.7	26.7	97.8	2.6	DT 300	62	24	38	CH	2.7	97.3	26.7	2.2							
4605	5/11/2011	711	Pass	3	133+14	PS	-63	6.8			3649	94.8	24.1	59	23	36	94.0				115.6	91.1	26.9	96.1	2.8	DT 300	61	21	40	CH	3.3	96.7	26.9	2.5							
4605	5/11/2011	710	Pass	3	130+91	PS	-104	5.6			3649	94.8	24.1	59	23	36	94.0				115.4	90.2	27.9	95.1	3.8	DT 300	64	25	40	CH	2.8	97.2	27.9	2.3							
4605	5/11/2011	713	Fail	3	137+09	PS	-88	6.0		4762+781	4502	91.6	28.2	68	23	45	95.0				109.6	88.2	24.2	96.3	-4.0	DT 300	66	23	43	CH	3.1	96.9	24.2	2.5							
4613	5/12/2011	717	Pass	3	109+57	PS	-156	1.3			3649	94.8	24.1	59	23	36	94.0	27.1	94.4	120.0	116.6	91.7	27.2	96.7	3.1	DT 300	64	24	40	CH	7.3	92.7	27.2	4.1	116.3	91.4	27.2	96.4	0.3	3.1	YES
4613	5/12/2011	714	Pass	2	109+56	PS	-139	1.2			3649	94.8	24.1	59	23	36	94.0				117.7	92.6	27.1	97.7	3.0	DT 300	62	25	37	CH	3.2	96.8	27.1	3.4							
4613	5/12/2011	719	Pass	3	141+00	PS	-72	6.6			3649	94.8	24.1	59	23	36	94.0				116.4	91.4	27.3	96.4	3.2	DT 300	61	24	37	CH	2.1	97.9	27.3	3.4							
4613	5/12/2011	718	Pass	3	138+65	PS	-77	6.3			3649	94.8	24.1	59	23	36	94.0				115.2	92.9	24.0	98.0	-0.1	DT 300	61	22	39	CH	4.8	95.2	24.0	2.8							
4613	5/12/2011	715	Pass	1	68+45	PS	-137	1.0			4502	91.6	28.2	68	23	45	95.0				115.0	90.2	27.5	98.5	-0.7	DT 300	66	24	42	CH	5.0	95.0	27.5	3.7							
4613	5/12/2011	720	Pass	3	143+07	PS	-73	6.6			3649	94.8	24.1	59	23	36	94.0				114.2	90.4	26.3	95.4	2.2	DT 300	59	22	37	CH	5.7	94.3	26.3	3.6							
4613	5/12/2011	721	Pass	3	145+23	PS	-81	6.3			3649	94.8	24.1	59	23	36	94.0				111.3	87.6	27.0	92.4	2.9	DT 300	61	23	38	CH	3.1	96.9	27.0	1.9							
4613	5/12/2011	716	Fail	1	63+22	PS	-135	2.0		4828+795	3649	94.8	24.1	59	23	36	94.0				110.5	93.1	18.7	98.2	-5.4	DT 150	64	24	40	CH	6.0	94.0	18.7	4.3							
4641	5/16/2011	722	Fail	6	88+03	PS	-130	2.9		5474+896	4502	91.6	28.2	68	23	45	95.0	19.7	97.3	116.5	111.2	92.4	20.3	100.9	-7.9	DT 300	63	21	42	CH	4.9	95.1	20.3	4.2							
4641	5/16/2011	724	Pass	5	98+04	PS	-147	2.6			3649	94.8	24.1	59	23	36	94.0				120.9	97.3	24.3	102.6	0.2	DT 300	63	23	40	CH	3.7	96.3	24.3	3.7							
4641	5/16/2011	723	Pass	6	92+97	PS	-158	2.1			3649	94.8	24.1	59	23	36	94.0				117.6	93.7	25.5	98.8	1.4	DT 300	62	22	40	CH	3.9	96.1	25.5	3.8							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w $_{Meas}$	% Compaction Nuclear	Nuclear w $_{Meas}$ - w_{Opt}	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC w $_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w $_{Meas}$	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w $_{Meas}$ - w_{Opt}	Difference Within 3%
4641	5/16/2011	726	Pass	4	107+00	PS	-148	2.0			4502	91.6	28.2	68	23	45	95.0				111.3	88.5	25.8	96.6	-2.4	DT 300	65	21	44	CH	6.2	93.8	25.8	3.7							
4641	5/16/2011	725	Fail	4	103+02	PS	-145	2.1		4675+754	4502	91.6	28.2	68	23	45	95.0				108.1	88.0	22.8	96.1	-5.4	DT 300	65	23	42	CH	4.9	95.1	22.8	4.1							
4655	5/17/2011	727	Fail	6	82+94	PS	-151	2.4		4828+799	3649	94.8	24.1	59	23	36	94.0	21.2	96.6	117.1	114.5	100.4	14.1	105.9	-10.0	DT 150	58	22	36	CH	6.1	93.9	14.1	3.4	113.0	99.0	14.1	104.4	1.3	-10.0	YES
4655	5/17/2011	737	Pass	10	97+49	PS	-6	13.1			4502	91.6	28.2	68	23	45	95.0	26.9	91.3	115.8	107.7	84.7	27.1	92.5	-1.1	DT 150	68	24	44	CH	3.7	96.3	27.1	4.1	108.5	85.4	27.1	93.2	0.7	-1.1	YES
4655	5/17/2011	732	Pass	7	48+01	CL	0	10.8			3550	92.3	26.0	63	19	44	95.0	25.7	91.0	114.5	110.7	88.3	25.3	95.7	-0.7	DT 300	68	23	45	CH	7.0	93.0	25.3	4.4							
4655	5/17/2011	729	Pass	5	73+06	PS	-152	2.2			3649	94.8	24.1	59	23	36	94.0				114.6	93.2	23.0	98.3	-1.1	DT 300	65	24	41	CH	6.1	93.9	23.0	3.9							
4655	5/17/2011	738	Pass	10	102+55	CL	0	13.2			3815	88.9	29.6	75	21	54	95.4				114.5	89.9	27.3	101.1	-2.3	DT 150	74	23	51	CH	2.6	97.4	27.3	3.5							
4655	5/17/2011	731	Pass	7	52+93	FS	5	10.8			4171	96.5	22.9	60	22	38	88.2				113.8	91.1	24.9	94.4	2.0	DT 300	62	25	37	CH	10.2	89.8	24.9	3.9							
4655	5/17/2011	735	Pass	7	33+00	CL	0	11.0			3555	86.6	30.0	78	28	50	94.1				112.7	84.3	33.7	97.3	3.7	DT 300	83	31	52	CH	12.3	87.7	33.7	6.2							
4655	5/17/2011	728	Fail	5	77+92	PS	-131	2.6		4675+745	3649	94.8	24.1	59	23	36	94.0				111.1	93.6	18.7	98.7	-5.4	DT 300	63	22	41	CH				3.7							
4655	5/17/2011	730	Pass	2	68+08	PS	-132	2.3			3649	94.8	24.1	59	23	36	94.0				110.0	88.9	23.7	93.8	-0.4	DT 300	62	24	38	CH	3.6	96.4	23.7	3.4							
4655	5/17/2011	736	Fail	10	77+49	CL	0	13.2		4675+740	4171	96.5	22.9	60	22	38	88.2				108.2	91.2	18.7	94.5	-4.2	DT 150	63	24	39	CH	6.4	93.6	18.7	4.4							
4655	5/17/2011	733	Pass	7	43+00	CL	0	10.9			3555	86.6	30.0	78	28	50	94.1				106.9	83.5	28.0	96.4	-2.0	DT 300	77	26	51	CH	13.9	86.1	28.0	6.2							
4655	5/17/2011	739	Pass	10	107+43	CL	0	13.2			4502	91.6	28.2	68	23	45	95.0				106.8	84.5	26.4	92.2	-1.8	DT 150	67	22	45	CH	3.6	96.4	26.4	3.4							
4655	5/17/2011	734	Pass	7	37+99	CL	0	11.0			3550	92.3	26.0	63	19	44	95.0				105.2	84.0	25.2	91.0	-0.8	DT 300	73	29	44	CH	8.6	91.4	25.2	5.7							
4675	5/19/2011	747	Pass	5	55+90	PS	-9	8.0			3649	94.8	24.1	59	23	36	94.0	22.3	94.9	116.1	110.6	88.9	24.4	93.8	0.3	DT 150	62	23	39	CH	2.1	97.9	24.4	3.2	113.7	91.4	24.4	96.4	2.7	0.3	YES
4675	5/19/2011	742	Pass	10	87+48	CL	0	13.2		4762+778	4502	91.6	28.2	68	23	45	95.0	24.6	95.4	118.8	113.6	90.2	25.9	98.5	-2.3	DT 150	68	23	45	CH	0.9	99.1	25.9	2.8							
4675	5/19/2011	752	Fail	7	8+96	PS	-9	10.9		4699+759	4716	79.2	34.0	90	29	61	82.6	39.9	75.4	105.4	110.8	77.4	43.2	97.7	9.2	DT 300	92	26	66	CH	21.5	78.5	43.2	7.0							
4675	5/19/2011	755	Pass	6	108+86	CL	0	10.7			4502	91.6	28.2	68	23	45	95.0				119.1	91.2	30.6	99.6	2.4	DT 300	68	22	46	CH	5.3	94.7	30.6	2.4							
4675	5/19/2011	740	Pass	10	77+49	CL	0	13.2	4655+736		4171	96.5	22.9	60	22	38	88.2				118.0	93.9	25.7	97.3	2.8	DT 150	65	23	42	CH	7.3	92.7	25.7	4.9							
4675	5/19/2011	754	Pass	4	103+02	PS	-145	2.1	4641+725		4502	91.6	28.2	68	23	45	95.0				116.4	92.0	26.5	100.4	-1.7	DT 300	64	24	40	CH	4.1	95.9	26.5	2.8							
4675	5/19/2011	744	Fail	6	82+94	PS	-151	2.4	4655-727	4828+799	3649	94.8	24.1	59	23	36	94.0				116.0	98.7	17.5	104.1	-6.6	DT 300	63	21	42	CH	4.4	95.6	17.5	3.9							
4675	5/19/2011	743	Fail	10	92+49	CL	0	13.2		4699+757	4502	91.6	28.2	68	23	45	95.0				113.4	90.7	25.0	99.0	-3.2	DT 150	70	22	48	CH	4.0	96.0	25.0	2.9							
4675	5/19/2011	749	Pass	7	23+07	CL	0	10.9			4716	79.2	34.0	90	29	61	82.6				112.9	81.3	38.9	102.7	4.9	DT 300	91	26	65	CH	9.7	90.3	38.9	6.1							
4675	5/19/2011	746	Pass	6	59+40	CL	0	9.1			3649	94.8	24.1	59	23	36	94.0				112.8	89.7	25.7	94.6	1.6	DT 300	62	23	39	CH	3.9	96.1	25.7	3.0							
4675	5/19/2011	750	Pass	7	18+07	CL	0	11.0			4716	79.2	34.0	90	29	61	82.6				112.0	81.0	38.2	102.3	4.2	DT 300	86	26	60	CH	12.3	87.7	38.2	6.4							
4675	5/19/2011	741	Fail	10	82+44	CL	0	13.1		QA Test	4171	96.5	22.9	60	22	38	88.2				112.0	85.5	31.0	88.6	8.1	DT 150	64	25	40	CH	3.9	96.1	31.0	4.1							
4675	5/19/2011	748	Pass	7	27+48	PS	-6	10.9			4716	79.2	34.0	90	29	61	82.6				111.0	80.0	38.7	101.0	4.7	DT 300	90	27	63	CH	10.1	89.9	38.7	6.2							
4675	5/19/2011	751	Pass	7	12+99	CL	0	11.0			4716	79.2	34.0	90	29	61	82.6				108.6	78.8	37.8	99.5	3.8	DT 300	89	27	62	CH	16.4	83.6	37.8	5.2							
4675	5/19/2011	745	Pass	5	77+92	PS	-131	2.6	4655+728		3649	94.8	24.1	59	23	36	94.0				107.0	87.8	21.8	92.6	-2.3	DT 300	62	21	41	CH	4.5	95.5	21.8	3.5							
4675	5/19/2011	753	Fail	7	3+97	CL	0	10.9		4699+760	4716	79.2	34.0	90	29	61	82.6				101.8	72.2	40.9	91.2	6.9	DT 300	91	27	64	CH	15.5	84.5	40.9	6.8							
4699	5/23/2011	757	Pass	10	92+49	CL	0	13.2	4675+743		3649	94.8	24.1	59	23	36	94.0	24.3	94.2	117.0	118.7	95.7	24.0	100.9	-0.1	DT 150	62	22	40	CH	5.2	94.8	24.0	3.7	116.1	93.6	24.0	98.7	2.2	-0.1	YES
4699	5/23/2011	758	Pass	7	109+27	CL	0	12.1			4502	91.6	28.2	68	23	45	95.0				110.2	86.0	28.2	93.9	0.0	DT 300	69	23	46	CH	7.0	93.0	28.2	4.0							
4699	5/23/2011	756	Fail	6	82+94	PS	-151	2.4	4675-744	4828+799	3649	94.8	24.1	59	23	36	94.0				108.6	91.6	18.6	96.6	-5.5	DT 300	60	22	38	CH	4.4	95.6	18.6	3.7							
4699	5/23/2011	759	Pass	7	8+96	PS	-9	10.9	4675+752		4716	79.2	34.0	90	29	61	82.6				106.2	78.0	36.2	98.5	2.2	DT 300	85	32	53	CH	7.7	92.3	36.2	6.9							
4699	5/23/2011	760	Pass	7	3+97	CL	0	10.9	4675+753		4716	79.2	34.0	90	29	61	82.6				105.2	76.6	37.3	96.7	3.3	DT 300	89	33	56	CH	12.8	87.2	37.3	8.9							
4716	5/24/2011	762	Pass	4	103+46	FS	83	5.1			4502	91.6	28.2	68	23	45	95.0	28.7	89.5	115.2	112.5	87.6	28.4	95.6	0.2	DT 150	73	27	46	CH	6.8	93.2	28.4	4.1							
4716	5/24/2011	761	Pass	4	108+55	FS	79				4502	91.6	28.2	68	23	45	95.0				109.8	87.5	25.5	95.5	-2.7		69	24	45	CH	4.1	95.9	25.5	4.2							
4726	5/26/2011	765	Pass	3	68+99	PS	-136				4502	91.6	28.2	68	23	45	95.0				115.5	92.0	25.5	100.4	-2.7		70	23	47	CH	5.3	94.7	25.5	3.9							
4726	5/26/2011	766	Fail	8	108+75	CL	0	12.6		4746+776	3815	88.9	29.6	75	21	54	95.4				110.9	89.4	24.0	100.6	-5.6	DT 300	74	23	51	CH	6.1	93.9	24.0	3.8							
4726	5/26/2011	767	Fail	11	101+00	CL	0	13.7		4762+784	4502	91.6	28.2	68	23	45	95.0				107.6	87.5	23.0	95.5	-5.2	DT 300	70	22	48	CH	9.5	90.5	23.0	3.9							
4746	6/1/2011	777	Pass	4	66+70	FS	99	4.8			3550	92.3	26.0	63	19	44	95.0				117.1	94.3	24.2	102.2	-1.8	DT 150	67	22	45	CH	5.3	94.7	24.2	2.9							
4746	6/1/2011	776	Pass	8	108+75	CL	0	12.6	4726+766		3815	88.9	29.6	75	21	54	95.4				111.0	83.0	33.8	93.4	4.2	DT 300	74	22	52	CH	6.0	94.0	33.8	3.9							
4746	6/1/2011	775	Pass	6	55+99	CL	0				3815	88.9	29.6	75	21	54	95.4				106.1	81.9	29.6	92.1	0.0		77	26	51	CH	3.6	96.4	29.6	3.9							
4748	5/31/2011	769	Pass	4	93+50	FS	93	4.8			3804	85.5	31.1	84	27	57	94.9	28.3	88.4	113.4	111.5	86.4	29.1	101.1	-2.0	DT 150	81	26	55	CH	7.1	92.9	29.1	3.4	109.0	84.4	29.1	98.7	2.3	-2.0	YES
4748	5/31/2011	774	Pass	4	73+50	FS	85	5.3			3550	92.3	26.0	63	19	44	95.0	25.0	95.1	118.9	114.7	91.2	25.8	98.8	-0.2	DT 150	64	21	43	CH	10.8	89.2	25.8	2.6							
4748	5/31/2011	773	Pass	4	78+56	FS	78				4171	96.5	22.9	60	22	38	88.2				119.8	96.9	23.6	100.4	0.7		63	22	41	CH	8.9	91.1	23.6	2.3							
4748	5/31/2011	770	Pass	4	88+57	FS	94	5.0			4502	91.6	28.2	68	23	45	95.0				114.6	89.7	27.7	97.9	-0.5	DT 150	70	23	47	CH	6.0	94.0	27.7	2.9							
4748	5/31/2011	768	Pass	5	57+48	CL	0	8.5			4502	91.6	28.2	68	23	45	95.0				111.3	88.3	26.1	96.4	-2.1	DT 300	73	24	49	CH	8.7	91.3	26.1	3.3							
4748	5/31/2011	771	Pass	4	83+57	FS	73	6.4			4502	91.6	28.2	68	23	45	95.0				108.6	86.4	25.7	94.3	-2.5	DT 150	70	24	46	CH	6.6	93.4	25.7	3.5							
4748	5/31/2011	772	Pass	5	57+48	CL	0				4502	91.6	28.2	68	23	45	95.0				107.6	84.6	27.2	92.4	-1.0		69	25	44	CH	4.2	95.8	27.2	3.0							
4762	6/2/2011	779	Pass	3	133+14	PS	-63	6.8	4605+711		3649	94.8	24.1	59	23	36	94.0	27.2	93.1	118.3	117.5	93.3	26.0	98.4	1.9	DT 150	61	20	41	CH	3.8	96.2	26.0	2.7	115.7	91.8	26.0	96.8	1.6	1.9	YES
4762	6/2/2011	784	Pass	11	101+00	CL	0	13.7	4726+767		3815	88.9	29.6	75	21	54	95.4	29.4	90.8	117.5	113.0	88.4	27.9	99.4	-1.7	DT 150	73	22	51	CH	3.4	96.6	27.9	3.2							
4762	6/2/2011	782	Pass	10	87+48	CL	0		4675+742		4502	91.6	28.2	68	23	45	95.0				117.9	91.4	29.0	99.8	0.8		69	21	48	CH	3.5	96.5	29.0	3.4							
4762	6/2/2011	783	Pass	10	77+49	CL	0	13.2	4675+740		3815	88.9	29.6	75	21	54	95.4				117.0	90.1	29.8	101.3	0.2		74	23	51	CH	5.1	94.9	29.8	3.9							
4762	6/2/2011	778	Fail	10	87+48	CL	0	13.2	4675+744	4762+778	4502	91.6	28.2	68	23	45	95.0				114.6	91.8	24.9	100.2	-3.3	DT 150	67	21	46	CH	3.7	96.3	24.9	3.2							
4762	6/2/2011	785	Pass	11	97+99	FS	15	11.3			3815	88.9	29.6	75	21	54	95.4				113.8	89.5	27.2	100.7	-2.4	DT 150	77	24	53	CH	5.6	94.4	27.2	4.1							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w $_{Meas}$	% Compaction Nuclear	Nuclear w $_{Meas}$ - w_{Opt}	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC w $_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w $_{Meas}$	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w $_{Meas}$ - w $_{Opt}$	Difference Within 3%
4762	6/2/2011	780	Pass	3	135+19	PS	-73	6.6	4605+712		4502	91.6	28.2	68	23	45	95.0				112.4	89.7	25.3	97.9	-2.9	DT 300	68	23	45	CH	4.3	95.7	25.3	3.9							
4762	6/2/2011	781	Pass	3	137+09	PS	-88	6.0	4605+713		4502	91.6	28.2	68	23	45	95.0				110.6	87.6	26.2	95.6	-2.0	DT 300	66	21	45	CH	6.2	93.8	26.2	3.1							
4798	6/3/2011	786	Pass	5	105+15	PS	150				3815	88.9	29.6	75	21	54	95.4				114.2	88.9	28.5	100.0	-1.1		74	24	50	CH	5.3	94.7	28.5	3.5							
4798	6/3/2011	788	Pass	11	92+68	CL	0	13.7			3815	88.9	29.6	75	21	54	95.4				112.3	87.7	28.1	98.7	-1.5	DT 150	74	22	52	CH	4.3	95.7	28.1	3.2							
4798	6/3/2011	787	Pass	5	100+95	PS	-155	2.9			4502	91.6	28.2	68	23	45	95.0				109.2	85.0	28.4	92.8	0.2	DT 150	69	23	46	CH	3.3	96.7	28.4	3.2							
4828	6/7/2011	799	Pass	6	82+94	PS	-151	2.4	4699+756		4502	91.6	28.2	68	23	45	95.0	27.0	92.4	117.4	114.4	90.6	26.3	98.9	-1.9	DT 300	67	22	45	CH	5.7	94.3	26.3	3.0	112.8	89.3	26.3	97.5	1.4	-1.9	YES
4828	6/7/2011	789	Pass	6	96+31	PS	-103	4.0			3815	88.9	29.6	75	21	54	95.4	27.0	92.3	117.2	113.0	88.8	27.3	99.9	-2.3	DT 150	75	22	53	CH	3.9	96.1	27.3	3.2	111.0	87.2	27.3	98.1	1.8	-2.3	YES
4828	6/7/2011	794	Pass	7	87+60	PS	-108	3.5			4502	91.6	28.2	68	23	45	95.0	28.4	92.4	118.6	121.4	94.3	28.7	102.9	0.5	DT 150	69	19	50	CH	6.2	93.8	28.7	3.2							
4828	6/7/2011	795	Pass	1	63+22	PS	-135	2.0	4613+716		4502	91.6	28.2	68	23	45	95.0				117.5	92.2	27.5	100.7	-0.7	DT 150	70	22	48	CH	8.2	91.8	27.5	3.7							
4828	6/7/2011	796	Pass	11	77+55	CL	0	13.6			3815	88.9	29.6	75	21	54	95.4				115.2	88.1	30.7	99.1	1.1	DT 150	73	23	50	CH	5.8	94.2	30.7	3.8							
4828	6/7/2011	790	Pass	7	91+00	PS	-99	4.0			3815	88.9	29.6	75	21	54	95.4				114.4	88.5	29.2	99.6	-0.4	DT 150	75	24	51	CH	4.8	95.2	29.2	2.9							
4828	6/7/2011	791	Pass	9	108+85	CL	0	13.2			3815	88.9	29.6	75	21	54	95.4				114.3	88.7	28.8	99.8	-0.8	DT 150	77	23	54	CH	7.8	92.2	28.8	3.1							
4828	6/7/2011	798	Pass	10	67+45	CL	0	13.7			4502	91.6	28.2	68	23	45	95.0				113.8	89.0	27.8	97.2	-0.4	DT 150	69	23	46	CH	5.7	94.3	27.8	3.0							
4828	6/7/2011	797	Pass	10	72+62	CL	0	13.8			4502	91.6	28.2	68	23	45	95.0				113.3	89.1	27.1	97.3	-1.1	DT 150	71	22	49	CH	5.6	94.4	27.1	3.3							
4828	6/7/2011	792	Pass	11	87+57	CL	0	13.6			3815	88.9	29.6	75	21	54	95.4				113.2	89.1	27.0	100.2	-2.6	DT 150	75	24	51	CH	4.0	96.0	27.0	3.3							
4849	6/9/2011	804	Pass	3	152+47	PS	-84	6.1			4502	91.6	28.2	68	23	45	95.0	25.2	96.0	120.2	120.5	95.2	26.6	103.9	-1.6	DT 300	67	20	47	CH	3.9	96.1	26.6	3.0							
4849	6/9/2011	803	Pass	3	150+50	PS	-52	7.2			4502	91.6	28.2	68	23	45	95.0				120.9	92.4	30.8	100.9	2.6	DT 300	67	21	46	CH	3.4	96.6	30.8	3.2							
4849	6/9/2011	800	Pass	3	122+97	PS	-82	6.3	4583+703		3649	94.8	24.1	59	23	36	94.0				119.4	95.6	24.9	100.8	0.8	DT 300	62	22	40	CH	3.3	96.7	24.9	3.0							
4849	6/9/2011	805	Pass	3	154+38	PS	-96	5.9			4502	91.6	28.2	68	23	45	95.0				119.0	89.9	32.3	98.1	4.1	DT 300	69	23	46	CH	3.7	96.3	32.3	3.0							
4849	6/9/2011	802	Pass	7	59+31	FS	7	10.2			3815	88.9	29.6	75	21	54	95.4				117.6	91.7	28.3	103.1	-1.3	DT 300	76	22	54	CH	4.5	95.5	28.3	3.3							
4849	6/9/2011	801	Pass	11	108+39	CL	0	13.7			3804	85.5	31.1	84	27	57	94.9				112.2	83.0	35.2	97.1	4.1	DT 150	81	26	55	CH	5.5	94.5	28.3	3.9							
4876	6/13/2011	809	Pass	3	158+63	PS	-87	6.1			4502	91.6	28.2	68	23	45	95.0	27.1	94.7	120.4	116.0	91.7	26.5	100.1	-1.7	DT 150	67	22	45	CH	4.4	95.6	26.5	3.5	114.7	90.7	26.5	99.0	1.1	-1.7	YES
4876	6/13/2011	806	Pass	3	146+31	PS	-78	6.3			3649	94.8	24.1	59	23	36	94.0				119.4	95.6	24.9	100.8	0.8	DT 300	58	18	40	CH	3.2	96.8	24.9	2.5							
4876	6/13/2011	808	Pass	3	156+63	PS	-84	6.5			4502	91.6	28.2	68	23	45	95.0				118.1	92.9	27.1	101.4	-1.1	DT 300	69	24	45	CH	4.0	96.0	27.1	2.7							
4876	6/13/2011	807	Pass	3	148+44	PS	-99	5.7			4502	91.6	28.2	68	23	45	95.0				114.6	89.0	28.8	97.2	0.6	DT 300	66	24	42	CH	5.1	94.9	28.8	3.1							
4900	6/14/2011	810	Pass	4	68+29	PS	-103	4.0			4502	91.6	28.2	68	23	45	95.0				120.7	93.9	28.6	102.5	0.4	DT 150	65	22	43	CH	3.0	97.0	28.6	2.4							
4900	6/14/2011	811	Pass	6	72+99	PS	-132	3.5			3815	88.9	29.6	75	21	54	95.4				111.2	87.1	27.6	98.0	-2.0	DT 150	75	24	51	CH	3.4	96.6	27.6	4.2							
4900	6/14/2011	812	Pass	6	78+05	PS	-128	3.4			4502	91.6	28.2	68	23	45	95.0				108.3	85.7	26.4	93.6	-1.8	DT 150	74	25	49	CH	3.2	96.8	26.4	3.9							
4914	6/16/2011	814	Pass	3	163+19	PS	-111	5.3			3815	88.9	29.6	75	21	54	95.4	27.8	92.5	118.2	114.8	89.0	29.0	100.1	-0.6	DT 300	71	24	47	CH	6.5	93.5	29.0	3.2							
4914	6/16/2011	813	Pass	3	161+33	PS	-135	4.7			3815	88.9	29.6	75	21	54	95.4				117.7	90.0	30.8	101.2	1.2	DT 300	73	24	49	CH	5.2	94.8	30.8	3.2							
4914	6/16/2011	817	Pass	3	169+08	PS	-138	4.6			3815	88.9	29.6	75	21	54	95.4				115.0	88.7	29.7	99.8	0.1	DT 300	72	23	49	CH	5.0	95.0	29.7	3.0							
4914	6/16/2011	816	Pass	3	166+95	PS	-139	4.5			3815	88.9	29.6	75	21	54	95.4				114.5	89.0	28.6	100.1	-1.0	DT 300	74	22	52	CH	4.3	95.7	28.6	3.0							
4914	6/16/2011	818	Pass	3	171+31	PS	-130	4.8			3815	88.9	29.6	75	21	54	95.4				112.2	86.4	29.8	97.2	0.2	DT 300	75	24	51	CH	3.5	96.4	29.8	3.7							
4914	6/16/2011	815	Pass	3	165+12	PS	-111	5.5			3815	88.9	29.6	75	21	54	95.4				110.8	87.3	26.9	98.2	-2.7	DT 300	78	24	54	CH	3.8	96.2	26.9	3.6							
4920	6/17/2011	819	Pass	3	173+22	PS	-129	4.6			3815	88.9	29.6	75	21	54	95.4	30.9	88.9	116.4	114.3	86.8	31.7	97.6	2.1	DT150	72	23	49	CH	2.9	97.1	31.7	3.6	112.3	85.3	31.7	96.0	1.8	2.1	YES
4920	6/17/2011	820	Pass	3	175+29	PS	-113	5.3			3815	88.9	29.6	75	21	54	95.4				115.3	90.2	27.8	101.5	-1.8	DT 300	71	22	49	CH	5.1	94.9	27.8	3.8							
4920	6/17/2011	823	Pass	3	181+27	PS	-120	4.8			3815	88.9	29.6	75	21	54	95.4				115.2	89.6	28.6	100.8	-1.0	DT 300	75	24	51	CH	3.4	96.6	28.6	3.9							
4920	6/17/2011	822	Pass	3	179+16	PS	-106	5.7			3815	88.9	29.6	75	21	54	95.4				109.2	85.0	28.5	95.6	-1.1	DT 300	75	22	53	CH	3.2	96.8	28.5	4.2							
4920	6/17/2011	821	Pass	3	177+10	PS	-111	5.4			3815	88.9	29.6	75	21	54	95.4				105.7	81.6	29.5	91.8	-0.1	DT 300	72	22	50	CH	6.3	93.7	29.5	4.4							
4956	6/22/2011	824	Pass	8	55+97	PS	-11	11.1			3745	95.8	23.5	63	21	42	91.9	25.6	96.4	121.0	110.1	89.4	23.1	93.3	-0.4	DT 300	65	24	41	CH	4.9	96.0	23.1	3.4							
4956	6/22/2011	828	Pass	4	123+59	PS	-165	3.4			4502	91.6	28.2	68	23	45	95.0				119.0	94.1	26.5	102.7	-1.7	DT 150	65	23	42	CH	2.9	97.1	26.5	3.2							
4956	6/22/2011	825	Pass	8	61+57	PS	-15	10.9			4502	91.6	28.2	68	23	45	95.0				118.7	93.2	27.4	101.7	-0.8	DT 300	68	23	45	CH	3.3	96.7	27.4	3.2							
4956	6/22/2011	827	Pass	9	129+55	CL	0	13.3			4502	91.6	28.2	68	23	45	95.0				116.2	90.4	28.6	98.7	0.4	DT 150	69	25	44	CH	2.0	98.0	28.6	4.3							
4956	6/22/2011	826	Pass	9	123+92	CL	0	13.3			4502	91.6	28.2	68	23	45	95.0				108.0	84.5	27.8	92.2	-0.4	DT 150	72	26	46	CH	3.1	96.9	27.8	3.5							
4980	6/27/2011	829	Pass	9	60+88	CL	0				4502	94.8	24.1	68	23	45	95.0	24.8	94.9	118.4	116.2	92.1	26.2	97.2	2.1		70	22	48	CH	6.2	93.8	26.2	3.5	114.3	90.6	26.2	95.6	1.7	2.1	YES
4980	6/27/2011	830	Pass	9	55+80	PS	-6	12.1			4502	94.8	24.1	68	23	45	95.0				117.4	92.4	27.1	97.5	3.0	DT 300	66	22	44	CH	4.8	95.2	27.1	3.1							
4980	6/27/2011	831	Pass	4	156+63	PS	-136	4.6			4502	94.8	24.1	68	23	45	95.0				114.1	89.8	27.0	94.7	2.9	DT 300	64	22	42	CH	4.0	96.0	27.0	2.7							
4992	6/28/2011	839	Pass	9	149+80	CL	0	12.8			3815	88.9	29.6	75	21	54	95.4	31.8	88.9	117.1	107.6	82.1	31.1	92.4	1.5	DT 150	77	21	56	CH	3.1	96.9	31.1	3.8	106.9	81.5	31.1	91.7	0.7	1.5	YES
4992	6/28/2011	834	Pass	4	139+50	PS	-134	4.4			4502	96.1	28.2	68	23	45	95.0	23.3	95.6	118.0	111.6	88.6	26.0	92.2	-2.2	DT 150	65	20	45	CH	3.5	96.5	26.0	3.4							
4992	6/28/2011	832	Pass	4	133+57	PS	-147	4.0			4502	96.1	28.2	68	23	45	95.0				117.0	92.7	26.2	96.5	-2.0	DT-150	64	21	43	CH	2.9	97.1	26.2	3.2							
4992	6/28/2011	835	Pass	4	143+82	PS	-142	4.1			4502	96.1	28.2	68	23	45	95.0				116.2	91.8	26.6	95.5	-1.6	DT 150	62	20	42	CH	5.5	94.5	26.6	3.0							
4992	6/28/2011	837	Pass	9	138+59	CL	0	13.7			4502	91.6	28.2	68	23	45	95.0				116.1	88.5	31.2	96.6	3.0	DT-150	71	22	49	CH	5.2	94.8	31.2	3.5							
4992	6/28/2011	840	Pass	4	154+30	PS	-138	4.1			4502	91.6	28.2	68	23	45	95.0				115.4	86.8	33.0	94.8	4.8	DT 150	69	21	48	CH	3.7	96.3	33.0	3.1							
4992	6/28/2011	838	Pass	9	144+25	CL	0	12.8			3815	88.9	29.6	75	21	54	95.4				112.9	87.2	29.5	98.1	-0.1	DT 150	79	23	56	CH	5.0	95.0	29.5	3.6							
4992	6/28/2011	841	Pass	4	157+47	PS	-129	4.5			4502	91.6	28.2	68	23	45	95.0				112.9	85.5	32.1	93.3	3.9	DT 150	69	22	47	CH	3.1	96.9	32.1	2.9							
4992	6/28/2011	836	Pass	4	147+92	PS	-131	4.4			4502	96.1	28.2	68	23	45	95.0				110.6	87.8	25.9	91.4	-2.3	DT 150	66	20	46	CH	3.4	96.6	25.9	3.5							
4992	6/28/2011	833	Pass	9	133+79	CL	0	13.5			4502	96.1	28.2	68	23	45	95.0				109.9	86.5	27.0	90.0	-1.2	DT 150	71	24	47	CH	2.5	97.5	27.0	3.3							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear $w_{Meas} - w_{Opt}$	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC $w_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone $w_{Meas} - w_{Opt}$	Difference Within 3%
5003	6/29/2011	844	Pass	9	155+34	CL	0	12.8			4502	91.6	28.2	68	23	45	95.0	30.4	90.2	117.6	112.8	85.4	32.1	93.2	3.9	DT 150	67	25	42	CH	3.0	97.0	32.1	3.3							
5003	6/29/2011	845	Pass	9	159+04	CL	0	12.9			4502	91.6	28.2	68	23	45	95.0	29.1	86.8	112.0	114.5	87.5	30.8	95.5	2.6	DT 150	67	24	43	CH	4.1	95.9	30.8	2.8							
5003	6/29/2011	842	Pass	10	60+63	CL	0	13.3			4502	91.6	28.2	68	23	45	95.0				117.9	93.6	26.0	102.2	-2.2	DT 300	63	22	41	CH	13.1	86.9	26.0	3.0							
5003	6/29/2011	843	Pass	10	58+29	CL	0	13.2			4502	91.6	28.2	68	23	45	95.0				114.4	88.5	29.2	96.6	1.0	DT 300	65	22	43	CH	5.0	95.0	29.3	3.8							
5016	6/30/2011	849	Pass	4	169+40	PS	-162	3.7			4502	91.6	28.2	68	23	45	95.0	26.9	93.7	118.9	116.1	91.4	27.0	99.8	-1.2	DT 150	67	19	48	CH	4.3	95.7	27.0	2.9	112.8	88.8	27.0	96.9	2.9	-1.2	YES
5016	6/30/2011	854	Pass	9	178+64	CL	0	13.5			3804	85.5	31.1	84	27	57	94.9	29.1	86.8	112.0	113.4	86.9	30.5	101.6	-0.6	DT 150	80	23	57	CH	5.7	94.3	30.5	4.0							
5016	6/30/2011	850	Pass	11	61+27	CL	0	13.7			4502	91.6	28.2	68	23	45	95.0				117.1	92.2	27.0	100.7	-1.2	DT 150	65	18	47	CH	7.6	92.4	27.0	3.0							
5016	6/30/2011	855	Pass	9	174+44	CL	0	13.4			4502	91.6	28.2	68	23	45	95.0				116.0	90.4	28.3	98.7	0.1	DT 150	67	21	46	CH	3.4	96.6	28.3	3.2							
5016	6/30/2011	846	Pass	9	163+74	CL	0	13.2			3815	88.9	29.6	75	21	54	95.4				114.6	90.1	27.2	101.3	-2.4	DT 150	72	19	53	CH	5.7	94.3	27.2	3.2							
5016	6/30/2011	848	Pass	4	165+89	PS	-155	4.0			4502	91.6	28.2	68	23	45	95.0				114.3	87.3	31.0	95.3	2.8	DT 150	68	20	48	CH	3.2	96.8	31.0	3.1							
5016	6/30/2011	853	Pass	4	178+50	PS	-154	4.4			4502	91.6	28.2	68	23	45	95.0				113.0	88.9	27.1	97.1	-1.1	DT 150	68	19	49	CH	3.7	96.3	27.1	3.0							
5016	6/30/2011	851	Pass	11	55+71	PS	-5	13.5			3815	88.9	29.6	75	21	54	95.4				112.1	88.3	27.0	99.3	-2.6	DT 150	72	17	55	CH	5.2	94.8	27.0	3.6							
5016	6/30/2011	852	Pass	4	174+30	PS	-144	4.6			4502	91.6	28.2	68	23	45	95.0				111.7	84.0	32.9	91.7	4.7	DT 150	69	19	50	CH	2.8	997.2	32.9	3.2							
5016	6/30/2011	847	Pass	9	169+16	CL	0	13.1			3815	88.9	29.6	75	21	54	95.4				107.9	84.9	27.1	95.5	-2.5	DT 150	79	22	57	CH	3.4	96.6	27.1	4.1							
5053	7/6/2011	857	Pass	4	127+88	FS	87	5.2			3824	82.9	33.7	92	31	61	93.7				109.4	83.7	30.7	101.0	-3.0	DT 150	92	25	67	CH	6.8	93.2	30.7	5.0							
5053	7/6/2011	856	Pass	4	123+48	FS	72	5.5			3804	85.5	31.1	84	27	57	94.9				106.7	83.2	28.2	97.3	-2.9	DT 150	80	26	54	CH	8.0	92.0	28.2	5.0							
5065	7/7/2011	859	Pass	12	54+87	CL	0	14.6			4502	91.6	28.2	68	23	45	95.0	26.8	93.2	118.1	113.8	89.4	27.3	97.6	-0.9	DT 150	65	20	45	CH	6.5	93.5	27.3	2.8	111.2	87.4	27.3	95.4	2.3	-0.9	YES
5065	7/7/2011	864	Pass	4	153+36	FS	90	5.1			4502	91.6	28.2	68	23	45	95.0	25.7	92.9	116.8	115.8	92.2	25.6	100.7	-2.6	DT 150	64	23	41	CH	4.1	95.9	25.6	2.9							
5065	7/7/2011	865	Pass	4	158+77	FS	60	5.8			4502	91.6	28.2	68	23	45	95.0				115.5	90.2	28.1	98.5	-0.1	DT 150	69	23	46	CH	3.2	96.8	28.1	3.1							
5065	7/7/2011	863	Pass	4	148+77	FS	76	5.2			4502	91.6	28.2	68	23	45	95.0				113.8	89.2	27.6	97.4	-0.6	DT 150	69	22	47	CH	5.1	94.9	27.6	3.8							
5065	7/7/2011	858	Pass	12	58+69	CL	0	14.6			4502	91.6	28.2	68	23	45	95.0				112.5	85.4	31.8	93.2	3.6	DT 150	67	18	49	CH	5.0	95.0	31.8	3.0							
5065	7/7/2011	860	Pass	4	133+39	FS	79	5.0			3815	88.9	29.6	75	21	54	95.4				111.1	83.5	33.1	93.9	3.5	DT 150	75	19	56	CH	5.3	94.7	33.1	3.9							
5065	7/7/2011	862	Pass	4	144+15	FS	93	4.7			4502	91.6	28.2	68	23	45	95.0				109.8	87.4	25.7	95.4	-2.5	DT 150	68	20	48	CH	5.6	94.4	25.7	3.8							
5065	7/7/2011	861	Pass	4	138+74	FS	58	5.8			3804	85.5	31.1	84	27	57	94.9				102.8	77.0	33.5	90.1	2.4	DT 150	80	24	56	CH	7.1	92.9	33.5	5.6							
5077	7/8/2011	869	Pass	4	168+33	FS	92	5.1			4502	91.6	28.2	68	23	45	95.0	24.6	95.2	118.6	117.2	93.2	25.8	101.7	-2.4	DT 150	69	21	48	CH	3.8	96.2	25.8	2.7	115.3	91.7	25.8	100.1	1.6	-2.4	YES
5077	7/8/2011	866	Pass	12	60+52	CL	0	14.6			4502	91.6	28.2	68	23	45	95.0				118.2	93.8	26.0	102.4	-2.2	DT-150	64	20	44	CH	7.3	92.7	26.0	3.4							
5077	7/8/2011	870	Pass	4	173+43	FS	87	5.3			3815	88.9	29.6	75	21	54	95.4				117.0	90.1	29.9	101.3	0.3	DT 150	78	24	54	CH	4.2	95.8	29.9	3.0							
5077	7/8/2011	868	Pass	4	164+10	FS	83	5.4			3804	85.5	31.1	84	27	57	94.9				114.9	84.8	35.5	99.2	4.4	DT 150	87	28	59	CH	7.8	92.2	35.5	5.2							
5077	7/8/2011	871	Pass	4	178+87	FS	98	4.8			3815	88.9	29.6	75	21	54	95.4				112.0	84.7	32.3	95.3	2.7	DT 150	79	25	54	CH	4.0	96.0	32.3	3.6							
5077	7/8/2011	867	Fail	1	110+66	FS	6	10.0		5112+881	4502	91.6	28.2	68	23	45	95.0				101.1	80.0	26.3	87.3	-1.9	DT 300	70	22	48	CH	9.3	90.7	26.3	3.6							
5078	7/9/2011	879	Pass	10	152+74	CL	0	13.2			3815	88.9	29.6	75	21	54	95.4	30.4	89.6	116.9	112.4	84.3	33.4	94.8	3.8	DT 150	75	20	55	CH	3.8	96.2	33.4	3.0	111.9	83.9	33.4	94.4	0.4	3.8	YES
5078	7/9/2011	874	Pass	10	128+09	CL	0	13.8			4502	91.6	28.2	68	23	45	95.0	28.7	90.6	116.6	109.8	85.8	28.0	93.7	-0.2	DT 150	66	23	43	CH	3.6	96.4	28.0	3.6							
5078	7/9/2011	873	Pass	10	124+11	CL	0	13.8			4502	91.6	28.2	68	23	45	95.0				112.0	85.3	31.3	93.1	3.1	DT 150	64	21	43	CH	4.3	95.7	31.3	3.0							
5078	7/9/2011	877	Pass	10	143+77	CL	0	13.2			3815	88.9	29.6	75	21	54	95.4				111.8	83.1	34.5	93.5	4.9	DT 150	75	23	52	CH	5.9	94.1	34.5	3.3							
5078	7/9/2011	878	Pass	10	148+16	CL	0	13.2			3815	88.9	29.6	75	21	54	95.4				111.6	84.3	32.4	94.8	2.8	DT 150	75	26	49	CH	3.3	96.7	32.4	3.8							
5078	7/9/2011	875	Pass	10	133+12	CL	0	13.8			4502	91.6	28.2	68	23	45	95.0				111.5	89.0	25.3	97.2	-2.9	DT 150	66	22	44	CH	3.8	96.2	25.3	3.1							
5078	7/9/2011	876	Pass	10	137+83	CL	0	13.8			4502	91.6	28.2	68	23	45	95.0				110.9	88.1	25.9	96.2	-2.3	DT 150	68	21	47	CH	3.8	96.2	25.9	3.1							
5078	7/9/2011	872	Pass	10	121+84	CL	0	13.8			4502	91.6	28.2	68	23	45	95.0				110.7	83.1	33.2	90.7	5.0	DT 150	69	21	48	CH	4.3	95.7	33.2	3.3							
5078	7/9/2011	880	Pass	10	157+89	CL	0	13.2			4502	91.6	28.2	68	23	45	95.0				108.3	85.7	26.3	93.6	-1.9	DT 150	67	22	45	CH	5.0	95.0	26.3	3.4							
5112	7/12/2011	884	Pass	5	132+76	PS	-150	4.3			3649	94.8	24.1	59	23	36	94.0	23.0	91.9	113.1	115.6	92.6	24.9	97.7	0.8	DT 150	63	24	39	CH	3.2	96.8	24.9	2.6							
5112	7/12/2011	883	Pass	5	127+74	PS	-134	5.2			3649	94.8	24.1	59	23	36	94.0				117.0	93.5	25.2	98.6	1.1	DT 150	61	22	39	CH	3.6	96.4	25.2	2.1							
5112	7/12/2011	882	Pass	5	122+33	PS	-121	5.7			4502	91.6	28.2	68	23	45	95.0				115.8	92.1	25.8	100.5	-2.4	DT 150	63	21	42	CH	3.6	96.4	25.8	2.6							
5112	7/12/2011	885	Pass	6	125+29	PS	-126	5.3			4502	91.6	28.2	68	23	45	95.0				111.1	88.5	25.5	96.6	-2.7	DT 150	66	23	43	CH	8.5	91.5	25.5	2.5							
5112	7/12/2011	881	Pass	1	110+66	PS	-6	10.0	5077+867		4502	91.6	28.2	68	23	45	95.0				111.1	88.2	25.9	96.3	-2.3	DT 300	67	19	48	CH	4.5	95.5	25.9	2.4							
5126	7/13/2011	887	Pass	2	112+24	FS	29	1.0			3555	86.6	30.0	78	28	50	94.1				107.1	81.0	32.3	93.5	2.3	DT 300	81	26	55	CH	3.2	96.8	32.3	2.4							
5126	7/13/2011	886	Pass	1	112+24	FS	26	0.0			3555	86.6	30.0	78	28	50	94.1				102.7	79.1	29.9	91.3	-0.1	DT 300	83	29	54	CH	5.1	94.9	29.9	2.5							
5138	7/14/2011	888	Pass		112+66	FS	22				3804	85.5	31.1	84	27	57	94.9				110.7	84.9	30.4	99.3	-0.7		84	26	58	CH	6.2	93.8	30.4	2.2							
5444	8/12/2011	889	Pass	5	141+12	PS	-147	4.3			4502	91.6	28.2	68	23	45	95.0	32.2	88.0	116.3	112.8	87.2	29.3	95.2	1.1	DT 150	62	18	44	CH	5.4	94.7	29.3	2.6	111.9	86.5	29.3	94.4	0.8	1.1	YES
5444	8/12/2011	891	Pass	5	148+80	PS	-152	4.0			4502	91.6	28.2	68	23	45	95.0				115.5	90.9	27.1	99.2	-1.1	DT 150	63	19	44	CH	6.6	93.4	27.1	2.7							
5444	8/12/2011	890	Pass	5	145+63	PS	-60	6.9			4502	91.6	28.2	68	23	45	95.0				111.0	85.8	29.3	93.7	1.1	DT 150	64	20	44	CH	6.3	93.7	29.3	1.8							
5444	8/12/2011	892	Pass	5	156+39	PS	-137	4.7			4502	91.6	28.2	68	23	45	95.0				108.7	84.9	28.1	92.7	-0.1	DT 150	63	20	43	CH	4.1	95.9	28.1	2.7							
5444	8/12/2011	893	Pass	5	158+49	PS	-130	5.1			3649	94.8	24.1	59	23	36	94.0				108.7	87.5	24.2	92.3	0.1	DT 150	59	19	40	CH	4.2	95.8	24.2	2.6							
5474	8/17/2011	894	Pass	4	133+02	CL	0	9.6	3499+318		3183	87.5	27.6	81	25	56	99.6	32.2	88.0	116.3	110.7	83.8	32.1	95.8	4.5	DT-300	82	27	55	CH	4.6	95.4	32.1	4.3							
5474	8/17/2011	896	Pass	6	88+03	PS	-130	2.9	4641+722		4502	91.6	28.2	68	23	45	95.0				110.9	86.8	27.8	94.8	-0.4	DT 300	65	20	45	CH	4.2	95.8	27.8	3.7							
5474	8/17/2011	895	Pass	4	112+46	FS	30	3.2			3555	86.6	30.0	78	28	50	94.1				108.8	82.3	32.2	95.0	2.2	DT 300	76	26	50	CH	11.5	88.5	32.2	3.7							
5502	8/19/2011	899	Pass	3	2+51	PS	-154	0.8			4502	91.6	28.2	68	23	45	95.0	29.6	91.4	118.7	118.1	90.2	31.0	98.5	2.8	DT 150	69	22	47	CH	4.1	95.9	31.0	3.7	118.8	90.7	31.0	99.0	0.6	2.8	YES
5502	8/19/2011	904	Pass	8	41+89	CL	0	11.5			2762	92.1	26.6	72	29	43	97.1	26.8	92.0	116.7	108.8	85.4	27.4	92.7	0.8	DT 300	71	25	46	CH	12.7	87.3	27.4	6.5							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear w_{Meas} - w_{Opt}	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC $w_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w_{Meas} - w_{Opt}	Difference Within 3%
5502	8/19/2011	900	Pass	3	7+25	PS	-116	1.9			4502	91.6	28.2	68	23	45	95.0				114.6	87.5	30.9	95.5	2.7	DT 300	69	19	50	CH	6.5	93.5	30.9	3.5							
5502	8/19/2011	903	Pass	8	36+87	CL	0	11.7			3550	92.3	26.0	63	19	44	95.0				113.5	87.5	29.7	94.8	3.7	DT 300	68	25	43	CH	19.3	80.7	29.7	7.1							
5502	8/19/2011	906	Pass	8	51+70	CL	0	11.6			2762	92.1	26.6	72	29	43	97.1				109.5	84.0	30.4	91.2	3.8	DT 300	71	23	48	CH	11.3	88.7	30.4	5.2							
5502	8/19/2011	908	Pass	8	16+90	PS	-11	11.4			3555	86.6	30.0	78	28	50	94.1				108.9	81.5	33.7	94.1	3.7	DT 300	79	28	51	CH	10.7	89.3	33.7	7.9							
5502	8/19/2011	902	Pass	8	31+91	CL	0	11.4			2762	92.1	26.6	72	29	43	97.1				107.3	84.0	27.8	91.2	1.2	DT 300	70	26	44	CH	13.7	86.3	27.8	6.5							
5502	8/19/2011	905	Pass	8	46+85	CL	0	11.6			2762	92.1	26.6	72	29	43	97.1				106.4	84.8	25.5	92.1	-1.1	DT 300	70	23	47	CH	10.3	89.7	25.5	5.3							
5502	8/19/2011	907	Pass	8	11+89	CL	0	11.4			3555	86.6	30.0	78	28	50	94.1				105.3	78.8	33.6	91.0	3.6	DT 300	78	26	52	CH	12.1	87.9	33.6	6.4							
5502	8/19/2011	901	Pass	8	31+95	CL	0	11.4			3555	86.6	30.0	78	28	50	94.1				103.4	78.7	31.4	90.9	1.4	DT 300	70	18	52	CH	9.4	90.6	31.4	6.0							
5513	8/22/2011	909	Pass	3	11+95	PS	-118	2.1			4502	91.6	28.2	68	23	45	95.0	25.3	92.2	116.5	114.7	89.6	28.0	97.8	-0.2	DT 150	63	19	44	CH	3.6	96.4	28.0	3.8	112.4	87.8	28.0	95.9	2.0	-0.2	YES
5513	8/22/2011	914	Pass	3	26+81	PS	-134	2.4			4502	91.6	28.2	68	23	45	95.0	29.6	92.1	119.3	114.4	88.3	29.6	96.4	1.4	DT 300	65	19	46	CH	6.0	94.0	29.6	3.7							
5513	8/22/2011	910	Pass	3	16+90	PS	-117	2.6			4502	91.6	28.2	68	23	45	95.0				114.4	89.1	28.4	97.3	0.2	DT 300	65	19	46	CH	3.3	96.7	28.4	3.5							
5513	8/22/2011	913	Pass	3	21+83	PS	-116	2.8			4502	91.6	28.2	68	23	45	95.0				114.0	88.4	29.0	96.5	0.8	DT 300	65	19	46	CH	3.7	96.3	29.0	3.7							
5513	8/22/2011	912	Pass	8	6+96	PS	-12	11.3			3550	92.3	26.0	63	19	44	95.0				105.0	84.2	24.7	91.2	-1.3	DT 300	63	20	43	CH	14.3	85.7	24.7	8.4							
5513	8/22/2011	911	Pass	8	2+00	FS	9	11.2			3550	92.3	26.0	63	19	44	95.0				104.3	84.0	24.2	91.0	-1.8	DT 300	64	21	43	CH	11.4	88.6	24.2	8.2							
5526	8/23/2011	919	Pass	5	173+35	PS	-127	5.6			3291	99.5	21.9	64	22	42	97.8	22.6	98.3	120.4	120.2	98.9	21.5	99.4	-0.4	DT 150	61	17	44	CH	3.3	96.7	21.5	1.6	118.0	97.1	21.5	97.6	1.9	-0.4	YES
5526	8/23/2011	916	Pass	5	166+42	PS	-127	5.5			3291	99.5	21.9	64	22	42	97.8				116.9	97.7	19.7	98.2	-2.2	DT 150	61	17	44	CH	3.4	96.6	19.7	2.3							
5526	8/23/2011	918	Pass	3	37+00	PS	-137	2.5			3815	88.9	29.6	75	21	54	95.4				116.4	90.9	28.0	102.2	-1.6	DT 300	71	20	51	CH	3.2	96.8	28.0	2.8							
5526	8/23/2011	915	Pass	5	163+51	PS	-112	5.7			3291	99.5	21.9	64	22	42	97.8				116.3	96.8	20.2	97.3	-1.7	DT 150	61	17	44	CH	3.1	96.9	20.2	2.8							
5526	8/23/2011	920	Pass	5	178+38	PS	-142	4.9			3180	95.8	29.0	60	21	39	97.8				116.1	90.6	28.1	94.6	-0.9	DT 150	62	22	40	CH	4.1	95.9	28.1	3.0							
5526	8/23/2011	917	Pass	3	31+82	PS	-115	3.0			4502	91.6	28.2	68	23	45	95.0				116.0	90.9	27.6	99.2	-0.6	DT 300	68	19	49	CH	2.8	97.2	27.6	2.4							
5557	8/26/2011	924	Pass	4	2+16	FS	62	5.2			4502	91.6	28.2	68	23	45	95.0	26.6	92.2	116.7	116.2	91.9	26.5	100.3	-1.7	DT 300	68	24	44	CH	4.0	96.0	26.5	3.0							
5557	8/26/2011	926	Pass	3	45+80	PS	-115	2.8			4502	91.6	28.2	68	23	45	95.0				119.8	93.7	27.8	102.3	-0.4	DT 300	69	24	45	CH	3.9	96.1	27.8	2.9							
5557	8/26/2011	923	Pass	3	14+34	PS	-137	7.0			4502	91.6	28.2	68	23	45	95.0				117.9	93.3	26.4	101.9	-1.8	DT 300	65	22	43	CH	2.0	98.0	26.4	2.8							
5557	8/26/2011	925	Pass	4	5+96	FS	53	5.7			4502	91.6	28.2	68	23	45	95.0				117.0	92.5	26.5	101.0	-1.7	DT 300	70	22	48	CH	4.9	95.1	26.5	3.8							
5557	8/26/2011	921	Pass	3	34+43	PS	-155	2.0			4502	91.6	28.2	68	23	45	95.0				116.4	89.2	30.5	97.4	2.3	DT-300	65	18	47	CH	2.9	97.1	30.5	2.7							
5557	8/26/2011	922	Pass	3	42+45	PS	-137	2.1			4502	91.6	28.2	68	23	45	95.0				114.9	89.4	28.5	97.6	0.3	DT 300	64	24	40	CH	3.9	96.1	28.5	3.0							
5566	8/29/2011	929	Pass	4	10+06	PS	-104	3.5			3186	91.6	26.5	67	23	44	98.9	26.6	92.3	116.8	120.8	94.0	28.5	102.6	2.0	DT 150	67	21	46	CH	5.2	94.8	28.5	2.1	119.6	93.1	28.5	101.6	1.0	2.0	YES
5566	8/29/2011	928	Pass	4	5+96	PS	-101	3.5			3034	94.8	24.8	67	24	43	95.5				116.4	94.6	23.0	99.8	-1.8	DT 300	68	25	43	CH	2.3	97.7	23.0	2.0							
5566	8/29/2011	927	Pass	4	2+15	PS	-100				3185	90.0	28.5	74	23	51	99.2				115.3	90.9	26.9	101.0	-1.6		75	24	51	CH	6.3	93.7	26.9	2.0							
5577	8/30/2011	934	Pass		157+90	CL	0	13.8			3181	92.9	22.3	78	23	55	99.6	25.6	93.4	117.3	109.4	87.7	24.7	94.4	2.4	REF!	75	20	55	CH	3.1	96.9	24.7	1.2							
5577	8/30/2011	931	Pass	11	143+07	CL	0	13.5			3185	90.0	28.5	74	23	51	99.2				118.5	93.3	27.0	103.7	-1.5	DT 150	75	25	50	CH	10.1	89.9	27.0	1.5							
5577	8/30/2011	933	Pass	11	152+91	CL	0	13.8			3178	91.7	26.2	68	20	48	98.1				114.0	89.1	27.9	97.2	1.7	DT 150	72	25	47	CH	6.9	93.1		1.5							
5577	8/30/2011	930	Pass	11	157+90	CL	0	13.8			3185	90.0	28.5	74	23	51	99.2				113.6	89.9	26.3	99.9	-2.2	DT 150	75	24	51	CH	3.7	96.3	26.3	1.1							
5577	8/30/2011	932	Pass	11	147+97	CL	0	13.7			3181	92.9	22.3	78	23	55	99.6				112.1	88.7	26.4	95.5	4.1	DT 150	76	21	55	CH	4.1	95.9	26.4	1.2							
5588	8/31/2011	935	Pass	4	18+05	PS	-103	4.0			3185	90.0	28.5	74	23	51	99.2				117.0	89.6	30.6	99.6	2.1	DT 300	75	25	50	CH	5.6	94.4	30.6	1.1							
5642	9/9/2011	936	Fail	4	22+11	PS	-124	3.6		5644+938	3182	88.2	29.4	87	25	62	99.8				117.9	85.6	37.7	97.1	8.3	DT 300	86	22	64	CH	13.7	86.3	37.7	2.4							
5643	9/12/2011	944	Pass	4	37+83	PS	-142	3.2			3185	90.0	28.5	74	23	51	99.2	30.1	90.0	117.1	114.8	88.2	30.2	98.0	1.7	DT 300	70	21	49	CH	8.8	91.2	30.2	6.7							
5643	9/12/2011	948	Pass	10	165+32	CL	0	13.7			3185	90.0	28.5	74	23	51	99.2				121.2	91.5	32.5	101.7	4.0	DT 150	74	22	52	CH	3.4	96.6	32.5	5.3							
5643	9/12/2011	946	Pass	12	160+93	CL	0	13.7			3185	90.0	28.5	74	23	51	99.2				120.8	92.6	30.5	102.9	2.0	DT 150	74	24	50	CH	4.4	95.6	30.5	5.7							
5643	9/12/2011	947	Pass	5	163+68	FS	-45	6.3			3185	90.0	28.5	74	23	51	99.2				116.9	92.1	26.9	102.3	-1.6	DT 150	73	22	51	CH	2.7	97.3	26.9	7.3							
5643	9/12/2011	942	Pass	12	156+02	CL	0	13.7			3185	90.0	28.5	74	23	51	99.2				116.3	90.0	29.2	100.0	0.7	DT 150	73	22	51	CH	7.5	92.6	29.2	6.2							
5643	9/12/2011	945	Pass	4	41+63	PS	-108	3.9			3185	90.0	28.5	74	23	51	99.2				115.2	91.2	26.3	101.3	-2.2	DT 300	74	22	52	CH	2.7	97.3	26.3	6.0							
5643	9/12/2011	941	Pass	12	151+14	CL	0	13.8			3185	90.0	28.5	74	23	51	99.2				113.8	87.9	29.4	97.7	0.9	DT 150	72	21	51	CH	2.3	97.7	29.4	6.1							
5643	9/12/2011	940	Pass	12	146+57	CL	0	13.7			3185	90.0	28.5	74	23	51	99.2				113.8	88.0	29.3	97.8	0.8	DT-150	72	23	49	CH	2.6	97.4	29.3	6.5							
5643	9/12/2011	943	Pass	4	34+45	PS	-99	4.2			3185	90.0	28.5	74	23	51	99.2				112.9	88.5	27.6	98.3	-0.9	DT 300	72	21	51	CH	2.1	97.9	27.6	6.8							
5644	9/11/2011	939	Pass	4	26+07	PS	-111	3.8			3178	91.7	26.2	68	20	48	98.1	28.9	93.7	120.8	120.8	94.2	28.3	102.7	2.1	DT 150	70	19	51	CH	3.1	96.9	28.3	3.6	118.9	92.7	28.3	101.1	1.6	2.1	YES
5644	9/11/2011	938	Pass	4	22+11	PS	-124	3.6	5642+936		3178	91.7	26.2	68	20	48	98.1				119.4	93.9	27.2	102.4	1.0	DT 300	69	19	50	CH	2.9	97.1	27.2	2.8							
5644	9/11/2011	937	Pass	4	30+10	PS	-133	3.3			3178	91.7	26.2	68	20	48	98.1				113.7	89.5	27.1	97.6	0.9	DT 300	70	23	47	CH	2.9	97.1	27.1	3.5							
5657	9/14/2011	949	Pass	4	45+60	PS	-87	4.6			3185	90.0	28.5	74	23	51	99.2	30.2	90.0	117.1	118.4	89.6	32.2	99.6	3.7	DT-150	73	23	50	CH	3.6	96.4	32.2	2.9	116.7	88.3	32.2	98.1	1.5	3.7	YES
5657	9/14/2011	950	Pass	4	49+08	PS	-105	4.2			3185	90.0	28.5	74	23	51	99.2				121.5	92.2	31.8	102.4	3.3	DT 300	72	24	48	CH	3.3	96.7	31.8	1.9							
5709	9/26/2011	951	Pass	10	170+16	CL	0	13.6			3291	91.6	21.9	64	22	42	97.8				117.7	93.1	26.4	101.6	4.5	DT 150	62	20	42	CH	6.1	93.9	26.4	4.9							
5709	9/26/2011	952	Pass	10	175+12	CL	0	13.6			2854	95.9	23.9	62	24	40	97.0				117.7	92.0	27.9	95.9	4.0	DT 150	62	22	40	CH	1.7	98.3	27.9	3.6							
5709	9/26/2011	953	Pass	10	180+07	CL	0	13.6			2854	95.9	23.9	62	24	40	97.0				112.0	88.2	27.0	92.0	3.1	DT 150	62	22	40	CH	2.7	97.3	27.0	5.2							
5713	9/27/2011	959	Pass	5	13+20	PS	-62	5.0			3178	91.7	26.2	68	20	48	98.1	27.2	92.3	117.4	124.1	94.7	31.1	103.3	4.9	DT 150	69	23	46	CH	4.8	95.2	29.0	1.0	121.5	94.2	29.0	102.7	2.1	2.8	YES
5713	9/27/2011	954	Pass	1	124+40	PS	-42	5.5			3180	95.8	24.0	60	21	39	97.8	23.1	95.1	117.1	112.3	92.4	21.5	96.5	-2.5	DT 300	62	22	40	CH	1.9	98.1	21.5	1.8							
5713	9/27/2011	958	Pass	5	10+24	PS	-75	4.7			3178	91.7	26.2	68	20	48	98.1				122.3	95.2	28.5	103.8	2.3	DT 150	67	20	47	CH	2.7	97.3	28.5	1.0							
5713	9/27/2011	957	Pass	5	6+51	PS	-67	5.1			3178	91.7	26.2	68	20	48	98.1				118.4	95.2	24.4	103.8	-1.8	DT 150	67	21	46	CH	2.9	97.1	24.4	1.0							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w $_{Meas}$	% Compaction Nuclear	Nuclear w $_{Meas}$ - w_{Opt}	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC w $_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w $_{Meas}$	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w $_{Meas}$ - w $_{Opt}$	Difference Within 3%
5713	9/27/2011	956	Pass	5	2+91	PS	-81	4.8			3181	92.9	22.3	78	23	55	99.6				115.9	92.6	25.1	99.7	2.8	DT 150	76	22	54	CH	3.2	96.8	25.1	0.8							
5713	9/27/2011	955	Pass	1	122+23	PS	-69	4.6			3183	87.5	27.6	81	25	56	99.6				112.7	87.8	28.4	100.3	0.8	DT 300	81	26	55	CH	2.6	97.4	28.4	1.1							
5719	9/28/2011	969	Pass	1	149+99	CL	0	9.3			3186	91.6	26.5	67	23	44	98.9	24.1	98.8	122.7	119.9	92.9	29.1	101.4	2.6	DT 150	61	17	44	CH	19.3	80.7	24.0	1.9	120.6	97.3	24.0	97.8	0.6	2.1	YES
5719	9/28/2011	964	Fail	2	170+01	PS	-138	3.6			3291	99.5	21.9	64	22	42	97.8	22.0	98.7	120.4	123.3	98.8	24.8	99.3	2.9	DT 300	62	19	43	CH	10.7	89.3	24.8	9.4							
5719	9/28/2011	965	Pass	3	169+97	PS	-140	4.2			3291	99.5	21.9	64	22	42	97.8				123.7	101.9	21.4	102.4	-0.5	DT 300	61	17	44	CH	4.1	95.9	21.4	2.8							
5719	9/28/2011	966	Pass	4	170+03	PS	-136	5.1			3291	99.5	21.9	64	22	42	97.8				122.5	99.6	23.0	100.1	1.1	DT 300	61	17	44	CH	6.5	93.5	23.0	2.3							
5719	9/28/2011	967	Pass	1	170+05	CL	0	11.5			3178	91.7	26.2	68	20	48	98.1				119.4	94.6	26.2	103.2	0.0	DT 300	68	19	49	CH	9.4	90.6	26.2	2.6							
5719	9/28/2011	963	Pass	1	169+97	PS	-137	2.3			3185	90.0	28.5	74	23	51	99.2				118.0	93.0	26.9	103.3	-1.6	DT 300	72	25	47	CH	12.1	87.9	26.9	6.4							
5719	9/28/2011	968	Pass	2	170+01	CL	0	12.4			3185	90.0	28.5	74	23	51	99.2				117.5	91.7	28.2	101.9	-0.3	DT 300	71	20	51	CH	13.7	86.3	24.6	2.7							
5719	9/28/2011	962	Pass	3	112+03	FS	-8.2	3.5			3181	92.9	22.3	78	23	55	99.6				112.1	90.8	23.5	97.7	1.2	DT 150	76	21	55	CH	11.3	88.7	23.5	5.2							
5719	9/28/2011	961	Pass	2	112+34	FS	-7.3	2.9			3185	90.0	28.5	74	23	51	99.2				111.1	88.0	26.2	97.8	-2.3	DT 300	75	25	50	CH	10.3	89.7	26.2	5.3							
5719	9/28/2011	960	Pass	1	112+23	FS	-9.6	2.0			3185	90.0	28.5	74	23	51	99.2				110.8	87.0	27.3	96.7	-1.2	DT 150	75	24	51	CH	12.7	87.3	27.3	3.5							
5739	10/3/2011	979	Pass	2	160+00	FS	49	5.5			3186	91.6	26.5	67	23	44	98.9	27.2	91.9	116.9	117.5	92.2	27.5	100.7	1.0	DT 150	65	19	46	CH	3.7	96.3	27.5	3.0	118.9	93.3	27.5	101.9	1.2	1.0	YES
5739	10/3/2011	989	Pass	7	150+04	CL	0	13.6			2653	99.7	23.1	59	24	35	96.3	23.0	98.7	121.4	122.2	101.5	20.4	101.8	-2.7	DT 150	56	22	34	CH	2.9	97.1	20.4	2.5	118.7	98.6	20.4	98.9	2.9	-2.7	YES
5739	10/3/2011	984	Pass	2	150+00	CL	0	9.5			2653	99.7	23.1	59	24	35	96.3	22.9	98.8	121.5	113.5	91.8	23.7	92.1	0.6	DT 300	56	20	36	CH	2.8	97.2	23.7	2.2							
5739	10/3/2011	974	Pass	4	8+48	FS	50	6.2			3186	91.6	26.5	67	23	44	98.9	26.0	92.5	116.6	115.8	92.4	25.3	100.9	-1.2	DT 150	66	22	44	CH	10.3	89.7	25.3	2.6							
5739	10/3/2011	976	Pass	3	170+07	CL	0	13.0			3186	91.6	26.5	67	23	44	98.9				124.2	95.1	30.6	103.8	4.1	DT 150	64	20	44	CH	4.4	95.6	30.6	1.9							
5739	10/3/2011	988	Pass	6	149+99	CL	0	13.1			2653	99.7	23.1	59	24	35	96.3				122.1	98.7	23.7	99.0	0.6	DT 150	55	22	33	CH	9.8	90.2	23.7	2.1							
5739	10/3/2011	973	Pass	4	13+51	FS	61	5.4			3186	91.6	26.5	67	23	44	98.9				117.2	90.6	29.4	98.9	2.9	DT 150	67	21	46	CH	3.1	96.9	29.4	2.7							
5739	10/3/2011	977	Pass	4	170+07	CL	0	13.6			3186	91.6	26.5	67	23	44	98.9				115.9	92.0	26.0	100.4	-0.5	DT 150	65	20	45	CH	4.2	95.8	26.0	2.5							
5739	10/3/2011	970	Pass	9	3+56	CL	0	12.1			2854	95.9	23.9	62	24	40	97.0				115.1	93.1	23.6	97.1	-0.3	DT 300	64	23	41	CH	5.5	94.5	23.6	2.4							
5739	10/3/2011	980	Pass	3	160+02	FS	49	6.4			3178	91.7	26.2	68	20	48	98.1				114.9	90.8	26.6	99.0	0.4	DT 300	66	19	47	CH	4.2	95.8	26.6	1.9							
5739	10/3/2011	978	Pass	1	160+00	FS	53	4.6			3186	91.6	26.5	67	23	44	98.9				114.3	91.4	25.0	99.8	-1.5	DT 300	64	19	45	CH	8.1	91.9	25.0	2.1							
5739	10/3/2011	986	Pass	4	150+04	CL	0	11.5			2653	99.7	23.1	59	24	35	96.3				111.7	91.9	21.5	92.2	-1.6	DT 300	56	21	35	CH	4.9	95.1	21.5	2.3							
5739	10/3/2011	972	Pass	9	13+56	CL	0	12.5			3186	91.6	26.5	67	23	44	98.9				111.6	88.9	25.5	97.1	-1.0	DT 300	67	22	45	CH	2.6	97.4	25.5	2.4							
5739	10/3/2011	981	Pass	9	18+56	CL	0	12.5			3291	99.5	21.9	64	22	42	97.8				111.4	91.1	22.3	91.6	0.4	DT 300	64	21	43	CH	6.5	93.5	22.3	3.7							
5739	10/3/2011	982	Fail	5	18+52	FS	57	6.0		5795+1086	2653	99.7	23.1	59	24	35	96.3				111.4	84.1	32.4	84.4	9.3	DT 150	55	22	33	CH	2.5	97.5	32.4	3.3							
5739	10/3/2011	985	Pass	3	149+98	CL	0	10.5			2653	99.7	23.1	59	24	35	96.3				111.1	91.0	22.1	91.3	-1.0	DT 300	56	25	31	CH	6.7	93.3	22.1	2.2							
5739	10/3/2011	971	Pass	9	8+53	CL	0	12.4			3034	94.8	24.8	67	24	43	95.5				111.0	90.3	22.9	95.3	-1.9	DT 300	67	23	44	CH	3.3	96.7	22.9	1.9							
5739	10/3/2011	975	Pass	4	3+56	FS	39	6.4			3186	91.6	26.5	67	23	44	98.9				108.9	85.1	28.0	92.9	1.5	DT 150	66	20	46	CH	3.6	96.4	28.0	3.0							
5739	10/3/2011	987	Pass	5	150+03	CL	0	12.4			2653	99.7	23.1	59	24	35	96.3				108.4	89.7	20.9	90.0	-2.2	DT 150	56	23	33	CH	5.6	94.4	20.9	2.3							
5739	10/3/2011	983	Pass	1	150+00	CL	0	8.4			2653	99.7	23.1	59	24	35	96.3				107.9	89.7	20.3	90.0	-2.8	DT 300	55	21	34	CH	7.2	92.8	20.3	2.2							
5748	10/4/2011	999	Pass	9	23+44	CL	0	12.5			3291	99.5	21.9	64	22	42	97.8	21.1	98.9	119.8	111.9	91.5	22.3	92.0	0.4	DT 150	65	22	43	CH	7.2	92.8	22.3	3.8	112.5	92.0	22.3	92.5	0.5	0.4	YES
5748	10/4/2011	1004	Pass	2	124+41	PS	-42	5.5			3291	99.5	21.9	64	22	42	97.8	22.0	99.0	120.8	117.5	95.5	23.0	96.0	1.1	DT 300	62	21	41	CH	3.5	96.5	23.0	2.7							
5748	10/4/2011	994	Pass	2	140+01	FS	53	5.4			3178	91.7	26.2	68	20	48	98.1	26.7	91.2	115.6	117.3	92.7	26.5	101.1	0.3	DT 300	68	19	49	CH	8.0	92.0	26.5	2.9							
5748	10/4/2011	1005	Pass	3	124+10	PS	-38	7.2			3291	99.5	21.9	64	22	42	97.8				121.5	99.0	22.7	99.5	0.8	DT 300	62	20	42	CH	11.4	88.6	22.7	3.2							
5748	10/4/2011	992	Pass	3	144+97	PS	-129	5.5			2653	99.7	23.1	59	24	35	96.3				118.8	96.3	23.4	96.6	0.3	DT 300	57	22	35	CH	5.9	94.1	23.4	2.0							
5748	10/4/2011	1007	Pass	2	122+22	PS	-64	6.0			3291	99.5	21.9	64	22	42	97.8				117.6	93.9	25.3	94.4	3.4	DT 300	63	21	42	CH	6.2	93.8	25.3	4.3							
5748	10/4/2011	1006	Pass	1	122+24	PS	-67	4.9			3291	99.5	21.9	64	22	42	97.8				116.5	93.7	24.3	94.2	2.4	DT 300	63	20	43	CH	4.2	95.8	24.3	3.0							
5748	10/4/2011	991	Pass	2	144+90	PS	-131	4.3			2653	99.7	23.1	59	24	35	96.3				116.4	94.5	23.2	94.8	0.1	DT 300	56	19	37	CH	3.8	96.2	23.2	2.9							
5748	10/4/2011	997	Pass	2	123+54	FS	70	4.8			2854	95.9	23.9	62	24	40	97.0				115.6	94.3	22.6	98.3	-1.3	DT 300	62	22	40	CH	6.5	93.5	22.6	3.4							
5748	10/4/2011	1008	Pass	3	122+22	PS	-68	6.6			3291	99.5	21.9	64	22	42	97.8				114.7	92.4	24.2	92.9	2.3	DT 300	64	22	42	CH	3.3	96.7	24.2	3.3							
5748	10/4/2011	990	Pass	1	145+01	PS	-126	3.3			3180	95.8	24.0	60	21	39	97.8				114.4	91.5	25.0	95.5	1.0	DT 300	60	19	41	CH	4.4	95.6	25.0	2.8							
5748	10/4/2011	993	Pass	1	139+96	FS	52	4.5			3178	91.7	26.2	68	20	48	98.1				112.8	86.8	29.9	94.7	3.7	DT 300	68	22	46	CH	5.3	94.7	29.9	2.9							
5748	10/4/2011	1002	Pass	4	27+76	FS	52	6.4			3180	95.8	24.0	60	21	39	97.8				112.5	89.6	25.5	93.5	1.5	DT 150	62	23	39	CH	4.4	95.6	25.5	2.6							
5748	10/4/2011	998	Pass	3	123+53	FS	68	5.5			3034	94.8	24.8	67	24	43	95.5				110.4	88.2	25.2	93.0	0.4	DT 300	66	23	43	CH	7.3	92.7	25.2	3.0							
5748	10/4/2011	995	Pass	3	140+00	FS	50	6.3			3186	91.6	26.5	67	23	44	98.9				110.2	87.8	25.5	95.9	-1.0	DT 300	66	23	43	CH	6.6	93.2	25.5	2.2							
5748	10/4/2011	1001	Pass	9	27+66	CL	0	12.5			2611	87.9	30.6	78	28	50	97.5				109.6	84.7	29.4	96.4	-1.2	DT 300	74	26	48	CH	5.3	94.7	29.4	7.3							
5748	10/4/2011	1003	Pass	1	124+41	PS	-38	5.0			3291	99.5	21.9	64	22	42	97.8				108.6	90.6	19.9	91.1	-2.0	DT 300	61	20	41	CH	3.1	96.9	19.9	3.2							
5748	10/4/2011	996	Pass	1	123+54	FS	65	3.9			3186	91.6	26.5	67	23	44	98.9				108.0	86.3	25.1	94.2	-1.4	DT 300	66	21	45	CH	12.2	87.8	25.1	2.3							
5748	10/4/2011	1000	Pass	4	23+41	FS	46	6.4			3183	87.5	27.6	81	25	56	99.6				107.7	85.2	26.4	97.4	-1.2	DT 150	81	25	56	CH	6.2	93.8	26.4	3.7							
5754	10/5/2011	1009	Pass	4	111+79	FS	-74	6.6			3291	99.5	21.9	64	22	42	97.8	21.5	99.7	121.2	115.6	95.1	21.5	95.6	-0.4	DT 150	64	21	43	CH	4.8	95.2	21.5	1.1	118.7	97.7	21.5	98.2	2.6	-0.4	YES
5754	10/5/2011	1029	Pass	1	79+99	FS	-51	4.0			2854	95.9	23.9	62	24	40	97.0	23.7	95.1	117.6	113.7	92.8	22.5	96.8	-1.4	DT 150	63	23	40	CH	5.6	94.4	22.5	3.0	112.5	91.8	22.5	95.7	1.1	-1.4	YES
5754	10/5/2011	1019	Pass	1	82+82	PS	-79	2.5			3182	88.2	29.4	87	25	62	99.8	28.7	89.4	115.1	110.5	86.6	27.6	98.2	-1.8	DT 150	87	24	63	CH	4.1	95.9	27.6	2.6	111.5	87.4	27.6	99.1	0.9	-1.8	YES
5754	10/5/2011	1039	Pass	1	118+81	CL	0	3.4			3182	88.2	29.4	87	25	62	99.8	32.1	88.7	117.1	107.2	80.8	32.7	91.6	3.3	DT 150	88	26	62	CH	4.1	95.9	32.7	4.9	106.5	80.3	32.7	91.0	0.7	3.3	YES
5754	10/5/2011	1014	Pass	3	89+99	CL	0	12.5			3291	99.5	21.9	64	22	42	97.8	24.0	99.2	123.0	112.7	91.6	23.1	92.1	1.2	DT 300	65	22	43	CH	3.5	96.5	23.1	2.7							
5754	10/5/2011	1024	Pass	3	82+04	PS	-62	5.0			3291	99.5	21.9	64	22	42	97.8	19.5	99.0	118.3	107.9	90.0	19.9	90.5	-2.0	DT 300	64	20	44	CH	4.7	95.3	19.9	3.0							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear $w_{Meas} - w_{Opt}$	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC $w_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone $w_{Meas} - w_{Opt}$	Difference Within 3%
5754	10/5/2011	1034	Pass	10	17+68	CL	0	13.1			3178	91.7	26.2	68	20	48	98.1	26.3	91.9	116.0	118.2	93.3	26.7	101.7	0.5	DT 150	67	19	48	CH	3.1	96.9	26.7	4.2							
5754	10/5/2011	1013	Pass	1	88+99	CL	0	10.5			3178	99.5	21.9	68	20	48	98.1				120.8	96.6	25.1	97.1	3.2	DT 300	65	23	42	CH	3.5	96.5	25.1	2.8							
5754	10/5/2011	1010	Pass	1	55+99	PS	-92	3.3			3291	99.5	21.9	64	22	42	97.8				118.9	94.7	25.6	95.2	3.7	DT 150	65	22	43	CH	2.6	97.4	25.6	0.8							
5754	10/5/2011	1011	Pass	1	59+31	PS	-88	3.5			3291	99.5	21.9	64	22	42	97.8				117.9	94.8	24.4	95.3	2.5	DT 150	64	23	41	CH	2.7	97.3	24.4	1.0							
5754	10/5/2011	1015	Pass	4	89+98	CL	0	13.0			3291	99.5	21.9	64	22	42	97.8				116.5	95.4	22.1	95.9	0.2	DT 150	63	22	41	CH	3.5	96.5	22.1	3.7							
5754	10/5/2011	1028	Pass	1	80+01		-54	4.0			3291	99.5	21.9	64	22	42	97.8				116.5	94.6	23.2	95.1	1.3	DT 300	65	23	42	CH	2.4	97.6	23.2	3.3							
5754	10/5/2011	1036	Pass	10	27+55	CL	0	13.0			3185	90.0	28.5	74	23	51	99.2				116.4	90.5	28.6	100.6	0.1	DT 150	75	24	51	CH	3.3	96.7	28.6	3.8							
5754	10/5/2011	1012	Pass	1	90+00	CL	0	10.5			3291	99.5	21.9	64	22	42	97.8				116.0	94.0	23.4	94.5	1.5	DT 300	65	22	43	CH	3.2	96.8	23.4	2.8							
5754	10/5/2011	1037	Pass	5	111+79	FS	98	5.3			3182	88.2	29.4	87	25	62	99.8				115.7	87.5	32.3	99.2	2.9	DT 300	87	25	62	CH	3.9	96.1	32.3	4.7							
5754	10/5/2011	1027	Pass	3	79+08	PS	-49	5.5			3291	99.5	21.9	64	22	42	97.8				114.4	94.2	21.4	94.7	-0.5	DT 300	64	22	42	CH	3.0	97.0	21.4	2.8							
5754	10/5/2011	1031	Pass	10	2+85	CL	0	13.1			3178	90.1	26.2	68	20	48	98.1				112.7	87.2	29.3	96.8	3.1	DT 150	69	22	47	CH	6.1	93.9	29.3	4.1							
5754	10/5/2011	1022	Pass	2	83+06	PS	-62	4.0			3291	99.5	21.9	64	22	42	97.8				112.7	91.9	22.6	92.4	0.7	DT 300	64	23	41	CH	3.3	97.0	22.6	2.1							
5754	10/5/2011	1021	Pass	2	82+81	PS	-75	3.6			3291	99.5	21.9	64	22	42	97.8				112.4	91.7	22.6	92.2	0.7	DT 300	64	21	43	CH	4.2	95.8	22.6	2.5							
5754	10/5/2011	1023	Pass	3	82+83	PS	-78	4.5			3291	99.5	21.9	64	22	42	97.8				112.2	90.9	23.5	91.4	1.6	DT 300	64	22	42	CH	3.0	97.0	23.5	3.3							
5754	10/5/2011	1038	Pass	1	118+94	FS	10	4.2			3182	88.2	29.4	87	25	62	99.8				111.8	87.1	28.4	98.8	-1.0	DT 300	86	25	61	CH	5.0	95.0	28.4	3.9							
5754	10/5/2011	1041	Pass	3	79+99	FS	52	6.0			3291	99.5	21.9	64	22	42	97.8				111.5	92.8	20.1	93.3	-1.8	DT 300	67	23	44	CH	1.7	98.3	20.1	3.4							
5754	10/5/2011	1033	Pass	10	12+76	CL	0	13.1			3185	90.0	28.5	74	23	51	99.2				111.3	85.4	30.4	94.9	1.9	DT 150	75	24	51	CH	2.4	97.6	30.4	5.1							
5754	10/5/2011	1026	Pass	9	79+05	PS	-48	4.5			3291	99.5	21.9	64	22	42	97.8				110.5	90.9	21.5	91.4	-0.4	DT 300	65	23	42	CH	3.0	97.0	21.5	2.4							
5754	10/5/2011	1042	Pass	3	83+53	FS	66	5.5			3291	99.5	21.9	64	22	42	97.8				110.2	90.6	21.6	91.1	-0.3	DT 300	65	23	42	CH	2.7	97.3	21.6	3.9							
5754	10/5/2011	1032	Pass	10	7+82	CL	0	13.0			3180	95.8	24.0	60	21	39	97.8				109.8	89.1	23.2	93.0	-0.8	DT 150	63	24	39	CH	3.1	96.9	23.2	4.1							
5754	10/5/2011	1016	Pass	5	89+97	CL	0	13.5			3291	99.5	21.9	64	22	42	97.8				109.8	91.3	20.2	91.8	-1.7	DT 150	64	21	43	CH	3.2	96.8	20.2	2.7							
5754	10/5/2011	1025	Pass	1	79+05	PS	-44	3.5			2854	95.9	23.9	62	24	40	97.0				109.2	87.5	24.8	91.2	0.9	DT 300	63	23	40	CH	3.0	97.0	24.8	2.6							
5754	10/5/2011	1030	Pass	2	83+54	FS	66	3.5			2854	95.9	23.9	62	24	40	97.0				108.3	87.8	23.3	91.6	-0.6	DT 300	64	24	40	CH	5.8	94.2	23.3	3.7							
5754	10/5/2011	1035	Pass	10	22+74	CL	0	13.0			3185	90.0	28.5	74	23	51	99.2				107.5	82.9	29.6	92.1	1.1	DT 150	75	24	51	CH	3.4	96.6	29.6	4.3							
5754	10/5/2011	1040	Pass	2	83+51	FS	66	4.5			2854	95.9	23.9	62	24	40	97.0				107.3	87.3	22.9	91.0	-1.0	DT 300	64	24	40	CH	5.5	94.5	22.9	3.6							
5754	10/5/2011	1020	Pass	1	82+06	PS	-60	3.0			3182	88.2	29.4	87	25	62	99.8				107.1	82.5	29.8	93.5	0.4	DT 300	87	25	62	CH	5.2	94.8	29.8	3.8							
5754	10/5/2011	1018	Pass	3	32+60	FS	73	5.7			3182	88.2	29.4	87	25	62	99.8				106.5	82.2	29.6	93.2	0.2	DT 300	89	28	61	CH	4.5	95.5	29.6	3.2							
5754	10/5/2011	1017	Pass	9	32+61	CL	0	12.5			3182	88.2	29.4	87	25	62	99.8				105.8	80.7	31.1	91.5	1.7	DT 300	89	28	61	CH	4.2	95.8	31.1	2.9							
5774	10/6/2011	1059	Pass	1	47+98	PS	-94	2.1			3185	90.0	28.5	74	23	51	99.2	29.0	90.7	117.1	120.0	91.8	30.7	102.0	2.2	DT 150	75	25	50	CH	2.7	97.3	30.7	3.3	117.6	90.0	30.7	100.0	2.6	2.2	YES
5774	10/6/2011	1069	Pass	3	48+01	PS	-96	4.2			3186	91.6	26.5	67	23	44	98.9	27.9	91.0	116.3	119.8	93.0	28.8	101.5	2.3	DT 150	65	21	44	CH	0.7	99.3	28.8	3.7	117.1	90.9	28.8	99.2	2.3	2.3	YES
5774	10/6/2011	1049	Pass	1	77+90	PS	-69	3.0			3182	88.2	29.4	87	25	62	99.8	29.7	88.5	114.7	113.2	85.7	32.1	97.2	2.7	DT 150	86	23	63	CH	3.7	96.3	32.1	3.6	114.9	87.0	32.1	98.6	1.6	2.7	YES
5774	10/6/2011	1044	Pass	2	74+16	PS	-14	9.5			3291	99.5	21.9	64	22	42	97.8	20.1	99.2	119.2	110.3	91.8	20.2	92.3	-1.7	DT 300	64	21	43	CH	4.0	96.0	20.2	2.5							
5774	10/6/2011	1064	Pass	4	118+91	PS	-8	6.7			3185	90.0	28.5	74	23	51	99.2	30.5	89.4	116.7	116.2	88.5	31.3	98.3	2.8	DT 300	75	24	51	CH	4.0	96.0	31.3	4.4							
5774	10/6/2011	1054	Pass	4	77+80	PS	-18	9.9			3182	88.2	29.4	87	25	62	99.8	30.3	88.0	114.7	116.8	88.9	31.4	100.8	2.0	DT 300	88	26	62	CH	4.6	95.4	31.4	3.4							
5774	10/6/2011	1068	Pass	4	48+03	CL	0	11.5			3186	91.6	26.5	67	23	44	98.9				117.3	92.1	27.3	100.5	0.8	DT 300	66	22	44	CH	2.3	97.7	27.3	3.8							
5774	10/6/2011	1050	Pass	3	77+82	PS	-18	9.1			3182	88.2	29.4	87	25	62	99.8				116.6	89.7	30.0	101.7	0.6	DT 300	87	25	62	CH	4.1	95.9	30.0	3.1							
5774	10/6/2011	1062	Pass	2	48+00	PS	-90	3.1			3185	90.0	28.5	74	23	51	99.2				116.0	91.9	26.2	102.1	4.3	DT 300	75	24	51	CH	3.2	96.8	26.2	3.4							
5774	10/6/2011	1055	Pass	2	77+88	PS	-68	3.9			3182	88.2	29.4	87	25	62	99.8				115.9	88.5	31.0	100.3	1.6	DT 300	87	26	61	CH	3.7	96.3	31.0	3.8							
5774	10/6/2011	1057	Pass	3	119+12	PS	-6	7.9			3182	88.4	29.4	87	25	62	99.8				115.8	89.1	30.0	100.8	0.6	DT 300	87	25	62	CH	4.9	95.1	30.0	4.8							
5774	10/6/2011	1058	Pass	5	77+99	PS	-68	5.0			3185	90.0	28.5	74	23	51	99.2				115.4	91.3	26.4	101.4	-2.1	DT 300	74	23	51	CH	3.5	96.5	26.4	3.9							
5774	10/6/2011	1043	Pass	1	74+14	PS	-17	8.8			3291	99.5	21.9	64	22	42	97.8				115.3	94.0	22.7	94.5	0.8	DT 300	64	23	41	CH	2.3	97.7	22.7	2.6							
5774	10/6/2011	1052	Pass	2	118+45	PS	-10	2.5			3182	88.2	29.4	87	25	62	99.8				115.1	87.2	32.0	98.9	2.6	DT 150	88	25	63	CH	3.9	96.1	32.0	3.6							
5774	10/6/2011	1060	Pass	5	77+81	PS	-20	9.8			3185	90.0	28.5	74	23	51	99.2				114.5	89.4	28.1	99.3	-0.4	DT 300	74	22	52	CH	4.2	95.8	28.1	3.6							
5774	10/6/2011	1051	Pass	2	118+89	FS	-8	5.0			3182	88.2	29.4	87	25	62	99.8				114.3	87.3	30.9	99.0	1.5	DT 300	87	26	61	CH	3.7	96.3	30.9	3.7							
5774	10/6/2011	1045	Pass	3	74+16	PS	-13	10.3			3182	88.2	29.4	87	25	62	99.8				114.0	85.9	32.7	97.4	3.3	DT 300	88	26	62	CH	3.3	96.7	32.7	3.5							
5774	10/6/2011	1047	Pass	1	77+82	PS	-21	7.4			3182	88.2	29.4	87	25	62	99.8				113.7	86.3	31.8	97.8	2.4	DT 300	87	26	61	CH	3.3	96.7	31.8	4.1							
5774	10/6/2011	1067	Pass	3	48+00	CL	0	10.3			3291	99.5	21.9	64	22	42	97.8				113.0	92.0	22.8	92.5	0.9	DT 300	63	21	42	CH	2.5	97.5	22.8	3.4							
5774	10/6/2011	1046	Pass	4	74+17	PS	-12	11.5			2854	95.9	23.9	62	24	40	97.0				113.0	93.2	21.3	97.2	-2.6	DT 300	65	25	40	CH	3.4	96.8	21.3	2.8							
5774	10/6/2011	1056	Pass	3	118+48	PS	-2	3.5			3182	88.2	29.4	87	25	62	99.8				112.8	87.4	29.1	99.1	-0.3	DT 300	87	25	62	CH	3.0	97.0	29.1	2.9							
5774	10/6/2011	1065	Pass	4	118+92	PS	-6	7.0			3185	90.0	28.5	74	23	51	99.2				112.5	87.4	28.7	97.1	0.2	DT 300	73	23	50	CH	3.8	96.2	28.7	3.9							
5774	10/6/2011	1066	Pass	2	48+00	CL	0	9.1			3291	99.5	21.9	64	22	42	97.8				111.9	92.0	21.6	92.5	-0.3	DT 300	62	21	41	CH	7.0	93.0	21.6	3.7							
5774	10/6/2011	1063	Pass	6	111+95	FS	12	5.0			3291	99.5	21.9	64	22	42	97.8				111.9	91.1	22.8	91.6	0.9	DT 300	63	22	41	CH	2.9	97.1	22.8	3.4							
5774	10/6/2011	1048	Pass	2	77+82	PS	-19	8.3			3291	99.5	21.9	64	22	42	97.8				110.3	91.0	21.2	91.5	-0.7	DT 300	64	22	42	CH	3.1	96.9	21.2	2.7							
5774	10/6/2011	1061	Pass	1	47+98	CL	0	8.1			3291	99.5	21.9	64	22	42	97.8				109.5	90.5	21.0	91.0	-0.9	DT 300	65	22	43	CH	3.5	96.5	21.0	4.5							
5780	10/7/2011	1074	Pass	5	118+89	FS	7	8.3			3182	88.2	29.4	87	25	62	99.8	29.3	88.0	113.9	113.2	87.7	29.1	99.4	-0.3	DT 300	88	27	61	CH	3.0	97.0	29.1	5.3							
5780	10/7/2011	1073	Pass	5	118+98	PS	-5	9.8			3186	91.6	26.5	67	23	44	98.9				116.8	92.3	26.5	100.8	0.0	DT 300	67	22	45	CH	2.6	97.4	26.5	4.3							
5780	10/7/2011	1077	Pass	6	119+32	FS	4	11.7			3186	91.6	26.5	67	23	44	98.9				114.8	89.8	27.8	98.0	1.3	DT 300	68	24	44	CH	4.7	95.3	27.8	4.2							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear $w_{Meas} - w_{Opt}$	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC $w_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone $w_{Meas} - w_{Opt}$	Difference Within 3%
5780	10/7/2011	1072	Pass	6	111+26	FS	25	7.5			3186	91.6	26.5	67	23	44	98.9				114.6	91.0	25.9	99.3	-0.6	DT 300	66	22	44	CH	4.1	95.9	25.9	3.9							
5780	10/7/2011	1071	Pass	7	111+35	FS	2	10.6			3291	99.5	21.9	64	22	42	97.8				114.5	91.7	24.9	92.2	3.0	DT 300	64	22	42	CH	3.0	97.0	24.9	4.1							
5780	10/7/2011	1075	Pass	5	119+08	FS	60	5.4			3186	91.6	26.5	67	23	44	98.9				112.9	89.5	26.2	97.7	-0.3	DT 300	68	24	44	CH	3.6	96.4	26.2	4.0							
5780	10/7/2011	1070	Pass	5	111+10	FS	74	5.0			3182	88.2	29.4	87	25	62	99.8				110.6	85.8	28.9	97.3	-0.5	DT 150	87	27	60	CH	4.2	95.8	28.9	4.6							
5780	10/7/2011	1076	Pass	6	119+28	FS	2	11.7			3186	91.6	26.5	67	23	44	98.9				110.4	87.3	26.5	95.3	0.0	DT 300	68	24	44	CH	5.1	94.9	26.4	4.4							
5790	10/10/2011	1079	Pass	9	37+59	CL	0	12.5			3183	88.2	29.4	81	25	56	99.6	30.8	88.5	115.8	115.4	87.8	31.4	99.5	2.0	DT 300	88	25	63	CH	3.7	96.3	31.4	4.1	112.3	85.5	31.4	96.9	2.8	2.0	YES
5790	10/10/2011	1084	Pass	7	118+93	FS	8	10.1			2854	95.9	23.9	62	24	40	97.0	24.3	95.4	118.6	117.2	94.0	24.7	98.0	0.8	DT 300	63	23	40	CH	4.4	95.6	24.7	3.4							
5790	10/10/2011	1078	Pass	3	51+27	PS	-24	2.6			3183	88.2	29.4	81	25	56	99.6				118.9	89.4	33.0	101.4	3.6	DT 300	88	26	62	CH	2.5	97.5	33.0	4.1							
5790	10/10/2011	1083	Pass	7	118+92	PS	-4	11.5			3291	99.5	21.9	64	22	42	97.8				118.1	95.4	23.8	95.9	1.9	DT 300	65	22	43	CH	6.4	93.6	23.8	3.7							
5790	10/10/2011	1081	Pass	9	42+53	CL	0	12.6			3181	92.9	22.3	78	23	55	99.6				117.2	94.1	24.5	101.3	2.2	DT 300	77	21	56	CH	4.7	95.3	24.5	2.6							
5790	10/10/2011	1082	Pass	4	42+50	FS	74	5.6			3181	92.9	22.3	78	23	55	99.6				110.4	89.2	23.8	96.0	1.5	DT 300	77	22	55	CH	3.4	96.6	23.8	3.9							
5790	10/10/2011	1080	Pass	4	37+79	FS	72	5.8			3183	87.5	27.6	81	25	56	99.6				109.2	86.3	26.6	98.6	-1.0	DT 300	82	26	56	CH	3.7	96.3	26.6	5.2							
5795	10/11/2011	1089	Pass	9	52+56	CL	0	12.6			3182	88.2	29.4	87	25	62	99.8	28.0	88.9	113.8	111.5	86.6	28.7	98.2	-0.7	DT 150	86	24	62	CH	4.4	95.6	28.7	4.5	114.5	89.0	28.7	100.9	2.6	-0.7	YES
5795	10/11/2011	1090	Pass	4	52+56	FS	76	5.6			3186	91.6	26.5	67	23	44	98.9				114.1	91.4	24.8	99.8	-1.7	DT 300	69	20	49	CH	3.8	96.2	24.8	4.3							
5795	10/11/2011	1088	Pass	5	47+58	FS	71	5.8			3182	88.2	29.4	87	25	62	99.8				113.3	88.4	28.2	100.2	-1.2	DT 300	86	24	62	CH	4.5	95.5	28.2	4.6							
5795	10/11/2011	1086	Pass	3	18+52	FS	57	6.0	5739+982		2653	99.7	23.1	59	24	35	96.3				111.9	91.0	23.0	91.3	-0.1	DT 150	57	22	35	CH	3.0	97.0	23.0	3.9							
5795	10/11/2011	1087	Pass	9	47+61	CL	0	12.5			3183	87.5	27.6	81	25	56	99.6				108.3	85.5	26.6	97.7	-1.0	DT 300	80	23	57	CH	3.5	96.5	26.6	4.4							
5803	10/12/2011	1091	Pass	5	48+51	PS	-127	3.5			3178	91.7	26.2	68	20	48	98.1				118.5	90.5	31.0	98.7	4.8	DT 300	67	18	49	CH	0.4	99.6	31.0	3.4							
5803	10/12/2011	1092	Pass	4	52+49	PS	-118	3.5			3178	91.7	26.2	68	20	48	98.1				114.7	93.0	23.3	101.4	-2.9	DT 300	66	18	48	CH	2.9	97.1	23.3	3.3							
5815	10/13/2011	1094	Pass	11	7+00	CL	0	13.6			3291	99.5	21.9	64	22	42	97.8	21.7	98.9	120.4	122.0	101.0	20.8	101.5	-1.1	DT 150	64	21	43	CH	2.3	97.7	20.8	1.5							
5815	10/13/2011	1095	Pass	11	12+00	CL	0	13.6			3291	99.5	21.9	64	22	42	97.8				121.6	97.9	24.2	98.4	2.3	DT 150	63	22	41	CH	1.4	98.6	24.2	2.1							
5815	10/13/2011	1096	Pass	11	17+00	CL	0	13.6			3186	91.6	26.5	67	23	44	98.9				118.2	92.1	28.4	100.5	1.9	DT 150	66	21	45	CH	2.0	98.0	28.4	2.4							
5815	10/13/2011	1093	Pass	11	2+06	CL	0	13.6			3182	88.2	29.4	87	25	62	99.8				116.2	88.8	30.8	100.7	1.4	DT 150	86	25	61	CH	1.0	99.0	30.8	1.8							
5818	10/19/2011	1097	Pass	2	170+01	PS	-136	3.6	5719+964																								24.8	8.7							
5823	10/18/2011	1099	Pass	11	32+17	CL	0	13.6			3178	91.7	26.2	68	20	48	98.1	27.2	90.9	115.7	120.7	93.9	28.5	102.4	2.3	DT 150	69	19	50	CH	5.7	94.3	28.5	2.7	117.2	91.2	28.5	99.5	3.0	2.3	YES
5823	10/18/2011	1104	Pass	10	50+90	CL	0	13.1			3178	91.7	26.2	68	20	48	98.1	24.8	90.8	113.4	114.0	92.3	23.5	100.7	-2.7	DT 150	68	19	49	CH	4.3	95.7	23.5	2.4							
5823	10/18/2011	1103	Pass	10	45+90	CL	0	13.1			3291	99.5	21.9	64	22	42	97.8				118.9	97.0	22.6	97.5	0.7	DT 150	63	22	41	CH	3.9	96.1	22.6	3.0							
5823	10/18/2011	1098	Pass	11	22+20	CL	0	13.5			3181	92.9	22.3	78	23	55	99.6				115.0	94.0	22.3	101.2	0.0	DT 150	75	19	56	CH	5.3	94.7	22.3	3.2							
5823	10/18/2011	1102	Pass	10	27+20	CL	0	13.6			3181	92.9	22.3	78	23	55	99.6				114.3	91.8	24.5	98.8	2.2	DT 150	76	20	56	CH	3.3	96.7	24.5	3.2							
5823	10/18/2011	1100	Pass	10	37+26	CL	0	13.6			3178	91.7	26.2	68	20	48	98.1				114.1	90.5	26.1	98.7	-2.4	DT 150	74	21	53	CH	6.8	93.2	26.1	2.9							
5823	10/18/2011	1101	Pass	10	41+54	CL	0	13.1			3178	91.7	26.2	68	20	48	98.1				110.7	87.6	26.4	95.5	-2.1	DT 150	73	20	53	CH	6.8	93.2	26.4	2.5							
5842	10/20/2011	1106	Pass	10	56+88	CL	0	13.6			3291	99.5	21.9	64	22	42	97.8				122.1	101.3	20.5	101.8	-1.4	DT 150	63	22	41	CH	6.6	93.4	20.5	1.8							
5842	10/20/2011	1105	Pass	11	37+14	CL	0	13.4			3178	91.7	26.2	68	20	48	98.1				116.8	92.0	27.0	100.3	0.8	DT 150	69	21	48	CH	5.7	94.3	27.0	2.7							
5842	10/20/2011	1107	Pass	11	56+80	CL	0	14.1			3291	99.5	21.9	64	22	42	97.8				115.0	95.0	21.1	95.5	-0.8	DT 150	64	22	42	CH	7.7	92.3	21.1	1.7							
5855	10/24/2011	1109	Pass	11	47+15	CL	0	13.6			3094	90.1	24.0	78	26	52	96.8	24.6	91.7	114.3	115.3	91.7	25.7	101.8	1.7	DT 150	78	24	54	CH	3.2	96.8	25.7	2.7	112.8	89.7	25.7	99.6	2.2	1.7	YES
5855	10/24/2011	1108	Pass	11	42+17	CL	0	13.6			3094	90.1	24.0	78	26	52	96.8				115.4	91.7	25.8	101.8	1.8	DT 150	78	25	53	CH	4.8	95.2	25.8	2.9							
5855	10/24/2011	1110	Pass	11	52+00	CL	0	13.6			3181	92.9	22.3	78	23	55	99.6				109.9	87.9	25.0	94.6	2.7	DT 150	78	22	56	CH	4.6	95.4	25.0	2.6							
5870	10/25/2011	1111	Pass	3	57+44	FS	100	4.6			3182	88.2	29.4	87	25	62	99.8				113.4	86.0	31.8	97.5	2.4	DT 300	87	26	61	CH	3.7	96.3	31.8	2.7							
5874	10/26/2011	1112	Pass	3	64+48	PS	-92	4.5			3291	99.5	21.9	64	22	42	97.8				120.9	98.9	22.3	99.4	0.4	DT 150	65	22	43	CH	3.7	96.3	22.3	3.2							
5874	10/26/2011	1113	Pass	3	58+88	PS	-72	4.9			3185	90.0	28.5	74	23	51	99.2				109.9	87.4	25.8	97.1	-2.7	DT 150	74	26	48	CH	4.5	95.5	25.8	3.0							
5896	10/31/2011	1134	Pass	2	165+02	CL	27	8.1			3183	87.5	27.6	81	25	56	99.6	32.0	89.1	117.6	116.8	88.3	32.3	100.9	4.7	DT 300	84	26	58	CH	3.4	96.6	32.3	2.1							
5896	10/31/2011	1114	Pass	1	172+06	PS	-55	4.9			3181	92.9	22.3	78	23	55	99.6	27.8	91.1	116.4	114.4	91.5	25.0	98.5	2.7	DT 300	77	24	53	CH	3.1	96.9	25.0	4.0							
5896	10/31/2011	1124	Pass	3	179+82	CL	0	12.5			3186	91.6	26.5	67	23	44	98.9	24.6	92.6	115.4	111.3	89.9	23.8	98.1	-2.7	DT 300	66	20	46	CH	4.4	95.6	23.8	3.2							
5896	10/31/2011	1119	Pass	3	173+98	CL	0	12.5			3183	87.5	27.6	81	25	56	99.6	32.2	87.2	115.2	113.5	87.2	30.1	99.7	2.5	DT 150	80	27	53	CH	2.9	97.1	30.1	3.9							
5896	10/31/2011	1129	Pass	3	180+01	PS	-188	2.6			3185	90.0	28.5	74	23	51	99.2	25.7	91.1	114.6	116.0	91.6	26.7	101.8	-1.8	DT 150	73	25	48	CH	3.5	96.5	26.7	1.9							
5896	10/31/2011	1130	Pass	4	180+05	PS	-181	3.1			3183	87.5	27.6	81	25	56	99.6				118.3	89.4	32.4	102.2	4.8	DT 150	82	27	55	CH	9.5	90.5	32.4	2.2							
5896	10/31/2011	1137	Pass	4	166+91	CL	0	13.1			3185	90.0	28.5	74	23	51	99.2				116.5	91.4	27.5	101.6	-1.0	DT 150	73	21	52	CH	3.1	96.9	27.5	1.5							
5896	10/31/2011	1120	Pass	4	173+92	CL	0	13.1			3186	91.6	26.5	67	23	44	98.9				116.4	93.2	24.9	101.7	-1.6	DT 150	70	24	46	CH			24.9	3.0							
5896	10/31/2011	1125	Pass	4	179+80	CL	0	13.1			3178	91.7	26.2	68	20	48	98.1				116.1	90.6	28.2	98.8	2.0	DT 150	72	25	47	CH	3.4	96.6	28.2	3.1							
5896	10/31/2011	1138	Pass	5	166+88	CL	0	13.6			3186	91.6	26.5	67	23	44	98.9				115.5	91.2	26.6	99.6	0.1	DT 150	66	20	46	CH	5.1	94.9	26.6	0.0							
5896	10/31/2011	1133	Pass	2	166+89	CL	0	11.5			3183	87.5	27.6	81	25	56	99.6				115.5	88.8	30.0	101.5	2.4	DT 300	80	26	54	CH	2.9	97.1	30.0	2.1							
5896	10/31/2011	1122	Pass	1	174+83	CL	0	10.5			3182	88.2	29.4	87	25	62	99.8				114.9	89.1	28.9	101.0	-0.5	DT 300	86	27	59	CH			28.9	3.8							
5896	10/31/2011	1123	Pass	2	179+81	CL	0	11.5			3186	91.6	26.5	67	23	44	98.9				114.9	87.9	30.7	96.0	4.2	DT 300	67	23	44	CH			30.7	3.5							
5896	10/31/2011	1118	Pass	2	174+02	CL	0	11.5			3178	91.7	26.2	68	20	48	98.1				114.5	89.7	27.6	97.8	1.4	DT 300	69	22	47	CH			27.6	3.2							
5896	10/31/2011	1116	Pass	3	172+07	PS	-52	7.1			3182	88.2	29.4	87	25	62	99.8				114.4	87.1	31.4	98.8	2.0	DT 300	87	26	61	CH			31.4	2.9							
5896	10/31/2011	1127	Pass	5	179+72	CL	0	13.6			3183	87.5	27.6	81	25	56	99.6				113.9	86.6	31.5	99.0	3.9	DT 150	84	28	56	CH	2.7	97.3	31.5	2.5							
5896	10/31/2011	1117	Pass	1	173+92	CL	0	10.5			3183	87.5	27.6	81	25	56	99.6				113.4	87.8	29.2	100.3	1.6	DT 300	82	28	54	CH			29.2	4.1							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear $w_{Meas} - w_{Opt}$	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC $w_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone $w_{Meas} - w_{Opt}$	Difference Within 3%
5896	10/31/2011	1115	Pass	2	172+07	PS	-57	6.0			3178	91.7	26.2	68	20	48	98.1				113.1	91.2	24.0	99.5	-2.2	DT 300	70	21	49	CH			24.0	3.0							
5896	10/31/2011	1126	Pass	1	180+01	PS	-186	0.6			3186	91.6	26.5	67	23	44	98.9				113.1	90.7	24.7	99.0	-1.8	DT 300	66	22	44	CH	5.2	94.8	24.7	2.2							
5896	10/31/2011	1132	Pass	1	165+07	PS	-31	7.0			3185	90.0	28.5	74	23	51	99.2				113.1	86.7	30.4	96.3	3.9	DT 300	73	26	47	CH	4.3	95.7	30.4	1.5							
5896	10/31/2011	1121	Pass	5	173+96	CL	0	13.6			3183	87.5	27.6	81	25	56	99.6				112.8	86.2	30.8	98.5	3.2	DT 150	81	25	56	CH			30.8	3.6							
5896	10/31/2011	1128	Pass	2	180+02	PS	-181	11.6			3183	87.5	27.6	81	25	56	99.6				111.7	85.0	31.4	97.1	3.8	DT 300	82	25	57	CH	2.8	97.2	31.4	2.4							
5896	10/31/2011	1135	Pass	3	165+07	PS	27	8.9			3183	87.5	27.6	81	25	56	99.6				111.6	84.3	32.4	96.3	4.8	DT 150	88	26	62	CH	2.5	97.5	32.4	2.0							
5896	10/31/2011	1136	Pass	3	166+89	CL	0	12.5			3183	87.5	27.6	81	25	56	99.6				110.7	88.7	24.8	101.4	-2.8	DT 300	88	22	66	CH	2.7	97.3	24.8	1.6							
5896	10/31/2011	1131	Pass	1	166+88	CL	0	10.5			3094	90.1	24.0	78	26	52	96.8				110.3	86.4	27.6	95.9	3.6	DT 300	79	26	53	CH	5.1	94.9	27.6	1.7							
5910	11/1/2011	1149	Pass	2	120+41	PS	-64	4.6			3183	87.5	27.6	81	25	56	99.6	28.5	89.0	114.3	115.3	88.2	30.7	100.8	3.1	DT 150	79	21	58	CH	2.3	97.7	30.7	3.4	114.4	87.5	30.7	100.0	0.8	3.1	YES
5910	11/1/2011	1159	Pass	3	66+87	CL	0	13.1			3185	90.0	28.5	74	23	51	99.2	27.3	91.7	116.8	114.5	89.5	27.9	99.4	-0.6	DT 150	70	19	51	CH	2.8	97.2	27.9	1.9	112.7	88.1	27.9	95.8	1.6	-0.6	YES
5910	11/1/2011	1139	Pass	1	136+08	CL	0	10.0			3291	99.5	21.9	64	22	42	97.8	21.6	102.4	124.6	111.4	91.8	21.4	92.3	-0.5	DT 150	66	25	41	CH	3.4	96.6	21.4		109.6	90.3	21.4	90.8	1.6	-0.5	YES
5910	11/1/2011	1164	Pass	4	69+97	CL	0	13.6			3185	90.0	28.5	74	23	51	99.2	29.2	91.2	117.8	111.0	84.8	30.9	94.2	2.4	DT 150	76	25	51	CH	3.7	96.3	30.9	2.7							
5910	11/1/2011	1154	Pass	2	121+46	PS	-15	8.8			3178	91.7	26.2	68	20	48	98.1	25.4	92.9	116.5	110.7	87.7	26.2	95.6	0.0	DT 300	65	17	48	CH	5.3	94.7	26.2	1.7							
5910	11/1/2011	1144	Pass	6	136+02	CL	0	13.6			3185	90.0	28.5	74	23	51	99.2	26.8	90.6	114.9	115.9	91.3	27.0	101.4	-1.5	DT 150	72	24	48	CH	3.1	96.9	27.0	4.0							
5910	11/1/2011	1165	Pass	1	108+17	PS	-63	3.0			3185	90.0	28.5	74	23	51	99.2				118.9	92.0	29.2	102.2	0.7	DT 300	73	20	53	CH			29.2	2.3							
5910	11/1/2011	1145	Pass	1	141+46	PS	-115	3.1			3183	87.5	27.6	81	25	56	99.6				117.6	89.2	31.9	101.9	4.3	DT 300	86	29	57	CH	3.5	96.5		5.4							
5910	11/1/2011	1167	Pass	1	97+00	CL	0	10.5			3178	91.7	26.2	68	20	48	98.1				117.0	92.4	26.6	100.8	0.4	DT 300	68	18	50	CH			26.6	1.2							
5910	11/1/2011	1168	Pass	2	108+13	PS	-62	4.0			3180	95.8	24.0	60	21	39	97.8				116.7	91.1	28.1	95.1	4.1	DT 150	61	21	40	CH			28.1	1.4							
5910	11/1/2011	1158	Pass	2	66+88	CL	0	12.6			3185	90.0	28.5	74	23	51	99.2				116.5	89.3	30.4	99.2	1.9	DT 300	75	24	51	CH	2.9	97.1	30.4	2.4							
5910	11/1/2011	1163	Pass	3	70+02	CL	0	13.1			3291	99.5	21.9	64	22	42	97.8				115.7	92.2	25.5	92.7	3.6	DT 150	61	19	42	CH	8.1	91.9	25.5	1.4							
5910	11/1/2011	1142	Pass	4	136+06	CL	0	12.6			3291	99.5	21.9	64	22	42	97.8				115.4	92.5	24.8	93.0	2.9	DT 150	66	20	46	CH	3.7	963.0		4.8							
5910	11/1/2011	1160	Pass	4	66+93	CL	0	13.6			3094	90.1	24.0	78	26	52	96.8				115.4	91.5	26.1	101.6	2.1	DT 150	78	25	53	CH	8.6	91.4	26.1	2.5							
5910	11/1/2011	1148	Pass	1	120+36	PS	-62	3.6			3178	91.7	26.2	68	20	48	98.1				115.3	91.2	26.4	99.5	0.2	DT 300	69	20	49	CH	2.4	97.6		3.5							
5910	11/1/2011	1152	Pass	1	120+37	PS	-91	5.8			3291	99.5	21.9	64	22	42	97.8				115.1	93.0	23.8	93.5	1.9	DT 300	62	18	44	CH	5.5	94.5		3.6							
5910	11/1/2011	1146	Pass	2	141+49	PS	-114	4.1			3181	92.9	22.3	78	23	55	99.6				114.9	91.2	26.0	98.2	3.7	DT 300	78	22	56	CH	2.1	97.9		3.9							
5910	11/1/2011	1143	Pass	5	136+08	CL	0	13.1			3185	90.0	28.5	74	23	51	99.2				114.8	90.2	27.3	100.2	-1.2	DT 150	71	22	49	CH	3.8	96.2		4.3							
5910	11/1/2011	1166	Pass	1	104+50	PS	-151	0.5			3186	91.6	26.5	67	23	44	98.9				114.6	91.0	26.0	99.3	-0.5	DT 300	65	19	46	CH			26.0	1.1							
5910	11/1/2011	1157	Pass	1	66+89	CL	0	11.6			3178	91.7	26.2	68	20	48	98.1				114.0	90.2	26.4	98.4	0.2	DT 300	70	20	50	CH	3.3	96.7	26.4	2.0							
5910	11/1/2011	1155	Pass	3	121+84	PS	-15	9.8			3178	91.7	26.2	68	20	48	98.1				114.0	88.0	29.6	96.0	3.4	DT 300	73	24	49	CH	2.9	97.1	29.6	1.9							
5910	11/1/2011	1156	Pass	4	121+44	PS	-12	11.3			3291	99.5	21.9	64	22	42	97.8				113.9	91.6	24.4	92.1	2.5	DT 300	64	20	44	CH	4.7	95.3	24.4	1.9							
5910	11/1/2011	1147	Pass	3	141+50	PS	-117	5.1			3186	91.6	26.5	67	23	44	98.9				113.5	90.6	25.3	98.9	-1.2	DT 300	63	19	44	CH	3.4	96.6		3.1							
5910	11/1/2011	1150	Pass	3	120+39	PS	-68	5.6			3291	99.5	21.9	64	22	42	97.8				111.6	89.6	24.5	90.1	2.6	DT 300	62	20	42	CH	4.4	95.6		2.9							
5910	11/1/2011	1141	Pass	3	136+06	CL	0	12.0			3291	99.5	21.9	64	22	42	97.8				111.1	91.6	21.3	92.1	-0.6	DT 300	66	26	40	CH	3.3	96.7		3.7							
5910	11/1/2011	1151	Pass	4	120+43	PS	-62	6.6			2611	87.9	30.6	78	28	50	97.5				110.9	83.3	33.1	94.8	2.5	DT 300	76	28	48	CH	3.3	96.7		3.5							
5910	11/1/2011	1140	Pass	2	136+09	CL	0	11.0			3291	99.5	21.9	64	22	42	97.8				110.4	90.7	21.7	91.2	-0.2	DT 300	65	26	39	CH	3.4	96.6		3.5							
5910	11/1/2011	1161	Pass	1	70+02	CL	0	11.5			3094	90.1	24.0	78	26	52	96.8				110.4	89.0	24.0	98.8	0.0	DT 300	75	21	54	CH	2.9	97.1	24.0	2.0							
5910	11/1/2011	1162	Pass	2	69+99	CL	0	12.5			3291	99.5	21.9	64	22	42	97.8				110.3	90.8	21.5	91.3	-0.4	DT 300	61	19	42	CH	8.8	91.2	21.5	2.2							
5910	11/1/2011	1153	Pass	1	121+47	PS	-18	7.5			3185	90.0	28.5	74	23	51	99.2				109.4	84.9	28.9	94.3	0.4	DT 300	73	24	49	CH	2.5	97.5		3.9							
5931	11/2/2011	1179	Pass	2	40+50	PS	-42	3.9			3185	90.0	28.5	74	23	51	99.2	27.7	95.5	121.6	119.1	92.4	28.9	102.7	0.4	DT 150	71	19	52	CH	18.9	81.1	28.9	3.2	117.7	91.3	28.9	101.4	1.2	0.4	YES
5931	11/2/2011	1169	Pass	2	108+13	PS	-62	4.0			3094	90.1	24.0	78	26	52	96.8	31.5	88.9	117.0	116.7	91.0	28.3	101.0	4.3	DT 150	78	25	53	CH	4.2	95.8	28.3	3.0	115.4	89.9	28.3	99.8	1.1	4.3	YES
5931	11/2/2011	1174	Pass	3	97+00	CL	0	12.4			3181	92.9	22.3	78	23	55	99.6	24.2	97.5	121.1	113.0	92.7	21.9	99.8	-0.4	DT 300	76	22	54	CH	13.0	87.0	21.9	2.7							
5931	11/2/2011	1180	Pass	3	40+49	PS	-39	5.0			3178	91.7	26.2	68	20	48	98.1				120.5	92.5	30.3	100.9	4.1	DT 300	67	19	48	CH	5.8	94.2	30.3	2.7							
5931	11/2/2011	1173	Pass	4	104+47	PS	-152	2.6			3183	87.5	27.6	81	25	56	99.6				116.5	88.9	31.1	101.6	3.5	DT 300	80	21	59	CH	8.3	91.7	31.1	2.8							
5931	11/2/2011	1176	Pass	5	97+00	CL	0	13.5			3178	91.7	26.2	68	20	48	98.1				115.8	93.0	24.5	101.4	-1.7	DT 150	67	19	48	CH	4.8	95.2	24.5	3.1							
5931	11/2/2011	1171	Pass	2	104+48	PS	-148	0.7			3185	90.0	28.5	74	23	51	99.2				115.6	88.7	30.4	98.6	1.9	DT 300	73	20	53	CH	5.0	95.0	30.4	2.4							
5931	11/2/2011	1178	Pass	1	40-+50	PS	-41	2.9			3183	87.5	27.6	81	25	56	99.6				114.9	87.0	32.0	99.4	4.4	DT 300	79	20	59	CH	5.3	94.7	32.0	2.9							
5931	11/2/2011	1177	Pass	1	40+34	PS	-39	6.4			3185	90.0	28.5	74	23	51	99.2				113.1	87.9	28.7	97.7	0.2	DT 300	72	21	51	CH	2.5	97.5	28.7	3.2							
5931	11/2/2011	1181	Pass	4	40+58	FS	40	6.3			3185	90.0	28.5	74	23	51	99.2				112.7	87.4	28.9	97.1	0.4	DT 300	75	22	53	CH	3.6	96.4	28.9	2.9							
5931	11/2/2011	1172	Pass	3	104+47	PS	-150	1.6			3185	90.0	28.5	74	23	51	99.2				110.2	86.4	27.5	96.0	-1.0	DT 300	70	19	51	CH	5.1	94.9	27.5	2.1							
5931	11/2/2011	1170	Pass	3	108+16	PS	-59	5.1			3185	90.0	28.5	74	23	51	99.2				109.8	87.3	25.8	97.0	-2.7	DT 300	75	24	51	CH	5.5	94.5	25.8	2.8							
5931	11/2/2011	1175	Pass	4	96+97	CL	0	12.9			3183	87.5	27.6	81	25	56	99.6				108.7	83.7	29.8	95.7	2.2	DT 150	79	21	58	CH	3.7	96.3	29.8	3.5							
5932	11/3/2011	1189	Pass	1	32+24	FS	111	1.4			2854	95.9	23.9	62	24	40	97.0	23.7	93.5	115.7	113.2	88.6	27.7	92.4	3.8	DT 150	65	25	40	CH	6.8	93.2	27.7	4.2	110.8	86.8	27.7	90.5	2.2	3.8	YES
5932	11/3/2011	1194	Pass	2	29+49	FS	17	7.7			3185	90.0	28.5	74	23	51	99.2	28.7	91.5	117.7	112.8	86.8	30.0	96.4	1.5	DT 150	72	23	49	CH	4.7	95.3	30.0	2.6							
5932	11/3/2011	1184	Pass	3	37+24	PS	-138	2.3			3182	88.2	29.4	87	25	62	99.8	27.7	89.5	114.3	116.1	88.2	31.7	100.0	2.3	DT 300	83	22	61	CH	5.9	94.1	31.7	2.6							
5932	11/3/2011	1183	Pass	2	27+32	PS	-142	1.3			3185	90.0	28.5	74	23	51	99.2				114.8	91.3	25.7	101.4	-2.8	DT 300	72	20	52	CH	4.2	95.8	25.7	2.3							
5932	11/3/2011	1188	Pass	3	39+86	FS	116	13.8			3185	90.0	28.5	74	23	51	99.2				114.7	89.5	28.2	99.4	-0.3	DT 300	71	23	48	CH	7.8	92.2	28.2	2.8							
5932	11/3/2011	1185	Pass	4	37+20	PS	-141	3.1			3186	91.6	26.5	67	23	44	98.9				114.3	91.0	25.6	99.3	-0.9	DT 300	67	23	44	CH	6.2	93.8	26.5	2.0							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w $_{Meas}$	% Compaction Nuclear	Nuclear w $_{Meas}$ - w_{Opt}	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC w $_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w $_{Meas}$	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w $_{Meas}$ - w $_{Opt}$	Difference Within 3%
5932	11/3/2011	1193	Pass	1	29+53	FS	17	6.8			3185	90.0	28.5	74	23	51	99.2				114.2	87.9	29.9	97.7	1.4	DT 300	75	25	50	CH	4.6	95.4	29.9	2.7							
5932	11/3/2011	1187	Pass	2	39+88	FS	119	2.5			3185	90.0	28.5	74	23	51	99.2				114.0	85.8	32.8	95.3	4.3	DT 300	71	24	47	CH	4.8	95.2	32.8	2.5							
5932	11/3/2011	1191	Pass	3	32+24	FS	112	3.5			3185	90.0	28.5	74	23	51	99.2				113.3	87.0	30.2	96.7	1.7	DT 300	70	20	50	CH	5.9	94.1	30.2	6.4							
5932	11/3/2011	1182	Pass	1	37+24	PS	-141	0.3			3186	91.6	26.5	67	23	44	98.9				113.3	89.3	26.9	97.5	0.4	DT 300	66	22	44	CH	5.6	94.4	26.9	2.7							
5932	11/3/2011	1190	Pass	2	32+27	FS	108	2.5			3185	90.0	28.5	74	23	51	99.2				113.2	87.8	29.0	97.6	0.5	DT 300	73	21	52	CH	4.6	95.4	29.0	2.4							
5932	11/3/2011	1192	Pass	4	32+26	FS	116	4.3			3178	91.7	26.2	68	20	48	98.1				112.5	87.9	28.0	95.9	1.8	DT 300	69	20	49	CH	5.8	94.2	28.0	3.3							
5932	11/3/2011	1186	Pass	1	39+90	FS	121	1.5			3182	88.2	29.4	87	25	62	99.8				110.9	84.9	30.6	96.3	1.2	DT 300	85	23	62	CH	5.4	94.6	30.6	2.5							
5954	11/7/2011	1209	Pass	5	154+50	FS	11	10.8			3178	90.1	26.2	68	20	48	98.1	28.5	95.7	123.1	119.7	91.4	30.9	101.4	4.7	DT 300	68	19	49	CH	6.2	93.8	30.9	1.5	118.2	90.3	30.9	100.2	0.9	4.7	YES
5954	11/7/2011	1219	Pass	2	29+54	FS	15	9.2			3182	88.2	29.4	87	25	62	99.8	30.1	90.6	117.9	113.4	87.6	29.4	99.3	0.0	DT 150	88	25	63	CH	5.2	94.8	29.4	3.5	115.0	88.9	29.4	100.8	1.8	0.0	YES
5954	11/7/2011	1199	Pass	2	162+46	CL	0	10.6			3181	92.9	22.3	78	23	55	99.6	23.5	96.1	118.7	110.5	88.6	24.7	95.4	2.4	DT 150	79	24	55	CH	11.2	88.8	24.7	2.5	108.8	87.2	24.7	93.9	1.6	2.4	YES
5954	11/7/2011	1204	Pass	4	162+52	CL	0	12.6			3180	95.8	24.0	60	21	39	97.8	25.7	98.2	123.4	116.5	92.3	26.2	96.3	2.2	DT 150	61	20	41	CH	6.1	93.9	26.2	2.6							
5954	11/7/2011	1214	Pass	1	27+46	FS	79	3.5			3183	87.5	27.6	81	25	56	99.6	30.9	88.7	116.2	116.1	88.8	30.8	101.5	3.2	DT 150	83	28	55	CH	3.1	96.9	30.8	3.8							
5954	11/7/2011	1224	Pass	2	9+79	FS	50	3.6			3185	90.0	28.5	74	23	51	99.2	25.4	89.1	111.6	118.0	91.6	28.8	101.8	0.3	DT 300	74	20	54	CH	4.3	95.7	28.8	3.3							
5954	11/7/2011	1203	Pass	3	154+51	FS	17	9.3			3180	95.8	24.0	60	21	39	97.8				120.8	96.8	24.8	101.0	0.8	DT 300	60	19	41	CH	7.0	93.0	24.8	2.2							
5954	11/7/2011	1206	Pass	4	154+47	FS	14	9.9			3180	95.8	24.0	60	21	39	97.8				120.8	96.5	25.2	100.7	1.2	DT 300	59	19	40	CH	6.9	93.1		1.9							
5954	11/7/2011	1200	Pass	2	154+54	FS	14	8.5			3291	99.5	21.9	64	22	42	97.8				119.8	98.8	21.2	99.3	-0.7	DT 300	64	16	48	CH	8.6	91.4	21.2	2.0							
5954	11/7/2011	1208	Pass	5	162+42	CL	0	13.0			3178	90.1	26.2	68	20	48	98.1				119.2	91.2	30.7	101.2	4.5	DT 150	67	20	47	CH	3.0	97.0		4.1							
5954	11/7/2011	1215	Pass	1	21+92	CL	0	9.0			3181	92.9	22.3	78	23	55	99.6				118.5	94.3	25.6	101.5	3.3	DT 300	79	24	55	CH	3.9	96.1		3.3							
5954	11/7/2011	1196	Pass	1	162+49	CL	0	9.7			3185	90.0	28.5	74	23	51	99.2				118.3	91.1	29.8	101.2	1.3	DT 300	73	21	52	CH	6.4	93.6	29.8	2.7							
5954	11/7/2011	1197	Pass	1	154+50	FS	15	7.6			3178	91.7	26.2	68	20	48	98.1				118.3	91.3	29.6	99.6	3.4	DT 300	68	19	49	CH	1.1	98.9	29.6	2.2							
5954	11/7/2011	1205	Pass	4	162+75	CL	0	13.0			3186	91.6	26.5	67	23	44	98.9				118.2	93.5	26.4	102.1	-0.1	DT 150	63	20	43	CH	4.3	95.7		2.7							
5954	11/7/2011	1216	Pass	1	9+79	FS	48	3.7			3178	91.7	26.2	68	20	48	98.1				118.2	92.9	27.2	101.3	1.0	DT 300	69	21	48	CH	7.1	92.9		3.4							
5954	11/7/2011	1202	Pass	3	162+51	CL	0	11.6			3178	91.7	26.2	68	20	48	98.1				117.9	93.2	26.5	101.6	0.3	DT 300	65	18	47	CH	6.0	94.0	26.5	2.8							
5954	11/7/2011	1207	Pass	5	162+71	CL	0	13.6			3291	99.5	21.9	64	22	42	97.8				116.7	93.7	24.5	94.2	2.6	DT 150	64	19	45	CH	4.5	95.5		2.4							
5954	11/7/2011	1210	Pass	6	162+44	CL	0	13.6			3178	91.7	26.2	68	20	48	98.1				116.0	92.5	25.4	100.9	-0.8	DT 150	66	19	47	CH				2.9							
5954	11/7/2011	1198	Pass	2	162+71	CL	0	11.6			3178	91.7	26.2	68	20	48	98.1				116.0	89.2	30.1	97.3	3.9	DT 300	69	21	48	CH	4.5	95.5	30.1	2.9							
5954	11/7/2011	1211	Pass	6	154+51	FS	14	11.0			3186	91.6	26.5	67	23	44	98.9				115.9	92.8	24.9	101.3	-1.6	DT 150	66	21	45	CH	4.9	95.1		2.4							
5954	11/7/2011	1218	Pass	1	1+43	FS	27	5.8			3178	91.7	26.2	68	20	48	98.1				115.9	93.3	24.2	101.7	-2.0	DT 300	70	21	49	CH	4.5	95.5		3.7							
5954	11/7/2011	1201	Pass	3	162+71	CL	0	12.6			3186	91.6	26.5	67	23	44	98.9				115.6	91.8	25.9	100.2	-0.6	DT 300	66	21	45	CH	9.2	90.8	25.9	2.3							
5954	11/7/2011	1225	Pass	2	4+42	PS	-35	5.4			3185	90.0	28.5	74	23	51	99.2				113.8	89.3	27.5	99.2	-1.0	DT 300	74	21	53	CH	11.0	89.0	27.5	7.6							
5954	11/7/2011	1221	Pass	2	27+47	FS	81	4.3			3182	88.2	29.4	87	25	62	99.8				113.8	87.8	29.6	99.5	0.2	DT 300	78	23	55	CH	4.3	95.7		4.0							
5954	11/7/2011	1217	Pass	1	4+41	PS	-27	4.6			3183	87.5	27.6	81	25	56	99.6				113.8	86.5	31.5	98.9	3.9	DT 300	82	25	57	CH	3.5	96.5		3.9							
5954	11/7/2011	1223	Pass	2	21+94	CL	0	10.6			3185	90.0	28.5	74	23	51	99.2				113.4	89.3	27.0	99.2	-1.5	DT 300	70	20	50	CH	3.6	96.4		3.1							
5954	11/7/2011	1195	Pass	1	162+69	CL	0	10.1			3185	90.0	28.5	74	23	51	99.2				112.8	89.0	26.7	98.9	-1.8	DT 300	76	26	50	CH	4.0	96.0	26.7	2.8							
5954	11/7/2011	1228	Pass	3	29+05	FS	11	12.0			3185	90.0	28.5	74	23	51	99.2				112.7	88.8	26.9	98.7	-1.6	DT 300	75	24	51	CH	4.6	95.4	26.9	3.4							
5954	11/7/2011	1222	Pass	2	27+24	FS	79	3.5			3181	92.9	22.3	78	23	55	99.6				110.8	88.3	25.5	95.0	3.2	DT 300	79	22	57	CH	7.4	92.6		4.1							
5954	11/7/2011	1220	Pass	1	29+05	FS	17	10.5			3183	87.5	27.6	81	25	56	99.6				110.4	83.8	31.7	95.8	4.1	DT 300	82	24	58	CH	3.9	96.1		3.0							
5954	11/7/2011	1212	Pass	1	29+49	FS	17	8.2			3178	91.7	26.2	68	20	48	98.1				110.3	87.3	26.3	95.2	0.1	DT 300	68	19	49	CH	4.5	95.5		4.1							
5954	11/7/2011	1213	Pass	1	27+25	FS	80	2.5			3183	87.5	27.6	81	25	56	99.6				110.2	84.2	30.9	96.2	3.3	DT 300	81	23	58	CH	10.9	89.1		3.5							
5954	11/7/2011	1226	Pass	2	1+43	FS	26	7.5			3181	92.9	22.3	78	23	55	99.6				109.8	87.2	25.9	93.9	3.6	DT 300	76	21	55	CH	7.1	92.9	25.9	3.9							
5960	11/8/2011	1239	Pass	4	4+32	PS	-31	7.1			3181	92.9	22.3	78	23	55	99.6	20.4	93.1	112.2	112.3	90.2	24.5	97.1	2.2	DT 150	75	21	54	CH	3.5	96.5	24.5	3.7	115.0	92.4	24.5	99.5	2.3	2.2	YES
5960	11/8/2011	1249	Pass	4	48+00	CL	0	13.0			3180	95.8	24.0	60	21	39	97.8	21.0	92.1	111.4	113.9	93.3	22.1	97.4	-1.9	DT 150	60	19	41	CH	5.4	94.6	22.1	3.4	111.3	91.2	22.1	95.2	2.3	-1.9	YES
5960	11/8/2011	1229	Pass	4	29+53	FS	11	11.2			3178	91.7	26.2	68	20	48	98.1	26.6	91.6	116.1	112.2	88.3	27.0	96.3	0.8	DT 150	69	22	47	CH	3.9	96.1	27.0	3.6	109.1	85.9	27.0	93.7	2.8	0.8	YES
5960	11/8/2011	1254	Pass	2	121+97	PS	-186	0.3			3185	90.0	28.5	74	23	51	99.2	29.2	90.8	117.3	113.9	87.0	30.9	96.7	2.4	DT 300	73	19	54	CH	5.8	94.2	30.9	3.8							
5960	11/8/2011	1234	Pass	3	4+43	PS	-29	6.8			3094	90.1	24.0	78	26	52	96.8	28.1	90.1	115.5	115.3	91.8	25.6	101.9	1.6	DT 300	78	27	51	CH	0.8	99.2	25.6	4.4							
5960	11/8/2011	1244	Pass	2	47+97	PS	-93	2.4			3182	88.2	29.4	87	25	62	99.8	31.3	87.9	115.5	115.3	88.0	31.0	99.8	1.6	DT 300	86	27	59	CH	3.7	96.3	31.0	2.5							
5960	11/8/2011	1237	Pass	4	21+93	CL	0	1.3			3185	90.0	28.5	74	23	51	99.2				119.4	91.7	30.2	101.9	1.7	DT 150	74	20	54	CH	4.3	95.7	30.2	3.1							
5960	11/8/2011	1245	Pass	1	122+24	PS	-71	3.9			3182	88.2	29.4	87	25	62	99.8				119.4	89.2	33.8	101.1	4.4	DT 300	85	24	61	CH	2.7	97.3	33.8	2.8							
5960	11/8/2011	1247	Pass	3	47+99	PS	-92	3.5			3178	91.7	26.2	68	20	48	98.1				117.9	91.7	28.6	100.0	2.4	DT 300	68	20	48	CH	3.9	96.1	28.6	3.1							
5960	11/8/2011	1258	Pass	4	121+99	PS	-189	2.0			3179	100.9	19.6	44	19	25	97.1				117.2	100.1	17.1	99.2	-2.5	DT 300	48	22	26	CH	9.0	91.0	17.1	2.8							
5960	11/8/2011	1230	Pass	3	27+25	FS	79	4.2			3178	91.7	26.2	68	20	48	98.1				117.0	93.0	25.8	101.4	-0.4	DT 300	68	21	47	CH	2.0	98.0	25.8	3.9							
5960	11/8/2011	1250	Pass	4	48+01	PS	-92	4.2			3180	95.8	24.0	60	21	39	97.8				117.0	93.5	25.1	97.6	1.1	DT 300	60	20	40	CH	4.1	95.9	25.1	3.4							
5960	11/8/2011	1256	Pass	3	121+98	PS	-173	0.7			3179	100.9	19.6	44	19	25	97.1				116.7	97.9	19.2	97.0	-0.4	DT 300	49	19	30	CH	9.4	90.6	19.2	3.9							
5960	11/8/2011	1242	Pass	1	47+96	PS	-90	1.4			3182	88.2	29.4	87	25	62	99.8				116.2	89.0	30.6	100.9	1.2	DT 300	87	28	59	CH	3.4	96.6	30.6	2.6							
5960	11/8/2011	1238	Pass	4	9+80	FS	51	5.5			3185	90.0	28.5	74	23	51	99.2				116.1	89.7	29.4	99.7	0.9	DT 300	75	20	55	CH	4.6	95.4	29.4	4.1							
5960	11/8/2011	1246	Pass	2	48+02	CL	0	11.6			3178	91.7	26.2	68	20	48	98.1				115.4	91.8	25.7	100.1	-0.5	DT 300	68	20	48	CH	3.5	96.4	25.7	3.2							
5960	11/8/2011	1232	Pass	3	21+92	CL	0	12.6			3185	90.0	28.5	74	23	51	99.2				115.3	89.7	28.6	99.7	0.1	DT 300	76	25	51	CH	3.6	96.4	28.6	3.4							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear $w_{Meas} - w_{Opt}$	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC $w_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone $w_{Meas} - w_{Opt}$	Difference Within 3%
5960	11/8/2011	1241	Pass	5	21+98	CL	0	13.6			3182	88.2	29.4	87	25	62	99.8				114.7	86.8	32.2	98.4	2.8	DT 150	87	28	59	CH	4.7	95.3	32.2	4.6							
5960	11/8/2011	1255	Pass	3	122+24	PS	-70	5.6			3179	100.9	19.6	44	19	25	97.1				114.5	94.5	21.1	93.7	1.5	DT 300	48	19	29	CL	3.5	96.5	21.1	3.1							
5960	11/8/2011	1233	Pass	3	9+79	FS	50	4.5			3094	90.1	24.0	78	26	52	96.8				114.3	91.3	25.2	101.3	1.2	DT 300	76	23	53	CH	3.0	97.0	25.2	3.7							
5960	11/8/2011	1251	Pass	4	48+02	CL	0	13.6			3180	95.8	24.0	60	21	39	97.8				113.4	91.7	23.6	95.7	-0.4	DT 150	61	21	40	CH	4.9	95.1	23.6	2.6							
5960	11/8/2011	1257	Pass	4	122+24	PS	-69	6.5			2762	99.7	23.1	72	29	43	97.1				113.4	92.6	22.4	92.9	-0.7	DT 300	51	21	30	CH	3.8	96.2	22.4	3.9							
5960	11/8/2011	1252	Pass	1	121+98	PS	-178	1.8			3186	91.6	26.5	67	23	44	98.9				113.1	88.3	28.1	96.4	1.6	DT 300	65	21	44	CH	4.0	96.0	28.1	3.6							
5960	11/8/2011	1248	Pass	3	47+98	CL	0	12.6			3178	91.7	26.2	68	20	48	98.1				112.8	90.4	24.8	98.6	-1.4	DT 300	67	20	47	CH	3.9	96.1	24.8	5.1							
5960	11/8/2011	1253	Pass	2	122+23	PS	-71	4.6			3291	99.5	21.9	64	22	42	97.8				112.7	93.7	20.3	94.2	-1.6	DT 300	62	20	42	CH	3.0	97.0	20.3	2.5							
5960	11/8/2011	1236	Pass	4	27+30	FS	83	5.2			3094	90.1	24.0	78	26	52	96.8				112.1	87.9	27.6	97.6	3.6	DT 300	78	27	51	CH	6.7	93.3	27.6	4.4							
5960	11/8/2011	1231	Pass	3	27+46	FS	81	5.2			3186	91.6	26.5	67	23	44	98.9				111.7	89.5	24.8	97.7	-1.7	DT 300	65	21	44	CH	3.5	96.5	24.8	4.1							
5960	11/8/2011	1235	Pass	3	1+40	FS	23	8.8			3094	90.1	24.0	78	26	52	96.8				111.3	89.2	24.8	99.0	0.8	DT 300	78	27	51	CH	2.5	97.5	24.8	3.9							
5960	11/8/2011	1240	Pass	5	9+83	FS	50	6.2			3182	88.2	29.4	87	25	62	99.8				111.3	83.7	32.9	94.9	3.5	DT 300	88	28	60	CH	2.8	97.2	32.9	3.4							
5960	11/8/2011	1243	Pass	1	48+01	CL	0	10.6			3182	88.2	29.4	87	25	62	99.8				110.7	82.7	33.9	93.8	4.5	DT 300	85	27	58	CH	3.0	97.0	33.9	4.6							
5967	11/9/2011	1269	Pass	3	77+89	PS	-69	3.6			3186	91.6	26.5	67	23	44	98.9	29.5	91.3	118.3	119.1	92.8	28.4	101.3	1.9	DT 150	68	24	44	CH	3.8	96.2	28.4	4.0	121.9	94.9	28.4	103.6	2.3	1.9	YES
5967	11/9/2011	1289	Pass	3	83+48	FS	69	5.4			3180	95.8	24.0	60	21	39	97.8	23.3	94.2	116.1	111.6	89.9	24.2	93.8	0.2	DT 150	63	25	38	CH	3.1	96.9	24.2	1.8	117.8	94.8	24.2	99.0	2.7	0.2	YES
5967	11/9/2011	1259	Pass	1	121+99	PS	-163	0.0			2653	99.7	23.1	59	24	35	96.3	20.2	100.4	120.8	118.4	97.7	21.2	98.0	-1.9	DT 150	57	22	35	CH	7.2	92.8	31.2	2.9	117.2	96.7	21.2	97.0	1.0	-1.9	YES
5967	11/9/2011	1279	Pass	3	71+39	PS	-39	4.7			3291	99.5	21.9	64	22	42	97.8	21.5	98.4	119.5	114.0	95.0	20.0	95.5	-1.9	DT 150	63	22	41	CH	4.3	95.7	20.0	2.3	116.6	97.2	20.0	97.7	1.9	-1.9	YES
5967	11/9/2011	1299	Pass	1	144+99	PS	-134	2.7			3180	95.8	24.0	60	21	39	97.8	22.1	97.8	119.4	118.2	96.8	22.1	101.0	-1.9	DT 150	58	18	40	CH	6.8	93.2	22.1	2.2	115.3	94.4	22.1	98.5	2.5	-1.9	YES
5967	11/9/2011	1294	Pass	2	109+27	PS	-33	4.8			3178	91.7	26.2	68	20	48	98.1	24.4	95.7	119.0	115.0	92.7	24.0	101.1	-2.2	DT 300	69	17	52	CH	4.2	95.8	24.0	3.5							
5967	11/9/2011	1264	Pass	2	77+87	PS	-67	2.5			3178	91.7	26.2	68	20	48	98.1	29.1	90.3	116.7	110.7	85.7	29.1	93.5	2.9	DT 300	69	23	46	CH	4.0	96.0	29.1	4.0							
5967	11/9/2011	1304	Pass	1	139+96	FS	48	3.7			3180	95.8	24.0	60	21	39	97.8	21.4	96.1	116.6	110.1	90.3	21.9	94.3	-2.1	DT 300	60	24	36	CH	3.7	96.3	21.9	2.7							
5967	11/9/2011	1274	Pass	2	82+77	PS	-77	3.0			3178	91.7	26.2	68	20	48	98.1	23.6	90.7	112.1	111.8	90.0	24.2	98.1	-2.0	DT 300	67	20	47	CH	2.7	97.3	24.2	1.9							
5967	11/9/2011	1284	Pass	3	90+01	CL	0	12.5			3180	95.8	24.0	60	21	39	97.8	20.3	92.5	111.3	118.7	97.2	22.1	101.5	-1.9	DT 300	62	24	38	CH	2.9	97.1	22.1	2.2							
5967	11/9/2011	1298	Pass	1	24+40	PS	-38	5.0			3291	99.5	21.9	64	22	42	97.8				118.0	95.1	24.1	95.6	2.2	DT 300	64	24	40	CH	6.8	93.2	24.1	2.8							
5967	11/9/2011	1303	Pass	1	170+00	PS	-131	3.0			2653	99.7	23.1	59	24	35	96.3				117.9	95.5	23.5	95.8	0.4	DT 300	59	26	33	CH	4.2	95.8	23.5	2.2							
5967	11/9/2011	1267	Pass	1	90+2	CL	0	10.6			3178	91.7	26.2	68	20	48	98.1				117.6	91.2	28.9	99.5	2.7	DT 300	72	20	52	CH				4.1							
5967	11/9/2011	1276	Pass	4	77+83	PS	-69	4.8			3186	91.6	26.5	67	23	44	98.9				116.8	92.9	25.7	101.4	-0.8	DT 300	67	22	45	CH	6.1	93.9	25.7	2.4							
5967	11/9/2011	1272	Pass	2	121+94	PS	-142	1.0			3186	91.6	26.5	67	23	44	98.9				116.2	92.6	25.5	101.1	-1.0	DT 300	70	25	45	CH	4.2	95.8	25.5	3.0							
5967	11/9/2011	1291	Pass	4	89+98	CL	0	13.0			3178	91.7	26.2	68	20	48	98.1				116.1	93.2	24.6	101.6	-1.6	DT 150	64	17	47	CH	3.5	96.5	24.6	2.6							
5967	11/9/2011	1277	Pass	3	77+80	PS	-21	9.1			3178	91.7	26.2	68	20	48	98.1				115.8	92.6	25.0	101.0	-1.2	DT 300	71	22	49	CH	3.0	97.0	25.0	3.7							
5967	11/9/2011	1271	Pass	2	71+39	PS	-37	4.4			3178	91.7	26.2	68	20	48	98.1				115.8	92.3	25.4	100.7	-0.8	DT 300	69	22	47	CH	4.7	95.3	25.4	3.3							
5967	11/9/2011	1262	Pass	1	74+18	PS	-17	8.5			2653	99.7	23.1	59	24	35	96.3				115.5	92.0	25.6	92.3	2.5	DT 300	58	22	36	CH	2.5	97.5	25.6	3.8							
5967	11/9/2011	1280	Pass	3	82+75	PS	-72	4.6			3291	99.5	21.9	64	22	42	97.8				115.4	95.6	20.7	96.1	-1.2	DT 300	63	22	41	CH	4.7	95.3	20.7	2.0							
5967	11/9/2011	1265	Pass	1	82+83	PS	-78	2.5			3178	91.7	26.2	68	20	48	98.1				115.2	93.2	23.6	101.6	-2.6	DT 300	70	24	46	CH	3.6	96.4	23.6	3.1							
5967	11/9/2011	1288	Pass	2	79+97	FS	50	4.8			3180	95.8	24.0	60	21	39	97.8				115.2	94.0	22.5	98.1	-1.5	DT 300	58	27	31	CH	3.6	96.4	22.5	2.3							
5967	11/9/2011	1295	Pass	3	109+30	PS	-32	5.8			3034	94.8	24.8	67	24	43	95.5				115.0	90.2	27.5	95.1	2.7	DT 300	68	27	41	CH	4.5	95.5	27.5	3.1							
5967	11/9/2011	1268	Pass	2	77+80	PS	-23	7.7			3178	91.7	26.2	68	20	48	98.1				114.6	90.8	26.2	99.0	0.0	DT 300	72	21	51	CH	5.0	95.0	26.2	3.9							
5967	11/9/2011	1287	Pass	1	83+51	FS	63	4.4			3180	95.8	24.0	60	21	39	97.8				114.6	93.8	22.2	97.9	-1.8	DT 300	57	18	39	CH	4.5	95.5	22.2	2.2							
5967	11/9/2011	1263	Pass	1	71+40	PS	-37	35.0			2653	99.7	23.1	59	24	35	96.3				114.4	90.4	26.6	90.7	3.5	DT 300	57	24	33	CH	4.4	95.6	26.6	3.5							
5967	11/9/2011	1300	Pass	1	149+98	CL	0	10.6			2653	99.7	23.1	59	24	35	96.3				114.4	94.6	20.9	94.9	-2.2	DT 300	58	26	32	CH	5.5	94.5	20.9	2.2							
5967	11/9/2011	1305	Pass	1	123+62	FS	68	2.6			2653	99.7	23.1	59	24	35	96.3				114.3	92.4	23.7	92.7	0.6	DT 300	58	26	32	CH	3.2	96.8	23.7	2.3							
5967	11/9/2011	1270	Pass	2	74+21	PS	-14	9.8			3186	91.6	26.5	67	23	44	98.9				114.2	88.2	29.5	96.3	3.0	DT 300	58	23	45	CH	3.1	96.9	29.5	3.8							
5967	11/9/2011	1261	Pass	1	77+81	PS	-21	6.5			2653	99.7	23.1	59	24	35	96.3				114.0	89.7	27.1	90.0	4.0	DT 300	57	22	35	CH	3.8	96.2	27.1	4.1							
5967	11/9/2011	1292	Pass	5	90+00	CL	0	13.6			2854	95.9	23.9	62	24	40	97.0				113.4	90.8	24.9	94.7	1.0	DT 150	66	26	40	CH	3.3	96.7	24.9	2.6							
5967	11/9/2011	1285	Pass	1	83+53	FS	65	3.4			3180	95.8	24.0	60	21	39	97.8				113.3	92.3	22.8	96.3	-1.2	DT 300	62	21	41	CH	3.4	96.6	22.8	2.4							
5967	11/9/2011	1282	Pass	3	121+94	PS	-140	2.1			3178	91.7	26.2	68	20	48	98.1				113.2	90.7	24.8	98.9	-1.4	DT 300	67	19	48	CH	4.2	95.8	24.8	2.0							
5967	11/9/2011	1275	Pass	2	82+07	PS	-63	3.6			3178	91.7	26.2	68	20	48	98.1				112.9	87.4	29.2	95.3	3.0	DT 300	70	20	50	CH	3.7	96.3	29.2	2.8							
5967	11/9/2011	1273	Pass	2	90+02	CL	0	11.6			3178	91.7	26.2	68	20	48	98.1				112.8	90.5	24.7	98.7	-1.5	DT 300	70	22	48	CH	3.4	96.6	24.7	2.5							
5967	11/9/2011	1281	Pass	3	82+04	PS	-64	4.6			3178	91.7	26.2	68	20	48	98.1				112.7	87.5	28.8	95.4	2.6	DT 300	71	22	49	CH	4.6	95.4	28.8	2.9							
5967	11/9/2011	1296	Pass	4	109+26	PS	-35	6.2			3178	91.7	26.2	68	20	48	98.1				112.3	90.1	24.7	98.3	-1.5	DT 300	64	16	48	CH	4.6	95.4	24.7	2.7							
5967	11/9/2011	1286	Pass	1	79+99	FS	51	3.8			3180	95.8	24.0	60	21	39	97.8				112.2	92.5	21.3	96.6	-2.7	DT 300	62	24	38	CH	4.5	95.5	21.3	2.2							
5967	11/9/2011	1297	Pass	4	121+99	PS	-170	3.1			3180	95.8	24.0	60	21	39	97.8				111.6	89.9	24.2	93.8	0.2	DT 300	63	28	35	CH	5.4	94.6	24.2	3.3							
5967	11/9/2011	1278	Pass	3	74+15	PS	-17	10.5			3181	92.9	22.3	78	23	55	99.6				111.4	89.0	25.2	95.8	2.9	DT 300	75	21	54	CH	3.1	96.9	25.2	2.5							
5967	11/9/2011	1290	Pass	3	80+01	FS	53	5.8			3186	91.6	26.5	67	23	44	98.9				111.4	87.9	26.8	96.0	0.3	DT 300	64	18	46	CH	2.3	97.7	26.8	2.4							
5967	11/9/2011	1302	Pass	1	170+03	CL	0	11.0			3180	95.8	24.0	60	21	39	97.8				111.4	90.4	23.2	94.4	-0.8	DT 300	60	16	44	CH	4.7	95.3	23.2	2.1							
5967	11/9/2011	1260	Pass	1	77+86	PS	-68	1.5			2653	99.7	23.1	59	24	35	96.3				111.3	90.6	22.8	90.9	-0.3	DT 300	57	22	35	CH	3.7	96.3	27.8	4.1							
5967	11/9/2011	1266	Pass	1	82+08	PS	-63	3.0			3178	91.7	26.2	68	20	48	98.1				110.9	85.7	29.4	93.5	3.2	DT 300	70	22	48	CH	3.8	96.2	29.4	4.6							

Table 7-1 CQC Test Data for Compacted Fill

Test Report Information											Test Reference Proctor Information							One-Point Proctor			Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Reference Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	1-PT w_{Meas}	1-PT γ_d	1-PT γ_T	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear w_{Meas} - w_{Opt}	Transmission Mode	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC $w_{Measured}$	ASTM D 2974 Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w_{Meas} - w_{Opt}	Difference Within 3%
5967	11/9/2011	1283	Pass	4	71+39	PS	-37	5.8			2854	95.9	23.9	62	24	40	97.0				110.6	88.6	24.9	92.4	1.0	DT 300	68	23	45	Ch	3.3	96.7	24.9	2.8							
5982	11/10/2011	1309	Pass	2	144+99	PS	-130	3.0			2854	95.9	23.9	62	24	40	97.0	21.8	95.9	116.9	122.2	97.7	25.1	101.9	1.2	DT 150	64	24	40	CH	3.3	96.7	25.1	2.4	118.9	94.9	25.3	99.0	2.8	1.4	YES
5982	11/10/2011	1319	Pass	3	150+05	CL	0	12.6			2854	95.9	23.9	62	24	40	97.0	21.2	94.7	114.7	114.7	94.6	21.2	98.6	-2.7	DT 150	64	24	40	CH	3.6	96.4	21.2	1.2	113.6	93.7	21.2	97.7	2.9	-2.7	YES
5982	11/10/2011	1314	Pass	3	170+01	PS	-134	5.1			2653	99.7	23.1	59	24	35	96.3	24.8	98.1	122.4	112.1	92.6	21.0	92.9	-2.1	DT 300	62	26	36	CH	4.1	95.9	21.0	2.1							
5982	11/10/2011	1324	Pass	4	150+03	CL	0	13.1			2653	99.7	23.1	59	24	35	96.3	19.3	98.7	117.8	111.1	91.9	20.9	92.2	-2.2	DT 150	59	23	36	CH	4.8	95.2	20.9	2.1							
5982	11/10/2011	1312	Pass	2	170+01	PS	133	4.1			2653	99.7	23.1	59	24	35	96.3				122.9	101.0	21.7	101.3	-1.4	DT 300	62	25	37	CH	8.3	91.7	21.7	2.0							
5982	11/10/2011	1307	Pass	2	124+39	PS	-39	5.8			2762	92.1	26.0	72	29	43	97.1				121.2	93.4	29.8	101.4	3.8	DT 300	58	24	34	CH	4.3	95.7	29.8	3.2							
5982	11/10/2011	1317	Pass	5	169+98	CL	0	13.6			2854	95.9	23.9	62	24	40	97.0				120.0	93.5	28.3	97.5	4.4	DT 150	65	25	40	CH	3.3	96.7	28.3	1.6							
5982	11/10/2011	1311	Pass	2	160+00	FS	-52	5.1			2653	99.7	23.1	59	24	35	96.3				117.1	95.4	22.7	95.7	-0.4	DT 300	62	27	35	CH	5.0	95.0	22.7	2.4							
5982	11/10/2011	1315	Pass	3	170+02	CL	0	12.7			2653	99.7	23.1	59	24	35	96.3				116.2	93.6	24.2	93.9	1.1	DT 150	61	23	38	CH	8.9	91.1	24.2	2.5							
5982	11/10/2011	1323	Pass	3	124+37	PS	-39	7.1			2653	99.7	23.1	59	24	35	96.3				115.2	95.6	20.5	95.9	-2.6	DT 300	58	23	35	CH	3.5	96.5	20.5	2.3							
5982	11/10/2011	1310	Pass	2	150+01	CL	0	11.6			2762	92.1	26.0	72	29	43	97.1				114.3	91.9	24.4	99.8	-1.6	DT 300	59	25	34	CH	8.1	91.9	24.4	2.3							
5982	11/10/2011	1308	Pass	2	140+01	FS	53	5.1			2762	92.1	26.0	72	29	43	97.1				113.7	91.8	23.8	99.7	-2.2	DT 300	59	24	35	CH	3.3	96.7	23.8	3.1							
5982	11/10/2011	1322	Pass	3	123+60	FS	76	5.2			2653	99.7	23.1	59	24	35	96.3				113.4	94.0	20.7	94.3	-2.4	DT 300	58	24	34	CH	4.2	95.8	20.7	2.2							
5982	11/10/2011	1318	Pass	3	159+97	FS	51	6.1			2854	95.9	23.9	62	24	40	97.0				112.3	92.5	21.4	96.5	-2.5	DT 300	65	25	40	CH	4.0	96.0	21.4	2.1							
5982	11/10/2011	1325	Pass	5	150+00	CL	0	13.6			2653	99.7	23.1	59	24	35	96.3				112.2	91.9	22.1	92.2	-1.0	DT 150	61	23	38	CH	4.6	95.4	22.1	2.5							
5982	11/10/2011	1321	Pass	3	140+02	FS	51	6.1			2854	95.9	23.9	62	24	40	97.0				111.4	90.4	23.2	94.3	-0.7	DT 300	64	24	40	CH	3.2	96.8	23.2	1.4							
5982	11/10/2011	1320	Pass	3	145+00	PS	-125	5.2			2854	95.9	23.9	62	24	40	97.0				110.3	89.9	22.7	93.7	-1.2	DT 300	64	25	39	CH	3.7	96.3	22.7	1.7							
5982	11/10/2011	1313	Pass	2	169+99	CL	0	12.2			2653	99.7	23.1	59	24	35	96.3				110.3	90.9	21.4	91.2	-1.7	DT 300	62	25	37	CH	3.3	96.7	23.6	1.6							
5982	11/10/2011	1306	Pass	2	123+63	FS	66	3.9			2762	92.1	26.0	72	29	43	97.1				110.2	87.9	25.3	95.4	-0.7	DT 300	62	25	37	CH	5.4	94.6	25.3	1.9							
5982	11/10/2011	1316	Pass	4	169+98	CL	0	13.1			2854	95.9	23.9	62	24	40	97.0				110.1	87.7	25.5	91.4	1.6	DT 150	64	27	37	CH	3.3	96.7	25.5	2.4							
6046	11/22/2011	1327	Pass	2	79+00	PS	-45	4.3			2653	99.7	23.1	59	24	35	96.3				123.6	101.6	21.6	101.9	-1.5	DT 300	63	27	36	CH	4.7	95.3	21.6	1.7							
6046	11/22/2011	1328	Pass	3	79+00	PS	-41	5.3			2854	95.9	23.9	62	24	40	97.0				115.1	94.0	22.4	98.0	-1.5	DT 300	64	24	40	CH	4.3	95.7	22.4	2.0							
6046	11/22/2011	1326	Pass	1	79+00	PS	-44	3.3			2653	99.7	23.1	59	24	35	96.3				113.6	92.7	22.5	93.0	-0.6	DT 300	63	25	38	CH	8.8	91.2	22.5	2.2							

Note (1) This table was developed by the Tiger Team using database spreadsheets summarizing all CQC tests provided by MVN Construction Quality Assurance Branch Division. Gaps in the summary spreadsheets were supplemented with information from the individual test reports provided in Appendix T. During the course of the investigation - at the request of the Tiger Team additional information was provided by MVN to develop this table.

Note (2) All densities are in pounds per cubic foot (pcf)

Note (3) This table includes test results for both passing and failing tests - only on compacted fill.

Table 7-2 CQC Test Data for Uncompacted Fill

Test Report Information					Materials Classification Tests						Organic Content Tests	
Report #	Sample Date	Test #	Test Result	Station	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC w $_{Measured}$	ASTM D 2974 Organic Content (%)
3028	9/28/2010	91	Info Only	133+00	68	24	44	CH	4.3	95.7	36.2	3.9
3059	9/30/2010	99	Info Only	138+00	76	29	47	CH	4.2	95.8	38.1	4.7
3066	10/1/2010	101	Info Only	107+97	73	31	42	CH	3.7	96.3	38.7	3.4
3115	10/6/2010	115	Pass	106+00	51	23	28	CH	3.1	96.9	29.6	2.8
3115	10/6/2010	116	Pass	170+00	76	26	50	CH	6.9	93.1	35.1	3.5
3115	10/6/2010	118	Pass	176+00	57	27	30	CH	1.8	98.2	31.4	2.7
3115	10/6/2010	119	Pass	108+00	62	24	38	CH	3.7	96.3	33.6	3.1
3140	10/8/2010	123	Pass	105+00	63	24	39	CH	3.9	96.1	29.5	3.1
3183	10/14/2010	139	Pass	100+50	66	27	39	CH	3.5	96.5	34.5	3.3
3183	10/14/2010	141	Pass	157+00	60	28	32	CH	3.3	96.7	31.4	3.0
3194	10/15/2010	143	Pass	103+00	61	27	34	CH	2.8	97.2	27.5	3.5
3194	10/15/2010	144	Pass	152+00	73	26	47	CH	2.6	97.4	31.6	3.8
3194	10/15/2010	145	Pass	155+00	54	23	31	CH	4.0	96.0	27.1	3.2
3200	10/16/2010	151	Pass	98+00	68	24	44	CH	1.8	98.2	29.7	2.4
3200	10/16/2010	152	Pass	150+00	72	26	46	CH	1.8	98.2	29.0	2.7
3218	10/19/2010	162	Pass	87+00	68	24	44	CH	0.7	99.3	42.2	2.9
3218	10/19/2010	163	Pass	144+00	63	30	33	CH	2.9	97.1	39.5	3.1
3236	10/21/2010	167	Pass	88+00	57	25	32	CH	4.6	95.4	25.9	5.0
3236	10/21/2010	166	Pass	87+00	58	25	33	CH	2.1	97.9	37.7	6.1
3266	10/26/2010	176	Pass	75+00	68	31	37	CH	3.9	96.1	36.2	3.2
3266	10/26/2010	177	Pass	78+00	67	30	37	CH	3.4	96.6	27.7	3.5
3266	10/26/2010	178	Pass	82+00	65	30	35	CH	3.0	97.0	31.8	3.0
3297	10/30/2010	199	Pass	66+00	69	25	44	CH	2.6	97.4	34.7	2.8
3297	10/30/2010	200	Pass	70+00	66	22	44	CH	8.4	91.6	30.2	2.7
3297	10/30/2010	201	Pass	73+00	66	26	40	CH	6.9	93.1	36.2	1.7
3297	10/30/2010	202	Pass	88+00	69	32	37	CH	5.1	94.9	38.3	1.7
3301	11/1/2010	211	Pass	58+00	60	23	37	CH	3.0	97.0		3.5

Table 7-2 CQC Test Data for Uncompacted Fill

Test Report Information					Materials Classification Tests						Organic Content Tests	
Report #	Sample Date	Test #	Test Result	Station	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC w $_{Measured}$	ASTM D 2974 Organic Content (%)
3371	11/10/2010	235	Pass		71	24	47	CH	0.9	99.1	26.2	3.4
3371	11/10/2010	236	Pass		73	24	49	CH	0.3	99.7	44.0	4.0
3510	12/8/2010	330	PASS	54+50	66	25	41	CH	1.2	98.8	25.6	3.4
3510	12/8/2010	331	PASS	53+00	65	16	49	CH	0.5	99.5	31.7	3.2
3510	12/8/2010	332	PASS	56+00	67	22	45	CH	1.5	98.5	24.5	3.2
3510	12/8/2010	333	PASS	51+50	65	24	41	CH	2.1	97.9	30.3	3.2
2970	9/20/2010	69	Info Only	128+75	47	22	25	CL	5.1	94.9	28.1	2.9
3094	10/2/2010	105	Info Only	180+00	44	23	21	CL	4.0	96.0	33.3	2.0
3095	10/3/2010	111	Info Only	179+00	49	22	27	CL	4.5	95.5	32.3	2.1
3115	10/6/2010	117	Pass	172+00	46	23	23	CL	5.7	94.3	27.0	2.4
3115	10/6/2010	120	Pass	171+00	47	22	25	CL	3.9	96.1	32.4	2.6
3140	10/8/2010	124	Pass	167+00	43	20	23	CL	7.9	92.1	28.5	2.5
3183	10/14/2010	140	Pass	101+50	47	24	23	CL	6.5	93.5	26.6	2.9
3183	10/14/2010	142	Pass	159+00	44	22	22	CL	6.7	93.3	29.7	2.1
3202	10/17/2010	155	Pass	148+50	44	27	17	CL	4.4	95.6	30.2	2.9
3202	10/17/2010	156	Pass	146+00	48	26	22	CL	4.1	95.9	28.0	3.1
3202	10/17/2010	157	Pass	95+00	48	30	18	CL	4.8	95.2	32.3	4.4
3297	10/30/2010	197	Pass	59+00	41	18	23	CL	2.0	98.0	33.6	3.1
3297	10/30/2010	198	Pass	61+00	39	19	20	CL	2.6	97.4	29.1	2.7

Note (1) This table was developed by the Tiger Team using database spreadsheets summarizing all CQC tests provided by MVN Construction Quality Assurance Branch Division. Gaps in the summary spreadsheets were supplemented with information from the individual test reports provided in Appendix T. During the course of the investigation - at the request of the Tiger Team additional information was provided by MVN to develop this table.

Table 7-3 CQC Tests Data for Existing Levee

Test Report Information								Materials Classification Tests						Organic Content Tests	
Report #	Sample Date	Test #	Test Result	Station	Location	Offset	EL (ft)	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	OC w $_{Measured}$	ASTM D 2974 Organic Content (%)
3857A	1/27/2011	390	PASS	180+00	PS	-46	5.9	58	27	31	CH	14.6	85.4	30.3	4.5
3857A	1/27/2011	391	PASS	175+00	PS	-34.5	6.3	61	25	36	CH	16.0	84.0	32.6	3.6
3857A	1/27/2011	392	PASS	170+00	PS	-32.4	6.9	61	27	34	CH	22.2	77.8	28.6	4.7
3857A	1/27/2011	393	PASS	165+00	PS	-33.4	6.1	50	22	28	CH	17.0	83.0	24.1	3.6
3857A	1/27/2011	394	PASS	159+99	PS	-34.5	6.2	55	23	32	CH	17.4	82.6	28.3	3.5
3857B	1/27/2011	395	PASS	154+98	PS	-34.9	6.1	55	26	29	CH	16.2	83.8	28.6	3.6
3857B	1/27/2011	396	PASS	144+98	PS	-35.4	6.1	55	22	33	CH	21.6	78.4	23.8	3.6
3857B	1/27/2011	397	PASS	134+99	PS	-33.2	6.4	77	32	45	CH	7.1	92.9	37.5	6.4
3857B	1/27/2011	398	PASS	125+01	PS	-35.3	6.1	58	22	36	CH	19.3	80.7	23.1	3.4
3857B	1/27/2011	399	PASS	130+00	PS	-32.9	6.3	92	37	55	CH	9.3	90.7	44.8	7.3
3857C	1/27/2011	400	PASS	105+00	PS	-35	6.0	80	31	49	CH	4.7	95.3	38.6	4.4
3857C	1/27/2011	401	PASS	100+00	PS	-44	6.1	66	22	44	CH	8.1	91.9	24.2	3.9
3857C	1/27/2011	402	PASS	195+00	PS	-47	5.6	91	35	56	CH	6.2	93.8	44.4	6.5
3857C	1/27/2011	403	PASS	90+00	PS	-49	5.1	64	26	38	CH	7.1	92.9	27.6	3.3
3857C	1/27/2011	404	PASS	85+00	PS	-48	5.2	61	27	34	CH	13.9	86.1	28.4	4.4
3857D	1/27/2011	405	PASS	65+00	PS	-55	5.3	55	20	35	CH	26.6	73.4	23.7	3.3

Note (1) This table was developed by the Tiger Team using database spreadsheets summarizing all CQC tests provided by MVN Construction Quality Assurance Branch Division. Gaps in the summary spreadsheets were supplemented with information from the individual test reports provided in Appendix T. During the course of the investigation - at the request of the Tiger Team additional information was provided by MVN to develop this table.

Table 7-4 QA Test Data

Test Report Information										Test Reference Proctor Information							One-Point Proctor		Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	El. (ft)	Retest of ID	Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	One Point Proctor Moisture Content w	One Point Proctor Dry Density	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear w_{Meas} - w_{Opt}	Probe Depth 6" or 12"	LL	PL	PI	Group Symbol	Sand Content (%)	% Fines	OC w Measured	Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w $_{Meas}$ - w_{Opt}	Difference Within 3%
5164	4/7/2011	C-05	Pass		12+00	CL	0			5164-C-05	91.6	26													77	23	54	CH	3.9	96.1	26.96	4.6							
5164	4/7/2011	C-06	Pass		145+00	CL	0			5164-C-06	84.5	30													96	27	69	CH	5.1	94.9	35.98	6.6							
5972	8/23/2011	C-07	Pass	5	163+51	PS	112	5.7		5972-C-07	99.5	23.5													59	17	42	CH	2.5	97.5	21.6	4.6							
5972	8/23/2011	C-08	Pass	5	168+42	PS	127	5.5		5972-C-08	101.5	21													57	16	41	CH	2.8	97.2	21.7	3.3							
3833	8/27/2010	C-1	Pass	1	145+08	FS	21	5		3833-C-1	96.6	20.8													60	16	44	CH	4.2	95.8	27.8	3.4							
3833	8/27/2010	C-2	Pass	1	139+03	FS	22	4.8		3833-C-2	100.1	20.9													54	18	36	CH	4.2	95.8	28.5	3.7							
4075	9/29/2010	C-3	Pass		99+25	CL	0			4075-C-3	92	23.9													71	21	50	CH	4.4	95.6	21.4	5.1							
4075	9/29/2010	C-4	Pass		99+25	CL	0			4075-C-4	88.7	27													75	23	52	CH	11.6	88.4	54.1	6.1							
3833	8/27/2010	T-1	Fail	1	145+08	FS	21	5		3833-C-01/02	98.4	20.9							118.3	92.3	28.1	93.8	7.2	6	60	16	44	CH	2.9	97.1	28.1	3.5							
4216	10/19/2010	T-10	Pass	2	77+07	FS	17	5.6		3094-108	90.1	24	78	26	52	96.8	23.0	87.1	105.3	84.2	25.1	93.5	1.1	12	82	21	61	CH	6.4	93.6	25.1	4.6	119.6	95.6	25.1	106.1	1.8	1.1	YES
4216	10/19/2010	T-11	Pass	2	71+99	FS	36	4.8		2854-40	95.9	23.9	64	24	40	97			117.2	95.2	23.1	99.3	-0.8	12	56	18	38	CH	3.6	96.4	23.1	3.4							
4216	10/19/2010	T-12	Pass	2	81+04	FS	25	5		2854-40	95.9	23.9	64	24	40	97			106.7	86.3	23.6	90	-0.3	12	60	18	42	CH	4.7	95.3	23.6	3.5							
4501	11/23/2010	T-13	Pass	4	87+54	PS	12	8		3185-132	90	28.5	74	23	51	99.2			115.1	88.6	29.9	98.4	1.4	12	75	22	53	CH	2.4	97.6	29.85	3.8							
4501	11/23/2010	T-14	Pass	3	82+90	CL	0	7.2		3183-130	87.5	27.6	81	25	56	99.6			113.4	84.1	34.9	96.1	7.3	12	80	22	58	CH	2	98	34.94	4.4							
4501	11/23/2010	T-15	Pass	3	79+00	FS	9	8.1		3183-130	87.5	27.6	81	25	56	99.6	27.4	89.2	116.6	89.8	29.9	102.6	2.3	12	79	21	58	CH	1.7	98.3	29.89	4.3							
4501	11/23/2010	T-16	Pass	3	76+53	CL	0	7.8		3182-129	88.2	29.4	87	25	62	99.8			113	82.3	37.3	93.3	7.9	12	90	21	69	CH	1.4	98.6	37.29	4.4							
4501	11/23/2010	T-17	Pass	4	69+06	FS	39	6.3		3186-133	91.6	26.5	67	23	44	98.9			117	91.1	28.4	99.5	1.9	12	64	17	47	CH	3.5	96.5	28.37	3.1							
4527	12/7/2010	T-18	Fail	2	92+72	PS	148	-0.8		3182-129	88.2	29.4	87	25	62	99.8			112.1	82.5	35.9	93.5	6.5	12	85	24	61	CH	10.8	89.2	35.86	4.3							
4527	12/7/2010	T-19	Pass	2	87+00	PS	143	0.2		3185-132	90	28.5	74	23	51	99.2			111.9	85.2	31.4	94.7	2.9	12	76	21	55	CH	7.2	92.8	31.35	3.6							
3833	8/27/2010	T-2	Fail	1	139+03	FS	22	4.8		3833-C-01/02	98.4	20.9							115.5	89.3	29.3	90.8	8.4	6	52	16	36	CH	5	95	29.3	3.3	116.1	89.8	29.3	91.3	0.5	8.4	YES
4527	12/7/2010	T-20	Pass	2	82+03	PS	140	0.5		3185-132	90	28.5	74	23	51	99.2	30.1	89.6	108.4	85.6	26.6	95.1	-1.9	12	70	20	50	CH	6.7	93.3	26.62	3.3	112.8	89.1	26.6	99	2	-1.9	YES
4527	12/7/2010	T-21	Pass	2	77+00	PS	138	0.6		3185-132	90	28.5	74	23	51	99.2			107.1	83.8	27.8	93.1	-0.7	12	72	20	52	CH	6.5	93.5	27.77	3.7							
4527	12/7/2010	T-22	Pass	2	72+03	PS	141	0.4		3185-132	90	28.5	74	23	51	99.2			111	86.2	28.8	95.8	0.3	12	75	20	55	CH	5.5	94.5	28.76	3.3							
4957	3/2/2011	T-23	Pass	3	143+96	FS	16	6.8		2609-001	95.1	26.4	64	23	41	98.2			115.4	89.5	29	94.1	2.6	12	63	20	43	CH	5.1	94.9	29.05	4.9							
4957	3/2/2011	T-24	Pass	3	145+99	FS	16	6.8		3178-125	91.7	26.2	68	20	48	98.1			115.8	90.1	28.5	98.3	2.3	12	66	19	47	CH	3.3	96.7	28.51	4.7							
4957	3/2/2011	T-25	Pass	3	148+24	CL	0	7		2609-001	95.1	26.4	64	23	41	98.2	25.9	93.5	109.8	87.7	25.2	92.2	-1.2	12	64	20	44	CH	2.9	97.1	25.18	3.7							
4957	3/2/2011	T-26	Pass	3	150+72	FS	11	6.8		3462-307	89.1	28.8	65	23	42	94.5			115.7	87.9	31.6	98.7	2.8	12	68	21	47	CH	3.7	96.3	31.65	4.9							
4957	3/2/2011	T-27	Pass	3	153.+22	FS	19	6.7		3178-125	91.7	26.2	68	20	48	98.1			113	86.7	30.3	94.5	4.1	12	69	19	50	CH	5.8	94.2	30.31	5.3							
5075	3/24/2011	T-28	Pass	1	107+07	PS	82	4.4		3182-129	88.2	29.4	87	25	62	99.8			115.2	87.3	31.9	99	2.5	6	83	26	57	CH	5	95	31.9	6							
5075	3/24/2011	T-29	Pass	1	101+99	PS	73	4.6		3182-129	88.2	29.4	87	25	62	99.8			114.2	87.6	30.4	99.3	1	6	83	22	61	CH	7.1	92.9	30.4	5.6							
4029	9/23/2010	T-3	Pass	11	110+56	CL	0	13.5		2854-40	95.9	23.9	64	24	40	97			118.5	96.3	23	100.4	-0.9	6	67	19	48	CH	4.1	95.9	23.05	4.1							
5075	3/24/2011	T-30A	Pass	7	96+99	CL	0	11.5		3555-353	86.6	30	78	28	50	94.1			102.3	80.1	27.7	92.5	-2.3	12	90	24	66	CH	2.1	97.9	27.7	5.4							
5075	3/24/2011	T-30B	Pass	7	96+99	CL	0	11.5		3555-353	86.6	30	78	28	50	94.1	25.0	83.7	107.9	83.8	28.7	96.8	-1.3	6	90	24	66	CH	2.1	97.9	28.7	5.6	110.7	86.7	27.7	100.1	2.5	-2.3	YES
5075	3/24/2011	T-31	Fail	7	102+00	CL	0	11.4		3555-353	86.6	30	78	28	50	94.1			101.6	83.8	21.2	96.8	-8.8	12	77	21	56	CH	3.2	96.8	21.2	4.9							
5075	3/24/2011	T-32	Fail	7	107+02	CL	0	11.4		3555-353	86.6	30	78	28	50	94.1			99.3	81.3	22.1	93.9	-7.9	12	75	22	53	CH	3.4	96.6	22.1	4.9							
5164	4/7/2011	T-33	Fail	3	6+03	CL	0	7.5		3824-389	82.9	33.7	92	31	61	93.7			104	81.8	27.1	98.7	-6.6	12	90	25	65	CH	4.1	95.9	27.11	6.9							
5164	4/7/2011	T-34	Pass	8	96+10	CL	0	12		3824-389	82.9	33.7	92	31	61	93.7			107.6	79.9	34.7	96.4	1	12	100	28	72	CH	6.2	93.8	34.75	8							
5164	4/7/2011	T-35	Fail	8	100+98	CL	0	12.2		3824-389	82.9	33.7	92	31	61	93.7	26.3	91.3	108	82.8	30.4	99.9	-3.3	12	92	26	66	CH	7.1	92.9	30.36	7.2							
5164	4/7/2011	T-36	Pass	8	106+00	CL	0	12		3824-389	82.9	33.7	92	31	61	93.7			109.2	82.7	32.1	99.8	-1.6	12	95	26	69	CH	9.1	90.9	32.06	7.6							
5381	5/11/2011	T-37	Pass	3	127+00	PS	64	6.8		3815-388	88.9	29.6	75	21	54	95.4			112.9	87.2	29.5	98.1	-0.1	12	72	20	52	CH	2.3	97.7	29.5	4.1							
5381	5/11/2011	T-38	Fail	3	128+97	PS	92	5.9		3815-388	88.9	29.6	75	21	54	95.4			112.4	89.1	26.1	100.2	-3.5	12	70	19	51	CH	2	98	26.1	4.2							
5381	5/11/2011	T-39	Pass	3	130+91	PS	104	5.6		3815-388	88.9	29.6	75	21	54	95.4			112	87.6	27.8	98.5	-1.8	12	72	20	52	CH	2	98	27.8	4.2							
4029	9/23/2010	T-4	Fail	1	107+04	FS	8.8	8.8		2854-40	95.9	23.9	64	24	40	97			116	88.5	31	92.3	7.1	6	85	23	62	CH	1.4	98.6	30.98	5.1							
5381	5/11/2011	T-40	Fail	3	133+14	PS	63	6.8		3815-388	88.9	29.6	75	21	54	95.4	21.9	92.2	111.3	91.1	22.2	102.5	-7.4	12	68	18	50	CH	2.4	97.6	22.2	3.9	110	90	22.2	101.2	2.8	-7.4	YES
5381	5/11/2011	T-41	Fail	3	135+19	PS	73	6.6		3815-388	88.9	29.6	75	21	54	95.4			109.6	87.5	25.3	98.4	-4.3	12	74	21	53	CH	2.4	97.6	25.3	4							
5381	5/11/2011	T-42	Pass	3	137+09	PS	88	6		3815-388	88.9	29.6	75	21	54	95.4			107.3	84	27.7	94.5	-1.9	12	68	20	48	CH	2.5	97.5	27.7	4.2							
5382	5/12/2011	T-43	Pass	1	68+45	PS	137	1		3815-388	88.9	29.6	75	21	54	95.4			114.2	90.1	26.8	101.3	-2.8	6	81	23	58	CH	3.6	96.4	26.8	5.4							
5382	5/12/2011	T-44	Fail	1	63+22	PS	135	2		3815-388	88.9	29.6	75	21	54	95.4			110.4	90.9	21.4	102.2	-8.2	6	77	23	54	CH	4.5	95.5	21.4	5.4							
5444	5/19/2011	T-45	Fail	10	77+49	CL	0	13.2		2762-24	92.1	26.6	72	29	43	97.1	21.9	87.5	118.2	96.7	22.2	105	-4.4	6	75	20	55	CH	3.5	96.5	22.2	5.5							
5444	5/19/2011	T-46	Pass	10	82+44	CL	0	13.1		3555-353	86.6	30	78	28	50	94.1			111.4	87	28.1	100.5	-1.9	6	78	21	57	CH	2.7	97.3	28.1	5.7							
5444	5/19/2011	T-47	Fail	10	87+48	CL	0	13.2		3815-388	88.9	29.6	75	21	54	95.4			112.4	92.6	21.4	104.2	-8.2	6	73	20	53	CH	2.6	97.4	21.4	4.6							
5444	5/19/2011	T-48	Pass	10	92+49	CL	0	13.2		3815-388	88.9	29.6	75	21	54	95.4			113.1	88.9	27.2	100	-2.4	6	74	19	55	CH	2.8	97.8	27.2	6.2							
5444	5/19/2011	T-49	Fail	6	82+94	PS	151	2.4		4502-642	91.6	28.2	68	23	45	95			112.1	96.1	16.6	104.9	-11.6	12	71	19	52	CH	2.6	97.4	16.6	4.7							
4029	9/23/2010	T-5	Fail	1	103+06	CL	0	5.8		2854-40	95.9	23.9	64	24	40	97	27.3	84.2	106.3	83.5	27.3	87.1	3.4	6	96	24	72	CH	0.9	99.1	27.34	5.3							
5444	5/19/2011	T-50	Fail	5	77+92	PS	131	2.6		3815-388	88.9	29.6	75	21	54	95.4	18.6	87.9	102.7	84.8	21.1	95.4	-8.5	12	74	20	54	CH	2.9	97.1	21.1	5.1	106.9	88.3	21.1	95.9	1.6	-5.5	YES
5444	5/19/2011	T-51	Pass	6	59+40	CL	0	9.1		3815-388	88.9	29.6	75	21	54	95.4			108.5	85.1	27.5	95.7	-2.1	12	74	18	56	CH	2.7	97.3	27.5	5							

Table 7-4 QA Test Data

Test Report Information										Test Reference Proctor Information							One-Point Proctor		Field Density - Nuclear Method & Oven Moisture Content						Materials Classification Tests						Organic Content Tests		Sand Cone Density Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	El. (ft)	Retest of ID	Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	One Point Proctor Moisture Content w	One Point Proctor Dry Density	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear w_{Meas} - w_{Opt}	Probe Depth 6" or 12"	LL	PL	PI	Group Symbol	Sand Content (%)	% Fines	OC w Measured	Organic Content (%)	Sand Cone γ_T	Sand Cone γ_d	Sand Cone Oven w_{Meas}	Sand Cone % Compaction	NUC γT & Sand Cone γT Difference (pcf)	Sand Cone w $_{Meas}$ - w_{Opt}	Difference Within 3%
5444	5/19/2011	T-52	Fail	5	55+90	PS	9	8		3815-388	88.9	29.6	75	21	54	95.4			107	87.6	22.2	98.5	-7.4	12	74	22	52	CH	2.6	97.4	22.2	5.7							
5494	5/26/2011	T-53	Pass	3	68+99	PS	136	2.8		3815-388	88.9	29.6	75	21	54	95.4			114.8	90	27.5	101.2	-2.1	6	78	20	58	CH	3.6	96.4	27.5	5.1							
5494	5/26/2011	T-54	Fail	8	108+75	CL	0	12.6		3815-388	88.9	29.6	75	21	54	95.4			109.7	87.7	25.1	98.7	-4.5	12	82	19	63	CH	3.8	96.2	25.1	4.9							
5494	5/26/2011	T-55	Fail	11	101+00	CL	0	13.7		3815-388	88.9	29.6	75	21	54	95.4	21.2	88.6	107.2	87.4	22.7	98.3	-6.9	6	81	20	61	CH	2.2	97.8	22.7	4.8							
5528	6/2/2011	T-56	Pass	6	82+94	PS	151	2.4	T-49	3550-352	92.3	26	63	19	44	95			114.3	91.2	25.3	98.8	-0.7	12	67	19	48	CH	2.9	97.1	25.3	5							
5528	6/2/2011	T-57	Pass	3	133+14	PS	63	6.8	T-40	4171-498	96.6	22.8	60	22	38	88.2			118.5	94.7	25.1	98	2.3	12	60	17	43	CH	3	97	25.1	3.6							
5528	6/2/2011	T-58	Pass	3	135+19	PS	73	6.6	T41	3550-352	92.3	26	63	19	44	95			112.8	91	24	98.6	-2	12	66	19	47	CH	3.2	96.8	24	4.3							
5528	6/2/2011	T-59	Pass	10	87+48	CL	0	13.2	T-47	2762-24	92.1	26.6	72	29	43	97.1			118.2	91.4	29.3	99.2	2.7	6	73	20	53	CH	3.1	96.9	29.3	4.7							
4029	9/23/2010	T-6	Pass	2	135+97	FS	22	5.3		2854-40	95.9	23.9	64	24	40	97			119.8	98.2	22	102.4	-1.9	12	73	20	53	CH	2.6	97.4	21.94	4.4							
5528	6/2/2011	T-60	Pass	10	77+49	CL	0	13.2	T-45	2762-24	92.1	26.6	72	29	43	97.1	21.8	83.1	116.8	90.4	29.2	98.2	2.6	6	73	20	53	CH	3.6	96.4	29.2	4.9	117.7	91.2	29.1	99	0.8	2.5	YES
5563	6/9/2011	T-61	Pass	5	77+92	PS	131	2.6	T-50	3815-388	88.9	29.6	75	21	54	95.4			114	89.5	27.4	100.7	-2.2	12	73	19	54	CH	1.9	98.1	27.4	5.3							
5563	6/9/2011	T-62	Pass	3	150+50	PS	52	7.2		4502-642	91.6	28.2	68	23	45	95			116.9	88.9	31.5	97.1	3.3	12	71	19	52	CH	2.8	97.2	31.5	4.8							
5563	6/9/2011	T-63	Pass	3	152+47	PS	84	6.1		4502-642	91.6	28.2	68	23	45	95			117.7	92.8	26.8	101.3	-1.4	12	70	18	52	CH	2.8	97.2	26.8	4.7							
5563	6/9/2011	T-64	Pass	3	154+38	PS	96	5.9		3815-388	88.9	29.6	75	21	54	95.4			115.6	86.9	33	97.8	3.4	12	73	19	54	CH	2.5	97.5	33	5.4							
5972	8/23/2011	T-65	Pass	5	163+51	PS	112	5.7		5972 C-07	99.5	23.5	59	17	42	97.5			119.3	98.1	21.6	98.6	-1.9	6	58	16	42	CH	2.5	97.5	21.63	4.6							
5972	8/23/2011	T-66	Pass	5	168+42	PS	127	5.5		5972 C-08	101.5	21	57	16	41	97.2			117.3	96.1	22.1	94.7	1.1	6	54	16	38	CH	2.8	97.2	22.14	3.6							
6294	10/12/2011	T-67	Pass	5	48+51	PS	127	3.5		3185-132	90	28.5	74	23	51	99.2			121.7	95.1	28	105.7	-0.5	12	71	19	52	CH	4.1	95.9	28	4.6							
6294	10/12/2011	T-68	Pass	4	52+49	PS	118	3.5		3291-184	99.5	21.9	64	22	42	97.8			115.3	93.9	22.8	94.4	0.9	12	64	18	46	CH	5.6	94.4	22.8	3.9							
6324	10/18/2011	T-69	Pass	11	22+20	CL	0	13.6		3094-108	90.1	24	78	26	52	96.8	91.5	23.3	113.9	92.1	23.7	102.2	-0.3	6	82	16	66	CH	3	97	23.7	4.1	113.9	94.7	23.7	105.1	2.7	-0.3	YES
4074	9/30/2010	T-7	Pass	1	93+17	FS	16	4.5		2854-40	95.9	23.9	64	24	40	97			116.3	94.4	23.2	98.4	-0.7	6	66	19	47	CH	5	95									
6324	10/18/2011	T-70	Pass	11	32+17	CL	0	13.6		3094-108	90.1	24	78	26	52	96.8			121.1	94.5	28.1	104.9	4.1	6	77	16	61	CH	2.4	97.6	28.1	4.2							
6324	10/18/2011	T-71	Pass	10	37+26	CL	0	13.1		3094-108	90.1	24	78	26	52	96.8			114	92.4	23.4	102.6	-0.6	6	83	17	66	CH	2.8	97.2	23.4	3.7							
6324	10/18/2011	T-72	Pass	10	41+51	CL	0	13.1		3185-132	90	28.5	74	23	51	99.2			110	85.6	28.5	95.1	0	6	74	15	59	CH	2.8	97.2	28.5	4.1							
6324	10/18/2011	T-73	Pass	11	27+20	CL	0	13.6		3094-108	90.1	24	78	26	52	96.8			114.3	91.4	25	101.4	1	6	85	16	69	CH	2.8	97.2	25	4.6							
4074	9/30/2010	T-8	Pass	1	103+06	CL	0	5.8	T-5	2611-003	87.9	30.6	78	28	50	97.5			107.6	83.9	28.3	95.4	-2.3	6	90	26	64	CH	8.6	91.4									
4074	9/30/2010	T-9	Pass	2	154+88	FS	37	5.5		2854-40	95.9	23.9	64	24	40	97			109.7	89.2	23	93	-0.9	12	69	21	48	CH	5	95									

Note (1) This table was developed by the Tiger Team using database spreadsheets summarizing all QA tests provided by MVN Construction Quality Assurance Branch Division. Gaps in the summary spreadsheets were supplemented with information from the individual test reports provided in Appendix T.

Note (2) All densities are in pounds per cubic foot (pcf)

Table 7-13 CQC Proctor Summary

WBV14C.2 Tiger Team Investigation - QA/QC Tests Data Review - Arcement, Singh, and Wielputz				D698 Data Entry / Plotting Errors Identified	D698 Moisture Points>4%	D698 Opt. MC% Reported	D698 Opt. MC% From Graph	D698 Opt. MC% From Average Reported	D698 Opt. MC% From Average Corrected	D698 Max Dry Density pcf Reported	D698 Max Dry Density From Graph	D698 Max Dry Density From Average Reported	D698 Max Dry Density From Average Corrected	D4318 Liquid Limit	D4318 Plastic Limit	D4318 Plastic Index	D2487 Classification Correct (Y/N)	% Passing No. 200 Sieve
Sample ID	Station/Location	Depth/Elev.	Date															
2609-001A	Willow Bend - Northeast Stockpile	NA	7/16/2010	Y	N	26.2	26.4	26.4	26.1	94.5	94.9	95.1	95.5	64	23	41	N	98.2
2609-001B				Y	N	26.6	25.8			95.6	96.1							
2610-001A	Willow Bend - Northeast New Pit	NA	7/16/2010	Y	Y	25.1	26.0	25.0	25.6	94.7	94.9	94.6	94.8	53	25	28	N	97.2
2610-001B				Y	N	24.9	25.2			94.4	94.6							
2611-003A	Willow Bend - Southeast Stockpile	NA	7/16/2010	Y	N	30.7	31.3	30.6	31.2	87.9	88.7	87.9	88.9	78	28	50	N	97.5
2611-003B				Y	N	30.4	31.1			87.9	89.0							
2641-004A	Willow Bend - South End of New Pit	NA	7/27/2010	Y	N	19.3	18.6	18.8	18.7	105.3	105.6	105.3	105.4	35	22	13	Y	93.7
2641-004B				Y	N	18.7	18.7			105.2	105.2							
2653-008A	Onsite, Willow Bend	NA	8/2/2010	N	N	23.1	20.3	23.1	20.4	99.7	100.3	99.7	100.3	59	24	35	Y	96.3
2653-008B				N	N	23.2	20.5			99.7	100.3							
2762-24A	Existing Levee - Sta. 120+50	NA	8/20/2010	N	N	26.5	25.5	26.6	26.0	92.5	92.5	92.1	92.3	72	29	43	Y	97.1
2762-24B				N	N	26.7	26.5			91.7	92.0							
2854-40A	Willow Bend - Phase 2	NA	9/8/2010	N	N	23.5	24.1	23.9	23.9	95.7	96.0	95.9	96.2	64	24	40	Y	97.0
2854-40B				N	N	24.2	23.6			96.0	96.4							
3034-92A	Onsite 99+25 (Willow Bend)	NA	9/29/2010	N	N	24.5	23.9	24.8	24.3	94.7	95.1	94.8	95.4	67	24	43	Y	95.5
3034-92B				N	N	25.1	24.7			94.9	95.7							
3094-108A	Onsite 77+00 (Willow Bend)	NA	10/2/2010	N	N	24.4	23.5	24.0	23.3	90.0	90.4	90.1	90.4	78	26	52	Y	96.8
3094-108B				N	N	23.5	23.0			90.2	90.3							
3178-125A	Willow Bend - North End	2.6	10/7/2010	N	N	26.8	27.8	26.2	27.3	91.3	91.8	91.7	92.1	68	20	48	Y	98.1
3178-125B				N	N	25.6	26.8			92.1	92.4							
3179-126A	Willow Bend - North End	-4.0	10/7/2010	Y	Y	20.1	21.4	19.6	20.4	101.7	102.2	100.9	101.4	44	19	25	Y	97.1
3179-126B				N	Y	19.1	19.4			100.1	100.6							
3180-127A	Willow Bend North End (Mixture 125 &126)	2.6	10/7/2010	Y	Y	23.7	22.8	24.0	23.5	96.4	97.1	95.8	96.1	60	21	39	Y	97.8
3180-127B				Y	N	24.2	24.2			95.1	95.0							
3181-128A	Willow Bend - Middle	2.1	10/7/2010	N	N	22.3	21.9	22.5	22.6	92.9	93.0	92.8	93.5	78	23	55	Y	99.6
3181-128B				N	N	22.7	23.2			92.7	94.0							
3182-129A	Willow Bend - Middle	-5.0	10/7/2010	N	N	29.1	28.3	29.4	29.3	88.3	88.4	88.2	88.3	87	25	62	Y	99.8
3182-129B				N	N	29.7	30.2			88.0	88.1							
3183-130A	Willow Bend - Middle (Mixture 128 &129)	-5.0	10/7/2010	N	N	27.1	26.9	27.6	27.1	87.9	88.7	87.5	88.3	81	25	56	Y	99.6
3183-130B				N	Y	28.0	27.3			87.1	87.8							
3184-131A	Willow Bend - South End of New Pit	2.3	10/7/2010	N	N	20.9	20.4	21.9	21.6	94.0	94.6	93.8	94.4	71	23	48	Y	99.2
3184-131B				N	N	22.9	22.8			93.5	94.1							
3185-132A	Willow Bend - South End	-5.3	10/7/2010	N	N	29.5	28.5	28.5	28.4	89.6	90.3	90.0	90.7	74	23	51	Y	99.2
3185-132B				N	N	27.5	28.2			90.4	91.0							
3186-133A	Willow Bend - South End (Mixture 131 & 132)	-5.3	10/7/2010	N	Y	27.6	27.3	26.5	26.1	91.5	92.0	91.6	92.2	67	23	44	Y	98.9
3186-133B				N	N	25.4	24.9			91.7	92.3							
3291-184A	Willow Bend - Onsite - Sta. 169+80	NA	10/29/2010	N	N	21.8	21.0	21.9	21.1	99.5	100.6	99.5	100.7	64	22	42	Y	97.8
3291-184B				N	N	21.9	21.2			99.4	100.8							
3462-307A	WBV 14b.2 Sta. 18+00	NA	11/30/2010	N	N	28.7	28.7	28.8	28.8	89.0	89.6	89.1	89.8	65	23	42	Y	94.5
3462-307B				N	N	28.9	28.9			89.1	89.9							

Table 7-13 CQC Proctor Summary

WBV14C.2 Tiger Team Investigation - QA/QC Tests Data Review - Arcement, Singh, and Wielputz				D698 Data Entry / Plotting Errors Identified	D698 Moisture Points>4%	D698 Opt. MC% Reported	D698 Opt. MC% From Graph	D698 Opt. MC% From Average Reported	D698 Opt. MC% From Average Corrected	D698 Max Dry Density pcf Reported	D698 Max Dry Density From Graph	D698 Max Dry Density From Average Reported	D698 Max Dry Density From Average Corrected	D4318 Liquid Limit	D4318 Plastic Limit	D4318 Plastic Index	D2487 Classification Correct (Y/N)	% Passing No. 200 Sieve
Sample ID	Station/Location	Depth/Elev.	Date															
3467-308A	WBV 14b.2 Sta. 41+50	NA	12/1/2010	N	N	22.6	22.8	22.6	22.6	97.7	98.1	97.8	98.1	55	20	35	Y	91.7
3467-308B				N	N	22.6	22.3			97.8	98.1							
3550-352A	Existing Levee - Sta. 149+90	NA	12/14/2010	N	N	26.0	25.8	26.0	25.8	92.3	92.1	92.3	92.2	63	19	44	Y	95.0
3550-352B				N	N	26.0	25.8			92.2	92.2							
3555-353A	Existing Levee - Sta. 174+90	NA	12/14/2010	N	N	29.9	28.1	30.0	28.4	87.1	87.3	86.6	87.3	78	28	50	Y	94.1
3555-353B				N	N	30.0	28.6			86.1	87.2							
3616-361A	River Birch - East Pit Stockpile	NA	12/20/2010	N	N	23.4	23.8	24.0	NA	95.0	95.4	95.5	NA	54	23	31	Y	94.8
3616-361B				Y	N	24.6	NA			96.0	NA							
3649-362A	River Birch - West Pit Stockpile	NA	12/20/2010	N	N	24.5	24.6	24.1	23.8	94.5	94.3	94.8	94.8	59	23	36	Y	94.0
3649-362B				N	N	23.7	23.0			95.0	95.2							
3745-365A	WBV 14b.2 Onsite Sta. 27+49	NA	1/13/2011	Y	N	23.2	24.3	23.5	24.5	95.9	26.2	95.8	96.2	63	21	42	Y	91.9
3745-365B				Y	N	23.7	24.6			95.7	26.2							
3804-387A	River Birch - South End Stockpile B	NA	1/22/2011	N	N	30.8	28.6	31.1	29.1	85.2	86.2	85.5	86.0	84	27	57	Y	94.9
3804-387B				N	Y	31.3	29.6			85.8	85.7							
3815-388A	River Birch - Northeast Corner - Stockpile B	NA	1/22/2011	N	N	29.5	28.5	29.6	28.5	88.8	88.6	88.9	88.8	75	21	54	Y	95.4
3815-388B				N	N	29.6	28.5			88.9	89.0							
3824-389A	River Birch - Center - Pile A	NA	1/22/2011	N	N	33.7	33.3	33.7	33.3	82.7	83.6	82.9	83.7	92	31	61	Y	93.7
3824-389B				N	N	33.6	33.3			83.0	83.8							
4171-498A	Existing - Sta. 65+00	6.9	3/4/2011	N	N	22.9	22.6	22.8	23.1	96.5	96.7	96.6	97.2	60	22	38	Y	88.2
4171-498B				N	N	22.7	23.6			96.6	97.6							
4502-642A	Onsite - Sta. 142+62 (River Birch)	5.0	4/27/2011	N	N	27.8	27.8	28.2	28.2	91.6	92.3	91.6	92.3	68	23	45	Y	95.0
4502-642B				N	N	28.5	28.6			91.6	92.3							
4716-763A	Existing - Sta. 8+75	10.6	5/23/2011	N	N	34.0	32.2	34.0	32.2	79.2	79.2	79.2	79.0	90	29	61	Y	82.6
4716-763B				N	N	33.9	32.1			79.1	78.8							

Note (1) This table was developed by the Tiger Team using database spreadsheets summarizing all CQC tests provided by MVN Construction Quality Assurance Branch Division. Gaps in the summary spreadsheets were supplemented with information from the individual test reports provided in Appendix T. During the course of the investigation - at the request of the Tiger Team additional information was provided by MVN to develop this table.

Note (2) All columns labelled as "Reported" refer to the values officially reported by the CQC laboratory to MVN during construction.

Note (3) All columns labelled "From Graph" or "Corrected" are the interpretations made by the Tiger Team during the course of this investigation. These interpretations are illustrated on Figures ??? In Appendix T.

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
2653	8/2/2010	6	Pass	1	181+43	FS	6	6.3			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	120.6	95.9	25.8	100.8	**100.4**	-0.6		**-0.3**		59	24	35	CH	2.7	97.3	2.9
2657	8/2/2010	7	Pass	1	175+00	FS	15	5.7			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	116.4	92.8	25.4	97.6	**97.2**	-1.0		**-0.7**		59	24	35	CH	3.1	96.9	2.9
2690	8/6/2010	22	Fail	1	124+98.7	PS	-80	5.0		4171+497	2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	117.1	87.5	33.8	92.0	**91.6**	7.4	YES	**7.7**	YES	74	36	38	CH	3.4	96.6	3.1
2690	8/6/2010	12	Pass	1	175+05	PS	-80.5	4.8			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	117.9	94.9	24.2	99.8	**99.4**	-2.2		**-1.9**		67	27	40	CH	3.7	96.3	4.3
2690	8/6/2010	20	Pass	1	134+96.2	PS	-80.7	4.6			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	122.6	98.1	25.0	103.2	**102.7**	-1.4		**-1.1**		64	32	32	CH	3.9	96.1	5.1
2690	8/6/2010	16	Pass	1	154+92.5	PS	-77.5	4.8			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	116.9	90.1	29.7	94.7	**94.3**	3.3		**3.6**		63	29	34	CH	4.0	96.0	5.4
2690	8/6/2010	13	Pass	1	169+76.5	PS	-83.3	4.9			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	118.7	94.9	25.1	99.8	**99.4**	-1.3		**-1.0**		61	24	37	CH	8.1	91.9	4.5
2690	8/6/2010	14	Fail	1	164+82.8	PS	-83.3	5.0		4316+577	2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	119.8	98.9	21.1	104.0	**103.6**	-5.3	YES	**-5.0**	YES	61	26	35	CH	7.7	92.3	4.2
2690	8/6/2010	9	Pass	1	168+84.1	FS	13.8	5.9			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	119.9	92.8	29.2	97.6	**97.2**	2.8		**3.1**		61	25	36	CH	2.6	97.4	3.8
2690	8/6/2010	19	Pass	1	139+99.4	PS	-78.9	4.8			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	121.5	98.1	23.9	103.2	**102.7**	-2.5		**-2.2**		60	29	31	CH	2.0	98.0	6.5
2690	8/6/2010	15	Pass	1	159+93.8	PS	-77.3	4.9			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	121.8	98.7	23.4	103.8	**103.4**	-3.0		**-2.7**		59	29	30	CH	3.4	96.6	3.9
2690	8/6/2010	17	Pass	1	149+86	PS	-76.4	4.9			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	123.6	99.6	24.1	104.7	**104.3**	-2.3		**-2.0**		58	28	30	CH	2.4	97.6	3.8
2690	8/6/2010	11	Pass	1	180+73.1	PS	-86.9	5.1			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	121.9	96.4	26.4	101.4	**100.9**	0.0		**0.3**		57	25	32	CH	2.3	97.7	2.1
2690	8/6/2010	18	Pass	1	145+01	PS	-78.7	4.9			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	121.7	96.6	26.0	101.6	**101.2**	-0.4		**-0.1**		53	23	35	CH	4.4	95.6	5.0
2690	8/6/2010	21	Pass	1	129+97.3	PS	-82.5	4.9			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	122.1	96.4	26.7	101.4	**100.9**	0.3		**0.6**		53	25	28	CH	2.4	97.6	3.1
2690	8/6/2010	23	Pass	1	120+99.2	PS	-79.6	5.4			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	121.6	97.9	24.2	102.9	**102.5**	-2.2		**-1.9**		48	27	21	CH	3.0	97.0	2.9
2690	8/6/2010	10	Pass	1	161+04.7	FS	27.9	4.9			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	115.6	93.2	24.1	98.0	**97.6**	-2.3		**-2.0**		38	24	14	CL	11.8	88.2	2.5
2783	8/26/2010	26	Pass	1	151+30	FS	20	5.2			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	113.6	87.3	30.2	91.8	**91.4**	3.8		**4.1**		66	25	41	CH	2.9	97.1	3.0
2783	8/26/2010	25	Pass	1	156+60	FS	15	5.8			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	115.6	90.7	27.4	95.4	**95.0**	1.0		**1.3**		62	25	37	CH	6.2	93.8	2.9
2796	8/27/2010	27	Fail	1	145+08	FS	21	5.0		2834+32	2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	116.6	90.5	28.8	90.8	**90.2**	5.7	YES	**8.4**	YES	61	18	43	CH	3.3	96.7	2.1
2796	8/27/2010	28	Fail	1	139+03	FS	22	4.8		2868+41	2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	115.1	88.0	30.8	88.3	**87.7**	7.7	YES	**10.4**	YES	52	17	35	CH	4.2	95.8	2.4
2830	9/3/2010	30	Fail	2	119+65	PS	-2	5.7		2834+31	2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	112.2	89.0	26.1	89.3	**88.7**	3.0		**5.7**	YES	62	19	43	CH	6.3	93.7	3.5
2830	9/3/2010	29	Pass	1	119+30	PS	-4	4.6			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	112.9	87.6	28.9	92.1	**91.7**	2.5		**2.8**		57	19	38	CH	2.4	97.6	2.7
2834	9/5/2010	31	Pass	2	119+49	PS	-6.1	5.3	2830+30		2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	116.9	91.7	27.4	92.1	**91.4**	4.3		**7.0**	YES	67	22	45	CH	6.1	93.9	3.0
2834	9/5/2010	33	Fail	1	139+03	FS	22	4.8	2796-28	2868+41	2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	106.8	84.9	25.8	85.2	**84.6**	2.7		**5.4**	YES	62	23	39	CH	3.1	96.9	4.3
2834	9/5/2010	32	Pass	1	145+08	FS	21	5.0	2796+27		2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	113.5	93.6	21.2	93.9	**93.3**	-1.9		**0.8**		61	19	42	CH	3.5	96.5	3.9
2836	9/6/2010	34	Pass	1	110+76	PS	-11	5.2			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	115.9	88.3	31.3	92.8	**92.5**	4.9		**5.2**	YES	68	22	46	CH	3.3	96.7	2.6
2836	9/6/2010	35	Pass	3	119+44	FS	1	6.0			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	113.0	88.5	27.7	93.1	**92.7**	1.3		**1.6**		63	23	40	CH	4.8	95.2	2.9
2854	9/8/2010	37	Fail	4	119+36	FS	12	6.8		2928+48	2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	113.5	92.1	23.2	96.8	**96.4**	-3.2	YES	**-2.9**		65	22	43	CH	4.0	96.0	4.0
2854	9/8/2010	36	Pass	2	110+96	FS	15	5.6			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	118.1	93.4	26.5	98.2	**97.8**	0.1		**0.4**		64	25	40	CH	4.6	95.4	4.4
2854	9/8/2010	39	Fail	1	163+28	FS	21	5.6		2935+55	2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	116.3	90.5	28.5	90.8	**90.2**	5.4	YES	**8.1**	YES	59	24	35	CH	3.4	96.6	4.0
2854	9/8/2010	38	Pass	1	121+99	FS	5	5.0			2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	115.7	90.0	28.6	94.6	**94.2**	2.2		**2.5**		63	25	38	CH	3.2	96.8	4.2
2868	9/9/2010	44	Fail	1	124+97	FS	18.8	5.5		2926+50	2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	113.4	87.8	29.1	88.1	**87.5**	6.0	YES	**8.7**	YES	64	26	38	CH	4.0	96.0	3.3
2868	9/9/2010	45	Pass	2	181+43	FS	12	6.5			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	118.0	92.1	28.1	92.4	**91.8**	5.0		**7.7**	YES	64	25	39	CH	1.5	98.5	3.8
2868	9/9/2010	43	Pass	1	129+99	FS	17.6	5.5			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	117.6	93.7	25.5	94.0	**93.4**	2.4		**5.1**	YES	61	22	39	CH	5.5	94.5	3.9
2868	9/9/2010	41	Fail	1	139+03	FS	22	4.8	2868-33	2868+41	2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	110.0	89.4	23.1	89.7	**89.1**	-0.1		**2.7**		60	23	37	CH	3.6	96.4	2.3
2868	9/9/2010	46	Fail	2	175+01	FS	25.4	5.9		2942+59	2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	112.6	87.8	28.3	88.1	**87.5**	5.2	YES	**7.9**	YES	60	24	36	CH	2.7	97.3	3.2
2868	9/9/2010	42	Pass	1	135+05	FS	16.4	5.6			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	119.0	95.0	25.2	95.3	**94.7**	2.1		**4.8**		57	22	35	CH	4.3	95.7	2.4
2926	9/15/2010	51	Pass	5	119+33	CL	-3.7	7.8			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	115.4	91.0	26.8	94.9	**94.6**	2.9		**2.9**		69	24	45	CH	3.2	96.8	4.5
2926	9/15/2010	50	Pass	1	124+97	FS	18.8	5.5	2868+44		2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	115.5	92.5	24.8	92.8	**92.2**	1.7		**4.4**		64	22	42	CH	3.2	96.8	4.4
2926	9/15/2010	52	Fail	2	175+01	FS	25.4	5.9	2868-46	2942+59	2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	112.8	86.4	30.5	90.1	**89.8**	6.6	YES	**6.6**	YES	63	24	39	CH	2.9	97.1	3.8
2928	9/14/2010	48	Pass	4	119+36	FS	12	6.8	2854+37		2609	95.1	26.4	**95.5**	**26.1**	64	23	41	98.2	115.0	92.3	24.6	97.1	**96.6**	-1.8		**-1.5**		68	23	45	CH	7.6	92.4	3.2
2928	9/14/2010	49	Pass	3	110+68	FS	1	6.9			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	117.8	95.2	23.7	99.3	**99.0**	-0.2		**-0.2**		64	22	42	CH	4.1	95.9	5.1
2928	9/14/2010	47	Pass	1	139+03	FS	22	4.8	2868+41		2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	119.1	96.6	23.3	96.9	**96.3**	0.2		**2.9**		61	24	37	CH	3.2	96.8	2.9
2935	9/16/2010	54	Fail	6	119+13	CL	2.5	8.3		2942+61	2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	107.0	82.9	29.7	86.0	**86.2**	5.8	YES	**5.8**	YES	73	27	46	CH	2.5	97.5	5.3
2935	9/16/2010	55	Pass	1	163+28	FS	21	5.9	2854+39		2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	117.4	91.6	28.1	91.9	**91.3**	5.0		**7.7**	YES	64	24	40	CH	4.5	95.5	4.2
2935	9/16/2010	56	Fail	2	175+01	FS	25.4	5.9	2926-52	2942+59	2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	116.5	89.1	30.8	92.9	**92.6**	6.9	YES	**6.9**	YES	63	25	38	CH	2.9	97.1	3.8
2935	9/16/2010	53	Pass	4	110+91	FS	23.5	6.8			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	110.1	89.6	22.9	93.4	**93.1**	-1.0		**-1.0**		61	21	40	CH	3.5	96.5	4.1
2942	9/17/2010	58	Pass	5	110+81	CL	-3.2	8.2			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	116.3	93.8	24.0	97.8	**97.5**	0.1		**0.1**		65	18	47	CH	3.4	96.6	4.0
2942	9/17/2010	59	Pass	2	175+01	FS	25.4	5.7	2935+56		2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	115.9	90.0	28.8	93.8	**93.6**	4.9		**4.9**		64	21	44	CH	3.2	96.8	5.5
2942	9/17/2010	60	Pass	2	170+03	FS	28.6	5.8			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	116.1	90.6	28.1	94.5	**94.2**	4.2		**4.2**		63	21	42	CH	2.6	97.4	4.7
2942	9/17/2010	61	Pass	6	119+13	CL	2.5	8.3	2942+54		2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	114.9	92.9	23.7	96.9	**96.6**	-0.2		**-0.2**		58	20	38	CH	4.4	95.6	3.7
2942	9/17/2010	62	Pass	7	119+59	PS	-8.2	10.9			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	114.3	89.4	27.9	93.1	**92.9**	4.0		**4.0**		50	27	23	CH	3.7	96.3	4.1
2968	9/18/2010	65	Pass	1	119+84	PS	-126	2.6			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	118.1	92.1	28.2	96.0	**95.7**	4.3		**4.3**		74	21	53	CH	7.9	92.1	4.1
2968	9/18/2010	64	Pass	8	119+26	CL	2.9	12.2			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	113.2	90.9	24.6	94.8	**94.5**	0.7		**0.7**		68	20	48	CH	3.2	96.8	3.8
2968	9/18/2010	63	Pass	6	110+75	FS	8.4	9.2			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	107.2	87.3	22.8	90.9	**90.7**	-1.1		**-1.1**		64	17	47	CH	5.8	94.2	3.6
2970	9/20/2010	67	Pass	2	119+42	PS	-104	3.7			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	108.9	87.6	24.3	91.3	**91.1**	0.4		**0.4**		69	23	46	CH	4.3	95.7	3.8
2970	9/20/2010	70	Pass	7	110+84	PS	-6	9.8			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	112.7	90.4	24.7	94.3	**94.0**	0.8		**0.8**		68	25	43	CH	4.7	95.3	3.4
2970	9/20/2010	68	Pass	2	120+97	FS	20.5	5.6			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	122.9	97.9	25.6	102.1	**101.8**	1.7		**1.7**		66	23	43	CH	4.3	95.7	3.5
2970	9/20/2010	66	Pass	9	119+47	CL	3.7	13.5			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	109.9	90.8	21.0	94.7	**94.4**	-2.9		**-2.9**		65	22	43	CH	3.4	96.6	3.7
2987	9/22/2010	73	Pass	3	119+92	FS	133.9	3.4			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	118.8	94.2	26.1	98.2	**97.9**	2.2		**2.2**		73	25	48	CH	6.4	93.6	4.1
2987	9/22/2010	77	Pass	2	129+99	FS	28	5.2			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	121.7	95.2	27.8	99.3	**99.0**	3.9		**3.9**		68	24	44	CH	4.5	95.5	3.1
2987	9/22/2010	76	Pass	2	125+02	FS	43	4.6			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	117.5	93.3	26.0	97.3	**97.0**	2.1		**2.1**		65	22	43	CH	5.3	94.7	4.5
2987	9/22/2010	75	Pass	11	119+20	CL	1.7	14.0			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	116.7	94.9	23.0	99.0	**98.6**	-0.9		**-0.9**		65	21	44	CH	4.9	95.1	3.5
2987	9/22/2010	72	Pass	10	119+60	CL	3.2	13.2			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	121.4	98.1	23.7	102.3	**102.0**	-0.2		**-0.2**		64	21	43	CH	11.8	88.2	3.9
2987	9/22/2010	74	Pass	9	110+91	CL	1.4	12.1			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	111.4	90.6	22.9	94.5	**94.2**	-1.0		**-1.0**		64	21	43	CH	7.2	92.8	3.3
2987	9/22/2010	78	Pass	10	110+95	CL	4.5	13.0			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	116.1	96.0	21.0	100.1	**99.8**	-2.9		**-2.9**		64	20	44	CH	4.3	95.7	3.1
2987	9/22/2010	71	Pass	8	111+17	FS	14	10.4			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	113.6	90.5	25.5	94.4	**94.1**	1.6		**1.6**		62	21	41	CH	6.3	93.7	3.4
3002	9/23/2010	81	Fail	1	103+06	CL	2.5	5.8		3094+106	2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	104.1	80.9	28.7	84.4	**84.1**	4.8		**4.8**		89	26	63	CH	2.9	97.1	4.3
3002	9/23/2010	80	Fail	1	107+05	FS	8.8	5.0		3028+87	2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	113.0	86.5	30.6	90.2	**89.9**	6.7	YES	**6.7**	YES	84	28	56	CH	8.1	91.9	3.9
3002	9/23/2010	86	Fail	1	107+05	FS	8.8	5.0	3002-80	3028+87	2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	112.6	87.0	29.4	90.7	**90.4**	5.5	YES	**5.5**	YES	82	27	55	CH	2.8	97.2	3.9
3002	9/23/2010	82	Pass	2	135+97	FS	22	5.3			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	118.2	94.1	25.6	98.1	**97.8**	1.7		**1.7**		80	24	56	CH	3.0	97.0	4.0
3002	9/23/2010	83	Pass	2	140+02	FS	26.5	4.7			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	110.3	90.6	21.7	94.5	**94.2**	-2.2		**-2.2**		64	16	48	CH	2.9	97.1	3.1

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
3002	9/23/2010	85	Pass	12	110+93	FS	4.6	14.0			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	117.9	96.2	22.5	100.3	**100.0**	-1.4		**-1.4**		63	22	41	CH	3.9	96.1	3.0
3002	9/23/2010	79	Pass	11	110+56	CL	0	3.6			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	116.1	95.5	21.6	99.6	**99.3**	-2.3		**-2.3**		63	23	40	CH	2.1	97.9	3.1
3002	9/23/2010	84	Pass	3	110+94	FS	89	4.9			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	107.5	87.5	22.9	91.2	**91.0**	-1.0		**-1.0**		62	23	39	CH	3.6	96.4	3.1
3028	9/28/2010	90	Pass	2	149+98	FS	31.9	4.9			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	118.2	92.9	27.3	96.9	**96.6**	3.4		**3.4**		75	25	50	CH	3.6	96.4	4.2
3028	9/28/2010	87	Pass	1	107+05	FS	8.8	5.0	3002+86		2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	114.4	91.4	25.2	95.3	**95.0**	1.3		**1.3**		69	23	46	CH	5.4	94.6	4.3
3028	9/28/2010	89	Pass	1	143+97	FS	8.3	5.4			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	119.0	93.0	28.0	97.0	**96.7**	4.1		**4.1**		65	24	41	CH	2.6	97.4	3.4
3028	9/28/2010	88	Pass	1	97+57	FS	14	4.6			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	115.1	95.0	21.1	99.1	**98.8**	-2.8		**-2.8**		60	21	39	CH	4.7	95.3	3.5
3034	9/29/2010	95	Pass	1	128+03	FS	76.8	4.3			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	118.8	92.8	28.0	96.8	**96.5**	4.1		**4.1**		76	31	45	CH	4.2	95.8	4.9
3034	9/29/2010	94	Pass	1	126+23	FS	78	4.1			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	117.6	95.2	23.5	99.3	**99.0**	-0.4		**-0.4**		70	26	44	CH	2.9	97.1	4.0
3034	9/29/2010	93	Pass	1	121+92	FS	78	4.7			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	114.1	93.7	21.8	97.7	**97.4**	-2.1		**-2.1**		68	24	44	CH	4.3	95.7	4.0
3059	9/30/2010	97	Fail	1	103+06	CL	2.5	5.8	3002-81	3094+106	2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	108.4	84.4	28.4	88.0	**87.7**	4.5		**4.5**		86	29	57	CH	4.2	95.8	5.0
3059	9/30/2010	98	Pass	2	154+88	FS	37	5.5			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	112.3	91.5	22.7	95.4	**95.1**	-1.2		**-1.2**		63	24	39	CH	4.7	95.3	4.0
3059	9/30/2010	96	Pass	1	93+17	FS	15.6	4.5			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	117.0	96.1	21.8	100.2	**99.9**	-2.1		**-2.1**		61	23	38	CH	3.5	96.5	3.5
3066	10/1/2010	100	Pass	3	121+99	FS	42.5	6.7			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	117.3	93.5	25.4	97.5	**97.2**	1.5		**1.5**		70	25	45	CH	4.3	95.7	3.6
3094	10/2/2010	106	Pass	1	103+06	CL	2.5	5.8	3002+81		2611	87.9	30.6	**88.9**	**31.2**	78	28	50	97.5	109.3	82.1	33.1	93.4	**92.4**	2.5		**1.9**		91	31	60	CH	4.4	95.6	4.9
3094	10/2/2010	102	Pass	2	128+00	FS	63	5.3			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	111.1	88.8	25.1	92.6	**92.3**	1.2		**1.2**		68	23	45	CH	3.7	96.3	3.2
3094	10/2/2010	104	Pass	1	133+05	FS	70	4.2			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	109.9	87.5	25.6	91.2	**91.0**	1.7		**1.7**		66	24	42	CH	3.2	96.8	3.3
3094	10/2/2010	107	Pass	1	88+02	FS	36	3.1			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	120.9	97.7	23.7	101.9	**101.6**	-0.2		**-0.2**		65	22	43	CH	3.4	96.6	3.4
3094	10/2/2010	103	Pass	2	131+00	FS	68	5.0			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	113.3	92.4	22.6	96.4	**96.0**	-1.3		**-1.3**		64	21	43	CH	3.6	96.4	3.3
3095	10/3/2010	109	Pass	1	110+93	PS	-160	0.1			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	115.3	91.4	26.2	95.3	**95.0**	2.3		**2.3**		77	24	53	CH	4.3	95.7	3.4
3095	10/3/2010	110	Pass	2	110+37	PS	-147	1.6			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	113.9	91.3	24.7	95.2	**94.9**	0.8		**0.8**		67	23	44	CH	4.0	96.0	3.5
3097	10/4/2010	113	Pass	1	82+58	FS	35.5	3.2			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	118.0	91.8	28.6	95.7	**95.4**	4.7		**4.7**		67	28	39	CH	3.1	96.9	3.6
3097	10/4/2010	112	Pass	3	110+69	PS	-155	1.9			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	110.9	89.6	23.8	93.4	**93.1**	-0.1		**-0.1**		66	23	43	CH	5.3	94.7	3.3
3097	10/4/2010	114	Pass	4	110+50	PS	-130	3.3			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	117.6	95.1	23.6	99.2	**98.9**	-0.3		**-0.3**		65	23	42	CH	4.2	95.8	3.1
3131	10/7/2010	122	Pass	2	96+00	FS	18	5.1			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	119.3	93.3	27.8	97.3	**97.0**	3.9		**3.9**		71	24	47	CH	3.3	96.7	4.0
3131	10/7/2010	121	Pass	2	105+96	FS	37	4.1			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	117.0	92.5	26.5	96.5	**96.2**	2.6		**2.6**		68	25	43	CH	4.6	95.4	3.4
3177	10/13/2010	134	Pass	1	77+94	FS	22	4.4			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	115.8	90.0	28.6	93.8	**93.6**	4.7		**4.7**		79	27	52	CH	3.7	96.3	3.7
3177	10/13/2010	135	Pass	1	72+98	FS	21	4.5			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	115.6	93.7	23.4	97.7	**97.4**	-0.5		**-0.5**		66	22	44	CH	4.1	95.9	3.4
3177	10/13/2010	137	Pass	1	63+00	FS	22	4.2			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	121.5	96.7	25.7	100.8	**100.5**	1.8		**1.8**		66	23	43	CH	4.1	95.9	4.3
3177	10/13/2010	136	Pass	1	67+92	FS	46	3.0			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	106.4	86.4	23.1	90.1	**89.8**	-0.8		**-0.8**		63	21	42	CH	6.7	93.3	4.1
3183	10/14/2010	138	Pass	2	159+45	FS	54	4.5			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	119.6	93.7	27.6	97.7	**97.4**	3.7		**3.7**		68	25	43	CH	4.7	95.3	3.7
3200	10/16/2010	150	Pass	2	164+53	FS	46	4.5			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	112.9	88.3	27.8	92.1	**91.8**	3.9		**3.9**		85	28	57	CH	2.3	97.7	3.9
3200	10/16/2010	149	Pass	1	42+43	FS	18	4.5			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	112.1	87.1	28.7	90.8	**90.5**	4.8		**4.8**		71	25	46	CH	1.5	98.5	2.8
3200	10/16/2010	146	Pass	1	55+69	FS	57	4.0			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	119.1	94.9	25.5	99.0	**98.6**	1.6		**1.6**		66	23	43	CH	7.0	93.0	2.9
3200	10/16/2010	148	Pass	1	48+62	FS	14	4.1			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	115.3	90.6	27.2	94.5	**94.2**	3.3		**3.3**		62	23	39	CH	4.1	95.9	2.7
3200	10/16/2010	147	Pass	1	52+23	FS	4	5.1			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	118.3	95.1	24.4	99.2	**98.9**	0.5		**0.5**		54	21	33	CH	5.1	94.9	2.2
3202	10/17/2010	153	Pass	1	38+02	FS	8	4.6			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	111.2	87.8	26.7	91.6	**91.3**	2.8		**2.8**		73	25	48	CH	3.1	96.9	4.2
3202	10/17/2010	154	Pass	1	32+16	FS	10	4.3			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	110.6	87.7	26.1	91.4	**91.2**	2.2		**2.2**		73	24	49	CH	2.4	97.6	4.0
3218	10/19/2010	161	Pass	1	28+07	FS	34	4.1			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	112.7	89.4	26.0	93.2	**92.9**	2.1		**2.1**		68	23	45	CH	2.5	97.5	3.2
3218	10/19/2010	158	Pass	2	77+07	FS	16.8	5.6			3094	90.1	24.0	**90.4**	**23.3**	78	26	52	96.8	104.5	81.9	27.6	90.9	**90.6**	3.6		**4.3**		74	24	50	CH	2.3	97.7	3.7
3218	10/19/2010	159	Pass	2	71+99	FS	36	4.8			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	115.9	95.5	21.4	99.6	**99.3**	-2.5		**-2.5**		52	20	32	CH	4.2	95.8	2.1
3218	10/19/2010	160	Pass	2	81+04	FS	25	5.0			3094	90.1	24.0	**90.4**	**23.3**	78	26	52	96.8	105.3	84.4	24.7	93.7	**93.4**	0.7		**1.4**		60	22	38	CH	6.5	93.5	3.0
3236	10/21/2010	165	Pass	1	17+89	FS	22	4.0			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	114.7	89.3	28.5	93.1	**92.8**	4.6		**4.6**		78	28	50	CH	3.4	96.6	5.8
3236	10/21/2010	164	Pass	1	22+54	FS	30	3.0			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	119.4	99.4	20.1	99.7	**99.1**	-3.0		**-0.3**		58	22	36	CH	4.6	95.4	4.9
3266	10/26/2010	170	Pass	1	169+78	FS	82	4.5			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	119.6	97.3	22.9	96.4	**96.0**	3.3		**2.5**		68	23	45	CH	6.2	93.8	3.3
3266	10/26/2010	169	Pass	1	174+35	FS	65	4.2			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	117.5	99.0	18.7	98.1	**97.6**	-0.9		**-1.7**		62	21	41	CH	3.7	96.3	2.8
3266	10/26/2010	173	Pass	2	86+05	FS	24	5.1			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	121.0	98.9	22.4	98.0	**97.5**	2.8		**2.0**		61	25	36	CH	6.1	93.9	3.5
3266	10/26/2010	168	Pass	1	179+04	FS	67	3.8			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	118.3	97.0	21.9	96.1	**95.7**	2.3		**1.5**		59	22	37	CH	4.0	96.0	3.2
3266	10/26/2010	174	Pass	2	66+64	FS	26	4.9			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	115.9	96.2	20.5	95.3	**94.9**	0.9		**0.1**		56	22	34	CH	7.1	92.9	2.6
3266	10/26/2010	175	Pass	2	61+98	FS	14	5.5			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	118.5	96.5	22.8	95.6	**95.2**	3.2		**2.4**		56	22	34	CH	4.0	96.0	2.8
3266	10/26/2010	172	Pass	2	91+01	FS	28	4.4			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	112.5	85.1	32.2	97.3	**96.4**	4.6		**5.1**	YES	85	30	55	CH	4.3	95.7	4.0
3266	10/26/2010	171	Pass	2	101+97	FS	26	4.7			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	115.7	92.3	25.3	96.2	**95.9**	1.4		**1.4**		64	23	41	CH	3.4	96.6	2.9
3284	10/28/2010	183	Pass	1	12+45	FS	9	4.9			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	117.6	93.9	25.3	98.0	**97.7**	1.3		**1.8**		75	27	48	CH	4.8	95.2	3.0
3284	10/28/2010	179	Pass	1	51+37	PS	-92	2.5			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	125.7	103.5	21.4	102.6	**102.1**	1.8		**1.0**		55	20	35	CH	7.2	92.8	2.4
3284	10/28/2010	181	Pass	1	41+60	PS	-90	2.0			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	123.8	101.1	22.5	100.2	**99.7**	2.9		**2.1**		52	21	31	CH	6.2	93.8	2.7
3284	10/28/2010	182	Pass	1	7+41	FS	9	5.4			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	116.8	90.8	28.6	94.8	**94.5**	4.6		**5.1**	YES	59	25	34	CH	4.9	95.1	3.4
3284	10/28/2010	180	Pass	1	46+43	PS	-93	1.8			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	117.3	93.5	25.5	97.6	**97.3**	1.5		**2.0**		57	25	32	CH	5.0	95.0	2.9
3291	10/29/2010	185	Pass	2	180+00	FS	69	4.7			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	110.6	88.6	24.8	92.5	**92.2**	0.8		**1.3**		59	21	38	CH	4.2	95.8	3.0
3297	10/30/2010	186	Pass	1	3+41	FS	17	4.4			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	122.7	98.9	24.1	98.0	**97.5**	4.5		**3.7**		59	21	38	CH	3.9	96.1	2.6
3297	10/30/2010	188	Pass	1	161+00	FS	66	4.4			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	120.7	98.9	22.1	98.0	**97.5**	2.5		**1.7**		56	19	37	CH	5.1	94.9	2.3
3297	10/30/2010	187	Pass	1	160+00	FS	45	5.0			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	125.1	104.3	20.0	103.4	**102.9**	0.4		**-0.4**		55	17	38	CH	4.4	95.6	3.0
3297	10/30/2010	195	Pass	2	26+76	FS	26	4.6			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	117.8	96.8	21.7	95.9	**95.5**	2.1		**1.3**		54	19	35	CH	4.4	95.6	2.8
3297	10/30/2010	191	Fail	2	47+92	FS	26	4.5		3827+384	3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	116.2	87.2	33.3	95.1	**94.7**	7.1	YES	**6.0**	YES	77	29	48	CH	2.8	97.2	3.9
3297	10/30/2010	192	Pass	2	42+93	FS	25	5.2			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	116.6	92.7	25.8	96.8	**96.5**	1.8		**2.3**		62	23	39	CH	3.5	96.5	3.2
3297	10/30/2010	189	Pass	2	58+34	FS	60	4.7			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	118.0	94.2	25.2	98.3	**98.0**	1.2		**1.7**		61	22	39	CH	9.1	90.9	3.3
3297	10/30/2010	190	Pass	2	51+92	FS	27	4.1			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	115.0	92.6	24.2	96.7	**96.4**	0.2		**0.7**		60	22	38	CH	4.3	95.7	3.3
3297	10/30/2010	194	Pass	2	34+01	FS	20	4.8			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	115.6	90.9	27.2	94.9	**94.6**	3.2		**3.7**		58	23	35	CH	4.3	95.7	3.3
3297	10/30/2010	193	Pass	2	35+96	FS	11.1	5.0			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	119.7	95.8	25.0	100.0	**99.7**	1.0		**1.5**		55	22	33	CH	5.4	94.6	2.6
3297	10/30/2010	196	Pass	2	24+02	FS	30	4.8			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	117.5	93.0	26.4	97.1	**96.8**	2.4		**2.9**		54	24	30	CH	4.6	95.4	3.2
3299	10/31/2010	210	Pass	2	17+95	FS	19	5.2			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	112.0	87.4	28.2	91.2	**90.9**	4.2		**4.7**		80	30	50	CH	2.5	97.5	4.4
3299	10/31/2010	206	Pass	2	165+02	FS	92	4.1			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	115.4	90.1	28.1	94.1	**93.8**	4.1		**4.6**		66	23	43	CH	2.8	97.2	3.2
3299	10/31/2010	207	Pass	2	13+00	FS	24	4.9			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	112.6	89.4	25.9	93.3	**93.0**	1.9		**2.4**		61	21	40	CH	4.3	95.7	2.8
3299	10/31/2010	208	Pass	2	7+98	FS	22	4.9			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	113.9	90.0	26.6	93.9	**93.7**	2.6		**3.1**		60	22	38	CH	4.6	95.4	3.2

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
3299	10/31/2010	205	Pass	2	161+05	FS	94	4.1			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	115.1	91.5	25.8	95.5	**95.2**	1.8		**2.3**		60	20	40	CH	4.4	95.6	2.9
3299	10/31/2010	209	Pass	2	3+00	FS	24	4.8			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	115.7	93.5	23.8	97.6	**97.3**	-0.2		**0.3**		59	20	39	CH	6.8	93.2	2.6
3299	10/31/2010	204	Pass	2	166+13	FS	83	4.8			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	115.9	92.6	25.2	96.7	**96.4**	1.2		**1.7**		54	25	29	CH	3.5	96.5	2.5
3299	10/31/2010	203	Pass	2	173+01	FS	100	4.2			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	109.5	85.1	28.7	92.8	**92.4**	2.5		**1.4**		61	22	39	CH	4.3	95.7	3.0
3301	11/1/2010	212	Pass	1	108+99	FS	82	4.1			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	120.8	97.7	23.6	96.8	**96.4**	4.0		**3.2**		53	20	33	CH	4.9	95.1	2.6
3301	11/1/2010	214	Pass	1	98+86	FS	82	3.7			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	118.8	93.5	27.1	97.6	**97.3**	3.1		**3.6**		64	24	40	CH	4.0	96.0	4.8
3301	11/1/2010	215	Pass	1	93+99	FS	75	4.0			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	117.2	91.3	28.3	95.3	**95.0**	4.3		**4.8**		60	24	36	CH	4.0	96.0	3.1
3301	11/1/2010	216	Pass	1	153+09	FS	80	4.7			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	119.0	94.4	26.1	98.5	**98.2**	2.1		**2.6**		56	21	35	CH	4.8	95.2	2.8
3301	11/1/2010	213	Pass	1	103+92	FS	89	3.5			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	120.9	96.3	25.6	100.5	**100.2**	1.6		**2.1**		55	22	33	CH	4.8	95.2	3.2
3354	11/6/2010	217	Pass	2	124+84	FS	91	4.3			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	108.1	85.1	27.0	92.9	**92.3**	0.5		**0.9**		66	24	42	CH	7.5	92.5	4.3
3354	11/6/2010	218	Pass	1	86+96	FS	83	4.1			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	113.6	90.0	26.2	90.3	**89.7**	3.1		**5.8**	YES	52	21	31	CH	4.5	95.5	3.1
3354	11/6/2010	219	Pass	1	82+10	FS	77	4.3			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	116.5	89.5	30.1	97.7	**97.1**	3.6		**4.0**		58	25	33	CH	3.9	96.1	3.4
3356	11/7/2010	222	Pass	1	67+99	FS	72	4.3			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	116.4	90.6	28.5	94.6	**94.3**	4.5		**5.0**		66	25	41	CH	2.8	97.2	3.8
3356	11/7/2010	221	Pass	1	74+05	FS	67	4.8			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	112.1	88.6	26.5	92.5	**92.2**	2.5		**3.0**		58	24	34	CH	5.2	94.8	3.0
3356	11/7/2010	224	Pass	1	58+90	FS	85	4.4			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	117.7	94.7	24.3	98.9	**98.5**	0.3		**0.8**		58	22	36	CH	5.2	94.8	3.3
3356	11/7/2010	223	Pass	1	62+95	FS	53	5.0			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	120.3	94.9	26.8	99.1	**98.8**	2.8		**3.3**		57	22	35	CH	5.3	94.7	2.8
3356	11/7/2010	220	Pass	1	75+98	FS	77	4.6			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	116.0	93.2	24.4	97.3	**97.0**	0.4		**0.9**		54	22	32	CH	4.5	95.5	2.8
3356	11/7/2010	226	Pass	3	180+58	FS	69	6.1			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	117.3	93.6	25.3	97.7	**97.4**	1.3		**1.8**		53	21	32	CH	4.4	95.6	2.7
3356	11/7/2010	225	Pass	3	178+39	FS	74	6.2			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	110.5	87.9	25.7	91.8	**91.5**	1.7		**2.2**		52	22	30	CH	4.0	96.0	3.2
3363	11/9/2010	227	Pass	2	107+60	FS	91	5.2			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	112.1	88.3	26.9	92.2	**91.9**	2.9		**3.4**		67	24	43	CH	4.2	95.8	3.0
3363	11/9/2010	230	Pass	1	147+88	FS	88	3.8			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	118.1	94.4	25.1	98.5	**98.2**	1.1		**1.6**		64	21	43	CH	4.6	95.4	3.4
3363	11/9/2010	229	Pass	3	175+72	FS	56	6.6			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	115.2	90.1	27.9	94.1	**93.8**	3.9		**4.4**		61	24	37	CH	3.8	96.2	3.2
3363	11/9/2010	228	Pass	2	101+91	FS	96	4.8			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	119.5	93.8	27.4	97.9	**97.6**	3.4		**3.9**		52	23	29	CH	4.5	95.5	2.6
3371	11/10/2010	233	Pass	1	143+72	FS	101	3.4			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	118.8	92.3	28.7	96.3	**96.0**	4.7		**5.2**	YES	65	23	42	CH	4.7	95.3	3.4
3371	11/10/2010	231	Pass	2	96+83	FS	64	5.5			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	117.9	93.1	26.6	97.2	**96.9**	2.6		**3.1**		58	21	37	CH	4.7	95.3	3.3
3371	11/10/2010	234	Pass	1	137+67	FS	84	4.7			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	118.6	91.4	29.7	99.7	**99.2**	3.5		**2.4**		62	20	42	CH	3.6	96.4	3.2
3371	11/10/2010	232	Pass	2	92+31	FS	53	6.0			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	115.7	87.8	31.8	99.5	**99.4**	2.4		**2.5**		74	28	46	CH	6.3	93.7	3.7
3379	11/11/2010	237	Pass	3	172+24	FS	63	6.3			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	118.8	91.6	29.7	99.9	**99.5**	3.5		**2.4**		75	26	49	CH	6.2	93.8	2.0
3379	11/11/2010	238	Pass	3	169+75	FS	55	6.2			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	117.8	89.8	31.2	97.9	**97.5**	5.0		**3.9**		71	24	47	CH	4.7	95.3	2.0
3379	11/11/2010	243	Pass	3	63+50	FS	42	5.9			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	116.0	91.0	27.5	99.2	**98.8**	1.3		**0.2**		68	21	47	CH	8.3	91.7	4.8
3379	11/11/2010	240	Pass	3	164+71	FS	76	5.3			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	118.4	93.2	27.1	97.3	**97.0**	3.1		**3.6**		60	21	39	CH	6.1	93.9	1.8
3379	11/11/2010	244	Pass	3	61+12	FS	85	5.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	118.9	91.5	30.0	99.8	**99.3**	3.8		**2.7**		66	26	40	CH	7.8	92.2	3.3
3379	11/11/2010	239	Pass	3	167+25	FS	51	6.2			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	119.2	91.0	31.0	99.2	**98.8**	4.8		**3.7**		65	23	42	CH	7.4	92.6	2.6
3379	11/11/2010	241	Pass	3	68+46	FS	86	4.8			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	115.8	87.2	32.8	96.9	**96.1**	4.3		**4.4**		70	26	44	CH	11.3	88.7	3.3
3379	11/11/2010	242	Pass	3	66+06	FS	55	5.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	116.7	89.8	30.0	97.9	**97.5**	3.8		**2.7**		64	23	41	CH	3.2	96.8	3.5
3384	11/12/2010	248	Fail	3	158+50	FS	71	5.5		4019+440	3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	113.5	84.6	34.2	92.3	**91.9**	8.0	YES	**6.9**	YES	73	26	47	CH	5.9	94.1	3.9
3384	11/12/2010	245	Fail	4	181+02	CL	0	9.1		3391+263	3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	113.1	83.9	34.8	91.5	**91.1**	8.6	YES	**7.5**	YES	73	27	46	CH	2.5	97.5	4.4
3384	11/12/2010	251	Pass	4	175+12	PS	-10	8.7			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	116.8	92.6	26.2	96.7	**96.4**	2.2		**2.7**		64	24	40	CH	3.9	96.1	3.6
3384	11/12/2010	249	Pass	2	85+43	FS	62	6.1			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	116.2	87.4	32.9	97.1	**96.4**	4.4		**4.5**		76	26	50	CH	2.8	97.2	3.8
3384	11/12/2010	250	Pass	2	84+02	FS	50	6.1			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	120.5	96.0	25.5	100.2	**99.9**	1.5		**2.0**		62	23	39	CH	4.2	95.8	3.7
3384	11/12/2010	246	Pass	3	162+97	FS	77	5.3			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	118.2	93.9	25.9	98.0	**97.7**	1.9		**2.4**		60	25	35	CH	4.0	96.0	3.0
3384	11/12/2010	254	Pass	2	71+99	FS	71	5.8			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	118.1	93.7	26.1	97.8	**97.5**	2.1		**2.6**		58	21	37	CH	3.4	96.6	3.0
3384	11/12/2010	252	Pass	4	169+06	CL	0	8.4			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	113.0	88.1	28.3	92.0	**91.7**	4.3		**4.8**		56	25	31	CH	6.7	93.3	2.9
3384	11/12/2010	253	Pass	4	164+04	CL	0	8.2			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	117.9	92.7	27.2	96.8	**96.5**	3.2		**3.7**		54	21	33	CH	6.5	93.5	2.4
3384	11/12/2010	247	Pass	3	160+16	FS	81	5.2			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	115.4	88.0	31.2	96.0	**95.5**	5.0		**3.9**		57	22	35	CH	14.0	86.0	2.9
3384	11/12/2010	255	Pass	2	78+03	FS	61	5.1			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	113.9	90.0	26.6	98.1	**97.7**	0.4		**-0.7**		52	20	32	CH	4.7	95.3	2.7
3388	11/13/2010	256	Pass	3	108+70	FS	70	5.7			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	121.9	94.6	28.8	98.7	**98.4**	4.8		**5.3**	YES	66	24	42	CH	5.0	95.0	5.4
3388	11/13/2010	257	Pass	3	106+28	FS	50	6.4			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	116.6	91.8	27.0	95.8	**95.5**	3.0		**3.5**		64	24	40	CH	5.6	94.4	3.1
3388	11/13/2010	261	Pass	3	95+48	CL	0	7.2			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	114.0	90.7	25.7	98.9	**98.5**	-0.5		**-1.6**		70	21	49	CH	5.4	94.6	2.7
3388	11/13/2010	260	Fail	3	98+48	CL	2	7.2		3433+292	3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	112.5	83.1	35.4	86.7	**86.5**	11.4	YES	**11.9**	YES	56	29	27	CH	2.4	97.6	3.9
3388	11/13/2010	258	Pass	3	103+72	CL	0	7.1			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	116.4	89.6	29.9	97.7	**97.3**	3.7		**2.6**		55	22	33	CH	4.0	96.0	3.4
3388	11/13/2010	259	Pass	3	101+06	CL	0	7.3			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	120.8	95.9	26.0	100.1	**99.8**	2.0		**2.5**		42	25	17	CH	6.9	93.1	2.7
3391	11/14/2010	268	PASS	3	81+25	CL	0	7.4			3184	93.8	21.9	**94.4**	**21.6**	71	23	48	99.2	121.6	96.0	26.7	102.3	**101.7**	4.8		**5.1**	YES	76	30	46	CH	4.6	95.4	2.6
3391	11/14/2010	263	Pass	4	181+02	CL	0	5.6	3384+245		3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	119.0	93.5	27.3	97.6	**97.3**	3.3		**3.8**		65	24	41	CH	4.3	95.7	2.7
3391	11/14/2010	265	Pass	3	89+13	CL	0	7.4			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	107.8	85.2	26.6	92.9	**92.5**	0.4		**-0.7**		72	25	47	CH	2.9	97.1	2.9
3391	11/14/2010	264	PASS	3	91+92	CL	0	7.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	116.6	89.3	30.6	97.4	**97.0**	4.4		**3.3**		71	25	46	CH	4.5	95.5	2.5
3391	11/14/2010	269	PASS	4	122+96	CL	0	8.4			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	107.1	82.4	29.9	91.6	**90.8**	1.4		**1.5**		77	26	51	CH	3.3	96.7	2.6
3391	11/14/2010	267	Fail	3	82+90	CL	0	7.2		3485+311	3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	109.4	84.8	29.0	88.5	**88.2**	5.0		**5.5**	YES	61	24	37	CH	3.6	96.4	1.9
3391	11/14/2010	266	Pass	3	87+49	CL	0	7.4			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	115.8	91.0	27.2	95.0	**94.7**	3.2		**3.7**		61	24	37	CH	3.2	96.8	1.7
3391	11/14/2010	271	Fail	3	126+51	CL	0	8.4		3492+316	3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	117.8	90.6	30.0	94.6	**94.3**	6.0	YES	**6.5**	YES	60	24	36	CH	4.5	95.5	1.6
3391	11/14/2010	270	PASS	3	124+50	PS	-13	8.0			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	112.2	88.0	27.5	91.9	**91.6**	3.5		**4.0**		56	24	32	CH	5.4	94.6	1.7
3391	11/14/2010	262	PASS	3	94+00	CL	0	7.4			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	117.8	91.1	29.3	99.3	**98.9**	3.1		**2.0**		56	22	34	CH	5.4	94.6	1.9
3423	11/19/2010	276	Pass	3	137+52	CL	0	8.2			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	116.1	90.2	28.7	94.2	**93.9**	4.7		**5.2**	YES	62	24	38	CH	3.0	97.0	3.6
3423	11/19/2010	275	Fail	3	135+03	PS	-6	8.3		3492+315	3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	110.4	83.6	32.0	91.3	**90.7**	5.5	YES	**5.9**	YES	67	25	42	CH	3.0	97.0	3.6
3423	11/19/2010	274	Pass	3	132+50	CL	0	8.6			2611	87.9	30.6	**88.9**	**31.2**	78	28	50	97.5	114.1	84.5	35.0	96.1	**95.1**	4.4		**3.8**		76	30	46	CH	6.5	93.5	4.5
3423	11/19/2010	273	Pass	3	130+00	CL	0	8.3			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	114.9	88.2	30.3	96.2	**95.8**	4.1		**3.0**		64	24	40	CH	4.9	95.1	3.6
3423	11/19/2010	272	Pass	3	127+62	CL	0	8.1			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	119.3	93.9	27.0	98.0	**97.7**	3.0		**3.5**		53	22	31	CH	5.8	94.2	3.2
3423	11/19/2010	277	Pass	3	139+96	CL	0	7.9			2611	87.9	30.6	**88.9**	**31.2**	78	28	50	97.5	113.9	85.6	33.0	97.4	**96.3**	2.4		**1.8**		71	26	45	CH	2.7	97.3	4.7
3429	11/21/2010	284	Fail	4	87+54	PS	-12	8.0		3439+294	3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	113.6	84.0	35.3	91.7	**91.1**	8.8	YES	**9.2**	YES	79	33	46	CH	3.1	95.6	3.1
3429	11/21/2010	285	Fail	4	94+58	CL	0	8.0		3433+293	3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	116.3	86.0	35.3	95.6	**94.8**	6.8	YES	**6.9**	YES	81	31	50	CH	3.8	96.2	3.8
3429	11/21/2010	283	Fail	3	82+90	CL	0	7.2	3391-267	3485+311	3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	113.0	84.5	33.7	92.2	**91.6**	7.2	YES	**7.6**	YES	72	28	44	CH	5.0	94.2	2.8
3429	11/21/2010	278	Fail	4	64+00	CL	0	7.4		3439+299	3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	115.2	85.4	34.9	93.2	**92.6**	8.4	YES	**8.8**	YES	71	28	43	CH	4.0	96.0	2.5
3429	11/21/2010	279	Pass	3	71+22	CL	0	8.1			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	118.8	91.8	29.4	100.2	**99.6**	2.9		**3.3**		71	25	46	CH	2.4	97.6	2.3

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear w_{Meas} - w_{Opt}	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear w_{Meas} - w_{Opt} Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
3429	11/21/2010	290	Fail	1	94+59	PS	-152	-1.4		3485+310	3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	110.5	81.4	35.8	88.9	**88.3**	9.3	YES	**9.7**	YES	70	29	41	CH	5.0	95.0	4.0
3429	11/21/2010	288	Fail	4	108+13	FS	12	8.4		3533+339	3184	93.8	21.9	**94.4**	**21.6**	71	23	48	99.2	118.0	86.8	35.9	92.5	**91.9**	14.0	YES	**14.3**	YES	73	28	45	CH	3.9	96.1	2.8
3429	11/21/2010	282	Fail	3	79+00	FS	9	8.4		3485+312	3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	120.0	90.2	33.0	98.5	**97.8**	6.5	YES	**6.9**	YES	69	29	40	CH	4.0	96.0	3.1
3429	11/21/2010	289	Pass	1	98+91	PS	-152	-0.1			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	111.8	86.1	29.9	95.7	**94.9**	1.4		**1.5**		76	27	49	CH	3.6	96.4	4.0
3429	11/21/2010	286	Fail	3	98+48	CL	-2	7.2	3388-260	3433+292	3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	118.1	89.0	32.7	97.2	**96.5**	6.2	YES	**6.6**	YES	69	26	43	CH	4.4	96.9	2.7
3429	11/21/2010	280	Pass	3	73+25	CL	0	8.0			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	111.2	84.8	31.1	94.2	**93.5**	2.6		**2.7**		75	27	48	CH	6.7	93.3	3.7
3429	11/21/2010	281	Fail	3	76+53	CL	0	7.8		3485+313	3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	113.5	83.2	36.4	92.4	**91.7**	7.9	YES	**8.0**	YES	75	31	44	CH	3.8	96.2	2.8
3429	11/21/2010	287	Pass	4	103+27	CL	0	7.9			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	118.4	94.0	25.9	98.1	**97.8**	1.9		**2.4**		55	21	34	CH	5.8	95.0	1.5
3433	11/22/2010	291	Fail	4	108+13	FS	12	8.4	3429-288	3533+339	3184	93.8	21.9	**94.4**	**21.6**	71	23	48	99.2	117.7	91.2	29.0	97.2	**96.6**	7.1	YES	**7.4**	YES	71	24	47	CH	3.6	96.4	3.7
3433	11/22/2010	292	Pass	3	98+48	CL	0	7.2	3388+260		3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	120.8	97.0	24.5	101.3	**100.9**	0.5		**1.0**		60	22	38	CH	4.9	95.1	2.7
3433	11/22/2010	293	Pass	4	94+58	CL	0	8.0	3429+285		3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	112.9	89.4	26.3	99.3	**98.6**	-2.2		**-2.1**		69	24	45	CH	3.2	96.8	3.8
3439	11/23/2010	297	Fail	3	76+53	CL	0	7.8	3429-281	3485+313	3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	112.4	80.3	40.0	91.8	**90.9**	12.4	YES	**12.9**	YES	88	31	57	CH	2.2	97.8	3.2
3439	11/23/2010	294	Pass	4	87+54	PS	-12	8.0	3429+284		3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	114.7	88.3	29.9	98.1	**97.4**	1.4		**1.5**		78	25	53	CH	9.6	90.4	3.5
3439	11/23/2010	299	Pass	4	64+00	CL	0	7.4	3429-278		3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	114.2	87.4	30.6	97.1	**96.4**	2.1		**2.2**		77	24	53	CH	3.0	97.0	3.1
3439	11/23/2010	295	Fail	3	82+90	CL	0	7.2	3429-283	3485+311	3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	111.8	82.0	36.4	93.7	**92.9**	8.8	YES	**9.3**	YES	82	28	54	CH	3.7	96.3	3.3
3439	11/23/2010	296	Fail	3	79+00	FS	19	8.4	3429-282	3485+312	3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	115.4	85.3	35.3	97.5	**96.6**	7.7	YES	**8.2**	YES	82	28	54	CH	3.4	96.6	3.3
3439	11/23/2010	298	Fail	4	69+06	FS	39	6.3		3485+314	3184	93.8	21.9	**94.4**	**21.6**	71	23	48	99.2	117.1	90.6	29.2	96.6	**96.0**	7.3	YES	**7.6**	YES	71	23	48	CH	6.1	93.9	2.5
3448	11/24/2010	302	Pass	1	88+03	PS	-143	-1.1			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	112.0	84.7	32.2	94.1	**93.4**	3.7		**3.8**		79	31	48	CH	8.3	91.7	5.3
3448	11/24/2010	303	Pass	1	83+07	PS	-151	-0.8			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	109.3	85.3	28.2	94.8	**94.0**	-0.3		**-0.2**		79	30	49	CH	3.4	96.6	3.2
3448	11/24/2010	305	Fail	1	73+08	PS	-141	-0.1		3485+309	3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	113.2	84.8	33.5	92.6	**92.0**	7.0	YES	**7.4**	YES	71	28	43	CH	4.1	95.9	2.9
3448	11/24/2010	306	Pass	4	71+50	CL	0	9.1			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	109.0	83.6	30.4	91.3	**90.7**	3.9		**4.3**		71	27	44	CH	0.9	99.1	3.0
3448	11/24/2010	301	Fail	1	94+59	PS	-152	-1.4	3429-290	3485+310	3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	107.8	77.0	40.0	88.0	**87.2**	12.4	YES	**12.9**	YES	83	33	50	CH	3.2	96.8	4.1
3448	11/24/2010	300	Fail	3	135+03	PS	-6	8.3	3423-275	3492+315	3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	115.5	87.5	32.0	95.5	**94.9**	5.5	YES	**5.9**	YES	68	27	41	CH	4.0	96.0	2.6
3448	11/24/2010	304	Pass	1	78+02	PS	-142	-0.4			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	112.2	87.7	27.9	91.5	**91.3**	3.9		**4.4**		59	24	35	CH	4.7	95.3	2.7
3485	12/3/2010	314	Pass	4	69+06	FS	39	6.3	3439+298		3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	115.4	88.2	30.8	96.3	**95.7**	4.3		**4.7**		70	26	44	CH	3.9	96.1	2.3
3485	12/3/2010	312	Pass	3	79+00	FS	9	8.4	3439+296		3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	119.6	92.7	29.0	101.2	**100.5**	2.5		**2.9**		68	23	45	CH	3.9	96.1	2.3
3485	12/3/2010	309	Pass	1	73+08	PS	-141	-0.1	3448-305		3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	114.5	85.8	33.4	95.3	**94.6**	4.9		**5.0**		75	26	49	CH	2.5	97.5	2.1
3485	12/3/2010	310	Pass	1	94+59	PS	-152	-1.4	3448+301		3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	113.5	87.8	29.2	95.9	**95.2**	2.7		**3.1**		67	23	44	CH	4.7	95.3	2.5
3485	12/3/2010	313	Pass	3	76+53	CL	0	7.8	3439+297		3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	117.5	89.2	31.8	101.9	**101.0**	4.2		**4.7**		81	28	53	CH	3.0	97.0	2.6
3485	12/3/2010	311	Pass	3	82+90	CL	0	7.2	3439+295		3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	113.8	87.2	30.5	96.9	**96.1**	2.0		**2.1**		72	24	48	CH	3.3	96.7	2.6
3492	12/4/2010	315	Pass	3	135+03	PS	-6	8.3	3448+300		3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	116.5	92.0	26.6	97.0	**96.4**	1.8		**2.3**		69	22	47	CH	3.0	97.0	3.5
3492	12/4/2010	316	Pass	3	126+51	CL	0	8.4	3391+271		3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	119.9	96.1	24.8	101.4	**100.7**	0.0		**0.5**		68	23	45	CH	8.0	92.0	4.1
3499	12/6/2010	318	Fail	4	133+02	CL	0	9.6		5474+894	3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	114.8	86.2	33.2	98.5	**97.6**	5.6	YES	**6.1**	YES	81	27	54	CH	2.6	97.4	3.7
3499	12/6/2010	317	Pass	4	126+01	CL	0	9.0			3181	92.8	22.5	**93.5**	**22.6**	78	23	55	99.6	116.2	91.6	26.9	98.7	**98.0**	4.4		**4.3**		77	25	52	CH	6.6	93.4	3.9
3499	12/6/2010	319	Pass	4	96+06	CL	0	8.5			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	121.3	90.5	34.1	102.6	**102.5**	4.7		**4.8**		86	27	59	CH	4.2	95.8	3.9
3506	12/7/2010	326	Pass	4	78+03	CL	0	9.0			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	109.5	87.0	25.8	90.8	**90.5**	1.8		**2.3**		62	23	39	CH	3.5	96.5	3.1
3506	12/7/2010	328	Pass	5	64+55	FS	-11	9.0			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	114.4	89.4	28.0	93.3	**93.0**	4.0		**4.5**		61	22	39	CH	5.4	94.6	3.2
3506	12/7/2010	321	Fail	2	87+00	PS	-143	0.2		3533+340	3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	114.9	89.1	28.9	89.5	**88.5**	7.0	YES	**7.8**	YES	64	22	42	CH	4.3	95.7	3.4
3506	12/7/2010	325	Pass	4	83+07	CL	0	9.2			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	118.3	93.0	27.2	97.1	**96.8**	3.2		**3.7**		60	22	38	CH	3.1	96.9	3.3
3506	12/7/2010	320	Fail	2	92+72	PS	-148	-0.8		4019+445	3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	114.4	85.1	34.5	94.6	**93.8**	6.0	YES	**6.1**	YES	73	25	48	CH	4.8	95.2	3.7
3506	12/7/2010	324	Fail	2	72+03	PS	-141	0.4		3533+343	3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	106.1	84.9	25.0	88.6	**88.3**	1.0		**1.5**		59	22	37	CH	4.1	95.9	2.8
3506	12/7/2010	323	Fail	2	77+00	PS	-138	0.6		4019+442	3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	105.4	80.6	30.7	85.0	**84.5**	5.9	YES	**6.4**	YES	66	25	41	CH	5.0	95.0	3.9
3506	12/7/2010	322	Fail	2	82+03	PS	-140	0.5		3533+341	3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	106.9	83.8	27.6	87.5	**87.2**	3.6		**4.1**		58	21	37	CH	4.4	95.6	3.0
3506	12/7/2010	327	Pass	5	67+00	FS	-15	9.1			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	114.2	90.2	26.6	94.2	**93.9**	2.6		**3.1**		56	22	34	CH	7.5	92.5	2.8
3510	12/8/2010	329	Fail	5	73+02	CL	0	9.8		3974+418	3094	90.1	24.0	**90.4**	**23.3**	78	26	52	96.8	113.3	85.5	32.5	94.9	**94.6**	8.5	YES	**9.2**	YES	78	26	52	CH	2.5	97.5	4.0
3520	12/9/2010	337	Pass	1	37+48	PS	-152	0.7			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	114.8	91.4	25.6	95.4	**95.1**	1.6		**2.1**		64	22	42	CH	5.4	94.6	3.2
3520	12/9/2010	338	Pass	1	31+76	PS	-126	1.0			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	119.2	92.5	28.9	96.6	**96.3**	4.9		**5.4**	YES	63	23	40	CH	8.5	91.5	2.7
3520	12/9/2010	335	Pass	1	47+63	PS	-156	0.4			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	112.5	91.5	22.9	95.5	**95.2**	-1.1		**-0.6**		63	21	42	CH	7.7	92.3	3.1
3520	12/9/2010	336	Pass	1	42+55	PS	-145	0.5			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	116.9	92.9	25.8	97.0	**96.7**	1.8		**2.3**		60	23	37	CH	5.8	94.2	2.7
3520	12/9/2010	334	Pass	1	52+58	PS	-141	1.2			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	112.3	90.5	24.1	94.5	**94.2**	0.1		**0.6**		60	22	38	CH	5.1	94.9	2.8
3533	12/10/2010	346	Pass	1	17+51	PS	-152	0.5			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	110.6	87.3	26.7	91.0	**90.7**	2.8		**2.8**		64	23	41	CH	3.5	96.5	2.6
3533	12/10/2010	342	Fail	2	77+00	PS	-138	0.6	3506-323	4019+442	3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	104.5	81.5	28.2	89.0	**88.4**	1.7		**2.1**		68	27	41	CH	3.5	96.5	3.0
3533	12/10/2010	341	Pass	2	82+03	PS	-140	0.5	3506+322		3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	116.1	94.7	22.6	98.9	**98.5**	-1.4		**-0.9**		61	21	40	CH	4.5	95.5	2.9
3533	12/10/2010	344	Pass	1	27+51	PS	-151	0.2			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	118.4	92.4	28.2	96.4	**96.0**	4.3		**4.3**		63	24	39	CH	4.7	95.3	2.7
3533	12/10/2010	339	Pass	4	108+13	FS	12	8.4	3433+291		3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	110.5	83.5	32.3	92.8	**92.1**	3.8		**3.9**		74	26	48	CH	4.0	96.0	3.9
3533	12/10/2010	343	Pass	2	72+03	PS	-141	0.4	3506+324		3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	117.9	93.8	25.7	94.3	**93.1**	3.8		**4.6**		64	23	41	CH	3.8	96.2	2.5
3533	12/10/2010	340	Pass	2	87+00	PS	-143	0.2	3506+321		3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	113.4	88.4	28.3	96.5	**95.9**	1.8		**2.2**		65	26	39	CH	3.7	96.3	2.5
3533	12/10/2010	345	Pass	1	22+50	PS	-145	0.5			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	118.7	93.1	27.5	97.2	**96.9**	3.5		**4.0**		58	24	34	CH	4.2	95.8	2.5
3544	12/13/2010	350	Pass	1	7+51	PS	-136.6	0.4			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	109.8	88.1	24.7	92.9	**92.3**	-0.1		**0.4**		67	23	44	CH	4.6	95.4	3.2
3544	12/13/2010	348	Pass	1	47+52	FS	69.6	4.5			3462	89.1	28.8	**89.8**	**28.8**	65	23	42	94.5	113.7	88.4	28.6	99.2	**98.4**	-0.2		**-0.2**		64	24	40	CH	0.5	99.5	3.5
3544	12/13/2010	351	Pass	1	2+50	PS	-139.8	0.2			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	109.0	87.8	24.1	92.6	**92.0**	-0.7		**-0.2**		65	23	42	CH	5.1	94.9	3.1
3544	12/13/2010	349	Pass	1	12+53	PS	-150.2	0.3			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	112.4	90.3	24.5	90.8	**89.7**	2.6		**3.4**		61	22	39	CH	5.2	94.8	3.1
3544	12/13/2010	347	Fail	1	52+44	FS	63.3	4.6		3603+360	3462	89.1	28.8	**89.8**	**28.8**	65	23	42	94.5	105.4	86.1	22.4	96.6	**95.9**	-6.4	YES	**-6.4**	YES	62	21	41	CH	4.9	95.1	3.2
3570	12/16/2010	358	Pass	2	48+95	PS	-149	1.5			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	112.2	87.5	28.3	95.4	**95.0**	2.1		**1.0**		74	28	46	CH	2.8	97.2	3.9
3570	12/16/2010	357	Pass	2	53+01	PS	-146	1.7			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	118.7	93.2	27.4	97.3	**97.0**	3.4		**3.9**		64	27	37	CH	4.2	95.8	3.7
3570	12/16/2010	354	Pass	1	42+51	FS	61	4.4			3462	89.1	28.8	**89.8**	**28.8**	65	23	42	94.5	115.2	89.9	28.2	100.9	**100.1**	-0.6		**-0.6**		69	26	43	CH	3.7	96.3	3.8
3570	12/16/2010	355	Pass	1	37+50	FS	64	4.5			3462	89.1	28.8	**89.8**	**28.8**	65	23	42	94.5	115.7	87.9	31.7	98.7	**97.9**	2.9		**2.9**		66	24	42	CH	2.9	97.1	3.5
3570	12/16/2010	359	Pass	2	45+00	PS	-145	1.4			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	112.6	90.3	24.7	95.3	**94.7**	-0.1		**0.4**		67	24	43	CH	4.4	95.6	3.8
3570	12/16/2010	356	Pass	1	32+48	FS	57	4.1			3462	89.1	28.8	**89.8**	**28.8**	65	23	42	94.5	116.5	91.2	27.7	102.4	**101.6**	-1.1		**-1.1**		64	27	37	CH	4.4	95.6	3.6
3603	12/21/2010	360	Pass	1	52+44	FS	63.3	4.6	3544+347		3467	97.8	22.6	**98.1**	**22.6**	55	20	35	91.7	118.9	96.6	23.1	98.8	**98.5**	0.5		**0.5**		61	21	40	CH	3.6	96.4	2.8
3712	1/8/2011	363	Pass	1	27+49	FS	59	4.4			3467	97.8	22.6	**98.1**	**22.6**	55	20	35	91.7	118.7	93.2	27.4	95.3	**95.0**	4.8		**4.8**		65	22	43	CH	3.7	96.3	3.0
3712	1/8/2011	364	Fail	1	17+53	FS	56.6	4.6		3754+367	3467	97.8	22.6	**98.1**	**22.6**	55	20	35	91.7	116.0	86.4	34.2	88.3	**88.1**	11.6	YES	**11.6**	YES	57	22	35	CH	4.4	95.6	2.9
3754	1/14/2011	366	Pass	1	22+49	FS	64	4.3			3467	97.8	22.6	**98.1**	**22.6**	55	20	35	91.7	115.5	90.9	27.0	92.9	**92.7**	4.4		**4.4**		60	23	37	CH	7.1	92.9	3.2

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
3754	1/14/2011	367	Pass	1	17+53	FS	56.6	4.6	3712+364		3467	97.8	22.6	**98.1**	**22.6**	55	20	35	91.7	116.0	91.2	27.2	93.3	**93.0**	4.6		**4.6**		56	23	33	CH	5.6	94.4	2.9
3754	1/14/2011	368	Pass	1	12+65	FS	44.6	4.6			3467	97.8	22.6	**98.1**	**22.6**	55	20	35	91.7	115.0	91.9	25.1	94.0	**93.7**	2.5		**2.5**		54	22	32	CH	6.6	93.4	2.8
3772	1/17/2011	381	Fail	2	46+50	FS	31	5.3	3297+191	3827+384	3467	97.8	22.6	**98.1**	**22.6**	55	20	35	91.7	113.6	86.5	31.4	88.4	**88.2**	8.8	YES	**8.8**	YES	59	23	36	CH	4.6	95.4	4.0
3772	1/17/2011	380	Fail	2	49+50	FS	36	5.4		3827+383	3467	97.8	22.6	**98.1**	**22.6**	55	20	35	91.7	121.5	94.8	28.1	96.9	**96.6**	5.5	YES	**5.5**	YES	58	22	36	CH	14.1	85.9	3.6
3772	1/17/2011	378	Fail	5	180+02	CL	0	10.2		4004+421	2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	113.4	85.7	32.3	89.4	**89.1**	8.4	YES	**8.4**	YES	65	24	41	CH	4.4	95.6	3.9
3772	1/17/2011	373	Fail	3	155+06	CL	0	8.1		4103+470	3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	101.1	73.2	38.1	84.5	**83.8**	8.1	YES	**9.7**	YES	81	29	52	CH	5.7	94.3	6.4
3772	1/17/2011	369	Pass	1	7+54	FS	40	5.1			3467	97.8	22.6	**98.1**	**22.6**	55	20	35	91.7	121.1	98.7	22.7	100.9	**100.6**	0.1		**0.1**		58	20	38	CH	5.7	94.3	3.5
3772	1/17/2011	374	Pass	4	160+03	FS	6.4	8.0			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	109.1	81.9	33.2	94.6	**93.8**	3.2		**4.8**		77	26	51	CH	6.7	93.3	5.4
3772	1/17/2011	370	Pass	1	2+49	FS	48	5.1			3745	95.8	23.5	**96.2**	**24.5**	63	21	42	91.9	113.7	89.4	27.2	93.3	**92.9**	3.7		**2.7**		62	21	41	CH	5.6	94.4	3.5
3772	1/17/2011	371	Fail	3	145+04	CL	0	8.0		3827+382	2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	112.6	84.4	33.4	91.6	**91.4**	6.8	YES	**7.4**	YES	70	25	47	CH	9.4	90.6	4.4
3772	1/17/2011	372	Pass	3	150+03	FS	7	8.0			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	114.6	85.8	33.6	99.1	**98.3**	3.6		**5.2**	YES	76	24	52	CH	6.9	93.1	4.8
3772	1/17/2011	375	Fail	5	165+03	PS	-10.1	10.1		4004+423	3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	116.6	90.2	29.2	94.2	**93.9**	5.2	YES	**5.7**	YES	58	23	35	CH	3.0	97.0	3.8
3772	1/17/2011	376	Fail	5	170+03	PS	-10.8	10.1		4004+422	3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	111.0	82.3	34.9	85.9	**85.6**	10.9	YES	**11.4**	YES	56	20	36	CH	10.7	89.3	3.6
3772	1/17/2011	379	Pass	2	53+00	FS	36.7	5.7			3745	95.8	23.5	**96.2**	**24.5**	63	21	42	91.9	110.8	87.2	27.1	91.0	**90.6**	3.6		**2.6**		58	18	40	CH	8.6	91.4	3.8
3772	1/17/2011	377	Pass	5	175+03	PS	-8	10.1			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	116.9	91.3	28.1	95.3	**95.0**	4.1		**4.6**		54	21	33	CH	5.0	95.0	4.7
3827	1/23/2011	384	Pass	2	46+50	FS	31	5.3	3772+381		3745	95.8	23.5	**96.2**	**24.5**	63	21	42	91.9	111.4	89.5	24.4	93.4	**93.0**	0.9		**-0.1**		63	24	39	CH	10.1	89.9	3.8
3827	1/23/2011	383	Pass	2	49+50	FS	36	5.4	3772+380		3467	97.8	22.6	**98.1**	**22.6**	55	20	35	91.7	115.6	91.5	26.4	93.6	**93.3**	3.8		**3.8**		55	21	34	CH	6.9	93.1	3.5
3827	1/23/2011	382	Pass	4	145+04	CL	0	8.0	3772+371		2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	117.5	90.5	29.8	98.3	**98.0**	3.2		**3.8**		68	25	43	CH	4.9	95.1	4.3
3830	1/24/2011	385	Pass	2	12+95	FS	23.5	6.3			3462	89.1	28.8	**89.8**	**28.8**	65	23	42	94.5	110.6	86.8	27.4	97.4	**96.7**	-1.4		**-1.4**		77	25	52	CH	5.2	94.8	4.3
3830	1/24/2011	386	Pass	2	9+92	FS	54	6.1			3467	97.8	22.6	**98.1**	**22.6**	55	20	35	91.7	118.1	93.5	26.3	95.6	**95.3**	3.7		**3.7**		57	21	36	CH	7.4	92.6	3.8
3873	1/29/2011	410	Pass	2	38+06	FS	56	5.3			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	115.3	86.0	34.1	96.7	**96.8**	4.5		**5.6**	YES	77	27	50	CH	5.4	94.6	4.1
3873	1/29/2011	407	Fail	2	5+04	CL	0	7.4		4004+419	3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	113.5	82.8	37.0	93.1	**93.2**	7.4	YES	**8.5**	YES	77	24	53	CH	3.3	96.7	4.6
3873	1/29/2011	408	Pass	2	2+02	FS	64	5.7			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	115.2	86.7	32.9	97.5	**97.6**	3.3		**4.4**		76	25	51	CH	6.6	93.4	5.1
3873	1/29/2011	406	Fail	2	6+92	FS	32	6.7		4004+420	3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	113.0	87.1	29.7	91.9	**91.9**	5.6	YES	**5.9**	YES	59	25	34	CH	10.9	89.1	4.9
3873	1/29/2011	409	Pass	2	40+95	FS	27	5.6			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	112.9	84.6	33.5	95.2	**95.3**	3.9		**5.0**		73	23	50	CH	4.0	96.0	3.9
3974	2/14/2011	411	Pass	5	106+02	CL	0	9.1			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	111.8	88.6	26.2	96.6	**96.2**	0.0		**-1.1**		70	22	48	CH	6.2	93.8	2.7
3974	2/14/2011	412	Pass	5	100+97	CL	0	9.6			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	110.7	88.5	25.1	96.6	**96.0**	-1.4		**-1.0**		68	23	45	CH	2.7	97.3	2.7
3974	2/14/2011	417	Pass	5	76+00	PS	-10.3	9.7			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	115.2	87.9	31.1	95.9	**95.4**	4.9		**3.8**		69	25	44	CH	2.9	97.1	2.6
3974	2/14/2011	418	Pass	5	73+02	CL	0	9.8	3510+329		3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	113.6	89.2	27.4	97.3	**96.9**	1.2		**0.1**		68	22	46	CH	5.2	94.8	2.7
3974	2/14/2011	415	Pass	5	85+97	CL	0	9.5			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	113.8	90.2	26.2	100.2	**99.4**	-2.3		**-2.2**		72	24	48	CH	6.7	93.3	3.0
3974	2/14/2011	413	Pass	5	98+05	CL	0	9.7			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	112.8	84.5	33.5	93.9	**93.2**	5.0		**5.1**	YES	72	24	48	CH	3.1	96.9	2.7
3974	2/14/2011	416	Pass	5	80+97	PS	-8.5	9.7			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	120.3	93.5	28.7	103.9	**103.1**	0.2		**0.3**		71	24	47	CH	4.6	95.4	2.4
3974	2/14/2011	414	Pass	5	93+01	CL	0	9.3			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	116.6	89.9	29.7	99.9	**99.1**	1.2		**1.3**		71	24	47	CH	2.9	97.1	2.9
4004	2/17/2011	429	Pass	2	15+98	FS	68	4.6			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	115.1	88.7	29.8	99.8	**99.9**	0.2		**1.3**		79	25	54	CH	5.1	94.9	3.8
4004	2/17/2011	422	Pass	5	170+03	PS	-10.8	10.1	3772+376		3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	120.4	97.4	23.6	97.9	**96.7**	1.7		**2.5**		68	21	47	CH	2.1	97.9	4.2
4004	2/17/2011	427	PASS	2	141+05	FS	78	4.0			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	121.1	95.6	26.7	96.1	**94.9**	4.8		**5.6**	YES	67	22	45	CH	3.3	96.7	3.2
4004	2/17/2011	419	Pass	2	5+04	CL	0	7.4	3873+407		3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	114.1	86.0	32.6	96.7	**96.8**	3.0		**4.1**		77	25	52	CH	4.8	95.2	5.2
4004	2/17/2011	420	Pass	2	6+92	FS	32	6.7	3873+406		3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	115.7	91.3	26.7	96.3	**96.3**	2.6		**2.9**		61	23	38	CH	5.6	94.4	4.3
4004	2/17/2011	426	PASS	2	145+99	FS	70	4.4			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	120.0	96.5	24.4	97.0	**95.8**	2.5		**3.3**		65	21	44	CH	4.4	95.6	3.6
4004	2/17/2011	428	Pass	2	136+02	FS	68	4.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	118.7	93.6	26.8	94.1	**92.9**	4.9		**5.7**	YES	65	24	41	CH	3.5	96.5	4.2
4004	2/17/2011	421	Pass	5	180+02	CL	0	10.2	3772+378		3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	122.4	97.8	25.2	98.3	**97.1**	3.3		**4.1**		64	21	43	CH	3.6	96.4	3.3
4004	2/17/2011	425	Pass	2	150+92	FS	69	4.8			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	119.6	92.2	29.7	97.3	**96.6**	4.9		**5.4**	YES	66	22	44	CH	5.0	95.0	3.3
4004	2/17/2011	423	Pass	5	165+03	PS	-10.1	10.1	3773+375		3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	117.7	88.2	33.4	98.0	**97.2**	4.9		**5.0**		71	23	48	CH	4.4	95.6	5.4
4004	2/17/2011	424	Pass	2	156+00	FS	62	4.1			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	124.0	98.5	25.9	99.0	**97.8**	4.0		**4.8**		57	21	36	CH	6.3	93.7	2.9
4012	2/18/2011	433	Pass	6	77+01	CL	0	10.7			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	108.8	82.1	32.5	94.8	**94.0**	2.5		**4.1**		83	30	53	CH	5.9	94.1	6.0
4012	2/18/2011	430	Pass	6	62+41	CL	0	10.5			2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	109.0	82.9	31.5	90.0	**89.8**	4.9		**5.5**	YES	73	28	45	CH	8.9	91.1	5.9
4012	2/18/2011	434	Pass	6	83+96	PS	-11	10.7			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	109.5	82.8	32.2	95.6	**94.8**	2.2		**3.8**		78	29	49	CH	3.9	96.1	5.1
4012	2/18/2011	431	Pass	6	68+00	CL	0	10.7			2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	106.7	83.3	28.1	90.4	**90.2**	1.5		**2.1**		71	26	45	CH	7.1	92.9	4.4
4012	2/18/2011	432	Pass	6	72+01	CL	0	10.7			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	103.8	81.0	28.2	93.5	**92.8**	-1.8		**-0.2**		75	25	50	CH	3.4	96.6	4.7
4017	2/20/2011	438	Pass	2	44+50	FS	57	5.2			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	108.8	78.5	38.6	94.7	**93.8**	4.9		**5.3**	YES	98	31	67	CH	1.7	98.3	4.2
4017	2/20/2011	437	Pass	2	35+00	FS	55	4.7			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	114.1	84.9	34.4	95.5	**95.6**	4.8		**5.9**	YES	78	27	51	CH	3.7	96.3	3.8
4017	2/20/2011	435	Pass	2	29+00	FS	57	4.9			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	117.5	87.7	34.0	98.7	**98.8**	4.4		**5.5**	YES	75	25	50	CH	6.3	93.7	3.6
4017	2/20/2011	436	Pass	2	31+00	FS	48	4.6			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	117.3	88.8	32.1	99.9	**100.0**	2.5		**3.6**		71	25	46	CH	4.0	96.0	3.3
4019	2/21/2011	445	Pass	2	92+72	PS	-148	-0.8	3506+320		3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	111.9	87.8	27.5	95.7	**95.3**	1.3		**0.2**		72	24	48	CH	3.6	96.4	3.9
4019	2/21/2011	444	Pass	3	85+93	PS	-139	1.2			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	110.2	85.4	29.0	96.1	**96.2**	-0.6		**0.5**		76	27	49	CH	6.4	93.6	5.5
4019	2/21/2011	448	Pass	6	89+03	CL	0	10.8			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	112.0	89.8	24.7	97.3	**97.4**	-1.3		**-1.1**		64	23	41	CH	4.1	95.9	4.3
4019	2/21/2011	440	Pass	3	158+50	FS	71	5.5	3384+248		3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	122.5	97.2	26.0	97.7	**96.5**	4.1		**4.9**		64	23	41	CH	3.9	96.1	3.0
4019	2/21/2011	442	Pass	2	77+00	PS	-138	0.6	3506+323		3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	117.5	93.7	25.4	97.8	**97.5**	1.4		**1.9**		60	22	38	CH	3.8	96.2	3.6
4019	2/21/2011	443	Pass	3	81+00	PS	-139	1.6			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	110.6	84.2	31.3	94.7	**94.8**	1.7		**2.8**		75	27	48	CH	3.9	96.1	6.0
4019	2/21/2011	446	Pass	2	97+00	PS	-138	1.1			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	115.0	89.1	29.1	94.0	**94.0**	5.0		**5.3**	YES	58	24	34	CH	3.5	96.5	4.9
4019	2/21/2011	447	Pass	6	94+05	CL	0	10.8			2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	112.6	86.0	31.0	93.4	**93.2**	4.4		**5.0**		69	28	41	CH	7.2	92.8	5.5
4019	2/21/2011	441	Pass	3	71+04	PS	-141	1.6			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	112.4	82.9	35.6	97.0	**96.4**	4.5		**6.5**	YES	80	28	52	CH	3.6	96.4	5.4
4049	2/22/2011	453	Pass	7	87+01	CL	0	11.7			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	121.1	94.4	28.3	102.3	**102.4**	2.3		**2.5**		74	23	51	CH	4.8	95.2	3.8
4049	2/22/2011	449	Pass	2	26+01	FS	6	5.9			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	110.2	83.4	32.2	93.8	**93.9**	2.6		**3.7**		77	27	50	CH	3.6	96.4	2.8
4049	2/22/2011	451	Fail	2	20+07	FS	42	5.4		4049+461	3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	112.2	79.1	41.8	95.4	**94.5**	8.1	YES	**8.5**	YES	93	33	60	CH	2.8	97.2	7.9
4049	2/22/2011	450	Pass	2	23+06	FS	24	5.9			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	111.0	80.8	37.4	97.5	**96.5**	3.7		**4.1**		92	29	63	CH	4.8	95.2	3.8
4049	2/22/2011	452	Pass	7	91+98	CL	0	11.7			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	109.0	83.3	30.8	96.2	**95.4**	0.8		**2.4**		74	25	49	CH	4.0	96.0	3.4
4051	2/23/2011	454	Pass	7	77+91	CL	0	11.7			2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	104.5	83.3	25.4	90.4	**90.2**	-1.2		**-0.6**		73	22	51	CH	4.8	95.2	4.9
4051	2/23/2011	456	Pass	7	73+05	CL	0	11.7			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	105.4	80.4	31.1	92.8	**92.1**	1.1		**2.7**		78	27	51	CH	4.3	95.7	4.7
4051	2/23/2011	455	Pass	7	82+96	CL	0	11.7			2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	107.3	85.2	25.9	92.5	**92.3**	-0.7		**-0.1**		71	22	49	CH	6.4	93.6	4.5
4051	2/23/2011	457	Pass	7	65+95	CL	0	11.7			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	114.9	91.7	25.3	99.3	**99.5**	-0.7		**-0.5**		62	19	43	CH	6.1	93.9	3.3
4051	2/23/2011	458	Pass	7	62+50	CL	0	11.5			2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	110.4	87.6	26.0	95.1	**94.9**	-0.6		**0.0**		69	23	46	CH	6.5	93.5	4.3
4057	2/24/2011	459	Pass	1	103+01	PS	-131	1.2			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	112.1	83.9	33.6	94.4	**94.5**	4.0		**5.1**	YES	79	25	54	CH	3.4	96.6	3.1

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
4057	2/24/2011	460	Pass	1	108+02	PS	-138	0.8			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	106.8	79.7	34.0	93.2	**92.7**	2.9		**4.9**		85	27	58	CH	3.4	96.6	5.1
4094	3/1/2011	461	Pass	2	20+07	FS	42	5.4	4049+451		3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	110.9	83.6	32.7	97.8	**97.2**	1.6		**3.6**		84	32	52	CH	2.7	97.3	5.0
4103	3/2/2011	470	Pass	3	155+74	FS	23	6.6	3772+373		3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	118.9	93.3	27.5	101.7	**101.3**	1.3		**0.2**		72	24	48	CH	4.4	95.6	3.4
4103	3/2/2011	464	Pass	3	14+95	FS	57	6.1			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	117.1	94.0	24.6	99.2	**99.2**	0.5		**0.8**		63	22	41	CH	6.2	93.8	3.0
4103	3/2/2011	469	Fail	3	153+22	FS	19	6.7		4143+486	3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	117.1	86.3	35.7	94.1	**93.7**	9.5	YES	**8.4**	YES	71	25	46	CH	4.6	95.4	3.6
4103	3/2/2011	467	Pass	3	148+24	CL	0	7.0			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	113.7	91.3	24.6	99.7	**99.0**	-1.9		**-1.5**		66	22	44	CH	4.4	95.6	2.6
4103	3/2/2011	463	Fail	3	10+13	FS	31	6.4		4281+545	3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	115.9	82.4	40.6	99.4	**98.4**	6.9	YES	**7.3**	YES	91	30	61	CH	3.1	96.9	4.1
4103	3/2/2011	468	Pass	3	150+72	FS	11	6.8			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	118.9	91.5	30.0	99.9	**99.2**	3.5		**3.9**		65	22	43	CH	3.7	96.3	2.7
4103	3/2/2011	466	Pass	3	145+99	FS	16	6.8			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	121.0	93.6	29.3	98.7	**98.1**	4.5		**5.0**		65	22	43	CH	3.9	96.1	2.5
4103	3/2/2011	465	Pass	3	143+96	FS	16	6.8			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	123.0	94.8	29.7	100.0	**99.4**	4.9		**5.4**	YES	65	20	45	CH	3.1	96.9	1.9
4113	3/3/2011	473	Pass	2	32+00	PS	-142	1.1			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	116.5	92.2	26.3	100.5	**100.1**	0.1		**-1.0**		72	23	49	CH	3.9	96.1	2.8
4113	3/3/2011	472	Pass	2	37+99	PS	-142	1.3			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	114.0	89.4	27.5	97.5	**97.1**	1.3		**0.2**		71	24	47	CH	4.7	95.3	2.6
4113	3/3/2011	474	Pass	2	29+93	PS	-142	1.4			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	112.6	91.3	23.3	95.2	**94.9**	-0.6		**-0.6**		64	23	41	CH	4.2	95.8	3.0
4113	3/3/2011	475	Pass	2	26+01	PS	-139	1.4			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	113.8	91.0	25.0	96.0	**95.4**	0.2		**0.7**		69	24	45	CH	5.2	94.8	2.9
4113	3/3/2011	478	Pass	8	71+03	CL	0	12.8			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	103.7	81.2	27.7	93.8	**93.0**	-2.3		**-0.7**		78	27	51	CH	6.9	93.1	4.2
4113	3/3/2011	476	Pass	2	21+91	PS	-136	1.5			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	118.8	93.5	27.1	98.6	**98.0**	2.3		**2.8**		67	24	43	CH	4.7	95.3	2.9
4113	3/3/2011	471	Pass	2	42+03	PS	-153	0.9			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	120.5	94.9	27.0	100.1	**99.5**	2.2		**2.7**		67	23	44	CH	4.0	96.0	2.5
4113	3/3/2011	477	Pass	2	17+96	PS	-141	1.5			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	122.6	97.3	26.0	101.6	**101.2**	2.0		**2.5**		57	23	34	CH	5.4	94.6	2.3
4143	3/13/2011	489	Pass	8	84+12	CL	0	12.3			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	107.9	81.6	32.2	94.2	**93.5**	2.2		**3.8**		83	30	53	CH	7.8	92.2	7.2
4143	3/13/2011	484	Pass	6	107+39	CL	0	10.8			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	112.5	84.8	32.7	97.9	**97.1**	2.7		**4.3**		83	27	56	CH	7.5	92.5	4.4
4143	3/13/2011	486	Pass	3	153+22	FS	19	6.7	4103+469		3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	118.7	91.5	29.7	96.5	**95.9**	4.9		**5.4**	YES	72	24	48	CH	2.8	97.2	3.8
4143	3/13/2011	485	Pass	5	121+35	CL	0	9.3			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	118.5	91.7	29.2	96.7	**96.1**	4.4		**4.9**		71	26	45	CH	5.4	94.6	2.9
4143	3/13/2011	490	Pass	9	74+53	CL	0	13.0			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	114.2	90.2	26.6	97.7	**97.8**	0.6		**0.8**		65	22	43	CH	5.8	94.2	3.5
4143	3/13/2011	491	Pass	9	69+98	CL	0	13.1			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	112.5	89.3	26.0	96.7	**96.9**	0.0		**0.2**		64	23	41	CH	5.7	94.3	3.6
4143	3/13/2011	487	Pass	8	93+10	CL	0	12.5			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	114.3	88.5	29.2	95.9	**96.0**	3.2		**3.4**		64	22	42	CH	2.5	97.5	5.0
4143	3/13/2011	482	Pass	6	98+94	CL	0	10.9			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	115.0	89.4	28.7	96.9	**97.0**	2.7		**2.9**		63	25	38	CH	11.2	88.2	4.1
4143	3/13/2011	483	Pass	6	103+97	CL	0	10.7			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	111.3	87.8	26.8	95.1	**95.2**	0.8		**1.0**		63	24	39	CH	4.9	95.1	5.0
4143	3/13/2011	492	Pass	9	65+00	CL	0	13.0			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	123.4	101.6	21.5	101.9	**101.3**	-1.6		**1.1**		58	19	39	CH	9.9	90.1	3.2
4143	3/13/2011	488	Pass	8	88+05	CL	0	12.3			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	115.2	86.7	32.9	100.1	**99.3**	2.9		**4.5**		77	27	50	CH	5.6	94.4	4.9
4169	3/12/2011	481	Pass	8	75+97	CL	0	12.2			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	115.0	85.9	33.9	99.2	**98.4**	3.9		**5.5**	YES	83	29	54	CH	5.9	94.1	5.4
4169	3/12/2011	479	Pass	8	63+58	CL	0	12.6			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	121.0	94.7	27.8	102.6	**102.7**	1.8		**2.0**		58	20	38	CH	8.3	91.7	3.0
4169	3/12/2011	480	Pass	8	68+93	CL	0	12.7			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	113.2	89.8	26.0	97.3	**97.4**	0.0		**0.2**		56	22	34	CH	7.9	92.1	3.0
4171	3/14/2011	496	Pass	4	137+93	PS	-12	9.4			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	116.6	91.1	28.0	99.3	**98.9**	1.8		**0.7**		72	23	49	CH	3.9	96.1	4.0
4171	3/14/2011	493	Pass	3	76+06	PS	-125	2.0			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	106.9	81.9	30.5	92.1	**92.2**	0.9		**2.0**		78	26	52	CH	3.7	96.3	3.4
4171	3/14/2011	495	Pass	4	128+46	PS	-15	9.1			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	110.7	86.8	27.5	94.7	**94.2**	1.3		**0.2**		70	22	48	CH	3.5	96.5	3.9
4171	3/14/2011	494	Pass	3	91+00	PS	-120	2.0			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	117.9	91.9	28.3	96.9	**96.9**	4.2		**4.5**		61	22	39	CH	3.5	96.4	3.1
4171	3/14/2011	497	Pass	1	124+98	PS	-80	5.0	2690+22		3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	127.4	102.8	23.9	103.3	**102.1**	2.0		**2.8**		65	18	47	CH	2.8	97.2	3.2
4213	3/19/2011	504	Pass	6	173+03	PS	-8	10.9			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	115.3	83.8	37.6	101.1	**100.1**	3.9		**4.3**		99	35	64	CH	7.3	92.7	7.1
4213	3/19/2011	506	Pass	6	163+09	PS	-10	10.8			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	113.8	84.6	34.5	98.9	**98.4**	3.4		**5.4**	YES	88	27	61	CH	3.7	96.3	4.8
4213	3/19/2011	505	Pass	6	168+04	CL	0	10.8			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	110.4	81.2	35.9	97.9	**97.0**	2.2		**2.6**		94	30	64	CH	2.0	98.0	6.2
4213	3/19/2011	500	Pass	4	148+08	FS	7	7.8			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	104.8	79.1	32.5	95.4	**94.5**	-1.2		**-0.8**		92	27	65	CH	3.3	96.7	5.1
4213	3/19/2011	502	Pass	4	158+03	CL	0	7.9			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	109.2	78.7	38.7	94.9	**94.0**	5.0		**5.4**	YES	91	28	63	CH	2.6	97.4	5.4
4213	3/19/2011	499	Pass	4	143+00	CL	0	8.0			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	111.9	83.4	34.1	100.6	**99.6**	0.4		**0.8**		90	27	63	CH	6.6	93.4	5.4
4213	3/19/2011	503	Pass	6	178+01	CL	0	10.9			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	110.4	80.6	37.0	97.2	**96.3**	3.3		**3.7**		90	32	58	CH	3.8	96.2	6.6
4213	3/19/2011	501	Pass	4	153+02	FS	7.2	7.8			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	107.0	80.5	32.9	97.1	**96.2**	-0.8		**-0.4**		89	26	63	CH	2.5	97.5	5.5
4217	3/20/2011	509	Pass	5	132+00	CL	0	10.1			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	113.7	88.6	28.3	103.6	**103.0**	-2.8		**-0.8**		84	24	60	CH	4.3	95.7	4.7
4217	3/20/2011	512	Pass	1	122+12	PS	-142	2.0			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	113.3	89.4	26.7	99.3	**98.6**	-1.8		**-1.7**		73	22	51	CH	4.0	96.0	3.0
4217	3/20/2011	508	Pass	5	127+08	CL	0	10.2			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	116.4	84.7	37.4	102.2	**101.2**	3.7		**4.1**		91	30	61	CH	4.3	95.7	5.0
4217	3/20/2011	510	Pass	5	136+90	PS	-6	10.1			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	102.4	77.9	31.4	94.0	**93.1**	-2.3		**-1.9**		90	28	62	CH	3.8	96.2	5.5
4217	3/20/2011	511	Pass	5	141+01	CL	0	10.0			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	115.6	87.8	31.6	98.8	**98.9**	2.0		**3.1**		71	21	50	CH	6.2	93.8	3.6
4217	3/20/2011	507	Pass	6	122+14	CL	0	10.2			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	109.7	79.4	38.2	95.8	**94.9**	4.5		**4.9**		88	26	62	CH	4.4	95.6	4.7
4240	3/23/2011	520	Pass	3	44+04	FS	18	6.7			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	111.6	80.7	38.3	97.3	**96.4**	4.6		**5.0**		90	27	63	CH	4.2	95.8	4.7
4240	3/23/2011	521	Pass	3	39+00	FS	28	6.6			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	109.1	81.5	33.8	98.3	**97.4**	0.1		**0.5**		87	28	59	CH	5.6	94.4	4.8
4248	3/24/2011	527	Pass	3	34+01	CL	0	6.7			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	107.8	78.2	37.9	94.3	**93.4**	4.2		**4.6**		98	34	64	CH	4.4	95.6	6.8
4248	3/24/2011	525	Fail	7	102+00	CL	0	11.4		4305+554	3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	110.0	90.7	21.3	98.9	**98.5**	-4.9	YES	**-6.0**	YES	73	26	47	CH	4.5	95.5	5.0
4248	3/24/2011	524	Pass	7	96+99	CL	0	11.5			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	108.1	84.1	28.5	96.1	**95.2**	0.9		**1.4**		83	26	57	CH	4.2	95.8	4.7
4248	3/24/2011	523	Pass	1	101+99	PS	-73	4.6			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	115.1	87.6	31.4	100.1	**99.2**	3.8		**4.3**		81	28	53	CH	11.8	88.2	4.9
4248	3/24/2011	526	Pass	7	107+02	CL	0	11.4		4248+526	3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	106.9	85.2	25.4	91.7	**91.1**	3.1		**2.8**		78	23	55	CH	6.5	93.5	4.3
4248	3/24/2011	528	Pass	3	28+98	CL	0	6.4			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	112.4	85.8	31.0	100.4	**99.8**	-0.1		**1.9**		84	28	56	CH	4.4	95.6	6.1
4248	3/24/2011	522	Pass	1	107+07	PS	-82	4.4			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	120.4	95.0	26.8	102.3	**101.6**	4.5		**4.2**		75	23	52	CH	5.1	94.9	4.1
4250	3/22/2011	513	Pass	3	54+00	FS	39	6.4			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	110.4	83.0	33.0	100.1	**99.2**	-0.7		**-0.3**		97	29	68	CH	5.3	94.7	5.9
4250	3/22/2011	519	Pass	1	77+00	PS	-77	4.6			3185	90.0	26.5	**90.7**	**28.4**	74	23	51	99.2	121.7	94.3	29.0	104.8	**104.0**	2.5		**0.6**		74	24	50	CH	4.5	95.5	4.3
4250	3/22/2011	518	Pass	1	82+00	PS	-77	4.6			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	121.1	95.1	27.3	105.7	**104.9**	-1.2		**-1.1**		74	22	52	CH	3.6	96.4	3.4
4250	3/22/2011	514	Pass	3	49+04	FS	20	6.7			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	114.6	85.5	34.1	100.0	**99.4**	3.0		**5.0**		84	26	58	CH	3.7	96.3	4.6
4250	3/22/2011	517	Pass	1	87+00	PS	-72	4.7			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	118.8	95.2	24.8	102.5	**101.8**	2.5		**2.2**		77	25	52	CH	5.5	94.5	4.0
4250	3/22/2011	515	Pass	1	97+03	PS	-83	4.6			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	114.1	92.6	23.2	97.7	**97.1**	-1.6		**-1.1**		66	21	45	CH	4.3	95.7	3.1
4250	3/22/2011	516	Pass	1	91+96	PS	-73.1	4.8			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	115.6	93.2	24.0	100.3	**99.7**	1.7		**1.4**		73	21	52	CH	3.3	96.7	3.8
4256	3/25/2011	529	Pass	6	139+10	CL	0	11.0			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	114.6	89.0	28.8	96.4	**96.5**	2.8		**3.0**		72	26	46	CH	8.6	91.4	3.9
4256	3/25/2011	530	Pass	6	134+00	CL	0	11.1			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	115.5	88.8	30.0	96.2	**96.3**	4.0		**4.2**		66	24	42	CH	3.7	96.3	3.7
4256	3/25/2011	532	Pass	6	124+12	CL	0	11.2			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	110.1	82.5	33.4	92.8	**92.9**	3.8		**4.9**		76	26	50	CH	4.4	95.6	3.8
4256	3/25/2011	531	Pass	6	129+05	CL	0	11.1			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	113.5	88.3	28.6	99.3	**99.4**	-1.0		**0.1**		76	25	51	CH	3.4	96.6	3.7
4256	3/25/2011	533	Pass	7	121+58	CL	0	11.1			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	112.2	86.6	29.6	97.4	**97.5**	0.0		**1.1**		75	25	50	CH	4.1	95.9	3.8
4256	3/25/2011	535	Pass	5	156+16	CL	0	9.1			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	105.9	79.6	33.1	93.1	**92.6**	2.0		**4.0**		83	27	56	CH	3.7	96.3	5.7

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	**Reported Moisture Out of Tolerance - 3/+5%**	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	**Corrected Moisture Out of Tolerance - 3/+5%**	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
4256	3/25/2011	537	Pass	5	146+03	FS	10	9.0			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	104.5	78.9	32.5	95.2	**94.3**	-1.2		**-0.8**		90	28	62	CH	3.3	96.7	5.6
4256	3/25/2011	536	Fail	5	151+00	CL	0	9.1		4268+544	3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	100.0	75.0	33.3	87.7	**87.2**	2.2		**4.2**		80	27	53	CH	5.4	94.6	5.7
4256	3/25/2011	534	Pass	5	160+98	CL	0	9.2			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	112.7	82.0	37.4	98.9	**98.0**	3.7		**4.1**		85	30	55	CH	6.2	93.8	5.9
4264	3/26/2011	538	Pass	3	19+08	FS	7.5	7.2			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	114.9	85.9	33.7	96.6	**96.7**	4.1		**5.2**	YES	79	26	53	CH	4.2	95.8	4.3
4264	3/26/2011	539	Pass	3	23+97	CL	0	7.3			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	107.2	81.5	31.5	98.3	**97.4**	-2.2		**-1.8**		89	27	62	CH	2.5	97.5	3.7
4268	3/28/2011	544	Pass	5	151+00	CL	0	9.1	4256+536		3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	114.5	86.6	32.2	101.3	**100.7**	1.1		**3.1**		85	30	55	CH	6.7	93.3	4.6
4268	3/28/2011	542	Pass	9	89+98	CL	0	12.9			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	107.5	77.8	38.2	93.8	**93.0**	4.5		**4.9**		93	32	61	CH	6.0	94.0	5.6
4268	3/28/2011	540	Pass	9	79+93	CL	0	12.9			2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	114.9	90.3	27.2	98.0	**97.8**	0.6		**1.2**		71	23	48	CH	5.0	95.0	3.2
4268	3/28/2011	541	Pass	9	85+00	CL	0	12.9			2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	103.6	83.1	24.6	90.2	**90.0**	-2.0		**-1.4**		70	21	49	CH	5.2	94.8	3.7
4268	3/28/2011	543	Fail	9	94+82	CL	0	13.0		4305+553	3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	104.1	85.1	22.3	102.7	**101.7**	-11.4	YES	**-11.0**	YES	86	22	64	CH	4.5	95.5	4.1
4281	3/29/2011	552	Pass	7	141+00	PS	-9	11.8			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	117.4	92.2	27.4	99.9	**100.0**	1.4		**1.6**		70	24	46	CH	7.4	92.6	4.1
4281	3/29/2011	551	Pass	7	136+57	PS	-8	11.9			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	107.9	85.4	26.3	92.5	**92.6**	0.3		**0.5**		70	24	46	CH	6.8	93.2	4.1
4281	3/29/2011	550	Pass	7	131+32	CL	0	12.1			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	109.3	86.9	25.8	94.1	**94.3**	-0.2		**0.0**		70	23	47	CH	4.2	95.8	5.7
4281	3/29/2011	548	Pass	8	122+90	CL	0	12.2			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	114.7	87.2	31.6	100.7	**99.9**	1.6		**3.2**		82	27	55	CH	4.3	95.7	3.8
4281	3/29/2011	549	Pass	7	126+45	CL	0	12.0			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	109.1	85.0	28.4	98.2	**97.4**	-1.6		**0.0**		82	25	57	CH	3.6	96.4	3.9
4281	3/29/2011	546	Fail	3	6+03	CL	0	7.5		4347+581	3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	98.9	71.0	39.3	83.0	**82.6**	8.2	YES	**10.2**	YES	86	29	57	CH	10.6	89.4	6.1
4281	3/29/2011	545	Pass	3	10+13	FS	31	6.4	4103+463		3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	110.5	86.6	27.6	97.4	**97.5**	-2.0		**-0.9**		75	25	50	CH	4.0	96.0	4.8
4281	3/29/2011	547	Pass	3	2+98	CL	0	7.5			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	111.4	83.4	33.5	100.6	**99.6**	-0.2		**0.2**		90	30	60	CH	4.9	95.1	6.0
4305	4/1/2011	553	Pass	9	94+82	CL	0	13.0	4268+543		2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	114.8	91.9	24.9	99.8	**99.6**	-1.7		**-1.1**		75	29	46	CH	3.5	96.5	4.3
4305	4/1/2011	554	Pass	7	102+00	CL	0	11.4	4248+525		2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	119.5	92.4	29.3	100.3	**100.1**	2.7		**3.3**		71	28	43	CH	6.1	93.9	4.5
4305	4/1/2011	555	Pass	7	107+02	CL	0	11.4	4248+526		2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	120.4	95.6	26.0	103.8	**103.6**	-0.6		**0.0**		68	25	43	CH	7.7	92.3	3.9
4316	4/4/2011	565	Pass	6	149+00	CL	0	10.1			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	113.3	88.9	27.5	93.8	**93.8**	3.4		**3.7**		69	25	44	CH	2.7	97.3	4.5
4316	4/4/2011	570	Pass	8	124+03	CL	0	12.8			4171	96.5	22.9	**97.2**	**23.1**	60	22	38	88.2	114.6	89.6	27.9	92.8	**92.2**	5.0		**4.8**		67	25	42	CH	2.8	97.2	3.7
4316	4/4/2011	566	Pass	6	144+06	PS	-15	10.1			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	114.1	90.7	25.8	95.7	**95.7**	1.7		**2.0**		65	24	41	CH	4.5	95.5	3.7
4316	4/4/2011	564	Pass	6	154+03	PS	-8	10.2			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	114.6	88.8	29.1	93.7	**93.7**	5.0		**5.3**	YES	65	23	42	CH	3.5	96.5	3.5
4316	4/4/2011	558	Pass	1	137+19	PS	-134	2.4			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	109.8	85.9	27.8	96.6	**96.7**	-1.8		**-0.7**		79	26	53	CH	4.2	95.8	4.9
4316	4/4/2011	563	Pass	6	158+94	PS	-20	10.1			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	116.7	92.3	26.5	97.4	**97.4**	2.4		**2.7**		63	24	39	CH	5.0	95.0	3.8
4316	4/4/2011	576	Pass	1	162+01	PS	-151	1.7			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	110.5	83.4	32.5	93.8	**93.9**	2.9		**4.0**		78	29	49	CH	4.3	95.7	5.7
4316	4/4/2011	561	Pass	1	152+05	PS	-138	1.7			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	111.2	85.0	30.8	95.6	**95.7**	1.2		**2.3**		78	28	50	CH	2.3	97.7	4.8
4316	4/4/2011	569	Fail	8	129+03	CL	0	13.0		4369+588	4171	96.5	22.9	**97.2**	**23.1**	60	22	38	88.2	115.1	86.7	32.7	89.8	**89.2**	9.8	YES	**9.6**	YES	63	25	38	CH	2.7	97.3	3.9
4316	4/4/2011	556	Pass	1	127+38	PS	-131	2.6			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	111.7	85.2	31.1	95.8	**95.9**	1.5		**2.6**		77	28	49	CH	2.8	97.2	5.0
4316	4/4/2011	577	Pass	1	164+83	PS	-83	5.0	2690+14		3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	123.6	100.0	23.6	100.5	**99.3**	1.7		**2.5**		63	22	41	CH	4.2	95.8	3.8
4316	4/4/2011	579	Pass	1	172+02	PS	-131	2.2			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	106.9	80.0	33.6	90.0	**90.1**	4.0		**5.1**	YES	74	27	47	CH	5.7	94.3	5.2
4316	4/4/2011	578	Pass	1	167+02	PS	-130	2.1			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	111.3	82.8	34.4	93.1	**93.2**	4.8		**5.9**	YES	74	26	48	CH	4.0	96.0	5.0
4316	4/4/2011	575	Fail	7	164+09	CL	0	11.9		4369+587	3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	105.8	77.2	37.0	90.3	**89.8**	5.9	YES	**7.9**	YES	83	30	53	CH	3.1	96.9	5.4
4316	4/4/2011	562	Pass	1	157+12	PS	-140	1.8			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	113.2	86.4	31.0	97.2	**97.3**	1.4		**2.5**		74	26	48	CH	2.4	97.6	4.1
4316	4/4/2011	568	Pass	8	134+08	CL	0	13.0			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	113.9	87.0	30.9	100.5	**99.7**	0.9		**2.5**		77	28	49	CH	3.3	96.7	4.8
4316	4/4/2011	559	Pass	1	142+61	PS	-143	2.1			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	112.7	84.9	32.8	95.5	**95.6**	3.2		**4.3**		73	26	47	CH	4.5	95.5	5.1
4316	4/4/2011	580	Pass	1	177+00	PS	-130	2.3			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	105.3	76.0	38.5	91.7	**90.8**	4.8		**5.2**	YES	90	30	60	CH	4.2	95.8	5.6
4316	4/4/2011	560	Pass	1	147+07	PS	-141	1.8			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	108.9	79.1	37.6	95.4	**94.5**	3.9		**4.3**		90	30	60	CH	3.4	96.6	5.3
4316	4/4/2011	573	Fail	7	174+05	CL	0	12.0		4369+585	3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	106.9	76.7	39.4	89.7	**89.2**	8.3	YES	**10.3**	YES	81	30	51	CH	3.8	96.2	5.5
4316	4/4/2011	574	Fail	7	169+03	CL	0	12.0		4369+586	3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	107.9	78.4	37.6	91.7	**91.2**	6.5	YES	**8.5**	YES	81	30	51	CH	2.1	97.9	5.5
4316	4/4/2011	572	Pass	7	179+02	CL	0	12.1			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	110.0	81.6	34.8	95.4	**94.9**	3.7		**5.7**	YES	80	27	53	CH	2.7	97.3	5.2
4316	4/4/2011	557	Pass	1	132+32	PS	-136	2.4			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	106.6	76.9	38.6	92.8	**91.9**	4.9		**5.3**	YES	88	33	55	CH	3.7	96.3	6.2
4316	4/4/2011	571	Pass	9	122+03	CL	0	12.8			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	111.8	84.8	31.8	97.9	**97.1**	1.8		**3.4**		73	25	48	CH	2.3	97.7	3.7
4316	4/4/2011	567	Pass	8	138+90	FS	5	12.8			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	115.3	86.8	32.8	100.2	**99.4**	2.8		**4.4**		71	26	45	CH	4.3	95.7	5.4
4347	4/7/2011	583	Pass	8	100+98	CL	0	12.2			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	107.6	80.7	33.3	94.4	**93.8**	2.2		**4.2**		84	27	57	CH	3.3	96.7	5.6
4347	4/7/2011	584	Pass	8	106+00	CL	0	12.0			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	108.7	81.6	33.2	95.4	**94.9**	2.1		**4.1**		84	27	57	CH	3.2	96.8	5.8
4347	4/7/2011	582	Pass	8	96+10	CL	0	12.0			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	108.3	79.3	36.6	95.7	**94.7**	2.9		**3.3**		90	33	57	CH	9.6	90.4	7.1
4347	4/7/2011	581	Pass	3	6+03	CL	0	7.5	4281+546		3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	103.8	80.7	28.7	94.4	**93.8**	-2.4		**-0.4**		81	25	56	CH	3.9	96.1	6.8
4369	4/11/2011	592	Pass	4	30+47	CL	0	8.2			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	105.3	78.1	34.9	94.2	**93.3**	1.2		**1.6**		95	31	64	CH	6.1	93.9	6.9
4369	4/11/2011	590	Pass	4	20+53	FS	21	8.5			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	110.9	82.1	35.1	99.0	**98.1**	1.4		**1.8**		94	28	66	CH	5.2	94.8	6.2
4369	4/11/2011	591	Pass	4	28+35	CL	0	8.3			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	104.6	78.6	33.1	94.8	**93.9**	-0.6		**-0.2**		93	28	65	CH	6.4	93.6	6.8
4369	4/11/2011	589	Pass	4	16+01	FS	10	8.4			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	106.6	78.4	35.9	91.7	**91.2**	4.8		**6.8**	YES	84	28	56	CH	7.8	92.2	7.9
4369	4/11/2011	587	Pass	7	164+09	CL	0	11.9	4316+575		3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	109.2	80.5	35.7	94.2	**93.6**	4.6		**6.6**	YES	84	31	53	CH	5.5	94.5	4.7
4369	4/11/2011	593	Pass	4	35+05	PS	-10	8.2			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	105.7	79.8	32.4	96.3	**95.3**	-1.3		**-0.9**		91	23	63	CH	6.2	93.8	6.2
4369	4/11/2011	588	Pass	8	129+03	CL	0	13.0	4316+569		3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	109.0	81.2	34.3	95.0	**94.4**	3.2		**5.2**	YES	81	29	52	CH	7.7	92.3	5.2
4369	4/11/2011	594	Pass	4	43+02	CL	0	8.2			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	105.8	78.1	35.5	94.2	**93.3**	1.8		**2.2**		89	30	59	CH	6.8	93.2	6.1
4369	4/11/2011	586	Pass	7	169+03	CL	0	12.0	4316+574		3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	109.7	81.0	35.4	94.7	**94.2**	4.3		**6.3**	YES	80	28	52	CH	5.2	94.8	5.4
4369	4/11/2011	585	Pass	7	174+05	CL	0	12.0	4316+573		3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	111.2	82.2	35.3	96.1	**95.6**	4.2		**6.2**	YES	79	27	52	CH	4.0	96.0	5.1
4400	4/14/2011	603	Pass	7	155+00	CL	0	10.9			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	108.2	87.3	24.0	94.6	**94.7**	-2.0		**-1.8**		70	21	49	CH	3.5	96.5	4.5
4400	4/14/2011	595	Pass	4	81+98	PS	-130	2.6			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	107.7	81.6	32.0	91.8	**91.9**	2.4		**3.5**		79	28	51	CH	4.6	95.4	4.9
4400	4/14/2011	602	Pass	7	150+00	CL	0	11.0			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	108.7	88.3	23.1	95.7	**95.8**	-2.9		**-2.7**		67	24	43	CH	3.4	96.6	3.9
4400	4/14/2011	601	Pass	7	144+94	CL	0	11.3			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	108.3	87.6	23.6	94.9	**95.0**	-2.4		**-2.2**		67	22	45	CH	1.5	98.5	4.3
4400	4/14/2011	597	Pass	4	92+01	PS	-130	2.1			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	106.0	78.6	34.9	91.9	**91.4**	3.8		**5.8**	YES	86	32	54	CH	7.3	92.7	6.3
4400	4/14/2011	598	Pass	3	97+00	PS	-143	1.9			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	107.4	82.1	30.8	92.4	**92.5**	1.2		**2.3**		77	27	50	CH	4.2	95.8	5.3
4400	4/14/2011	604	Pass	7	159+95	CL	0	11.1			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	111.8	88.0	27.1	95.3	**95.4**	1.1		**1.3**		65	24	41	CH	3.7	96.3	3.7
4400	4/14/2011	599	Pass	2	102+00	PS	-136	1.4			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	104.3	77.0	35.5	90.1	**89.5**	4.4		**6.4**	YES	83	29	54	CH	12.8	87.2	6.6
4400	4/14/2011	596	Pass	4	86+97	PS	-131	2.2			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	112.2	86.0	30.5	96.7	**96.8**	0.9		**2.0**		74	27	47	CH	4.6	95.4	4.3
4400	4/14/2011	600	Pass	2	107+02	PS	-133	1.2			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	103.4	77.2	33.9	93.1	**92.2**	0.2		**0.6**		89	31	58	CH	4.6	95.4	6.4
4408	4/15/2011	608	Pass	4	43+04	FS	18	7.5			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	102.7	78.5	30.8	91.8	**91.3**	-0.3		**1.7**		86	30	56	CH	3.0	97.0	5.9
4408	4/15/2011	607	Pass	4	38+02	FS	19	7.5			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	107.2	79.1	35.5	92.5	**92.0**	4.4		**6.4**	YES	85	33	52	CH	5.1	94.9	5.2
4408	4/15/2011	605	Pass	4	28+00	FS	21	7.4			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	108.9	79.3	37.3	95.7	**94.7**	3.6		**4.0**		89	32	57	CH	5.2	94.8	5.9

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
4408	4/15/2011	606	Pass	4	32+96	FS	14	7.3			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	107.9	80.7	33.7	97.3	**96.4**	0.0		**0.4**		88	31	57	CH	3.3	96.7	5.7
4413	4/17/2011	610	Pass	2	58+65	CL	0	2.3			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	122.9	98.2	25.2	98.7	**97.5**	3.3		**4.1**		67	23	44	CH	10.2	89.8	4.3
4413	4/17/2011	609	Pass	1	58+90	CL	0	1.3			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	120.5	97.1	24.1	97.6	**96.4**	2.2		**3.0**		66	23	43	CH	9.2	90.8	4.0
4413	4/17/2011	611	Pass	3	59+61	CL	0	3.0			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	121.5	99.2	22.5	99.7	**98.5**	0.6		**1.4**		66	23	43	CH	8.4	91.6	3.6
4445	4/19/2011	613	Pass	2	59+85	CL	0	5.3			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	111.8	88.1	26.9	96.2	**95.6**	0.4		**0.8**		70	25	45	CH	5.9	94.1	5.1
4445	4/19/2011	619	Pass	9	95+55	CL	0	12.9			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	112.1	86.4	29.7	94.3	**93.6**	1.5		**1.5**		70	24	46	CH	4.9	95.1	3.5
4445	4/19/2011	617	Pass	9	105+52	CL	0	13.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	115.0	86.6	32.8	94.5	**93.8**	4.6		**4.6**		70	24	46	CH	2.7	97.3	4.2
4445	4/19/2011	614	Pass	2	120+22	PS	-13	4.3			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	113.4	85.6	32.4	93.4	**92.7**	4.2		**4.2**		70	24	46	CH	2.6	97.4	4.4
4445	4/19/2011	612	Pass	1	59+59	CL	0	4.2			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	111.1	92.0	20.8	92.5	**91.4**	-1.1		**-0.3**		65	23	42	CH	6.8	93.2	4.1
4445	4/19/2011	618	Pass	9	100+52	CL	0	13.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	112.6	87.9	28.1	96.0	**95.2**	-0.1		**-0.1**		69	26	43	CH	5.4	94.6	4.6
4445	4/19/2011	615	Pass	2	122+60	PS	-109.8	5.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	110.2	86.2	27.8	94.1	**93.4**	-0.4		**-0.4**		66	23	43	CH	3.8	96.2	4.5
4445	4/19/2011	616	Pass	2	125+13	PS	-115.8	4.2			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	108.9	84.2	29.3	91.9	**91.2**	1.1		**1.1**		62	24	38	CH	6.2	93.8	3.6
4461	4/20/2011	624	Pass	2	132+67	PS	-107	4.7			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	108.7	83.0	30.9	90.6	**89.9**	2.7		**2.7**		73	25	48	CH	6.3	93.7	4.4
4461	4/20/2011	629	Pass	3	58+42	CL	0	6.1			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	109.1	84.3	29.4	92.0	**91.3**	1.2		**1.2**		70	25	45	CH	6.8	93.2	4.9
4461	4/20/2011	626	Pass	2	137+84	PS	-84	5.5			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	112.7	88.9	26.8	97.1	**96.3**	-1.4		**-1.4**		70	27	43	CH	3.8	96.2	5.2
4461	4/20/2011	622	PASS	2	127+60	PS	-94.2	5.3			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	109.6	83.5	31.3	91.2	**90.5**	3.1		**3.1**		70	25	45	CH	3.0	97.0	4.8
4461	4/20/2011	623	Pass	2	130+02	PS	-100	4.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	107.4	83.3	29.0	90.9	**90.2**	0.8		**0.8**		69	24	45	CH	3.2	96.8	4.0
4461	4/20/2011	625	Pass	2	135+18	PS	-98	5.0			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	107.9	83.1	29.8	93.5	**93.6**	0.2		**1.3**		76	27	49	CH	2.6	97.4	4.6
4461	4/20/2011	621	Pass	4	52+00	FS	7	7.9			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	103.5	78.2	32.3	91.5	**90.9**	1.2		**3.2**		84	29	55	CH	4.5	95.5	6.4
4461	4/20/2011	628	Pass	2	142+62	PS	-90	5.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	108.1	84.5	28.0	92.2	**91.5**	-0.2		**-0.2**		68	24	44	CH	3.1	96.9	3.8
4461	4/20/2011	620	Pass	4	47+21	CL	0	7.9			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	106.9	78.9	35.5	92.3	**91.7**	4.4		**6.4**	YES	82	31	51	CH	4.0	96.0	6.1
4461	4/20/2011	627	Pass	2	140+02	PS	-84	5.6			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	112.9	86.8	30.0	94.8	**94.0**	1.8		**1.8**		66	26	40	CH	3.7	96.3	4.0
4479	4/25/2011	632	Pass	2	150+08	PS	-106	4.7			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	113.7	88.4	28.6	93.2	**93.2**	4.5		**4.8**		62	24	38	CH	3.8	96.2	3.3
4479	4/25/2011	634	Pass	2	155+14	PS	-121	4.0			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	114.5	92.6	23.7	97.7	**97.7**	-0.4		**-0.1**		62	22	40	CH	3.7	96.3	3.6
4479	4/25/2011	633	Pass	2	152+62	PS	-106	4.4			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	115.5	93.1	24.1	98.2	**98.2**	0.0		**0.3**		61	21	40	CH	2.8	97.2	3.1
4479	4/25/2011	631	Pass	2	147+67	PS	-111	4.5			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	115.4	88.2	30.9	96.3	**95.6**	2.7		**2.7**		67	24	43	CH	6.9	93.1	3.5
4479	4/25/2011	630	Pass	2	145+10	PS	-80	5.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	113.1	88.2	28.3	96.3	**95.6**	0.1		**0.1**		66	20	46	CH	3.1	96.9	3.1
4479	4/25/2011	636	Fail	2	160+09	PS	-134	3.8		4527+662	4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	110.1	89.3	23.3	97.5	**96.7**	-4.9	YES	**-4.9**	YES	65	22	43	CH	3.6	96.4	3.3
4479	4/25/2011	635	Pass	2	157+57	PS	-122	4.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	111.2	85.0	30.9	92.8	**92.1**	2.7		**2.7**		63	21	42	CH	3.5	96.5	3.3
4486	4/26/2011	638	Pass	8	148+00	CL	0	12.3			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	109.9	86.1	27.6	93.3	**93.4**	1.6		**1.8**		70	23	47	CH	4.0	96.0	4.1
4486	4/26/2011	641	Pass	4	60+28	PS	-11	7.3			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	115.3	91.1	26.6	98.7	**98.8**	0.6		**0.8**		69	25	44	CH	6.4	93.6	4.1
4486	4/26/2011	640	Pass	8	158+13	CL	0	12.2			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	118.2	92.4	27.9	100.1	**100.2**	1.9		**2.1**		69	22	47	CH	4.0	96.0	3.8
4486	4/26/2011	637	Fail	8	143+09	CL	0	12.2		4527+660	3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	113.5	94.0	20.7	101.8	**102.0**	-5.3	YES	**-5.1**	YES	64	23	41	CH	5.0	95.0	3.8
4486	4/26/2011	639	Pass	8	153+08	CL	0	12.2		4527+661	3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	108.4	87.6	23.8	94.9	**95.0**	-2.2		**-2.0**		64	20	44	CH	4.3	95.7	3.4
4502	4/27/2011	644	Pass	8	168+05	CL	0	12.9			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	110.7	83.7	32.2	91.4	**90.7**	4.0		**4.0**		71	23	48	CH	3.7	96.5	4.8
4502	4/27/2011	643	Pass	8	163+11	CL	0	12.8			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	118.1	93.0	27.0	98.1	**98.1**	2.9		**3.2**		60	20	40	CH	5.2	94.8	3.8
4502	4/27/2011	645	Pass	8	173+13	CL	0	12.9			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	116.4	92.7	25.6	101.2	**100.4**	-2.6		**-2.6**		66	21	45	CH	4.4	95.6	3.6
4502	4/27/2011	646	Pass	8	178+29	CL	0	12.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	109.0	84.8	28.5	92.6	**91.9**	0.3		**0.3**		62	22	40	CH	3.4	96.6	3.4
4507	4/28/2011	647	Pass	5	46+00	CL	0	8.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	106.2	83.8	26.7	91.5	**90.8**	-1.5		**-1.5**		71	24	47	CH	4.5	95.5	5.3
4507	4/28/2011	648	Pass	5	51+06	CL	0	8.9			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	109.3	86.1	27.0	96.9	**97.0**	-2.6		**-1.5**		74	22	52	CH	5.6	94.4	4.9
4518	4/29/2011	649	Pass	5	41+05	CL	0	8.9			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	111.2	83.7	32.8	94.2	**94.3**	3.2		**4.3**		79	27	52	CH	6.7	93.3	4.1
4518	4/29/2011	651	Pass	5	26+19	FS	8	8.5			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	107.1	81.7	31.1	91.9	**92.0**	1.5		**2.6**		79	27	52	CH	5.2	94.8	4.3
4518	4/29/2011	652	Pass	5	31+00	PS	-7	8.6			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	112.7	89.0	26.7	97.2	**96.4**	-1.5		**-1.5**		70	23	47	CH	6.4	93.6	3.4
4518	4/29/2011	650	Pass	5	36+90	CL	0	8.8			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	105.5	81.2	30.0	95.0	**94.4**	-1.1		**0.9**		80	22	58	CH	6.9	93.1	5.1
4524	4/30/2011	655	Pass	4	10+95	FS	8	8.2			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	112.1	87.8	27.7	95.9	**95.1**	-0.5		**-0.5**		69	22	47	CH	5.4	94.6	3.2
4524	4/30/2011	657	Pass	5	22+05	CL	0	9.0			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	109.7	85.9	27.7	96.6	**96.7**	-1.9		**-0.8**		75	25	50	CH	6.8	93.2	4.2
4524	4/30/2011	653	Fail	4	1+40	PS	-7	8.2		4558+681	3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	108.6	91.7	18.4	103.1	**103.3**	-11.2	YES	**-10.1**	YES	74	22	52	CH	3.4	96.6	4.2
4524	4/30/2011	656	Pass	5	16+63	CL	0	9.0			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	106.2	82.5	28.7	92.8	**92.9**	-0.9		**0.2**		73	23	50	CH	5.6	94.4	4.1
4524	4/30/2011	654	Fail	4	6+54	PS	-6	8.4		4533+674	3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	109.7	88.8	23.5	99.9	**100.0**	-6.1	YES	**-5.0**	YES	73	21	52	CH	3.3	96.7	4.0
4524	4/30/2011	658	Pass	1	55+75	PS	-8	4.4			4171	96.5	22.9	**97.2**	**23.1**	60	22	38	88.2	115.3	94.5	22.0	97.9	**97.2**	-0.9		**-1.1**		56	21	35	CH	17.0	83.0	3.3
4527	5/1/2011	666	Pass	2	172+64	PS	-68	6.3			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	107.3	84.2	27.4	91.9	**91.2**	-0.8		**-0.8**		71	26	45	CH	9.3	90.7	5.0
4527	5/1/2011	661	Pass	8	153+08	CL	0	12.0	4486+639		3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	111.4	90.3	23.4	97.8	**97.9**	-2.6		**-2.4**		66	19	47	CH	3.7	96.3	3.5
4527	5/1/2011	660	Pass	8	143+09	CL	0	11.7	4486+637		3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	115.3	93.0	24.0	100.8	**100.9**	-2.0		**-1.8**		65	20	45	CH	5.4	94.6	3.2
4527	5/1/2011	667	Pass	2	170+00	PS	-61	6.6			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	108.0	83.3	29.6	90.9	**90.2**	1.4		**1.4**		70	29	41	CH	5.0	95.0	4.2
4527	5/1/2011	668	Pass	2	167+50	PS	-84	5.8			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	113.1	88.1	28.4	99.1	**99.2**	-1.2		**-0.1**		77	25	52	CH	3.9	96.1	3.7
4527	5/1/2011	669	Pass	2	165+02	PS	-73	6.0			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	110.7	85.7	29.1	96.4	**96.5**	-0.5		**0.6**		76	25	51	CH	4.0	96.0	3.3
4527	5/1/2011	659	Pass	2	56+39	CL	0	5.2			4171	96.5	22.9	**97.2**	**23.1**	60	22	38	88.2	115.0	92.7	24.1	96.1	**95.4**	1.2		**1.0**		59	21	38	CH	14.8	85.2	3.8
4527	5/1/2011	664	Pass	2	177+55	PS	-67	6.6			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	107.9	84.5	27.7	92.2	**91.5**	-0.5		**-0.5**		67	25	42	CH	6.8	93.2	3.5
4527	5/1/2011	665	Pass	2	175+12	PS	-56	6.4			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	109.4	86.8	26.1	94.8	**94.0**	-2.1		**-2.1**		67	23	44	CH	5.6	94.4	3.9
4527	5/1/2011	663	Pass	2	179+92	PS	-66	6.3			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	107.4	84.4	27.3	94.9	**95.0**	-2.3		**-1.2**		74	21	53	CH	4.3	95.7	3.5
4527	5/1/2011	670	Pass	2	162+53	PS	-80	6.2			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	115.2	88.5	30.2	99.6	**99.7**	0.6		**1.7**		73	22	51	CH	6.9	93.1	3.9
4527	5/1/2011	662	Pass	2	160+09	PS	-134	3.8	4479+636		4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	110.6	87.8	26.0	95.9	**95.1**	-2.2		**-2.2**		65	19	46	CH	6.6	93.4	3.1
4533	5/2/2011	676	Pass	5	92+96	PS	-138	2.6			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.0	86.9	31.2	94.9	**94.1**	3.0		**3.0**		71	26	45	CH	4.2	95.8	3.9
4533	5/2/2011	675	Pass	4	98+05	PS	-138	3.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	109.5	83.4	31.3	91.0	**90.4**	3.1		**3.1**		70	25	45	CH	4.3	95.7	4.6
4533	5/2/2011	673	Fail	4	1+40	PS	-16	8.2	4524-653	4558+681	3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	105.4	88.0	19.8	99.0	**99.1**	-9.8	YES	**-8.7**	YES	73	26	47	CH	7.8	92.2	5.3
4533	5/2/2011	671	Pass	3	101+01	PS	-135	2.6			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	108.6	84.6	28.4	92.4	**91.7**	0.2		**0.2**		66	24	42	CH	5.0	95.0	3.6
4533	5/2/2011	672	Fail	3	106+00	PS	-128	2.1		4566+695	4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	111.1	89.3	24.4	97.5	**96.7**	-3.8	YES	**-3.8**	YES	66	20	46	CH	4.4	95.6	4.1
4533	5/2/2011	674	Pass	4	6+54	PS	-6	8.4	4524+654		3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	113.1	88.8	27.4	99.9	**100.0**	-2.2		**-1.1**		72	23	49	CH	3.9	96.1	4.0
4546	5/3/2011	680	Pass	3	56+60	CL	0	6.0			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	111.5	89.3	24.8	96.7	**96.9**	-1.2		**-1.0**		71	23	48	CH	10.1	89.9	5.2
4546	5/3/2011	679	Pass	4	78+97	PS	-152	1.6			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	113.2	85.8	32.0	93.7	**93.0**	3.8		**3.8**		72	26	46	CH	4.3	95.7	5.2
4546	5/3/2011	677	Pass	5	89+01	PS	-127	2.9			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.0	89.6	27.3	97.8	**97.1**	-0.9		**-0.9**		64	22	42	CH	5.9	94.1	4.0
4546	5/3/2011	678	Pass	5	84+02	PS	-136	2.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	108.5	86.2	25.8	94.1	**93.4**	-2.4		**-2.4**		64	21	43	CH	4.0	96.0	3.6
4558	5/4/2011	689	Pass	6	24+02	CL	0	9.8			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	110.9	88.1	25.9	92.9	**92.9**	1.8		**2.1**		68	20	48	CH	3.4	96.6	4.1

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear w_{Meas} - w_{Opt}	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear w_{Meas} - w_{Opt} Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
4558	5/4/2011	685	Pass	6	44+01	CL	0	9.8			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	114.9	91.7	25.3	96.7	**96.7**	1.2		**1.5**		63	21	42	CH	3.0	97.0	3.6
4558	5/4/2011	691	Pass	4	55+61	FS	6	7.1			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	108.0	86.0	25.6	93.2	**93.3**	-0.4		**-0.2**		66	24	42	CH	12.0	88.0	5.0
4558	5/4/2011	684	Pass	6	49+03	PS	-5	9.7			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	117.7	93.6	25.7	98.7	**98.7**	1.6		**1.9**		62	21	41	CH	2.9	97.1	3.3
4558	5/4/2011	690	Pass	6	19+02	CL	0	9.9			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	107.2	81.0	32.4	94.7	**94.2**	1.3		**3.3**		86	25	61	CH	4.1	95.9	4.9
4558	5/4/2011	681	Pass	4	1+40	PS	-16	8.2	4533+673		3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	107.1	84.6	26.6	95.2	**95.3**	-3.0		**-1.9**		76	22	54	CH	3.8	96.2	4.7
4558	5/4/2011	682	Pass	5	58+90	FS	14	8.1			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	105.6	81.7	29.3	91.9	**92.0**	-0.3		**0.8**		75	24	51	CH	4.9	95.1	4.0
4558	5/4/2011	686	Pass	6	39+00	PS	-11	9.7			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	109.7	87.2	25.8	95.2	**94.5**	-2.4		**-2.4**		67	21	46	CH	5.2	94.8	4.1
4558	5/4/2011	688	Pass	6	29+02	PS	-8	9.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	111.7	88.9	25.7	97.1	**96.3**	-2.5		**-2.5**		66	21	45	CH	4.4	95.6	4.2
4558	5/4/2011	683	Pass	6	54+04	CL	0	9.8			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	113.2	87.5	29.3	98.4	**98.5**	-0.3		**0.8**		73	23	50	CH	2.8	97.2	4.2
4558	5/4/2011	693	Pass	5	9+02	CL	0	9.0			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	114.4	92.3	24.0	97.4	**97.4**	-0.1		**0.2**		57	22	35	CH	3.9	96.1	3.4
4558	5/4/2011	687	PASS	6	34+00	PS	-11	9.9			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	117.0	90.0	30.0	98.3	**97.5**	1.8		**1.8**		64	21	43	CH	3.6	96.4	4.2
4558	5/4/2011	692	Pass	5	14+06	CL	0	8.9			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	111.5	88.6	25.8	96.7	**96.0**	-2.4		**-2.4**		64	22	42	CH	3.6	96.4	3.7
4566	5/5/2011	696	Pass	4	70+95	PS	-144	2.2			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	107.8	84.4	27.8	92.1	**91.4**	-0.4		**-0.4**		74	26	48	CH	4.2	95.8	5.0
4566	5/5/2011	695	Pass	3	106+00	FS	-128	2.1	4533+672		4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	109.1	86.3	26.4	94.2	**93.5**	-1.8		**-1.8**		69	24	45	CH	5.0	95.0	4.6
4566	5/5/2011	694	Pass	1	109+54	PS	-164	-0.6			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	110.1	86.8	26.9	94.8	**94.0**	-1.3		**-1.3**		67	23	44	CH	3.4	96.6	4.2
4572	5/6/2011	697	Pass	2	2+08	PS	-107	2.2			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	110.2	86.4	27.6	91.1	**91.1**	3.5		**3.8**		61	24	37	CH	3.5	96.5	2.9
4572	5/6/2011	698	Pass	2	4+50	PS	-103	2.2			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	114.2	90.3	26.4	95.3	**95.3**	2.3		**2.6**		58	24	34	CH	3.2	96.8	2.9
4572	5/6/2011	699	Pass	2	6+83	PS	-116	1.7			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.6	90.4	26.8	98.7	**97.9**	-1.4		**-1.4**		65	25	40	CH	3.5	96.5	3.0
4572	5/6/2011	700	Pass	2	9+50	PS	-123	1.6			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.3	90.2	26.7	98.5	**97.7**	-1.5		**-1.5**		62	22	40	CH	3.4	96.8	2.9
4583	5/9/2011	702	Pass	3	120+89	PS	-111	5.3			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	112.8	90.7	24.3	95.7	**95.7**	0.2		**0.5**		62	22	40	CH	3.4	96.6	2.7
4583	5/9/2011	703	Fail	3	122+97	PS	-82	6.3		4849+800	3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	110.7	94.4	17.3	99.6	**99.6**	-6.8	YES	**-6.5**	YES	60	20	40	CH	3.5	96.5	3.4
4583	5/9/2011	701	Pass	5	3+04	PS	-7	9.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	105.8	84.0	25.9	91.7	**91.0**	-2.3		**-2.3**		65	22	43	CH	3.7	96.3	4.1
4583	5/9/2011	704	Pass	3	124+99	PS	-110	5.3			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	109.1	86.7	25.8	91.5	**91.5**	1.7		**2.0**		56	21	35	CH	3.6	96.4	3.4
4596	5/10/2011	706	Pass	6	8+00	CL	0	9.8			3616	95.5	24.0	**95.5**	**24.0**	54	23	31	94.8	118.2	94.1	25.6	98.5	**98.5**	1.6		**1.6**		55	23	32	CH	3.8	96.2	3.1
4596	5/10/2011	705	Pass	6	3+00	CL	0	9.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.5	86.6	32.2	94.5	**93.8**	4.0		**4.0**		64	25	39	CH	7.2	92.8	4.3
4596	5/10/2011	707	Pass	6	12+93	CL	0	9.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	113.8	87.7	29.7	95.7	**95.0**	1.5		**1.5**		63	26	37	CH	3.2	96.8	3.6
4605	5/11/2011	710	Pass	3	130+91	PS	-104	5.6			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	115.4	90.2	27.9	95.1	**95.1**	3.8		**4.1**		64	25	40	CH	2.8	97.2	2.3
4605	5/11/2011	709	Pass	3	128+97	PS	-92	5.9			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	117.4	92.7	26.7	97.8	**97.8**	2.6		**2.9**		62	24	38	CH	2.7	97.3	2.2
4605	5/11/2011	711	Pass	3	133+14	PS	-63	6.8			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	115.6	91.1	26.9	96.1	**96.1**	2.8		**3.1**		61	21	40	CH	3.3	96.7	2.5
4605	5/11/2011	712	Pass	3	135+19	PS	-73	6.6		4762+780	3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	113.2	92.4	22.5	97.5	**97.5**	-1.6		**-1.3**		60	22	38	CH	3.6	96.4	3.0
4605	5/11/2011	708	Pass	3	127+00	PS	-64	6.8			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	117.4	93.8	25.2	98.9	**98.9**	1.1		**1.4**		58	23	35	CH	3.2	96.8	2.8
4605	5/11/2011	713	Fail	3	137+09	PS	-88	6.0		4762+781	4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	109.6	88.2	24.2	96.3	**95.6**	-4.0	YES	**-4.0**	YES	66	23	43	CH	3.1	96.9	2.5
4613	5/12/2011	717	Pass	3	109+57	PS	-156	1.3			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	116.6	91.7	27.2	96.7	**96.7**	3.1		**3.4**		64	24	40	CH	7.3	92.7	4.1
4613	5/12/2011	716	Fail	1	63+22	PS	-135	2.0		4828+795	3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	110.5	93.1	18.7	98.2	**98.2**	-5.4	YES	**-5.1**	YES	64	24	40	CH	6.0	94.0	4.3
4613	5/12/2011	714	Pass	2	109+56	PS	-139	1.2			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	117.7	92.6	27.1	97.7	**97.7**	3.0		**3.3**		62	25	37	CH	3.2	96.8	3.4
4613	5/12/2011	718	Pass	3	138+65	PS	-77	6.3			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	115.2	92.9	24.0	98.0	**98.0**	-0.1		**0.2**		61	22	39	CH	4.8	95.2	2.8
4613	5/12/2011	721	Pass	3	145+23	PS	-81	6.3			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	111.3	87.6	27.0	92.4	**92.4**	2.9		**3.2**		61	23	38	CH	3.1	96.9	1.9
4613	5/12/2011	719	Pass	3	141+00	PS	-72	6.6			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	116.4	91.4	27.3	96.4	**96.4**	3.2		**3.5**		61	24	37	CH	2.1	97.9	3.4
4613	5/12/2011	720	Pass	3	143+07	PS	-73	6.6			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	114.2	90.4	26.3	95.4	**95.4**	2.2		**2.5**		59	22	37	CH	5.7	94.3	3.6
4613	5/12/2011	715	Pass	1	68+45	PS	-137	1.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	115.0	90.2	27.5	98.5	**97.7**	-0.7		**-0.7**		66	24	42	CH	5.0	95.0	3.7
4641	5/16/2011	724	Pass	5	98+04	PS	-147	2.6			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	120.9	97.3	24.3	102.6	**102.6**	0.2		**0.5**		63	23	40	CH	3.7	96.3	3.7
4641	5/16/2011	723	Pass	6	92+97	PS	-158	2.1			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	117.6	93.7	25.5	98.8	**98.8**	1.4		**1.7**		62	22	40	CH	3.9	96.1	3.8
4641	5/16/2011	726	Pass	4	107+00	PS	-148	2.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	111.3	88.5	25.8	96.6	**95.9**	-2.4		**-2.4**		65	21	44	CH	6.2	93.8	3.7
4641	5/16/2011	725	Fail	4	103+02	PS	-145	2.1		4675+754	4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	108.1	88.0	22.8	96.1	**95.3**	-5.4	YES	**-5.4**	YES	65	23	42	CH	4.9	95.1	4.1
4641	5/16/2011	722	Fail	6	88+03	PS	-130	2.9		5474+896	4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	111.2	92.4	20.3	100.9	**100.1**	-7.9	YES	**-7.9**	YES	63	21	42	CH	4.9	95.1	4.2
4655	5/17/2011	734	Pass	7	37+99	CL	0	11.0			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	105.2	84.0	25.2	91.0	**91.1**	-0.8		**-0.6**		73	29	44	CH	8.6	91.4	5.7
4655	5/17/2011	729	Pass	5	73+06	PS	-152	2.2			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	114.6	93.2	23.0	98.3	**98.3**	-1.1		**-0.8**		65	24	41	CH	6.1	93.9	3.9
4655	5/17/2011	735	Pass	7	33+00	CL	0	11.0			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	112.7	84.3	33.7	97.3	**96.6**	3.7		**5.3**	YES	83	31	52	CH	12.3	87.7	6.2
4655	5/17/2011	732	Pass	7	48+01	CL	0	10.8			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	110.7	88.3	25.3	95.7	**95.8**	-0.7		**-0.5**		68	23	45	CH	7.0	93.0	4.4
4655	5/17/2011	728	Fail	5	77+92	PS	-131	2.6		4675+745	3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	111.1	93.6	18.7	98.7	**98.7**	-5.4	YES	**-5.1**	YES	63	22	41	CH			3.7
4655	5/17/2011	730	Pass	2	68+08	PS	-132	2.3			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	110.0	88.9	23.7	93.8	**93.8**	-0.4		**-0.1**		62	24	38	CH	3.6	96.4	3.4
4655	5/17/2011	736	Fail	10	77+49	CL	0	13.2		4675+740	4171	96.5	22.9	**97.2**	**23.1**	60	22	38	88.2	108.2	91.2	18.7	94.5	**93.8**	-4.2	YES	**-4.4**	YES	63	24	39	CH	6.4	93.6	4.4
4655	5/17/2011	731	Pass	7	52+93	FS	5	10.8			4171	96.5	22.9	**97.2**	**23.1**	60	22	38	88.2	113.8	91.1	24.9	94.4	**93.7**	2.0		**1.8**		62	25	37	CH	10.2	89.8	3.9
4655	5/17/2011	737	Pass	10	97+49	PS	-6	13.1			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	107.7	84.7	27.1	92.5	**91.8**	-1.1		**-1.1**		68	24	44	CH	3.7	96.3	4.1
4655	5/17/2011	733	Pass	7	43+00	CL	0	10.9			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	106.9	83.5	28.0	96.4	**95.6**	-2.0		**-0.4**		77	26	51	CH	13.9	86.1	6.2
4655	5/17/2011	727	Fail	6	82+94	PS	-151	2.4		4828+799	3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	114.5	100.4	14.1	105.9	**105.9**	-10.0	YES	**-9.7**	YES	58	22	36	CH	6.1	93.9	3.4
4655	5/17/2011	739	Pass	10	107+43	CL	0	13.2			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	106.8	84.5	26.4	92.2	**91.5**	-1.8		**-1.8**		67	22	45	CH	3.6	96.4	3.4
4655	5/17/2011	738	Pass	10	102+55	CL	0	13.2			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	114.5	89.9	27.3	101.1	**101.2**	-2.3		**-1.2**		74	23	51	CH	2.6	97.4	3.5
4675	5/19/2011	740	Pass	10	77+49	CL	0	13.2	4655+736		4171	96.5	22.9	**97.2**	**23.1**	60	22	38	88.2	118.0	93.9	25.7	97.3	**96.6**	2.8		**2.6**		65	23	42	CH	7.3	92.7	4.9
4675	5/19/2011	744	Fail	6	82+94	PS	-151	2.4	4655-727	4828+799	3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	116.0	98.7	17.5	104.1	**104.1**	-6.6	YES	**-6.3**	YES	63	21	42	CH	4.4	95.6	3.9
4675	5/19/2011	741	Fail	10	82+44	CL	0	13.1		QA Test	4171	96.5	22.9	**97.2**	**23.1**	60	22	38	88.2	112.0	85.5	31.0	88.6	**88.0**	8.1	YES	**7.9**	YES	64	25	40	CH	3.9	96.1	4.1
4675	5/19/2011	745	Pass	5	77+92	PS	-131	2.6	4655+728		3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	107.0	87.8	21.8	92.6	**92.6**	-2.3		**-2.0**		62	21	41	CH	4.5	95.5	3.5
4675	5/19/2011	746	Pass	6	59+40	CL	0	9.1			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	112.8	89.7	25.7	94.6	**94.6**	1.6		**1.9**		62	23	39	CH	3.9	96.1	3.0
4675	5/19/2011	747	Pass	5	55+90	PS	-9	8.0			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	110.6	88.9	24.4	93.8	**93.8**	0.3		**0.6**		62	23	39	CH	2.1	97.9	3.2
4675	5/19/2011	752	Fail	7	8+96	PS	-9	10.9		4699+759	4716	79.2	34.0	**79.0**	**32.2**	90	29	61	82.6	110.8	77.4	43.2	97.7	**98.0**	9.2	YES	**11.0**	YES	92	26	66	CH	21.5	78.5	7.0
4675	5/19/2011	743	Fail	10	92+49	CL	0	13.2		4699+757	4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	113.4	90.7	25.0	99.0	**98.3**	-3.2	YES	**-3.2**	YES	70	22	48	CH	4.0	96.0	2.9
4675	5/19/2011	753	Fail	7	3+97	CL	0	10.9		4699+760	4716	79.2	34.0	**79.0**	**32.2**	90	29	61	82.6	101.8	72.2	40.9	91.2	**91.4**	6.9	YES	**8.7**	YES	91	27	64	CH	15.5	84.5	6.8
4675	5/19/2011	749	Pass	7	23+07	CL	0	10.9			4716	79.2	34.0	**79.0**	**32.2**	90	29	61	82.6	112.9	81.3	38.9	102.7	**102.9**	4.9		**6.7**	YES	91	26	65	CH	9.7	90.3	6.1
4675	5/19/2011	755	Pass	6	108+86	CL	0	10.7			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	119.1	91.2	30.6	99.6	**98.8**	2.4		**2.4**		68	22	46	CH	5.3	94.7	2.4
4675	5/19/2011	742	Pass	10	87+48	CL	0	13.2		4762+778	4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	113.6	90.2	25.9	98.5	**97.7**	-2.3		**-2.3**		68	23	45	CH	0.9	99.1	2.8
4675	5/19/2011	748	Pass	7	27+48	PS	-6	10.9			4716	79.2	34.0	**79.0**	**32.2**	90	29	61	82.6	111.0	80.0	38.7	101.0	**101.3**	4.7		**6.5**	YES	90	27	63	CH	10.1	89.9	6.2
4675	5/19/2011	751	Pass	7	12+99	CL	0	11.0			4716	79.2	34.0	**79.0**	**32.2**	90	29	61	82.6	108.6	78.8	37.8	99.5	**99.7**	3.8		**5.6**	YES	89	27	62	CH	16.4	83.6	5.2
4675	5/19/2011	754	Pass	4	103+02	PS	-145	2.1	4641+725		4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	116.4	92.0	26.5	100.4	**99.7**	-1.7		**-1.7**		64	24	40	CH	4.1	95.9	2.8

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	**Reported Moisture Out of Tolerance - 3/+5%**	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	**Corrected Moisture Out of Tolerance - 3/+5%**	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
4675	5/19/2011	750	Pass	7	18+07	CL	0	11.0			4716	79.2	34.0	**79.0**	**32.2**	90	29	61	82.6	112.0	81.0	38.2	102.3	**102.5**	4.2		**6.0**	YES	86	26	60	CH	12.3	87.7	6.4
4699	5/23/2011	757	Pass	10	92+49	CL	0	13.2	4675+743		3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	118.7	95.7	24.0	100.9	**100.9**	-0.1		**0.2**		62	22	40	CH	5.2	94.8	3.7
4699	5/23/2011	758	Pass	7	109+27	CL	0	12.1			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	110.2	86.0	28.2	93.9	**93.2**	0.0		**0.0**		69	23	46	CH	7.0	93.0	4.0
4699	5/23/2011	756	Fail	6	82+94	PS	-151	2.4	4675-744	4828+799	3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	108.6	91.6	18.6	96.6	**96.6**	-5.5	YES	**-5.2**	YES	60	22	38	CH	4.4	95.6	3.7
4699	5/23/2011	760	Pass	7	3+97	CL	0	10.9	4675+753		4716	79.2	34.0	**79.0**	**32.2**	90	29	61	82.6	105.2	76.6	37.3	96.7	**97.0**	3.3		**5.1**	YES	89	33	56	CH	12.8	87.2	8.9
4699	5/23/2011	759	Pass	7	8+96	PS	-9	10.9	4675+752		4716	79.2	34.0	**79.0**	**32.2**	90	29	61	82.6	106.2	78.0	36.2	98.5	**98.7**	2.2		**4.0**		85	32	53	CH	7.7	92.3	6.9
4716	5/24/2011	762	Pass	4	103+46	FS	83	5.1			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	112.5	87.6	28.4	95.6	**94.9**	0.2		**0.2**		73	27	46	CH	6.8	93.2	4.1
4716	5/24/2011	761	Pass	4	108+55	FS	79				4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	109.8	87.5	25.5	95.5	**94.8**	-2.7		**-2.7**		69	24	45	CH	4.1	95.9	4.2
4726	5/26/2011	767	Fail	11	101+00	CL	0	13.7		4762+784	4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	107.6	87.5	23.0	95.5	**94.8**	-5.2	YES	**-5.2**	YES	70	22	48	CH	9.5	90.5	3.9
4726	5/26/2011	765	Pass	3	68+99	PS	-136				4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	115.5	92.0	25.5	100.4	**99.7**	-2.7		**-2.7**		70	23	47	CH	5.3	94.7	3.9
4726	5/26/2011	766	Fail	8	108+75	CL	0	12.6		4746+776	3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	110.9	89.4	24.0	100.6	**100.7**	-5.6	YES	**-4.5**	YES	74	23	51	CH	6.1	93.9	3.8
4746	6/1/2011	777	Pass	4	66+70	FS	99	4.8			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	117.1	94.3	24.2	102.2	**102.3**	-1.8		**-1.6**		67	22	45	CH	5.3	94.7	2.9
4746	6/1/2011	775	Pass	6	55+99	CL	0				3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	106.1	81.9	29.6	92.1	**92.2**	0.0		**1.1**		77	26	51	CH	3.6	96.4	3.9
4746	6/1/2011	776	Pass	8	108+75	CL	0	12.6	4726+766		3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	111.0	83.0	33.8	93.4	**93.5**	4.2		**5.3**	YES	74	22	52	CH	6.0	94.0	3.9
4748	5/31/2011	768	Pass	5	57+48	CL	0	8.5			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	111.3	88.3	26.1	96.4	**95.7**	-2.1		**-2.1**		73	24	49	CH	8.7	91.3	3.3
4748	5/31/2011	773	Pass	4	78+56	FS	78				4171	96.5	22.9	**97.2**	**23.1**	60	22	38	88.2	119.8	96.9	23.6	100.4	**99.7**	0.7		**0.5**		63	22	41	CH	8.9	91.1	2.3
4748	5/31/2011	771	Pass	4	83+57	FS	73	6.4			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	108.6	86.4	25.7	94.3	**93.6**	-2.5		**-2.5**		70	24	46	CH	6.6	93.4	3.5
4748	5/31/2011	770	Pass	4	88+57	FS	94	5.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.6	89.7	27.7	97.9	**97.2**	-0.5		**-0.5**		70	23	47	CH	6.0	94.0	2.9
4748	5/31/2011	774	Pass	4	73+50	FS	85	5.3			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	114.7	91.2	25.8	98.8	**98.9**	-0.2		**0.0**		64	21	43	CH	10.8	89.2	2.6
4748	5/31/2011	772	Pass	5	57+48	CL	0				4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	107.6	84.6	27.2	92.4	**91.7**	-1.0		**-1.0**		69	25	44	CH	4.2	95.8	3.0
4748	5/31/2011	769	Pass	4	93+50	FS	93	4.8			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	111.5	86.4	29.1	101.1	**100.5**	-2.0		**0.0**		81	26	55	CH	7.1	92.9	3.4
4762	6/2/2011	785	Pass	11	97+99	FS	15	11.3			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	113.8	89.5	27.2	100.7	**100.8**	-2.4		**-1.3**		77	24	53	CH	5.6	94.4	4.1
4762	6/2/2011	779	Pass	3	133+14	PS	-63	6.8	4605+711		3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	117.5	93.3	26.0	98.4	**98.4**	1.9		**2.2**		61	20	41	CH	3.8	96.2	2.7
4762	6/2/2011	782	Pass	10	87+48	CL	0		4675+742		4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	117.9	91.4	29.0	99.8	**99.0**	0.8		**0.8**		69	21	48	CH	3.5	96.5	3.4
4762	6/2/2011	780	Pass	3	135+19	PS	-73	6.6	4605+712		4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	112.4	89.7	25.3	97.9	**97.2**	-2.9		**-2.9**		68	23	45	CH	4.3	95.7	3.9
4762	6/2/2011	783	Pass	10	77+49	CL	0	13.2	4675+740		3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	117.0	90.1	29.8	101.3	**101.5**	0.2		**1.3**		74	23	51	CH	5.1	94.9	3.9
4762	6/2/2011	778	Fail	10	87+48	CL	0	13.2	4675+744	4762+778	4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.6	91.8	24.9	100.2	**99.5**	-3.3	YES	**-3.3**	YES	67	21	46	CH	3.7	96.3	3.2
4762	6/2/2011	781	Pass	3	137+09	PS	-88	6.0	4605+713		4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	110.6	87.6	26.2	95.6	**94.9**	-2.0		**-2.0**		66	21	45	CH	6.2	93.8	3.1
4762	6/2/2011	784	Pass	11	101+00	CL	0	13.7	4726+767		3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	113.0	88.4	27.9	99.4	**99.5**	-1.7		**-0.6**		73	22	51	CH	3.4	96.6	3.2
4798	6/3/2011	787	Pass	5	100+95	PS	-155	2.9			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	109.2	85.0	28.4	92.8	**92.1**	0.2		**0.2**		69	23	46	CH	3.3	96.7	3.2
4798	6/3/2011	786	Pass	5	105+15	PS	150				3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	114.2	88.9	28.5	100.0	**100.1**	-1.1		**0.0**		74	24	50	CH	5.3	94.7	3.5
4798	6/3/2011	788	Pass	11	92+68	CL	0	13.7			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	112.3	87.7	28.1	98.7	**98.8**	-1.5		**-0.4**		74	22	52	CH	4.3	95.7	3.2
4828	6/7/2011	797	Pass	10	72+62	CL	0	13.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	113.3	89.1	27.1	97.3	**96.5**	-1.1		**-1.1**		71	22	49	CH	5.6	94.4	3.3
4828	6/7/2011	791	Pass	9	108+85	CL	0	13.2			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	114.3	88.7	28.8	99.8	**99.9**	-0.8		**0.3**		77	23	54	CH	7.8	92.2	3.1
4828	6/7/2011	795	Pass	1	63+22	PS	-135	2.0	4613+716		4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	117.5	92.2	27.5	100.7	**99.9**	-0.7		**-0.7**		70	22	48	CH	8.2	91.8	3.7
4828	6/7/2011	794	Pass	7	87+60	PS	-108	3.5			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	121.4	94.3	28.7	102.9	**102.2**	0.5		**0.5**		69	19	50	CH	6.2	93.8	3.2
4828	6/7/2011	798	Pass	10	67+45	CL	0	13.7			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	113.8	89.0	27.8	97.2	**96.4**	-0.4		**-0.4**		69	23	46	CH	5.7	94.3	3.0
4828	6/7/2011	790	Pass	7	91+00	PS	-99	4.0			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	114.4	88.5	29.2	99.6	**99.7**	-0.4		**0.7**		75	24	51	CH	4.8	95.2	2.9
4828	6/7/2011	792	Pass	11	87+57	CL	0	13.6			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	113.2	89.1	27.0	100.2	**100.3**	-2.6		**-1.5**		75	24	51	CH	4.0	96.0	3.3
4828	6/7/2011	789	Pass	6	96+31	PS	-103	4.0			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	113.0	88.8	27.3	99.9	**100.0**	-2.3		**-1.2**		75	22	53	CH	3.9	96.1	3.2
4828	6/7/2011	799	Pass	6	82+94	PS	-151	2.4	4699+756		4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.4	90.6	26.3	98.9	**98.2**	-1.9		**-1.9**		67	22	45	CH	5.7	94.3	3.0
4828	6/7/2011	796	Pass	11	77+55	CL	0	13.6			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	115.2	88.1	30.7	99.1	**99.2**	1.1		**2.2**		73	23	50	CH	5.8	94.2	3.8
4849	6/9/2011	800	Pass	3	122+97	PS	-82	6.3	4583+703		3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	119.4	95.6	24.9	100.8	**100.8**	0.8		**1.1**		62	22	40	CH	3.3	96.7	3.0
4849	6/9/2011	802	Pass	7	59+31	FS	7	10.2			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	117.6	91.7	28.3	103.1	**103.3**	-1.3		**-0.2**		76	22	54	CH	4.5	95.5	3.3
4849	6/9/2011	805	Pass	3	154+38	PS	-96	5.9			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	119.0	89.9	32.3	98.1	**97.4**	4.1		**4.1**		69	23	46	CH	3.7	96.3	3.0
4849	6/9/2011	804	Pass	3	152+47	PS	-84	6.1			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	120.5	95.2	26.6	103.9	**103.1**	-1.6		**-1.6**		67	20	47	CH	3.9	96.1	3.0
4849	6/9/2011	803	Pass	3	150+50	PS	-52	7.2			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	120.9	92.4	30.8	100.9	**100.1**	2.6		**2.6**		67	21	46	CH	3.4	96.6	3.2
4849	6/9/2011	801	Pass	11	108+39	CL	0	13.7			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	112.2	83.0	35.2	97.1	**96.5**	4.1		**6.1**	YES	81	26	55	CH	5.5	94.5	3.9
4876	6/13/2011	808	Pass	3	156+63	PS	-84	6.5			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	118.1	92.9	27.1	101.4	**100.7**	-1.1		**-1.1**		69	24	45	CH	4.0	96.0	2.7
4876	6/13/2011	809	Pass	3	158+63	PS	-87	6.1			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	116.0	91.7	26.5	100.1	**99.3**	-1.7		**-1.7**		67	22	45	CH	4.4	95.6	3.5
4876	6/13/2011	806	Pass	3	146+31	PS	-78	6.3			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	119.4	95.6	24.9	100.8	**100.8**	0.8		**1.1**		58	18	40	CH	3.2	96.8	2.5
4876	6/13/2011	807	Pass	3	148+44	PS	-99	5.7			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.6	89.0	28.8	97.2	**96.4**	0.6		**0.6**		66	24	42	CH	5.1	94.9	3.1
4900	6/14/2011	812	Pass	6	78+05	PS	-128	3.4			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	108.3	85.7	26.4	93.6	**92.8**	-1.8		**-1.8**		74	25	49	CH	3.2	96.8	3.9
4900	6/14/2011	811	Pass	6	72+99	PS	-132	3.5			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	111.2	87.1	27.6	98.0	**98.1**	-2.0		**-0.9**		75	24	51	CH	3.4	96.6	4.2
4900	6/14/2011	810	Pass	4	68+29	PS	-103	4.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	120.7	93.9	28.6	102.5	**101.7**	0.4		**0.4**		65	22	43	CH	3.0	97.0	2.4
4914	6/16/2011	815	Pass	3	165+12	PS	-111	5.5			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	110.8	87.3	26.9	98.2	**98.3**	-2.7		**-1.6**		78	24	54	CH	3.8	96.2	3.6
4914	6/16/2011	818	Pass	3	171+31	PS	-130	4.8			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	112.2	86.4	29.8	97.2	**97.3**	0.2		**1.3**		75	24	51	CH	3.5	96.4	3.7
4914	6/16/2011	816	Pass	3	166+95	PS	-139	4.5			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	114.5	89.0	28.6	100.1	**100.2**	-1.0		**0.1**		74	22	52	CH	4.3	95.7	3.0
4914	6/16/2011	813	Pass	3	161+33	PS	-135	4.7			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	117.7	90.0	30.8	101.2	**101.4**	1.2		**2.3**		73	24	49	CH	5.2	94.8	3.2
4914	6/16/2011	817	Pass	3	169+08	PS	-138	4.6			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	115.0	88.7	29.7	99.8	**99.9**	0.1		**1.2**		72	23	49	CH	5.0	95.0	3.0
4914	6/16/2011	814	Pass	3	163+19	PS	-111	5.3			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	114.8	89.0	29.0	100.1	**100.2**	-0.6		**0.5**		71	24	47	CH	6.5	93.5	3.2
4920	6/17/2011	823	Pass	3	181+27	PS	-120	4.8			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	115.2	89.6	28.6	100.8	**100.9**	-1.0		**0.1**		75	24	51	CH	3.4	96.6	3.9
4920	6/17/2011	822	Pass	3	179+16	PS	-106	5.7			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	109.2	85.0	28.5	95.6	**95.7**	-1.1		**0.0**		75	22	53	CH	3.2	96.8	4.2
4920	6/17/2011	821	Pass	3	177+10	PS	-111	5.4			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	105.7	81.6	29.5	91.8	**91.9**	-0.1		**1.0**		72	22	50	CH	6.3	93.7	4.4
4920	6/17/2011	819	Pass	3	173+22	PS	-129	4.6			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	114.3	86.8	31.7	97.6	**97.7**	2.1		**3.2**		72	23	49	CH	2.9	97.1	3.6
4920	6/17/2011	820	Pass	3	175+29	PS	-113	5.3			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	115.3	90.2	27.8	101.5	**101.6**	-1.8		**-0.7**		71	22	49	CH	5.1	94.9	3.8
4956	6/22/2011	826	Pass	9	123+92	CL	0	13.3			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	108.0	84.5	27.8	92.2	**91.5**	-0.4		**-0.4**		72	26	46	CH	3.1	96.9	3.5
4956	6/22/2011	824	Pass	8	55+97	PS	-11	11.1			3745	95.8	23.5	**96.2**	**24.5**	63	21	42	91.9	110.1	89.4	23.1	93.3	**92.9**	-0.4		**-1.4**		65	24	41	CH	4.9	96.0	3.4
4956	6/22/2011	827	Pass	9	129+55	CL	0	13.3			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	116.2	90.4	28.6	98.7	**97.9**	0.4		**0.4**		69	25	44	CH	2.0	98.0	4.3
4956	6/22/2011	825	Pass	8	61+57	PS	-15	10.9			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	118.7	93.2	27.4	101.7	**101.0**	-0.8		**-0.8**		68	23	45	CH	3.3	96.7	3.2
4956	6/22/2011	828	Pass	4	123+59	PS	-165	3.4			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	119.0	94.1	26.5	102.7	**102.0**	-1.7		**-1.7**		65	23	42	CH	2.9	97.1	3.2
4980	6/27/2011	829	Pass	9	60+88	CL	0				4502	94.8	24.1	**92.3**	**28.2**	68	23	45	95.0	116.2	92.1	26.2	97.2	**99.8**	2.1		**-2.0**		70	22	48	CH	6.2	93.8	3.5
4980	6/27/2011	830	Pass	9	55+80	PS	-6	12.1			4502	94.8	24.1	**92.3**	**28.2**	68	23	45	95.0	117.4	92.4	27.1	97.5	**100.1**	3.0		**-1.1**		66	22	44	CH	4.8	95.2	3.1
4980	6/27/2011	831	Pass	4	156+63	PS	-136	4.6			4502	94.8	24.1	**92.3**	**28.2**	68	23	45	95.0	114.1	89.8	27.0	94.7	**97.3**	2.9		**-1.2**		64	22	42	CH	4.0	96.0	2.7

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
4992	6/28/2011	838	Pass	9	144+25	CL	0	12.8			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	112.9	87.2	29.5	98.1	**98.2**	-0.1		**1.0**		79	23	56	CH	5.0	95.0	3.6
4992	6/28/2011	837	Pass	9	138+59	CL	0	13.7			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	116.1	88.5	31.2	96.6	**95.9**	3.0		**3.0**		71	22	49	CH	5.2	94.8	3.5
4992	6/28/2011	833	Pass	9	133+79	CL	0	13.5			4502	96.1	28.2	**92.3**	**28.2**	68	23	45	95.0	109.9	86.5	27.0	90.0	**93.7**	-1.2		**-1.2**		71	24	47	CH	2.5	97.5	3.3
4992	6/28/2011	839	Pass	9	149+80	CL	0	12.8			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	107.6	82.1	31.1	92.4	**92.5**	1.5		**2.6**		77	21	56	CH	3.1	96.9	3.8
4992	6/28/2011	840	Pass	4	154+30	PS	-138	4.1			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	115.4	86.8	33.0	94.8	**94.0**	4.8		**4.8**		69	21	48	CH	3.7	96.3	3.1
4992	6/28/2011	841	Pass	4	157+47	PS	-129	4.5			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	112.9	85.5	32.1	93.3	**92.6**	3.9		**3.9**		69	22	47	CH	3.1	96.9	2.9
4992	6/28/2011	836	Pass	4	147+92	PS	-131	4.4			4502	96.1	28.2	**92.3**	**28.2**	68	23	45	95.0	110.6	87.8	25.9	91.4	**95.1**	-2.3		**-2.3**		66	20	46	CH	3.4	96.6	3.5
4992	6/28/2011	834	Pass	4	139+50	PS	-134	4.4			4502	96.1	28.2	**92.3**	**28.2**	68	23	45	95.0	111.6	88.6	26.0	92.2	**96.0**	-2.2		**-2.2**		65	20	45	CH	3.5	96.5	3.4
4992	6/28/2011	832	Pass	4	133+57	PS	-147	4.0			4502	96.1	28.2	**92.3**	**28.2**	68	23	45	95.0	117.0	92.7	26.2	96.5	**100.4**	-2.0		**-2.0**		64	21	43	CH	2.9	97.1	3.2
4992	6/28/2011	835	Pass	4	143+82	PS	-142	4.1			4502	96.1	28.2	**92.3**	**28.2**	68	23	45	95.0	116.2	91.8	26.6	95.5	**99.5**	-1.6		**-1.6**		62	20	42	CH	5.5	94.5	3.0
5003	6/29/2011	845	Pass	9	159+04	CL	0	12.9			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.5	87.5	30.8	95.5	**94.8**	2.6		**2.6**		67	24	43	CH	4.1	95.9	2.8
5003	6/29/2011	844	Pass	9	155+34	CL	0	12.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	112.8	85.4	32.1	93.2	**92.5**	3.9		**3.9**		67	25	42	CH	3.0	97.0	3.3
5003	6/29/2011	843	Pass	10	58+29	CL	0	13.2			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.4	88.5	29.2	96.6	**95.9**	1.0		**1.0**		65	22	43	CH	5.0	95.0	3.8
5003	6/29/2011	842	Pass	10	60+63	CL	0	13.3			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	117.9	93.6	26.0	102.2	**101.4**	-2.2		**-2.2**		63	22	41	CH	13.1	86.9	3.0
5016	6/30/2011	847	Pass	9	169+16	CL	0	13.1			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	107.9	84.9	27.1	95.5	**95.6**	-2.5		**-1.4**		79	22	57	CH	3.4	96.6	4.1
5016	6/30/2011	852	Pass	4	174+30	PS	-144	4.6			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	111.7	84.0	32.9	91.7	**91.0**	4.7		**4.7**		69	19	50	CH	2.8	97.2	3.2
5016	6/30/2011	853	Pass	4	178+50	PS	-154	4.4			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	113.0	88.9	27.1	97.1	**96.3**	-1.1		**-1.1**		68	19	49	CH	3.7	96.3	3.0
5016	6/30/2011	848	Pass	4	165+89	PS	-155	4.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.3	87.3	31.0	95.3	**94.6**	2.8		**2.8**		68	20	48	CH	3.2	96.8	3.1
5016	6/30/2011	849	Pass	4	169+40	PS	-162	3.7			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	116.1	91.4	27.0	99.8	**99.0**	-1.2		**-1.2**		67	19	48	CH	4.3	95.7	2.9
5016	6/30/2011	855	Pass	9	174+44	CL	0	13.4			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	116.0	90.4	28.3	98.7	**97.9**	0.1		**0.1**		67	21	46	CH	3.4	96.6	3.2
5016	6/30/2011	850	Pass	11	61+27	CL	0	13.7			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	117.1	92.2	27.0	100.7	**99.9**	-1.2		**-1.2**		65	18	47	CH	7.6	92.4	3.0
5016	6/30/2011	846	Pass	9	163+74	CL	0	13.2			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	114.6	90.1	27.2	101.3	**101.5**	-2.4		**-1.3**		72	19	53	CH	5.7	94.3	3.2
5016	6/30/2011	851	Pass	11	55+71	PS	-5	13.5			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	112.1	88.3	27.0	99.3	**99.4**	-2.6		**-1.5**		72	17	55	CH	5.2	94.8	3.6
5016	6/30/2011	854	Pass	9	178+64	CL	0	13.5			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	113.4	86.9	30.5	101.6	**101.0**	-0.6		**1.4**		80	23	57	CH	5.7	94.3	4.0
5053	7/6/2011	857	Pass	4	127+88	FS	87	5.2			3824	82.9	33.7	**83.7**	**33.3**	92	31	61	93.7	109.4	83.7	30.7	101.0	**100.0**	-3.0		**-2.6**		92	25	67	CH	6.8	93.2	5.0
5053	7/6/2011	856	Pass	4	123+48	FS	72	5.5			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	106.7	83.2	28.2	97.3	**96.7**	-2.9		**-0.9**		80	26	54	CH	8.0	92.0	5.0
5065	7/7/2011	863	Pass	4	148+77	FS	76	5.2			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	113.8	89.2	27.6	97.4	**96.6**	-0.6		**-0.6**		69	22	47	CH	5.1	94.9	3.8
5065	7/7/2011	865	Pass	4	158+77	FS	60	5.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	115.5	90.2	28.1	98.5	**97.7**	-0.1		**-0.1**		69	23	46	CH	3.2	96.8	3.1
5065	7/7/2011	860	Pass	4	133+39	FS	79	5.0			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	111.1	83.5	33.1	93.9	**94.0**	3.5		**4.6**		75	19	56	CH	5.3	94.7	3.9
5065	7/7/2011	862	Pass	4	144+15	FS	93	4.7			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	109.8	87.4	25.7	95.4	**94.7**	-2.5		**-2.5**		68	20	48	CH	5.6	94.4	3.8
5065	7/7/2011	858	Pass	12	58+69	CL	0	14.6			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	112.5	85.4	31.8	93.2	**92.5**	3.6		**3.6**		67	18	49	CH	5.0	95.0	3.0
5065	7/7/2011	859	Pass	12	54+87	CL	0	14.6			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	113.8	89.4	27.3	97.6	**96.9**	-0.9		**-0.9**		65	20	45	CH	6.5	93.5	2.8
5065	7/7/2011	861	Pass	4	138+74	FS	58	5.8			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	102.8	77.0	33.5	90.1	**89.5**	2.4		**4.4**		80	24	56	CH	7.1	92.9	5.6
5065	7/7/2011	864	Pass	4	153+36	FS	90	5.1			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	115.8	92.2	25.6	100.7	**99.9**	-2.6		**-2.6**		64	23	41	CH	4.1	95.9	2.9
5077	7/8/2011	871	Pass	4	178+87	FS	98	4.8			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	112.0	84.7	32.3	95.3	**95.4**	2.7		**3.8**		79	25	54	CH	4.0	96.0	3.6
5077	7/8/2011	868	Pass	4	164+10	FS	83	5.4			3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	114.9	84.8	35.5	99.2	**98.6**	4.4		**6.4**	YES	87	28	59	CH	7.8	92.2	5.2
5077	7/8/2011	870	Pass	4	173+43	FS	87	5.3			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	117.0	90.1	29.9	101.3	**101.5**	0.3		**1.4**		78	24	54	CH	4.2	95.8	3.0
5077	7/8/2011	867	Fail	1	110+66	FS	6	10.0		5112+881	4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	101.1	80.0	26.3	87.3	**86.7**	-1.9		**-1.9**		70	22	48	CH	9.3	90.7	3.6
5077	7/8/2011	869	Pass	4	168+33	FS	92	5.1			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	117.2	93.2	25.8	101.7	**101.0**	-2.4		**-2.4**		69	21	48	CH	3.8	96.2	2.7
5077	7/8/2011	866	Pass	12	60+52	CL	0	14.6			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	118.2	93.8	26.0	102.4	**101.6**	-2.2		**-2.2**		64	20	44	CH	7.3	92.7	3.4
5078	7/9/2011	872	Pass	10	121+84	CL	0	13.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	110.7	83.1	33.2	90.7	**90.0**	5.0		**5.0**		69	21	48	CH	4.3	95.7	3.3
5078	7/9/2011	877	Pass	10	143+77	CL	0	13.2			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	111.8	83.1	34.5	93.5	**93.6**	4.9		**6.0**	YES	75	23	52	CH	5.9	94.1	3.3
5078	7/9/2011	879	Pass	10	152+74	CL	0	13.2			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	112.4	84.3	33.4	94.8	**94.9**	3.8		**4.9**		75	20	55	CH	3.8	96.2	3.0
5078	7/9/2011	876	Pass	10	137+83	CL	0	13.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	110.9	88.1	25.9	96.2	**95.4**	-2.3		**-2.3**		68	21	47	CH	3.8	96.2	3.1
5078	7/9/2011	878	Pass	10	148+16	CL	0	13.2			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	111.6	84.3	32.4	94.8	**94.9**	2.8		**3.9**		75	26	49	CH	3.3	96.7	3.8
5078	7/9/2011	880	Pass	10	157+89	CL	0	13.2			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	108.3	85.7	26.3	93.6	**92.8**	-1.9		**-1.9**		67	22	45	CH	5.0	95.0	3.4
5078	7/9/2011	875	Pass	10	133+12	CL	0	13.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	111.5	89.0	25.3	97.2	**96.4**	-2.9		**-2.9**		66	22	44	CH	3.8	96.2	3.1
5078	7/9/2011	874	Pass	10	128+09	CL	0	13.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	109.8	85.8	28.0	93.7	**93.0**	-0.2		**-0.2**		66	23	43	CH	3.6	96.4	3.6
5078	7/9/2011	873	Pass	10	124+11	CL	0	13.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	112.0	85.3	31.3	93.1	**92.4**	3.1		**3.1**		64	21	43	CH	4.3	95.7	3.0
5112	7/12/2011	884	Pass	5	132+76	PS	-150	4.3			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	115.6	92.6	24.9	97.7	**97.7**	0.8		**1.1**		63	24	39	CH	3.2	96.8	2.6
5112	7/12/2011	883	Pass	5	127+74	PS	-134	5.2			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	117.0	93.5	25.2	98.6	**98.6**	1.1		**1.4**		61	22	39	CH	3.6	96.4	2.1
5112	7/12/2011	881	Pass	1	110+66	PS	-6	10.0	5077+867		4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	111.1	88.2	25.9	96.3	**95.6**	-2.3		**-2.3**		67	19	48	CH	4.5	95.5	2.4
5112	7/12/2011	885	Pass	6	125+29	PS	-126	5.3			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	111.1	88.5	25.5	96.6	**95.9**	-2.7		**-2.7**		66	23	43	CH	8.5	91.5	2.5
5112	7/12/2011	882	Pass	5	122+33	PS	-121	5.7			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	115.8	92.1	25.8	100.5	**99.8**	-2.4		**-2.4**		63	21	42	CH	3.6	96.4	2.6
5126	7/13/2011	886	Pass	1	112+24	FS	26	0.0			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	102.7	79.1	29.9	91.3	**90.6**	-0.1		**1.5**		83	29	54	CH	5.1	94.9	2.5
5126	7/13/2011	887	Pass	2	112+24	FS	29	1.0			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	107.1	81.0	32.3	93.5	**92.8**	2.3		**3.9**		81	26	55	CH	3.2	96.8	2.4
5138	7/14/2011	888	Pass		112+66	FS	22				3804	85.5	31.1	**86.0**	**29.1**	84	27	57	94.9	110.7	84.9	30.4	99.3	**98.7**	-0.7		**1.3**		84	26	58	CH	6.2	93.8	2.2
5444	8/12/2011	893	Pass	5	158+49	PS	-130	5.1			3649	94.8	24.1	**94.8**	**23.8**	59	23	36	94.0	108.7	87.5	24.2	92.3	**92.3**	0.1		**0.4**		59	19	40	CH	4.2	95.8	2.6
5444	8/12/2011	890	Pass	5	145+63	PS	-60	6.9			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	111.0	85.8	29.3	93.7	**93.0**	1.1		**1.1**		64	20	44	CH	6.3	93.7	1.8
5444	8/12/2011	891	Pass	5	148+80	PS	-152	4.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	115.5	90.9	27.1	99.2	**98.5**	-1.1		**-1.1**		63	19	44	CH	6.6	93.4	2.7
5444	8/12/2011	892	Pass	5	156+39	PS	-137	4.7			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	108.7	84.9	28.1	92.7	**92.0**	-0.1		**-0.1**		63	20	43	CH	4.1	95.9	2.7
5444	8/12/2011	889	Pass	5	141+12	PS	-147	4.3			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	112.8	87.2	29.3	95.2	**94.5**	1.1		**1.1**		62	18	44	CH	5.4	94.7	2.6
5474	8/17/2011	894	Pass	4	133+02	CL	0	9.6	3499+318		3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	110.7	83.8	32.1	95.8	**94.9**	4.5		**5.0**		82	27	55	CH	4.6	95.4	4.3
5474	8/17/2011	895	Pass	4	112+46	FS	30	3.2			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	108.8	82.3	32.2	95.0	**94.3**	2.2		**3.8**		76	26	50	CH	11.5	88.5	3.7
5474	8/17/2011	896	Pass	6	88+03	PS	-130	2.9	4641+722		4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	110.9	86.8	27.8	94.8	**94.0**	-0.4		**-0.4**		65	20	45	CH	4.2	95.8	3.7
5502	8/19/2011	903	Pass	8	36+87	CL	0	11.7			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	113.5	87.5	29.7	94.8	**94.9**	3.7		**3.9**		68	25	43	CH	19.3	80.7	7.1
5502	8/19/2011	908	Pass	8	16+90	PS	-11	11.4			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	108.9	81.5	33.7	94.1	**93.4**	3.7		**5.3**	YES	79	28	51	CH	10.7	89.3	7.9
5502	8/19/2011	900	Pass	3	7+25	PS	-116	1.9			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.6	87.5	30.9	95.5	**94.8**	2.7		**2.7**		69	19	50	CH	6.5	93.5	3.5
5502	8/19/2011	899	Pass	3	2+51	PS	-154	0.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	118.1	90.2	31.0	98.5	**97.7**	2.8		**2.8**		69	22	47	CH	4.1	95.9	3.7
5502	8/19/2011	907	Pass	8	11+89	CL	0	11.4			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	105.3	78.8	33.6	91.0	**90.3**	3.6		**5.2**	YES	78	26	52	CH	12.1	87.9	6.4
5502	8/19/2011	904	Pass	8	41+89	CL	0	11.5			2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	108.8	85.4	27.4	92.7	**92.5**	0.8		**1.4**		71	25	46	CH	12.7	87.3	6.5
5502	8/19/2011	906	Pass	8	51+70	CL	0	11.6			2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	109.5	84.0	30.4	91.2	**91.0**	3.8		**4.4**		71	23	48	CH	11.3	88.7	5.2
5502	8/19/2011	902	Pass	8	31+91	CL	0	11.4			2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	107.3	84.0	27.8	91.2	**91.0**	1.2		**1.8**		70	26	44	CH	13.7	86.3	6.5

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
5502	8/19/2011	905	Pass	8	46+85	CL	0	11.6			2762	92.1	26.6	**92.3**	**26.0**	72	29	43	97.1	106.4	84.8	25.5	92.1	**91.9**	-1.1		**-0.5**		70	23	47	CH	10.3	89.7	5.3
5502	8/19/2011	901	Pass	8	31+95	CL	0	11.4			3555	86.6	30.0	**87.3**	**28.4**	78	28	50	94.1	103.4	78.7	31.4	90.9	**90.1**	1.4		**3.0**		70	18	52	CH	9.4	90.6	6.0
5513	8/22/2011	911	Pass	8	2+00	FS	9	11.2			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	104.3	84.0	24.2	91.0	**91.1**	-1.8		**-1.6**		64	21	43	CH	11.4	88.6	8.2
5513	8/22/2011	912	Pass	8	6+96	PS	-12	11.3			3550	92.3	26.0	**92.2**	**25.8**	63	19	44	95.0	105.0	84.2	24.7	91.2	**91.3**	-1.3		**-1.1**		63	20	43	CH	14.3	85.7	8.4
5513	8/22/2011	914	Pass	3	26+81	PS	-134	2.4			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.4	88.3	29.6	96.4	**95.7**	1.4		**1.4**		65	19	46	CH	6.0	94.0	3.7
5513	8/22/2011	913	Pass	3	21+83	PS	-116	2.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.0	88.4	29.0	96.5	**95.8**	0.8		**0.8**		65	19	46	CH	3.7	96.3	3.7
5513	8/22/2011	910	Pass	3	16+90	PS	-117	2.6			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.4	89.1	28.4	97.3	**96.5**	0.2		**0.2**		65	19	46	CH	3.3	96.7	3.5
5513	8/22/2011	909	Pass	3	11+95	PS	-118	2.1			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.7	89.6	28.0	97.8	**97.1**	-0.2		**-0.2**		63	19	44	CH	3.6	96.4	3.8
5526	8/23/2011	920	Pass	5	178+38	PS	-142	4.9			3180	95.8	29.0	**96.1**	**23.5**	60	21	39	97.8	116.1	90.6	28.1	94.6	**94.3**	-0.9		**4.6**		62	22	40	CH	4.1	95.9	3.0
5526	8/23/2011	917	Pass	3	31+82	PS	-115	3.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	116.0	90.9	27.6	99.2	**98.5**	-0.6		**-0.6**		68	19	49	CH	2.8	97.2	2.4
5526	8/23/2011	916	Pass	5	166+42	PS	-127	5.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	116.9	97.7	19.7	98.2	**97.0**	-2.2		**-1.4**		61	17	44	CH	3.4	96.6	2.3
5526	8/23/2011	919	Pass	5	173+35	PS	-127	5.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	120.2	98.9	21.5	99.4	**98.2**	-0.4		**0.4**		61	17	44	CH	3.3	96.7	1.6
5526	8/23/2011	915	Pass	5	163+51	PS	-112	5.7			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	116.3	96.8	20.2	97.3	**96.1**	-1.7		**-0.9**		61	17	44	CH	3.1	96.9	2.8
5526	8/23/2011	918	Pass	3	37+00	PS	-137	2.5			3815	88.9	29.6	**88.8**	**28.5**	75	21	54	95.4	116.4	90.9	28.0	102.2	**102.4**	-1.6		**-0.5**		71	20	51	CH	3.2	96.8	2.8
5557	8/26/2011	925	Pass	4	5+96	FS	53	5.7			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	117.0	92.5	26.5	101.0	**100.2**	-1.7		**-1.7**		70	22	48	CH	4.9	95.1	3.8
5557	8/26/2011	926	Pass	3	45+80	PS	-115	2.8			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	119.8	93.7	27.8	102.3	**101.5**	-0.4		**-0.4**		69	24	45	CH	3.9	96.1	2.9
5557	8/26/2011	924	Pass	4	2+16	FS	62	5.2			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	116.2	91.9	26.5	100.3	**99.6**	-1.7		**-1.7**		68	24	44	CH	4.0	96.0	3.0
5557	8/26/2011	921	Pass	3	34+43	PS	-155	2.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	116.4	89.2	30.5	97.4	**96.6**	2.3		**2.3**		65	18	47	CH	2.9	97.1	2.7
5557	8/26/2011	923	Pass	3	14+34	PS	-137	7.0			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	117.9	93.3	26.4	101.9	**101.1**	-1.8		**-1.8**		65	22	43	CH	2.0	98.0	2.8
5557	8/26/2011	922	Pass	3	42+45	PS	-137	2.1			4502	91.6	28.2	**92.3**	**28.2**	68	23	45	95.0	114.9	89.4	28.5	97.6	**96.9**	0.3		**0.3**		64	24	40	CH	3.9	96.1	3.0
5566	8/29/2011	927	Pass	4	2+15	PS	-100				3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	115.3	90.9	26.9	101.0	**100.2**	-1.6		**-1.5**		75	24	51	CH	6.3	93.7	2.0
5566	8/29/2011	928	Pass	4	5+96	PS	-101	3.5			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	116.4	94.6	23.0	99.8	**99.2**	-1.8		**-1.3**		68	25	43	CH	2.3	97.7	2.0
5566	8/29/2011	929	Pass	4	10+06	PS	-104	3.5			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	120.8	94.0	28.5	102.6	**102.0**	2.0		**2.4**		67	21	46	CH	5.2	94.8	2.1
5577	8/30/2011	933	Pass	11	152+91	CL	0	13.8			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	114.0	89.1	27.9	97.2	**96.7**	1.7		**0.6**		72	25	47	CH	6.9	93.1	1.5
5577	8/30/2011	931	Pass	11	143+07	CL	0	13.5			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	118.5	93.3	27.0	103.7	**102.9**	-1.5		**-1.4**		75	25	50	CH	10.1	89.9	1.5
5577	8/30/2011	930	Pass	11	157+90	CL	0	13.8			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	113.6	89.9	26.3	99.9	**99.1**	-2.2		**-2.1**		75	24	51	CH	3.7	96.3	1.1
5577	8/30/2011	932	Pass	11	147+97	CL	0	13.7			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	112.1	88.7	26.4	95.5	**94.9**	4.1		**3.8**		76	21	55	CH	4.1	95.9	1.2
5577	8/30/2011	934	Pass		157+90	CL	0	13.8			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	109.4	87.7	24.7	94.4	**93.8**	2.4		**2.1**		75	20	55	CH	3.1	96.9	1.2
5588	8/31/2011	935	Pass	4	18+05	PS	-103	4.0			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	117.0	89.6	30.6	99.6	**98.8**	2.1		**2.2**		75	25	50	CH	5.6	94.4	1.1
5642	9/9/2011	936	Fail	4	22+11	PS	-124	3.6		5644+938	3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	117.9	85.6	37.7	97.1	**96.9**	8.3	YES	**8.4**	YES	86	22	64	CH	13.7	86.3	2.4
5643	9/12/2011	946	Pass	12	160+93	CL	0	13.7			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	120.8	92.6	30.5	102.9	**102.1**	2.0		**2.1**		74	24	50	CH	4.4	95.6	5.7
5643	9/12/2011	948	Pass	10	165+32	CL	0	13.7			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	121.2	91.5	32.5	101.7	**100.9**	4.0		**4.1**		74	22	52	CH	3.4	96.6	5.3
5643	9/12/2011	945	Pass	4	41+63	PS	-108	3.9			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	115.2	91.2	26.3	101.3	**100.6**	-2.2		**-2.1**		74	22	52	CH	2.7	97.3	6.0
5643	9/12/2011	942	Pass	12	156+02	CL	0	13.7			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	116.3	90.0	29.2	100.0	**99.2**	0.7		**0.8**		73	22	51	CH	7.5	92.6	6.2
5643	9/12/2011	947	Pass	5	163+68	FS	-45	6.3			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	116.9	92.1	26.9	102.3	**101.5**	-1.6		**-1.5**		73	22	51	CH	2.7	97.3	7.3
5643	9/12/2011	940	Pass	12	146+57	CL	0	13.7			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	113.8	88.0	29.3	97.8	**97.0**	0.8		**0.9**		72	23	49	CH	2.6	97.4	6.5
5643	9/12/2011	941	Pass	12	151+14	CL	0	13.8			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	113.8	87.9	29.4	97.7	**96.9**	0.9		**1.0**		72	21	51	CH	2.3	97.7	6.1
5643	9/12/2011	943	Pass	4	34+45	PS	-99	4.2			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	112.9	88.5	27.6	98.3	**97.6**	-0.9		**-0.8**		72	21	51	CH	2.1	97.9	6.8
5643	9/12/2011	944	Pass	4	37+83	PS	-142	3.2			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	114.8	88.2	30.2	98.0	**97.2**	1.7		**1.8**		70	21	49	CH	8.8	91.2	6.7
5644	9/11/2011	939	Pass	4	26+07	PS	-111	3.8			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	120.8	94.2	28.3	102.7	**102.3**	2.1		**1.0**		70	19	51	CH	3.1	96.9	3.6
5644	9/11/2011	937	Pass	4	30+10	PS	-133	3.3			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	113.7	89.5	27.1	97.6	**97.2**	0.9		**-0.2**		70	23	47	CH	2.9	97.1	3.5
5644	9/11/2011	938	Pass	4	22+11	PS	-124	3.6	5642+936		3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	119.4	93.9	27.2	102.4	**102.0**	1.0		**-0.1**		69	19	50	CH	2.9	97.1	2.8
5657	9/14/2011	949	Pass	4	45+60	PS	-87	4.6			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	118.4	89.6	32.2	99.6	**98.8**	3.7		**3.8**		73	23	50	CH	3.6	96.4	2.9
5657	9/14/2011	950	Pass	4	49+08	PS	-105	4.2			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	121.5	92.2	31.8	102.4	**101.7**	3.3		**3.4**		72	24	48	CH	3.3	96.7	1.9
5709	9/26/2011	953	Pass	10	180+07	CL	0	13.6			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	112.0	88.2	27.0	92.0	**91.7**	3.1		**3.1**		62	22	40	CH	2.7	97.3	5.2
5709	9/26/2011	952	Pass	10	175+12	CL	0	13.6			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	117.7	92.0	27.9	95.9	**95.6**	4.0		**4.0**		62	22	40	CH	1.7	98.3	3.6
5709	9/26/2011	951	Pass	10	170+16	CL	0	13.6			3291	91.6	21.9	**100.7**	**21.1**	64	22	42	97.8	117.7	93.1	26.4	101.6	**92.5**	4.5		**5.3**	YES	62	20	42	CH	6.1	93.9	4.9
5713	9/27/2011	954	Pass	1	124+40	PS	-42	5.5			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	112.3	92.4	21.5	96.5	**96.1**	-2.5		**-2.0**		62	22	40	CH	1.9	98.1	1.8
5713	9/27/2011	959	Pass	5	13+20	PS	-62	5.0			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	124.1	94.7	31.1	103.3	**102.8**	4.9		**3.8**		69	23	46	CH	4.8	95.2	1.0
5713	9/27/2011	955	Pass	1	122+23	PS	-69	4.6			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	112.7	87.8	28.4	100.3	**99.4**	0.8		**1.3**		81	26	55	CH	2.6	97.4	1.1
5713	9/27/2011	957	Pass	5	6+51	PS	-67	5.1			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	118.4	95.2	24.4	103.8	**103.4**	-1.8		**-2.9**		67	21	46	CH	2.9	97.1	1.0
5713	9/27/2011	958	Pass	5	10+24	PS	-75	4.7			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	122.3	95.2	28.5	103.8	**103.4**	2.3		**1.2**		67	20	47	CH	2.7	97.3	1.0
5713	9/27/2011	956	Pass	5	2+91	PS	-81	4.8			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	115.9	92.6	25.1	99.7	**99.0**	2.8		**2.5**		76	22	54	CH	3.2	96.8	0.8
5719	9/28/2011	960	Pass	1	112+23	FS	-9.6	2.0			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	110.8	87.0	27.3	96.7	**95.9**	-1.2		**-1.1**		75	24	51	CH	12.7	87.3	3.5
5719	9/28/2011	961	Pass	2	112+34	FS	-7.3	2.9			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	111.1	88.0	26.2	97.8	**97.0**	-2.3		**-2.2**		75	25	50	CH	10.3	89.7	5.3
5719	9/28/2011	967	Pass	1	170+05	CL	0	11.5			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	119.4	94.6	26.2	103.2	**102.7**	0.0		**-1.1**		68	19	49	CH	9.4	90.6	2.6
5719	9/28/2011	963	Pass	1	169+97	PS	-137	2.3			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	118.0	93.0	26.9	103.3	**102.5**	-1.6		**-1.5**		72	25	47	CH	12.1	87.9	6.4
5719	9/28/2011	962	Pass	3	112+03	FS	-8.2	3.5			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	112.1	90.8	23.5	97.7	**97.1**	1.2		**0.9**		76	21	55	CH	11.3	88.7	5.2
5719	9/28/2011	964	Pass	2	170+01	PS	-138	3.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	123.3	98.8	24.8	99.3	**98.1**	2.9		**3.7**		62	19	43	CH	10.7	89.3	9.4
5719	9/28/2011	968	Pass	2	170+01	CL	0	12.4			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	117.5	91.7	28.2	101.9	**101.1**	-0.3		**-0.2**		71	20	51	CH	13.7	86.3	2.7
5719	9/28/2011	966	Pass	4	170+03	PS	-136	5.1			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	122.5	99.6	23.0	100.1	**98.9**	1.1		**1.9**		61	17	44	CH	6.5	93.5	2.3
5719	9/28/2011	965	Pass	3	169+97	PS	-140	4.2			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	123.7	101.9	21.4	102.4	**101.2**	-0.5		**0.3**		61	17	44	CH	4.1	95.9	2.8
5719	9/28/2011	969	Pass	1	149+99	CL	0	9.3			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	119.9	92.9	29.1	101.4	**100.8**	2.6		**3.0**		61	17	44	CH	19.3	80.7	1.9
5739	10/3/2011	970	Pass	9	3+56	CL	0	12.1			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	115.1	93.1	23.6	97.1	**96.8**	-0.3		**-0.3**		64	23	41	CH	5.5	94.5	2.4
5739	10/3/2011	981	Pass	9	18+56	CL	0	12.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	111.4	91.1	22.3	91.6	**90.5**	0.4		**1.2**		64	21	43	CH	6.5	93.5	3.7
5739	10/3/2011	973	Pass	4	13+51	FS	61	5.4			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	117.2	90.6	29.4	98.9	**98.3**	2.9		**3.3**		67	21	46	CH	3.1	96.9	2.7
5739	10/3/2011	972	Pass	9	13+56	CL	0	12.5			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	111.6	88.9	25.5	97.1	**96.4**	-1.0		**-0.6**		67	22	45	CH	2.6	97.4	2.4
5739	10/3/2011	971	Pass	9	8+53	CL	0	12.4			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	111.0	90.3	22.9	95.3	**94.7**	-1.9		**-1.4**		67	23	44	CH	3.3	96.7	1.9
5739	10/3/2011	974	Pass	4	8+48	FS	50	6.2			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	115.8	92.4	25.3	100.9	**100.2**	-1.2		**-0.8**		66	22	44	CH	10.3	89.7	2.6
5739	10/3/2011	975	Pass	4	3+56	FS	39	6.4			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	108.9	85.1	28.0	92.9	**92.3**	1.5		**1.9**		66	20	46	CH	3.6	96.4	3.0
5739	10/3/2011	977	Pass	4	170+07	CL	0	13.6			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	115.9	92.0	26.0	100.4	**99.8**	-0.5		**-0.1**		65	20	45	CH	4.2	95.8	2.5
5739	10/3/2011	979	Pass	2	160+00	FS	49	5.5			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	117.5	92.2	27.5	100.7	**100.0**	1.0		**1.4**		65	19	46	CH	3.7	96.3	3.0
5739	10/3/2011	980	Pass	3	160+02	FS	49	6.4			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	114.9	90.8	26.6	99.0	**98.6**	0.4		**-0.7**		66	19	47	CH	4.2	95.8	1.9

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
5739	10/3/2011	978	Pass	1	160+00	FS	53	4.6			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	114.3	91.4	25.0	99.8	**99.1**	-1.5		**-1.1**		64	19	45	CH	8.1	91.9	2.1
5739	10/3/2011	976	Pass	3	170+07	CL	0	13.0			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	124.2	95.1	30.6	103.8	**103.1**	4.1		**4.5**		64	20	44	CH	4.4	95.6	1.9
5739	10/3/2011	985	Pass	3	149+98	CL	0	10.5			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	111.1	91.0	22.1	91.3	**90.7**	-1.0		**1.7**		56	25	31	CH	6.7	93.3	2.2
5739	10/3/2011	987	Pass	5	150+03	CL	0	12.4			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	108.4	89.7	20.9	90.0	**89.4**	-2.2		**0.5**		56	23	33	CH	5.6	94.4	2.3
5739	10/3/2011	986	Pass	4	150+04	CL	0	11.5			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	111.7	91.9	21.5	92.2	**91.6**	-1.6		**1.1**		56	21	35	CH	4.9	95.1	2.3
5739	10/3/2011	989	Pass	7	150+04	CL	0	13.6			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	122.2	101.5	20.4	101.8	**101.2**	-2.7		**0.0**		56	22	34	CH	2.9	97.1	2.5
5739	10/3/2011	984	Pass	2	150+00	CL	0	9.5			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	113.5	91.8	23.7	92.1	**91.5**	0.6		**3.3**		56	20	36	CH	2.8	97.2	2.2
5739	10/3/2011	988	Pass	6	149+99	CL	0	13.1			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	122.1	98.7	23.7	99.0	**98.4**	0.6		**3.3**		55	22	33	CH	9.8	90.2	2.1
5739	10/3/2011	983	Pass	1	150+00	CL	0	8.4			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	107.9	89.7	20.3	90.0	**89.4**	-2.8		**-0.1**		55	21	34	CH	7.2	92.8	2.2
5739	10/3/2011	982	Fail	5	18+52	FS	57	6.0		5795+1086	2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	111.4	84.1	32.4	84.4	**83.8**	9.3	YES	**12.0**	YES	55	22	33	CH	2.5	97.5	3.3
5748	10/4/2011	1002	Pass	4	27+76	FS	52	6.4			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	112.5	89.6	25.5	93.5	**93.2**	1.5		**2.0**		62	23	39	CH	4.4	95.6	2.6
5748	10/4/2011	999	Pass	9	23+44	CL	0	12.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	111.9	91.5	22.3	92.0	**90.9**	0.4		**1.2**		65	22	43	CH	7.2	92.8	3.8
5748	10/4/2011	994	Pass	2	140+01	FS	53	5.4			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	117.3	92.7	26.5	101.1	**100.7**	0.3		**-0.8**		68	19	49	CH	8.0	92.0	2.9
5748	10/4/2011	1000	Pass	4	23+41	FS	46	6.4			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	107.7	85.2	26.4	97.4	**96.5**	-1.2		**-0.7**		81	25	56	CH	6.2	93.8	3.7
5748	10/4/2011	997	Pass	2	123+54	FS	70	4.8			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	115.6	94.3	22.6	98.3	**98.0**	-1.3		**-1.3**		62	22	40	CH	6.5	93.5	3.4
5748	10/4/2011	993	Pass	1	139+96	FS	52	4.5			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	112.8	86.8	29.9	94.7	**94.2**	3.7		**2.6**		68	22	46	CH	5.3	94.7	2.9
5748	10/4/2011	990	Pass	1	145+01	PS	-126	3.3			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	114.4	91.5	25.0	95.5	**95.2**	1.0		**1.5**		60	19	41	CH	4.4	95.6	2.8
5748	10/4/2011	1008	Pass	3	122+22	PS	-68	6.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	114.7	92.4	24.2	92.9	**91.8**	2.3		**3.1**		64	22	42	CH	3.3	96.7	3.3
5748	10/4/2011	996	Pass	1	123+54	FS	65	3.9			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	108.0	86.3	25.1	94.2	**93.6**	-1.4		**-1.0**		66	21	45	CH	12.2	87.8	2.3
5748	10/4/2011	995	Pass	3	140+00	FS	50	6.3			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	110.2	87.8	25.5	95.9	**95.2**	-1.0		**-0.6**		66	23	43	CH	6.6	93.2	2.2
5748	10/4/2011	1007	Pass	2	122+22	PS	-64	6.0			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	117.6	93.9	25.3	94.4	**93.2**	3.4		**4.2**		63	21	42	CH	6.2	93.8	4.3
5748	10/4/2011	998	Pass	3	123+53	FS	68	5.5			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	110.4	88.2	25.2	93.0	**92.5**	0.4		**0.9**		66	23	43	CH	7.3	92.7	3.0
5748	10/4/2011	1006	Pass	1	122+24	PS	-67	4.9			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	116.5	93.7	24.3	94.2	**93.0**	2.4		**3.2**		63	20	43	CH	4.2	95.8	3.0
5748	10/4/2011	1005	Pass	3	124+10	PS	-38	7.2			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	121.5	99.0	22.7	99.5	**98.3**	0.8		**1.6**		62	20	42	CH	11.4	88.6	3.2
5748	10/4/2011	992	Pass	3	144+97	PS	-129	5.5			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	118.8	96.3	23.4	96.6	**96.0**	0.3		**3.0**		57	22	35	CH	5.9	94.1	2.0
5748	10/4/2011	1004	Pass	2	124+41	PS	-42	5.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	117.5	95.5	23.0	96.0	**94.8**	1.1		**1.9**		62	21	41	CH	3.5	96.5	2.7
5748	10/4/2011	1003	Pass	1	124+41	PS	-38	5.0			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	108.6	90.6	19.9	91.1	**90.0**	-2.0		**-1.2**		61	20	41	CH	3.1	96.9	3.2
5748	10/4/2011	991	Pass	2	144+90	PS	-131	4.3			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	116.4	94.5	23.2	94.8	**94.2**	0.1		**2.8**		56	19	37	CH	3.8	96.2	2.9
5748	10/4/2011	1001	Pass	9	27+66	CL	0	12.5			2611	87.9	30.6	**88.9**	**31.2**	78	28	50	97.5	109.6	84.7	29.4	96.4	**95.3**	-1.2		**-1.8**		74	26	48	CH	5.3	94.7	7.3
5754	10/5/2011	1032	Pass	10	7+82	CL	0	13.0			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	109.8	89.1	23.2	93.0	**92.7**	-0.8		**-0.3**		63	24	39	CH	3.1	96.9	4.1
5754	10/5/2011	1041	Pass	3	79+99	FS	52	6.0			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	111.5	92.8	20.1	93.3	**92.2**	-1.8		**-1.0**		67	23	44	CH	1.7	98.3	3.4
5754	10/5/2011	1018	Pass	3	32+60	FS	73	5.7			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	106.5	82.2	29.6	93.2	**93.1**	0.2		**0.3**		89	28	61	CH	4.5	95.5	3.2
5754	10/5/2011	1017	Pass	9	32+61	CL	0	12.5			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	105.8	80.7	31.1	91.5	**91.4**	1.7		**1.8**		89	28	61	CH	4.2	95.8	2.9
5754	10/5/2011	1030	Pass	2	83+54	FS	66	3.5			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	108.3	87.8	23.3	91.6	**91.3**	-0.6		**-0.6**		64	24	40	CH	5.8	94.2	3.7
5754	10/5/2011	1040	Pass	2	83+51	FS	66	4.5			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	107.3	87.3	22.9	91.0	**90.7**	-1.0		**-1.0**		64	24	40	CH	5.5	94.5	3.6
5754	10/5/2011	1031	Pass	10	2+85	CL	0	13.1			3178	90.1	26.2	**92.1**	**27.3**	68	20	48	98.1	112.7	87.2	29.3	96.8	**94.7**	3.1		**2.0**		69	22	47	CH	6.1	93.9	4.1
5754	10/5/2011	1039	Pass	1	118+81	CL	0	3.4			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	107.2	80.8	32.7	91.6	**91.5**	3.3		**3.4**		88	26	62	CH	4.1	95.9	4.9
5754	10/5/2011	1035	Pass	10	22+74	CL	0	13.0			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	107.5	82.9	29.6	92.1	**91.4**	1.1		**1.2**		75	24	51	CH	3.4	96.6	4.3
5754	10/5/2011	1029	Pass	1	79+99	FS	-51	4.0			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	113.7	92.8	22.5	96.8	**96.5**	-1.4		**-1.4**		63	23	40	CH	5.6	94.4	3.0
5754	10/5/2011	1036	Pass	10	27+55	CL	0	13.0			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	116.4	90.5	28.6	100.6	**99.8**	0.1		**0.2**		75	24	51	CH	3.3	96.7	3.8
5754	10/5/2011	1033	Pass	10	12+76	CL	0	13.1			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	111.3	85.4	30.4	94.9	**94.2**	1.9		**2.0**		75	24	51	CH	2.4	97.6	5.1
5754	10/5/2011	1014	Pass	3	89+99	CL	0	12.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	112.7	91.6	23.1	92.1	**91.0**	1.2		**2.0**		65	22	43	CH	3.5	96.5	2.7
5754	10/5/2011	1012	Pass	1	90+00	CL	0	10.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	116.0	94.0	23.4	94.5	**93.3**	1.5		**2.3**		65	22	43	CH	3.2	96.8	2.8
5754	10/5/2011	1026	Pass	9	79+05	PS	-48	4.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	110.5	90.9	21.5	91.4	**90.3**	-0.4		**0.4**		65	23	42	CH	3.0	97.0	2.4
5754	10/5/2011	1042	Pass	3	83+53	FS	66	5.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	110.2	90.6	21.6	91.1	**90.0**	-0.3		**0.5**		65	23	42	CH	2.7	97.3	3.9
5754	10/5/2011	1010	Pass	1	55+99	PS	-92	3.3			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	118.9	94.7	25.6	95.2	**94.0**	3.7		**4.5**		65	22	43	CH	2.6	97.4	0.8
5754	10/5/2011	1028	Pass	1	80+01		-54	4.0			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	116.5	94.6	23.2	95.1	**93.9**	1.3		**2.1**		65	23	42	CH	2.4	97.6	3.3
5754	10/5/2011	1025	Pass	1	79+05	PS	-44	3.5			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	109.2	87.5	24.8	91.2	**91.0**	0.9		**0.9**		63	23	40	CH	3.0	97.0	2.6
5754	10/5/2011	1020	Pass	1	82+06	PS	-60	3.0			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	107.1	82.5	29.8	93.5	**93.4**	0.4		**0.5**		87	25	62	CH	5.2	94.8	3.8
5754	10/5/2011	1019	Pass	1	82+82	PS	-79	2.5			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	110.5	86.6	27.6	98.2	**98.1**	-1.8		**-1.7**		87	24	63	CH	4.1	95.9	2.6
5754	10/5/2011	1037	Pass	5	111+79	FS	98	5.3			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	115.7	87.5	32.3	99.2	**99.1**	2.9		**3.0**		87	25	62	CH	3.9	96.1	4.7
5754	10/5/2011	1009	Pass	4	111+79	FS	-74	6.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	115.6	95.1	21.5	95.6	**94.4**	-0.4		**0.4**		64	21	43	CH	4.8	95.2	1.1
5754	10/5/2011	1024	Pass	3	82+04	PS	-62	5.0			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	107.9	90.0	19.9	90.5	**89.4**	-2.0		**-1.2**		64	20	44	CH	4.7	95.3	3.0
5754	10/5/2011	1021	Pass	2	82+81	PS	-75	3.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	112.4	91.7	22.6	92.2	**91.1**	0.7		**1.5**		64	21	43	CH	4.2	95.8	2.5
5754	10/5/2011	1016	Pass	5	89+97	CL	0	13.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	109.8	91.3	20.2	91.8	**90.7**	-1.7		**-0.9**		64	21	43	CH	3.2	96.8	2.7
5754	10/5/2011	1022	Pass	2	83+06	PS	-62	4.0			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	112.7	91.9	22.6	92.4	**91.3**	0.7		**1.5**		64	23	41	CH	3.3	97.0	2.1
5754	10/5/2011	1023	Pass	3	82+83	PS	-78	4.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	112.2	90.9	23.5	91.4	**90.3**	1.6		**2.4**		64	22	42	CH	3.0	97.0	3.3
5754	10/5/2011	1027	Pass	3	79+08	PS	-49	5.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	114.4	94.2	21.4	94.7	**93.5**	-0.5		**0.3**		64	22	42	CH	3.0	97.0	2.8
5754	10/5/2011	1011	Pass	1	59+31	PS	-88	3.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	117.9	94.8	24.4	95.3	**94.1**	2.5		**3.3**		64	23	41	CH	2.7	97.3	1.0
5754	10/5/2011	1038	Pass	1	118+94	FS	10	4.2			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	111.8	87.1	28.4	98.8	**98.6**	-1.0		**-0.9**		86	25	61	CH	5.0	95.0	3.9
5754	10/5/2011	1015	Pass	4	89+98	CL	0	13.0			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	116.5	95.4	22.1	95.9	**94.7**	0.2		**1.0**		63	22	41	CH	3.5	96.5	3.7
5754	10/5/2011	1034	Pass	10	17+68	CL	0	13.1			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	118.2	93.3	26.7	101.7	**101.3**	0.5		**-0.6**		67	19	48	CH	3.1	96.9	4.2
5754	10/5/2011	1013	Pass	1	88+99	CL	0	10.5			3178	99.5	21.9	**92.1**	**27.3**	68	20	48	98.1	120.8	96.6	25.1	97.1	**104.9**	3.2		**-2.2**		65	23	42	CH	3.5	96.5	2.8
5774	10/6/2011	1046	Pass	4	74+17	PS	-12	11.5			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	113.0	93.2	21.3	97.2	**96.9**	-2.6		**-2.6**		65	25	40	CH	3.4	96.8	2.8
5774	10/6/2011	1054	Pass	4	77+80	PS	-18	9.9			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	116.8	88.9	31.4	100.8	**100.7**	2.0		**2.1**		88	26	62	CH	4.6	95.4	3.4
5774	10/6/2011	1052	Pass	2	118+45	PS	-10	2.5			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	115.1	87.2	32.0	98.9	**98.8**	2.6		**2.7**		88	25	63	CH	3.9	96.1	3.6
5774	10/6/2011	1064	Pass	4	118+91	PS	-8	6.7			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	116.2	88.5	31.3	98.3	**97.6**	2.8		**2.9**		75	24	51	CH	4.0	96.0	4.4
5774	10/6/2011	1045	Pass	3	74+16	PS	-13	10.3			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	114.0	85.9	32.7	97.4	**97.3**	3.3		**3.4**		88	26	62	CH	3.3	96.7	3.5
5774	10/6/2011	1062	Pass	2	48+00	PS	-90	3.1			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	116.0	91.9	26.2	102.1	**101.3**	4.3		**-2.2**		75	24	51	CH	3.2	96.8	3.4
5774	10/6/2011	1059	Pass	1	47+98	PS	-94	2.1			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	120.0	91.8	30.7	102.0	**101.2**	2.2		**2.3**		75	25	50	CH	2.7	97.3	3.3
5774	10/6/2011	1061	Pass	1	47+98	CL	0	8.1			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	109.5	90.5	21.0	91.0	**89.9**	-0.9		**-0.1**		65	22	43	CH	3.5	96.5	4.5
5774	10/6/2011	1057	Pass	3	119+12	PS	-6	7.9			3182	88.4	29.4	**88.3**	**29.3**	87	25	62	99.8	115.8	89.1	30.0	100.8	**100.9**	0.6		**0.7**		87	25	62	CH	4.9	95.1	4.8
5774	10/6/2011	1050	Pass	3	77+82	PS	-18	9.1			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	116.6	89.7	30.0	101.7	**101.6**	0.6		**0.7**		87	25	62	CH	4.1	95.9	3.1

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
5774	10/6/2011	1051	Pass	2	118+89	FS	-8	5.0			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	114.3	87.3	30.9	99.0	**98.9**	1.5		**1.6**		87	26	61	CH	3.7	96.3	3.7
5774	10/6/2011	1055	Pass	2	77+88	PS	-68	3.9			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	115.9	88.5	31.0	100.3	**100.2**	1.6		**1.7**		87	26	61	CH	3.7	96.3	3.8
5774	10/6/2011	1060	Pass	5	77+81	PS	-20	9.8			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	114.5	89.4	28.1	99.3	**98.6**	-0.4		**-0.3**		74	22	52	CH	4.2	95.8	3.6
5774	10/6/2011	1047	Pass	1	77+82	PS	-21	7.4			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	113.7	86.3	31.8	97.8	**97.7**	2.4		**2.5**		87	26	61	CH	3.3	96.7	4.1
5774	10/6/2011	1056	Pass	3	118+48	PS	-2	3.5			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	112.8	87.4	29.1	99.1	**99.0**	-0.3		**-0.2**		87	25	62	CH	3.0	97.0	2.9
5774	10/6/2011	1058	Pass	5	77+99	PS	-68	5.0			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	115.4	91.3	26.4	101.4	**100.7**	-2.1		**-2.0**		74	23	51	CH	3.5	96.5	3.9
5774	10/6/2011	1044	Pass	2	74+16	PS	-14	9.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	110.3	91.8	20.2	92.3	**91.2**	-1.7		**-0.9**		64	21	43	CH	4.0	96.0	2.5
5774	10/6/2011	1048	Pass	2	77+82	PS	-19	8.3			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	110.3	91.0	21.2	91.5	**90.4**	-0.7		**0.1**		64	22	42	CH	3.1	96.9	2.7
5774	10/6/2011	1043	Pass	1	74+14	PS	-17	8.8			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	115.3	94.0	22.7	94.5	**93.3**	0.8		**1.6**		64	23	41	CH	2.3	97.7	2.6
5774	10/6/2011	1049	Pass	1	77+90	PS	-69	3.0			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	113.2	85.7	32.1	97.2	**97.1**	2.7		**2.8**		86	23	63	CH	3.7	96.3	3.6
5774	10/6/2011	1065	Pass	4	118+92	PS	-6	7.0			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	112.5	87.4	28.7	97.1	**96.4**	0.2		**0.3**		73	23	50	CH	3.8	96.2	3.9
5774	10/6/2011	1068	Pass	4	48+03	CL	0	11.5			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	117.3	92.1	27.3	100.5	**99.9**	0.8		**1.2**		66	22	44	CH	2.3	97.7	3.8
5774	10/6/2011	1063	Pass	6	111+95	FS	12	5.0			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	111.9	91.1	22.8	91.6	**90.5**	0.9		**1.7**		63	22	41	CH	2.9	97.1	3.4
5774	10/6/2011	1067	Pass	3	48+00	CL	0	10.3			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	113.0	92.0	22.8	92.5	**91.4**	0.9		**1.7**		63	21	42	CH	2.5	97.5	3.4
5774	10/6/2011	1066	Pass	2	48+00	CL	0	9.1			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	111.9	92.0	21.6	92.5	**91.4**	-0.3		**0.5**		62	21	41	CH	7.0	93.0	3.7
5774	10/6/2011	1069	Pass	3	48+01	PS	-96	4.2			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	119.8	93.0	28.8	101.5	**100.9**	2.3		**2.7**		65	21	44	CH	0.7	99.3	3.7
5780	10/7/2011	1076	Pass	6	119+28	FS	2	11.7			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	110.4	87.3	26.5	95.3	**94.7**	0.0		**0.4**		68	24	44	CH	5.1	94.9	4.4
5780	10/7/2011	1077	Pass	6	119+32	FS	4	11.7			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	114.8	89.8	27.8	98.0	**97.4**	1.3		**1.7**		68	24	44	CH	4.7	95.3	4.2
5780	10/7/2011	1074	Pass	5	118+89	FS	7	8.3			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	113.2	87.7	29.1	99.4	**99.3**	-0.3		**-0.2**		88	27	61	CH	3.0	97.0	5.3
5780	10/7/2011	1075	Pass	5	119+08	FS	60	5.4			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	112.9	89.5	26.2	97.7	**97.1**	-0.3		**0.1**		68	24	44	CH	3.6	96.4	4.0
5780	10/7/2011	1070	Pass	5	111+10	FS	74	5.0			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	110.6	85.8	28.9	97.3	**97.2**	-0.5		**-0.4**		87	27	60	CH	4.2	95.8	4.6
5780	10/7/2011	1073	Pass	5	118+98	PS	-5	9.8			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	116.8	92.3	26.5	100.8	**100.1**	0.0		**0.4**		67	22	45	CH	2.6	97.4	4.3
5780	10/7/2011	1071	Pass	7	111+35	FS	2	10.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	114.5	91.7	24.9	92.2	**91.1**	3.0		**3.8**		64	22	42	CH	3.0	97.0	4.1
5780	10/7/2011	1072	Pass	6	111+26	FS	25	7.5			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	114.6	91.0	25.9	99.3	**98.7**	-0.6		**-0.2**		66	22	44	CH	4.1	95.9	3.9
5790	10/10/2011	1079	Pass	9	37+59	CL	0	12.5			3183	88.2	29.4	**88.3**	**27.1**	81	25	56	99.6	115.4	87.8	31.4	99.5	**99.4**	2.0		**4.3**		88	25	63	CH	3.7	96.3	4.1
5790	10/10/2011	1078	Pass	3	51+27	PS	-24	2.6			3183	88.2	29.4	**88.3**	**27.1**	81	25	56	99.6	118.9	89.4	33.0	101.4	**101.2**	3.6		**5.9**	YES	88	26	62	CH	2.5	97.5	4.1
5790	10/10/2011	1083	Pass	7	118+92	PS	-4	11.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	118.1	95.4	23.8	95.9	**94.7**	1.9		**2.7**		65	22	43	CH	6.4	93.6	3.7
5790	10/10/2011	1080	Pass	4	37+79	FS	72	5.8			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	109.2	86.3	26.6	98.6	**97.7**	-1.0		**-0.5**		82	26	56	CH	3.7	96.3	5.2
5790	10/10/2011	1084	Pass	7	118+93	FS	8	10.1			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	117.2	94.0	24.7	98.0	**97.7**	0.8		**0.8**		63	23	40	CH	4.4	95.6	3.4
5790	10/10/2011	1081	Pass	9	42+53	CL	0	12.6			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	117.2	94.1	24.5	101.3	**100.6**	2.2		**1.9**		77	21	56	CH	4.7	95.3	2.6
5790	10/10/2011	1082	Pass	4	42+50	FS	74	5.6			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	110.4	89.2	23.8	96.0	**95.4**	1.5		**1.2**		77	22	55	CH	3.4	96.6	3.9
5795	10/11/2011	1090	Pass	4	52+56	FS	76	5.6			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	114.1	91.4	24.8	99.8	**99.1**	-1.7		**-1.3**		69	20	49	CH	3.8	96.2	4.3
5795	10/11/2011	1088	Pass	5	47+58	FS	71	5.8			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	113.3	88.4	28.2	100.2	**100.1**	-1.2		**-1.1**		86	24	62	CH	4.5	95.5	4.6
5795	10/11/2011	1089	Pass	9	52+56	CL	0	12.6			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	111.5	86.6	28.7	98.2	**98.1**	-0.7		**-0.6**		86	24	62	CH	4.4	95.6	4.5
5795	10/11/2011	1087	Pass	9	47+61	CL	0	12.5			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	108.3	85.5	26.6	97.7	**96.8**	-1.0		**-0.5**		80	23	57	CH	3.5	96.5	4.4
5795	10/11/2011	1086	Pass	3	18+52	FS	57	6.0	5739+982		2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	111.9	91.0	23.0	91.3	**90.7**	-0.1		**2.6**		57	22	35	CH	3.0	97.0	3.9
5803	10/12/2011	1091	Pass	5	48+51	PS	-127	3.5			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	118.5	90.5	31.0	98.7	**98.3**	4.8		**3.7**		67	18	49	CH	0.4	99.6	3.4
5803	10/12/2011	1092	Pass	4	52+49	PS	-118	3.5			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	114.7	93.0	23.3	101.4	**101.0**	-2.9		**-4.0**	YES	66	18	48	CH	2.9	97.1	3.3
5815	10/13/2011	1094	Pass	11	7+00	CL	0	13.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	122.0	101.0	20.8	101.5	**100.3**	-1.1		**-0.3**		64	21	43	CH	2.3	97.7	1.5
5815	10/13/2011	1096	Pass	11	17+00	CL	0	13.6			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	118.2	92.1	28.4	100.5	**99.9**	1.9		**2.3**		66	21	45	CH	2.0	98.0	2.4
5815	10/13/2011	1093	Pass	11	2+06	CL	0	13.6			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	116.2	88.8	30.8	100.7	**100.6**	1.4		**1.5**		86	25	61	CH	1.0	99.0	1.8
5815	10/13/2011	1095	Pass	11	12+00	CL	0	13.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	121.6	97.9	24.2	98.4	**97.2**	2.3		**3.1**		63	22	41	CH	1.4	98.6	2.1
5818	10/19/2011	1097	Pass	2	170+01	PS	-136	3.6	5719+964																										8.7
5823	10/18/2011	1100	Pass	10	37+26	CL	0	13.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	114.1	90.5	26.1	98.7	**98.3**	-2.4		**-1.2**		74	21	53	CH	6.8	93.2	2.9
5823	10/18/2011	1101	Pass	10	41+54	CL	0	13.1			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	110.7	87.6	26.4	95.5	**95.1**	-2.1		**-0.9**		73	20	53	CH	6.8	93.2	2.5
5823	10/18/2011	1099	Pass	11	32+17	CL	0	13.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	120.7	93.9	28.5	102.4	**102.0**	2.3		**1.2**		69	19	50	CH	5.7	94.3	2.7
5823	10/18/2011	1104	Pass	10	50+90	CL	0	13.1			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	114.0	92.3	23.5	100.7	**100.2**	-2.7		**-3.8**	YES	68	19	49	CH	4.3	95.7	2.4
5823	10/18/2011	1103	Pass	10	45+90	CL	0	13.1			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	118.9	97.0	22.6	97.5	**96.3**	0.7		**1.5**		63	22	41	CH	3.9	96.1	3.0
5823	10/18/2011	1102	Pass	10	27+20	CL	0	13.6			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	114.3	91.8	24.5	98.8	**98.2**	2.2		**1.9**		76	20	56	CH	3.3	96.7	3.2
5823	10/18/2011	1098	Pass	11	22+20	CL	0	13.5			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	115.0	94.0	22.3	101.2	**100.5**	0.0		**-0.3**		75	19	56	CH	5.3	94.7	3.2
5842	10/20/2011	1105	Pass	11	37+14	CL	0	13.4			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	116.8	92.0	27.0	100.3	**99.9**	0.8		**-0.3**		69	21	48	CH	5.7	94.3	2.7
5842	10/20/2011	1107	Pass	11	56+80	CL	0	14.1			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	115.0	95.0	21.1	95.5	**94.3**	-0.8		**0.0**		64	22	42	CH	7.7	92.3	1.7
5842	10/20/2011	1106	Pass	10	56+88	CL	0	13.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	122.1	101.3	20.5	101.8	**100.6**	-1.4		**-0.6**		63	22	41	CH	6.6	93.4	1.8
5855	10/24/2011	1110	Pass	11	52+00	CL	0	13.6			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	109.9	87.9	25.0	94.6	**94.0**	2.7		**2.4**		78	22	56	CH	4.6	95.4	2.6
5855	10/24/2011	1108	Pass	11	42+17	CL	0	13.6			3094	90.1	24.0	**90.4**	**23.3**	78	26	52	96.8	115.4	91.7	25.8	101.8	**101.4**	1.8		**2.5**		78	25	53	CH	4.8	95.2	2.9
5855	10/24/2011	1109	Pass	11	47+15	CL	0	13.6			3094	90.1	24.0	**90.4**	**23.3**	78	26	52	96.8	115.3	91.7	25.7	101.8	**101.4**	1.7		**2.4**		78	24	54	CH	3.2	96.8	2.7
5870	10/25/2011	1111	Pass	3	57+44	FS	100	4.6			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	113.4	86.0	31.8	97.5	**97.4**	2.4		**2.5**		87	26	61	CH	3.7	96.3	2.7
5874	10/26/2011	1112	Pass	3	64+48	PS	-92	4.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	120.9	98.9	22.3	99.4	**98.2**	0.4		**1.2**		65	22	43	CH	3.7	96.3	3.2
5874	10/26/2011	1113	Pass	3	58+88	PS	-72	4.9			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	109.9	87.4	25.8	97.1	**96.4**	-2.7		**-2.6**		74	26	48	CH	4.5	95.5	3.0
5896	10/31/2011	1136	Pass	3	166+89	CL	0	12.5			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	110.7	88.7	24.8	101.4	**100.5**	-2.8		**-2.3**		88	22	66	CH	2.7	97.3	1.6
5896	10/31/2011	1135	Pass	3	165+07	PS	27	8.9			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	111.6	84.3	32.4	96.3	**95.5**	4.8		**5.3**	YES	88	26	62	CH	2.5	97.5	2.0
5896	10/31/2011	1125	Pass	4	179+80	CL	0	13.1			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	116.1	90.6	28.2	98.8	**98.4**	2.0		**0.9**		72	25	47	CH	3.4	96.6	3.1
5896	10/31/2011	1134	Pass	2	165+02	CL	27	8.1			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	116.8	88.3	32.3	100.9	**100.0**	4.7		**5.2**	YES	84	26	58	CH	3.4	96.6	2.1
5896	10/31/2011	1127	Pass	5	179+72	CL	0	13.6			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	113.9	86.6	31.5	99.0	**98.1**	3.9		**4.4**		84	28	56	CH	2.7	97.3	2.5
5896	10/31/2011	1120	Pass	4	173+92	CL	0	13.1			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	116.4	93.2	24.9	101.7	**101.1**	-1.6		**-1.2**		70	24	46	CH			3.0
5896	10/31/2011	1115	Pass	2	172+07	PS	-57	6.0			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	113.1	91.2	24.0	99.5	**99.0**	-2.2		**-3.3**	YES	70	21	49	CH			3.0
5896	10/31/2011	1130	Pass	4	180+05	PS	-181	3.1			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	118.3	89.4	32.4	102.2	**101.2**	4.8		**5.3**	YES	82	27	55	CH	9.5	90.5	2.2
5896	10/31/2011	1128	Pass	2	180+02	PS	-181	11.6			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	111.7	85.0	31.4	97.1	**96.3**	3.8		**4.3**		82	25	57	CH	2.8	97.2	2.4
5896	10/31/2011	1131	Pass	1	166+88	CL	0	10.5			3094	90.1	24.0	**90.4**	**23.3**	78	26	52	96.8	110.3	86.4	27.6	95.9	**95.6**	3.6		**4.3**		79	26	53	CH	5.1	94.9	1.7
5896	10/31/2011	1117	Pass	1	173+92	CL	0	10.5			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	113.4	87.8	29.2	100.3	**99.4**	1.6		**2.1**		82	28	54	CH			4.1
5896	10/31/2011	1118	Pass	2	174+02	CL	0	11.5			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	114.5	89.7	27.6	97.8	**97.4**	1.4		**0.3**		69	22	47	CH			3.2
5896	10/31/2011	1116	Pass	3	172+07	PS	-52	7.1			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	114.4	87.1	31.4	98.8	**98.6**	2.0		**2.1**		87	26	61	CH			2.9
5896	10/31/2011	1121	Pass	5	173+96	CL	0	13.6			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	112.8	86.2	30.8	98.5	**97.6**	3.2		**3.7**		81	25	56	CH			3.6

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
5896	10/31/2011	1123	Pass	2	179+81	CL	0	11.5			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	114.9	87.9	30.7	96.0	**95.3**	4.2		**4.6**		67	23	44	CH			3.5
5896	10/31/2011	1126	Pass	1	180+01	PS	-186	0.6			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	113.1	90.7	24.7	99.0	**98.4**	-1.8		**-1.4**		66	22	44	CH	5.2	94.8	2.2
5896	10/31/2011	1138	Pass	5	166+88	CL	0	13.6			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	115.5	91.2	26.6	99.6	**98.9**	0.1		**0.5**		66	20	46	CH	5.1	94.9	0.0
5896	10/31/2011	1132	Pass	1	165+07	PS	-31	7.0			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	113.1	86.7	30.4	96.3	**95.6**	3.9		**2.0**		73	26	47	CH	4.3	95.7	1.5
5896	10/31/2011	1124	Pass	3	179+82	CL	0	12.5			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	111.3	89.9	23.8	98.1	**97.5**	-2.7		**-2.3**		66	20	46	CH	4.4	95.6	3.2
5896	10/31/2011	1129	Pass	3	180+01	PS	-188	2.6			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	116.0	91.6	26.7	101.8	**101.0**	-1.8		**-1.7**		73	25	48	CH	3.5	96.5	1.9
5896	10/31/2011	1114	Pass	1	172+06	PS	-55	4.9			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	114.4	91.5	25.0	98.5	**97.9**	2.7		**2.4**		77	24	53	CH	3.1	96.9	4.0
5896	10/31/2011	1119	Pass	3	173+98	CL	0	12.5			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	113.5	87.2	30.1	99.7	**98.8**	2.5		**3.0**		80	27	53	CH	2.9	97.1	3.9
5896	10/31/2011	1133	Pass	2	166+89	CL	0	11.5			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	115.5	88.8	30.0	101.5	**100.6**	2.4		**2.9**		80	26	54	CH	2.9	97.1	2.1
5896	10/31/2011	1137	Pass	4	166+91	CL	0	13.1			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	116.5	91.4	27.5	101.6	**100.8**	-1.0		**-0.9**		73	21	52	CH	3.1	96.9	1.5
5896	10/31/2011	1122	Pass	1	174+83	CL	0	10.5			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	114.9	89.1	28.9	101.0	**100.9**	-0.5		**-0.4**		86	27	59	CH			3.8
5910	11/1/2011	1145	Pass	1	141+46	PS	-115	3.1			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	117.6	89.2	31.9	101.9	**101.0**	4.3		**4.8**		86	29	57	CH	3.5	96.5	5.4
5910	11/1/2011	1155	Pass	3	121+84	PS	-15	9.8			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	114.0	88.0	29.6	96.0	**95.5**	3.4		**2.3**		73	24	49	CH	2.9	97.1	1.9
5910	11/1/2011	1164	Pass	4	69+97	CL	0	13.6			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	111.0	84.8	30.9	94.2	**93.5**	2.4		**2.5**		76	25	51	CH	3.7	96.3	2.7
5910	11/1/2011	1142	Pass	4	136+06	CL	0	12.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	115.4	92.5	24.8	93.0	**91.9**	2.9		**3.7**		66	20	46	CH	3.7	96.3	4.8
5910	11/1/2011	1157	Pass	1	66+89	CL	0	11.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	114.0	90.2	26.4	98.4	**97.9**	0.2		**-0.9**		70	20	50	CH	3.3	96.7	2.0
5910	11/1/2011	1139	Pass	1	136+08	CL	0	10.0			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	111.4	91.8	21.4	92.3	**91.2**	-0.5		**0.3**		66	25	41	CH	3.4	96.6	
5910	11/1/2011	1141	Pass	3	136+06	CL	0	12.0			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	111.1	91.6	21.3	92.1	**91.0**	-0.6		**0.2**		66	26	40	CH	3.3	96.7	3.7
5910	11/1/2011	1158	Pass	2	66+88	CL	0	12.6			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	116.5	89.3	30.4	99.2	**98.5**	1.9		**2.0**		75	24	51	CH	2.9	97.1	2.4
5910	11/1/2011	1140	Pass	2	136+09	CL	0	11.0			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	110.4	90.7	21.7	91.2	**90.1**	-0.2		**0.6**		65	26	39	CH	3.4	96.6	3.5
5910	11/1/2011	1148	Pass	1	120+36	PS	-62	3.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	115.3	91.2	26.4	99.5	**99.0**	0.2		**-0.9**		69	20	49	CH	2.4	97.6	3.5
5910	11/1/2011	1168	Pass	2	108+13	PS	-62	4.0			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	116.7	91.1	28.1	95.1	**94.8**	4.1		**4.6**		61	21	40	CH			1.4
5910	11/1/2011	1160	Pass	4	66+93	CL	0	13.6			3094	90.1	24.0	**90.4**	**23.3**	78	26	52	96.8	115.4	91.5	26.1	101.6	**101.2**	2.1		**2.8**		78	25	53	CH	8.6	91.4	2.5
5910	11/1/2011	1156	Pass	4	121+44	PS	-12	11.3			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	113.9	91.6	24.4	92.1	**91.0**	2.5		**3.3**		64	20	44	CH	4.7	95.3	1.9
5910	11/1/2011	1146	Pass	2	141+49	PS	-114	4.1			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	114.9	91.2	26.0	98.2	**97.5**	3.7		**3.4**		78	22	56	CH	2.1	97.9	3.9
5910	11/1/2011	1167	Pass	1	97+00	CL	0	10.5			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	117.0	92.4	26.6	100.8	**100.3**	0.4		**-0.7**		68	18	50	CH			1.2
5910	11/1/2011	1153	Pass	1	121+47	PS	-18	7.5			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	109.4	84.9	28.9	94.3	**93.6**	0.4		**0.5**		73	24	49	CH	2.5	97.5	3.9
5910	11/1/2011	1165	Pass	1	108+17	PS	-63	3.0			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	118.9	92.0	29.2	102.2	**101.4**	0.7		**0.8**		73	20	53	CH			2.3
5910	11/1/2011	1152	Pass	1	120+37	PS	-91	5.8			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	115.1	93.0	23.8	93.5	**92.4**	1.9		**2.7**		62	18	44	CH	5.5	94.5	3.6
5910	11/1/2011	1144	Pass	6	136+02	CL	0	13.6			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	115.9	91.3	27.0	101.4	**100.7**	-1.5		**-1.4**		72	24	48	CH	3.1	96.9	4.0
5910	11/1/2011	1150	Pass	3	120+39	PS	-68	5.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	111.6	89.6	24.5	90.1	**89.0**	2.6		**3.4**		62	20	42	CH	4.4	95.6	2.9
5910	11/1/2011	1149	Pass	2	120+41	PS	-64	4.6			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	115.3	88.2	30.7	100.8	**99.9**	3.1		**3.6**		79	21	58	CH	2.3	97.7	3.4
5910	11/1/2011	1151	Pass	4	120+43	PS	-62	6.6			2611	87.9	30.6	**88.9**	**31.2**	78	28	50	97.5	110.9	83.3	33.1	94.8	**93.7**	2.5		**1.9**		76	28	48	CH	3.3	96.7	3.5
5910	11/1/2011	1166	Pass	1	104+50	PS	-151	0.5			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	114.6	91.0	26.0	99.3	**98.7**	-0.5		**-0.1**		65	19	46	CH			1.1
5910	11/1/2011	1162	Pass	2	69+99	CL	0	12.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	110.3	90.8	21.5	91.3	**90.2**	-0.4		**0.4**		61	19	42	CH	8.8	91.2	2.2
5910	11/1/2011	1163	Pass	3	70+02	CL	0	13.1			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	115.7	92.2	25.5	92.7	**91.6**	3.6		**4.4**		61	19	42	CH	8.1	91.9	1.4
5910	11/1/2011	1154	Pass	2	121+46	PS	-15	8.8			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	110.7	87.7	26.2	95.6	**95.2**	0.0		**-1.1**		65	17	48	CH	5.3	94.7	1.7
5910	11/1/2011	1143	Pass	5	136+08	CL	0	13.1			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	114.8	90.2	27.3	100.2	**99.4**	-1.2		**-1.1**		71	22	49	CH	3.8	96.2	4.3
5910	11/1/2011	1161	Pass	1	70+02	CL	0	11.5			3094	90.1	24.0	**90.4**	**23.3**	78	26	52	96.8	110.4	89.0	24.0	98.8	**98.5**	0.0		**0.7**		75	21	54	CH	2.9	97.1	2.0
5910	11/1/2011	1147	Pass	3	141+50	PS	-117	5.1			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	113.5	90.6	25.3	98.9	**98.3**	-1.2		**-0.8**		63	19	44	CH	3.4	96.6	3.1
5910	11/1/2011	1159	Pass	3	66+87	CL	0	13.1			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	114.5	89.5	27.9	99.4	**98.7**	-0.6		**-0.5**		70	19	51	CH	2.8	97.2	1.9
5931	11/2/2011	1170	Pass	3	108+16	PS	-59	5.1			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	109.8	87.3	25.8	97.0	**96.3**	-2.7		**-2.6**		75	24	51	CH	5.5	94.5	2.8
5931	11/2/2011	1181	Pass	4	40+58	FS	40	6.3			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	112.7	87.4	28.9	97.1	**96.4**	0.4		**0.5**		75	22	53	CH	3.6	96.4	2.9
5931	11/2/2011	1169	Pass	2	108+13	PS	-62	4.0			3094	90.1	24.0	**90.4**	**23.3**	78	26	52	96.8	116.7	91.0	28.3	101.0	**100.7**	4.3		**5.0**		78	25	53	CH	4.2	95.8	3.0
5931	11/2/2011	1173	Pass	4	104+47	PS	-152	2.6			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	116.5	88.9	31.1	101.6	**100.7**	3.5		**4.0**		80	21	59	CH	8.3	91.7	2.8
5931	11/2/2011	1171	Pass	2	104+48	PS	-148	0.7			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	115.6	88.7	30.4	98.6	**97.8**	1.9		**2.0**		73	20	53	CH	5.0	95.0	2.4
5931	11/2/2011	1180	Pass	3	40+49	PS	-39	5.0			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	120.5	92.5	30.3	100.9	**100.4**	4.1		**3.0**		67	19	48	CH	5.8	94.2	2.7
5931	11/2/2011	1176	Pass	5	97+00	CL	0	13.5			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	115.8	93.0	24.5	101.4	**101.0**	-1.7		**-2.8**		67	19	48	CH	4.8	95.2	3.1
5931	11/2/2011	1174	Pass	3	97+00	CL	0	12.4			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	113.0	92.7	21.9	99.8	**99.1**	-0.4		**-0.7**		76	22	54	CH	13.0	87.0	2.7
5931	11/2/2011	1178	Pass	1	40-+50	PS	-41	2.9			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	114.9	87.0	32.0	99.4	**98.5**	4.4		**4.9**		79	20	59	CH	5.3	94.7	2.9
5931	11/2/2011	1175	Pass	4	96+97	CL	0	12.9			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	108.7	83.7	29.8	95.7	**94.8**	2.2		**2.7**		79	21	58	CH	3.7	96.3	3.5
5931	11/2/2011	1177	Pass	1	40+34	PS	-39	6.4			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	113.1	87.9	28.7	97.7	**96.9**	0.2		**0.3**		72	21	51	CH	2.5	97.5	3.2
5931	11/2/2011	1179	Pass	2	40+50	PS	-42	3.9			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	119.1	92.4	28.9	102.7	**101.9**	0.4		**0.5**		71	19	52	CH	18.9	81.1	3.2
5931	11/2/2011	1172	Pass	3	104+47	PS	-150	1.6			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	110.2	86.4	27.5	96.0	**95.3**	-1.0		**-0.9**		70	19	51	CH	5.1	94.9	2.1
5932	11/3/2011	1189	Pass	1	32+24	FS	111	1.4			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	113.2	88.6	27.7	92.4	**92.1**	3.8		**3.8**		65	25	40	CH	6.8	93.2	4.2
5932	11/3/2011	1192	Pass	4	32+26	FS	116	4.3			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	112.5	87.9	28.0	95.9	**95.4**	1.8		**0.7**		69	20	49	CH	5.8	94.2	3.3
5932	11/3/2011	1193	Pass	1	29+53	FS	17	6.8			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	114.2	87.9	29.9	97.7	**96.9**	1.4		**1.5**		75	25	50	CH	4.6	95.4	2.7
5932	11/3/2011	1185	Pass	4	37+20	PS	-141	3.1			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	114.3	91.0	25.6	99.3	**98.7**	-0.9		**-0.5**		67	23	44	CH	6.2	93.8	2.0
5932	11/3/2011	1182	Pass	1	37+24	PS	-141	0.3			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	113.3	89.3	26.9	97.5	**96.9**	0.4		**0.8**		66	22	44	CH	5.6	94.4	2.7
5932	11/3/2011	1190	Pass	2	32+27	FS	108	2.5			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	113.2	87.8	29.0	97.6	**96.8**	0.5		**0.6**		73	21	52	CH	4.6	95.4	2.4
5932	11/3/2011	1186	Pass	1	39+90	FS	121	1.5			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	110.9	84.9	30.6	96.3	**96.1**	1.2		**1.3**		85	23	62	CH	5.4	94.6	2.5
5932	11/3/2011	1194	Pass	2	29+49	FS	17	7.7			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	112.8	86.8	30.0	96.4	**95.7**	1.5		**1.6**		72	23	49	CH	4.7	95.3	2.6
5932	11/3/2011	1183	Pass	2	27+32	PS	-142	1.3			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	114.8	91.3	25.7	101.4	**100.7**	-2.8		**-2.7**		72	20	52	CH	4.2	95.8	2.3
5932	11/3/2011	1188	Pass	3	39+86	FS	116	13.8			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	114.7	89.5	28.2	99.4	**98.7**	-0.3		**-0.2**		71	23	48	CH	7.8	92.2	2.8
5932	11/3/2011	1187	Pass	2	39+88	FS	119	2.5			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	114.0	85.8	32.8	95.3	**94.6**	4.3		**4.4**		71	24	47	CH	4.8	95.2	2.5
5932	11/3/2011	1184	Pass	3	37+24	PS	-138	2.3			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	116.1	88.2	31.7	100.0	**99.9**	2.3		**2.4**		83	22	61	CH	5.9	94.1	2.6
5932	11/3/2011	1191	Pass	3	32+24	FS	112	3.5			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	113.3	87.0	30.2	96.7	**95.9**	1.7		**1.8**		70	20	50	CH	5.9	94.1	6.4
5954	11/7/2011	1195	Pass	1	162+69	CL	0	10.1			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	112.8	89.0	26.7	98.9	**98.1**	-1.8		**-1.7**		76	26	50	CH	4.0	96.0	2.8
5954	11/7/2011	1214	Pass	1	27+46	FS	79	3.5			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	116.1	88.8	30.8	101.5	**100.6**	3.2		**3.7**		83	28	55	CH	3.1	96.9	3.8
5954	11/7/2011	1218	Pass	1	1+43	FS	27	5.8			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	115.9	93.3	24.2	101.7	**101.3**	-2.0		**-3.1**	YES	70	21	49	CH	4.5	95.5	3.7
5954	11/7/2011	1199	Pass	2	162+46	CL	0	10.6			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	110.5	88.6	24.7	95.4	**94.8**	2.4		**2.1**		79	24	55	CH	11.2	88.8	2.5
5954	11/7/2011	1222	Pass	2	27+24	FS	79	3.5			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	110.8	88.3	25.5	95.0	**94.4**	3.2		**2.9**		79	22	57	CH	7.4	92.6	4.1
5954	11/7/2011	1216	Pass	1	9+79	FS	48	3.7			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	118.2	92.9	27.2	101.3	**100.9**	1.0		**-0.1**		69	21	48	CH	7.1	92.9	3.4

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
5954	11/7/2011	1219	Pass	2	29+54	FS	15	9.2			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	113.4	87.6	29.4	99.3	**99.2**	0.0		**0.1**		88	25	63	CH	5.2	94.8	3.5
5954	11/7/2011	1204	Pass	4	162+52	CL	0	12.6			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	116.5	92.3	26.2	96.3	**96.0**	2.2		**2.7**		61	20	41	CH	6.1	93.9	2.6
5954	11/7/2011	1228	Pass	3	29+05	FS	11	12.0			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	112.7	88.8	26.9	98.7	**97.9**	-1.6		**-1.5**		75	24	51	CH	4.6	95.4	3.4
5954	11/7/2011	1215	Pass	1	21+92	CL	0	9.0			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	118.5	94.3	25.6	101.5	**100.9**	3.3		**3.0**		79	24	55	CH	3.9	96.1	3.3
5954	11/7/2011	1220	Pass	1	29+05	FS	17	10.5			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	110.4	83.8	31.7	95.8	**94.9**	4.1		**4.6**		82	24	58	CH	3.9	96.1	3.0
5954	11/7/2011	1217	Pass	1	4+41	PS	-27	4.6			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	113.8	86.5	31.5	98.9	**98.0**	3.9		**4.4**		82	25	57	CH	3.5	96.5	3.9
5954	11/7/2011	1198	Pass	2	162+71	CL	0	11.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	116.0	89.2	30.1	97.3	**96.9**	3.9		**2.8**		69	21	48	CH	4.5	95.5	2.9
5954	11/7/2011	1213	Pass	1	27+25	FS	80	2.5			3183	87.5	27.6	**88.3**	**27.1**	81	25	56	99.6	110.2	84.2	30.9	96.2	**95.4**	3.3		**3.8**		81	23	58	CH	10.9	89.1	3.5
5954	11/7/2011	1225	Pass	2	4+42	PS	-35	5.4			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	113.8	89.3	27.5	99.2	**98.5**	-1.0		**-0.9**		74	21	53	CH	11.0	89.0	7.6
5954	11/7/2011	1200	Pass	2	154+54	FS	14	8.5			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	119.8	98.8	21.2	99.3	**98.1**	-0.7		**0.1**		64	16	48	CH	8.6	91.4	2.0
5954	11/7/2011	1203	Pass	3	154+51	FS	17	9.3			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	120.8	96.8	24.8	101.0	**100.7**	0.8		**1.3**		60	19	41	CH	7.0	93.0	2.2
5954	11/7/2011	1209	Pass	5	154+50	FS	11	10.8			3178	90.1	26.2	**92.1**	**27.3**	68	20	48	98.1	119.7	91.4	30.9	101.4	**99.2**	4.7		**3.6**		68	19	49	CH	6.2	93.8	1.5
5954	11/7/2011	1224	Pass	2	9+79	FS	50	3.6			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	118.0	91.6	28.8	101.8	**101.0**	0.3		**0.4**		74	20	54	CH	4.3	95.7	3.3
5954	11/7/2011	1212	Pass	1	29+49	FS	17	8.2			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	110.3	87.3	26.3	95.2	**94.8**	0.1		**-1.0**		68	19	49	CH	4.5	95.5	4.1
5954	11/7/2011	1207	Pass	5	162+71	CL	0	13.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	116.7	93.7	24.5	94.2	**93.0**	2.6		**3.4**		64	19	45	CH	4.5	95.5	2.4
5954	11/7/2011	1197	Pass	1	154+50	FS	15	7.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	118.3	91.3	29.6	99.6	**99.1**	3.4		**2.3**		68	19	49	CH	1.1	98.9	2.2
5954	11/7/2011	1201	Pass	3	162+71	CL	0	12.6			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	115.6	91.8	25.9	100.2	**99.6**	-0.6		**-0.2**		66	21	45	CH	9.2	90.8	2.3
5954	11/7/2011	1196	Pass	1	162+49	CL	0	9.7			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	118.3	91.1	29.8	101.2	**100.4**	1.3		**1.4**		73	21	52	CH	6.4	93.6	2.7
5954	11/7/2011	1206	Pass	4	154+47	FS	14	9.9			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	120.8	96.5	25.2	100.7	**100.4**	1.2		**1.7**		59	19	40	CH	6.9	93.1	1.9
5954	11/7/2011	1211	Pass	6	154+51	FS	14	11.0			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	115.9	92.8	24.9	101.3	**100.7**	-1.6		**-1.2**		66	21	45	CH	4.9	95.1	2.4
5954	11/7/2011	1208	Pass	5	162+42	CL	0	13.0			3178	90.1	26.2	**92.1**	**27.3**	68	20	48	98.1	119.2	91.2	30.7	101.2	**99.0**	4.5		**3.4**		67	20	47	CH	3.0	97.0	4.1
5954	11/7/2011	1226	Pass	2	1+43	FS	26	7.5			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	109.8	87.2	25.9	93.9	**93.3**	3.6		**3.3**		76	21	55	CH	7.1	92.9	3.9
5954	11/7/2011	1210	Pass	6	162+44	CL	0	13.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	116.0	92.5	25.4	100.9	**100.4**	-0.8		**-1.9**		66	19	47	CH			2.9
5954	11/7/2011	1202	Pass	3	162+51	CL	0	11.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	117.9	93.2	26.5	101.6	**101.2**	0.3		**-0.8**		65	18	47	CH	6.0	94.0	2.8
5954	11/7/2011	1205	Pass	4	162+75	CL	0	13.0			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	118.2	93.5	26.4	102.1	**101.4**	-0.1		**0.3**		63	20	43	CH	4.3	95.7	2.7
5954	11/7/2011	1223	Pass	2	21+94	CL	0	10.6			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	113.4	89.3	27.0	99.2	**98.5**	-1.5		**-1.4**		70	20	50	CH	3.6	96.4	3.1
5954	11/7/2011	1221	Pass	2	27+47	FS	81	4.3			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	113.8	87.8	29.6	99.5	**99.4**	0.2		**0.3**		78	23	55	CH	4.3	95.7	4.0
5960	11/8/2011	1256	Pass	3	121+98	PS	-173	0.7			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	116.7	97.9	19.2	97.0	**96.5**	-0.4		**-1.2**		49	19	30	CH	9.4	90.6	3.9
5960	11/8/2011	1258	Pass	4	121+99	PS	-189	2.0			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	117.2	100.1	17.1	99.2	**98.7**	-2.5		**-3.3**	YES	48	22	26	CH	9.0	91.0	2.8
5960	11/8/2011	1255	Pass	3	122+24	PS	-70	5.6			3179	100.9	19.6	**101.4**	**20.4**	44	19	25	97.1	114.5	94.5	21.1	93.7	**93.2**	1.5		**0.7**		48	19	29	CL	3.5	96.5	3.1
5960	11/8/2011	1232	Pass	3	21+92	CL	0	12.6			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	115.3	89.7	28.6	99.7	**98.9**	0.1		**0.2**		76	25	51	CH	3.6	96.4	3.4
5960	11/8/2011	1238	Pass	4	9+80	FS	51	5.5			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	116.1	89.7	29.4	99.7	**98.9**	0.9		**1.0**		75	20	55	CH	4.6	95.4	4.1
5960	11/8/2011	1251	Pass	4	48+02	CL	0	13.6			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	113.4	91.7	23.6	95.7	**95.4**	-0.4		**0.1**		61	21	40	CH	4.9	95.1	2.6
5960	11/8/2011	1240	Pass	5	9+83	FS	50	6.2			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	111.3	83.7	32.9	94.9	**94.8**	3.5		**3.6**		88	28	60	CH	2.8	97.2	3.4
5960	11/8/2011	1229	Pass	4	29+53	FS	11	11.2			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	112.2	88.3	27.0	96.3	**95.9**	0.8		**-0.3**		69	22	47	CH	3.9	96.1	3.6
5960	11/8/2011	1241	Pass	5	21+98	CL	0	13.6			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	114.7	86.8	32.2	98.4	**98.3**	2.8		**2.9**		87	28	59	CH	4.7	95.3	4.6
5960	11/8/2011	1236	Pass	4	27+30	FS	83	5.2			3094	90.1	24.0	**90.4**	**23.3**	78	26	52	96.8	112.1	87.9	27.6	97.6	**97.2**	3.6		**4.3**		78	27	51	CH	6.7	93.3	4.4
5960	11/8/2011	1237	Pass	4	21+93	CL	0	1.3			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	119.4	91.7	30.2	101.9	**101.1**	1.7		**1.8**		74	20	54	CH	4.3	95.7	3.1
5960	11/8/2011	1249	Pass	4	48+00	CL	0	13.0			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	113.9	93.3	22.1	97.4	**97.1**	-1.9		**-1.4**		60	19	41	CH	5.4	94.6	3.4
5960	11/8/2011	1242	Pass	1	47+96	PS	-90	1.4			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	116.2	89.0	30.6	100.9	**100.8**	1.2		**1.3**		87	28	59	CH	3.4	96.6	2.6
5960	11/8/2011	1247	Pass	3	47+99	PS	-92	3.5			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	117.9	91.7	28.6	100.0	**99.6**	2.4		**1.3**		68	20	48	CH	3.9	96.1	3.1
5960	11/8/2011	1250	Pass	4	48+01	PS	-92	4.2			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	117.0	93.5	25.1	97.6	**97.3**	1.1		**1.6**		60	20	40	CH	4.1	95.9	3.4
5960	11/8/2011	1246	Pass	2	48+02	CL	0	11.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	115.4	91.8	25.7	100.1	**99.7**	-0.5		**-1.6**		68	20	48	CH	3.5	96.4	3.2
5960	11/8/2011	1230	Pass	3	27+25	FS	79	4.2			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	117.0	93.0	25.8	101.4	**101.0**	-0.4		**-1.5**		68	21	47	CH	2.0	98.0	3.9
5960	11/8/2011	1235	Pass	3	1+40	FS	23	8.8			3094	90.1	24.0	**90.4**	**23.3**	78	26	52	96.8	111.3	89.2	24.8	99.0	**98.7**	0.8		**1.5**		78	27	51	CH	2.5	97.5	3.9
5960	11/8/2011	1234	Pass	3	4+43	PS	-29	6.8			3094	90.1	24.0	**90.4**	**23.3**	78	26	52	96.8	115.3	91.8	25.6	101.9	**101.5**	1.6		**2.3**		78	27	51	CH	0.8	99.2	4.4
5960	11/8/2011	1254	Pass	2	121+97	PS	-186	0.3			3185	90.0	28.5	**90.7**	**28.4**	74	23	51	99.2	113.9	87.0	30.9	96.7	**95.9**	2.4		**2.5**		73	19	54	CH	5.8	94.2	3.8
5960	11/8/2011	1244	Pass	2	47+97	PS	-93	2.4			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	115.3	88.0	31.0	99.8	**99.7**	1.6		**1.7**		86	27	59	CH	3.7	96.3	2.5
5960	11/8/2011	1248	Pass	3	47+98	CL	0	12.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	112.8	90.4	24.8	98.6	**98.2**	-1.4		**-2.5**		67	20	47	CH	3.9	96.1	5.1
5960	11/8/2011	1252	Pass	1	121+98	PS	-178	1.8			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	113.1	88.3	28.1	96.4	**95.8**	1.6		**2.0**		65	21	44	CH	4.0	96.0	3.6
5960	11/8/2011	1243	Pass	1	48+01	CL	0	10.6			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	110.7	82.7	33.9	93.8	**93.7**	4.5		**4.6**		85	27	58	CH	3.0	97.0	4.6
5960	11/8/2011	1245	Pass	1	122+24	PS	-71	3.9			3182	88.2	29.4	**88.3**	**29.3**	87	25	62	99.8	119.4	89.2	33.8	101.1	**101.0**	4.4		**4.5**		85	24	61	CH	2.7	97.3	2.8
5960	11/8/2011	1231	Pass	3	27+46	FS	81	5.2			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	111.7	89.5	24.8	97.7	**97.1**	-1.7		**-1.3**		65	21	44	CH	3.5	96.5	4.1
5960	11/8/2011	1253	Pass	2	122+23	PS	-71	4.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	112.7	93.7	20.3	94.2	**93.0**	-1.6		**-0.8**		62	20	42	CH	3.0	97.0	2.5
5960	11/8/2011	1233	Pass	3	9+79	FS	50	4.5			3094	90.1	24.0	**90.4**	**23.3**	78	26	52	96.8	114.3	91.3	25.2	101.3	**101.0**	1.2		**1.9**		76	23	53	CH	3.0	97.0	3.7
5960	11/8/2011	1239	Pass	4	4+32	PS	-31	7.1			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	112.3	90.2	24.5	97.1	**96.5**	2.2		**1.9**		75	21	54	CH	3.5	96.5	3.7
5960	11/8/2011	1257	Pass	4	122+24	PS	-69	6.5			2762	99.7	23.1	**92.3**	**26.0**	72	29	43	97.1	113.4	92.6	22.4	92.9	**100.3**	-0.7		**-3.6**	YES	51	21	30	CH	3.8	96.2	3.9
5967	11/9/2011	1283	Pass	4	71+39	PS	-37	5.8			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	110.6	88.6	24.9	92.4	**92.1**	1.0		**1.0**		68	23	45	Ch	3.3	96.7	2.8
5967	11/9/2011	1268	Pass	2	77+80	PS	-23	7.7			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	114.6	90.8	26.2	99.0	**98.6**	0.0		**-1.1**		72	21	51	CH	5.0	95.0	3.9
5967	11/9/2011	1292	Pass	5	90+00	CL	0	13.6			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	113.4	90.8	24.9	94.7	**94.4**	1.0		**1.0**		66	26	40	CH	3.3	96.7	2.6
5967	11/9/2011	1267	Pass	1	90+2	CL	0	10.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	117.6	91.2	28.9	99.5	**99.0**	2.7		**1.6**		72	20	52	CH			4.1
5967	11/9/2011	1297	Pass	4	121+99	PS	-170	3.1			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	111.6	89.9	24.2	93.8	**93.5**	0.2		**0.7**		63	28	35	CH	5.4	94.6	3.3
5967	11/9/2011	1272	Pass	2	121+94	PS	-142	1.0			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	116.2	92.6	25.5	101.1	**100.4**	-1.0		**-0.6**		70	25	45	CH	4.2	95.8	3.0
5967	11/9/2011	1281	Pass	3	82+04	PS	-64	4.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	112.7	87.5	28.8	95.4	**95.0**	2.6		**1.5**		71	22	49	CH	4.6	95.4	2.9
5967	11/9/2011	1277	Pass	3	77+80	PS	-21	9.1			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	115.8	92.6	25.0	101.0	**100.5**	-1.2		**-2.3**		71	22	49	CH	3.0	97.0	3.7
5967	11/9/2011	1289	Pass	3	83+48	FS	69	5.4			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	111.6	89.9	24.2	93.8	**93.5**	0.2		**0.7**		63	25	38	CH	3.1	96.9	1.8
5967	11/9/2011	1286	Pass	1	79+99	FS	51	3.8			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	112.2	92.5	21.3	96.6	**96.3**	-2.7		**-2.2**		62	24	38	CH	4.5	95.5	2.2
5967	11/9/2011	1266	Pass	1	82+08	PS	-63	3.0			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	110.9	85.7	29.4	93.5	**93.1**	3.2		**2.1**		70	22	48	CH	3.8	96.2	4.6
5967	11/9/2011	1275	Pass	2	82+07	PS	-63	3.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	112.9	87.4	29.2	95.3	**94.9**	3.0		**1.9**		70	20	50	CH	3.7	96.3	2.8
5967	11/9/2011	1265	Pass	1	82+83	PS	-78	2.5			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	115.2	93.2	23.6	101.6	**101.2**	-2.6		**-3.7**	YES	70	24	46	CH	3.6	96.4	3.1
5967	11/9/2011	1273	Pass	2	90+02	CL	0	11.6			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	112.8	90.5	24.7	98.7	**98.3**	-1.5		**-2.6**		70	22	48	CH	3.4	96.6	2.5
5967	11/9/2011	1285	Pass	1	83+53	FS	65	3.4			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	113.3	92.3	22.8	96.3	**96.0**	-1.2		**-0.7**		62	21	41	CH	3.4	96.6	2.4
5967	11/9/2011	1284	Pass	3	90+01	CL	0	12.5			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	118.7	97.2	22.1	101.5	**101.1**	-1.9		**-1.4**		62	24	38	CH	2.9	97.1	2.2

Table 7-20 CQC Test Data with "Corrected" Reference Proctors

Test Reprt Information											Test Reference Proctor (Includes Reported and Corrected Maximum Dry Densities and Optimum Water Contents)									Field Density - Nuclear Method and Oven Moisture Content (Includes Reported and Corrected Percent Compaction and Difference Between Measured Water Content and Optimum Water Content)									Materials Classification Tests						
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Passing Retest ID #	Proctor #	γ_d Max Reported	Reported w_{Opt}	**γ_d Max Corrected**	**Corrected w_{Opt}**	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	**Corrected % Compaction Nuclear**	Nuclear $w_{Meas} - w_{Opt}$	Reported Moisture Out of Tolerance - 3/+5%	**Nuclear $w_{Meas} - w_{Opt}$ Corrected**	Corrected Moisture Out of Tolerance - 3/+5%	LL	PL	PI	Group Symbol	Sand Content (%)	ASTM D 2487 % Fines	ASTM D 2974 Organic Content (%)
5967	11/9/2011	1271	Pass	2	71+39	PS	-37	4.4			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	115.8	92.3	25.4	100.7	**100.2**	-0.8		**-1.9**		69	22	47	CH	4.7	95.3	3.3
5967	11/9/2011	1269	Pass	3	77+89	PS	-69	3.6			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	119.1	92.8	28.4	101.3	**100.7**	1.9		**2.3**		68	24	44	CH	3.8	96.2	4.0
5967	11/9/2011	1294	Pass	2	109+27	PS	-33	4.8			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	115.0	92.7	24.0	101.1	**100.7**	-2.2		**-3.3**	YES	69	17	52	CH	4.2	95.8	3.5
5967	11/9/2011	1264	Pass	2	77+87	PS	-67	2.5			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	110.7	85.7	29.1	93.5	**93.1**	2.9		**1.8**		69	23	46	CH	4.0	96.0	4.0
5967	11/9/2011	1295	Pass	3	109+30	PS	-32	5.8			3034	94.8	24.8	**95.4**	**24.3**	67	24	43	95.5	115.0	90.2	27.5	95.1	**94.5**	2.7		**3.2**		68	27	41	CH	4.5	95.5	3.1
5967	11/9/2011	1276	Pass	4	77+83	PS	-69	4.8			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	116.8	92.9	25.7	101.4	**100.8**	-0.8		**-0.4**		67	22	45	CH	6.1	93.9	2.4
5967	11/9/2011	1298	Pass	1	24+40	PS	-38	5.0			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	118.0	95.1	24.1	95.6	**94.4**	2.2		**3.0**		64	24	40	CH	6.8	93.2	2.8
5967	11/9/2011	1302	Pass	1	170+03	CL	0	11.0			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	111.4	90.4	23.2	94.4	**94.1**	-0.8		**-0.3**		60	16	44	CH	4.7	95.3	2.1
5967	11/9/2011	1304	Pass	1	139+96	FS	48	3.7			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	110.1	90.3	21.9	94.3	**94.0**	-2.1		**-1.6**		60	24	36	CH	3.7	96.3	2.7
5967	11/9/2011	1303	Pass	1	170+00	PS	-131	3.0			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	117.9	95.5	23.5	95.8	**95.2**	0.4		**3.1**		59	26	33	CH	4.2	95.8	2.2
5967	11/9/2011	1280	Pass	3	82+75	PS	-72	4.6			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	115.4	95.6	20.7	96.1	**94.9**	-1.2		**-0.4**		63	22	41	CH	4.7	95.3	2.0
5967	11/9/2011	1282	Pass	3	121+94	PS	-140	2.1			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	113.2	90.7	24.8	98.9	**98.5**	-1.4		**-2.5**		67	19	48	CH	4.2	95.8	2.0
5967	11/9/2011	1279	Pass	3	71+39	PS	-39	4.7			3291	99.5	21.9	**100.7**	**21.1**	64	22	42	97.8	114.0	95.0	20.0	95.5	**94.3**	-1.9		**-1.1**		63	22	41	CH	4.3	95.7	2.3
5967	11/9/2011	1300	Pass	1	149+98	CL	0	10.6			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	114.4	94.6	20.9	94.9	**94.3**	-2.2		**0.5**		58	26	32	CH	5.5	94.5	2.2
5967	11/9/2011	1274	Pass	2	82+77	PS	-77	3.0			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	111.8	90.0	24.2	98.1	**97.7**	-2.0		**-3.1**	YES	67	20	47	CH	2.7	97.3	1.9
5967	11/9/2011	1305	Pass	1	123+62	FS	68	2.6			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	114.3	92.4	23.7	92.7	**92.1**	0.6		**3.3**		58	26	32	CH	3.2	96.8	2.3
5967	11/9/2011	1262	Pass	1	74+18	PS	-17	8.5			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	115.5	92.0	25.6	92.3	**91.7**	2.5		**5.2**	YES	58	22	36	CH	2.5	97.5	3.8
5967	11/9/2011	1299	Pass	1	144+99	PS	-134	2.7			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	118.2	96.8	22.1	101.0	**100.7**	-1.9		**-1.4**		58	18	40	CH	6.8	93.2	2.2
5967	11/9/2011	1259	Pass	1	121+99	PS	-163	0.0			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	118.4	97.7	21.2	98.0	**97.4**	-1.9		**0.8**		57	22	35	CH	7.2	92.8	2.9
5967	11/9/2011	1288	Pass	2	79+97	FS	50	4.8			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	115.2	94.0	22.5	98.1	**97.8**	-1.5		**-1.0**		58	27	31	CH	3.6	96.4	2.3
5967	11/9/2011	1263	Pass	1	71+40	PS	-37	35.0			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	114.4	90.4	26.6	90.7	**90.1**	3.5		**6.2**	YES	57	24	33	CH	4.4	95.6	3.5
5967	11/9/2011	1261	Pass	1	77+81	PS	-21	6.5			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	114.0	89.7	27.1	90.0	**89.4**	4.0		**6.7**	YES	57	22	35	CH	3.8	96.2	4.1
5967	11/9/2011	1260	Pass	1	77+86	PS	-68	1.5			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	111.3	90.6	22.8	90.9	**90.3**	-0.3		**2.4**		57	22	35	CH	3.7	96.3	4.1
5967	11/9/2011	1278	Pass	3	74+15	PS	-17	10.5			3181	92.9	22.3	**93.5**	**22.6**	78	23	55	99.6	111.4	89.0	25.2	95.8	**95.2**	2.9		**2.6**		75	21	54	CH	3.1	96.9	2.5
5967	11/9/2011	1287	Pass	1	83+51	FS	63	4.4			3180	95.8	24.0	**96.1**	**23.5**	60	21	39	97.8	114.6	93.8	22.2	97.9	**97.6**	-1.8		**-1.3**		57	18	39	CH	4.5	95.5	2.2
5967	11/9/2011	1290	Pass	3	80+01	FS	53	5.8			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	111.4	87.9	26.8	96.0	**95.3**	0.3		**0.7**		64	18	46	CH	2.3	97.7	2.4
5967	11/9/2011	1296	Pass	4	109+26	PS	-35	6.2			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	112.3	90.1	24.7	98.3	**97.8**	-1.5		**-2.6**		64	16	48	CH	4.6	95.4	2.7
5967	11/9/2011	1291	Pass	4	89+98	CL	0	13.0			3178	91.7	26.2	**92.1**	**27.3**	68	20	48	98.1	116.1	93.2	24.6	101.6	**101.2**	-1.6		**-2.7**		64	17	47	CH	3.5	96.5	2.6
5967	11/9/2011	1270	Pass	2	74+21	PS	-14	9.8			3186	91.6	26.5	**92.2**	**26.1**	67	23	44	98.9	114.2	88.2	29.5	96.3	**95.7**	3.0		**3.4**		58	23	45	CH	3.1	96.9	3.8
5982	11/10/2011	1312	Pass	2	170+01	PS	133	4.1			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	122.9	101.0	21.7	101.3	**100.7**	-1.4		**1.3**		62	25	37	CH	8.3	91.7	2.0
5982	11/10/2011	1311	Pass	2	160+00	FS	-52	5.1			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	117.1	95.4	22.7	95.7	**95.1**	-0.4		**2.3**		62	27	35	CH	5.0	95.0	2.4
5982	11/10/2011	1318	Pass	3	159+97	FS	51	6.1			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	112.3	92.5	21.4	96.5	**96.2**	-2.5		**-2.5**		65	25	40	CH	4.0	96.0	2.1
5982	11/10/2011	1314	Pass	3	170+01	PS	-134	5.1			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	112.1	92.6	21.0	92.9	**92.3**	-2.1		**0.6**		62	26	36	CH	4.1	95.9	2.1
5982	11/10/2011	1317	Pass	5	169+98	CL	0	13.6			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	120.0	93.5	28.3	97.5	**97.2**	4.4		**4.4**		65	25	40	CH	3.3	96.7	1.6
5982	11/10/2011	1313	Pass	2	169+99	CL	0	12.2			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	110.3	90.9	21.4	91.2	**90.6**	-1.7		**1.0**		62	25	37	CH	3.3	96.7	1.6
5982	11/10/2011	1315	Pass	3	170+02	CL	0	12.7			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	116.2	93.6	24.2	93.9	**93.3**	1.1		**3.8**		61	23	38	CH	8.9	91.1	2.5
5982	11/10/2011	1325	Pass	5	150+00	CL	0	13.6			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	112.2	91.9	22.1	92.2	**91.6**	-1.0		**1.7**		61	23	38	CH	4.6	95.4	2.5
5982	11/10/2011	1320	Pass	3	145+00	PS	-125	5.2			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	110.3	89.9	22.7	93.7	**93.5**	-1.2		**-1.2**		64	25	39	CH	3.7	96.3	1.7
5982	11/10/2011	1319	Pass	3	150+05	CL	0	12.6			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	114.7	94.6	21.2	98.6	**98.3**	-2.7		**-2.7**		64	24	40	CH	3.6	96.4	1.2
5982	11/10/2011	1309	Pass	2	144+99	PS	-130	3.0			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	122.2	97.7	25.1	101.9	**101.6**	1.2		**1.2**		64	24	40	CH	3.3	96.7	2.4
5982	11/10/2011	1316	Pass	4	169+98	CL	0	13.1			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	110.1	87.7	25.5	91.4	**91.2**	1.6		**1.6**		64	27	37	CH	3.3	96.7	2.4
5982	11/10/2011	1321	Pass	3	140+02	FS	51	6.1			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	111.4	90.4	23.2	94.3	**94.0**	-0.7		**-0.7**		64	24	40	CH	3.2	96.8	1.4
5982	11/10/2011	1324	Pass	4	150+03	CL	0	13.1			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	111.1	91.9	20.9	92.2	**91.6**	-2.2		**0.5**		59	23	36	CH	4.8	95.2	2.1
5982	11/10/2011	1322	Pass	3	123+60	FS	76	5.2			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	113.4	94.0	20.7	94.3	**93.7**	-2.4		**0.3**		58	24	34	CH	4.2	95.8	2.2
5982	11/10/2011	1323	Pass	3	124+37	PS	-39	7.1			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	115.2	95.6	20.5	95.9	**95.3**	-2.6		**0.1**		58	23	35	CH	3.5	96.5	2.3
5982	11/10/2011	1306	Pass	2	123+63	FS	66	3.9			2762	92.1	26.0	**92.3**	**26.0**	72	29	43	97.1	110.2	87.9	25.3	95.4	**95.2**	-0.7		**-0.7**		62	25	37	CH	5.4	94.6	1.9
5982	11/10/2011	1310	Pass	2	150+01	CL	0	11.6			2762	92.1	26.0	**92.3**	**26.0**	72	29	43	97.1	114.3	91.9	24.4	99.8	**99.6**	-1.6		**-1.6**		59	25	34	CH	8.1	91.9	2.3
5982	11/10/2011	1308	Pass	2	140+01	FS	53	5.1			2762	92.1	26.0	**92.3**	**26.0**	72	29	43	97.1	113.7	91.8	23.8	99.7	**99.5**	-2.2		**-2.2**		59	24	35	CH	3.3	96.7	3.1
5982	11/10/2011	1307	Pass	2	124+39	PS	-39	5.8			2762	92.1	26.0	**92.3**	**26.0**	72	29	43	97.1	121.2	93.4	29.8	101.4	**101.2**	3.8		**3.8**		58	24	34	CH	4.3	95.7	3.2
6046	11/22/2011	1326	Pass	1	79+00	PS	-44	3.3			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	113.6	92.7	22.5	93.0	**92.4**	-0.6		**2.1**		63	25	38	CH	8.8	91.2	2.2
6046	11/22/2011	1327	Pass	2	79+00	PS	-45	4.3			2653	99.7	23.1	**100.3**	**20.4**	59	24	35	96.3	123.6	101.6	21.6	101.9	**101.3**	-1.5		**1.2**		63	27	36	CH	4.7	95.3	1.7
6046	11/22/2011	1328	Pass	3	79+00	PS	-41	5.3			2854	95.9	23.9	**96.2**	**23.9**	62	24	40	97.0	115.1	94.0	22.4	98.0	**97.7**	-1.5		**-1.5**		64	24	40	CH	4.3	95.7	2.0

Note (1) This table was developed by the Tiger Team using database spreadsheets summarizing all CQC tests provided by MVN Construction Quality Assurance Branch Division. Gaps in the summary spreadsheets were supplemented with information from the individual test reports provided in Appendix T. During the course of the investigation - at the request of the Tiger Team additional information was provided by MVN to develop this table.

Note (2) All densities are in pounds per cubic foot (pcf)

Note (3) This table includes test results for both passing and failing tests - only on compacted fill.

Table 7-24 Tiger Team Evaluation of "Corrected" Reference Proctors

Test Report Information										CQC Test Reference Proctor							Tiger Team "Corrected" Test Reference Proctor			Field Density - Nuclear Method & Oven Moisture Content with CQC Test Reference Proctor					Tiger Team "Corrected" Percent Compaction and Moisture Range		Materials Classification Tests					Differences Between Materials Classification Tests and CQC Selected Reference Proctor Values			
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Corrected Reference Proctor #	γ_d Max Corrected	Corrected w_{Opt}	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear $w_{Meas} - w_{Opt}$	Corrected % Compaction Nuclear	Nuclear $w_{Meas} - w_{Opt}$ Corrected	LL	PL	PI	Group Symbol	ASTM D 2974 Organic Content (%)	LL Difference	PL Difference	PI Difference	% Fines Difference
2690	8/6/2010	21	Pass	1	129+97.3	PS	-82.5	4.9		2609	95.1	26.4	64	23	41	98.2	2610	**94.8**	**25.6**	122.1	96.4	26.7	101.4	0.3	83.0	1.1	53	25	28	CH	3.1	-11	2	-13	-0.6
2690	8/6/2010	18	Pass	1	145+01	PS	-78.7	4.9		2609	95.1	26.4	64	23	41	98.2	2610	**94.8**	**25.6**	121.7	96.6	26.0	101.6	-0.4	83.5	0.4	53	23	30	CH	5.0	-11	0	-11	-2.6
2690	8/6/2010	17	Pass	1	149+86	PS	-76.4	4.9		2609	95.1	26.4	64	23	41	98.2	2610	**94.8**	**25.6**	123.6	99.6	24.1	104.7	-2.3	84.7	-1.5	58	28	30	CH	3.8	-6	5	-11	-0.6
2690	8/6/2010	19	Pass	1	139+99.4	PS	-78.9	4.8		2609	95.1	26.4	64	23	41	98.2	3180	**96.1**	**23.5**	121.5	98.1	23.9	103.2	-2.5	84.9	0.4	60	29	31	CH	6.5	-4	6	-10	-0.2
2690	8/6/2010	15	Pass	1	159+93.8	PS	-77.3	4.9		2609	95.1	26.4	64	23	41	98.2	3180	**96.1**	**23.5**	121.8	98.7	23.4	103.8	-3.0	85.2	-0.1	59	29	30	CH	3.9	-5	6	-11	-1.6
2690	8/6/2010	23	Pass	1	120+99.2	PS	-79.6	5.4		2609	95.1	26.4	64	23	41	98.2	3179	**101.4**	**20.4**	121.6	97.9	24.2	102.9	-2.2	84.7	3.8	48	27	21	CH	2.9	-16	4	-20	-1.2
2690	8/6/2010	10	Pass	1	161+04.7	FS	27.9	4.9		2609	95.1	26.4	64	23	41	98.2	2641	**105.4**	**18.7**	115.6	93.2	24.1	98.0	-2.3	84.8	5.4	38	24	14	CL	2.5	-26	1	-27	-10.0
2834	9/5/2010	31	Pass	2	119+49	PS	-6.1	5.3	2830+30	2653	99.7	23.1	59	24	35	96.3	3550	**92.2**	**25.8**	116.9	91.7	27.4	92.1	4.3	78.8	1.6	67	22	45	CH	3.0	8	-2	10	-2.4
2942	9/17/2010	62	Pass	7	119+59	PS	-8.2	10.9		2854	95.9	23.9	62	24	40	97.0	3180	**96.1**	**23.5**	114.3	89.4	27.9	93.1	4.0	81.5	4.4	50	27	23	CH	4.1	-12	3	-17	-0.7
2968	9/18/2010	65	Pass	1	119+84	PS	-126	2.6		2854	95.9	23.9	62	24	40	97.0	3185	**90.7**	**28.4**	118.1	92.1	28.2	96.0	4.3	81.3	-0.3	74	21	53	CH	4.1	12	-3	13	-4.9
2987	9/22/2010	73	Pass	3	119+92	FS	133.9	3.4		2854	95.9	23.9	62	24	40	97.0	3185	**90.7**	**28.4**	118.8	94.2	26.1	98.2	2.2	82.7	-2.3	73	25	48	CH	4.1	11	1	8	-3.4
2987	9/22/2010	72	Pass	10	119+60	CL	3.2	13.2		2854	95.9	23.9	62	24	40	97.0	3291	**100.7**	**21.1**	121.4	98.1	23.7	102.3	-0.2	84.3	2.6	64	21	43	CH	3.9	2	-3	3	-8.8
3002	9/23/2010	82	Pass	2	135+97	FS	22	5.3		2854	95.9	23.9	62	24	40	97.0	3183	**88.3**	**27.1**	118.2	94.1	25.6	98.1	1.7	83.0	-1.5	80	24	56	CH	4.0	18	0	16	0.0
3028	9/28/2010	90	Pass	2	149+98	FS	31.9	4.9		2854	95.9	23.9	62	24	40	97.0	2611	**88.9**	**31.2**	118.2	92.9	27.3	96.9	3.4	82.0	-3.9	75	25	50	CH	4.2	13	1	10	-0.6
3034	9/29/2010	95	Pass	1	128+03	FS	76.8	4.3		2854	95.9	23.9	62	24	40	97.0	3185	**90.7**	**28.4**	118.8	92.8	28.0	96.8	4.1	81.5	-0.4	76	31	45	CH	4.9	14	7	5	-1.2
3094	10/2/2010	106	Pass	1	103+06	CL	2.5	5.8	3002+81	2611	87.9	30.6	78	28	50	97.5	3182	**88.3**	**29.3**	109.3	82.1	33.1	93.4	2.5	85.5	3.8	91	31	60	CH	4.9	13	3	10	-1.9
3095	10/3/2010	109	Pass	1	110+93	PS	-160	0.1		2854	95.9	23.9	62	24	40	97.0	3094	**90.4**	**23.3**	115.3	91.4	26.2	95.3	2.3	82.7	2.9	77	24	53	CH	3.4	15	0	13	-1.3
3177	10/13/2010	134	Pass	1	77+94	FS	22	4.4		2854	95.9	23.9	62	24	40	97.0	3094	**90.4**	**23.3**	115.8	90.0	28.6	93.8	4.7	81.0	5.3	79	27	52	CH	3.7	17	3	12	-0.7
3200	10/16/2010	150	Pass	2	164+53	FS	46	4.5		2854	95.9	23.9	62	24	40	97.0	3183	**88.3**	**27.1**	112.9	88.3	27.8	92.1	3.9	81.6	0.7	85	28	57	CH	3.9	23	4	17	0.7
3202	10/17/2010	154	Pass	1	32+16	FS	10	4.3		2854	95.9	23.9	62	24	40	97.0	3185	**90.7**	**28.4**	110.6	87.7	26.1	91.4	2.2	82.6	-2.3	73	24	49	CH	4.0	11	0	9	0.6
3202	10/17/2010	153	Pass	1	38+02	FS	8	4.6		2854	95.9	23.9	62	24	40	97.0	3184	**94.4**	**21.6**	111.2	87.8	26.7	91.6	2.8	82.4	5.1	73	25	48	CH	4.2	11	1	8	-0.1
3218	10/19/2010	159	Pass	2	71+99	FS	36	4.8		2854	95.9	23.9	62	24	40	97.0	2610	**94.8**	**25.6**	115.9	95.5	21.4	99.6	-2.5	85.9	-4.2	52	20	32	CH	2.1	-10	-4	-8	-1.2
3218	10/19/2010	160	Pass	2	81+04	FS	25	5.0		3094	90.1	24.0	78	26	52	96.8	3180	**96.1**	**23.5**	105.3	84.4	24.7	93.7	0.7	89.0	1.2	60	22	38	CH	3.0	-18	-4	-14	-3.3
3236	10/21/2010	165	Pass	1	17+89	FS	22	4.0		2854	95.9	23.9	62	24	40	97.0	2611	**88.9**	**31.2**	114.7	89.3	28.5	93.1	4.6	81.2	-2.7	78	28	50	CH	5.8	16	4	10	-0.4
3266	10/26/2010	170	Pass	1	169+78	FS	82	4.5		3179	100.9	19.6	44	19	25	97.1	3034	**95.4**	**24.3**	119.6	97.3	22.9	96.4	3.3	80.6	-1.4	68	23	45	CH	3.3	24	4	20	-3.3
3266	10/26/2010	175	Pass	2	61+98	FS	14	5.5		3179	100.9	19.6	44	19	25	97.1	3180	**96.1**	**23.5**	118.5	96.5	22.8	95.6	3.2	80.7	-0.7	56	22	34	CH	2.8	12	3	9	-1.1
3266	10/26/2010	173	Pass	2	86+05	FS	24	5.1		3179	100.9	19.6	44	19	25	97.1	3180	**96.1**	**23.5**	121.0	98.9	22.4	98.0	2.8	81.0	-1.1	61	25	36	CH	3.5	17	6	11	-3.2
3266	10/26/2010	168	Pass	1	179+04	FS	67	3.8		3179	100.9	19.6	44	19	25	97.1	3180	**96.1**	**23.5**	118.3	97.0	21.9	96.1	2.3	81.2	-1.6	59	22	37	CH	3.2	15	3	12	-1.1
3266	10/26/2010	174	Pass	2	66+64	FS	26	4.9		3179	100.9	19.6	44	19	25	97.1	3180	**96.1**	**23.5**	115.9	96.2	20.5	95.3	0.9	82.2	-3.0	56	22	34	CH	2.6	12	3	9	-4.2
3266	10/26/2010	169	Pass	1	174+35	FS	65	4.2		3179	100.9	19.6	44	19	25	97.1	3180	**96.1**	**23.5**	117.5	99.0	18.7	98.1	-0.9	83.5	-4.8	62	21	41	CH	2.8	18	2	16	-0.8
3284	10/28/2010	183	Pass	1	12+45	FS	9	4.9		3180	95.8	24.0	60	21	39	97.8	3184	**94.4**	**21.6**	117.6	93.9	25.3	98.0	1.3	83.3	3.7	75	27	48	CH	3.0	15	6	9	-2.6
3284	10/28/2010	179	Pass	1	51+37	PS	-92	2.5		3179	100.9	19.6	44	19	25	97.1	3180	**96.1**	**23.5**	125.7	103.5	21.4	102.6	1.8	81.6	-2.1	55	20	35	CH	2.4	11	1	10	-4.3
3297	10/30/2010	186	Pass	1	3+41	FS	17	4.4		3179	100.9	19.6	44	19	25	97.1	3180	**96.1**	**23.5**	122.7	98.9	24.1	98.0	4.5	79.9	0.6	59	21	38	CH	2.6	15	2	13	-1.0
3297	10/30/2010	188	Pass	1	161+00	FS	66	4.4		3179	100.9	19.6	44	19	25	97.1	3180	**96.1**	**23.5**	120.7	98.9	22.1	98.0	2.5	81.2	-1.4	56	19	37	CH	2.3	12	0	12	-2.2
3297	10/30/2010	195	Pass	2	26+76	FS	26	4.6		3179	100.9	19.6	44	19	25	97.1	3180	**96.1**	**23.5**	117.8	96.8	21.7	95.9	2.1	81.4	-1.8	54	19	35	CH	2.8	10	0	10	-1.5
3297	10/30/2010	187	Pass	1	160+00	FS	45	5.0		3179	100.9	19.6	44	19	25	97.1	3180	**96.1**	**23.5**	125.1	104.3	20.0	103.4	0.4	82.7	-3.5	55	17	38	CH	3.0	11	-2	13	-1.5
3299	10/31/2010	210	Pass	2	17+95	FS	19	5.2		3180	95.8	24.0	60	21	39	97.8	2611	**88.9**	**31.2**	112.0	87.4	28.2	91.2	4.2	81.4	-3.0	80	30	50	CH	4.4	20	9	11	-0.3
3299	10/31/2010	204	Pass	2	166+13	FS	83	4.8		3180	95.8	24.0	60	21	39	97.8	3180	***96.1***	***23.5***	115.9	92.6	25.2	96.7	1.2	83.4	1.7	54	25	29	CH	2.5	-6	4	-10	-1.3
3354	11/6/2010	219	Pass	1	82+10	FS	77	4.3		3186	91.6	26.5	67	23	44	98.9	2610	**94.8**	**25.6**	116.5	89.5	30.1	97.7	3.6	83.9	4.5	58	25	33	CH	3.4	-9	2	-11	-2.8
3363	11/9/2010	228	Pass	2	101+91	FS	96	4.8		3180	95.8	24.0	60	21	39	97.8	3180	***96.1***	***23.5***	119.5	93.8	27.4	97.9	3.4	81.9	3.9	52	23	29	CH	2.6	-8	2	-10	-2.3
3371	11/10/2010	232	Pass	2	92+31	FS	53	6.0		3182	88.2	29.4	87	25	62	99.8	3185	**90.7**	**28.4**	115.7	87.8	31.8	99.5	2.4	86.0	3.4	74	28	46	CH	3.7	-13	3	-16	-6.1
3379	11/11/2010	241	Pass	3	68+46	FS	86	4.8		3185	90.0	28.5	74	23	51	99.2	3034	**95.4**	**24.3**	115.8	87.2	32.8	96.9	4.3	83.7	8.5	70	26	44	CH	3.3	-4	3	-7	-10.5
3384	11/12/2010	255	Pass	2	78+03	FS	61	5.1		3178	91.7	26.2	68	20	48	98.1	2610	**94.8**	**25.6**	113.9	90.0	26.6	98.1	0.4	86.1	1.0	52	20	32	CH	2.7	-16	0	-16	-2.8
3384	11/12/2010	247	Pass	3	160+16	FS	81	5.2		3178	91.7	26.2	68	20	48	98.1	3180	**96.1**	**23.5**	115.4	88.0	31.2	96.0	5.0	83.2	7.7	57	22	35	CH	2.9	-11	2	-13	-12.1
3388	11/13/2010	258	Pass	3	103+72	CL	0	7.1		3178	91.7	26.2	68	20	48	98.1	3180	**96.1**	**23.5**	116.4	89.6	29.9	97.7	3.7	83.9	6.4	55	22	33	CH	3.4	-13	2	-15	-2.1
3388	11/13/2010	259	Pass	3	101+06	CL	0	7.3		3180	95.8	24.0	60	21	39	97.8	3179	**101.4**	**20.4**	120.8	95.9	26.0	100.1	2.0	82.9	5.6	42	25	17	CH	2.7	-18	4	-22	-4.7
3391	11/14/2010	262	PASS	3	94+00	CL	0	7.4		3178	91.7	26.2	68	20	48	98.1	3180	**96.1**	**23.5**	117.8	91.1	29.3	99.3	3.1	84.3	5.8	56	22	34	CH	1.9	-12	2	-14	-3.5
3439	11/23/2010	294	Pass	4	87+54	PS	-12	8.0	3429+284	3185	90.0	28.5	74	23	51	99.2	3178	**92.1**	**27.3**	114.7	88.3	29.9	98.1	1.4	85.5	2.6	78	25	53	CH	3.5	4	2	2	-8.8
3448	11/24/2010	302	Pass	1	88+03	PS	-143	-1.1		3185	90.0	28.5	74	23	51	99.2	3185	***90.7***	***28.4***	112.0	84.7	32.2	94.1	3.7	84.0	3.8	79	31	48	CH	5.3	5	8	-3	-7.5
3712	1/8/2011	363	Pass	1	27+49	FS	59	4.4		3467	97.8	22.6	55	20	35	91.7	2854	**96.2**	**23.9**	118.7	93.2	27.4	95.3	4.8	80.3	3.5	65	22	43	CH	3.0	10	2	8	4.6
3830	1/24/2011	385	Pass	2	12+95	FS	23.5	6.3		3462	89.1	28.8	65	23	42	94.5	3462	**89.8**	**28.8**	110.6	86.8	27.4	97.4	-1.4	88.1	-1.4	77	25	52	CH	4.3	12	2	10	0.3
4049	2/22/2011	453	Pass	7	87+01	CL	0	11.7		3550	92.3	26.0	63	19	44	95.0	3555	**87.3**	**28.4**	121.1	94.4	28.3	102.3	2.3	84.5	-0.1	74	23	51	CH	3.8	11	4	7	0.2
4169	3/12/2011	480	Pass	8	68+93	CL	0	12.7		3550	92.3	26.0	63	19	44	95.0	2653	**100.3**	**20.4**	113.2	89.8	26.0	97.3	0.0	86.0	5.6	56	22	34	CH	3.0	-7	3	-10	-2.9
4248	3/24/2011	523	Pass	1	101+99	PS	-73	4.6		3183	87.5	27.6	81	25	56	99.6	3183	***88.3***	***27.1***	115.1	87.6	31.4	100.1	3.8	87.0	4.3	81	28	53	CH	4.9	0	3	-3	-11.4
4316	4/4/2011	570	Pass	8	124+03	CL	0	12.8		4171	96.5	22.9	60	22	38	88.2	3550	**92.2**	**25.8**	114.6	89.6	27.9	92.8	5.0	81.0	2.1	67	25	42	CH	3.7	7	3	4	9.0
4316	4/4/2011	565	Pass	6	149+00	CL	0	10.1		3649	94.8	24.1	59	23	36	94.0	4502	**92.3**	**28.2**	113.3	88.9	27.5	93.8	3.4	82.8	-0.7	69	25	44	CH	4.5	10	2	8	3.3
4400	4/14/2011	599	Pass	2	102+00	PS	-136	1.4		3804	85.5	31.1	84	27	57	94.9	3804	***86.0***	***29.1***	104.3	77.0	35.5	90.1	4.4	86.4	6.4	83	29	54	CH	6.6	-1	2	-3	-7.7
4413	4/17/2011	610	Pass	2	58+65	CL	0	2.3		3291	99.5	21.9	64	22	42	97.8	3034	**95.4**	**24.3**	122.9	98.2	25.2	98.7	3.3	80.3	0.9	67	23	44	CH	4.3	3	1	2	-8.0
4413	4/17/2011	609	Pass	1	58+90	CL	0	1.3		3291	99.5	21.9	64	22	42	97.8	3034	**95.4**	**24.3**	120.5	97.1	24.1	97.6	2.2	81.0	-0.2	66	23	43	CH	4.0	2	1	1	-7.0
4558	5/4/2011	691	Pass	4	55+61	FS	6	7.1		3550	92.3	26.0	63	19	44	95.0	2762	**92.3**	**26.0**	108.0	86.0	25.6	93.2	-0.4	86.3	-0.4	66	24	42	CH	5.0	3	5	-2	-7.0
4558	5/4/2011	689	Pass	6	24+02	CL	0	9.8		3649	94.8	24.1	59	23	36	94.0	4502	**92.3**	**28.2**	110.9	88.1	25.9	92.9	1.8	83.8	-2.3	68	20	48	CH	4.1	9	-3	12	2.6
4655	5/17/2011	733	Pass	7	43+00	CL	0	10.9		3555	86.6	30.0	78	28	50	94.1	3555	**87.3**	**28.4**	106.9	83.5	28.0	96.4	-2.0	90.2	-0.4	77	26	51	CH	6.2	-1	-2	1	-8.0
4655	5/17/2011	734	Pass	7	37+99	CL	0	11.0		3550	92.3	26.0	63	19	44	95.0	2762	**92.3**	**26.0**	105.2	84.0	25.2	91.0	-0.8	86.5	-0.8	73	29	44	CH	5.7	10	10	0	-3.6
4675	5/19/2011	749	Pass	7	23+07	CL	0	10.9		4716	79.2	34.0	90	29	61	82.6	4716	***79.0***	***32.2***	112.9	81.3	38.9	102.7	4.9	91.0	6.7	91	26	65	CH	6.1	1	-3	4	7.7
4675	5/19/2011	748	Pass	7	27+48	PS	-6	10.9		4716	79.2	34.0	90	29	61	82.6	4716	***79.0***	***32.2***	111.0	80.0	38.7	101.0	4.7	91.0	6.5	90	27	63	CH	6.2	0	-2	2	7.3

Table 7-24 Tiger Team Evaluation of "Corrected" Reference Proctors

Test Report Information										CQC Test Reference Proctor							Tiger Team "Corrected" Test Reference Proctor			Field Density - Nuclear Method & Oven Moisture Content with CQC Test Reference Proctor					Tiger Team "Corrected" Percent Compaction and Moisture Range		Materials Classification Tests					Differences Between Materials Classification Tests and CQC Selected Reference Proctor Values			
Report #	Sample Date	Test #	Test Result	Lift #	Station	Location	Offset	EL (ft)	Retest of ID #	Proctor #	γ_d Max	w_{Opt}	Proctor LL	Proctor PL	Proctor PI	Proctor % Fines	Corrected Reference Proctor #	γ_d Max Corrected	Corrected w_{Opt}	Nuclear γ_T	Nuc & Oven γ_d	Nuc Oven w_{Meas}	% Compaction Nuclear	Nuclear $w_{Meas} - w_{Opt}$	Corrected % Compaction Nuclear	Nuclear $w_{Meas} - w_{Opt}$ Corrected	LL	PL	PI	Group Symbol	ASTM D 2974 Organic Content (%)	LL Difference	PL Difference	PI Difference	% Fines Difference
4699	5/23/2011	759	Pass	7	8+96	PS	-9	10.9	4675+752	4716	79.2	34.0	90	29	61	82.6	4716	79.0	32.2	106.2	78.0	36.2	98.5	2.2	92.7	4.0	85	32	53	CH	6.9	-5	3	-8	9.7
5003	6/29/2011	842	Pass	10	60+63	CL	0	13.3		4502	91.6	28.2	68	23	45	95.0	3649	94.8	23.8	117.9	93.6	26.0	102.2	-2.2	86.7	2.2	63	22	41	CH	3.0	-5	-1	-4	-8.1
5502	8/19/2011	901	Pass	8	31+95	CL	0	11.4		3555	86.6	30.0	78	28	50	94.1	3555	87.3	28.4	103.4	78.7	31.4	90.9	1.4	87.9	3.0	70	18	52	CH	6.0	-8	-10	2	-3.5
5502	8/19/2011	906	Pass	8	51+70	CL	0	11.6		2762	92.1	26.6	72	29	43	97.1	3555	87.3	28.4	109.5	84.0	30.4	91.2	3.8	83.3	2.0	71	23	48	CH	5.2	-1	-6	5	-8.4
5502	8/19/2011	903	Pass	8	36+87	CL	0	11.7		3550	92.3	26.0	63	19	44	95.0	3550	92.2	25.8	113.5	87.5	29.7	94.8	3.7	83.5	3.9	68	25	43	CH	7.1	5	6	-1	-14.3
5502	8/19/2011	902	Pass	8	31+91	CL	0	11.4		2762	92.1	26.6	72	29	43	97.1	2762	92.3	26.0	107.3	84.0	27.8	91.2	1.2	85.0	1.8	70	26	44	CH	6.5	-2	-3	1	-10.8
5502	8/19/2011	904	Pass	8	41+89	CL	0	11.5		2762	92.1	26.6	72	29	43	97.1	2762	92.3	26.0	108.8	85.4	27.4	92.7	0.8	85.2	1.4	71	25	46	CH	6.5	-1	-4	3	-9.8
5502	8/19/2011	905	Pass	8	46+85	CL	0	11.6		2762	92.1	26.6	72	29	43	97.1	2762	92.3	26.0	106.4	84.8	25.5	92.1	-1.1	86.6	-0.5	70	23	47	CH	5.3	-2	-6	4	-7.4
5513	8/22/2011	912	Pass	8	6+96	PS	-12	11.3		3550	92.3	26.0	63	19	44	95.0	3550	92.2	25.8	105.0	84.2	24.7	91.2	-1.3	86.9	-1.1	63	20	43	CH	8.4	0	1	-1	-9.3
5577	8/30/2011	931	Pass	11	143+07	CL	0	13.5		3185	90.0	28.5	74	23	51	99.2	3178	92.1	27.3	118.5	93.3	27.0	103.7	-1.5	87.5	-0.3	75	25	50	CH	1.5	1	2	-1	-9.3
5643	9/12/2011	944	Pass	4	37+83	PS	-142	3.2		3185	90.0	28.5	74	23	51	99.2	3178	92.1	27.3	114.8	88.2	30.2	98.0	1.7	85.4	2.9	70	21	49	CH	6.7	-4	-2	-2	-8.0
5719	9/28/2011	967	Pass	1	170+05	CL	0	11.5		3178	91.7	26.2	68	20	48	98.1	3178.0	92.1	27.3	119.4	94.6	26.2	103.2	0.0	86.4	-1.1	68	19	49	CH	2.6	0	-1	1	-7.5
5719	9/28/2011	961	Pass	2	112+34	FS	-7.3	2.9		3185	90.0	28.5	74	23	51	99.2	3178	92.1	27.3	111.1	88.0	26.2	97.8	-2.3	88.0	-1.1	75	25	50	CH	5.3	1	2	-1	-9.5
5719	9/28/2011	962	Pass	3	112+03	FS	-8.2	3.5		3181	92.9	22.3	78	23	55	99.6	3181	93.5	22.6	112.1	90.8	23.5	97.7	1.2	87.2	0.9	76	21	55	CH	5.2	-2	-2	0	-10.9
5719	9/28/2011	968	Pass	2	170+01	CL	0	12.4		3185	90.0	28.5	74	23	51	99.2	3184	94.4	21.6	117.5	91.7	28.2	101.9	-0.3	86.7	6.6	71	20	51	CH	2.7	-3	-3	0	-12.9
5719	9/28/2011	960	Pass	1	112+23	FS	-9.6	2.0		3185	90.0	28.5	74	23	51	99.2	3184	94.4	21.6	110.8	87.0	27.3	96.7	-1.2	87.2	5.7	75	24	51	CH	3.5	1	1	0	-11.9
5719	9/28/2011	963	Pass	1	169+97	PS	-137	2.3		3185	90.0	28.5	74	23	51	99.2	3034	95.4	24.3	118.0	93.0	26.9	103.3	-1.6	87.6	2.6	72	25	47	CH	6.4	-2	2	-4	-11.3
5719	9/28/2011	964	Pass	2	170+01	PS	-138	3.6		3291	99.5	21.9	64	22	42	97.8	3291	100.7	21.1	123.3	98.8	24.8	99.3	2.9	80.5	3.7	62	19	43	CH	9.4	-2	-3	1	-8.5
5719	9/28/2011	969	Pass	1	149+99	CL	0	9.3		3186	91.6	26.5	67	23	44	98.9	3291	100.7	21.1	119.9	92.9	29.1	101.4	2.6	84.6	8.0	61	17	44	CH	1.9	-6	-6	0	-18.2
5739	10/3/2011	974	Pass	4	8+48	FS	50	6.2		3186	91.6	26.5	67	23	44	98.9	3291	100.7	21.1	115.8	92.4	25.3	100.9	-1.2	87.1	4.2	66	22	44	CH	2.6	-1	-1	0	-9.2
5739	10/3/2011	978	Pass	1	160+00	FS	53	4.6		3186	91.6	26.5	67	23	44	98.9	3291	100.7	21.1	114.3	91.4	25.0	99.8	-1.5	87.3	3.9	64	19	45	CH	2.1	-3	-4	1	-7.0
5748	10/4/2011	1005	Pass	3	124+10	PS	-38	7.2		3291	99.5	21.9	64	22	42	97.8	3291	100.7	21.1	121.5	99.0	22.7	99.5	0.8	81.9	1.6	62	20	42	CH	3.2	-2	-2	0	-9.2
5748	10/4/2011	996	Pass	1	123+54	FS	65	3.9		3186	91.6	26.5	67	23	44	98.9	3291	100.7	21.1	108.0	86.3	25.1	94.2	-1.4	87.2	4.0	66	21	45	CH	2.3	-1	-2	1	-11.1
5896	10/31/2011	1130	Pass	4	180+05	PS	-181	3.1		3183	87.5	27.6	81	25	56	99.6	3183	88.3	27.1	118.3	89.4	32.4	102.2	4.8	86.4	5.3	82	27	55	CH	2.2	1	2	-1	-9.1
5896	10/31/2011	1136	Pass	3	166+89	CL	0	12.5		3183	87.5	27.6	81	25	56	99.6	3182	88.3	29.3	110.7	88.7	24.8	101.4	-2.8	91.6	-4.5	88	22	66	CH	1.6	7	-3	10	-2.3
5931	11/2/2011	1173	Pass	4	104+47	PS	-152	2.6		3183	87.5	27.6	81	25	56	99.6	3183	88.3	27.1	116.5	88.9	31.1	101.6	3.5	87.2	4.0	80	21	59	CH	2.8	-1	-4	3	-7.9
5931	11/2/2011	1174	Pass	3	97+00	CL	0	12.4		3181	92.9	22.3	78	23	55	99.6	3181	93.5	22.6	113.0	92.7	21.9	99.8	-0.4	88.3	-0.7	76	22	54	CH	2.7	-2	-1	-1	-12.6
5931	11/2/2011	1179	Pass	2	40+50	PS	-42	3.9		3185	90.0	28.5	74	23	51	99.2	3184	94.4	21.6	119.1	92.4	28.9	102.7	0.4	86.2	7.3	71	19	52	CH	3.2	-3	-4	1	-18.1
5932	11/3/2011	1188	Pass	3	39+86	FS	116	13.8		3185	90.0	28.5	74	23	51	99.2	3178	92.1	27.3	114.7	89.5	28.2	99.4	-0.3	86.7	0.9	71	23	48	CH	2.8	-3	0	-3	-7.0
5954	11/7/2011	1213	Pass	1	27+25	FS	80	2.5		3183	87.5	27.6	81	25	56	99.6	3183	88.3	27.1	110.2	84.2	30.9	96.2	3.3	87.3	3.8	81	23	58	CH	3.5	0	-2	2	-10.5
5954	11/7/2011	1225	Pass	2	4+42	PS	-35	5.4		3185	90.0	28.5	74	23	51	99.2	3178	92.1	27.3	113.8	89.3	27.5	99.2	-1.0	87.2	0.2	74	21	53	CH	7.6	0	-2	2	-10.2
5954	11/7/2011	1222	Pass	2	27+24	FS	79	3.5		3181	92.9	22.3	78	23	55	99.6	3181	93.5	22.6	110.8	88.3	25.5	95.0	3.2	85.7	2.9	79	22	57	CH	4.1	1	-1	2	-7.0
5954	11/7/2011	1199	Pass	2	162+46	CL	0	10.6		3181	92.9	22.3	78	23	55	99.6	3181	93.5	22.6	110.5	88.6	24.7	95.4	2.4	86.3	2.1	79	24	55	CH	2.5	1	1	0	-10.8
5954	11/7/2011	1201	Pass	3	162+71	CL	0	12.6		3186	91.6	26.5	67	23	44	98.9	3291	100.7	21.1	115.6	91.8	25.9	100.2	-0.6	86.7	4.8	66	21	45	CH	2.3	-1	-2	1	-8.1
5960	11/8/2011	1257	Pass	4	122+24	PS	-69	6.5		2762	99.7	23.1	72	29	43	97.1	2653	100.3	20.4	113.4	92.6	22.4	92.9	-0.7	81.9	2.0	51	21	30	CH	3.9	-21	-8	-13	-0.9
5982	11/10/2011	1306	Pass	2	123+63	FS	66	3.9		2762	92.1	26.0	72	29	43	97.1	4171	97.2	23.1	110.2	87.9	25.3	95.4	-0.7	86.6	2.2	62	25	37	CH	1.9	-10	-4	-6	-2.5
5982	11/10/2011	1307	Pass	2	124+39	PS	-39	5.8		2762	92.1	26.0	72	29	43	97.1	2653	100.3	20.4	121.2	93.4	29.8	101.4	3.8	83.7	9.4	58	24	34	CH	3.2	-14	-5	-9	-1.4
5982	11/10/2011	1310	Pass	2	150+01	CL	0	11.6		2762	92.1	26.0	72	29	43	97.1	2653	100.3	20.4	114.3	91.9	24.4	99.8	-1.6	87.3	4.0	59	25	34	CH	2.3	-13	-4	-9	-5.2
5982	11/10/2011	1308	Pass	2	140+01	FS	53	5.1		2762	92.1	26.0	72	29	43	97.1	2653	100.3	20.4	113.7	91.8	23.8	99.7	-2.2	87.7	3.4	59	24	35	CH	3.1	-13	-5	-8	-0.4

Note (1) This table was developed by the Tiger Team using database spreadsheets summarizing all CQC tests provided by MVN Construction Quality Assurance Branch Division. Gaps in the summary spreadsheets were supplemented with information from the individual test reports provided in Appendix T. During the course of the investigation - at the request of the Tiger Team additional information was provided by MVN to develop this table.

Note (2) All densities are in pounds per cubic foot (pcf)

Note (3) In some situations the same reference proctor used by the CQC laboratory was selected as the "corrected" reference if the Proctor was determined to be the most appropriate based on the available Proctor data.

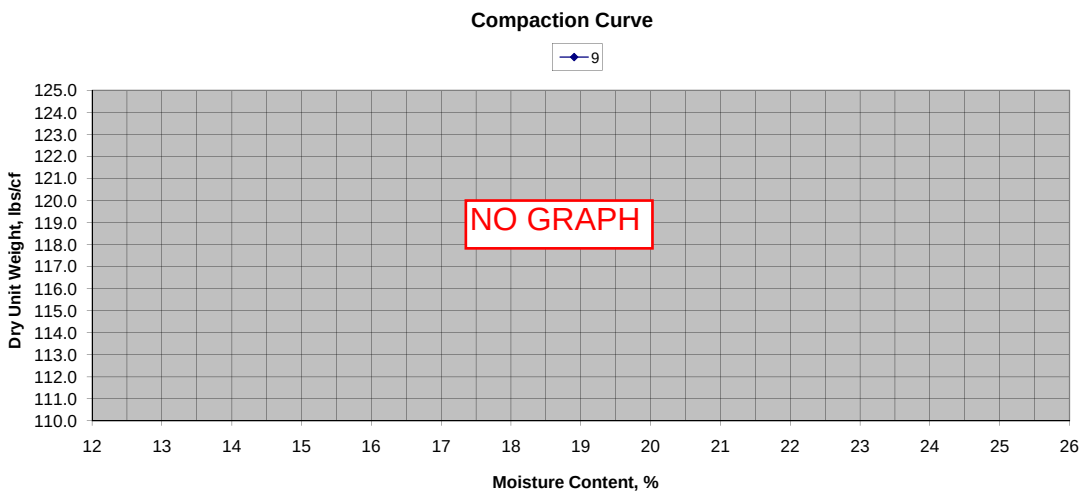
Note (4) The analysis evaluation presented above ALSO uses the "Corrected" maximum dry density and optimum water content as presented on Figure 73.

TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	TOLUNAY-WONG ENGINEERS		Test ID	2609-001A	
USACE Contract Number	W912P8-09-D-0046 0008		Contractor	PHYLWAY	
Project	WBV-14c.2 PHASE 2, FIRST LIFT		Date	7/16/2010	
Source of Material	NE STOCKPILE	Feature		Visual Description (ASTM D 2488)	BR. CL.
Station		Offset		Lift Number	
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	D698	Preparation Method	WET	As-Received Moisture Content	
Hand / Mechanical Rammer	HAND	Specific Gravity	2.65	Specific Gravity Method: As Tested or Estimated	ESTIMATED
Percent Retained - No. 4 Sieve	0	Percent Retained - 3/8" Sieve			
Percent Retained - 3/4" Sieve	0	Oversize Fraction		ASTM D 3718 Correction - Yes/No	NO
Tested By	B. LANDERS	Checked By	G. LECOQ	Submitted By	G. LECOQ

Test Sequence Number	1	2	3	4	5
a. Mold Number					
b. Mass of Mold (g)	2017.3	2017.3	2017.3	2017.3	2017.3
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3777.5	3828.5	3829.7	3794.1	3759.9
e. Mass of Wet Soil (g)	1760.2	1811.2	1812.4	1776.8	1742.6
f. Wet Unit Weight (lbs/cf)	116.5	119.9	120.0	117.6	115.4
g. Container No.	DT30	DT04	DT27	DT14	DT25
h. Mass of Tare (g)	203.30	233.50	209.70	245.10	205.80
i. Mass of Wet Soil+Tare (g)	390.40	408.30	375.00	407.40	415.00
j. Mass of Dry Soil+Tare (g)	353.60	371.80	338.40	370.00	364.60
k. Mass of Water (g)	36.80	36.50	36.60	37.40	50.40
l. Mass of Dry Soil (g)	150.30	138.30	128.70	124.90	158.80
m. Moisture Content %	24.5	26.4	28.4	29.9	31.7
n. Dry Unit Weight (lbs/cf)	93.6	94.9	93.4	90.5	87.6



Test Results	
Compaction Curve Control No.	2609 CURVE 1
Optimum Moisture Content (%)	26.2
Max. Dry Unit Weight (lbs/cf)	94.5
Classification of Sample	FAT CLAY Should be CH
Liquid And Plastic Limits	
Liquid Limit	64
Plastic Limit	23
Plasticity Index	41
Symbol From Plastic Chart:	CL
% Passing 200	98.2
% Passing No. 4	100

Dry Unit Weight Scale			
Min	85	Max	95

Moisture Content % Scale			
Min	15	Max	22

Change Graph Scale

Remarks:	Average Curve 1 & 2, Maximum Dry Unit Weight = 95.1, Optimum Moisture = 26.4%

Figure 7-1

US Army Corps of Engineers

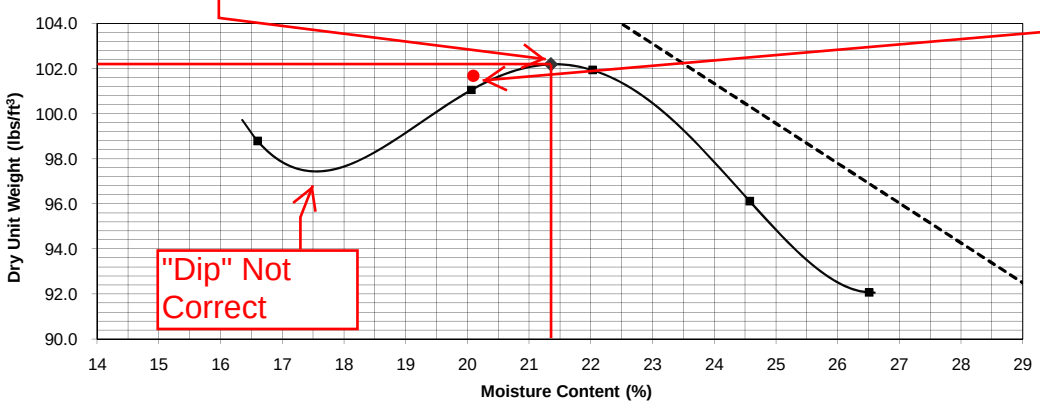
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3179-1	**Test No**	126
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Sandy Clay		
Station	North End	**Offset**	500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02029	**Longitude (°W)**	90.605590	**Elevation (ft)**	-4.0		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	32.5		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Not "Sandy"

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3785.4	3878.1	3924.4	3854.2	3804.8		
Wet Soil Mass (g)	1739.9	1832.6	1878.9	1808.7	1759.3		
Wet Unit Weight (lbs/ft³)	115.2	121.3	124.4	119.7	116.5		
Tare No	81	66	35	51	13		
Tare Mass (g)	253.1	259.2	251.8	245.6	237.6		
Wet Soil + Tare Mass (g)	403.4	445.3	439.6	414.9	421.8		
Dry Soil + Tare Mass (g)	382.0	414.2	405.7	381.5	383.2		
Moisture Content (%)	**16.6**	**20.1**	**22.0**	**24.6**	**26.5**		
Dry Unit Weight (lbs/ft³)	**98.8**	**101.1**	**101.9**	**96.1**	**92.1**		

102.2pcf & 21.4%



Proctor Test Results	
Proctor No	3179-126 CURVE 1
Optimum Moisture Content (%)	20.1
Max Dry Unit Weight (lbs/ft³)	101.7

Liquid And Plastic Limits	
Liquid Limit	44
Plastic Limit	19
Plasticity Index	25
Group Symbol	CL
Sand Content (Retained No 200) (%)	2.94
Fines (Minus No 200) (%)	97.06

Remarks Sample Location: North End of Pit, 500' from North Pit Limit Avg. Curve 1 & 2; Max. Dry Unit Wt. = 100.9lbs/cf; Optimum Moisture= 19.6%

Version MVNQS02-100907

Figure 7-2

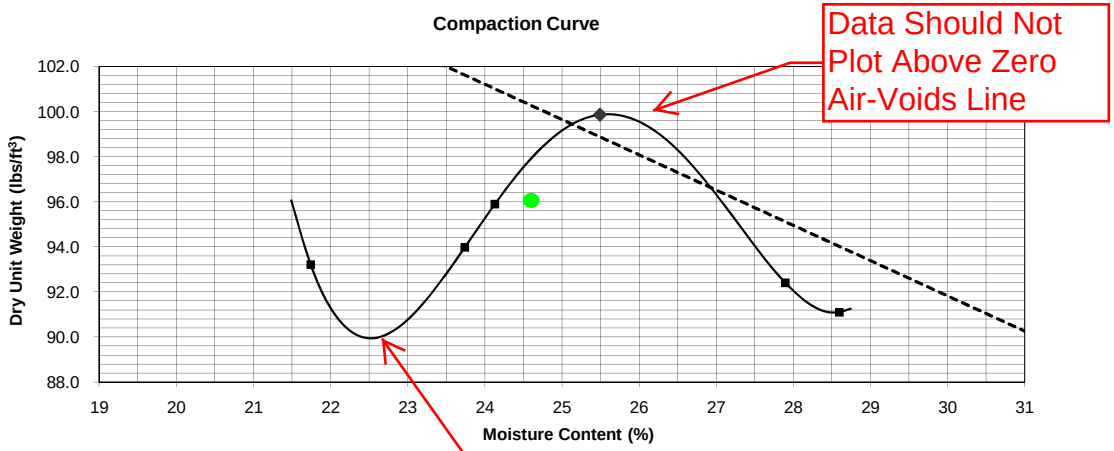
MVNQS02 W912P8-09-D-0046-0008 3179 126 A R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3616	**Test No**	361B
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	12/20/2010		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	BR. G. CL.		
Station		**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	29.5		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	S03	S03	S03	S03	S03
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3759.5	3801.8	3843.5	3830.5	3814.8
Wet Soil Mass (g)	1714.0	1756.3	1798.0	1785.0	1769.3
Wet Unit Weight (lbs/ft³)	113.5	116.3	119.0	118.2	117.1
Tare No	9	41	51	57	38
Tare Mass (g)	305.8	259.3	260.7	261.5	258.9
Wet Soil + Tare Mass (g)	444.1	359.9	385.7	421.5	394.7
Dry Soil + Tare Mass (g)	419.4	340.6	361.4	386.6	364.5
Moisture Content (%)	**21.7**	**23.7**	**24.1**	**27.9**	**28.6**
Dry Unit Weight (lbs/ft³)	**93.2**	**94.0**	**95.9**	**92.4**	**91.1**



Data Should Not Plot Above Zero Air-Voids Line

Proctor Test Results	
Proctor No	3616
Optimum Moisture Content (%)	24.6
Max Dry Unit Weight (lbs/ft³)	96.0

Liquid And Plastic Limits	
Liquid Limit	54
Plastic Limit	23
Plasticity Index	31
Group Symbol	CH
Sand Content (Retained No 200) (%)	5.2
Fines (Minus No 200) (%)	94.8

Remarks	Avergae Max DD: 95.5pcf / Average Optimum Moisture: 24.0%M	SAMPLE COLLECTED FROM RIVER BURCH PIT EAST STOCKPILE
Version	**MVNQS02-101130**	

Dip in Graph Should not Occur

Data Suspect due to Errors noted above. - Max Density and Opt Moisture Cannot be Determined

Figure 7-3

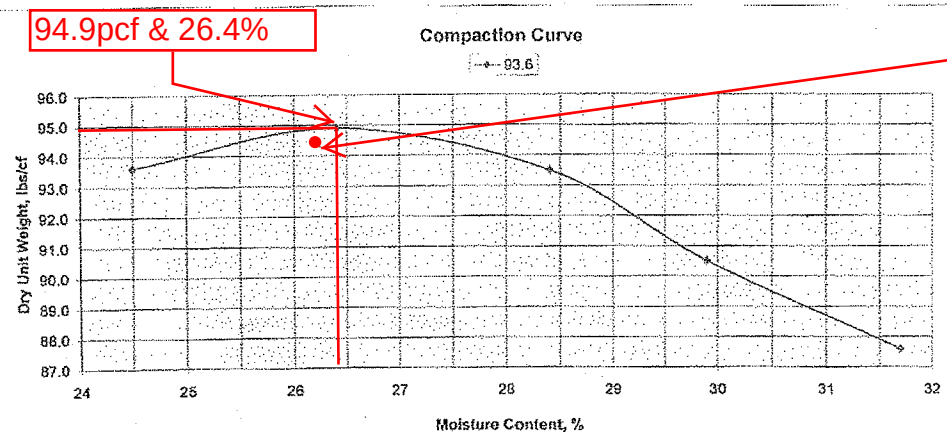
MVNQS02 W912P8-09-D-0046 0008 3616B.xls

TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	Tolunay-Wong Engineers, Inc.		Test ID	2609-001	
USACE Contract Number	W912P8-09-D-0046 0008		Contractor	Phylway, Inc.	
Project	WBV-14c.2 Phase 2, First Lift		Date	7/16/2010	
Source of Material	NE Stockpile	Feature		Visual Description (ASTM D 2488)	G-BR Clay
Station		Offset		Lift Number	
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	METHOD A	Preparation Method	Wet	As-Received Moisture Content	28.4
Hand / Mechanical Rammer	Hand	Specific Gravity	2.66	Specific Gravity Method: As Tested or Estimated	Estimated
Percent Retained - No. 4 Sieve		Percent Retained - 3/8" Sieve	0		
Percent Retained - 3/4" Sieve		Oversize Fraction		ASTM D 3718 Correction - Yes/No	
Tested By	B. Landers	Checked By	G. LeCoq	Submitted By	G. LeCoq
Test Sequence Number	1	2	3	4	5
a. Mold Number					
b. Mass of Mold (g)	2017.3	2017.3	2017.3	2017.3	2017.3
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3777.5000	3828.6	3829.7	3794.1	3759.9
e. Mass of Wet Soil (g)	2057.3	210.3	2109.5	2073.9	2039.7
f. Wet Unit Weight (lbs/cf)	136.2	139.6	139.6	137.3	135.0
g. Container No.	DT-30	DT-04	DT-27	DT-14	DT-26
h. Mass of Tare (g)	203.30	233.50	209.70	245.10	205.80
i. Mass of Wet Soil+Tare (g)	390.40	408.30	375.00	407.40	416.00
j. Mass of Dry Soil+Tare (g)	353.60	371.80	338.40	370.00	364.60
k. Mass of Water (g)	36.80	36.50	36.60	37.40	50.40
l. Mass of Dry Soil (g)	150.30	138.30	128.70	124.90	158.80
m. Moisture Content %	24.5	26.4	28.4	29.9	31.7
n. Dry Unit Weight (lbs/cf)	93.6	94.9	93.5	90.5	87.6

94.9pcf & 26.4%



Test Results	
Compaction Curve Control No.	2609 Curve 1
Optimum Moisture Content (%)	26.2
Max. Dry Unit Weight (lbs/cf)	94.5
Classification of Sample	FAT CLAY
Liquid And Plastic Limits	
Liquid Limit	64
Plastic Limit	23
Plasticity Index	41
Symbol From Plastic Chart:	CH
% Passing 200	98.2
% Passing No. 4	100

Dry Unit Weight Scale: Min 85 Max 95

Moisture Content % Scale: Min 15 Max 22 Change Graph Scale

Remarks: AVERAGE CURVE 1 & 2; MAX DRY UNIT WEIGHT = 95.1 LBS/CF; OPTIMUM MOISTURE = 26.4%

Figure 7-4

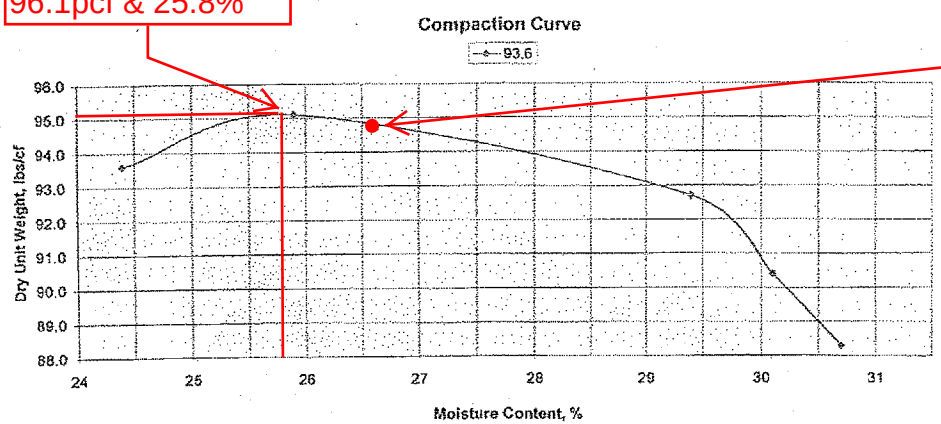
1/7/11

TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	Tolunay-Wong Engineers, Inc.		Test ID	2609-001	
USACE Contract Number	W912P8-09-D-0046 0008		Contractor	Phylway, Inc.	
Project	WBV-14c,2 Phase 2, First Lift		Date	7/16/2010	
Source of Material	NE Stockpile	Feature	EMBANKMENT	Visual Description (ASTM D 2488)	G-BR Clay
Station		Offset		Lift Number	
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	METHOD A	Preparation Method	Wet	As-Received Moisture Content	29.4
Hand / Mechanical Rammer	Hand	Specific Gravity	2.65	Specific Gravity Method: As Tested or Estimated	Estimated
Percent Retained - No. 4 Sieve		Percent Retained - 3/8" Sieve	0		
Percent Retained - 3/4" Sieve		Oversize Fraction		ASTM D 3718 Correction - Yes/No	NO
Tested By	B. Landers	Checked By	G. LeCoq	Submitted By	G. LeCoq
Test Sequence Number	1	2	3	4	5
a. Mold Number					
b. Mass of Mold (g)	2017.3	2017.3	2017.3	2017.3	2017.3
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3775.9000	3825.3	3828.1	3794.4	3761.1
e. Mass of Wet Soil (g)	2055.7	2105.1	2107.9	2074.2	2040.9
f. Wet Unit Weight (lbs/cf)	136.1	139.4	139.5	137.3	135.1
g. Container No.	DT-21	DT-02	DT-20	DT-11	DT-24
h. Mass of Tare (g)	211.50	178.90	212.50	181.00	206.50
i. Mass of Wet Soil+Tare (g)	462.70	376.00	410.80	412.10	526.60
j. Mass of Dry Soil+Tare (g)	413.60	335.40	365.80	358.70	450.60
k. Mass of Water (g)	49.20	40.60	45.00	53.40	75.00
l. Mass of Dry Soil (g)	202.00	156.50	153.30	177.70	244.10
m. Moisture Content %	24.4	25.9	29.4	30.1	30.7
n. Dry Unit Weight (lbs/cf)	93.6	96.1	92.7	90.4	88.3

96.1pcf & 25.8%



Test Results	
Compaction Curve Control No.	2609 Curve 2
Optimum Moisture Content (%)	26.6
Max. Dry Unit Weight (lbs/cf)	95.6
Classification of Sample	FAT CLAY
Liquid And Plastic Limits	
Liquid Limit	64
Plastic Limit	23
Plasticity Index	41
Symbol From Plastic Chart:	CH
% Passing 200	98.2
% Passing No. 4	100

Dry Unit Weight Scale: Min 85 Max 95

Moisture Content % Scale: Min 16 Max 22 Change Graph Scale

Remarks: AVERAGE CURVE 1 & 2: MAX DRY UNIT WEIGHT = 95.1 LBS/CF; OPTIMUM MOISTURE = 26.4%

Figure 7-5

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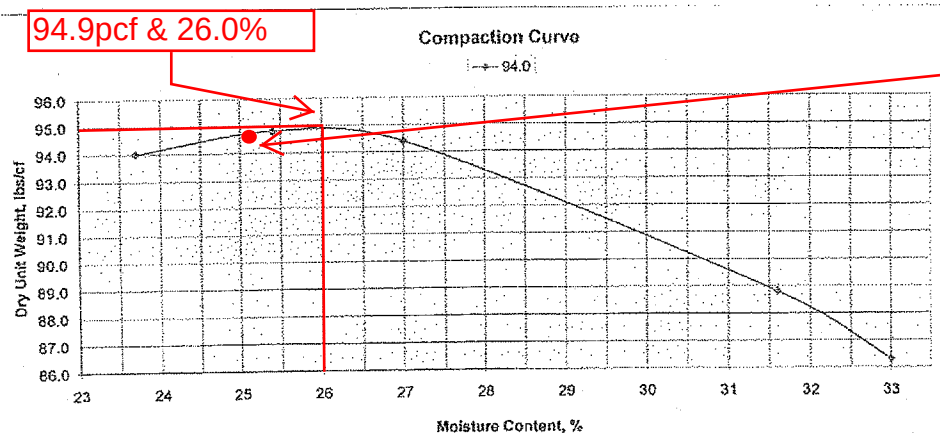
TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	Tolunay-Wong Engineers, Inc.		Test ID	2610-002	
USACE Contract Number	W912P8-09-D-0046 0008		Contractor	Phylway, Inc.	
Project	WBV-14c.2 Phase 2, First Lift		Date	7/16/2010	
Source of Material	NE NEW PIT	Feature	EMBANKMENT	Visual Description (ASTM D 2488)	BR CLAY
Station		Offset		Lift Number	
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	METHOD A	Preparation Method	Wet	As-Received Moisture Content	
Hand / Mechanical Rammer	Hand	Specific Gravity		Specific Gravity Method: As Tested or Estimated	Estimated
Percent Retained - No. 4 Sieve	0	Percent Retained - 3/8" Sieve			
Percent Retained - 3/4" Sieve	0	Oversize Fraction		ASTM D 3718 Correction - Yes/No	NO
Tested By	B. Landers	Checked By	G. LeCoq	Submitted By	G. LeCoq
Test Sequence Number	1	2	3	4	5
a. Mold Number					
b. Mass of Mold (g)	2017.3	2017.3	2017.3	2017.3	2017.3
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3765.9000	3866.2	3821.4	3776.3	3743.4
e. Mass of Wet Soil (g)	2068.8	2086.0	2101.2	2056.1	2023.1
f. Wet Unit Weight (lbs/cf)	137.0	138.1	139.1	136.1	133.9
g. Container No.	DT-04	ML-04	ML-08	ML-07	DT-08
h. Mass of Tare (g)	233.50	233.00	265.10	258.30	187.40
i. Mass of Wet Soil+Tare (g)	430.40	458.70	416.30	466.10	459.50
j. Mass of Dry Soil+Tare (g)	393.30	413.70	383.84	416.70	392.70
k. Mass of Water (g)	37.10	45.00	31.46	49.40	66.80
l. Mass of Dry Soil (g)	159.90	180.70	118.74	158.70	205.30
m. Moisture Content %	23.2	24.9	26.5	31.1	32.6
n. Dry Unit Weight (lbs/cf)	94.0	94.8	94.4	88.8	86.3

94.9pcf & 26.0%



Test Results	
Compaction Curve Control No.	2610 Curve 1
Optimum Moisture Content (%)	25.1
Max. Dry Unit Weight (lbs/cf)	94.7
Classification of Sample	FAT CLAY
Liquid And Plastic Limits	
Liquid Limit	63
Plastic Limit	25
Plasticity Index	28
Symbol From Plastic Chart:	CH
% Passing 200	97.2
% Passing No. 4	100

Dry Unit Weight Scale: Min 85 Max 95

Moisture Content % Scale: Min 15 Max 22 Change Graph Scale

Remarks: AVERAGE CURVE 1 & 2: MAX DRY UNIT WEIGHT = 94.6 LBS/CF: OPTIMUM MOISTURE = 25%

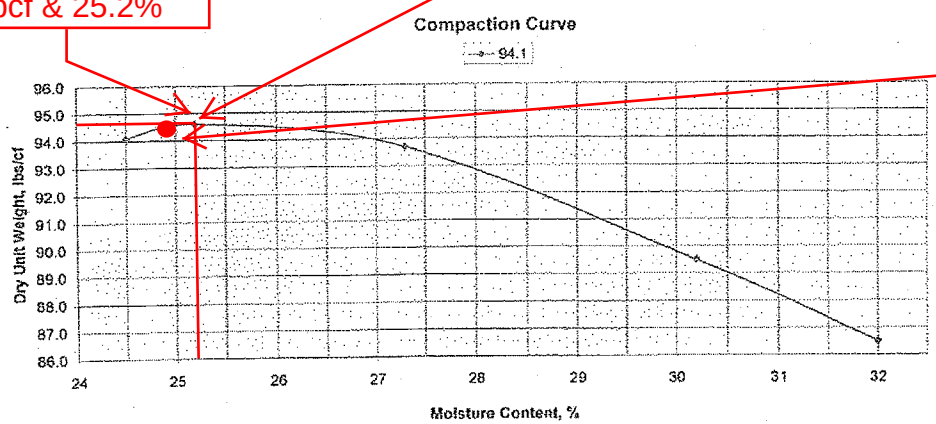
Figure 7-6

TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	Tolunay-Wong Engineers, Inc.		Test ID	2610-002	
USACE Contract Number	W912P8-09-D-0046 0008		Contractor	Phylway, Inc.	
Project	WBV-14c.2 Phase 2, First Lift		Date	7/16/2010	
Source of Material	NE NEW PIT	Feature	EMBANKMENT	Visual Description (ASTM D 2488)	BR Clay
Station		Offset		Lift Number	
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	METHOD A	Preparation Method	Wet	As-Received Moisture Content	
Hand / Mechanical Rammer	Hand	Specific Gravity		Specific Gravity Method: As Tested or Estimated	Estimated
Percent Retained - No. 4 Sieve	0	Percent Retained - 3/8" Sieve			
Percent Retained - 3/4" Sieve	0	Oversize Fraction		ASTM D 3718 Correction - Yes/No	NO
Tested By	B. Landers	Checked By	G. LeCoq	Submitted By	G. LeCoq
Test Sequence Number	1	2	3	4	5
a. Mold Number					
b. Mass of Mold (g)	2017.3	2017.3	2017.3	2017.3	2017.3
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3786.7000	3805.9	3820.0	3777.6	3741.9
e. Mass of Wet Soil (g)	2066.6	2085.7	2099.8	2057.4	2021.7
f. Wet Unit Weight (lbs/cf)	136.7	138.1	139.0	136.2	133.8
g. Container No.	V4	ML-02	ML-11	ML-01	ML-12
h. Mass of Tare (g)	64.50	255.00	222.00	244.70	265.30
i. Mass of Wet Soil+Tare (g)	242.10	411.70	376.60	505.70	489.60
j. Mass of Dry Soil+Tare (g)	207.20	380.20	343.00	445.10	435.10
k. Mass of Water (g)	34.90	25.20	27.30	30.20	54.40
l. Mass of Dry Soil (g)	142.70	125.20	121.00	200.40	169.80
m. Moisture Content %	24.5	25.2	27.3	30.2	32.0
n. Dry Unit Weight (lbs/cf)	94.1	94.6	93.7	89.5	86.5

94.6pcf & 25.2%



Test Results	
Compaction Curve Control No.	2610 Curve 2
Optimum Moisture Content (%)	24.9
Max. Dry Unit Weight (lbs/cf)	94.4
Classification of Sample	FAT CLAY
Liquid And Plastic Limits	
Liquid Limit	53
Plastic Limit	25
Plasticity Index	28
Symbol From Plastic Chart:	CH
% Passing 200	97.2
% Passing No. 4	100

Dry Unit Weight Scale: Min 85 Max 95

Moisture Content % Scale: Min 15 Max 22 Change Graph Scale

Remarks: AVERAGE CURVE 1 & 2: MAX DRY UNIT WEIGHT = 94.6 LBS/CF; OPTIMUM MOISTURE = 25%

Figure 7-7

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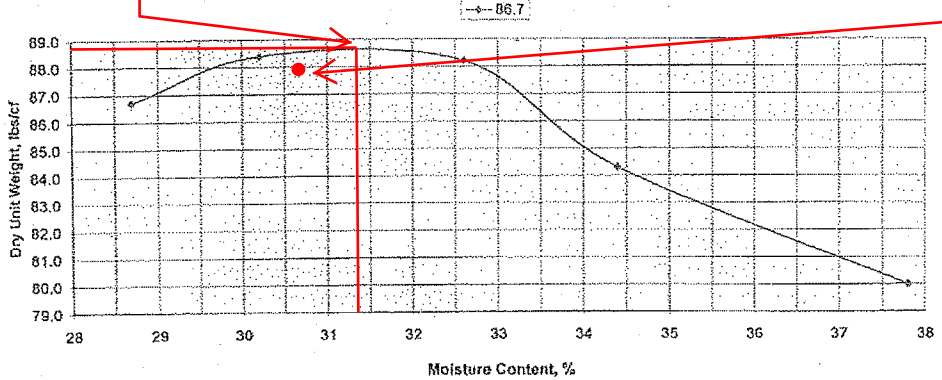
TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	Tolunay-Wong Engineers, Inc.		Test ID	2611-003	
USACE Contract Number	W912P8-09-D-0046 0008		Contractor	Phylway, Inc.	
Project	WBV-14c.2 Phase 2, First Lift		Date	7/16/2010	
Source of Material	Sample B SE Corner of S. Pile	Feature	EMBANKMENT	Visual Description (ASTM D 2488)	GR-BR CLAY
Station		Offset		Lift Number	
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	METHOD A	Preparation Method	Wet	As-Received Moisture Content	
Hand / Mechanical Rammer	Hand	Specific Gravity		Specific Gravity Method: As Tested or Estimated	Estimated
Percent Retained - No. 4 Sieve	0	Percent Retained - 3/8" Sieve			
Percent Retained - 3/4" Sieve	0	Oversize Fraction		ASTM D 3718 Correction - Yes/No	NO
Tested By	B. Landers	Checked By	G. LeCoq	Submitted By	G. LeCoq
Test Sequence Number	1	2	3	4	5
a. Mold Number					
b. Mass of Mold (g)	2017.3	2017.3	2017.3	2017.3	2017.3
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3703.1000	3766.6	3783.8	3728.7	3683.7
e. Mass of Wet Soil (g)	2022.9	2036.4	2063.6	2008.5	1963.6
f. Wet Unit Weight (lbs/cf)	133.9	134.8	136.6	133.0	130.0
g. Container No.	DT-20	DT-14	DT-25	DT-30	ML-10
h. Mass of Tare (g)	212.60	244.70	205.70	203.30	251.60
i. Mass of Wet Soil+Tare (g)	422.20	441.10	407.40	400.80	436.90
j. Mass of Dry Soil+Tare (g)	375.50	395.60	357.80	350.30	386.00
k. Mass of Water (g)	46.70	45.50	49.60	50.50	50.90
l. Mass of Dry Soil (g)	162.90	150.90	152.10	147.00	134.50
m. Moisture Content %	28.7	30.2	32.6	34.4	37.8
n. Dry Unit Weight (lbs/cf)	86.7	88.4	86.2	84.3	80.0

88.7pcf & 31.3%



Test Results	
Compaction Curve Control No.	2611 Curve 1
Optimum Moisture Content (%)	30.7
Max. Dry Unit Weight (lbs/cf)	87.9
Classification of Sample	FAT CLAY

Liquid And Plastic Limits	
Liquid Limit	78
Plastic Limit	28
Plasticity Index	50
Symbol From Plastic Chart:	CH
% Passing 200	97.5
% Passing No. 4	100

Dry Unit Weight Scale: Min 85 Max 95

Moisture Content % Scale: Min 15 Max 22

Change Graph Scale

Remarks: AVERAGE CURVE 1 & 2; MAX DRY UNIT WEIGHT = 87.9 LBS/CF; OPTIMUM MOISTURE = 30.6%

Figure 7-8

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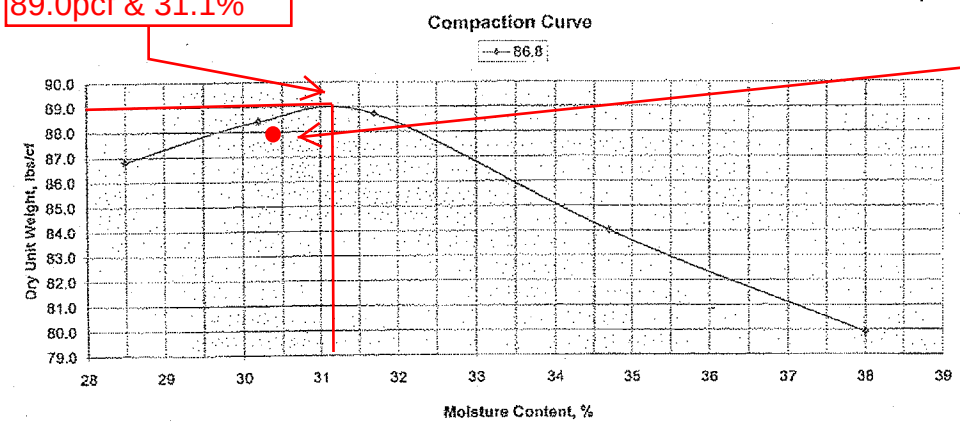
TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	Tolunay-Wong Engineers, Inc.		Test ID	2611-003	
USACE Contract Number	W912P8-09-D-0046 0008		Contractor	Phylway, Inc.	
Project	WBV-14c.2 Phase 2, First Lift		Date	7/16/2010	
Source of Material	Sample B SE Corner of S. Pile	Feature	EMBANKMENT	Visual Description (ASTM D 2488)	GR-BR CLAY
Station		Offset		Lift Number	
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	METHOD A	Preparation Method	Wet	As-Received Moisture Content	
Hand / Mechanical Rammer	Hand	Specific Gravity		Specific Gravity Method: As Tested or Estimated	Estimated
Percent Retained - No. 4 Sieve	0	Percent Retained - 3/8" Sieve			
Percent Retained - 3/4" Sieve	0	Oversize Fraction		ASTM D 3718 Correction - Yes/No	NO
Tested By	B. Landers	Checked By	G. LeCoq	Submitted By	G. LeCoq
Test Sequence Number	1	2	3	4	5
a. Mold Number					
b. Mass of Mold (g)	2017.3	2017.3	2017.3	2017.3	2017.3
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3702.9000	3756.4	3781.8	3726.1	3682.1
e. Mass of Wet Soil (g)	2022.7	2036.2	2061.6	2005.9	1961.9
f. Wet Unit Weight (lbs/cf)	133.9	134.8	136.5	132.8	129.9
g. Container No.	DT-27	DT-01	DT-08	DT-21	ML-06
h. Mass of Tare (g)	209.50	171.60	187.50	211.50	258.20
i. Mass of Wet Soil+Tare (g)	561.70	505.30	460.60	353.20	442.70
j. Mass of Dry Soil+Tare (g)	483.50	427.90	394.90	316.70	391.90
k. Mass of Water (g)	78.20	77.40	65.70	36.50	50.80
l. Mass of Dry Soil (g)	274.00	256.30	207.40	105.20	133.70
m. Moisture Content %	28.5	30.2	31.7	34.7	38.0
n. Dry Unit Weight (lbs/cf)	86.8	88.4	88.7	84.0	79.9

89.0pcf & 31.1%



Test Results	
Compaction Curve Control No.	2611 Curve 2
Optimum Moisture Content (%)	30.4
Max. Dry Unit Weight (lbs/cf)	87.9
Classification of Sample	FAT CLAY

Liquid And Plastic Limits	
Liquid Limit	78
Plastic Limit	28
Plasticity Index	50
Symbol From Plastic Chart:	CH
% Passing 200	97.5
% Passing No. 4	100

Dry Unit Weight Scale
Min 85 Max 95

Moisture Content % Scale
Min 15 Max 22

Change Graph Scale

Remarks:	AVERAGE CURVE 1 & 2; MAX DRY UNIT WEIGHT = 87.9 LBS/CF; OPTIMUM MOISTURE = 30.6%

Figure 7-9

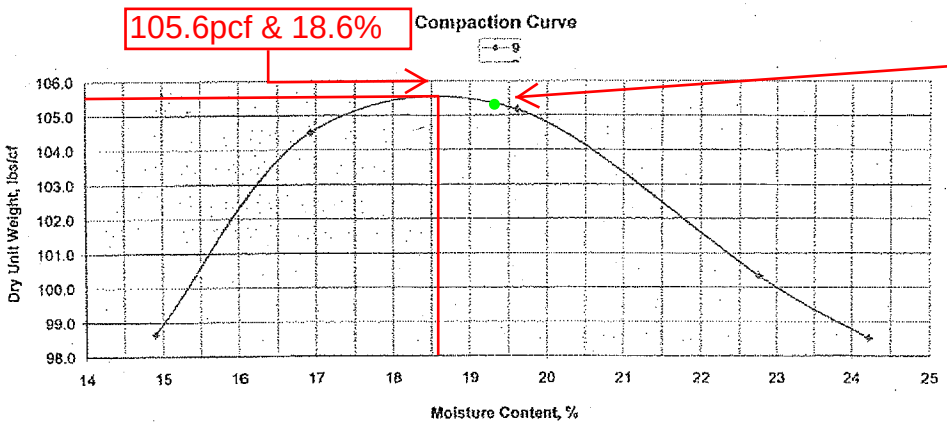
TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	TOLUNAY-WONG ENGINEERS		Test ID	2641-004	
USACE Contract Number	W912P8-09-D-0046 0008		Contractor	PHYLWAY	
Project	WBV-14c.2 PHASE 2, FIRST LIFT		Date	7/27/2010	
Source of Material	SOUTH END NEW PIT	Feature	Embankment	Visual Description (ASTM D 2488)	BR. SA. CL.
Station		Offset		Lift Number	
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	D698	Preparation Method	WET	As-Received Moisture Content	
Hand / Mechanical Rammer	HAND	Specific Gravity		Specific Gravity Method: As Tested or Estimated	ESTIMATED
Percent Retained - No. 4 Sieve	0	Percent Retained - 3/8" Sieve			
Percent Retained - 3/4" Sieve	0	Oversize Fraction		ASTM D 3718 Correction - Yes/No	
Tested By	B. LANDERS	Checked By	G. LECOQ	Submitted By	G. LECOQ
Test Sequence Number	1	2	3	4	5
a. Mold Number					
b. Mass of Mold (g)	2017.3	2017.3	2017.3	2017.3	2017.3
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3729.6	3863.2	3917.2	3877.7	3866.0
e. Mass of Wet Soil (g)	1712.3	1845.9	1899.9	1860.4	1848.7
f. Wet Unit Weight (lbs/cf)	113.4	122.2	125.8	123.2	122.4
g. Container No.	ML03	DT1	DT27	DT31	DT30
h. Mass of Tare (g)	261.70	171.90	209.70	203.30	211.00
i. Mass of Wet Soil+Tare (g)	367.30	339.00	415.90	424.40	558.70
j. Mass of Dry Soil+Tare (g)	352.30	314.80	382.10	383.40	490.90
k. Mass of Water (g)	15.00	24.20	33.80	41.00	67.80
l. Mass of Dry Soil (g)	100.60	142.90	172.40	180.10	279.90
m. Moisture Content %	14.9	16.9	19.6	22.8	24.2
n. Dry Unit Weight (lbs/cf)	98.7	104.5	105.2	100.3	98.5

Not "Sandy"

105.6pcf & 18.6%



Test Results	
Compaction Curve Control No.	2641 Curve 1
Optimum Moisture Content (%)	19.3
Max. Dry Unit Weight (lbs/cf)	105.3
Classification of Sample	LEAN CLAY
Liquid And Plastic Limits	
Liquid Limit	35
Plastic Limit	22
Plasticity Index	13
Symbol From Plastic Chart:	CL
% Passing 200	93.7
% Passing No. 4	100

Dry Unit Weight Scale: Min 85 Max 95

Moisture Content % Scale: Min 15 Max 22

Change Graph Scale

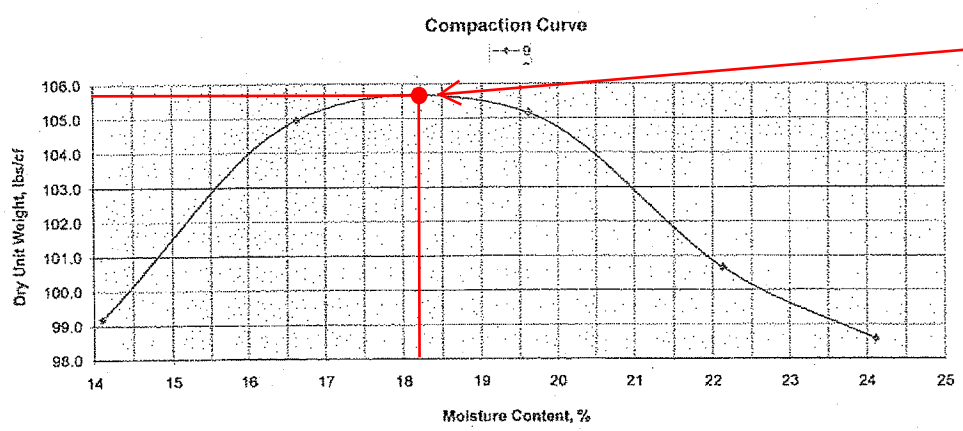
Remarks: Average Curve 1 & 2. Maximum Dry Unit Weight = 105.3. Optimum Moisture = 18.6%

Figure 7-10

TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	TOLUNAY-WONG ENGINEERS		Test ID	2641-004	
USACE Contract Number	W912P8-09-D-0046 0008		Contractor	PHYLWAY	
Project	WBV-14c.2 PHASE 2, FIRST LIFT		Date	7/27/2010	
Source of Material	SOUTH END NEW PIT	Feature		Visual Description (ASTM D 2488)	BR. SA. CL.
Station		Offset		Lift Number	
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	D698	Preparation Method	WET	As-Received Moisture Content	
Hand / Mechanical Rammer	HAND	Specific Gravity		Specific Gravity Method: As Tested or Estimated	ESTIMATED
Percent Retained - No. 4 Sieve	0	Percent Retained - 3/8" Sieve			
Percent Retained - 3/4" Sieve	0	Oversize Fraction		ASTM D 3718 Correction - Yes/No	NO
Tested By	B. LANDERS	Checked By	G. LECOQ	Submitted By	G. LECOQ
Test Sequence Number	1	2	3	4	5
a. Mold Number					
b. Mass of Mold (g)	2017.3	2017.3	2017.3	2017.3	2017.3
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3727.1	3865.9	3917.1	3874.0	3865.2
e. Mass of Wet Soil (g)	1709.8	1848.6	1899.8	1856.7	1847.9
f. Wet Unit Weight (lbs/cf)	113.2	122.4	125.8	122.9	122.3
g. Container No.	ML09	DT20	DT14	DT21	DT25
h. Mass of Tare (g)	257.40	212.90	245.20	211.60	205.70
i. Mass of Wet Soil+Tare (g)	361.70	398.10	478.80	476.50	434.20
j. Mass of Dry Soil+Tare (g)	348.80	371.70	440.50	428.50	389.80
k. Mass of Water (g)	12.90	26.40	38.30	48.00	44.40
l. Mass of Dry Soil (g)	91.40	158.80	195.30	216.90	184.10
m. Moisture Content %	14.1	16.6	19.6	22.1	24.1
n. Dry Unit Weight (lbs/cf)	99.2	104.9	105.2	100.6	98.6



Test Results	
Compaction Curve Control No.	2641 Curve 2
Optimum Moisture Content (%)	18.7
Max. Dry Unit Weight (lbs/cf)	105.2
Classification of Sample	LEAN CLAY
Liquid And Plastic Limits	
Liquid Limit	35
Plastic Limit	22
Plasticity Index	13
Symbol From Plastic Chart:	CL
% Passing 200	93.7
% Passing No. 4	100

Dry Unit Weight Scale: Min 85 Max 95

Moisture Content % Scale: Min 15 Max 22 Change Graph Scale

Remarks: Average Curve 1 & 2, Maximum Dry Unit Weight = 105.3, Optimum Moisture = 18.8%

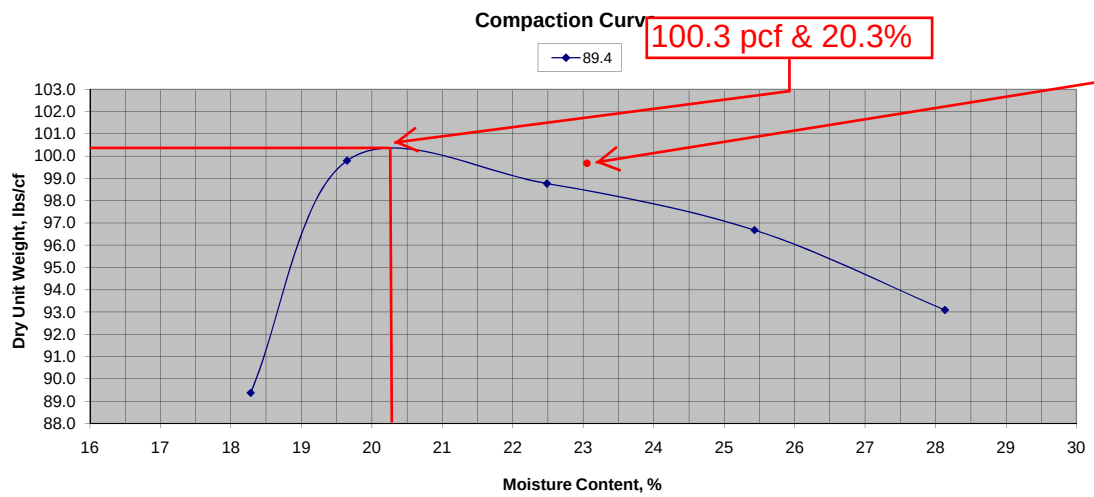
Figure 7-11

TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	TOLUNAY-WONG ENGINEERS		Test ID	2653-008A	
USACE Contract Number	W912P8-09-D-0046 0008		Contractor	PHYLWAY	
Project	WBV-14c.2 PHASE 2, FIRST LIFT		Date	8/2/2010	
Source of Material	WILLOW BEND PIT	Feature	EMBANKMENT	Visual Description (ASTM D 2488)	BR. CALY
Station	FLOOD SIDE 177+00	Offset		Lift Number	1
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	Method A	Preparation Method	WET	As-Received Moisture Content	24.7
Hand / Mechanical Rammer	Hand	Specific Gravity	2.65	Specific Gravity Method: As Tested or Estimated	ESTIMATED
Percent Retained - No. 4 Sieve	0	Percent Retained - 3/8" Sieve	0		
Percent Retained - 3/4" Sieve	0	Oversize Fraction		ASTM D 3718 Correction - Yes/No	No
Tested By	B. LANDERS	Checked By	G. LeCoq	Submitted By	G. LeCoq

Test Sequence Number	1	2	3	4	5
a. Mold Number					
b. Mass of Mold (g)	2017.2	2017.2	2017.2	2017.2	2017.2
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3614.2	3820.7	3844.5	3848.9	3819.0
e. Mass of Wet Soil (g)	1597.0	1803.5	1827.3	1831.7	1801.8
f. Wet Unit Weight (lbs/cf)	105.7	119.4	121.0	121.3	119.3
g. Container No.	DT47	DT01	DT20	DT40	DT42
h. Mass of Tare (g)	177.80	171.80	212.60	176.20	178.10
i. Mass of Wet Soil+Tare (g)	401.20	463.50	425.60	398.80	382.80
j. Mass of Dry Soil+Tare (g)	366.67	415.60	386.50	353.67	337.86
k. Mass of Water (g)	34.53	47.90	39.10	45.13	44.94
l. Mass of Dry Soil (g)	188.87	243.80	173.90	177.47	159.76
m. Moisture Content %	18.3	19.6	22.5	25.4	28.1
n. Dry Unit Weight (lbs/cf)	89.4	99.8	98.8	96.7	93.1



Test Results	
Compaction Curve Control No.	2653-008 CURVE 1
Optimum Moisture Content (%)	23.1
Max. Dry Unit Weight (lbs/cf)	99.7
Classification of Sample	FAT CLAY
Liquid And Plastic Limits	
Liquid Limit	59
Plastic Limit	24
Plasticity Index	35
Symbol From Plastic Chart:	CH
% Passing 200	96.3
% Passing No. 4	100

Dry Unit Weight Scale: Min 85 Max 95

Moisture Content % Scale: Min 15 Max 22

Change Graph Scale

Remarks: AVG CURVE 1 & 2; MAX DRY UNIT WEIGHT = 99.7LBS/CF, OPT. MOISTURE = 23.1

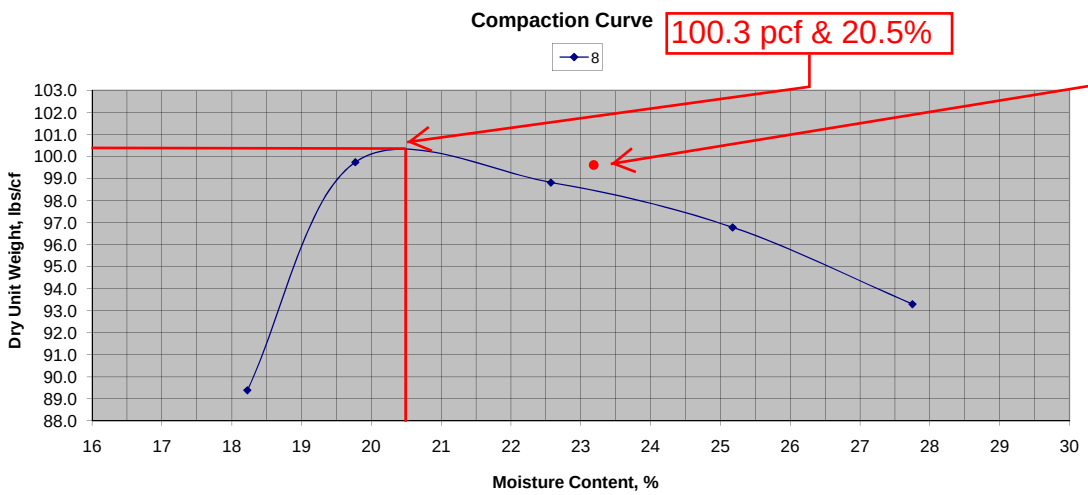
Figure 7-12

TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	TOLUNAY-WONG ENGINEERS		Test ID	2653-008B	
USACE Contract Number	W912P8-09-D-0046 0008		Contractor	PHYLWAY	
Project	WBV-14c.2 PHASE 2, FIRST LIFT		Date	8/2/2010	
Source of Material	WILLOW BEND PIT	Feature	EMBANKMENT	Visual Description (ASTM D 2488)	BR. FAT CLAY
Station	FLOOD SIDE 177+00	Offset		Lift Number	1
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	Method A	Preparation Method	WET	As-Received Moisture Content	24.7
Hand / Mechanical Rammer	HAND	Specific Gravity	2.65	Specific Gravity Method: As Tested or Estimated	ESTIMATED
Percent Retained - No. 4 Sieve	0	Percent Retained - 3/8" Sieve	0		
Percent Retained - 3/4" Sieve	0	Oversize Fraction		ASTM D 3718 Correction - Yes/No	NO
Tested By	B. LANDERS	Checked By	G. LECOQ	Submitted By	G. LECOQ

Test Sequence Number	1	2	3	4	5
a. Mold Number					
b. Mass of Mold (g)	2017.2	2017.2	2017.2	2017.2	2017.2
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3613.4	3821.7	3846.9	3847.1	3817.5
e. Mass of Wet Soil (g)	1596.2	1804.5	1829.7	1829.9	1800.3
f. Wet Unit Weight (lbs/cf)	105.7	119.5	121.1	121.1	119.2
g. Container No.	DT46	DT21	DT24	DT41	DT43
h. Mass of Tare (g)	178.10	211.60	206.40	177.80	179.80
i. Mass of Wet Soil+Tare (g)	423.30	463.00	451.30	411.10	402.20
j. Mass of Dry Soil+Tare (g)	385.50	421.50	406.20	364.18	353.89
k. Mass of Water (g)	37.80	41.50	45.10	46.92	48.31
l. Mass of Dry Soil (g)	207.40	209.90	199.80	186.38	174.09
m. Moisture Content %	18.2	19.8	22.6	25.2	27.8
n. Dry Unit Weight (lbs/cf)	89.4	99.7	98.8	96.8	93.3



Test Results	
Compaction Curve Control No.	2653-008 CURVE 2
Optimum Moisture Content (%)	23.2
Max. Dry Unit Weight (lbs/cf)	99.7
Classification of Sample	FAT CLAY
Liquid And Plastic Limits	
Liquid Limit	59
Plastic Limit	24
Plasticity Index	35
Symbol From Plastic Chart:	CH
% Passing 200	96.3
% Passing No. 4	100

Dry Unit Weight Scale: Min 85 Max 95

Moisture Content % Scale: Min 15 Max 22

Change Graph Scale

Remarks: AVG CURVE 1 & 2; MAX DRY UNIT WEIGHT = 99.7LBS/CF, OPT. MOISTURE = 23.1

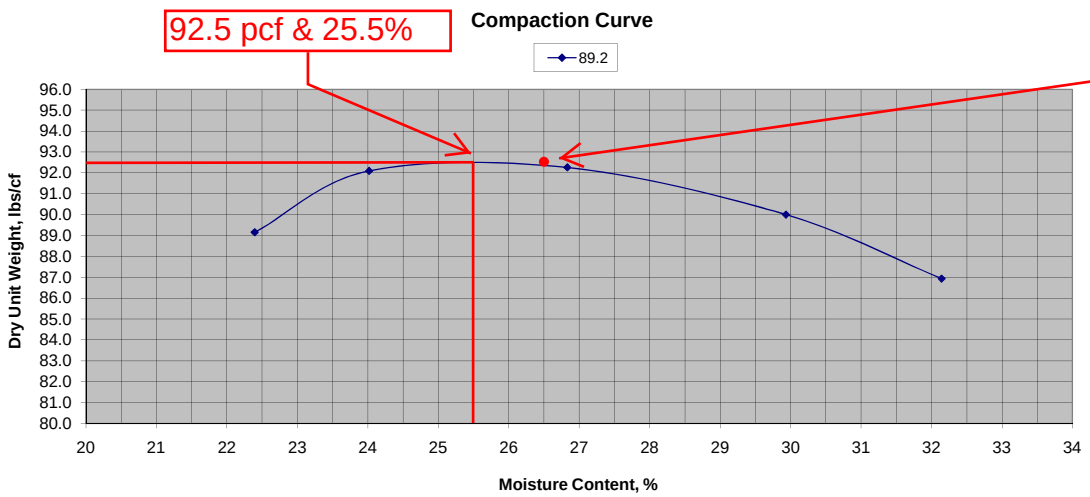
Figure 7-13

TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	TOLUNAY-WONG ENGINEERS		Test ID	2762-024A	
USACE Contract Number	W912P8-09-D-0046 0008		Contractor	PHYLWAY	
Project	WBV-14c.2 PHASE 2, FIRST LIFT		Date	8/20/2010	
Source of Material	Material of Existing Levee	Feature	EMBANKMENT	Visual Description (ASTM D 2488)	BR. CALY
Station	120+50	Offset		Lift Number	1
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	Method A	Preparation Method	WET	As-Received Moisture Content	34.9
Hand / Mechanical Rammer	Hand	Specific Gravity	2.65	Specific Gravity Method: As Tested or Estimated	ESTIMATED
Percent Retained - No. 4 Sieve	0	Percent Retained - 3/8" Sieve	0		
Percent Retained - 3/4" Sieve	0	Oversize Fraction		ASTM D 3718 Correction - Yes/No	No
Tested By	B. LANDERS	Checked By	G. LeCoq	Submitted By	G. LeCoq

Test Sequence Number	1	2	3	4	5
a. Mold Number					
b. Mass of Mold (g)	2017.2	2017.2	2017.2	2017.2	2017.2
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3665.5	3742.4	3784.7	3783.6	3752.5
e. Mass of Wet Soil (g)	1648.3	1725.2	1767.5	1766.4	1735.3
f. Wet Unit Weight (lbs/cf)	109.1	114.2	117.0	116.9	114.9
g. Container No.	DT42	DT27	DT44	DT20	DT45
h. Mass of Tare (g)	178.10	209.60	176.00	212.70	177.20
i. Mass of Wet Soil+Tare (g)	389.60	402.20	432.20	461.00	391.40
j. Mass of Dry Soil+Tare (g)	350.90	364.90	378.00	403.80	339.30
k. Mass of Water (g)	38.70	37.30	54.20	57.20	52.10
l. Mass of Dry Soil (g)	172.80	155.30	202.00	191.10	162.10
m. Moisture Content %	22.4	24.0	26.8	29.9	32.1
n. Dry Unit Weight (lbs/cf)	89.2	92.1	92.3	90.0	86.9



Test Results	
Compaction Curve Control No.	2762-024 Curve 1
Optimum Moisture Content (%)	26.5
Max. Dry Unit Weight (lbs/cf)	92.5
Classification of Sample	FAT CLAY
Liquid And Plastic Limits	
Liquid Limit	72
Plastic Limit	29
Plasticity Index	43
Symbol From Plastic Chart:	CH
% Passing 200	97.1
% Passing No. 4	100

Dry Unit Weight Scale			
Min	85	Max	95

Moisture Content % Scale			
Min	15	Max	22

Change Graph Scale

Remarks:	Avg. Curve 1 & 2; Max. Dry Unit Wt. = 92.1 lbs/cf; Optimum Moisture= 26.6%

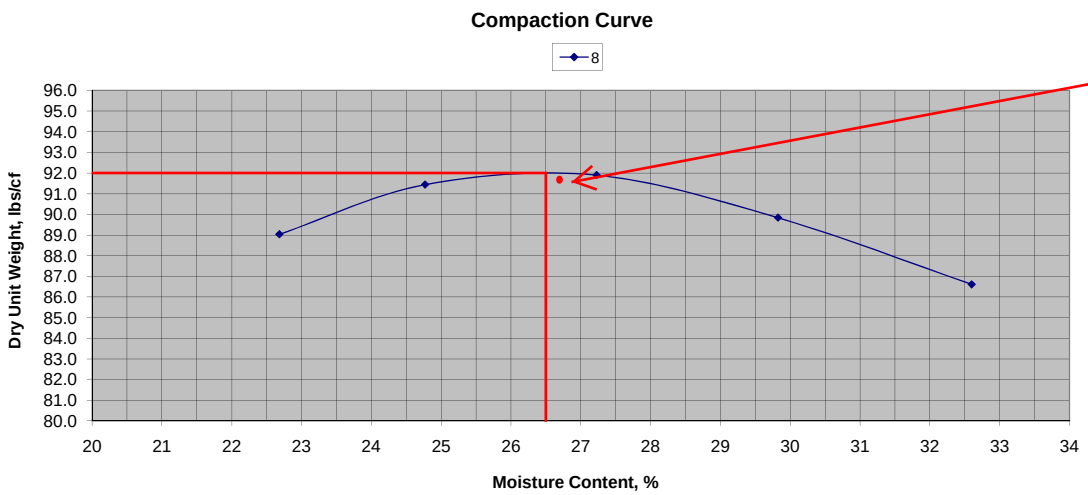
Figure 7-14

TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	TOLUNAY-WONG ENGINEERS		Test ID	2762-024B	
USACE Contract Number	W912P8-09-D-0046 0008		Contractor	PHYLWAY	
Project	WBV-14c.2 PHASE 2, FIRST LIFT		Date	8/20/2010	
Source of Material	Material of Existing Levee	Feature	EMBANKMENT	Visual Description (ASTM D 2488)	BR. CLAY
Station	120+50	Offset		Lift Number	1
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	D698	Preparation Method	WET	As-Received Moisture Content	34.9
Hand / Mechanical Rammer	HAND	Specific Gravity		Specific Gravity Method: As Tested or Estimated	ESTIMATED
Percent Retained - No. 4 Sieve	0	Percent Retained - 3/8" Sieve			
Percent Retained - 3/4" Sieve	0	Oversize Fraction		ASTM D 3718 Correction - Yes/No	NO
Tested By	B. LANDERS	Checked By	G. LECOQ	Submitted By	G. LECOQ

Test Sequence Number	1	2	3	4	5
a. Mold Number					
b. Mass of Mold (g)	2017.2	2017.2	2017.2	2017.2	2017.2
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3667.1	3740.6	3783.3	3778.9	3751.8
e. Mass of Wet Soil (g)	1649.9	1723.4	1766.1	1761.7	1734.6
f. Wet Unit Weight (lbs/cf)	109.2	114.1	116.9	116.6	114.8
g. Container No.	DT40	DT08	DT41	DT43	DT14
h. Mass of Tare (g)	176.20	187.50	178.10	179.90	245.10
i. Mass of Wet Soil+Tare (g)	427.70	364.30	402.40	424.10	479.40
j. Mass of Dry Soil+Tare (g)	381.20	329.20	354.40	368.00	421.80
k. Mass of Water (g)	46.50	35.10	48.00	56.10	57.60
l. Mass of Dry Soil (g)	205.00	141.70	176.30	188.10	176.70
m. Moisture Content %	22.7	24.8	27.2	29.8	32.6
n. Dry Unit Weight (lbs/cf)	89.0	91.4	91.9	89.8	86.6



Test Results	
Compaction Curve Control No.	2762-024 Curve 2
Optimum Moisture Content (%)	26.7
Max. Dry Unit Weight (lbs/cf)	91.7
Classification of Sample	FAT CLAY
Liquid And Plastic Limits	
Liquid Limit	72
Plastic Limit	29
Plasticity Index	43
Symbol From Plastic Chart:	CH
% Passing 200	97.1
% Passing No. 4	100.0

Dry Unit Weight Scale: Min 85 Max 95

Moisture Content % Scale: Min 15 Max 22

Change Graph Scale

Remarks: Avg. Curve 1 & 2; Maximum Dry Unit Wt. = 92.1 lbs/cf; Optimum Moisture = 26.6%

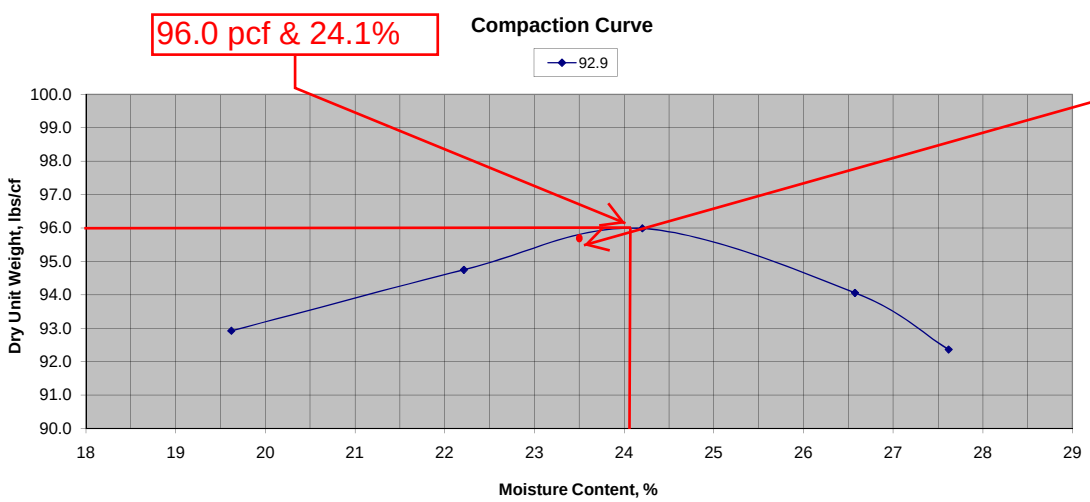
Figure 7-15

TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	Tolunay-Wong Engineers, Inc.		**Test ID**	2854-040A	
USACE Contract Number	W912P8-09-D-0046 0008		**Contractor**	Phylway, Inc.	
Project	WBV-14c.2 Phase 2, First Lift		**Date**	9/8/2010	
Source of Material	WILLOW BEND PIT	Feature	EMBANKMENT	Visual Description (ASTM D 2488)	G-Br. Clay
Station	WILLOW BEND PIT PHASE 2	Offset		Lift Number	
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	D698	Preparation Method	WET	As-Received Moisture Content	30.01
Hand / Mechanical Rammer	HAND	Specific Gravity	2.65	Specific Gravity Method: As Tested or Estimated	ESTIMATED
Percent Retained - No. 4 Sieve	0	Percent Retained - 3/8" Sieve	0		
Percent Retained - 3/4" Sieve	0	Oversize Fraction		ASTM D 3718 Correction - Yes/No	NO
Tested By	B. LANDERS	Checked By	G. LeCoq	Submitted By	G. LeCoq

Test Sequence Number	1	2	3	4	5
a. Mold Number	GZL-ML-03-PM	GZL-ML-03-PM	GZL-ML-03-PM	GZL-ML-03-PM	GZL-ML-03-PM
b. Mass of Mold (g)	2016.6	2016.6	2016.6	2016.6	2016.6
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3695.6	3765.7	3817.4	3814.9	3797.1
e. Mass of Wet Soil (g)	1679.0	1749.1	1800.8	1798.3	1780.5
f. Wet Unit Weight (lbs/cf)	111.2	115.8	119.2	119.1	117.9
g. Container No.	DT49	DT48	DT42	DT50	DT27
h. Mass of Tare (g)	176.30	183.50	178.10	180.70	209.60
i. Mass of Wet Soil+Tare (g)	377.30	419.30	433.80	454.90	437.40
j. Mass of Dry Soil+Tare (g)	344.33	376.44	383.97	397.33	388.10
k. Mass of Water (g)	32.97	42.86	49.83	57.57	49.30
l. Mass of Dry Soil (g)	168.03	192.94	205.87	216.63	178.50
m. Moisture Content %	19.6	22.2	24.2	26.6	27.6
n. Dry Unit Weight (lbs/cf)	92.9	94.7	96.0	94.1	92.4



Test Results	
Compaction Curve Control No.	2854 CURVE 1
Optimum Moisture Content (%)	23.5
Max. Dry Unit Weight (lbs/cf)	95.7
Classification of Sample	FAT CLAY
Liquid And Plastic Limits	
Liquid Limit	64
Plastic Limit	24
Plasticity Index	40
Symbol From Plastic Chart:	CH
% Passing 200	97
% Passing No. 4	100

Dry Unit Weight Scale

Min 85 Max 95

Moisture Content % Scale

Min 15 Max 22

Change Graph Scale

Remarks:	Avg. Curves 1 & 2; Max. Dry Unit Weight= 95.9 lbs/cf, Optimum Moisture = 23.9 %

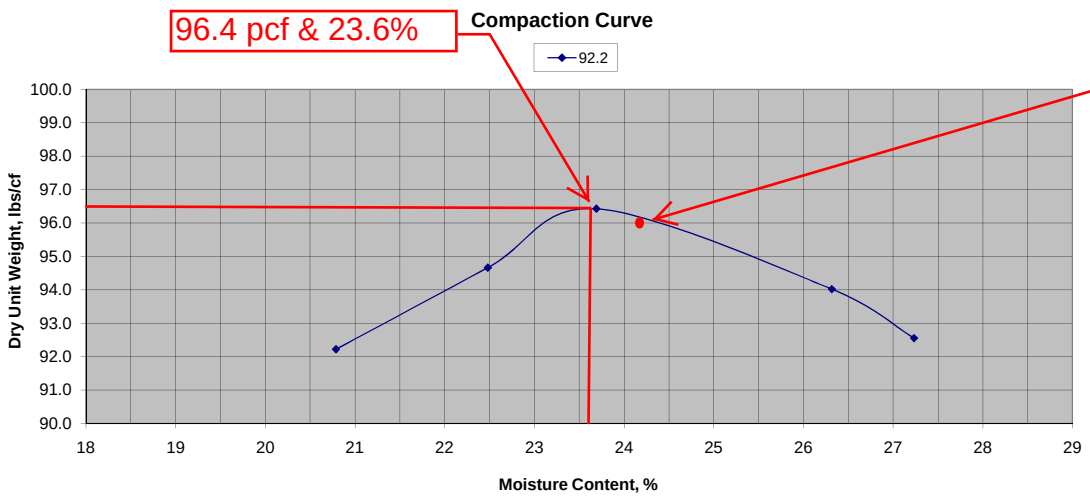
Figure 7-16

TOLUNAY-WONG ENGINEERS, INC.

Compaction - Moisture Density Relationship - ASTM D 698

Laboratory	Tolunay-Wong Engineers, Inc.		**Test ID**	2854-040B	
USACE Contract Number	W912P8-09-D-0046 0008		**Contractor**	Phylway, Inc.	
Project	WBV-14c.2 Phase 2, First Lift		**Date**	9/8/2010	
Source of Material	WILLOW BEND PIT	Feature	EMBANKMENT	Visual Description (ASTM D 2488)	G-Br. Clay
Station	WILLOW BEND PIT PHASE 2	Offset		Lift Number	
X-Coordinate		Y-Coordinate		Elevation (ft)	
Test Method	D698	Preparation Method	WET	As-Received Moisture Content	30.01
Hand / Mechanical Rammer	HAND	Specific Gravity	2.65	Specific Gravity Method: As Tested or Estimated	ESTIMATED
Percent Retained - No. 4 Sieve	0	Percent Retained - 3/8" Sieve	0		
Percent Retained - 3/4" Sieve	0	Oversize Fraction		ASTM D 3718 Correction - Yes/No	NO
Tested By	B. LANDERS	Checked By	G. LeCoq	Submitted By	G. LeCoq

Test Sequence Number	1	2	3	4	5
a. Mold Number	GZL-ML-03-PM	GZL-ML-03-PM	GZL-ML-03-PM	GZL-ML-03-PM	GZL-ML-03-PM
b. Mass of Mold (g)	2016.6	2016.6	2016.6	2016.6	2016.6
c. Volume of Mold (cf)	0.0333	0.0333	0.0333	0.0333	0.0333
d. Mass of Wet Soil+Mold (g)	3699.2	3767.9	3818.1	3810.5	3795.4
e. Mass of Wet Soil (g)	1682.6	1751.3	1801.5	1793.9	1778.8
f. Wet Unit Weight (lbs/cf)	111.4	115.9	119.3	118.8	117.8
g. Container No.	DT02	DT11	DT14	DT04	DT20
h. Mass of Tare (g)	178.80	180.90	245.10	233.40	212.60
i. Mass of Wet Soil+Tare (g)	359.80	466.40	507.20	487.80	496.20
j. Mass of Dry Soil+Tare (g)	328.65	414.00	457.00	434.80	435.50
k. Mass of Water (g)	31.15	52.40	50.20	53.00	60.70
l. Mass of Dry Soil (g)	149.85	233.10	211.90	201.40	222.90
m. Moisture Content %	20.8	22.5	23.7	26.3	27.2
n. Dry Unit Weight (lbs/cf)	92.2	94.7	96.4	94.0	92.6



Test Results	
Compaction Curve Control No.	2854 CURVE 2
Optimum Moisture Content (%)	24.2
Max. Dry Unit Weight (lbs/cf)	96.0
Classification of Sample	FAT CLAY
Liquid And Plastic Limits	
Liquid Limit	64
Plastic Limit	24
Plasticity Index	40
Symbol From Plastic Chart:	CH
% Passing 200	97
% Passing No. 4	100

Dry Unit Weight Scale

Min 85 Max 95

Moisture Content % Scale

Min 15 Max 22

Change Graph Scale

Remarks: Avg. Curves 1 & 2; Max. Dry Unit Weight= 95.9 lbs/cf, Optimum Moisture = 23.9 %

Figure 7-17

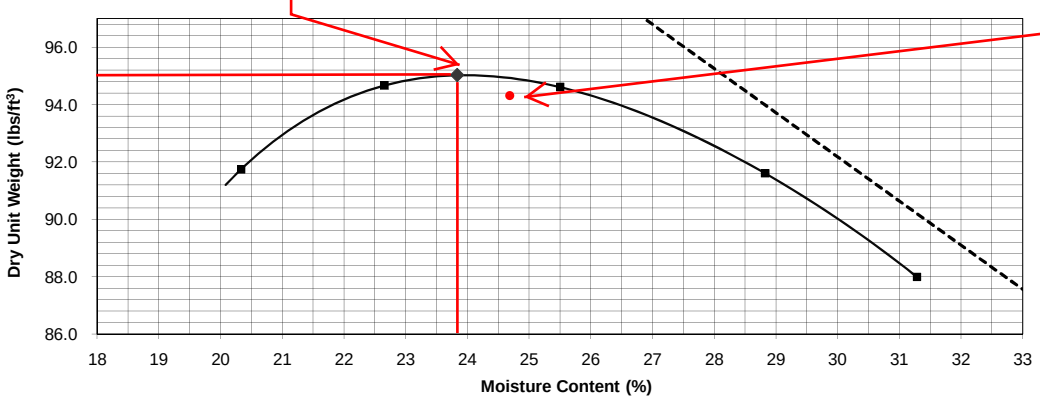
US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3034	**Test No**	92A
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway, Inc.	**Revision**	1
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	9/29/2010		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	CR. CL. W/ SI.		
Station	99+25	**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	26.6		
Compaction Hammer	Manual	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	RODNEY FISHER	**Reviewed By**	B. LANDERS	**Submitted By**	B. LANDERS		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.6	2016.6	2016.6	2016.6	2016.6
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3684.1	3770.5	3810.1	3799.1	3761.5
Wet Soil Mass (g)	1667.5	1753.9	1793.5	1782.5	1744.9
Wet Unit Weight (lbs/ft³)	110.4	116.1	118.7	118.0	115.5
Tare No	DT08	DT49	DT20	DT43	DT02
Tare Mass (g)	187.4	176.3	212.6	179.9	179.0
Wet Soil + Tare Mass (g)	439.5	487.6	486.7	381.9	440.0
Dry Soil + Tare Mass (g)	396.9	430.1	431.0	336.7	377.8
Moisture Content (%)	**20.3**	**22.7**	**25.5**	**28.8**	**31.3**
Dry Unit Weight (lbs/ft³)	**91.7**	**94.7**	**94.6**	**91.6**	**88.0**

95.1 pcf & 23.9%



Proctor Test Results	
Proctor No	3034-92 CURVE ONE
Optimum Moisture Content (%)	24.5
Max Dry Unit Weight (lbs/ft³)	94.7

Liquid And Plastic Limits	
Liquid Limit	67
Plastic Limit	24
Plasticity Index	43
Group Symbol	CH
Sand Content (Retained No 200) (%)	4.5
Fines (Minus No 200) (%)	95.5

Remarks	Average of Curve 1 & Curve 2: Opt. Moisture 24.8%, Max Dry Density 94.8 pcf
Version	**MVNQS02-100907**

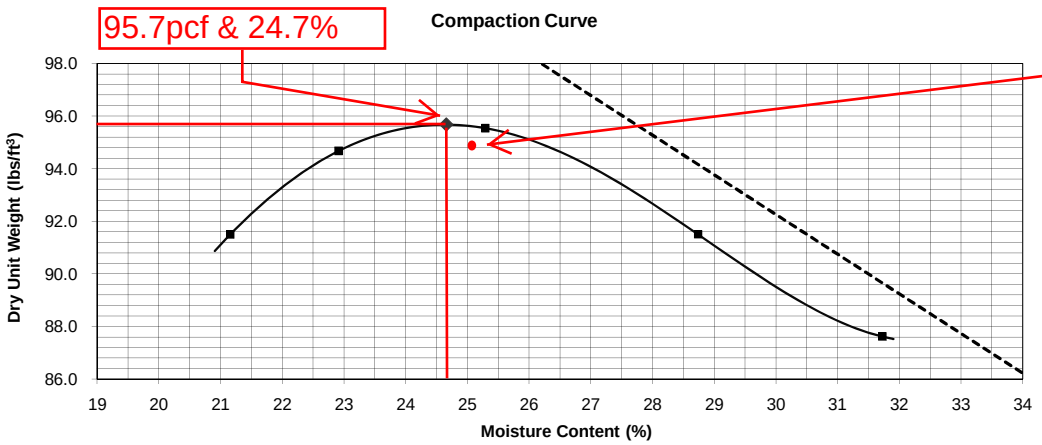
Figure 7-18

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3034	**Test No**	92B
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway, Inc.	**Revision**	1
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	9/29/2010		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	BR. CL. W/ SI.		
Station	99+25	**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	26.6		
Compaction Hammer	Manual	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	RODNEY FISHER	**Reviewed By**	B. LANDERS	**Submitted By**	B. LANDERS		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.6	2016.6	2016.6	2016.6	2016.6
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3691.1	3774.3	3824.7	3796.0	3759.9
Wet Soil Mass (g)	1674.5	1757.7	1808.1	1779.4	1743.3
Wet Unit Weight (lbs/ft³)	110.9	116.4	119.7	117.8	115.4
Tare No	DT40	DT31	DT14	DT24	DT25
Tare Mass (g)	176.1	210.9	245.0	206.4	205.8
Wet Soil + Tare Mass (g)	408.6	446.4	461.0	457.7	383.5
Dry Soil + Tare Mass (g)	368.0	402.5	417.4	401.6	340.7
Moisture Content (%)	**21.2**	**22.9**	**25.3**	**28.7**	**31.7**
Dry Unit Weight (lbs/ft³)	**91.5**	**94.7**	**95.5**	**91.5**	**87.6**



Proctor Test Results	
Proctor No	3034-92 CURVE TWO
Optimum Moisture Content (%)	25.1
Max Dry Unit Weight (lbs/ft³)	94.9

Liquid And Plastic Limits	
Liquid Limit	67
Plastic Limit	24
Plasticity Index	43
Group Symbol	CH
Sand Content (Retained No 200) (%)	4.5
Fines (Minus No 200) (%)	95.5

Remarks	Average of Curve 1 & Curve 2: Opt. Moisture 24.8%, Max Dry Density 94.8 pcf
Version	**MVNQS02-100907**

Figure 7-19

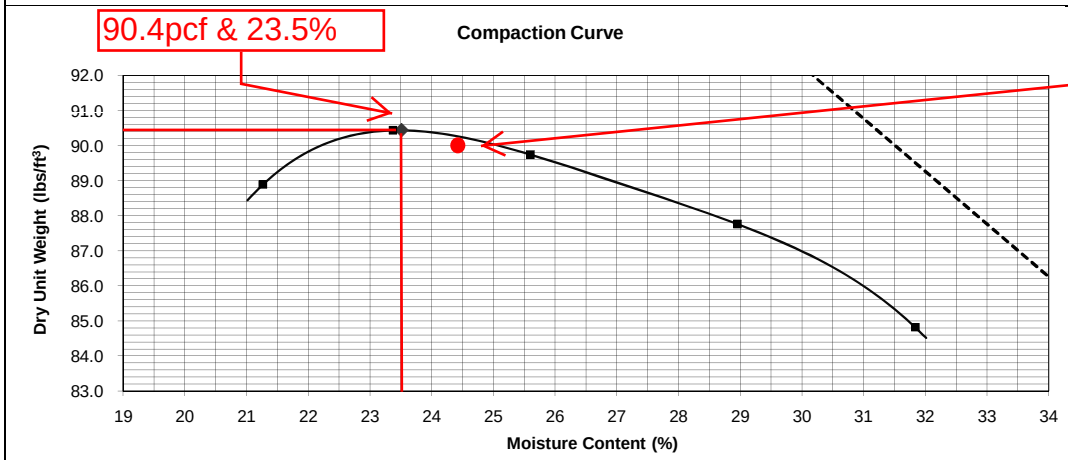
MVNQS02 W912P8-09-D-0046-0008 3034 092 2 R1.xlsm

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3094	**Test No**	108A
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway, Inc.	**Revision**	1
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	10/2/2010		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	BR. FAT CLAY		
Station	77+00	**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	32.1		
Compaction Hammer	Manual	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	RODNEY FISHER	**Reviewed By**	B. LANDERS	**Submitted By**	B. LANDERS		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.6	2016.6	2016.6	2016.6	2016.6
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3644.8	3701.9	3719.2	3726.1	3705.7
Wet Soil Mass (g)	1628.2	1685.3	1702.6	1709.5	1689.1
Wet Unit Weight (lbs/ft³)	107.8	111.6	112.7	113.2	111.8
Tare No	DT08	DT45	DT47	DT02	DT48
Tare Mass (g)	187.5	177.2	178.1	178.9	183.5
Wet Soil + Tare Mass (g)	401.3	402.6	361.1	451.9	427.4
Dry Soil + Tare Mass (g)	363.8	359.9	323.8	390.6	368.5
Moisture Content (%)	**21.3**	**23.4**	**25.6**	**29.0**	**31.8**
Dry Unit Weight (lbs/ft³)	**88.9**	**90.4**	**89.7**	**87.8**	**84.8**



Proctor Test Results	
Proctor No	3094-108 CURVE ONE
Optimum Moisture Content (%)	24.4
Max Dry Unit Weight (lbs/ft³)	90.0

Liquid And Plastic Limits	
Liquid Limit	78
Plastic Limit	26
Plasticity Index	52
Group Symbol	CH
Sand Content (Retained No 200) (%)	3.2
Fines (Minus No 200) (%)	96.8

Remarks	Average of Curve 1 & Curve 2: Opt. Moisture 24.0 %, Max Dry Density 90.1 pcf	
Version	**MVNQS02-100907**	

Figure 7-20

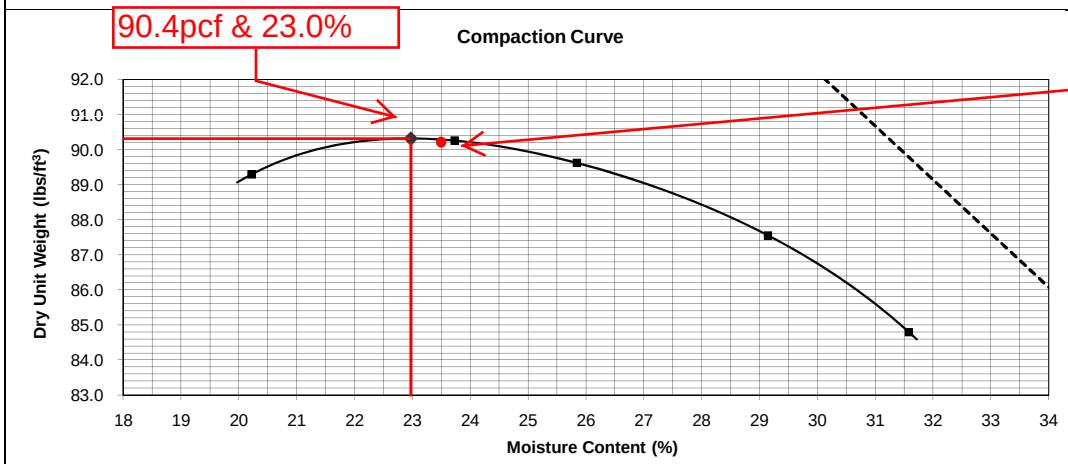
MVNQS02 W912P8-09-D-0046-0008 3094 108 1 R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3094	**Test No**	108B
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway, Inc.	**Revision**	1
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	10/2/2010		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	BR. FAT CLAY		
Station	77+00	**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	32.1		
Compaction Hammer	Manual	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	RODNEY FISHER	**Reviewed By**	B. LANDERS	**Submitted By**	B. LANDERS		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.6	2016.6	2016.6	2016.6	2016.6
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3638.1	3703.4	3720.1	3724.5	3701.9
Wet Soil Mass (g)	1621.5	1686.8	1703.5	1707.9	1685.3
Wet Unit Weight (lbs/ft³)	107.4	111.7	112.8	113.1	111.6
Tare No	DT01	DT50	DT21	DT46	DT30
Tare Mass (g)	171.8	180.7	211.5	177.9	203.4
Wet Soil + Tare Mass (g)	467.9	441.4	375.6	465.9	446.3
Dry Soil + Tare Mass (g)	418.1	391.4	341.9	400.9	388.0
Moisture Content (%)	**20.2**	**23.7**	**25.8**	**29.1**	**31.6**
Dry Unit Weight (lbs/ft³)	**89.3**	**90.3**	**89.6**	**87.6**	**84.8**



Proctor Test Results	
Proctor No	3094-108 CURVE TWO
Optimum Moisture Content (%)	23.5
Max Dry Unit Weight (lbs/ft³)	90.2

Liquid And Plastic Limits	
Liquid Limit	78
Plastic Limit	26
Plasticity Index	52
Group Symbol	CH
Sand Content (Retained No 200) (%)	3.2
Fines (Minus No 200) (%)	96.8

Remarks	Average of Curve 1 & Curve 2: Opt. Moisture 24.0%, Max Dry Density 90.1 pcf	
Version	**MVNQS02-100907**	

Figure 7-21

MVNQS02 W912P8-09-D-0046-0008 3094 108 2 R1.xlsm

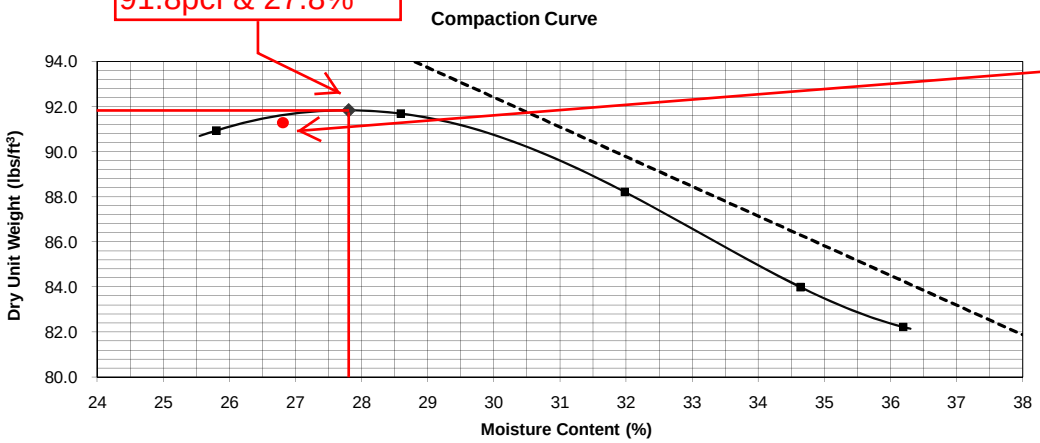
US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3178.P-1	**Test No**	125
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	North End	**Offset**	500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02305	**Longitude (°W)**	90.605790	**Elevation (ft)**	2.6		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	30.66		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3773.4	3826.4	3804.0	3753.6	3736.9		
Wet Soil Mass (g)	1727.9	1780.9	1758.5	1708.1	1691.4		
Wet Unit Weight (lbs/ft³)	114.4	117.9	116.4	113.1	112.0		
Tare No	50	62	17	59	19		
Tare Mass (g)	253.5	242.1	241.8	255.5	251.5		
Wet Soil + Tare Mass (g)	398.3	404.9	388.3	386.1	375.3		
Dry Soil + Tare Mass (g)	368.6	368.7	352.8	352.5	342.4		
Moisture Content (%)	**25.8**	**28.6**	**32.0**	**34.6**	**36.2**		
Dry Unit Weight (lbs/ft³)	**90.9**	**91.7**	**88.2**	**84.0**	**82.2**		

91.8pcf & 27.8%



Proctor Test Results	
Proctor No	3178-125 CURVE 1
Optimum Moisture Content (%)	26.8
Max Dry Unit Weight (lbs/ft³)	91.3

Liquid And Plastic Limits	
Liquid Limit	68
Plastic Limit	20
Plasticity Index	48
Group Symbol	CH
Sand Content (Retained No 200) (%)	1.94
Fines (Minus No 200) (%)	98.06

Remarks	Sample Location: North End of Pit, 500' from North Pit Limit	Avg. Curve 1 & 2; Max. Dry Unit Wt. = 91.7lbs/cf; Optimum Moisture= 26.2%
Version	**MVNQS02-100907**	

Figure 7-22

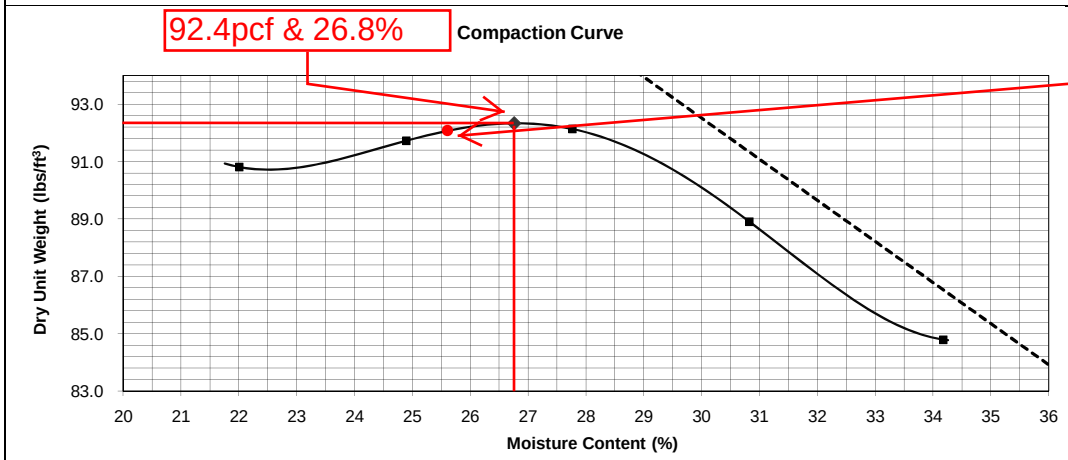
MVNQS02 W912P8-09-D-0046-0008 3178 125 A R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3178-2	**Test No**	125
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	North End	**Offset**	500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02305	**Longitude (°W)**	90.605790	**Elevation (ft)**	2.6		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	30.66		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3719.0	3775.9	3823.6	3802.3	3763.9		
Wet Soil Mass (g)	1673.5	1730.4	1778.1	1756.8	1718.4		
Wet Unit Weight (lbs/ft³)	110.8	114.6	117.7	116.3	113.8		
Tare No	10	28	57	41	79		
Tare Mass (g)	304.5	252.4	261.3	259.6	245.1		
Wet Soil + Tare Mass (g)	475.8	433.5	474.8	437.0	435.9		
Dry Soil + Tare Mass (g)	444.9	397.4	428.4	395.2	387.3		
Moisture Content (%)	**22.0**	**24.9**	**27.8**	**30.8**	**34.2**		
Dry Unit Weight (lbs/ft³)	**90.8**	**91.7**	**92.1**	**88.9**	**84.8**		



Proctor Test Results	
Proctor No	3178-125 CURVE 2
Optimum Moisture Content (%)	25.6
Max Dry Unit Weight (lbs/ft³)	92.1

Liquid And Plastic Limits	
Liquid Limit	68
Plastic Limit	20
Plasticity Index	48
Group Symbol	CH
Sand Content (Retained No 200) (%)	1.94
Fines (Minus No 200) (%)	98.06

Remarks Sample Location: North End of Pit, 500' from North Pit Limit Avg. Curve 1 & 2; Max. Dry Unit Wt. = 91.7lbs/cf; Optimum Moisture= 26.2%

Version MVNQS02-100907

Figure 7-23

MVNQS02 W912P8-09-D-0046-0008 3178 125 B R1.xls

US Army Corps of Engineers

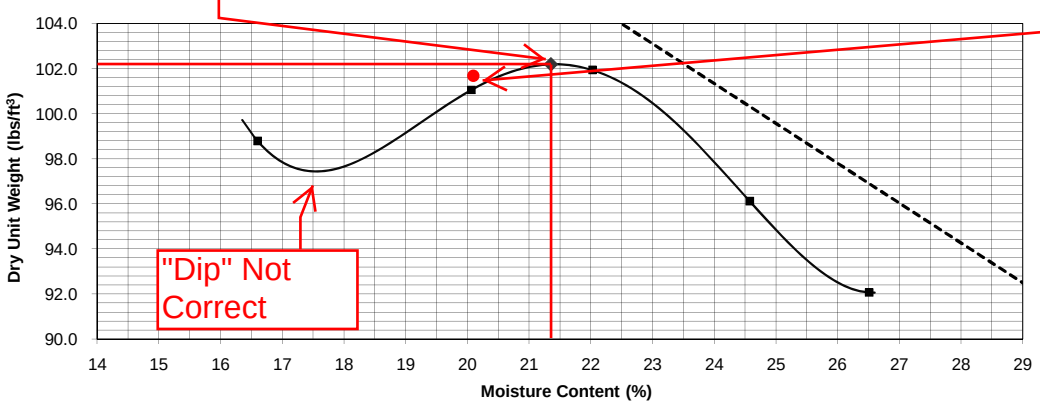
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3179-1	**Test No**	126
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Sandy Clay		
Station	North End	**Offset**	500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02029	**Longitude (°W)**	90.605590	**Elevation (ft)**	-4.0		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	32.5		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Not "Sandy"

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3785.4	3878.1	3924.4	3854.2	3804.8		
Wet Soil Mass (g)	1739.9	1832.6	1878.9	1808.7	1759.3		
Wet Unit Weight (lbs/ft³)	115.2	121.3	124.4	119.7	116.5		
Tare No	81	66	35	51	13		
Tare Mass (g)	253.1	259.2	251.8	245.6	237.6		
Wet Soil + Tare Mass (g)	403.4	445.3	439.6	414.9	421.8		
Dry Soil + Tare Mass (g)	382.0	414.2	405.7	381.5	383.2		
Moisture Content (%)	**16.6**	**20.1**	**22.0**	**24.6**	**26.5**		
Dry Unit Weight (lbs/ft³)	**98.8**	**101.1**	**101.9**	**96.1**	**92.1**		

102.2pcf & 21.4%



Proctor Test Results	
Proctor No	3179-126 CURVE 1
Optimum Moisture Content (%)	20.1
Max Dry Unit Weight (lbs/ft³)	101.7

Liquid And Plastic Limits	
Liquid Limit	44
Plastic Limit	19
Plasticity Index	25
Group Symbol	CL
Sand Content (Retained No 200) (%)	2.94
Fines (Minus No 200) (%)	97.06

Remarks Sample Location: North End of Pit, 500' from North Pit Limit Avg. Curve 1 & 2; Max. Dry Unit Wt. = 100.9lbs/cf; Optimum Moisture= 19.6%

Version MVNQS02-100907

Figure 7-24

MVNQS02 W912P8-09-D-0046-0008 3179 126 A R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

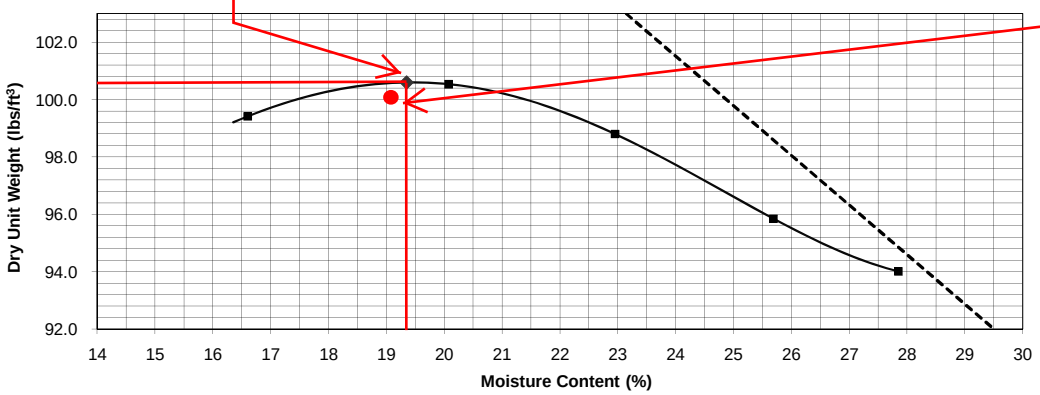
Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3179-2	**Test No**	126
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Sandy Clay		
Station	North End	**Offset**	500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02029	**Longitude (°W)**	90.605590	**Elevation (ft)**	-4.0		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	32.5		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Not "Sandy"

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3796.4	3868.9	3880.3	3865.1	3860.9		
Wet Soil Mass (g)	1750.9	1823.4	1834.8	1819.6	1815.4		
Wet Unit Weight (lbs/ft³)	115.9	120.7	121.5	120.5	120.2		
Tare No	67	23	36	34	69		
Tare Mass (g)	253.1	259.3	248.6	248.1	245.5		
Wet Soil + Tare Mass (g)	403.4	445.3	400.2	430.1	428.2		
Dry Soil + Tare Mass (g)	382.0	414.2	371.9	392.9	388.4		
Moisture Content (%)	**16.6**	**20.1**	**23.0**	**25.7**	**27.9**		
Dry Unit Weight (lbs/ft³)	**99.4**	**100.5**	**98.8**	**95.8**	**94.0**		

100.6pcf & 19.4%

Compaction Curve



Proctor Test Results	
Proctor No	3179-126 CURVE 2
Optimum Moisture Content (%)	19.1
Max Dry Unit Weight (lbs/ft³)	100.1

Liquid And Plastic Limits	
Liquid Limit	44
Plastic Limit	19
Plasticity Index	25
Group Symbol	CL
Sand Content (Retained No 200) (%)	2.94
Fines (Minus No 200) (%)	97.06

Remarks	Sample Location: North End of Pit, 500' from North Pit Limit	Avg. Curve 1 & 2; Max. Dry Unit Wt. = 100.9lbs/cf; Optimum Moisture= 19.6%
Version	**MVNQS02-100907**	

Figure 7-25

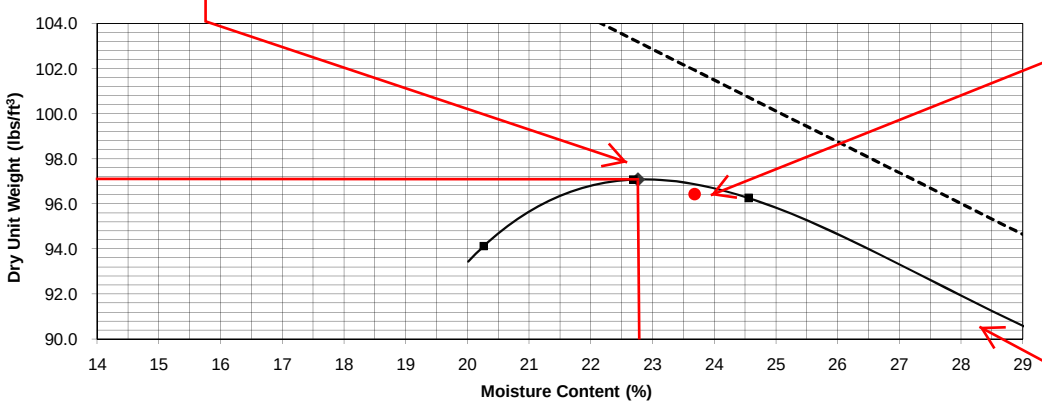
US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3180-1	**Test No**	127
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	North End	**Offset**	500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02305	**Longitude (°W)**	90.605790	**Elevation (ft)**	2.6		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	36.57		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3755.3	3844.5	3856.6	3797.9	3840.2		
Wet Soil Mass (g)	1709.8	1799.0	1811.1	1752.4	1794.7		
Wet Unit Weight (lbs/ft³)	113.2	119.1	119.9	116.0	118.8		
Tare No	11	14	21	56	72		
Tare Mass (g)	244.9	245.1	320.7	254.2	284.8		
Wet Soil + Tare Mass (g)	426.5	303.5	503.8	421.1	410.2		
Dry Soil + Tare Mass (g)	395.9	292.7	467.7	382.2	375.0		
Moisture Content (%)	**20.3**	**22.7**	**24.6**	**30.4**	**39.0**		
Dry Unit Weight (lbs/ft³)	**94.1**	**97.1**	**96.3**	**89.0**	**85.5**		

97.1pcf & 22.8%



Proctor Test Results	
Proctor No	3180-127 CURVE 1
Optimum Moisture Content (%)	23.7
Max Dry Unit Weight (lbs/ft³)	96.4

Liquid And Plastic Limits	
Liquid Limit	60
Plastic Limit	21
Plasticity Index	39
Group Symbol	CH
Sand Content (Retained No 200) (%)	2.2
Fines (Minus No 200) (%)	97.8

Remarks	Sample Location: North End of Pit, 500' from North Pit Limit	Avg. Curve 1 & 2; Max. Dry Unit Wt. = 95.8lbs/cf; Optimum Moisture= 24.0%
Version	**MVNQS02-100907**	

High Points not Plotted

Figure 7-26

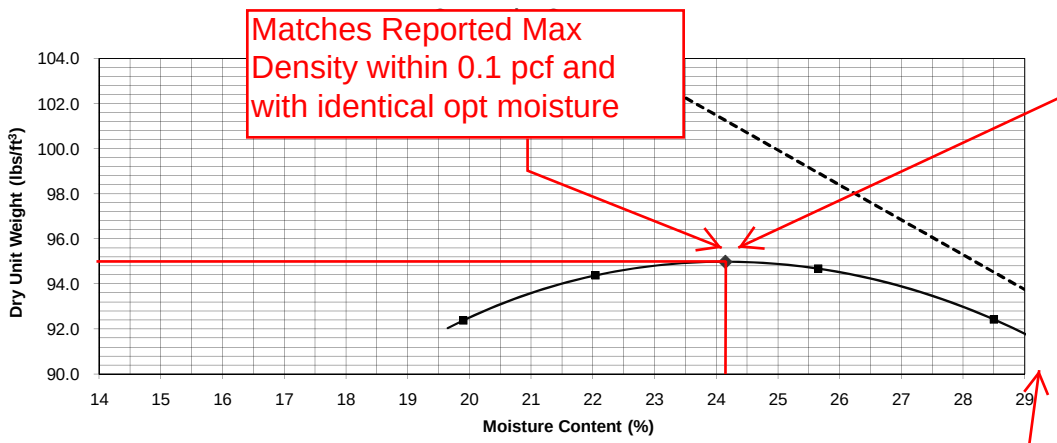
MVNQS02 W912P8-09-D-0046-0008 3180 127 A R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3180-2	**Test No**	127
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	North End	**Offset**	500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02305	**Longitude (°W)**	90.605790	**Elevation (ft)**	2.6		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	36.57		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3718.5	3785.3	3842.4	3839.5	3779.9		
Wet Soil Mass (g)	1673.0	1739.8	1796.9	1794.0	1734.4		
Wet Unit Weight (lbs/ft³)	110.8	115.2	119.0	118.8	114.8		
Tare No	1	42	18	77	70		
Tare Mass (g)	245.1	253.7	300.6	248.9	256.4		
Wet Soil + Tare Mass (g)	440.3	444.7	498.0	454.5	428.7		
Dry Soil + Tare Mass (g)	407.9	410.2	457.7	408.9	387.4		
Moisture Content (%)	**19.9**	**22.0**	**25.7**	**28.5**	**31.5**		
Dry Unit Weight (lbs/ft³)	**92.4**	**94.4**	**94.7**	**92.4**	**87.3**		



Proctor Test Results

Proctor No	3180-127 CURVE 2
Optimum Moisture Content (%)	24.2
Max Dry Unit Weight (lbs/ft³)	95.1

Liquid And Plastic Limits

Liquid Limit	60
Plastic Limit	21
Plasticity Index	39
Group Symbol	CH
Sand Content (Retained No 200) (%)	2.2
Fines (Minus No 200) (%)	97.8

Remarks	Sample Location: North End of Pit, 500' from North Pit Limit	Avg. Curve 1 & 2; Max. Dry Unit Wt. = 95.8lbs/cf; Optimum Moisture= 24.0%
Version	MVNQS02-100907	

Doesn't show last point

Figure 7-27

MVNQS02 W912P8-09-D-0046-0008 3180 127 B R1.xls

US Army Corps of Engineers

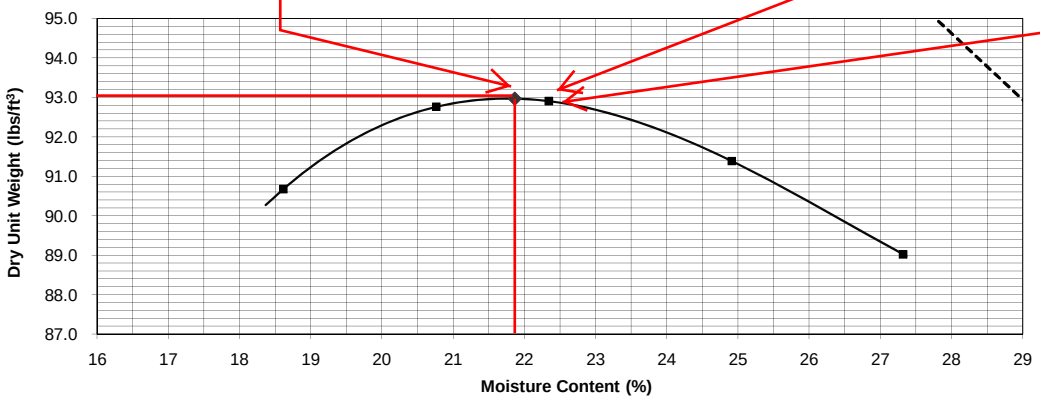
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3181-1	**Test No**	128
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	Middle	**Offset**	1500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.020299	**Longitude (°W)**	90.605593	**Elevation (ft)**	2.1		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	42.85		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3670.1	3737.6	3762.4	3769.7	3757.5		
Wet Soil Mass (g)	1624.6	1692.1	1716.9	1724.2	1712.0		
Wet Unit Weight (lbs/ft³)	107.6	112.0	113.7	114.2	113.3		
Tare No	76	26	12	2	8		
Tare Mass (g)	314.1	260.2	251.2	252.4	244.0		
Wet Soil + Tare Mass (g)	523.1	471.9	417.1	429.9	388.0		
Dry Soil + Tare Mass (g)	490.3	435.5	386.8	394.5	357.1		
Moisture Content (%)	**18.6**	**20.8**	**22.3**	**24.9**	**27.3**		
Dry Unit Weight (lbs/ft³)	**90.7**	**92.8**	**92.9**	**91.4**	**89.0**		

93.0pcf & 21.9%

Compaction Curve



Proctor Test Results	
Proctor No	3181-128 CURVE A
Optimum Moisture Content (%)	22.3
Max Dry Unit Weight (lbs/ft³)	92.9

Liquid And Plastic Limits	
Liquid Limit	78
Plastic Limit	23
Plasticity Index	55
Group Symbol	CH
Sand Content (Retained No 200) (%)	0.38
Fines (Minus No 200) (%)	99.62

Remarks Sample Location: Middle of Pit, 1500' from North Pit Limit Avg. Curve 1 & 2; Max. Dry Unit Wt. = 92.8lbs/cf; Optimum Moisture= 22.5%

Version MVNQS02-100907

Figure 7-28

MVNQS02 W912P8-09-D-0046-0008 3181 128 A R1.xls

US Army Corps of Engineers

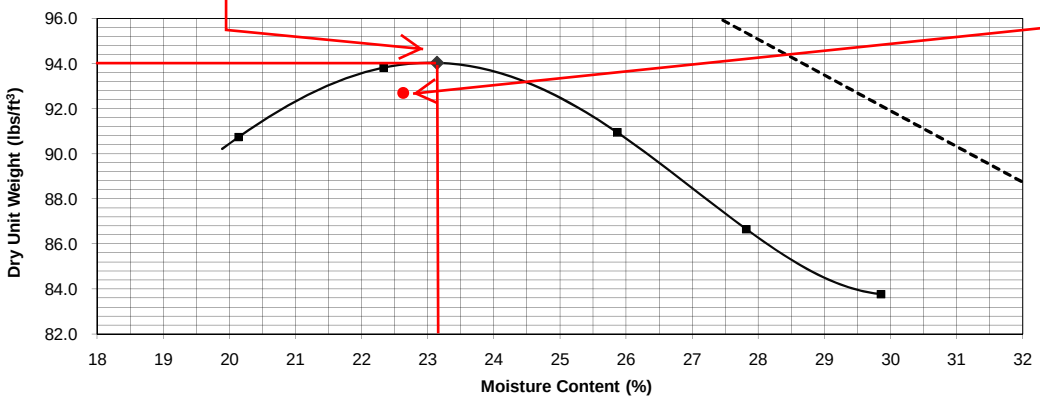
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3181-2	**Test No**	128
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	Middle	**Offset**	1500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.020299	**Longitude (°W)**	90.605593	**Elevation (ft)**	2.1		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	42.85		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3692.1	3779.1	3774.5	3718.4	3688.5		
Wet Soil Mass (g)	1646.6	1733.6	1729.0	1672.9	1643.0		
Wet Unit Weight (lbs/ft³)	109.0	114.8	114.5	110.8	108.8		
Tare No	27	29	71	53	31		
Tare Mass (g)	252.5	247.8	255.7	249.3	251.2		
Wet Soil + Tare Mass (g)	303.8	297.1	440.6	470.3	457.8		
Dry Soil + Tare Mass (g)	295.2	288.1	402.6	422.2	410.3		
Moisture Content (%)	**20.1**	**22.3**	**25.9**	**27.8**	**29.9**		
Dry Unit Weight (lbs/ft³)	**90.7**	**93.8**	**90.9**	**86.6**	**83.8**		

94.0pcf & 23.2%

Compaction Curve



Proctor Test Results	
Proctor No	3181-128 CURVE 2
Optimum Moisture Content (%)	22.7
Max Dry Unit Weight (lbs/ft³)	92.7

Liquid And Plastic Limits	
Liquid Limit	78
Plastic Limit	23
Plasticity Index	55
Group Symbol	CH
Sand Content (Retained No 200) (%)	0.38
Fines (Minus No 200) (%)	99.62

Remarks Sample Location: Middle of Pit, 1500' from North Pit Limit Avg. Curve 1 & 2; Max. Dry Unit Wt. = 92.8lbs/cf; Optimum Moisture= 22.5%

Version MVNQS02-100907

Figure 7-29

MVNQS02 W912P8-09-D-0046-0008 3181 128 B R1.xls

US Army Corps of Engineers

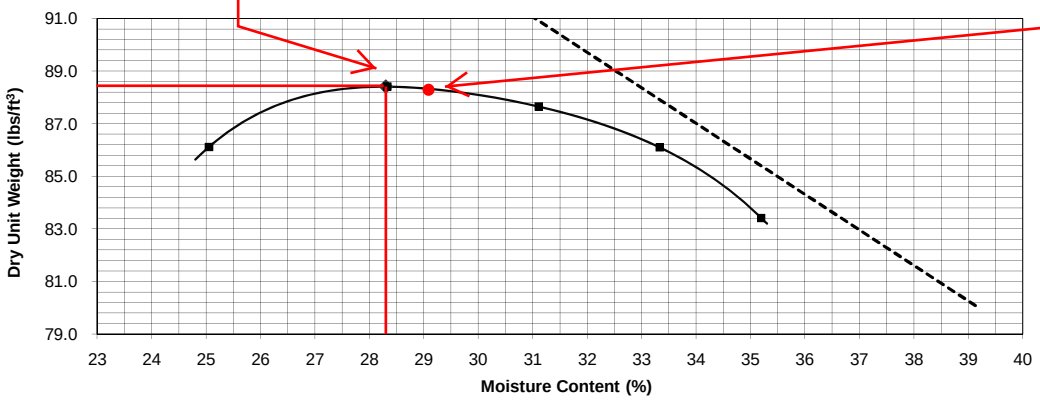
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3182-1	**Test No**	129
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	Middle	**Offset**	1500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02029	**Longitude (°W)**	90.605590	**Elevation (ft)**	-5.0		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	41.4		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3672.1	3759.2	3781.3	3779.5	3748.9		
Wet Soil Mass (g)	1626.6	1713.7	1735.8	1734.0	1703.4		
Wet Unit Weight (lbs/ft³)	107.7	113.5	114.9	114.8	112.8		
Tare No	28	79	59	57	77		
Tare Mass (g)	251.8	253.3	252.3	244.8	225.0		
Wet Soil + Tare Mass (g)	310.2	298.6	405.7	414.8	452.4		
Dry Soil + Tare Mass (g)	298.5	288.6	369.3	372.3	393.2		
Moisture Content (%)	**25.1**	**28.3**	**31.1**	**33.3**	**35.2**		
Dry Unit Weight (lbs/ft³)	**86.1**	**88.4**	**87.6**	**86.1**	**83.4**		

88.4pcf & 28.3%

Compaction Curve



Proctor Test Results

Proctor No	3182-129 CURVE 1
Optimum Moisture Content (%)	29.1
Max Dry Unit Weight (lbs/ft³)	88.3

Liquid And Plastic Limits

Liquid Limit	
Plastic Limit	
Plasticity Index	
Group Symbol	
Sand Content (Retained No 200) (%)	
Fines (Minus No 200) (%)	

Data Not Shown

Remarks	Sample Location: Middle of Pit, 1500' from North Pit Limit	Avg. Curve 1 & 2; Max. Dry Unit Wt. = 88.2Lbs/cf; Optimum Moisture= 29.4%
Version	MVNQS02-100907	

Figure 7-30

MVNQS02 W912P8-09-D-0046-0008 3182 129 A R1.xls

US Army Corps of Engineers

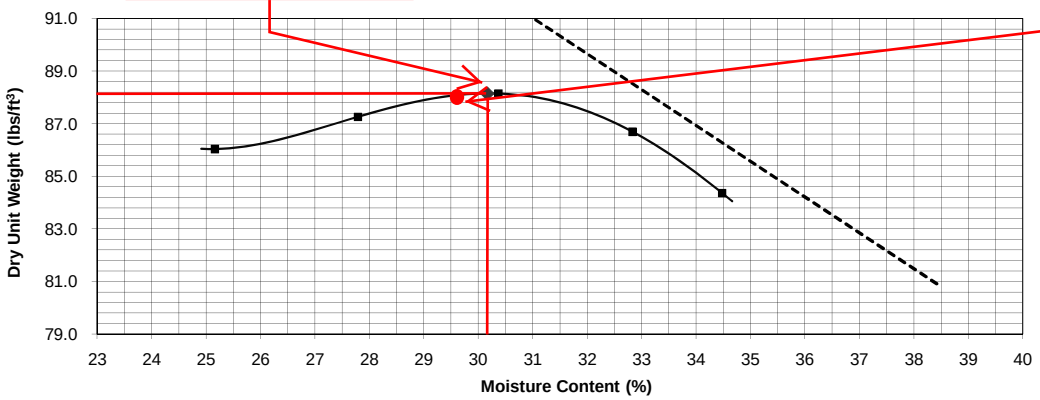
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3182-2	**Test No**	129
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	Middle	**Offset**	1500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02029	**Longitude (°W)**	90.605590	**Elevation (ft)**	-5.0		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	41.4		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3672.0	3729.8	3781.2	3784.9	3759.1		
Wet Soil Mass (g)	1626.5	1684.3	1735.7	1739.4	1713.6		
Wet Unit Weight (lbs/ft³)	107.7	111.5	114.9	115.2	113.4		
Tare No	67	17	62	26	76		
Tare Mass (g)	253.3	251.8	248.8	241.5	241.5		
Wet Soil + Tare Mass (g)	311.0	310.2	417.5	365.3	421.3		
Dry Soil + Tare Mass (g)	299.4	297.5	378.2	334.7	375.2		
Moisture Content (%)	**25.2**	**27.8**	**30.4**	**32.8**	**34.5**		
Dry Unit Weight (lbs/ft³)	**86.0**	**87.3**	**88.1**	**86.7**	**84.4**		

88.1pcf & 30.2%

Compaction Curve



Proctor Test Results	
Proctor No	3182-129 CURVE 2
Optimum Moisture Content (%)	29.7
Max Dry Unit Weight (lbs/ft³)	88.0

Liquid And Plastic Limits	
Liquid Limit	87
Plastic Limit	25
Plasticity Index	62
Group Symbol	CH
Sand Content (Retained No 200) (%)	0.24
Fines (Minus No 200) (%)	99.76

Remarks Sample Location: Middle of Pit, 1500' from North Pit Limit Avg. Curve 1 & 2; Max. Dry Unit Wt. = 88.2Lbs/cf; Optimum Moisture= 29.4%

Version MVNQS02-100907

Figure 7-31

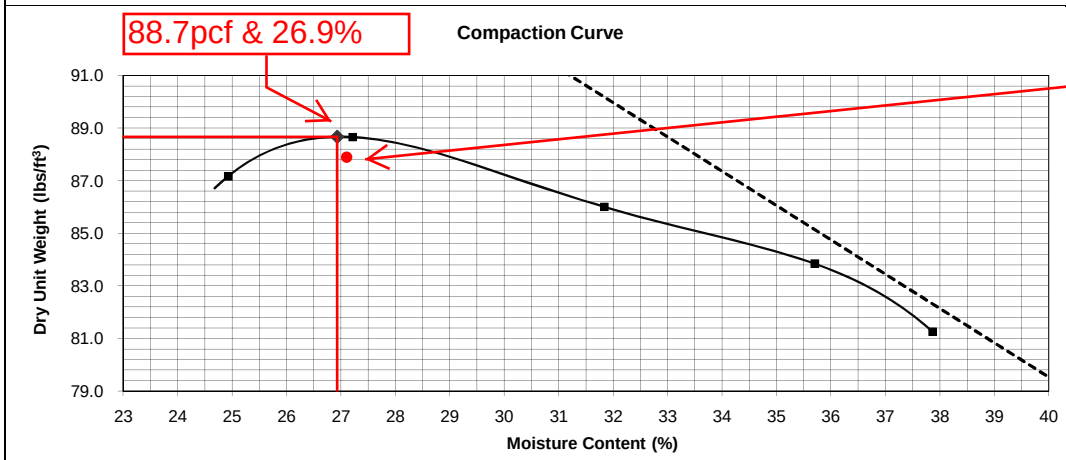
MVNQS02 W912P8-09-D-0046-0008 3182 129 B R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3183-1	**Test No**	130
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	Middle	**Offset**	1500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02029	**Longitude (°W)**	90.605590	**Elevation (ft)**	-5.0		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	40.1		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3690.3	3749.1	3758.2	3764.1	3737.7		
Wet Soil Mass (g)	1644.8	1703.6	1712.7	1718.6	1692.2		
Wet Unit Weight (lbs/ft³)	108.9	112.8	113.4	113.8	112.0		
Tare No	81	8	31	13	34		
Tare Mass (g)	304.1	250.9	259.1	253.8	254.7		
Wet Soil + Tare Mass (g)	349.2	311.2	421.0	356.8	446.2		
Dry Soil + Tare Mass (g)	340.2	298.3	381.9	329.7	393.6		
Moisture Content (%)	**24.9**	**27.2**	**31.8**	**35.7**	**37.9**		
Dry Unit Weight (lbs/ft³)	**87.2**	**88.7**	**86.0**	**83.8**	**81.3**		



Proctor Test Results	
Proctor No	3183-130 CURVE 1
Optimum Moisture Content (%)	27.1
Max Dry Unit Weight (lbs/ft³)	87.9

Liquid And Plastic Limits	
Liquid Limit	81
Plastic Limit	25
Plasticity Index	56
Group Symbol	CH
Sand Content (Retained No 200) (%)	0.4
Fines (Minus No 200) (%)	99.6

Remarks	Avergae Max DD: 87.5 pcf / Average Optimum Moisture: 27.6 %M	Sample Location: Middle of Pit, 1500' from North Pit Limit
Version	**MVNQS02-100907**	

Figure 7-32

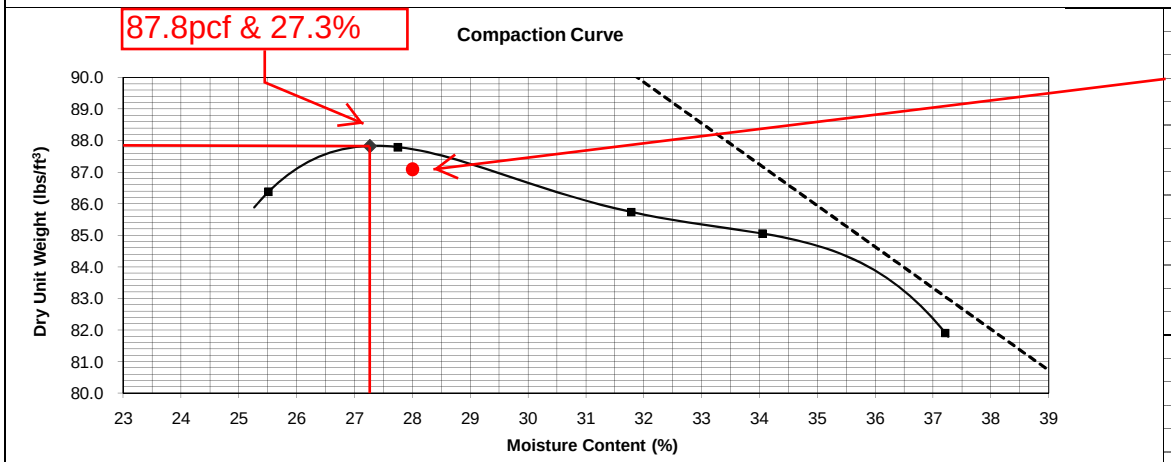
MVNQS02 W912P8-09-D-0046-0008 3183 130 A R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3183-2	**Test No**	130
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	Middle	**Offset**	1500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02029	**Longitude (°W)**	90.605590	**Elevation (ft)**	-5.0		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	40.1		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3683.1	3739.5	3752.1	3767.6	3742.9		
Wet Soil Mass (g)	1637.6	1694.0	1706.6	1722.1	1697.4		
Wet Unit Weight (lbs/ft³)	108.4	112.2	113.0	114.0	112.4		
Tare No	41	72	18	1	69		
Tare Mass (g)	247.7	253.0	251.9	314.5	251.3		
Wet Soil + Tare Mass (g)	400.7	379.6	453.4	432.6	364.5		
Dry Soil + Tare Mass (g)	369.6	352.1	404.8	402.6	333.8		
Moisture Content (%)	**25.5**	**27.7**	**31.8**	**34.1**	**37.2**		
Dry Unit Weight (lbs/ft³)	**86.4**	**87.8**	**85.7**	**85.1**	**81.9**		



Proctor Test Results	
Proctor No	3183-130 CURVE 2
Optimum Moisture Content (%)	28.0
Max Dry Unit Weight (lbs/ft³)	87.1

Liquid And Plastic Limits	
Liquid Limit	81
Plastic Limit	25
Plasticity Index	56
Group Symbol	CH
Sand Content (Retained No 200) (%)	0.4
Fines (Minus No 200) (%)	99.6

Remarks	Avergae Max DD: 87.5 pcf / Average Optimum Moisture: 27.6 %M	Sample Location: Middle of Pit, 1500' from North Pit Limit
Version	**MVNQS02-100907**	

Figure 7-33

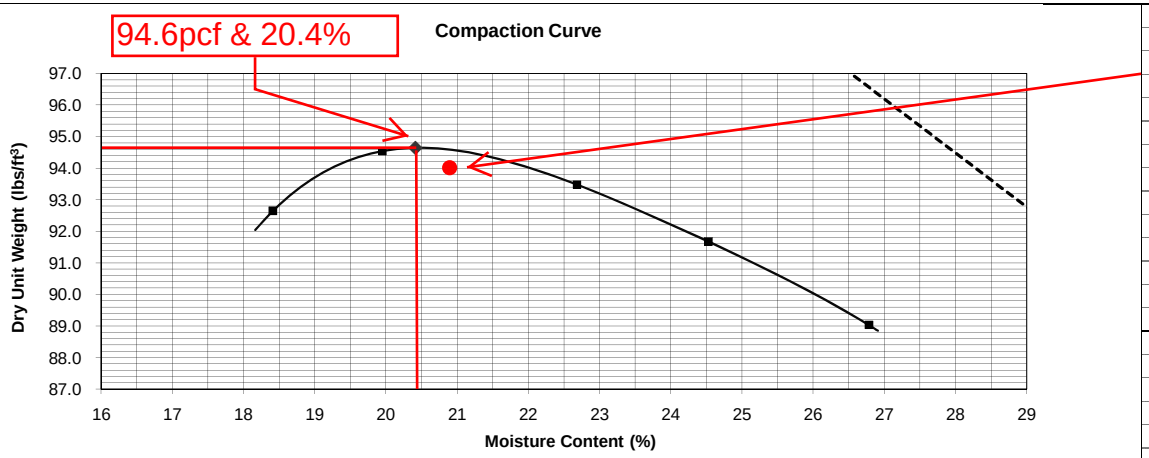
MVNQS02 W912P8-09-D-0046-0008 3183 130 B R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3184-1	**Test No**	131
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	South End	**Offset**	2500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02029	**Longitude (°W)**	90.605593	**Elevation (ft)**	2.3		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	34.7		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3702.6	3758.4	3777.7	3769.9	3750.5		
Wet Soil Mass (g)	1657.1	1712.9	1732.2	1724.4	1705.0		
Wet Unit Weight (lbs/ft³)	109.7	113.4	114.7	114.2	112.9		
Tare No	50	23	36	66	58		
Tare Mass (g)	248.6	257.3	254.2	248.4	245.6		
Wet Soil + Tare Mass (g)	393.3	407.0	366.7	406.8	368.2		
Dry Soil + Tare Mass (g)	370.8	382.1	345.9	375.6	342.3		
Moisture Content (%)	**18.4**	**20.0**	**22.7**	**24.5**	**26.8**		
Dry Unit Weight (lbs/ft³)	**92.6**	**94.5**	**93.5**	**91.7**	**89.0**		



Proctor Test Results	
Proctor No	3184-131 CURVE 1
Optimum Moisture Content (%)	20.9
Max Dry Unit Weight (lbs/ft³)	94.0

Liquid And Plastic Limits	
Liquid Limit	71
Plastic Limit	23
Plasticity Index	48
Group Symbol	CH
Sand Content (Retained No 200) (%)	0.82
Fines (Minus No 200) (%)	99.18

Remarks	Avergae Max DD: 93.8 pcf / Average Optimum Moisture: 21.9 %M	Sample Location: South End of Pit, 2500' from North Pit Limit
Version	**MVNQS02-100907**	

Figure 7-34

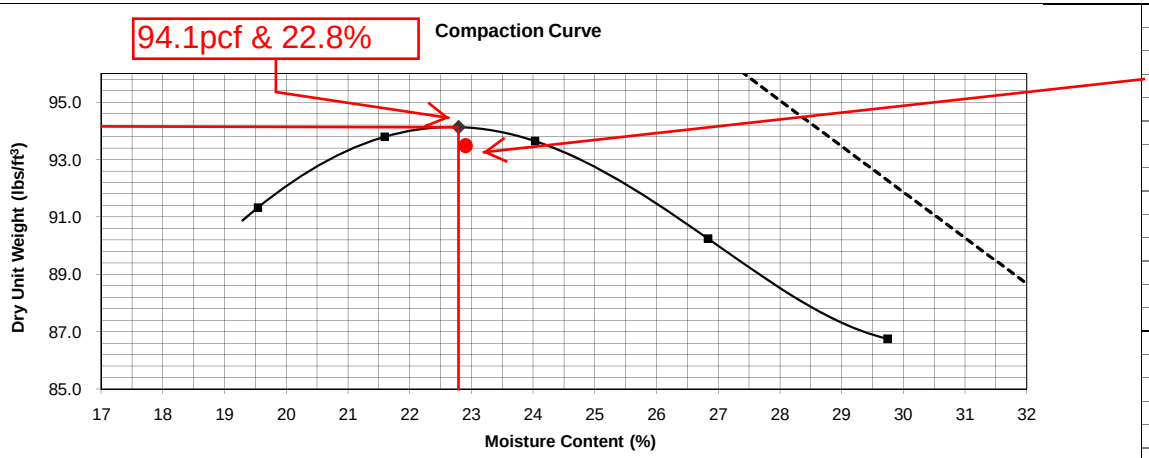
MVNQS02 W912P8-09-D-0046-0008 3184 A R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3184-2	**Test No**	131
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	South End	**Offset**	2500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02029	**Longitude (°W)**	90.605593	**Elevation (ft)**	2.3		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	34.7		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3694.5	3768.2	3799.9	3774.4	3745.6		
Wet Soil Mass (g)	1649.0	1722.7	1754.4	1728.9	1700.1		
Wet Unit Weight (lbs/ft³)	109.2	114.1	116.1	114.5	112.6		
Tare No	19	51	11	42	10		
Tare Mass (g)	245.8	248.4	251.5	260.9	301.6		
Wet Soil + Tare Mass (g)	313.7	321.6	389.3	371.5	408.9		
Dry Soil + Tare Mass (g)	302.6	308.6	362.6	348.1	384.3		
Moisture Content (%)	**19.5**	**21.6**	**24.0**	**26.8**	**29.7**		
Dry Unit Weight (lbs/ft³)	**91.3**	**93.8**	**93.6**	**90.2**	**86.8**		



Proctor Test Results	
Proctor No	3184-131 CURVE 2
Optimum Moisture Content (%)	22.9
Max Dry Unit Weight (lbs/ft³)	93.5

Liquid And Plastic Limits	
Liquid Limit	71
Plastic Limit	23
Plasticity Index	48
Group Symbol	CH
Sand Content (Retained No 200) (%)	0.82
Fines (Minus No 200) (%)	99.18

Remarks	Avergae Max DD: 93.8 pcf / Average Optimum Moisture: 21.9 %M	Sample Location: South End of Pit, 2500' from North Pit Limit
Version	**MVNQS02-100907**	

Figure 7-35

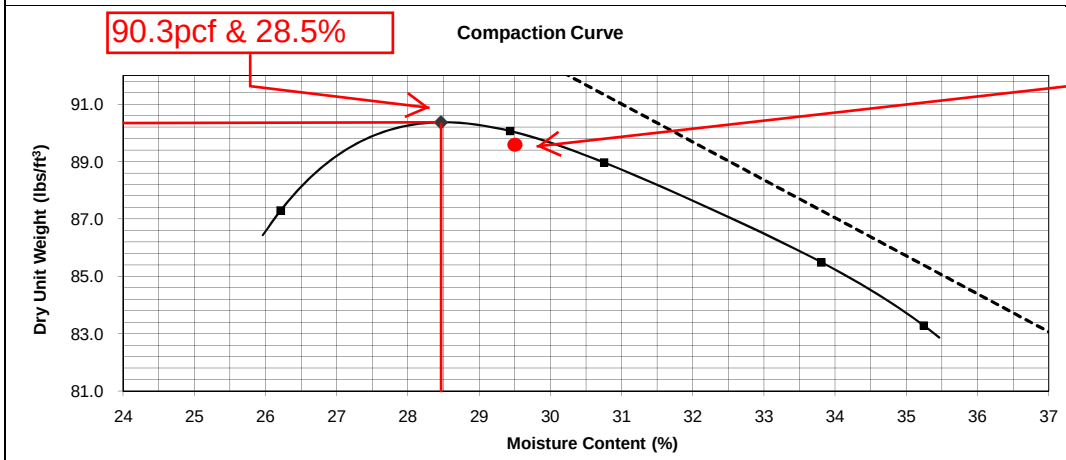
MVNQS02 W912P8-09-D-0046-0008 3184 B R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3185-1	**Test No**	132
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	South End	**Offset**	2500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02029	**Longitude (°W)**	90.605593	**Elevation (ft)**	-5.3		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	45.9		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3709.6	3806.3	3802.6	3773.3	3746.8		
Wet Soil Mass (g)	1664.1	1760.8	1757.1	1727.8	1701.3		
Wet Unit Weight (lbs/ft³)	110.2	116.6	116.3	114.4	112.6		
Tare No	70	21	53	12	29		
Tare Mass (g)	246.4	257.1	249.5	312.7	250.2		
Wet Soil + Tare Mass (g)	433.7	456.3	408.5	463.1	429.4		
Dry Soil + Tare Mass (g)	394.8	411.0	371.1	425.1	382.7		
Moisture Content (%)	**26.2**	**29.4**	**30.8**	**33.8**	**35.2**		
Dry Unit Weight (lbs/ft³)	**87.3**	**90.1**	**89.0**	**85.5**	**83.3**		



Proctor Test Results	
Proctor No	3185-132 CURVE 1
Optimum Moisture Content (%)	29.5
Max Dry Unit Weight (lbs/ft³)	89.6

Liquid And Plastic Limits	
Liquid Limit	74
Plastic Limit	23
Plasticity Index	51
Group Symbol	CH
Sand Content (Retained No 200) (%)	0.82
Fines (Minus No 200) (%)	99.18

Remarks	Sample Location: South End of Pit, 2500' from North Pit Limit	Avergae Max DD: 90.0 pcf / Average Optimum Moisture: 28.5 %M
Version	**MVNQS02-100907**	

Figure 7-36

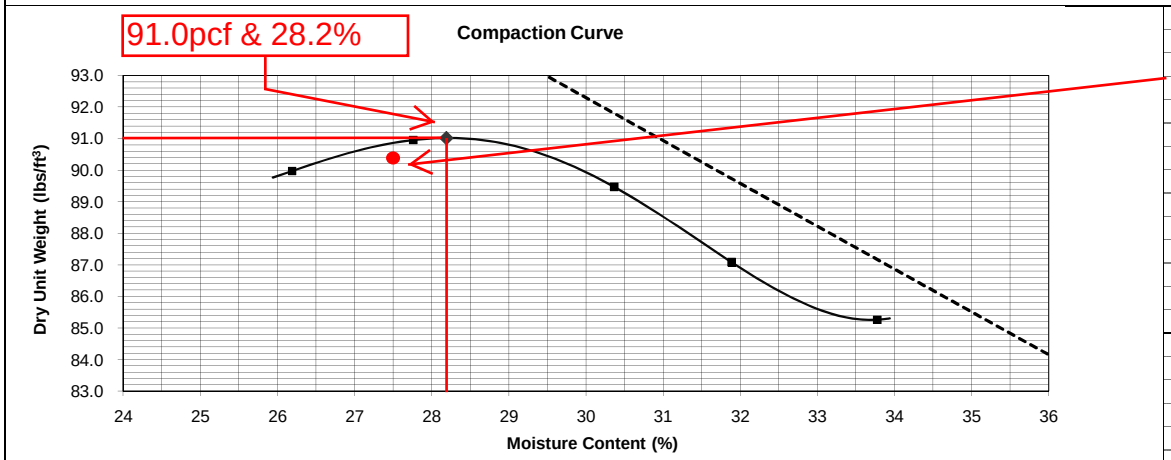
MVNQS02 W912P8-09-D-0046-0008 3185 A R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3185-2	**Test No**	132
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	South End	**Offset**	2500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02029	**Longitude (°W)**	90.605593	**Elevation (ft)**	-5.3		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	45.9		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3760.4	3800.7	3807.3	3780.4	3768.3		
Wet Soil Mass (g)	1714.9	1755.2	1761.8	1734.9	1722.8		
Wet Unit Weight (lbs/ft³)	113.5	116.2	116.6	114.9	114.1		
Tare No	35	14	78	2	71		
Tare Mass (g)	237.3	249.7	251.6	315.4	253.4		
Wet Soil + Tare Mass (g)	375.1	499.6	408.3	485.8	403.9		
Dry Soil + Tare Mass (g)	346.5	445.3	371.8	444.6	365.9		
Moisture Content (%)	**26.2**	**27.8**	**30.4**	**31.9**	**33.8**		
Dry Unit Weight (lbs/ft³)	**90.0**	**91.0**	**89.5**	**87.1**	**85.3**		



Proctor Test Results	
Proctor No	3185-132
Optimum Moisture Content (%)	27.5
Max Dry Unit Weight (lbs/ft³)	90.4

Liquid And Plastic Limits	
Liquid Limit	74
Plastic Limit	23
Plasticity Index	51
Group Symbol	CH
Sand Content (Retained No 200) (%)	0.82
Fines (Minus No 200) (%)	99.18

Remarks	Sample Location: South End of Pit, 2500' from North Pit Limit	Avergae Max DD: 90.0 pcf / Average Optimum Moisture: 28.5 %M
Version	**MVNQS02-100907**	

Figure 7-37

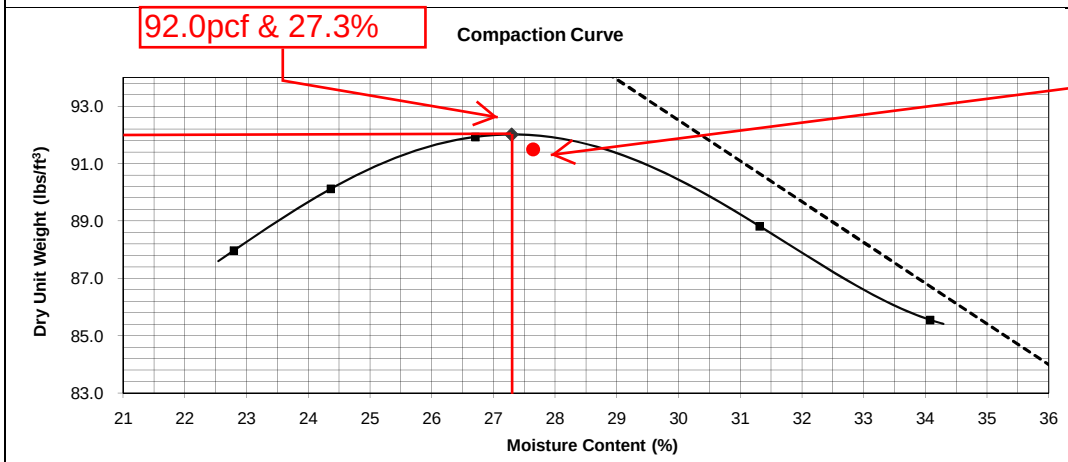
MVNQS02 W912P8-09-D-0046-0008 3185 B R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3186-1	**Test No**	133
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	South End	**Offset**	2500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02029	**Longitude (°W)**	90.605593	**Elevation (ft)**	-5.3		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	38.3		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3677.0	3738.3	3804.9	3807.1	3778.0		
Wet Soil Mass (g)	1631.5	1692.8	1759.4	1761.6	1732.5		
Wet Unit Weight (lbs/ft³)	108.0	112.1	116.5	116.6	114.7		
Tare No	27	38	16	5	9		
Tare Mass (g)	246.0	306.9	256.4	258.8	249.2		
Wet Soil + Tare Mass (g)	379.6	453.9	408.2	395.5	428.6		
Dry Soil + Tare Mass (g)	354.8	425.1	376.2	362.9	383.0		
Moisture Content (%)	**22.8**	**24.4**	**26.7**	**31.3**	**34.1**		
Dry Unit Weight (lbs/ft³)	**88.0**	**90.1**	**91.9**	**88.8**	**85.5**		



Proctor Test Results	
Proctor No	3186-133 CURVE 1
Optimum Moisture Content (%)	27.6
Max Dry Unit Weight (lbs/ft³)	91.5

Liquid And Plastic Limits	
Liquid Limit	67
Plastic Limit	23
Plasticity Index	44
Group Symbol	CH
Sand Content (Retained No 200) (%)	1.06
Fines (Minus No 200) (%)	98.94

Remarks	Sample Location: South End of Pit, 2500' from North Pit Limit	Avergae Max DD: 91.6 pcf / Average Optimum Moisture: 26.5 %M
Version	**MVNQS02-100907**	

Figure 7-38

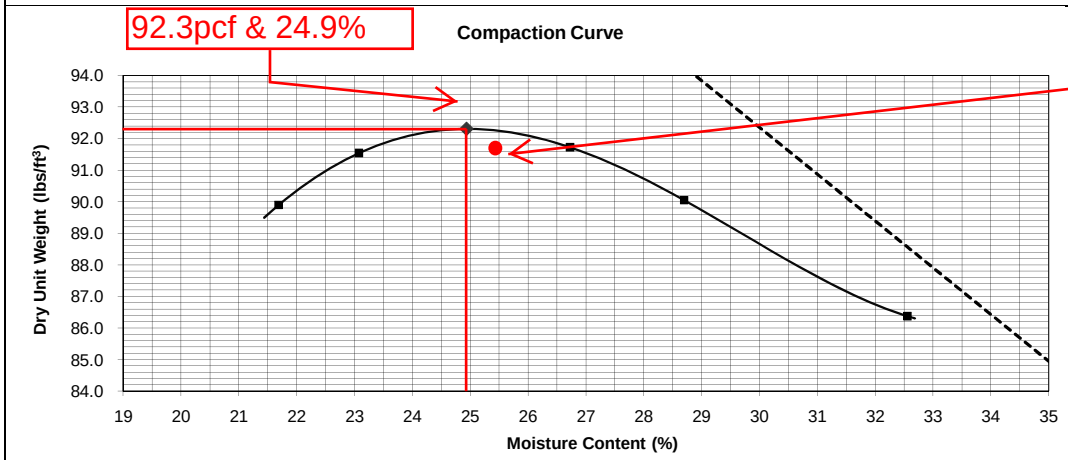
MVNQS02 W912P8-09-D-0046-0008 3186 A R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3186-2	**Test No**	133
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	7-Oct-10		
Material Source	Willow Bend	**Feature**	Levee Embankment	**Visual Description**	Brown and Gray Clay		
Station	South End	**Offset**	2500' from North Pit Limit	**Lift No**			
Latitude (°N)	30.02029	**Longitude (°W)**	90.605593	**Elevation (ft)**	-5.3		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	38.3		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	P. Grice	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**		
Mold No	S03	S03	S03	S03	S03		
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5		
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333		
Wet Soil + Mold Mass (g)	3697.8	3747.3	3801.3	3796.0	3774.9		
Wet Soil Mass (g)	1652.3	1701.8	1755.8	1750.5	1729.4		
Wet Unit Weight (lbs/ft³)	109.4	112.7	116.2	115.9	114.5		
Tare No	63	3	84	32	75		
Tare Mass (g)	243.9	246.7	256.8	315.4	249.8		
Wet Soil + Tare Mass (g)	375.2	437.1	398.1	461.6	341.0		
Dry Soil + Tare Mass (g)	351.8	401.4	368.3	429.0	318.6		
Moisture Content (%)	**21.7**	**23.1**	**26.7**	**28.7**	**32.6**		
Dry Unit Weight (lbs/ft³)	**89.9**	**91.5**	**91.7**	**90.0**	**86.4**		



Proctor Test Results	
Proctor No	3186-133 CURVE 2
Optimum Moisture Content (%)	25.4
Max Dry Unit Weight (lbs/ft³)	91.7

Liquid And Plastic Limits	
Liquid Limit	67
Plastic Limit	23
Plasticity Index	44
Group Symbol	CH
Sand Content (Retained No 200) (%)	1.06
Fines (Minus No 200) (%)	98.94

Remarks Sample Location: South End of Pit, 2500' from North Pit Limit Avergae Max DD: 91.6 pcf / Average Optimum Moisture: 26.5 %M

Version MVNQS02-100907

Figure 7-39

MVNQS02 W912P8-09-D-0046-0008 3186 B R1.xls

US Army Corps of Engineers

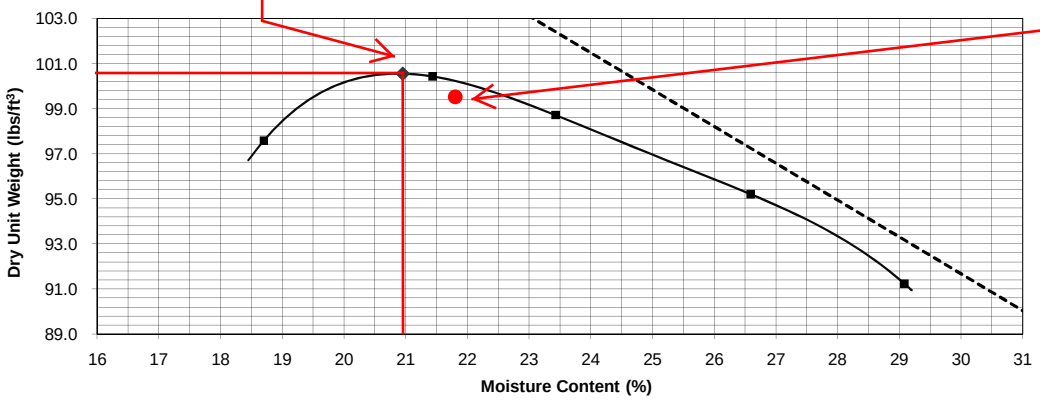
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3291-1	**Test No**	184
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	CONSTRUCTION	**Revision**	
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	10/29/2010		
Material Source	WILLOW BEND	**Feature**	Levee Embankment	**Visual Description**	GR. BR. CL.		
Station	169+80	**Offset**	ON-SITE MATERIAL	**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	21.4		
Compaction Hammer	Manual	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	RODNEY	**Reviewed By**	B. LANDERS	**Submitted By**	B. LANDERS		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.6	2016.6	2016.6	2016.6	2016.6
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3766.2	3858.7	3857.0	3837.0	3795.4
Wet Soil Mass (g)	1749.6	1842.1	1840.4	1820.4	1778.8
Wet Unit Weight (lbs/ft³)	115.8	122.0	121.8	120.5	117.8
Tare No	DT30	DT20	DT11	DT08	DT01
Tare Mass (g)	203.4	212.6	181.0	187.5	171.9
Wet Soil + Tare Mass (g)	554.4	470.9	428.6	487.9	424.9
Dry Soil + Tare Mass (g)	499.1	425.3	381.6	424.8	367.9
Moisture Content (%)	**18.7**	**21.4**	**23.4**	**26.6**	**29.1**
Dry Unit Weight (lbs/ft³)	**97.6**	**100.4**	**98.7**	**95.2**	**91.2**

100.6pcf & 21.0%

Compaction Curve



Proctor Test Results	
Proctor No	3291-184A
Optimum Moisture Content (%)	21.8
Max Dry Unit Weight (lbs/ft³)	99.5

Liquid And Plastic Limits	
Liquid Limit	64
Plastic Limit	22
Plasticity Index	42
Group Symbol	CH
Sand Content (Retained No 200) (%)	2.2
Fines (Minus No 200) (%)	97.8

Remarks	SAMPLE WAS COLLECTED FROM MATERIAL DELIVERED TO SITE	Avg. Curve 1 & 2; Max. Dry Unit Wt. = 99.5 Lbs/cf; Optimum Moisture= 21.9 %
Version	**MVNQS02-100907**	

Figure 7-40

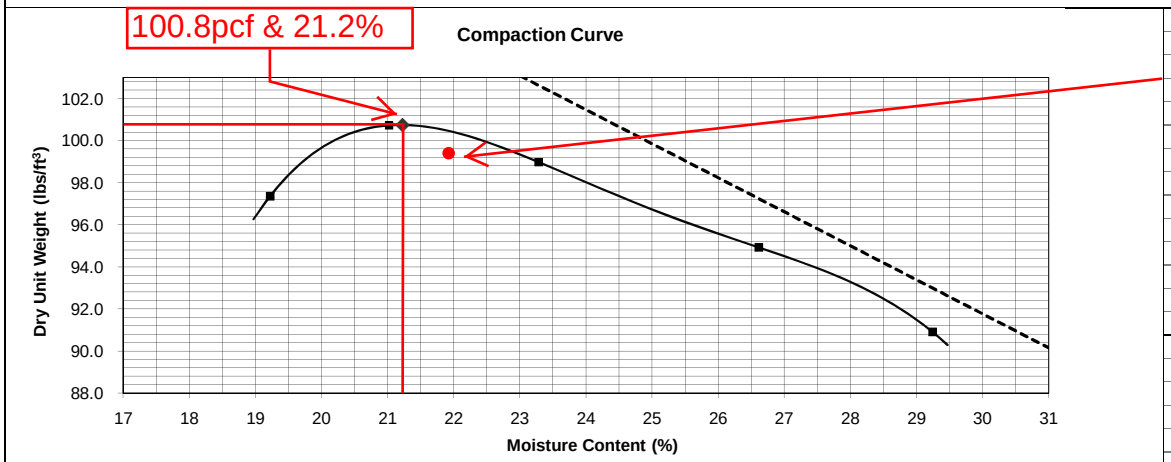
MVNQS02 W912P8-09-D-0046-0008 3291-184A.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3291-2	**Test No**	184
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	CONSTRUCTION	**Revision**	
Project	WBV-14C.2 Phase 2, First Lift			**Sample Date**	10/29/2010		
Material Source	WILLOW BEND	**Feature**	Levee Embankment	**Visual Description**	GR. BR. CL.		
Station	169+80	**Offset**	ON-SITE MATERIAL	**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	21.4		
Compaction Hammer	Manual	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	RODNEY	**Reviewed By**	B. LANDERS	**Submitted By**	B. LANDERS		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.6	2016.6	2016.6	2016.6	2016.6
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3769.8	3857.8	3859.7	3831.9	3791.2
Wet Soil Mass (g)	1753.2	1841.2	1843.1	1815.3	1774.6
Wet Unit Weight (lbs/ft³)	116.1	121.9	122.0	120.2	117.5
Tare No	DT45	DT25	DT47	DT04	DT21
Tare Mass (g)	177.2	205.7	178.1	233.5	211.6
Wet Soil + Tare Mass (g)	422.8	499.3	386.7	568.4	456.0
Dry Soil + Tare Mass (g)	383.2	448.3	347.3	498.0	400.7
Moisture Content (%)	**19.2**	**21.0**	**23.3**	**26.6**	**29.2**
Dry Unit Weight (lbs/ft³)	**97.4**	**100.7**	**99.0**	**94.9**	**90.9**



Proctor Test Results	
Proctor No	3291-184B
Optimum Moisture Content (%)	21.9
Max Dry Unit Weight (lbs/ft³)	99.4

Liquid And Plastic Limits	
Liquid Limit	64
Plastic Limit	22
Plasticity Index	42
Group Symbol	CH
Sand Content (Retained No 200) (%)	2.2
Fines (Minus No 200) (%)	97.8

Remarks	SAMPLE WAS COLLECTED FROM MATERIAL DELIVERED TO SITE	Avg. Curve 1 & 2; Max. Dry Unit Wt. = 99.5 Lbs/cf; Optimum Moisture= 21.9 %
Version	**MVNQS02-100907**	

Figure 7-41

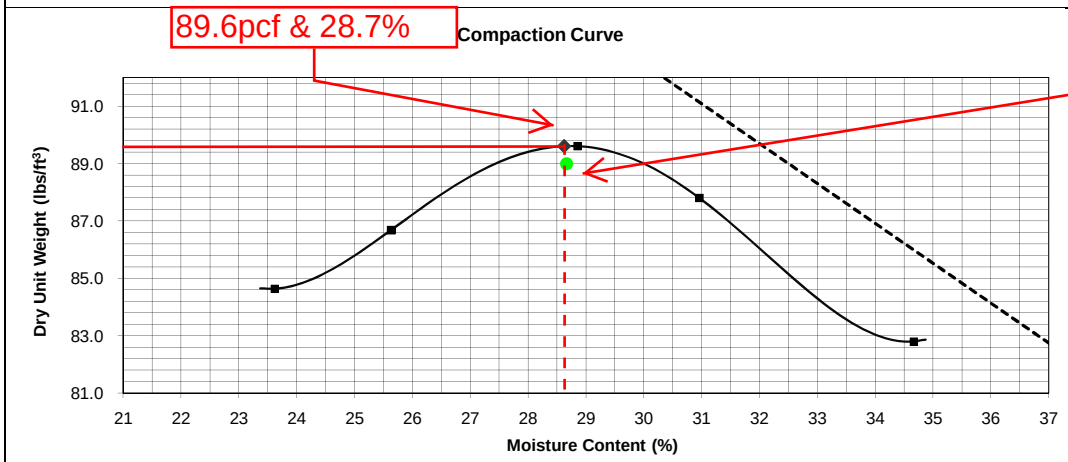
MVNQS02 W912P8-09-D-0046-0008 3291-184B.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3462	**Test No**	307 A
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway, Inc.	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	11/30/2010		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	G. BR. CLAY		
Station	18+00	**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	31		
Compaction Hammer	Manual	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	RODNEY FISHER	**Reviewed By**	B. LANDERS	**Submitted By**	B. LANDERS		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.6	2016.6	2016.6	2016.6	2016.6
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3596.9	3661.5	3760.6	3753.4	3700.7
Wet Soil Mass (g)	1580.3	1644.9	1744.0	1736.8	1684.1
Wet Unit Weight (lbs/ft³)	104.6	108.9	115.5	115.0	111.5
Tare No	dt45	dt47	dt49	dt46	dt50
Tare Mass (g)	177.2	178.1	176.4	177.9	180.7
Wet Soil + Tare Mass (g)	397.0	415.8	615.8	413.5	449.5
Dry Soil + Tare Mass (g)	355.0	367.3	517.4	357.8	380.3
Moisture Content (%)	**23.6**	**25.6**	**28.9**	**31.0**	**34.7**
Dry Unit Weight (lbs/ft³)	**84.6**	**86.7**	**89.6**	**87.8**	**82.8**



Proctor Test Results	
Proctor No	3462-307
Optimum Moisture Content (%)	28.7
Max Dry Unit Weight (lbs/ft³)	89.0

Liquid And Plastic Limits	
Liquid Limit	65
Plastic Limit	23
Plasticity Index	42
Group Symbol	CH
Sand Content (Retained No 200) (%)	5.5
Fines (Minus No 200) (%)	94.5

Remarks	Avergae Max DD: 89.1 pcf / Average Optimum Moisture: 28.8 %M	
Version	**MVNQS02-100907**	

Figure 7-42

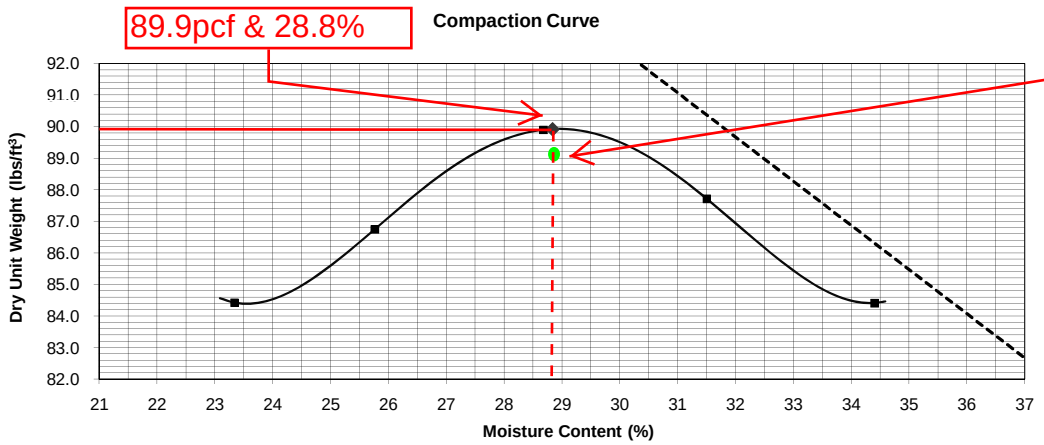
MVNQS02 W912P8-09-D-0046-0008 3462 307 A.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3462	**Test No**	307 B
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway, Inc.	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	11/30/2010		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	G. BR. CL.		
Station	18+00	**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	31		
Compaction Hammer	Manual	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	RODNEY FISHER	**Reviewed By**	B. LANDERS	**Submitted By**	B. LANDERS		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.6	2016.6	2016.6	2016.6	2016.6
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3589.3	3664.4	3763.9	3758.8	3730.2
Wet Soil Mass (g)	1572.7	1647.8	1747.3	1742.2	1713.6
Wet Unit Weight (lbs/ft³)	104.1	109.1	115.7	115.3	113.4
Tare No	DT25	DT30	DT21	DT48	DT41
Tare Mass (g)	205.7	203.3	211.6	183.5	178.0
Wet Soil + Tare Mass (g)	475.2	532.3	547.2	447.3	561.6
Dry Soil + Tare Mass (g)	424.2	464.9	472.4	384.1	463.4
Moisture Content (%)	**23.3**	**25.8**	**28.7**	**31.5**	**34.4**
Dry Unit Weight (lbs/ft³)	**84.4**	**86.7**	**89.9**	**87.7**	**84.4**



Proctor Test Results

Proctor No	3462-307
Optimum Moisture Content (%)	28.9
Max Dry Unit Weight (lbs/ft³)	89.1

Liquid And Plastic Limits

Liquid Limit	65
Plastic Limit	23
Plasticity Index	42
Group Symbol	CH
Sand Content (Retained No 200) (%)	5.5
Fines (Minus No 200) (%)	94.5

Remarks	Avergae Max DD: 89.1 pcf / Average Optimum Moisture: 28.8 %M
Version	**MVNQS02-100907**

Figure 7-43

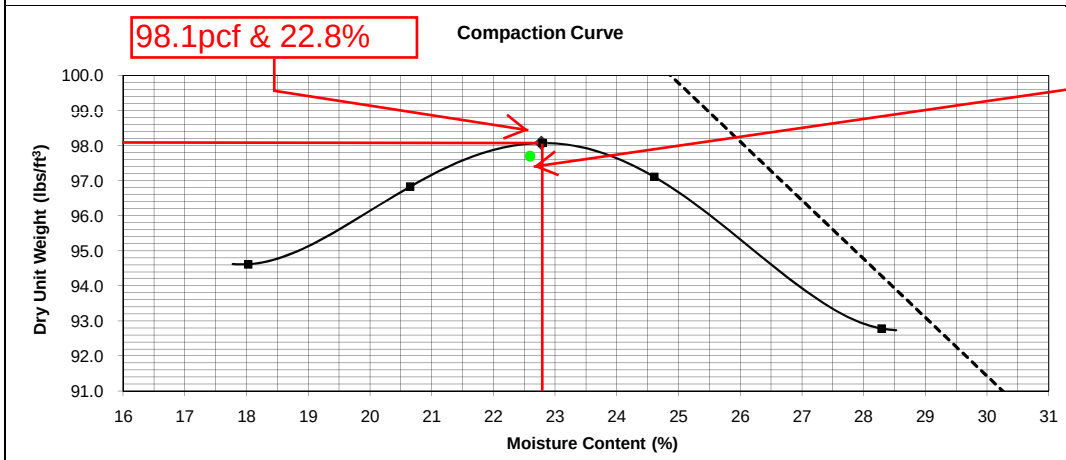
MVNQS02 W912P8-09-D-0046-0008 3462 307 B.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3467	**Test No**	308 A
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway, Inc.	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	12/1/2010		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	G. BR. CLAY		
Station	41+50	**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	24.8		
Compaction Hammer	Manual	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	RODNEY FISHER	**Reviewed By**	B. LANDERS	**Submitted By**	B. LANDERS		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.6	2016.6	2016.6	2016.6	2016.6
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3703.4	3781.3	3835.7	3844.4	3814.5
Wet Soil Mass (g)	1686.8	1764.7	1819.1	1827.8	1797.9
Wet Unit Weight (lbs/ft³)	111.7	116.8	120.4	121.0	119.0
Tare No	dt46	dt02	dt04	dt31	dt40
Tare Mass (g)	177.8	178.9	233.4	211.0	176.2
Wet Soil + Tare Mass (g)	456.7	437.7	630.4	578.6	456.9
Dry Soil + Tare Mass (g)	414.1	393.4	556.7	506.0	395.0
Moisture Content (%)	**18.0**	**20.7**	**22.8**	**24.6**	**28.3**
Dry Unit Weight (lbs/ft³)	**94.6**	**96.8**	**98.1**	**97.1**	**92.8**



Proctor Test Results	
Proctor No	3467-308
Optimum Moisture Content (%)	22.6
Max Dry Unit Weight (lbs/ft³)	97.7

Liquid And Plastic Limits	
Liquid Limit	55
Plastic Limit	20
Plasticity Index	35
Group Symbol	CH
Sand Content (Retained No 200) (%)	8.3
Fines (Minus No 200) (%)	91.7

Remarks	Avergae Max DD: 97.8pcf / Average Optimum Moisture: 22.6 %M
Version	**MVNQS02-100907**

Figure 7-44

MVNQS02 W912P8-09-D-0046-0008 3467 308 A.xls

US Army Corps of Engineers

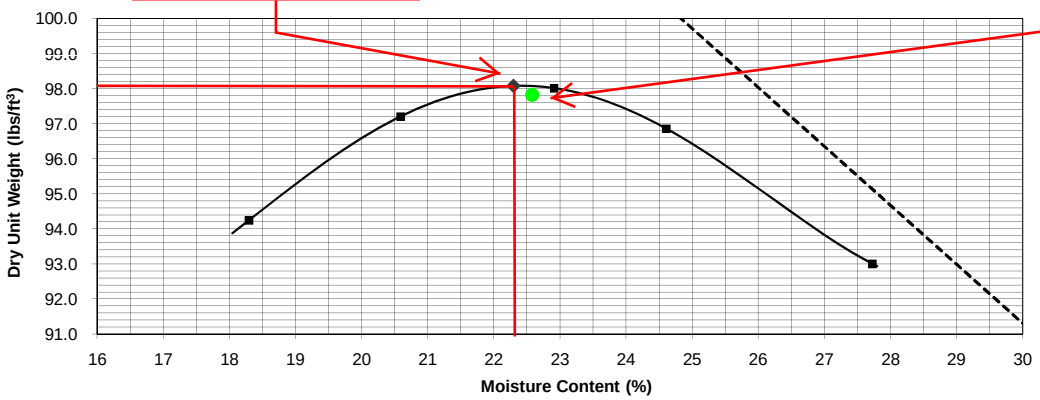
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3467	**Test No**	308 B
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway, Inc.	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	12/1/2010		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	G. BR. CL.		
Station	41+50	**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	24.8		
Compaction Hammer	Manual	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	RODNEY FISHER	**Reviewed By**	B. LANDERS	**Submitted By**	B. LANDERS		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.6	2016.6	2016.6	2016.6	2016.6
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3700.5	3787.1	3836.2	3839.6	3810.8
Wet Soil Mass (g)	1683.9	1770.5	1819.6	1823.0	1794.2
Wet Unit Weight (lbs/ft³)	111.5	117.2	120.5	120.7	118.8
Tare No	DT08	DT51	DT24	DT27	DT11
Tare Mass (g)	187.4	140.1	206.4	209.6	181.0
Wet Soil + Tare Mass (g)	412.4	344.5	469.8	503.8	450.5
Dry Soil + Tare Mass (g)	377.6	309.6	420.7	445.7	392.0
Moisture Content (%)	**18.3**	**20.6**	**22.9**	**24.6**	**27.7**
Dry Unit Weight (lbs/ft³)	**94.2**	**97.2**	**98.0**	**96.9**	**93.0**

98.1pcf & 22.3%

Compaction Curve



Proctor Test Results	
Proctor No	3467-308
Optimum Moisture Content (%)	22.6
Max Dry Unit Weight (lbs/ft³)	97.8

Liquid And Plastic Limits	
Liquid Limit	55
Plastic Limit	20
Plasticity Index	35
Group Symbol	CH
Sand Content (Retained No 200) (%)	8.3
Fines (Minus No 200) (%)	91.7

Remarks	Avergae Max DD: 97.8pcf / Average Optimum Moisture: 22.6 %M
Version	**MVNQS02-100907**

Figure 7-45

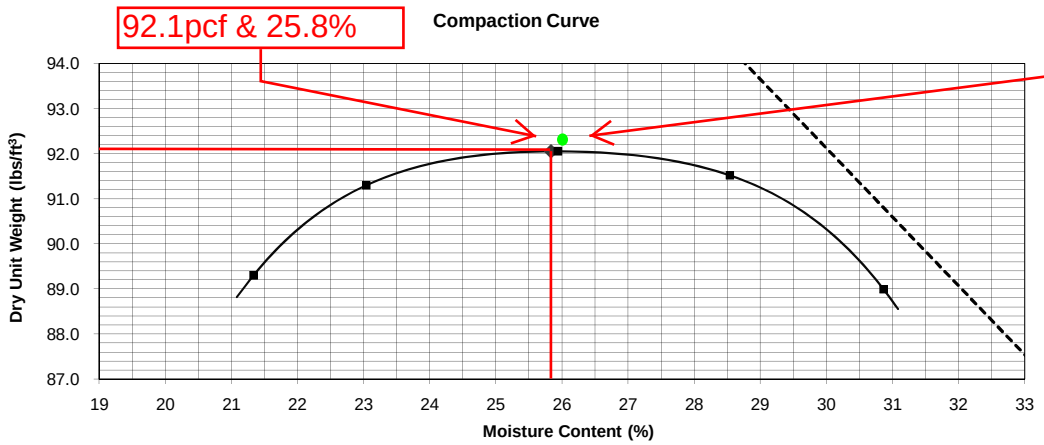
MVNQS02 W912P8-09-D-0046-0008 3467 308 B.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3550	**Test No**	352A
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway, Inc.	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	12/14/2010		
Material Source	Jobsite	**Feature**	Levee Embankment	**Visual Description**	BR. CLAY		
Station	149+90	**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	28.6		
Compaction Hammer	Manual	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	RODNEY FISHER	**Reviewed By**	B. LANDERS	**Submitted By**	B. LANDERS		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.6	2016.6	2016.6	2016.6	2016.6
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3653.2	3713.4	3767.7	3793.5	3775.7
Wet Soil Mass (g)	1636.6	1696.8	1751.1	1776.9	1759.1
Wet Unit Weight (lbs/ft³)	108.4	112.3	115.9	117.6	116.5
Tare No	DT30	DT08	DT27	DT43	DT31
Tare Mass (g)	203.4	187.5	209.7	179.9	211.0
Wet Soil + Tare Mass (g)	507.1	503.1	565.6	547.4	598.1
Dry Soil + Tare Mass (g)	453.7	444.0	492.3	465.8	506.8
Moisture Content (%)	**21.3**	**23.0**	**25.9**	**28.5**	**30.9**
Dry Unit Weight (lbs/ft³)	**89.3**	**91.3**	**92.1**	**91.5**	**89.0**



Proctor Test Results	
Proctor No	3550
Optimum Moisture Content (%)	26.0
Max Dry Unit Weight (lbs/ft³)	92.3

Liquid And Plastic Limits	
Liquid Limit	63
Plastic Limit	19
Plasticity Index	44
Group Symbol	CH
Sand Content (Retained No 200) (%)	5
Fines (Minus No 200) (%)	95

Remarks	Avergae Max DD: 92.3pcf / Average Optimum Moisture: 26.0%M	PROCTOR PULLED FROM EXISTING LEVEE 149+90
Version	**MVNQS02-100907**	

Figure 7-46

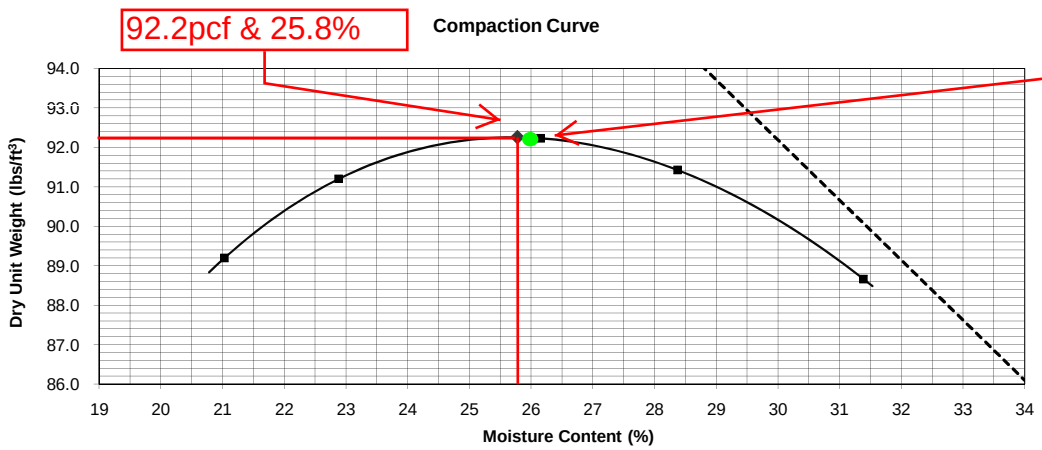
MVNQS02 W912P8-09-D-0046-0008 3550 352 A.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3550	**Test No**	352B
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway, Inc.	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	12/14/2010		
Material Source	Jobsite	**Feature**	Levee Embankment	**Visual Description**	BR. CL.		
Station	149+90	**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	28.6		
Compaction Hammer	Manual	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	RODNEY FISHER	**Reviewed By**	B. LANDERS	**Submitted By**	B. LANDERS		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.6	2016.6	2016.6	2016.6	2016.6
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3647.2	3709.4	3774.1	3789.4	3776.1
Wet Soil Mass (g)	1630.6	1692.8	1757.5	1772.8	1759.5
Wet Unit Weight (lbs/ft³)	108.0	112.1	116.4	117.4	116.5
Tare No	DT25	DT04	DT49	DT40	DT14
Tare Mass (g)	205.7	233.5	176.4	176.4	245.0
Wet Soil + Tare Mass (g)	572.3	500.4	588.8	621.6	508.3
Dry Soil + Tare Mass (g)	508.6	450.7	503.3	523.2	445.4
Moisture Content (%)	**21.0**	**22.9**	**26.2**	**28.4**	**31.4**
Dry Unit Weight (lbs/ft³)	**89.2**	**91.2**	**92.2**	**91.4**	**88.7**



Proctor Test Results	
Proctor No	3550
Optimum Moisture Content (%)	26.0
Max Dry Unit Weight (lbs/ft³)	92.2

Liquid And Plastic Limits	
Liquid Limit	63
Plastic Limit	19
Plasticity Index	44
Group Symbol	CH
Sand Content (Retained No 200) (%)	5
Fines (Minus No 200) (%)	95

Remarks	Avergae Max DD: 92.3pcf / Average Optimum Moisture: 26.0 %M	PROCTOR PULLED FROM EXISTING LEVEE 149+90
Version	**MVNQS02-100907**	

Figure 7-47

MVNQS02 W912P8-09-D-0046-0008 3550 352 B.xls

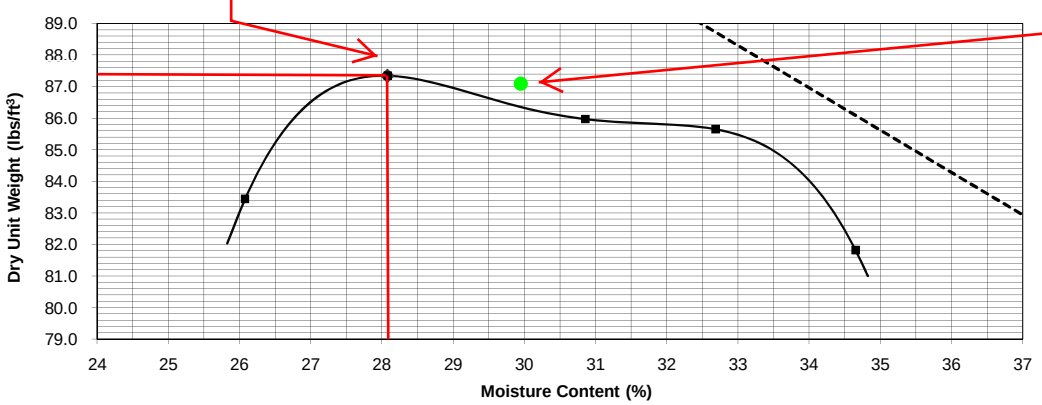
US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3555	**Test No**	353A
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway, Inc.	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	12/14/2010		
Material Source	Jobsite	**Feature**	Levee Embankment	**Visual Description**	BR. CLAY		
Station	174+90	**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	33.5		
Compaction Hammer	Manual	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	RODNEY FISHER	**Reviewed By**	B. LANDERS	**Submitted By**	B. LANDERS		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.6	2016.6	2016.6	2016.6	2016.6
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3605.6	3706.4	3715.9	3733.2	3680.7
Wet Soil Mass (g)	1589.0	1689.8	1699.3	1716.6	1664.1
Wet Unit Weight (lbs/ft³)	105.2	111.9	112.5	113.6	110.2
Tare No	DT01	DT20	DT43	DT25	DT24
Tare Mass (g)	171.9	212.7	179.9	205.7	206.5
Wet Soil + Tare Mass (g)	412.2	537.9	453.0	424.1	566.7
Dry Soil + Tare Mass (g)	362.5	466.6	388.6	370.3	474.0
Moisture Content (%)	**26.1**	**28.1**	**30.9**	**32.7**	**34.7**
Dry Unit Weight (lbs/ft³)	**83.4**	**87.3**	**86.0**	**85.7**	**81.8**

87.3pcf & 28.1%



Proctor Test Results	
Proctor No	3555
Optimum Moisture Content (%)	29.9
Max Dry Unit Weight (lbs/ft³)	87.1

Liquid And Plastic Limits	
Liquid Limit	78
Plastic Limit	28
Plasticity Index	50
Group Symbol	CH
Sand Content (Retained No 200) (%)	5.9
Fines (Minus No 200) (%)	94.1

Remarks	Avergae Max DD: 86.6pcf / Average Optimum Moisture: 30.0%M	PROCTOR PULLED FROM EXISTING LEVEE 174+90
Version	**MVNQS02-100907**	

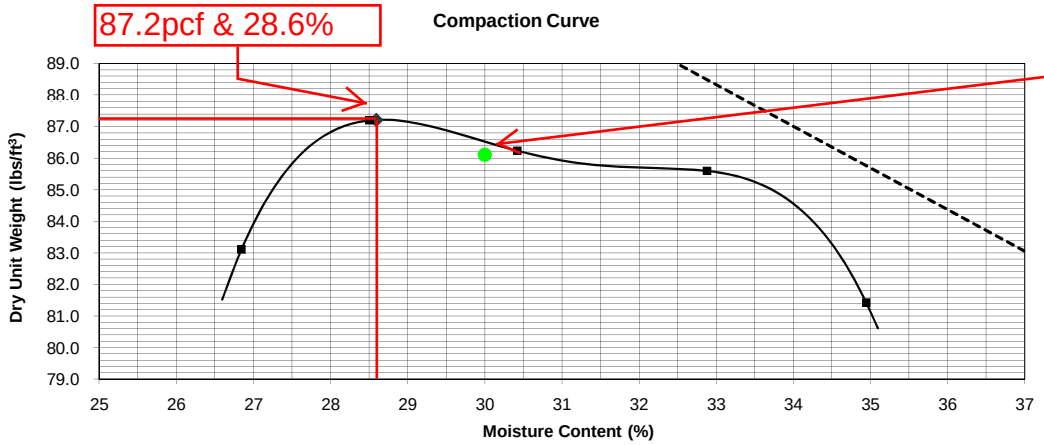
Figure 7-48

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Tolunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3555	**Test No**	353B
USACE Contract No	W912P8-09-D-0046-0008			**Contractor**	Phylway, Inc.	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	12/14/2010		
Material Source	Jobsite	**Feature**	Levee Embankment	**Visual Description**	BR. CL.		
Station	174+90	**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	33.5		
Compaction Hammer	Manual	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	RODNEY FISHER	**Reviewed By**	B. LANDERS	**Submitted By**	B. LANDERS		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.6	2016.6	2016.6	2016.6	2016.6
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3608.9	3709.1	3715.4	3734.6	3676.3
Wet Soil Mass (g)	1592.3	1692.5	1698.8	1718.0	1659.7
Wet Unit Weight (lbs/ft³)	105.4	112.1	112.5	113.7	109.9
Tare No	DT41	DT42	DT31	DT40	DT02
Tare Mass (g)	178.1	178.3	211.0	176.2	179.0
Wet Soil + Tare Mass (g)	434.2	422.2	448.5	440.9	522.3
Dry Soil + Tare Mass (g)	380.0	368.1	393.1	375.4	433.4
Moisture Content (%)	**26.8**	**28.5**	**30.4**	**32.9**	**34.9**
Dry Unit Weight (lbs/ft³)	**83.1**	**87.2**	**86.2**	**85.6**	**81.4**



Proctor Test Results	
Proctor No	3555
Optimum Moisture Content (%)	30.0
Max Dry Unit Weight (lbs/ft³)	86.1

Liquid And Plastic Limits	
Liquid Limit	78
Plastic Limit	28
Plasticity Index	50
Group Symbol	CH
Sand Content (Retained No 200) (%)	5.9
Fines (Minus No 200) (%)	94.1

Remarks	Avergae Max DD: 86.6pcf / Average Optimum Moisture: 30.0%M	PROCTOR PULLED FROM EXISTING LEVEE 174+90
Version	**MVNQS02-100907**	

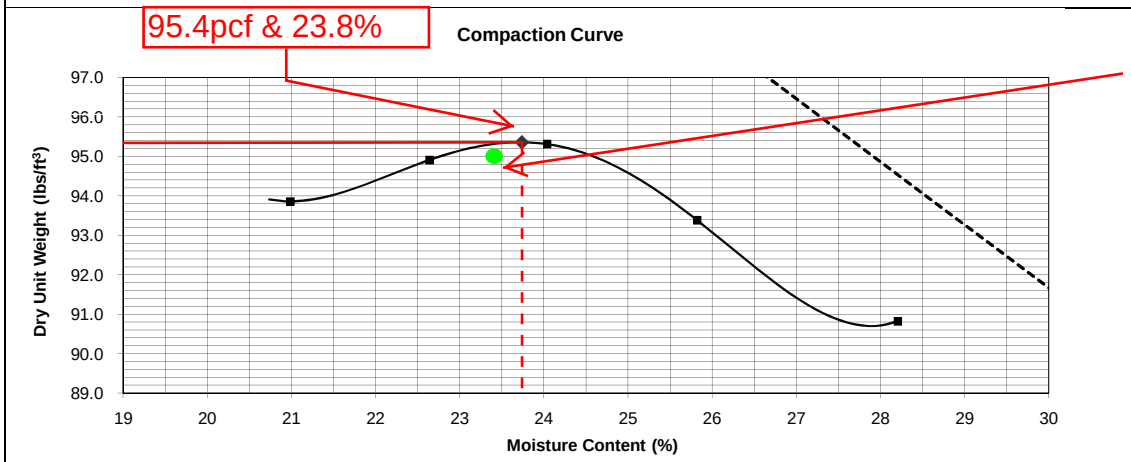
Figure 7-49

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3616	**Test No**	361A
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	12/20/2010		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	BR. GR. CL.		
Station		**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	29.5		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	S03	S03	S03	S03	S03
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3760.7	3803.6	3831.2	3820.2	3804.2
Wet Soil Mass (g)	1715.2	1758.1	1785.7	1774.7	1758.7
Wet Unit Weight (lbs/ft³)	113.6	116.4	118.2	117.5	116.4
Tare No	53	35	31	26	78
Tare Mass (g)	249.5	237.4	251.3	244.5	251.5
Wet Soil + Tare Mass (g)	357.3	354.4	377.2	366.8	402.4
Dry Soil + Tare Mass (g)	338.6	332.8	352.8	341.7	369.2
Moisture Content (%)	**21.0**	**22.6**	**24.0**	**25.8**	**28.2**
Dry Unit Weight (lbs/ft³)	**93.9**	**94.9**	**95.3**	**93.4**	**90.8**



Proctor Test Results	
Proctor No	3616
Optimum Moisture Content (%)	23.4
Max Dry Unit Weight (lbs/ft³)	95.0

Liquid And Plastic Limits	
Liquid Limit	54
Plastic Limit	23
Plasticity Index	31
Group Symbol	CH
Sand Content (Retained No 200) (%)	5.2
Fines (Minus No 200) (%)	94.8

Remarks	Avergae Max DD: 95.5pcf / Average Optimum Moisture: 24.0%M	SAMPLE COLLECTED FROM RIVER BURCH PIT EAST STOCKPILE
Version	**MVNQS02-101130**	

Figure 7-50

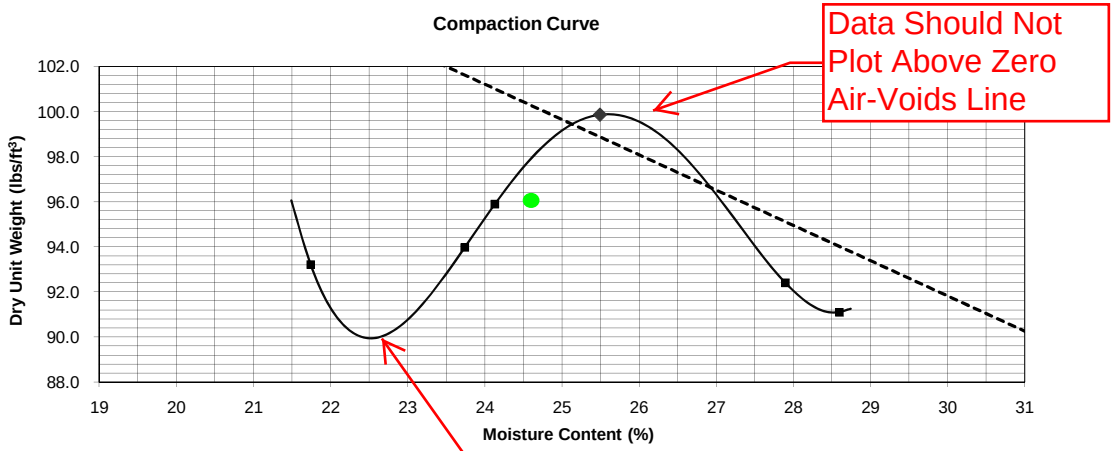
MVNQS02 W912P8-09-D-0046 0008 3616A.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3616	**Test No**	361B
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	12/20/2010		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	BR. G. CL.		
Station		**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	29.5		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	S03	S03	S03	S03	S03
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3759.5	3801.8	3843.5	3830.5	3814.8
Wet Soil Mass (g)	1714.0	1756.3	1798.0	1785.0	1769.3
Wet Unit Weight (lbs/ft³)	113.5	116.3	119.0	118.2	117.1
Tare No	9	41	51	57	38
Tare Mass (g)	305.8	259.3	260.7	261.5	258.9
Wet Soil + Tare Mass (g)	444.1	359.9	385.7	421.5	394.7
Dry Soil + Tare Mass (g)	419.4	340.6	361.4	386.6	364.5
Moisture Content (%)	**21.7**	**23.7**	**24.1**	**27.9**	**28.6**
Dry Unit Weight (lbs/ft³)	**93.2**	**94.0**	**95.9**	**92.4**	**91.1**



Data Should Not Plot Above Zero Air-Voids Line

Proctor Test Results	
Proctor No	3616
Optimum Moisture Content (%)	24.6
Max Dry Unit Weight (lbs/ft³)	96.0

Liquid And Plastic Limits	
Liquid Limit	54
Plastic Limit	23
Plasticity Index	31
Group Symbol	CH
Sand Content (Retained No 200) (%)	5.2
Fines (Minus No 200) (%)	94.8

Remarks	Avergae Max DD: 95.5pcf / Average Optimum Moisture: 24.0%M	SAMPLE COLLECTED FROM RIVER BURCH PIT EAST STOCKPILE
Version	**MVNQS02-101130**	

Dip in Graph Should not Occur

Data Suspect due to Errors noted above. - Max Density and Opt Moisture Cannot be Determined

Figure 7-51

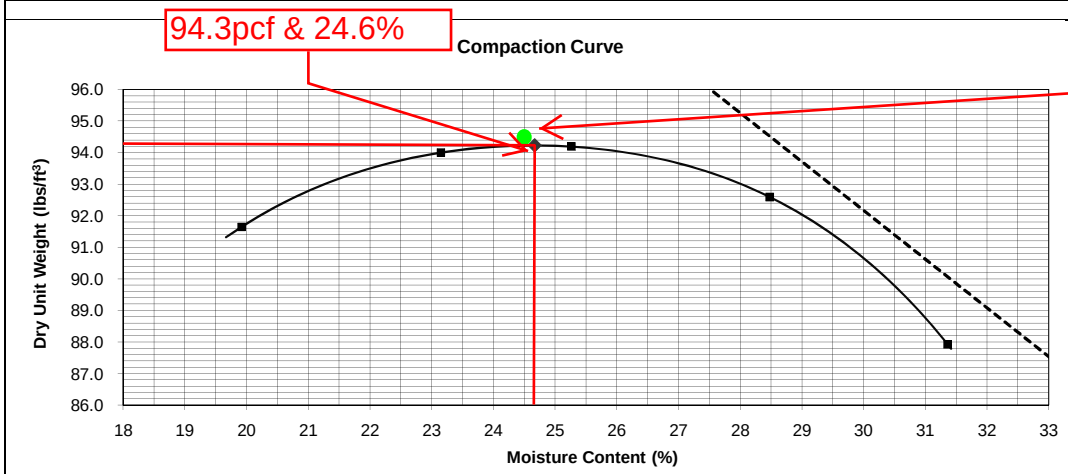
MVNQS02 W912P8-09-D-0046 0008 3616B.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3649	**Test No**	362A
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	12/20/2010		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	G. BR. CL.		
Station		**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	27.5		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	S03	S03	S03	S03	S03
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3705.5	3794.0	3827.7	3842.4	3790.0
Wet Soil Mass (g)	1660.0	1748.5	1782.2	1796.9	1744.5
Wet Unit Weight (lbs/ft³)	109.9	115.8	118.0	119.0	115.5
Tare No	75	20	66	1	70
Tare Mass (g)	243.9	251.1	246.0	321.3	246.3
Wet Soil + Tare Mass (g)	422.7	342.6	399.7	461.6	406.3
Dry Soil + Tare Mass (g)	393.0	325.4	368.7	430.5	368.1
Moisture Content (%)	**19.9**	**23.1**	**25.3**	**28.5**	**31.4**
Dry Unit Weight (lbs/ft³)	**91.6**	**94.0**	**94.2**	**92.6**	**87.9**



Proctor Test Results	
Proctor No	3649
Optimum Moisture Content (%)	24.5
Max Dry Unit Weight (lbs/ft³)	94.5

Liquid And Plastic Limits	
Liquid Limit	59
Plastic Limit	23
Plasticity Index	36
Group Symbol	CH
Sand Content (Retained No 200) (%)	6
Fines (Minus No 200) (%)	94

Remarks	Avergae Max DD: 94.8pcf / Average Optimum Moisture: 24.1 %M	SAMPLE COLLECTED FROM RIVER BURCH PIT WEST STOCKPILE
Version	**MVNQS02-101130**	

Figure 7-52

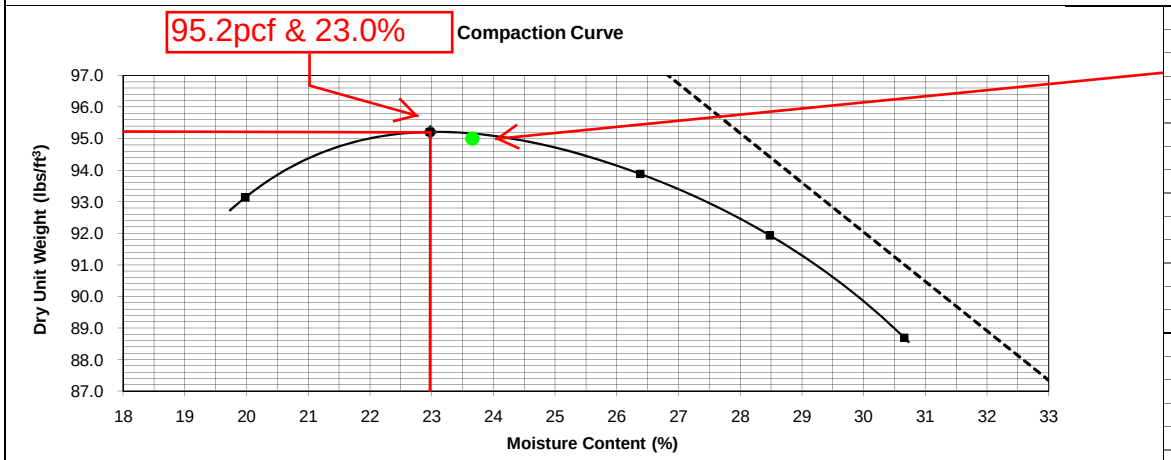
MVNQS02 W912P8-09-D-0046 0008 3649A R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3649	**Test No**	362B
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	12/20/2010		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	G. BR. CL		
Station		**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	27.5		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	S03	S03	S03	S03	S03
Mold Mass (g)	2045.5	2045.5	2045.5	2045.5	2045.5
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3733.3	3813.9	3837.6	3829.6	3795.8
Wet Soil Mass (g)	1687.8	1768.4	1792.1	1784.1	1750.3
Wet Unit Weight (lbs/ft³)	111.7	117.1	118.6	118.1	115.9
Tare No	16	18	8	60	55
Tare Mass (g)	249.1	254.8	313.3	256.8	252.8
Wet Soil + Tare Mass (g)	364.4	397.2	448.4	420.1	371.7
Dry Soil + Tare Mass (g)	345.2	370.6	420.2	383.9	343.8
Moisture Content (%)	**20.0**	**23.0**	**26.4**	**28.5**	**30.7**
Dry Unit Weight (lbs/ft³)	**93.1**	**95.2**	**93.9**	**91.9**	**88.7**



Proctor Test Results

Proctor No	3649
Optimum Moisture Content (%)	23.7
Max Dry Unit Weight (lbs/ft³)	95.0

Liquid And Plastic Limits

Liquid Limit	59
Plastic Limit	23
Plasticity Index	36
Group Symbol	CH
Sand Content (Retained No 200) (%)	6
Fines (Minus No 200) (%)	94

Remarks	Avergae Max DD: 94.8pcf / Average Optimum Moisture: 24.1 %M	SAMPLE COLLECTED FROM RIVER BURCH PIT WEST STOCKPILE
Version	**MVNQS02-101130**	

Figure 7-53

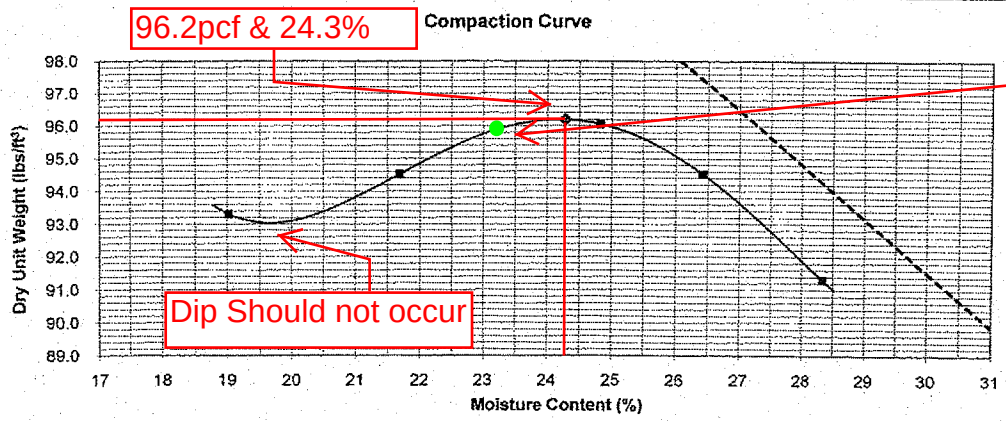
MVNQS02 W912P8-09-D-0046 0008 3649B R1.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	Lab Type	QC	Report No	3745	Test No	365A
USACE Contract No	W912P8-09-D-0046 0008			Contractor	Phylway Construction	Revision	
Project	WBV-14c.2 Phase 2, First Lift			Sample Date	1/13/2011		
Material Source	Borrow Pit	Feature	Levee Embankment	Visual Description	GR. BR. CL.		
Station	27+49	Offset	F.S. +59	Lift No	1		
Latitude (°N)	29.887629	Longitude (°W)	90.147345	Elevation (ft)	[illegible]		
Test Method	ASTM D698-A	Preparation Method	Moist	Received Moisture Content (%)	28.9		
Compaction Hammer	Mechanical	Specific Gravity	2.65	Specific Gravity Method	Estimated		
Retained - No 4 Sieve (%)		Retained - 3/8" Sieve (%)		ASTM D 3718 Correction	No		
Retained - 3/4" Sieve (%)				Test Result	Pass		
Lab Tested By	C. Willis	Reviewed By	B. Landers	Submitted By	B. Landers		

Trial No	1	2	3	4	5
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.4	2016.4	2016.4	2016.4	2016.4
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3693.8	3753.7	3827.4	3821.4	3786.4
Wet Soil Mass (g)	1677.4	1737.3	1811.0	1805.0	1770.0
Wet Unit Weight (lbs/ft³)	111.1	115.0	119.9	119.5	117.2
Tare No	DT40	DT42	DT24	DT41	DT01
Tare Mass (g)	176.3	178.3	206.4	178.0	171.8
Wet Soil + Tare Mass (g)	415.3	434.2	493.5	395.7	436.3
Dry Soil + Tare Mass (g)	377.1	388.6	436.4	350.2	377.9
Moisture Content (%)	19.0	21.7	24.8	26.4	28.3
Dry Unit Weight (lbs/ft³)	93.3	94.5	96.1	94.5	91.3



Proctor Test Results	
Proctor No	3745
Optimum Moisture Content (%)	23.2
Max Dry Unit Weight (lbs/ft³)	95.9

Liquid And Plastic Limits	
Liquid Limit	63
Plastic Limit	21
Plasticity Index	42
Group Symbol	CH
Sand Content (Retained No 200) (%)	8.1
Fines (Minus No 200) (%)	91.9

Remarks	Avergae Max DD: 95.8pcf / Average Optimum Moisture: 23.5 %M On-Site From Creek
Version	MVNQS02-101130

Figure 7-54

MVNQS02 W912P8-09-D-0046 0008 3745A

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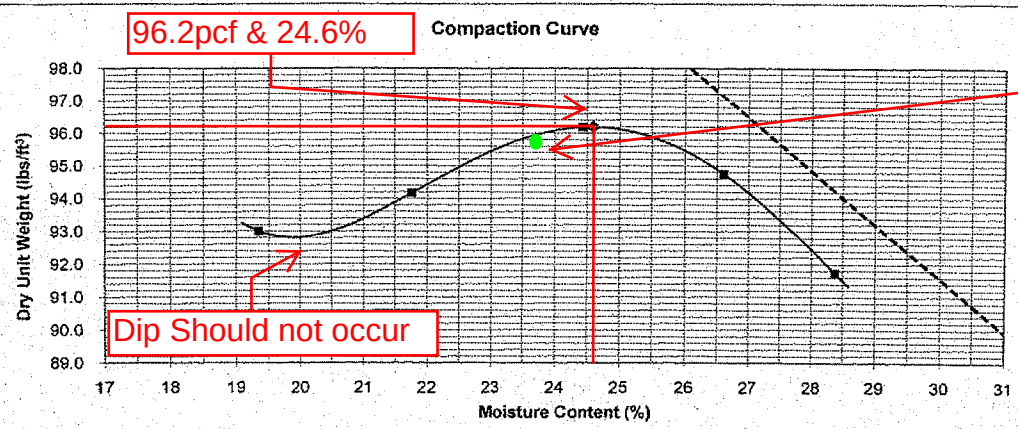
US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	Lab Type	QC	Report No	3745	Test No	365B
USACE Contract No	W912P8-09-D-0046 0008			Contractor	Phylway Construction	Revision	
Project	WBV-14c.2 Phase 2, First Lift			Sample Date	1/13/2011		
Material Source	Borrow Pit	Feature	Levee Embankment	Visual Description	GR. BR. CL.		
Station	27+49	Offset	F.S. +59	Lift No	1		
Latitude (°N)	29.887629	Longitude (°W)	90.147345	Elevation (ft)	[illegible]		
Test Method	ASTM D698-A	Preparation Method	Moist	Received Moisture Content (%)	28.9		
Compaction Hammer	Mechanical	Specific Gravity	2.65	Specific Gravity Method	Estimated		
Retained - No 4 Sieve (%)		Retained - 3/8" Sieve (%)		ASTM D 3718 Correction	No		
Retained - 3/4" Sieve (%)				Test Result	Pass		
Lab Tested By	R. FISHER	Reviewed By	B. Landers	Submitted By	B. Landers		

Trial No	1	2	3	4	5
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.4	2016.4	2016.4	2016.4	2016.4
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3692.8	3748.3	3824.0	3828.3	3795.2
Wet Soil Mass (g)	1676.4	1731.9	1807.6	1811.9	1778.8
Wet Unit Weight (lbs/ft³)	111.0	114.7	119.7	120.0	117.8
Tare No	DT31	DT43	DT20	DT02	DT25
Tare Mass (g)	210.9	179.9	212.7	178.9	205.6
Wet Soil + Tare Mass (g)	526.8	435.6	510.7	453.5	462.6
Dry Soil + Tare Mass (g)	475.6	389.9	452.2	395.8	405.6
Moisture Content (%)	19.3	21.8	24.4	26.6	28.4
Dry Unit Weight (lbs/ft³)	93.0	94.2	96.2	94.8	91.7



Proctor Test Results	
Proctor No	3745
Optimum Moisture Content (%)	23.7
Max Dry Unit Weight (lbs/ft³)	95.7

Liquid And Plastic Limits	
Liquid Limit	63
Plastic Limit	21
Plasticity Index	42
Group Symbol	CH
Sand Content (Retained No 200) (%)	8.1
Fines (Minus No 200) (%)	91.9

Remarks	Avergae Max DD: 95.8pcf / Average Optimum Moisture: 23.5 %M
Version	MVNQS02-101130

Figure 7-55

MVNQS02 W912P8-09-D-0046 0008 3745B

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US Army Corps of Engineers

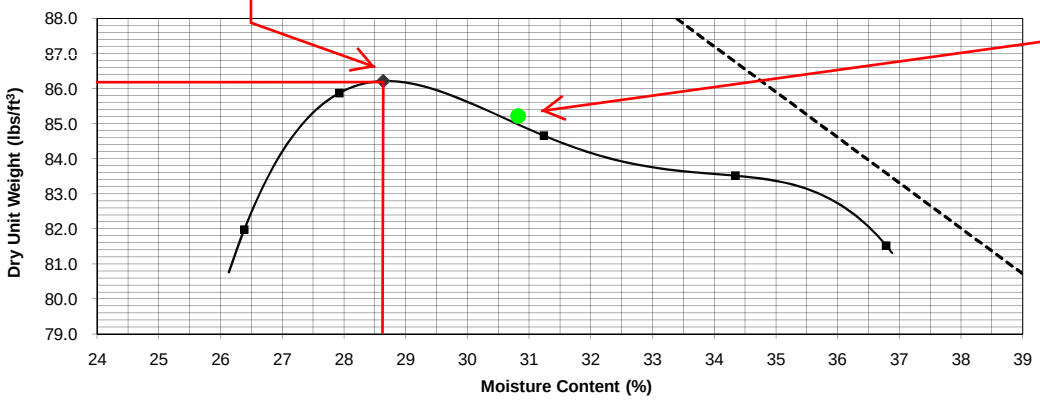
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3804	**Test No**	387A
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	1/22/2011		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	GR. BR. CL.		
Station		**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	43.1		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.4	2016.4	2016.4	2016.4	2016.4
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3581.4	3675.7	3694.6	3711.1	3700.8
Wet Soil Mass (g)	1565.0	1659.3	1678.2	1694.7	1684.4
Wet Unit Weight (lbs/ft³)	103.6	109.9	111.1	112.2	111.5
Tare No	DT43	DT48	DT47	DT14	DT46
Tare Mass (g)	179.8	183.4	178.1	245.1	177.8
Wet Soil + Tare Mass (g)	407.8	404.2	403.7	542.4	451.1
Dry Soil + Tare Mass (g)	360.2	356.0	350.0	466.4	377.6
Moisture Content (%)	**26.4**	**27.9**	**31.2**	**34.3**	**36.8**
Dry Unit Weight (lbs/ft³)	**82.0**	**85.9**	**84.7**	**83.5**	**81.5**

86.2pcf & 28.6%

Compaction Curve



Proctor Test Results	
Proctor No	3804
Optimum Moisture Content (%)	30.8
Max Dry Unit Weight (lbs/ft³)	85.2

Liquid And Plastic Limits	
Liquid Limit	84
Plastic Limit	27
Plasticity Index	57
Group Symbol	CH
Sand Content (Retained No 200) (%)	5.1
Fines (Minus No 200) (%)	94.9

Remarks	Avergae Max DD: 85.5pcf / Average Optimum Moisture: 31.1%M	Sample collected from River Burch Pit. South End of Stock Pile B.
Version	**MVNQS02-101130**	

Figure 7-56

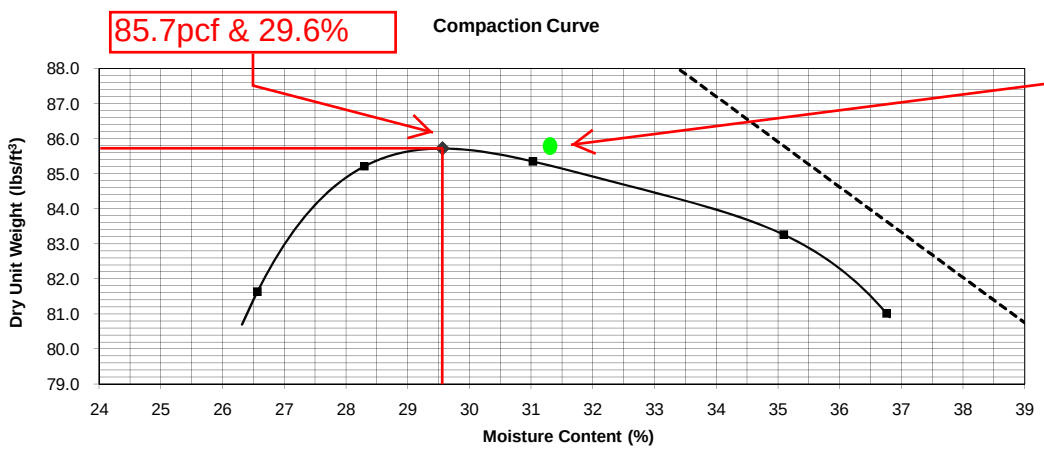
MVNQS02 W912P8-09-D-0046 0008 3804A.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3804	**Test No**	387B
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	1
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	1/22/2011		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	GR. BR. CL.		
Station		**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	43.1		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	R. FISHER	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.4	2016.4	2016.4	2016.4	2016.4
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3577.1	3667.7	3705.6	3715.4	3690.0
Wet Soil Mass (g)	1560.7	1651.3	1689.2	1699.0	1673.6
Wet Unit Weight (lbs/ft³)	103.3	109.3	111.8	112.5	110.8
Tare No	DT40	DT31	DT04	DT41	DT50
Tare Mass (g)	176.2	210.9	233.4	178.0	180.6
Wet Soil + Tare Mass (g)	406.8	492.9	499.0	466.7	458.5
Dry Soil + Tare Mass (g)	358.4	430.7	436.1	391.7	383.8
Moisture Content (%)	**26.6**	**28.3**	**31.0**	**35.1**	**36.8**
Dry Unit Weight (lbs/ft³)	**81.6**	**85.2**	**85.3**	**83.3**	**81.0**



Proctor Test Results	
Proctor No	3804
Optimum Moisture Content (%)	31.3
Max Dry Unit Weight (lbs/ft³)	85.8

Liquid And Plastic Limits	
Liquid Limit	84
Plastic Limit	27
Plasticity Index	57
Group Symbol	CH
Sand Content (Retained No 200) (%)	5.1
Fines (Minus No 200) (%)	94.9

Remarks	Avergae Max DD: 85.5pcf / Average Optimum Moisture: 31.1 %M	Sample collected from River Burch Pit. South End of Stock Pile B.
Version	**MVNQS02-101130**	

Figure 7-57

US Army Corps of Engineers

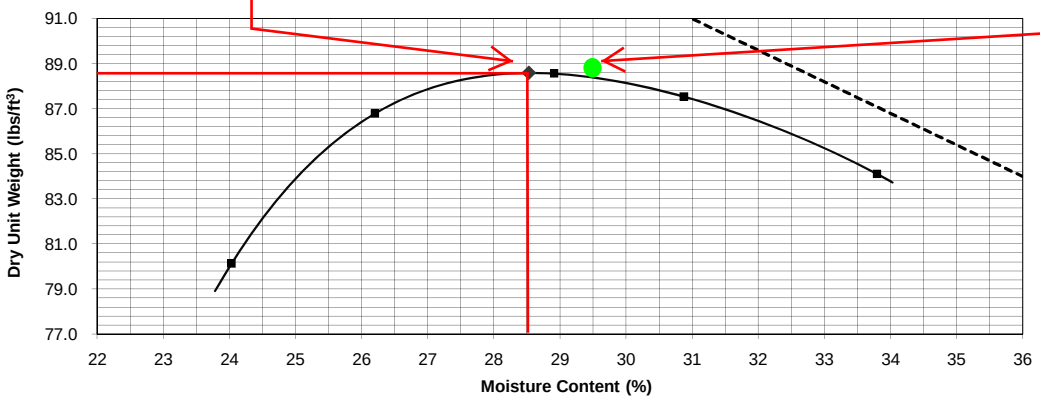
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3815	**Test No**	388A
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	1/22/2011		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	GR. BR. CL.		
Station		**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	39.6		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.4	2016.4	2016.4	2016.4	2016.4
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3517.6	3670.8	3740.8	3746.8	3716.2
Wet Soil Mass (g)	1501.2	1654.4	1724.4	1730.4	1699.8
Wet Unit Weight (lbs/ft³)	99.4	109.5	114.2	114.6	112.5
Tare No	DT42	DT44	DT01	DT02	DT41
Tare Mass (g)	178.1	175.9	171.8	178.8	177.9
Wet Soil + Tare Mass (g)	443.9	441.3	393.0	452.2	476.4
Dry Soil + Tare Mass (g)	392.4	386.2	343.4	387.7	401.0
Moisture Content (%)	**24.0**	**26.2**	**28.9**	**30.9**	**33.8**
Dry Unit Weight (lbs/ft³)	**80.1**	**86.8**	**88.6**	**87.5**	**84.1**

88.6pcf & 28.5%

Compaction Curve



Proctor Test Results	
Proctor No	3815
Optimum Moisture Content (%)	29.5
Max Dry Unit Weight (lbs/ft³)	88.8

Liquid And Plastic Limits	
Liquid Limit	75
Plastic Limit	21
Plasticity Index	54
Group Symbol	CH
Sand Content (Retained No 200) (%)	4.6
Fines (Minus No 200) (%)	95.4

Remarks	Avergae Max DD: 88.9 pcf / Average Optimum Moisture: 29.6 %M	Sample collected from River Burch Pit. Northeast Corner of Stock Pile B.
Version	**MVNQS02-101130**	

Figure 7-58

MVNQS02 W912P8-09-D-0046 0008 3815A.xls

US Army Corps of Engineers

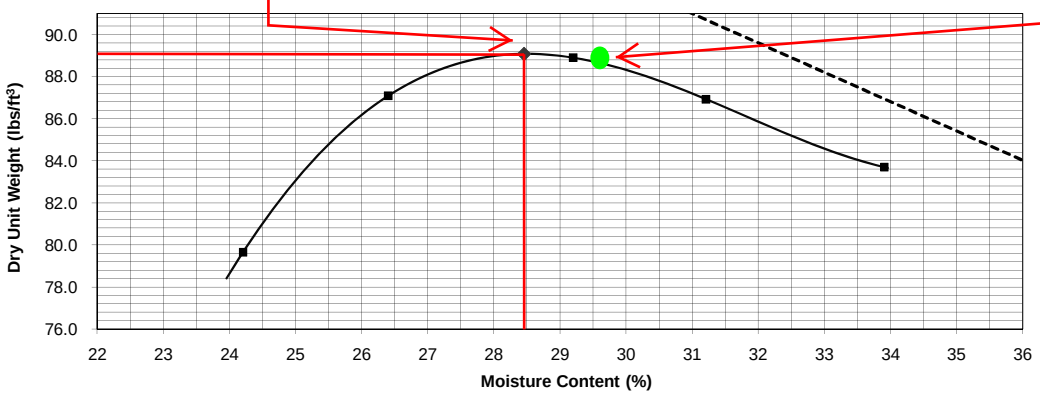
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3815	**Test No**	388B
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	1/22/2011		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	GR. BR. CL.		
Station		**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	39.6		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	R. FISHER	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.4	2016.4	2016.4	2016.4	2016.4
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3510.8	3679.2	3751.3	3739.1	3709.2
Wet Soil Mass (g)	1494.4	1662.8	1734.9	1722.7	1692.8
Wet Unit Weight (lbs/ft³)	98.9	110.1	114.9	114.1	112.1
Tare No	DT27	DT25	DT24	DT50	DT04
Tare Mass (g)	209.4	205.6	206.4	180.7	233.4
Wet Soil + Tare Mass (g)	510.6	426.3	482.5	516.2	466.8
Dry Soil + Tare Mass (g)	451.9	380.2	420.1	436.4	407.7
Moisture Content (%)	**24.2**	**26.4**	**29.2**	**31.2**	**33.9**
Dry Unit Weight (lbs/ft³)	**79.7**	**87.1**	**88.9**	**86.9**	**83.7**

89.0pcf & 28.5%

Compaction Curve



Proctor Test Results	
Proctor No	3815
Optimum Moisture Content (%)	29.6
Max Dry Unit Weight (lbs/ft³)	88.9

Liquid And Plastic Limits	
Liquid Limit	75
Plastic Limit	21
Plasticity Index	54
Group Symbol	CH
Sand Content (Retained No 200) (%)	4.6
Fines (Minus No 200) (%)	95.4

Remarks	Avergae Max DD: 88.9 pcf / Average Optimum Moisture: 29.6 %M	Sample collected from River Burch Pit. Northeast Corner of Stock Pile B.
Version	**MVNQS02-101130**	

Figure 7-59

MVNQS02 W912P8-09-D-0046 0008 3815B.xls

US Army Corps of Engineers

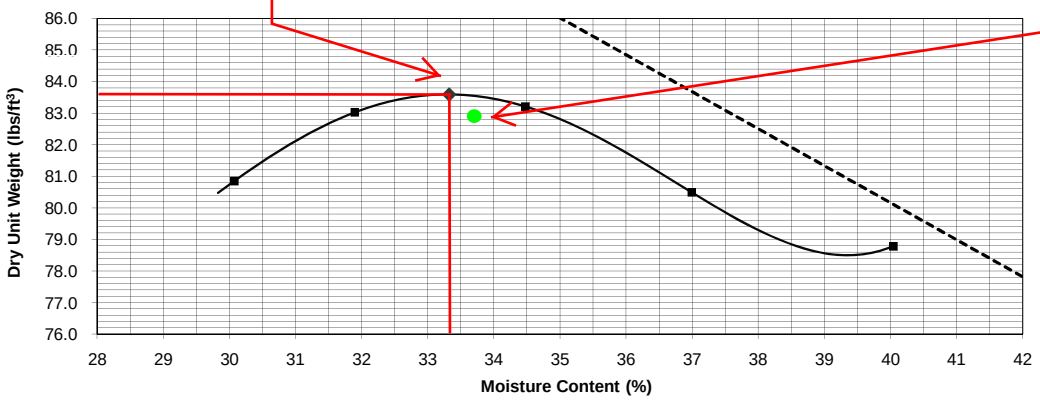
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3824	**Test No**	389A
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	1/22/2011		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	GR. BR. CL.		
Station		**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	50.9		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.4	2016.4	2016.4	2016.4	2016.4
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3604.9	3670.5	3706.6	3681.9	3682.9
Wet Soil Mass (g)	1588.5	1654.1	1690.2	1665.5	1666.5
Wet Unit Weight (lbs/ft³)	105.2	109.5	111.9	110.3	110.3
Tare No	dt40	dt02	dt30	dt50	dt46
Tare Mass (g)	176.2	178.9	203.4	180.7	179.2
Wet Soil + Tare Mass (g)	467.7	390.2	492.8	475.1	421.9
Dry Soil + Tare Mass (g)	400.3	339.1	418.6	395.6	352.5
Moisture Content (%)	**30.1**	**31.9**	**34.5**	**37.0**	**40.0**
Dry Unit Weight (lbs/ft³)	**80.9**	**83.0**	**83.2**	**80.5**	**78.8**

83.6pcf & 33.3%

Compaction Curve



Proctor Test Results	
Proctor No	3824
Optimum Moisture Content (%)	33.7
Max Dry Unit Weight (lbs/ft³)	82.7

Liquid And Plastic Limits	
Liquid Limit	92
Plastic Limit	31
Plasticity Index	61
Group Symbol	CH
Sand Content (Retained No 200) (%)	6.3
Fines (Minus No 200) (%)	93.7

Remarks	Avergae Max DD: 82.9 pcf / Average Optimum Moisture: 33.7 %M	Sample collected from River Burch Pit. Center of Stock Pile A.
Version	**MVNQS02-101130**	

Figure 7-60

MVNQS02 W912P8-09-D-0046 0008 3824A.xls

US Army Corps of Engineers

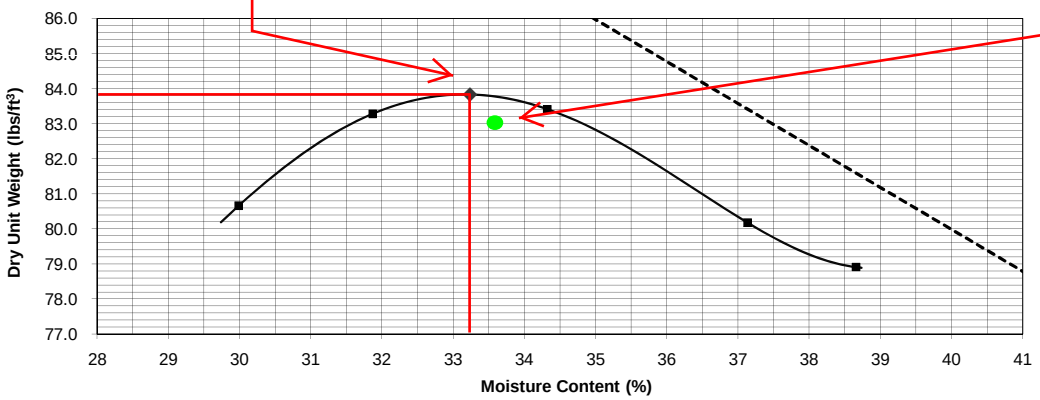
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	3824	**Test No**	389B
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	1/22/2011		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	GR. BR. CL.		
Station		**Offset**		**Lift No**			
Latitude (°N)		**Longitude (°W)**		**Elevation (ft)**			
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	50.9		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	R. FISHER	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.4	2016.4	2016.4	2016.4	2016.4
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3600.1	3675.2	3708.7	3677.2	3669.1
Wet Soil Mass (g)	1583.7	1658.8	1692.3	1660.8	1652.7
Wet Unit Weight (lbs/ft³)	104.8	109.8	112.0	110.0	109.4
Tare No	DT47	DT43	DT31	DT04	DT48
Tare Mass (g)	178.1	179.9	211.0	233.4	183.6
Wet Soil + Tare Mass (g)	373.6	477.4	491.6	548.4	475.2
Dry Soil + Tare Mass (g)	328.5	405.5	419.9	463.1	393.9
Moisture Content (%)	**30.0**	**31.9**	**34.3**	**37.1**	**38.7**
Dry Unit Weight (lbs/ft³)	**80.7**	**83.3**	**83.4**	**80.2**	**78.9**

83.8pcf & 33.3%

Compaction Curve



Proctor Test Results	
Proctor No	3824
Optimum Moisture Content (%)	33.6
Max Dry Unit Weight (lbs/ft³)	83.0

Liquid And Plastic Limits	
Liquid Limit	92
Plastic Limit	31
Plasticity Index	61
Group Symbol	CH
Sand Content (Retained No 200) (%)	6.3
Fines (Minus No 200) (%)	93.7

Remarks	Avergae Max DD: 82.9pcf / Average Optimum Moisture: 33.7 %M	Sample collected from River Burch Pit. Center of Stock Pile A.
Version	**MVNQS02-101130**	

Figure 7-61

MVNQS02 W912P8-09-D-0046 0008 3824B.xls

US Army Corps of Engineers

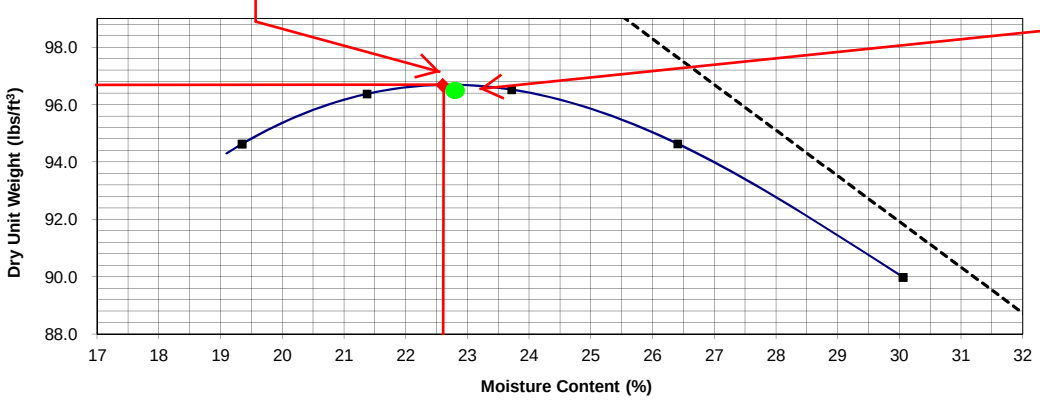
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	4171	**Test No**	498A
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	3/14/2011		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	GR. BR. CL.		
Station	65+00	**Offset**	P.S. -131.2	**Lift No**	4		
Latitude (°N)	29.885679	**Longitude (°W)**	90.136025	**Elevation (ft)**	6.9		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	24.6		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.4	2016.4	2016.4	2016.4	2016.4
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3722.2	3783.1	3820.0	3823.2	3784.1
Wet Soil Mass (g)	1705.8	1766.7	1803.6	1806.8	1767.7
Wet Unit Weight (lbs/ft³)	112.9	117.0	119.4	119.6	117.0
Tare No	DT04	DT24	DT14	DT49	DT01
Tare Mass (g)	233.4	206.5	245.0	176.3	171.9
Wet Soil + Tare Mass (g)	518.4	495.0	668.6	477.4	434.1
Dry Soil + Tare Mass (g)	472.2	444.2	587.4	414.5	373.5
Moisture Content (%)	**19.3**	**21.4**	**23.7**	**26.4**	**30.1**
Dry Unit Weight (lbs/ft³)	**94.6**	**96.4**	**96.5**	**94.6**	**90.0**

96.7pcf & 22.6%

Compaction Curve



Proctor Test Results	
Proctor No	4171
Optimum Moisture Content (%)	22.9
Max Dry Unit Weight (lbs/ft³)	96.5

Liquid And Plastic Limits	
Liquid Limit	60
Plastic Limit	22
Plasticity Index	38
Group Symbol	CH
Sand Content (Retained No 200) (%)	11.8
Fines (Minus No 200) (%)	88.2

Remarks	Avergae Max DD: 96.6 pcf / Average Optimum Moisture: 22.8 %M	MATERIAL SAMPLED FROM EXISITING SUBGRADE ON SITE (DE-GRADE)
Version	**MVNQS02-101130**	

Figure 7-62

4171 498A - G.xls

US Army Corps of Engineers

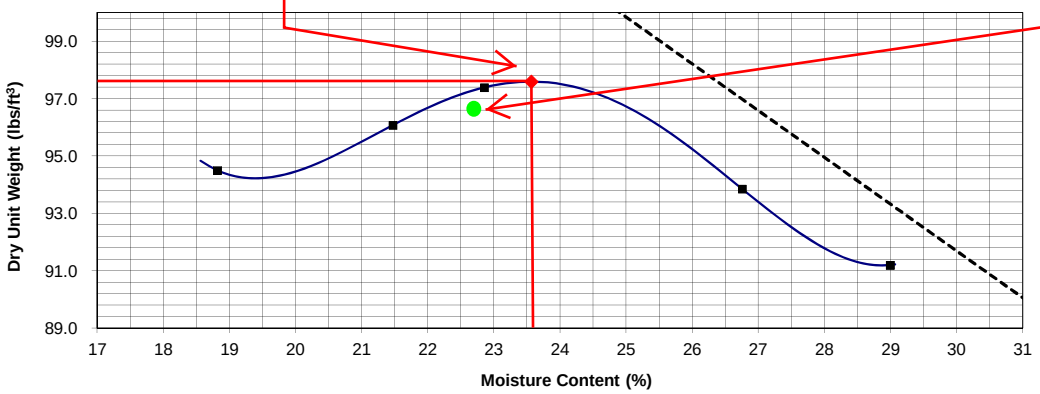
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	4171	**Test No**	498B
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	3/14/2011		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	GR. BR. CL.		
Station	65+00	**Offset**	P.S. -131.2	**Lift No**	4		
Latitude (°N)	29.885679	**Longitude (°W)**	90.136025	**Elevation (ft)**	6.9		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	24.6		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	C. Willis	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.4	2016.4	2016.4	2016.4	2016.4
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3712.3	3779.1	3823.5	3813.2	3793.2
Wet Soil Mass (g)	1695.9	1762.7	1807.1	1796.8	1776.8
Wet Unit Weight (lbs/ft³)	112.3	116.7	119.6	119.0	117.6
Tare No	DT-11	DT31	DT08	DT47	DT02
Tare Mass (g)	181.0	211.0	187.4	178.1	178.9
Wet Soil + Tare Mass (g)	530.8	463.3	579.8	479.4	453.4
Dry Soil + Tare Mass (g)	475.4	418.7	506.8	415.8	391.7
Moisture Content (%)	**18.8**	**21.5**	**22.9**	**26.8**	**29.0**
Dry Unit Weight (lbs/ft³)	**94.5**	**96.1**	**97.4**	**93.8**	**91.2**

97.6pcf & 23.6%

Compaction Curve



Proctor Test Results	
Proctor No	4171
Optimum Moisture Content (%)	22.7
Max Dry Unit Weight (lbs/ft³)	96.6

Liquid And Plastic Limits	
Liquid Limit	60
Plastic Limit	22
Plasticity Index	38
Group Symbol	CH
Sand Content (Retained No 200) (%)	11.8
Fines (Minus No 200) (%)	88.2

Remarks	Avergae Max DD: 96.6 pcf / Average Optimum Moisture: 22.8 %M	MATERIAL SAMPLED FROM ON SITE EXISITING SUBGRADE (DE-GRADE)
Version	**MVNQS02-101130**	

Figure 7-63

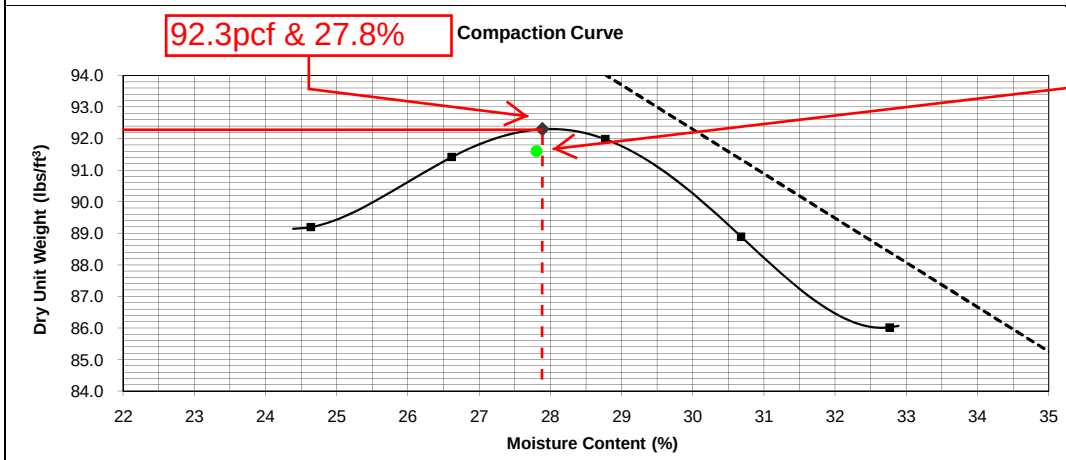
4171 498B - G.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	4502	**Test No**	642A
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	4/27/2011		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	GR. BR. CL.		
Station	142+62	**Offset**	P.S. -90	**Lift No**	2		
Latitude (°N)	29.872090	**Longitude (°W)**	90.129965	**Elevation (ft)**	5.0		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	31.7		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	R. FISHER	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.4	2016.4	2016.4	2016.4	2016.4
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3695.6	3764.7	3805.5	3771.0	3741.3
Wet Soil Mass (g)	1679.2	1748.3	1789.1	1754.6	1724.9
Wet Unit Weight (lbs/ft³)	111.2	115.7	118.4	116.2	114.2
Tare No	DT43	DT54	DT51	DT52	DT44
Tare Mass (g)	179.9	140.0	140.2	138.9	176.1
Wet Soil + Tare Mass (g)	385.8	334.1	331.3	404.7	363.3
Dry Soil + Tare Mass (g)	345.1	293.3	288.6	342.3	317.1
Moisture Content (%)	**24.6**	**26.6**	**28.8**	**30.7**	**32.8**
Dry Unit Weight (lbs/ft³)	**89.2**	**91.4**	**92.0**	**88.9**	**86.0**



Proctor Test Results	
Proctor No	4502
Optimum Moisture Content (%)	27.8
Max Dry Unit Weight (lbs/ft³)	91.6

Liquid And Plastic Limits	
Liquid Limit	68
Plastic Limit	23
Plasticity Index	45
Group Symbol	CH
Sand Content (Retained No 200) (%)	5
Fines (Minus No 200) (%)	95

Remarks	Avergae Max DD: 91.6 pcf / Average Optimum Moisture: 28.2 %M
Version	**MVNQS02-101130**

Figure 7-64

MVNQS02 W912P8-09-D-0046 0008 4502A 642.xls

US Army Corps of Engineers

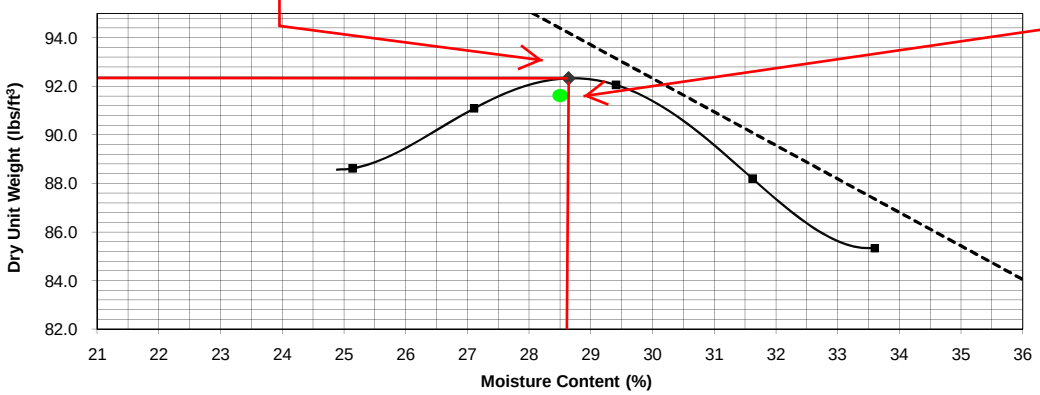
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	4502	**Test No**	642B
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	4/27/2011		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	GR. BR. CL.		
Station	142+62	**Offset**	P.S. -90	**Lift No**	2		
Latitude (°N)	29.872090	**Longitude (°W)**	90.129965	**Elevation (ft)**	5.0		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	31.7		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	R. FISHER	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.4	2016.4	2016.4	2016.4	2016.4
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3691.4	3765.3	3815.9	3769.8	3738.4
Wet Soil Mass (g)	1675.0	1748.9	1799.5	1753.4	1722.0
Wet Unit Weight (lbs/ft³)	110.9	115.8	119.1	116.1	114.0
Tare No	DT25	DT31	DT55	DT53	DT27
Tare Mass (g)	205.6	210.9	141.7	141.0	209.5
Wet Soil + Tare Mass (g)	387.8	445.8	367.9	394.9	458.8
Dry Soil + Tare Mass (g)	351.2	395.7	316.5	333.9	396.1
Moisture Content (%)	**25.1**	**27.1**	**29.4**	**31.6**	**33.6**
Dry Unit Weight (lbs/ft³)	**88.6**	**91.1**	**92.1**	**88.2**	**85.3**

92.3pcf & 28.6%

Compaction Curve



Proctor Test Results	
Proctor No	4502
Optimum Moisture Content (%)	28.5
Max Dry Unit Weight (lbs/ft³)	91.6

Liquid And Plastic Limits	
Liquid Limit	68
Plastic Limit	23
Plasticity Index	45
Group Symbol	CH
Sand Content (Retained No 200) (%)	5
Fines (Minus No 200) (%)	95

Remarks	Avergae Max 91.6 DD: pcf / Average Optimum Moisture: 28.2 %M
Version	**MVNQS02-101130**

Figure 7-65

MVNQS02 W912P8-09-D-0046 0008 4502B 642.xls

US Army Corps of Engineers

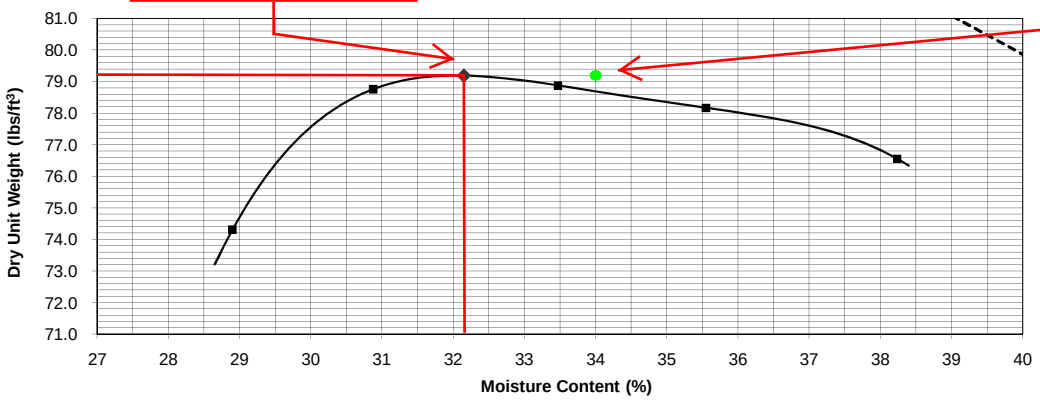
Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	4716	**Test No**	763A
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	5/23/2011		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	GR. BR. CL.		
Station	8+75	**Offset**	P.S. -26	**Lift No**	7		
Latitude (°N)	29.888899	**Longitude (°W)**	90.153081	**Elevation (ft)**	10.6		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	30.6		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	R. FISHER	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.4	2016.4	2016.4	2016.4	2016.4
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3463.2	3573.3	3606.6	3616.8	3614.8
Wet Soil Mass (g)	1446.8	1556.9	1590.2	1600.4	1598.4
Wet Unit Weight (lbs/ft³)	95.8	103.1	105.3	106.0	105.8
Tare No	DT21	DT50	DT20	DT42	DT02
Tare Mass (g)	211.6	180.7	212.7	178.2	179.0
Wet Soil + Tare Mass (g)	441.3	574.9	435.2	439.0	453.4
Dry Soil + Tare Mass (g)	389.8	481.9	379.4	370.6	377.5
Moisture Content (%)	**28.9**	**30.9**	**33.5**	**35.6**	**38.2**
Dry Unit Weight (lbs/ft³)	**74.3**	**78.8**	**78.9**	**78.2**	**76.6**

79.2pcf & 32.2%

Compaction Curve



Proctor Test Results	
Proctor No	4716
Optimum Moisture Content (%)	34.0
Max Dry Unit Weight (lbs/ft³)	79.2

Liquid And Plastic Limits	
Liquid Limit	90
Plastic Limit	29
Plasticity Index	61
Group Symbol	CH
Sand Content (Retained No 200) (%)	17.4
Fines (Minus No 200) (%)	82.6

Remarks	Avergae Max DD: 79.2 pcf / Average Optimum Moisture: 34.0 %M
Version	**MVNQS02-101130**

Figure 7-66

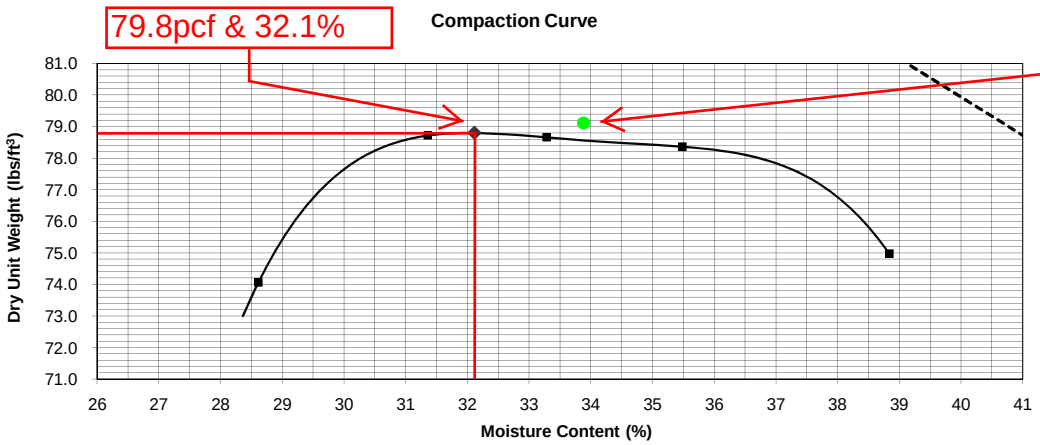
MVNQS02 W912P8-09-D-0046 0008 4716 763A.xls

US Army Corps of Engineers

Compaction - Moisture Density Relationship - ASTM D 698 / D 1557

Laboratory	Toulunay-Wong Engineers, Inc.	**Lab Type**	QC	**Report No**	4716	**Test No**	763B
USACE Contract No	W912P8-09-D-0046 0008			**Contractor**	Phylway Construction	**Revision**	
Project	WBV-14c.2 Phase 2, First Lift			**Sample Date**	5/23/2011		
Material Source	Borrow Pit	**Feature**	Levee Embankment	**Visual Description**	GR. BR. CL.		
Station	8+75	**Offset**	P.S. -26	**Lift No**	7		
Latitude (°N)	29.888899	**Longitude (°W)**	90.153081	**Elevation (ft)**	10.6		
Test Method	ASTM D698-A	**Preparation Method**	Moist	**Received Moisture Content (%)**	30.6		
Compaction Hammer	Mechanical	**Specific Gravity**	2.65	**Specific Gravity Method**	Estimated		
Retained - No 4 Sieve (%)		**Retained - 3/8" Sieve (%)**		**ASTM D 3718 Correction**	No		
Retained - 3/4" Sieve (%)				**Test Result**	**Pass**		
Lab Tested By	R. FISHER	**Reviewed By**	B. Landers	**Submitted By**	B. Landers		

Trial No	**1**	**2**	**3**	**4**	**5**
Mold No	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03	GZL-ML-03
Mold Mass (g)	2016.4	2016.4	2016.4	2016.4	2016.4
Mold Volume (ft³)	0.0333	0.0333	0.0333	0.0333	0.0333
Wet Soil + Mold Mass (g)	3455.2	3578.3	3600.0	3620.1	3588.7
Wet Soil Mass (g)	1438.8	1561.9	1583.6	1603.7	1572.3
Wet Unit Weight (lbs/ft³)	95.3	103.4	104.8	106.2	104.1
Tare No	DT40	DT24	DT48	DT01	DT43
Tare Mass (g)	176.2	206.5	183.5	171.8	179.9
Wet Soil + Tare Mass (g)	387.9	496.8	449.8	476.1	438.0
Dry Soil + Tare Mass (g)	340.8	427.5	383.3	396.4	365.8
Moisture Content (%)	**28.6**	**31.4**	**33.3**	**35.5**	**38.8**
Dry Unit Weight (lbs/ft³)	**74.1**	**78.7**	**78.7**	**78.4**	**75.0**



Proctor Test Results	
Proctor No	4716
Optimum Moisture Content (%)	33.9
Max Dry Unit Weight (lbs/ft³)	79.1

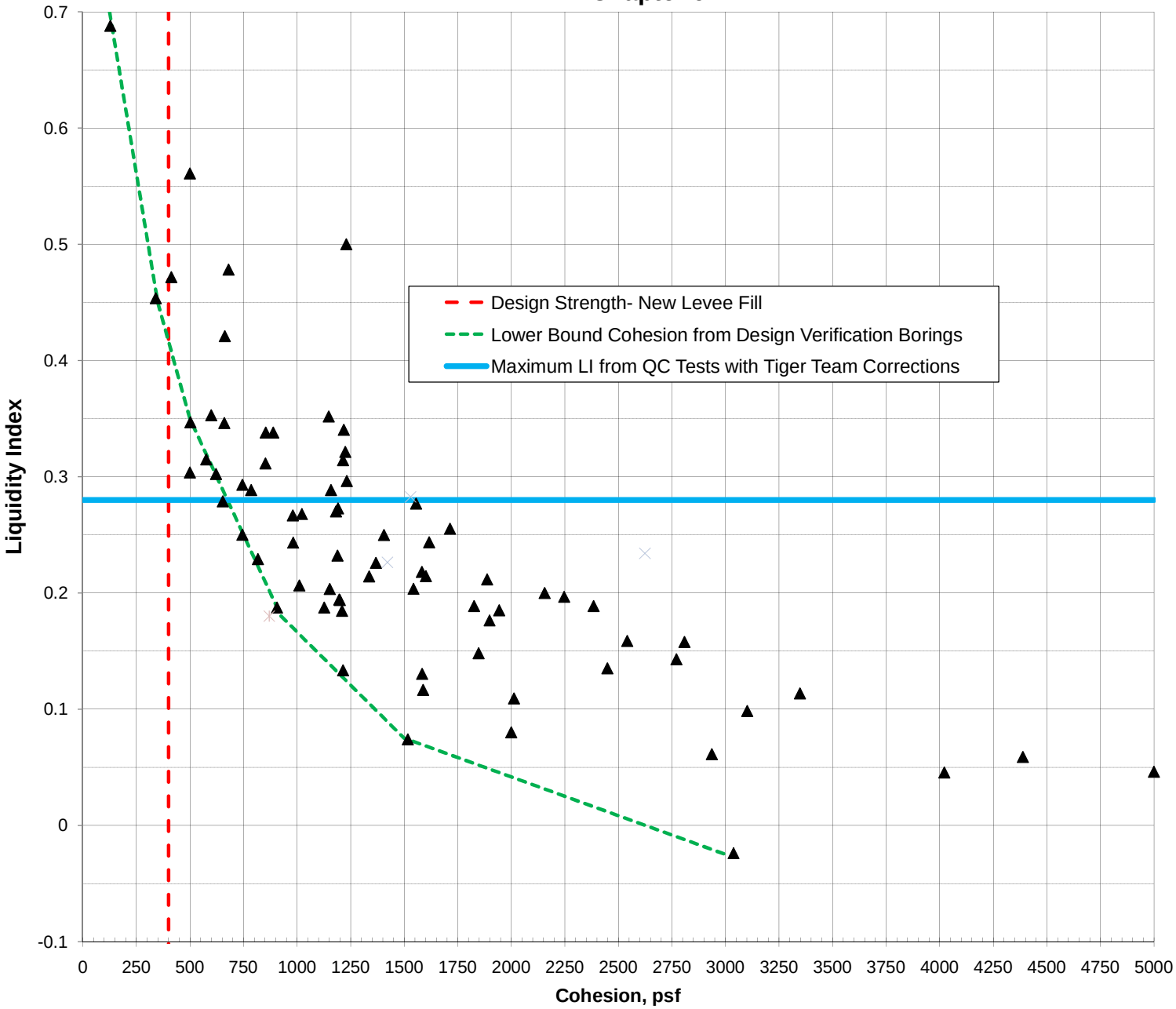
Liquid And Plastic Limits	
Liquid Limit	90
Plastic Limit	29
Plasticity Index	61
Group Symbol	CH
Sand Content (Retained No 200) (%)	17.4
Fines (Minus No 200) (%)	82.6

Remarks	Avergae Max DD: 79.2 pcf / Average Optimum Moisture:34.0 %M
Version	**MVNQS02-101130**

Figure 7-67

MVNQS02 W912P8-09-D-0046 0008 4716 763B.xls

Figure 7-68
Cohesion and Liquidy Index from Design Verification Boring Data Presented in Chapter 9



Chapter 8
Contractor Quality Control and Corps Quality Assurance Review

General

As outlined in Appendix J, "Final Tiger Team Scope of Work" paragraph 2i, a review of the contractor quality control (QC) records and the Corps quality assurance (QA) records, was performed to evaluate the QA/QC process for assuring contract compliance, and make recommendations for improvements, if necessary. Quality Control (QC) is the responsibility of the contractor and is the process by which the contractor insures and reports that the requirements of the contract are being achieved. Quality Assurance (QA) is the responsibility of the Corps and insures the contractor is performing the duties of Contractor Quality Control as defined in the contract.

The following documents were reviewed and are included in Appendix S:

a) Corps Daily QA Reports #1 through 576 dated 22 June 2010 through 18 January 2012
b) Contractor Daily QC Reports #1 through 567 dated 22 June 2010 through 9 January 2012
c) SLFPA-W Reports (generally weekly) dated 29 July 2010 through 6 December 2011
d) Minutes of Monthly Progress Meetings #1 through #15 dated 10 August 2010 through 8 November 2011
e) Contractor's Quality Control Plan dated 7 June 2010
f) Corps' Quality Assurance Plan for the New Orleans West Bank Area Office
g) Corps' Quality Assurance Plan for the WBV14C.2 Project
h) Contractor's minutes of Preparatory and Initial Inspection meetings held for Embankment
i) Corps Deficiency Tracking Log
j) Corps Testing Discrepancy Report
k) Summary of Evaluation of USACE QA Reports from David Roark, Non Federal Sponsor inspector to Giuseppe R. Miserendino, SLFPA-W Regional Director
l) MVN's responses to SLFPA-W's questions asked in letter dated 10 August, 2011
m) MVN Engineering considerations provided to MVN Construction dated 4 August 2009

A comprehensive review of all contractor and government contract files and records related to administration of this contract was not performed as in a full QC/QA audit. The primary focus of this review was on the quality of construction aspects as documented in the contract records with emphasis on embankment construction and objectionable wood and debris in the embankment fill materials. In addition to quality control and assurance, QA and QC programs include other aspects such as equipment and manpower, weather conditions, safety, and overall contract management.

Quality of Embankment Construction and Materials

For this review and analysis, specific attention was placed on the quality of the embankment construction and fill materials with the primary aspects of the embankment feature of work as follows:

A.) Scarification between lifts of fill
B.) Moisture range of fill prior to placement
C.) Suitability of fill and moisture/density requirements
D.) Amounts of objectionable wood or debris in fill
E.) Lift thickness prior to compaction

Visual observation and judgment are expected and were utilized by the QC and QA inspectors as compliance checks for all the items listed above. Detailed control and assurance testing is required by the contract specifications only for items B. and C. Visual observation is the primary method of control and assurance that items A, D, and E are in compliance.

In reference documents L. and M. from paragraph General above, the non-federal sponsor expressed concerns with scarification between lifts, suitability of fill, compaction of fill, wood and debris in fill, and the use of non approved compaction equipment. Reference documents L and M express no concerns regarding moisture of fill or lift thicknesses.

The embankment specification applicable to this contract, Section 31 24 00.0012 Embankment, is included in Appendix G. General embankment construction photos are included at the end of this chapter.

A. Scarification

Scarification requirements are stated in embankment specification section 31 24 00.0012 paragraph 3.1.1 Foundation Preparation. **"After clearing and grubbing and any required excavation of the embankment foundation, test pits and other similar cavities and depressions shall be broken down, where so directed, to flatten out the slopes. If for any cause, this broken surface becomes compacted in such a manner that, in the opinion of the Contracting Officer, a plane of seepage or weakness might be induced, it shall again be adequately scarified before depositing material thereon. For levee enlargement work, both the natural surface of the ground and the surface of the existing levee to be occupied by the new work shall be prepared as specified above."**

Scarification requirements are also stated in paragraph 3.2 Compacted Fill. **"When the surface of any compacted layer is too smooth to bond properly with the succeeding layer, it shall be adequately scarified before the next layer is placed thereon except as specified in paragraph Foundation Preparation."**

Scarification is addressed in the contractor's QC plan and the Corp's QA plan as well as the contractor's Preparatory and Initial Inspection documentation. Also, both QC and QA daily

reports noted throughout the entire project that scarification ahead of the embankment placement was performed. Refer to QC reports 85, 281, & 387 and QA reports 340, 49, & 238 for typical remarks regarding scarification.

QA reports 301, 302, 304, and 309 express concerns of contractor not re-scarifying areas that have become smooth/compacted after traversing with dump trucks used in transporting fill. The QA representative elevated this issue upward to the Project Engineer in reports 304 and 309. Subsequent QA reports did not report re-scarification as a continuing issue, nor did they report its resolution. The fact that re-scarifying for these few days was an issue further indicates that scarification was being performed on the project. Re-compacting with the dump trucks after initial scarification is a typical problem encountered in levee fill operations.

Based on review of the documents, it appears that not re-scarifying after compaction by haul units was an issue for a brief period in the contract (several days) and the issue was resolved. No other mention of scarification being an issue was found in the QA or QC reports. While this one instance indicates a temporary failure of the contractor's QC process, it serves as an example of the USACE QA process functioning as outlined. However, follow-up QA reports should have clearly stated that the scarification issue was resolved.

B. Moisture range of fill prior to placement

Contract requirements are stated in embankment specification section 31 24 00.0012 paragraph 1.8.2.1 Moisture Control-Compacted Fill. **"Borrow material is considered too wet to be placed directly upon the levee and berm(s) compacted fill footprint, if it has a moisture content greater than 10 percentage points above the optimum moisture content resulting from the Standard Proctor Compaction Test ASTM D 698."**

Moisture range prior to fill placement is adequately covered in the contractor's QC plan and Corp's QA plan. There is no specific mention of this contract requirement in the Contractor's Preparatory and Initial Inspections. However, both QC and QA daily reports noted throughout the contract performance period that moisture checks (both ASTM tests and visual) were made. Refer to QC reports 84, 264, & 372, and QA reports 84, 213, & 289 for typical comments regarding allowable moisture limits for placing fill into the embankment section. The QC and QA for these items were documented adequately and appear to have been controlled and assured in accordance with the contract documents. However, this item should have been specifically addressed in the Preparatory and Initial Inspection reports.

C. Suitability of Fill Materials and Moisture/Density Requirements

Contract requirements for fill suitability are covered in specification section 31 24 00.00 12 paragraph 2.1 Materials. **"The embankment shall be constructed of earth materials naturally occurring or Contractor blended. Materials that are classified in accordance with ASTM D 2487 as CL or CH with less than 35% sand content are suitable for use as embankment fill. Materials classified as ML are suitable if blended to produce a material that classifies as CH or CL according to ASTM D 2487." "Materials placed in the section must be at or above the Plasticity Index of 10. Materials placed in the section must be at or**

below organic content of 9 percent by weight, as determined by ASTM D 2974, Method C. Materials placed in the section must contain less than 35 percent sand content by weight, as determined by ASTM D 1140."

Moisture/density requirements are covered in Paragraph 1.8.3 Compaction **"The first and each successive layer of compacted fill material shall be compacted to at least 90 percent of maximum dry density as determined by ASTM D 698 (Standard Proctor Compaction Test) at a moisture content within the limits of plus 5 to minus 3 percentage points of optimum moisture content determined from ASTM D 698."**

Fill material suitability, compaction requirements, and associated required testing are covered adequately in the QC and QA plans as well as the contractor's Preparatory and Initial Inspection documentation. Both QC and QA daily reports appear to fully document the QC and QA tests conducted to fulfill the contract requirements for suitability of materials and moisture/density. Refer to QC reports 25, 42, 46, 151, 241, & 329, and QA Reports 25, 49, 58, 90, 130, 146, & 276 for documentation of fill suitability and moisture/density testing typical of the entire QC/QA Reports. The QAR did an excellent job of documenting that failed areas would be reworked and retested. He also noted areas that had previously failed tests were being reworked to become within contract compliance.

Due to the tremendous amount of testing, utilizing the QC and QA reports to ensure the required number of tests were conducted and acceptable results of tests were achieved is very difficult. For this purpose, a separate system of reporting and tracking of tests and results was utilized by the QA. These tests and results are evaluated in further detail in Chapter 7. Review of the QC testing information presented in Chapter 7 indicates that all reported failed test areas were reworked, retested, and met moisture/density requirements.

From review of QC and QA reports, it appears materials were adequately tested to assure embankment materials were suitable and placed in accordance with the contract.

D. Amounts of Objectionable Wood or Debris in Fill

Item D. is covered in specification section 31 24 00.00 12 paragraph 2.1 Materials. **"All fill materials shall be free from masses of organic matter, sticks, branches, roots, and other debris including hazardous and regulated solid wastes. As earth from the designated excavation areas may contain excessive amounts of wood, isolated pieces of wood will not be considered objectionable in the embankment provided their length does not exceed 1 foot, their cross-sectional area is less than 4 square inches, and they are distributed throughout the fill. Not more than 1 percent (by volume) of objectionable material shall be contained in the earth material placed in each cubic yard of the levee section. Pockets and/or zones of wood shall not be placed in the embankment."**

The interpretation of this specification utilized by MVN in administration of this contract was provided in MVN responses to SLFPA-W's questions asked in a letter dated August 10, 2011 as well as by Glen Gremillion (MVN Resident Engineer for this contract) in an interview with the Tiger team in late October 2011. Mr. Gremillion's written statement regarding the specification interpretation and enforcement is provided in Appendix I. A summary of the MVN interpretation and enforcement of this specification is :

- "masses" refers to a large quantity not isolated
- "excessive" refers to an unusually high amount that is predominant
- Wood smaller than 1 ft in length and cross sectional area less than 4 sq. inches is not considered objectionable provided this wood is not in masses and is distributed throughout the fill. No allowable percentage of wood of this size is specified.
- Wood larger than 1 ft long and cross sectional area greater than 4 sq. inches is objectionable and is limited by 1% (by volume) per cubic yard of the embankment. This was not interpreted as 1% for every individual cubic yard placed, but 1% per cubic yard for larger volumes such as 10+ yards. This interpretation was due to the way levees are constructed and inspected with material brought to the site in dump trucks and placed in large volumes daily. Since there is no standard calculation method for measuring the 1% of objectionable wood and any measurement would be highly subjective, it was determined that if the contractor picked all visible wood, the remaining wood debris that was not recovered would be within the 1% and then in accordance with the specifications.
- The goal of QA was to remove all objectionable size wood and any debris found in fill, realizing that some objectionable wood and debris would be missed by the QA and QC inspectors.
- The 9% limit on organics does not apply to woody pieces (both objectionable and non-objectionable sizes), but rather the organic content of the soils.

The interpretation and enforcement methods utilized by MVN are both reasonable and logical based on these specific contract specifications. However, it should be noted that the contract specifications do not explicitly outline processes or procedures to handle significant debris removal operations that were required during this contract. It should also be noted that based on QA reports, it appeared that during routine inspections, the QAR often assumed the role of QC by flagging as well as removing debris in the embankment fill.

Embankment materials suitability was referenced in the QC and QA plans; however, specifics regarding the objectionable size wood were not discussed in detail. Neither wood (whether objectionable or smaller sizes) nor debris was discussed in the contractor's Preparatory or Initial Inspection documentation. The QC and QA reports include documentation throughout with discussions, observations, disagreements, methods of inspection, and meetings with the Corps, SLFPA-W, contractor, and all chains of command in relation to wood and debris in the fill. QAR #116 (dated 15 Oct 2010) was the first noted remark by the Corps in regards to wood in the

fill with the note "Ensured material hauled to site did not contain objectionable material." QCR #212 (dated 19 Jan 2011) is the first noted mention of debris in the fill by the contractor. This report documents a meeting with the contractor, SLFPA-W and Corps in which the contractor stated "we told the levee district that debris removal is being performed every day and we will continue to pick up debris in the future."

Reports indicate joint decisions (contractor, Corps, and SLFPA-W) were made rejecting the use of existing levee fill in the new levee due to the amounts of debris/objectionable material. On other occasions, the contractor and Corps agreed that fill material could be adequately "picked" to meet specifications. Reports also document meetings on site (contractor, Corps, SLFPA-W, and State) which conclude that the contractor should continue to pick objectionable size debris out of the hauled in material and work to get cleaner materials out of the lower elevations of the borrow area.

While the Corps had a goal of removing all objectionable size material, the contractor often disagreed and asserted that he had removed enough objectionable wood for the material to be within specification. This was a source of disagreement between the contractor and the Corps. As stated in Col Fleming's letter to President Maclay (ref Appendix A), the contractor changed some of their staff assigned to this project in the field and the Corps modified the contract to obtain borrow material from a different source.

Neither the Corps daily QA reports nor contractor daily QC reports clearly or specifically addressed SLFPA-W individual photos and reports of wood and debris in the fill. While this may not be the purpose of the QA reports, separate correspondence to SLFPA-W could have been provided to address or rebut Flood Authority concerns. However, it should be noted that the Corps had a full time daily systematic approach to ensure removal of objectionable wood and debris. Various SLFPA-W personnel visited the site periodically and witnessed a "snapshot" of this process. SLFPA-W reports sometimes included documentation of debris/objectionable wood in fill that had not been through the entire QC/QA process (Ref QA reports dated 22 Mar, 24 Mar, 28 April, and 26 May 2011). For example, cases occurred where the contractor had sealed the fill area prior to a rain event before completing the "picking" operations. These areas were observed, photographed, and reported by the levee district as unacceptable. It should also be noted that some of the reports referring to USACE and contractor joint debris inspections indicate that the USACE QAR observed debris after the site was reportedly picked "clean" by the contractor. This shows an ineffectiveness of the QC process that was agreed upon between the Corps and the contractor. Also, the contractor at some point abandoned the agreed upon QC process of holding joint debris inspections.

From review of the records, it is obvious that objectionable and non-objectionable size wood and debris in fill was a point of interest early on and throughout the duration of the contract. This

issue was in the spotlight with continual scrutiny by all parties involved. Tests results presented in this report conclude that the QA and QC methods used and decisions made resulted in a product that generally meets the specifications as interpreted by the USACE in terms of allowable percentages of objectionable sized wood.

E. Lift Thickness Prior to Compaction

Lift thickness requirements are included in specification Section 31 24 00.00 12 Paragraph 3.2 Compacted Fill. **"The materials for compacted fill shall be placed or spread in layers, the first or bottom layer and the last two layers not more than 6 inches in thickness and all layers between the first and the last two layers not more than 12 inches in thickness prior to compaction except the first layer on top of the geotextile shall be 15 inches, plus or minus 3 inches tolerance, thick as specified in Section 31 05 19.05 12 REINFORCEMENT GEOTEXTILE for details see drawings."**

Lift thickness is also covered in Paragraph 3.3 Uncompacted Fill. **"Uncompacted fill shall be placed in approximately horizontal layers not exceeding 3 feet in thickness."**

Lift thickness was addressed in the QC and QA plans as well as in the contractor's Preparatory and Initial Inspection documentation. While the QC and QA reports don't consistently document the checks on lift thickness control and assurance, it is mentioned in various reports. Reference QCR's 52, 217, 213 and QAR's 74 and 297. Report 297 indicates the QA utilized the elevations on lift charts and control testing spreadsheet as a check on lift thickness.

Even though lift thickness checks on the control testing spreadsheet were in place, better documentation in the QA and QC reports of visual daily checks on lift thickness is recommended.

In regards to the non-federal sponsors concerns for use of non-approved compaction equipment, it should be noted that the specification for this contract is performance based in which the type of equipment is not specified. Tests are required to insure design requirements are satisfied vs a method of construction which dictates certain equipment sizes and types.

Summary

The review of the above referenced documents reveals that an overall acceptable quality program existed during this contract with both QC and QA systems in place to ensure that the definable features of work were constructed in accordance with the contract documents.

The Contractor's Quality Control Plan and the Corps' Quality Assurance Plan are both complete and acceptable for general levee construction. They adequately address the project's definable features of work, reference their applicable specification section, and identify the method and frequency of required testing. Some members of the Tiger Team feel that Contractor's QC Process with regards to the debris inspection was insufficient to handle the amount of debris

being observed in the borrow material. No formal plan was laid out to ensure that embankment was being inspected properly and eventually the accepted plan was abandoned. Due to the lack of a formal organized QC Plan for debris inspection the USACE QAR at times assumed a role as Quality Control inspector.

The three phase system of Preparatory, Initial, and Follow-up Inspections was implemented by the contractor and documented. QA reports indicate that the Corps Inspector was fully engaged in verifying that the contractor's QC program was in place and functioning to control quality. Reports also indicate a presence of QC and QA staff on site during construction activities and further indicated they appeared to have full knowledge of the contract requirements. Documentation and tracking of QC testing as well as visual observations of contractor's performance was generally adequate by the contractor. Corps daily reports which documented QA testing as well as visual observations, directions to the contractor, performance, and decisions made were generally thorough, comprehensive, detailed, and well written. However, resolution of deficiencies noted on reports should be better documented. The Corps Testing Discrepancy Report indicates that QC and QA testing was being monitored and checked by the Corps and action was taken to correct noted discrepancies or errors in testing.

The fill utilized in this contract appears to have had more objectionable and non-objectionable wood pieces than is typically observed based on the experience of the Tiger Team members. No tests were specified to determine contract compliance. Pass/fail of this contract requirement was both visual and subjective as outlined by the USACE Resident Engineer. QA reports document site visits by the USACE technical design staff evaluating the issue. However, the lack of specified test procedures likely contributed to the appearance that the Corps acted slowly in forming the Corps' position on the interpretation of the specification, determining the acceptability of the borrow source, and implementing methods to ensure fill met contract requirements.

Some members of the Tiger Team feel this approach contributed to the belief of the Levee District that the Corps position on the debris matter was dictated more by the contract specification than by an engineering opinion. Some members also believe that no real attempt was made to resolve the differences between the USACE and the Non-Federal Partners prior to substantial completion of the levee and that delaying a formal response to the debris/wood issue without suspending operations made it seem that schedule was more paramount than the quality of construction. However, QA Report # 217, dated January 24, 2011, did note the contractor was directed to suspend placement of material in the vicinity of Stations 165+00 to 170+00 because the material did not appear to meet contract requirements regarding debris content.
The fact that the borrow source was contractor provided, further complicated the issue. Changing borrow location by rejecting the fill without a specification violation, or by modifying

the contract without a performance issue, subjects the Corps and non-federal sponsor to potential high, unnecessary cost increases.

Recommendations for Improvement

When an issue listed on a daily report is resolved, follow up reports should state that fact. No comment to that affect leaves a question as to whether the issue remains.

For Initial Inspection minutes, be specific in documenting the quality standard. This is especially important for features or sub-features of work where visual inspection and subjectivity is involved with no detailed test to determine acceptance.

When quality standards or specification interpretations become an issue during the contract performance period, hold additional Preparatory and Initial Inspections to further clarify and document specification interpretations and acceptance criteria with all parties involved to ensure full consensus. The purpose in this case being to set the standard of acceptance and to document all agreed upon methods and inspections to be utilized in order to control quality of fill in relation to amounts of objectionable wood and debris. Interpretations, acceptance criteria, and changes to inspection procedures should be documented and adhered to for the duration of the project.

Utilize lift charts and photos to provide documentation of quality for features of work where acceptance is based primarily on visual observation and is subjective or controversial. A pass/fail tracking of inspections for objectionable wood or debris using lift charts is recommended when fill contains significant amounts of wood or debris.

Establish better communication between the Corps and the Levee District and better documentation of this communication to include agreements and disagreements on field observations and interpretations made.

Construction Photos:

General embankment construction photos follow. These photos are not in chronological order or inclusive of all contract activity. They are included to supplement photos elsewhere in this report and give the reader additional perspective of the scope of this project, including contractor processes and equipment.

Pickers

Station 175
Degrade of existing levee

Station 135
Debris pickers

Stabilizing seed/fertilizer placement

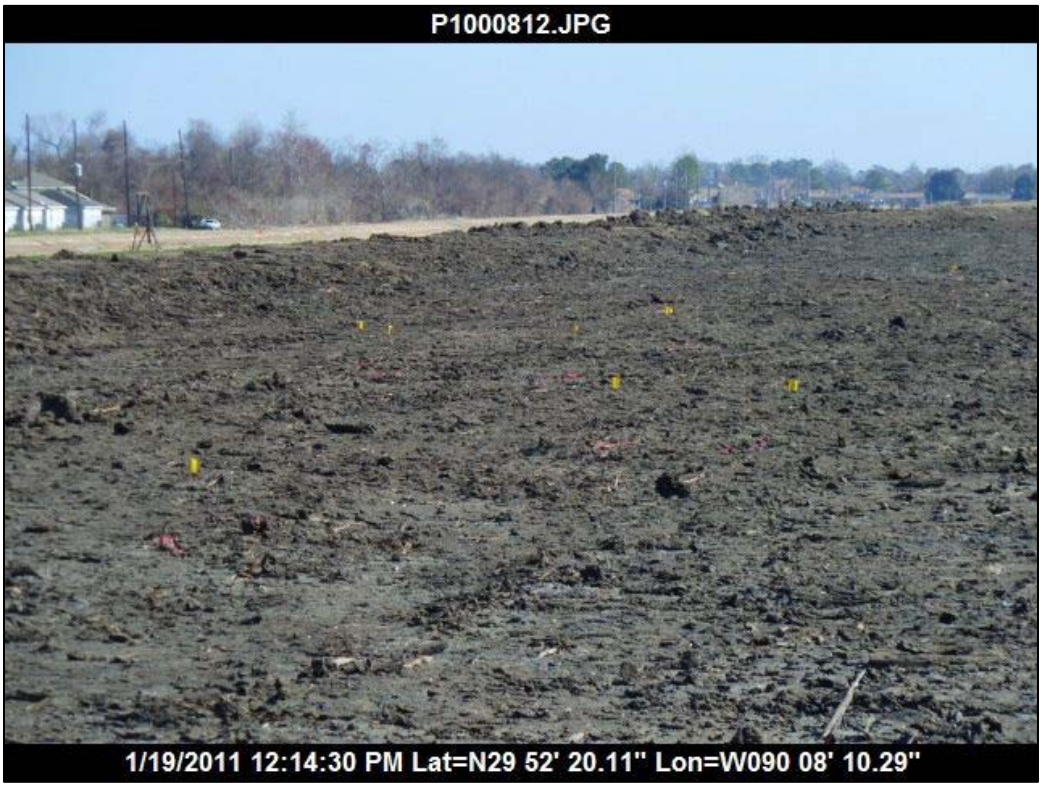
Vermeer

Debris inspection
stations 46 - 55

CAT

Looking West

09/15/2011


P1000812.JPG
1/19/2011 12:14:30 PM Lat=N29 52' 20.11" Lon=W090 08' 10.29"

03/30/2011

PM 3:30 AUG/11/2011

Chapter 9: Design Verification Boring Program

Background:
The standard procedure of the New Orleans District Corps of Engineers is to complete a Design Verification Borings and Soils Testing program on newly constructed levee embankments. CEMVN typically obtains borings at 1000-foot centers along the levee centerline obtaining 5-inch diameter, undisturbed samples of the new levee fill. For each 4-foot long, 5-inch diameter, undisturbed tube sample, the district typically obtains:

- One grain size test with the sample being washed through the #200 sieve,
- One organic content test,
- A minimum of one UU (unconsolidated, undrained) 1-point Q-Triaxial strength test.
- And an Atterberg Limits test.

The Tiger Team coordinated with the New Orleans District to co-locate the design verification program borings near Tiger Team inspection trenches and bulk sample locations in the levee centerline and in the marsh-side and protected side berms. Although borings are not located at every trench, the team obtained many borings and soils samples that provide the requisite shear strength and unit weight data in the levee embankment required by the New Orleans District, plus coverage of the marsh-side/protected-side berms. The Tiger Team's request for 14 borings in the marsh-side/protected-side berms represents the most conspicuous change to the district's standard design verification program. The Non-Federal Sponsor requested, and Tiger Team lead concurred, that the Design Verification borings be drilled deep enough to sample across the interface between the fill placed by the WBV14C.2 contractor and the existing fill. The entire Tiger Team concurred with this request. This requirement tended to increase the depth of the Design Verification borings by approximately one 4-foot long tube. These revisions to the standard design verification boring program were designed to meet Tiger Team and New Orleans District requirements for the WBV14C.2 project.

WBV14C.2 Tiger Team Design Verification Program.
The list of Design Verification borings and their proximity to Tiger Team inspection trenches or bulk sample locations are listed in Table 9-1. Figures 9-1 and 9-2 locate the Design Verification Borings on an aerial photo of the project. These are shown in white text with a white concentric circle marking the location.

The Scope of Work issued for this work may be found in Appendix L1. The plotted boring logs, test results, and laboratory testing data sheets resulting from this investigation program may be found in Appendix L2. The results of the design verification soils testing program are discussed in Chapter 10 and in Appendix Q.

Boring Number	Design Verification Boring Location				Investigation Trench Location	
	Northing	Easting	Station	O/S	Station	O/S
V-WW1	507,158.15	3,653,962.14	4+50	CL	4+42	34' PS
V-WW2	506,970.00	3,654,927.65	9+80	CL	9+80	49' FS
V-WW3	506,741.28	3,656,100.85	21+80	CL	21+95	CL
V-WW4-B	506,551.88	3,656,648.55	27+46	80’ FS	27+25	80' FS
V-WW5-B	506,601.03	3,656,816.56	29+04	CL	29+50	16' FS
V-WW6	506,495.92	3,657,351.71	34+50	CL		
V-WW7	506,500.45	3,657,899.01	39+90	110’ PS	39+90	110' PS
V-WW8-B	506,344.75	3,657,909.33	40+34	41’ FS	40+51	38'FS
V-WW9	506,241.84	3,658,646.70	47+70	CL	48+00	CL
V-WW10	506,218.05	3,659,313.89	54+50	CL		
V-WW11	505,814.06	3,660,396.05	66+68	CL	66+88	CL
V-WW12	505,219.05	3,660,538.06	74+50	CL		
V-WW13	504,681.52	3,660,333.81	80+20	47	80+00	47' FS
V-WW14	503,709.91	3,660,105.87	90+20	CL	90+00	CL
V-WW15	503,036.91	3,659,913.49	97+20	CL	97+00	CL
V-WW16	502,263.54	3,659,875.55	104+80	150’PS	104+51	149' PS
V-WW17	501,892.17	3,659,628.27	109+00	CL	109+30	33' PS
V-WW18	501,846.68	3,659,678.69	109+30	60’ PS	109+30	60' PS
V-WW19	501,054.27	3,660,007.85	120+50	CL	120+39	63' PS
V-WW20-B	501,135.02	3,659,990.07	120+40	85’ PS		
V-WW21	500,983.13	3,660,954.89	130+00	CL	139+00	CL
V-WW22	501,059.02	3,661,963.46	140+00	150’ PS	140+00	225' PS
V-WW22A			139+63	240’ PS		
V-WW22B			139+66	190.5 ‘ FS		
V-WW23	500,758.82	3,661,941.03	140+00	150’ FS		
V-WW24	500,916.02	3,661,852.89	139+00	CL	144+50	CL
V-WW25	500,842.12	3,662,920.25	149+70	CL	150+00	CL
V-WW26	500,809.68	3,663,407.53	154+50	CL	154+50	12'FS
V-WW27	500,724.11	3,663,913.99	159+70	50’ FS	160+00	51'FS
V-WW28-B	500,758.60	3,664,172.19	162+25	CL	162+00	CL
V-WW29-B	500,844.76	3,664,930.89	169+75	137’ PS	170+00	137' PS
V-WW30	500,677.03	3,665,394.47	174+50	CL	174+50	CL
V-WW31	500,598.80	3,665,942.09	180+05	CL	179+80	CL
V-WW32	500,776.57	3,665,998.98	180+20	187’ PS	180+01	187' PS

Table 9-1: Locations of Design Verification Borings

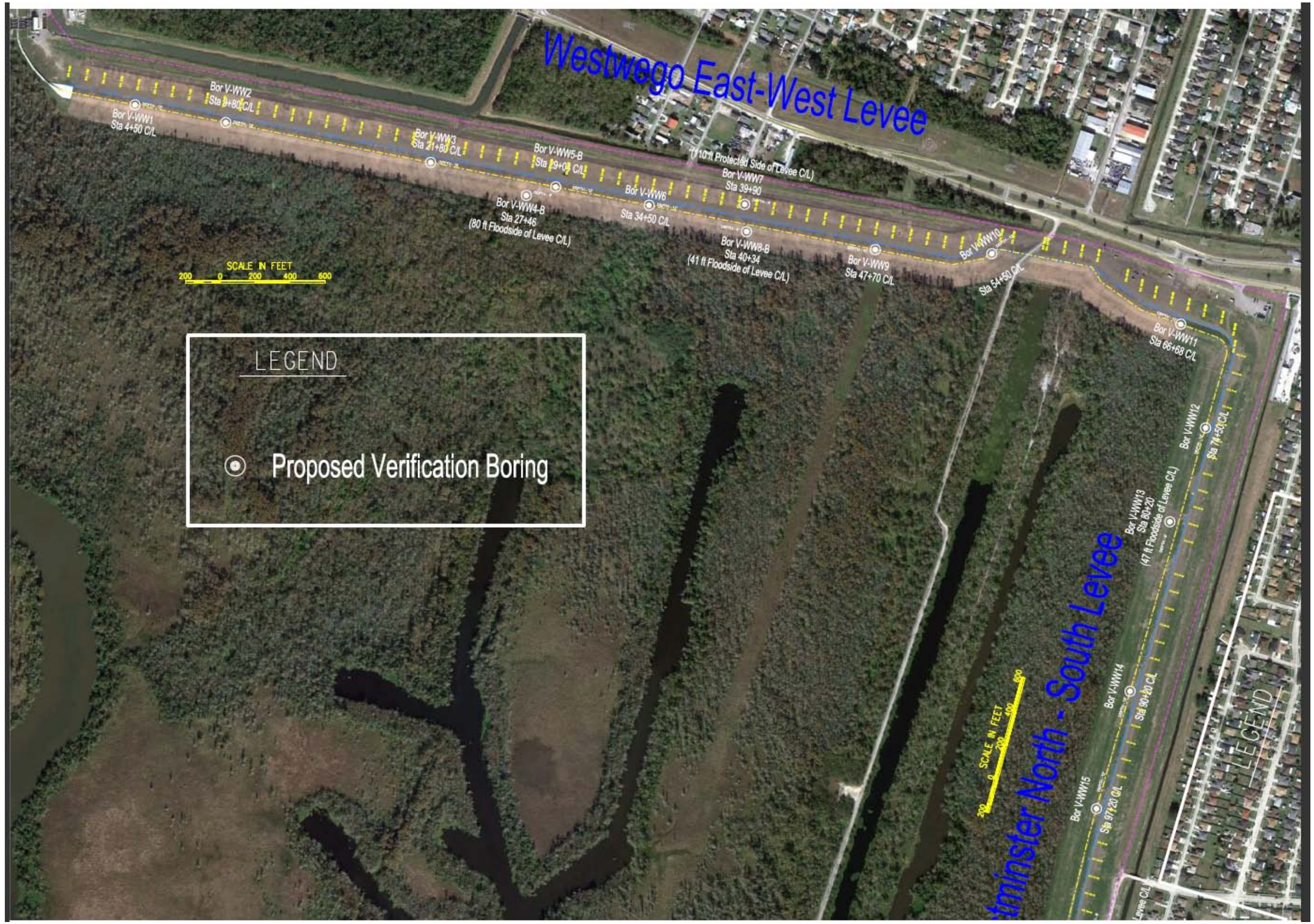


Figure 9-1: Design Verification Boring Locations.

Figure 9-2: Design Verification Boring Locations

Chapter 10 – Additional Studies and Analyses

Purpose

The purpose of these analyses was to investigate the variances in predicted performance, if any, between the completed project and the original design and to compare factors of safety for stability and seepage of the completed project with current Hurricane and Storm Risk Reduction System Design Guidelines (HSRRSDG).

Analyses were performed to estimate the potential increase in settlement and changes in the slope stability factors of safety considering:

1. Differences between the original design wet densities and the wet densities measured in tests performed on samples of the existing and new fill materials from the verification borings obtained during the Tiger Team study.
2. Differences between the design shear strengths and the shear strengths measured in tests performed on samples of the existing and new fill materials from the verification borings.
3. Differences between the design shear strength of the existing fill material and the shear strengths estimated from pocket penetrometer readings taken in the sidewalls of the test trenches.
4. Potentially weak planes in the new levee caused by decomposing woody debris.
5. Differences in compressibility due to the observed volume of wood in the new fill material.

In addition, seepage analyses were performed to investigate seepage factors of safety in the wet area at the toe of the protected side berm near Station 140+00.

References

a. Computer Programs. The following computer programs were used to evaluate the levees.
   (1) SEEP/W, Version 7.17
   (2) SLOPE/W, Version 7.17

b. Publications. The following USACE publications were utilized for guidance.
   (1) EM 1110-2-1901, Seepage Analysis and Control of Dams (April 1993)
   (2) ETL 1110-2-569, Design Guidance for Levee Underseepage (May 2005)
   (3) EM 1110-2-1902, Slope Stability (October 2003)
   (4) EM 1110-2-1913, Design and Construction of Levees (April 2000)
   (5) DIVR 1110-1-400, Soil Mechanics Data (December 1998)
   (6) Hurricane and Storm Risk Reduction System Design Guidelines (HSRRSDG), New Orleans District, USACE (12 June 08), including October 22, 2008 revisions to Table 3.1

c. Reports and Plans. The following design reports and construction drawings were utilized.

(1) New Westwego Pumping Station to New Orleans Village, First Lift (Phase 7 of S.P. No. 576-26-0002), Jefferson Parish, LA, As-built drawings (1996)
(2) New Westwego P.S. to New Orleans Village, Phase 2, First Lift Levee (WBV-14C.2), Jefferson Parish, LA, including Mod.# P0001 and P0002, (October 2009)
(3) Geotechnical Investigation, Authorized 2057 Height Soils Report, New Westwego Pump Station to Orleans Village, (March 2009)
(4) Letter Report for WBV-14c.2 Levee Enlargement, (25 Feb 2011)

Verification Borings

After completion of the project, verification borings were made by the USACE at selected locations to check the classifications, wet densities and shear strengths of the new fill materials. These borings were frequently co-located with investigation trenches. The Tiger Team was consulted about locations and exploration depths of the verification borings and about selection of the samples to be tested for shear strength. At the request of the Tiger Team, the boring depths were sometimes extended into the pre-existing levee fill materials or the natural foundation soils. Unconsolidated-undrained triaxial compression tests were performed to measure shear strength of selected samples. The water content, dry density and wet density were also determined for each compression test specimen. Borings are listed in Tables 10-1 through 10-3. Boring logs and laboratory test results are compiled in Appendix L.

Table 10-1 Verification Borings on Centerline

Boring Number	Date	Station	Ground Elevation, Feet NAVD88	Depth, Feet	Companion Trench
V-WW1	10/28/11	4+50	13.0	12	No
V-WW2	12/31/11	9+80	13.2	12	No
V-WW3	12/29/11	21+95	13.3	12	Yes
V-WW5	12/29/11	29+04	13.1	12	No
V-WW6	12/29/11	34+50	13.3	12	No
V-WW9	12/29/11	48+00	13.1	12	No
V-WW10	12/29/11	54+50	13.6	12	No
V-WW11	12/29/11	66+88	13.2	12	Yes
V-WW12	12/31/11	74+50	13.3	12	No
V-WW14	12/31/11	90+00	12.9	12	Yes
V-WW15	1/1/12	97+00	12.7	12	Yes
V-WW17	1/2/12	109+00	12.6	12	No
V-WW19	1/3/12	120+50	13.2	12	No
V-WW21	1/3/12	139+00	13.2	12	No
V-WW24	1/3/12	144+50	13.4	12	No
V-WW25	1/3/12	150+00	13.2	12	Yes
V-WW26	1/4/12	154+50	13.2	12	No
V-WW28B	1/3/12	162+50	13.3	12	Yes
V-WW30	1/4/12	174+50	13.4	12	No
V-WW31	1/4/12	179+80	13.3	12	Yes

Table 10-2 Verification Borings on Protected Side						
Boring Number	**Date**	**Station**	**Offset from Centerline, ft**	**Ground Elevation, Feet NAVD88**	**Depth, Feet**	**Companion Trench**
V-WW7	12/30/11	39+90	110	3.4	8	Yes
V-WW16	1/1/12	104+50	149	2.4	8	Yes
V-WW18	1/1/12	109+30	60	4.7	8	Yes
V-WW20B	1/2/12	120+38	84	6.3	8	Yes
V-WW22	1/2/12	140+00	225	4.2	12	No
V-WW22A	2/26/12	139+63	240	-1.7	12	No
V-WW22B	2/26/12	139+66	190.5	2.4	12	No
V-WW29B	1/2/12	170+00	137	5.2	8	Yes
V-WW32	1/1/12	180+01	187	2.8	8	Yes

Table 10-3 Verification Borings on Floodside						
Boring Number	**Date**	**Station**	**Offset from Centerline, ft**	**Ground Elevation, Feet NAVD88**	**Depth, Feet**	**Companion Trench**
V-WW4	13/30/11	27+46	80	5.0	8	Yes
V-WW8	12/30/11	40+34	41	6.3	8	Yes
V-WW13	1/1/12	80+00	47	5.9	8	Yes
V-WW23	1/3/12	140+00	150	4.0	12	No
V-WW27	1/4/12	160+00	51	6.2	8	Yes

Results of the laboratory tests performed on samples from the verification borings are identified by trench location (centerline, flood side and protected side) and by elevation (compacted fill and existing levee) and are presented as plots of cohesion versus elevation and wet density versus elevation on Figures Q-1 through Q-3 in Appendix Q. Some samples included in the plots as existing levee may actually be of natural soils beneath the existing levee or uncompacted fill placed on the flood side during the current contract to shift the levee towards the flood side and into the marsh. Values of cohesion and wet density used in the design slope stability analyses from the March 2009 WBV 14C.2 geotechnical design report are included on these figures for reference. On these plots, horizontal lines indicate the boundary between the existing levee and new fill materials used by the USACE for slope stability analyses performed during design. Hereafter, the fill materials placed during the most recent construction are referred to as "compacted fill" and the fill materials placed during previous construction are referred to as "existing levee". Design strength parameter plots used in the USACE design, along with the results of the design slope stability analyses, are presented in the original design report (reference c.(3) and Appendix W).

Centerline Data Laboratory test data from verification borings along the new levee centerline are presented on Figure Q-1. The lowest cohesion from tests performed on samples of the compacted fill is 500 pounds per square foot (psf), and the median value is about 1,350 psf. A

cohesion of 400 psf was assigned to the compacted fill for the original design. Tests showed an average wet density of the compacted fill of 116 pounds per cubic foot (pcf). A wet density of 110 pcf was assigned to the compacted fill for the original design. No tests were performed on samples of the existing levee from the centerline borings.

Flood Side Data Laboratory test data from verification borings along the flood side of the new levee are presented on Figure Q-2. The lowest cohesion from tests performed on samples of the compacted fill is 622 psf, and the median value is about 1,225 psf. A cohesion of 400 psf was assigned to the compacted fill for the original design. Tests showed an average wet density of the compacted fill of 120 pcf. A wet density of 110 pcf was assigned to the compacted fill for the original design. Two laboratory strength tests were performed on samples initially considered to be from the existing levee. It cannot be established whether these two samples came from the existing levee, uncompacted fill, or natural clays based solely on the sample elevations. These tests resulted in cohesions of about 341 psf and 500 psf. The moisture content of the sample with a cohesion of 341 psf was 67 percent, which suggests this sample is not compacted levee fill and more likely either uncompacted fill or natural clays. However, for the purposes of the Tiger Team investigation, both samples were assumed to be part of the existing levee. A cohesion of 600 psf was assigned to the existing levee for the original design. The average wet density from the two tests performed on samples of the existing levee is 112 pcf. A wet density of 110 pcf was assigned to the existing levee for the original design.

Protected Side Data Laboratory test data from verification borings along the protected side of the new levee are presented on Figure Q-3. The lowest cohesion from tests performed on samples of the compacted fill is 680 psf, and the median value is about 1,375 psf. A cohesion of 400 psf was assigned to the compacted fill for the original design. Tests showed an average wet density of the compacted fill of 113 pcf. A wet density of 110 pcf was assigned to the compacted fill for the original design. The lowest cohesion from tests performed on samples of the existing levee is 413 psf, and the median value is about 775 psf. A cohesion of 600 psf was assigned to the existing levee for the original design. The average wet density from tests performed on samples of the existing levee is 110 pcf. A wet density of 110 pcf was assigned to the existing levee for the original design.

Stability Analyses

With the exception of two relatively short reaches (Station 55+05 to 60+51 and Station 181+65 to 185+90), the new levee geometry can generally be represented by two typical cross sections. The levee from the beginning of the project at Station 0+44 to Station 110+59, with the exception noted above, can be represented by Typical Section 1 shown on Sheet C-13 of the project plans (reference c.(2) and Appendix G). This cross section was analyzed in the design report and was designated as the "Main Levee" section. The levee geometry from Station 120+61 to Station 181+65, with the exception noted above, can generally be represented by Typical Section 5 shown Sheet C-14A of the project plans (reference c.(2) and Appendix G).

Stability analyses were performed for Typical Section 1 and Typical Section 5. Analyses were performed for two water level conditions - the Still Water Level (elevation 9.4) and water at Project Grade (elevation 13.5). The wet densities and shear strengths from the March 2009 design report were used for the foundation soils (i.e., soils below the base of the existing levee).

Except for the existing levee on the flood side and centerline, the shear strength values used in the analyses for compacted fill and existing levee were selected so about 1/3 of the laboratory test results were less than the assigned value and 2/3 were greater than the assigned value as outlined in the HSRRSDG. Because of the small sample size of the data collected within the existing levee on the flood side and the absence of laboratory tests on samples of existing levee along the centerline, the 1/3 to 2/3 shear strength rule could not be followed and the average of the tests on flood side samples was used in these material regions. As a check, the strength values assigned to the existing levee in the Tiger Team analysis were compared to the larger set of shear strength data presented in the March 2009 design report and concluded that the average value used in this analysis is realistic and conservative. The average wet densities from the verification borings were assigned to the compacted fill and existing levee. Material regions used for the compacted fill and existing levee in the stability analyses are illustrated in Figure Q-4. Parameters assigned to each region are shown in Table 10-4.

Table 10-4 Soil Parameters for Stability Analyses

Material Region	From Verification Borings (From Original Design)	
	Average Wet Density, PCF	Cohesion Based on 1/3 – 2/3 Criteria, PSF
Levee Section - Compacted Fill	116 (110)	1150 (400)
Levee Section - Existing Levee (note 1)	112 (110)	420 (600)
Floodside - Compacted Fill	120 (110)	1150 (400)
Floodside - Existing Levee (note 2)	112 (110)	420 (600)
Protected Side - Compacted Fill/Existing Levee Above El 1.5	113 (110)	1000 (400)
Protected Side - Existing Levee Below Elevation 1.5	110 (110)	700 (600)

Note 1 – No tests were performed on samples of existing levee from the centerline borings. The average cohesion and average wet density from the floodside borings were conservatively assigned to this region. Based on the elevations of the two floodside samples tested, these soils are most likely either natural clays or uncompacted fill.
Note 2 – The assigned shear strength for the existing levee on the floodside is the average of the two samples tested.

The stability analyses were performed using the SLOPE/W, Version 7.17 computer program and Spencer's Method of analysis. Both circular and non-circular failure surfaces were considered. Critical failure surfaces were located using the entry and exit search method for circular surfaces and the block search method for non-circular surfaces. Analyses were then performed for a fully specified surface after locating the critical failure surface by the entry/exit and block search methods. All of the analyses were performed using the Optimization Procedure in SLOPE/W (recommended by MVN).

Tension cracks were used when tension appeared in the results of the Spencer's Method analysis. Tension cracks were only used when tension occurred in the upper (or active zone) portion of the slip surface. Tension can appear in the analysis along the upper portion of the slip surface in various ways, such as negative normal side forces on the slices (normal side forces on the slices are not compressive); negative total or effective normal forces on the bases of the slices; or line of thrust (or interslice forces resultant) acting outside the slice boundaries. The slice forces and normal forces (at the base of the slices) were examined to determine the need for including a

tension crack in the analysis. An iterative process was used to determine the depth of tension crack at which tensile stresses were removed from the analysis. The depth of tension cracks used in the analyses varied from 4 feet to 7 feet.

The results of the analyses were compared to the design factors of safety presented in the June 12, 2008 revision of Table 3.1 of the Hurricane and Storm Risk Reduction System Design Guidelines. The results of the analyses are presented on Figures Q-5 through Q-8 in Appendix Q and summarized in Table 10-5.

Table 10-5 Results of Stability Analyses

Analysis Cross Section	Water Level Condition	Factor of Safety		Search Method	Depth of Tension Crack, Feet	Minimum Elevation of Critical Failure Surface	Figure No.
		Target	Minimum Computed				
Typical Section 1	Still Water Level (9.4)	1.50	1.45	Fully Specified	7	-30.2	Q-5
	Project Grade (13.5)	1.40	1.37	Entry/Exit	5	-33.7	Q-6
Typical Section 5	Still Water Level (9.4)	1.50	1.47	Fully Specified	7	-26.8	Q-7
	Project Grade (13.5)	1.40	1.44	Fully Specified	4	-25.5	Q-8

Computed factors of safety for the Still Water Level (elevation 9.4) are less than those required by current criteria. The computed factor of safety for the water at Project Grade (elevation 13.5) is less than current criteria for Typical Section 1. Two soil properties contribute to the reduced factors of safety – the reduced strength in the existing levee and the increased wet density in the compacted fill and existing levee materials. The increased strength in the compacted fill results in an increase in the calculated factor of safety; however, the increase is partially offset by the consideration of a tension crack in the analyses.

The soil borings and cone penetration tests (CPT's) used to develop strengths and wet densities for the Phase 2 First Lift design (current project) were completed prior to the Phase 1 enlargement (last lift placed on the previous levee). Some consolidation of the foundations soils has occurred due to increases in vertical stress resulting from both the Phase 1 and Phase 2 construction. Consolidation results in an increase in the undrained shear strength of the foundation soils that is proportional to the increase in vertical stress. Additional analyses were performed for Typical Section 1 to investigate the increase in factor of safety associated with consolidation and strength gain in the foundation soils. Changes in vertical stress were estimated using Boussinesq theory. Strength gain was estimated based on a c/p ratio of 0.22 assuming

uniform consolidation throughout the depth of all clay strata. The analyses were performed for the Still Water Level. The results of these analyses are presented on Figures Q-5, Q-9 and Q-10 in Appendix Q and are summarized in Table 10-6.

Table 10-6 Results of Stability Analyses With Strength Gain – Typical Section 1 – SWL = 9.4

Degree of Consolidation, %	Factor of Safety		Search Method	Depth of Tension Crack, Feet	Minimum Elevation of Critical Failure Surface	Figure No.
	Target	Minimum Computed				
0	1.50	1.45	Fully Specified	7	-30.2	Q-5
20	1.50	1.47	Fully Specified	7	-26.5	Q-9
30	1.50	1.51	Fully Specified	7	-24.6	Q-10

Settlement plates were installed and surveyed near the protected side edge of the levee crown before new fill was placed. Subsequent surveys of the settlement plates show settlement during Phase 2 construction varied from about 0.5 feet to 1.0 feet with an average settlement of 0.75 feet. The average fill height above these settlement plates was 5.3 feet. The degree of consolidation corresponding to this amount of settlement cannot be determined without knowing the ultimate settlement that will occur due to the Phase 2 construction. If it is conservatively estimated that the ultimate settlement will be equal to 2/3 of the fill height, then the degree of consolidation is 0.75'/(5.3'x2/3)x100=21%. Based on these analyses, it appears that the current factors of safety for stability are slightly less than required by the HSRRSDG.

The lowest pocket penetrometer reading measured during trenching (250 psf) occurred in the elevation interval from 2.5 to 3.0 feet in the test trench located 63 feet towards the protected side at Station 120+39. Shear strengths from the pocket penetrometer readings within this depth interval ranged from 250 psf to 500 psf. The triaxial tests from the verification boring made adjacent to this trench (V-WW20B) resulted in undrained shear strengths of 680 psf, 1230 psf, and 414 psf for samples at elevations of 3.2 feet, 1.2 feet, and -0.8 feet, respectively. Additional slope stability analyses were performed to verify that lower undrained shear strength in the existing levee fill would not result in low factors of safety for potential failure surfaces that are essentially confined to the compacted fill and existing levee fill. In order to prevent the failure surfaces from migrating into the foundation, the optimization procedure was not used in these analyses. These analyses resulted in a minimum factor of safety of 3.3. These analyses are considered conservative due to the inaccuracy of the pocket penetrometer readings and the higher shear strengths measured by the triaxial tests completed on samples from the adjacent verification boring. The results of the analyses are presented on Figure Q-11.

There were no trenches excavated during either Phase I or Phase II trenching where continuous layers of wood were observed within the levee. Wood debris encountered in the trenches was well encapsulated by high plasticity clay (CH), and there were no observed voids or horizontal layers of interconnected wood. However, there were specific layers in some trenches that did have measured volumes of wood greater than other layers and/or other trenches. Some Tiger Team members expressed concern that weakening of the levee fill could occur along horizontal layers containing the high concentrations of woody debris, and that this weakening could contribute to failure of the levee. The team discussed possible mechanisms that could lead to weakening of the fill (such as voids created by decomposing wood and softening of clays adjacent to water filled voids), as well as possible approaches to quantify the amount of weakening. One suggested approach for quantifying the weakening was to simply reduce the strength of the compacted fill by the percentage of wood, by volume, in the fill. This approach was questioned by some team members. All team members agreed that decomposition of woody debris in the fill would result in some decrease in shear strength, but no consensus was reached on the likelihood of significant decomposition of the woody debris or the magnitude of the resulting reduction in shear strength.

It was agreed that additional slope stability analyses would be performed to investigate this issue. For these analyses, horizontal strata were postulated in the compacted fill at depth intervals from 3 feet to 4 feet, 6 feet to 7 feet and 9 feet to 10 feet. Simple wedge-type failure surfaces were evaluated for sliding along horizontal surfaces within each of these depth intervals. The analyses were performed for water at elevation 13.5 feet. Iterative analyses were performed in an attempt to back-calculate the shear strength in the weakened stratum that would yield a factor of safety of 1.4. However, the factor of safety remained above 1.4 when the cohesion was reduced to 10 psf. The results of the analyses are summarized in Table 10-7.

Table 10-7 Results of Stability Analyses – Reduced Cohesion in Layers with Woody Debris

Depth of Weakened Layer, FT	FS for Cohesion = 10 psf
3-4	1.56
6-7	3.08
9-10	8.06

These analyses indicate that the levee would remain above HSDRRSDG slope stability criteria even if the undrained shear strength within a “weakened” layer was reduced to 10 psf. This type of shear strength loss is unrealistic. These analyses, in combination with the visual observations during Phase I and Phase II trenching, demonstrate that this is an improbable failure mode.

Settlement

Two factors have been identified in this study that could contribute to increased settlements - the wet density of the compacted fill along the centerline and possible decomposition of woody debris in the levee fill. Some team members expressed concerns that woody debris in the levee will either decay or be reduced by termites, leading to increased settlement of the levee. A consensus could not be reached regarding the validity of these concerns.

The estimated schedule for future lifts presented in the geotechnical design report (reference c.(3) and Appendix W) is included as Figure Q-12 in Appendix Q. The Team understands that this schedule was developed based on settlement history of the site. This observational approach is considered to be superior to theoretical analyses, provided the fill thicknesses and configurations of the levees are similar. It was reported that historic surveys of the prior levee show 2 to 3.5 feet of settlement during the first 4 to 5 years after construction and about 1.5 feet of additional settlement over the following 5 years. A review of the project plans for the new and old levees indicates that the average fill thickness beneath the crown of the new levee varies from about 5 feet to 8 feet, while the thickness of fill beneath the crown of the old levee varied from about 8 to 11 feet. Since the fill thickness beneath the new levee crown is less than the fill thickness beneath the old levee crown, it would be expected that settlements of the new levee would be somewhat less than those reported for the old levee and that the schedule for future lifts based on observed settlement of the old levee is slightly conservative (i.e., over-estimates the future settlement).

The magnitude of settlement depends on a number of factors including:

(1) the applied load,
(2) the compressibility of the foundation soils and
(3) shrinkage of the embankment fill materials.

Estimates of settlement are often made based on one-dimensional consolidation theory. In these theoretical analyses, the load is estimated based on the anticipated wet density of the embankment fill, and the shrinkage of the fill material is taken as some percentage of the fill thickness based on experience. Since the magnitude of settlement and the schedule for future lifts for this project were estimated based on experience with previous levee construction in the project area, an evaluation of the potential for additional settlement due to the wet density of the compacted fill and the decomposition of woody debris in the levee fill must be based on a comparison of the properties of the new and old fill. For instance, the effect of wet density on settlement should be based on a comparison of 116 pcf (average wet density of the new fill based on laboratory tests performed on samples from the verification borings) and 115 pcf (average wet density of the old fill based on laboratory test data presented in the geotechnical design report). Woody debris was encountered in the test pits excavated in both the old fill and new fill. Based on data presented in Chapter 6, the volume of wood in fill placed for the current project is similar to the volume of wood in fill placed for the previously constructed levee.

With these factors in mind, a conservative approach was taken in the analyses to estimate the potential increase in settlement considering the factors above. The following assumptions were made for these analyses:

1. The ultimate settlement due to construction of the Phase 2, WBV-14C.2 levee will be 4.85 feet, which is the cumulative settlement from the lift schedule during the time period from 2011 to 2057.
2. The load on the foundation is increased by the ratio of the average wet density from the verification borings to the average wet density of the old fill based on laboratory test data presented in the geotechnical design report (116 pcf/115 pcf)
3. For small increases in vertical stress, the increase in settlement is proportional to the increase in load.
4. The increase in the amount of wood in the compacted fill compared to the existing levee is 1% by volume. It is further assumed that this increase in wood applies to the full thickness of the compacted fill.
5. All wood in the compacted fill will decay, the voids will collapse and the crown of the levee will settle.

Accordingly, the increase in settlement due to the increase in wet density of the compacted fill is conservatively estimated to be:

4.85' – 4.85' x (116pcf/115pcf) = 0.04' = 0.5"

For a fill thickness of 8 feet at the levee crown, the increase in settlement due to complete decay of wood is conservatively estimated to be:

8' * .01 = .08' = 1.0"

The total estimated potential increase in settlement due to the increase in wet density of the compacted fill and the complete decay of wood is about 1.5 inches. When expressed as a percentage of the assumed ultimate settlement, there is a 0.85% increase related to the increase in wet density and a 1.7% increase due to decay of wood. The total estimated potential increase in settlement is considered small in terms of the accuracy of settlement predictions in this geologic environment and when viewed in light of the variations in settlement revealed by past surveys. For instance, the reported settlement after the first lift of the previously constructed levee varied from 2 to 3.5 feet, a difference of 18 inches. Further, any increased settlement due to decomposition of wood should also be considered in light of the fact that wood decay does not occur instantaneously but over a period of time. The rate of decay is expected to be greatest near the surface where normal shrinkage cracks can provide an avenue for moisture and oxygen to accelerate decomposition, but the lack of oxygen and water at greater depths would reduce the rate of decay.

It should be noted that if the properties of the fill used in previous construction (i.e., wet density and wood volume) were not actually different than the properties of the fill used in the current project, then no increase in settlement would be expected. The data presented in Chapter 6 show that wood volumes are similar in the new fill and the existing levee fill. In addition, the field moisture/density test data (1,121 tests) summarized in Chapter 7 show an average wet density of the compacted fill of 114.1 pcf, which is less than the average wet density of the old fill based on laboratory test data presented in the geotechnical design report (115 pcf). Considering these data, the estimated increases in settlement presented above are considered conservative.

Additional Settlement Calculations Related to Decay of Wood

Additional calculations were performed to estimate the reduction of embankment height assuming that all of the wood in the new embankment fill will decay and the resulting voids will collapse. This settlement estimate accounts for the volume of wood pieces recovered from the trenches as well as the volume of wood measured in the bulk samples. For these analyses, it was assumed that the laboratory tests on the bulk samples captured the volume of wood pieces less than 6 inches in length. The volume of the wood pieces 6 inches and greater in length was estimated by dividing the weight of the wood recovered from the trenches by a conservative wood density of 35 pcf.

The bulk samples were obtained at locations where the Tiger Team observed very high concentrations of organic matter and small wood pieces. Consequently, the measured wood volumes in the bulk samples are not considered typical, but rather high end values. Calculations were performed using both the lowest and highest wood volumes from the bulk samples (0.05% and 1.31%). Settlements corresponding to the lowest and highest values are considered to represent lower and upper bound estimates, respectively.

Calculations were performed for each layer in each trench. First, the estimated volume of wood 6 inches and greater in length was divided by the volume of the excavated layer to determine the percentage of wood by volume. The percentage of wood by volume from the bulk sample was added to determine the total percentage of wood for the layer. The total percentage of wood by volume was then multiplied by the thickness of the layer to determine the loss of height due to wood decay in each incremental layer of excavation. The computed values for each incremental layer were summed to determine the loss of height in that trench due to wood decay. Finally, the loss of height in each trench was prorated for the remaining depth of levee embankment below the inspection trench. This prorating was done assuming an 8-foot total thickness of embankment, regardless of the trench location and elevation, and assumes that the percentage of wood in the inspection trench is representative of the soils below the inspection trench. The 8-foot total thickness of embankment is the thickness of fill placed under the new levee centerline for the majority of the WBV 14C.2 project. Minimum and maximum values of settlement are reported at each step in the calculations, which correspond to the lowest and highest wood percentages from the bulk samples, respectively.

The maximum computed loss of height due to wood decay was estimated to be about 1 inch for the minimum wood volume from the bulk samples and about 2.2 inches for the maximum wood volume from the bulk samples. The results of these analyses are summarized in Table 10-8.

Table 10-8 Additional Settlement Due to Wood Decay									
				% Wood Bulk Sample =		0.05	% Wood Bulk Sample =		1.31
Depth	Total Weight of Wood ≥ 6 inches long	Wood Vol Assuming Wood Density of 35 pcf	All Wood ≥ 6 inches as % of Total Layer Volume	Wood Vol + Bulk Sample Vol	Settlement due to Wood Decay	Settlement Prorated through 8-ft Fill	Wood Vol + Bulk Sample Vol	Settlement due to Wood Decay	Settlement Prorated through 8-ft Fill
	(lbs)	(cu ft)	(%)	(%)	(inches)	(inches)	(%)	(inches)	(inches)
Station 1+41, 21' Floodside									
0' - 1.1'	2.34	0.067	0.0695	0.120	0.014		1.380	0.166	
1.1' - 2.1'	8.63	0.247	0.3879	0.438	0.053		1.698	0.204	
2.1' - 3'	2.73	0.078	0.1832	0.233	0.028		1.493	0.179	
3' - 4'	3.98	0.114	0.1856	0.236	0.028		1.496	0.179	
4' - 5'	3.68	0.105	0.1357	0.186	0.022		1.446	0.173	
Totals					**0.15**	**0.23**		**0.90**	**1.44**
Station 4+42, 34' Protected Side									
Wedge	14.74	0.421	0.5345	1.731	0.208		1.844	0.221	
0' - 1'	0.29	0.008	0.0096	0.060	0.007		1.320	0.158	
1' - 2'	3.48	0.099	0.2107	0.261	0.031		1.521	0.182	
2' - 3'	10.44	0.298	0.7616	0.812	0.097		2.072	0.249	
Station 9+80, 49' Floodside									
0' - 1'	1.01	0.029	0.0349	0.085	0.010		1.345	0.161	
1' - 2'	2.57	0.073	0.1236	0.174	0.021		1.434	0.172	
2' - 3'	1.62	0.046	0.0812	0.131	0.016		1.391	0.167	
3' - 4'	1.16	0.033	0.0597	0.110	0.013		1.370	0.164	
4' - 5'	0.67	0.019	0.0642	0.114	0.014		1.374	0.165	
Totals					**0.07**	**0.12**		**0.83**	**1.33**
Station 21+95, Centerline									
0' - 1'	0.31	0.009	0.0111	0.061	0.007		1.321	0.159	
1' - 2'	0.28	0.008	0.0163	0.066	0.008		1.326	0.159	
2' - 3'	2.27	0.065	0.1256	0.176	0.021		1.436	0.172	
3' - 4'	1.22	0.035	0.0483	0.098	0.012		1.358	0.163	
4' - 5'	0	0.000	0.0000	0.050	0.006		1.310	0.157	
5' - 6'	3.59	0.103	0.2747	0.325	0.039		1.585	0.190	
Totals					**0.09**	**0.12**		**1.00**	**1.33**

Table 10-8 cont'd Additional Settlement Due to Wood Decay									
				% Wood Bulk Sample =		0.05	% Wood Bulk Sample =		1.31
Depth	Total Weight of Wood ≥ 6 inches long (lbs)	Wood Vol Assuming Wood Density of 35 pcf (cu ft)	All Wood ≥ 6 inches as % of Total Layer Volume (%)	Wood Vol + Bulk Sample Vol (%)	Settlement due to Wood Decay (inches)	Settlement Prorated through 8-ft Fill (inches)	Wood Vol + Bulk Sample Vol (%)	Settlement due to Wood Decay (inches)	Settlement Prorated through 8-ft Fill (inches)
Station 27+25, 80' Floodside									
0' - 1'	1.39	0.040	0.0411	0.091	0.011		1.351	0.162	
1' - 2'	2.7	0.077	0.0906	0.141	0.017		1.401	0.168	
2' - 3'	2.07	0.059	0.0848	0.135	0.016		1.395	0.167	
3' - 4'	2.44	0.070	0.1306	0.181	0.022		1.441	0.173	
Totals					**0.07**	**0.13**		**0.67**	**1.34**
Station 29+50, 13' Floodside									
0' - 1'	0.13	0.004	0.0030	0.053	0.006		1.313	0.158	
1' - 2'	0.9	0.026	0.0234	0.073	0.009		1.333	0.160	
2' - 3'	2.01	0.057	0.0589	0.109	0.013		1.369	0.164	
3' - 4.5'	2.74	0.078	0.0614	0.111	0.013		1.371	0.165	
4.5' - 5'	3.84	0.110	0.3025	0.352	0.042		1.612	0.193	
Totals					**0.08**	**0.13**		**0.84**	**1.34**
Station 32+29, 110' Floodside									
0' - 1'	2.69	0.077	0.0821	0.132	0.016		1.392	0.167	
1' - 2'	3.16	0.090	0.1059	0.156	0.019		1.416	0.170	
2' - 3'	3.14	0.090	0.1248	0.175	0.021		1.435	0.172	
3' - 4'	0	0.000	0.0000	0.050	0.006		1.310	0.157	
4' - 5'	0	0.000	0.0000	0.050	0.006		1.310	0.157	
Totals					**0.07**	**0.11**		**0.82**	**1.32**
0' - 1'	0.45	0.013	0.0145	0.065	0.008		1.325	0.159	
1' - 2'	1.91	0.055	0.1012	0.151	0.018		1.411	0.169	
2'-3'	0	0.000	0.0000	0.050	0.006		1.310	0.157	
3'-4'	0	0.000	0.0000	0.050	0.006		1.310	0.157	
Totals					**0.04**	**0.08**		**0.64**	**1.29**
Station 39+90, 120' Floodside									
0' - 1'	0.44	0.013	0.0120	0.062	0.007		1.322	0.159	
1'-2'	0	0.000	0.0000	0.050	0.006		1.310	0.157	
2' - 3'	0.06	0.002	0.0052	0.055	0.007		1.315	0.158	
3' - 4'	0.21	0.006	0.0100	0.060	0.007		1.320	0.158	
Totals					**0.03**	**0.05**		**0.63**	**1.26**

Table 10-8 cont'd Additional Settlement Due to Wood Decay									
Depth	Total Weight of Wood ≥ 6 inches long (lbs)	Wood Vol Assuming Wood Density of 35 pcf (cu ft)	All Wood ≥ 6 inches as % of Total Layer Volume (%)	% Wood Bulk Sample = 0.05			% Wood Bulk Sample = 1.31		
				Wood Vol + Bulk Sample Vol (%)	Settlement due to Wood Decay (inches)	Settlement Prorated through 8-ft Fill (inches)	Wood Vol + Bulk Sample Vol (%)	Settlement due to Wood Decay (inches)	Settlement Prorated through 8-ft Fill (inches)
Station 40+51, 38' Floodside									
0' - 1'	14.18	0.405	0.5312	0.581	0.070		1.841	0.221	
1' - 2'	2.95	0.084	0.1355	0.185	0.022		1.445	0.173	
2' - 3'	2.89	0.083	0.1224	0.172	0.021		1.432	0.172	
3' - 4'	1.3	0.037	0.0762	0.126	0.015		1.386	0.166	
4' -5'	0.15	0.004	0.0080	0.058	0.007		1.318	0.158	
Totals					**0.13**	**0.22**		**0.89**	**1.43**
Station 66+88, Centerline									
0' - 1'	1.61	0.046	0.0588	0.109	0.013		1.369	0.164	
1' - 2'	3.5	0.100	0.2297	0.280	0.034		1.540	0.185	
2' - 3'	0.29	0.008	0.0166	0.067	0.008		1.327	0.159	
3' - 3.5'	0.52	0.015	0.0618	0.112	0.013		1.372	0.165	
Totals					**0.07**	**0.16**		**0.67**	**1.54**
Station 70+00, Centerline									
0' - 1'	0.67	0.019	0.0346	0.085	0.010		1.345	0.161	
1' - 2'	0.32	0.009	0.0155	0.066	0.008		1.326	0.159	
2' - 3'	0.88	0.025	0.0451	0.095	0.011		1.355	0.163	
3' - 4'	0.8	0.023	0.1184	0.168	0.020		1.428	0.171	
Totals					**0.05**	**0.10**		**0.65**	**1.31**
Station 71+39, 36' Protected Side									
Wedge	0	0.000	0.0000	0.050	0.006		1.310	0.157	
0' - 1'	3.84	0.110	0.1479	0.198	0.024		1.458	0.175	
1' - 2'	0.24	0.007	0.0139	0.064	0.008		1.324	0.159	
2' - 3'	4.29	0.123	0.2247	0.275	0.033		1.535	0.184	
Totals					**0.07**	**0.19**		**0.68**	**1.80**
Station 98+00, Centerline									
0' - 1'	2.47	0.071	0.0897	0.140	0.017		1.400	0.168	
1' - 2'	2.57	0.073	0.1391	0.189	0.023		1.449	0.174	
2' - 3'	9.56	0.273	0.4071	0.457	0.055		1.717	0.206	
3' - 4'	8.54	0.244	0.6128	0.663	0.080		1.923	0.231	
Totals					**0.17**	**0.35**		**0.78**	**1.56**

Table 10-8 cont'd Additional Settlement Due to Wood Decay									
				% Wood Bulk Sample =		0.05	% Wood Bulk Sample =		1.31
Depth	Total Weight of Wood ≥ 6 inches long (lbs)	Wood Vol Assuming Wood Density of 35 pcf (cu ft)	All Wood ≥ 6 inches as % of Total Layer Volume (%)	Wood Vol + Bulk Sample Vol (%)	Settlement due to Wood Decay (inches)	Settlement Prorated through 8-ft Fill (inches)	Wood Vol + Bulk Sample Vol (%)	Settlement due to Wood Decay (inches)	Settlement Prorated through 8-ft Fill (inches)
Station 104+51, 149' Protected Side									
0' - 1'	3.04	0.087	0.0885	0.139	0.017		1.399	0.168	
1' - 2'	4.65	0.133	0.1830	0.233	0.028		1.493	0.179	
2' - 3'	13.62	0.389	0.6547	0.705	0.085		1.965	0.236	
3' - 4'	4.46	0.127	0.2116	0.262	0.031		1.522	0.183	
Totals					**0.16**	**0.32**		**0.77**	**1.53**
Station 108+18, 60' Protected Side									
0' -1'	30.2	0.863	0.8935	0.944	0.113		2.204	0.264	
1' - 2'	0.31	0.009	0.0103	0.060	0.007		1.320	0.158	
2' - 3'	0.08	0.002	0.0043	0.054	0.007		1.314	0.158	
3' - 3.5'	0.13	0.004	0.0114	0.061	0.007		1.321	0.159	
Totals					**0.13**	**0.31**		**0.74**	**1.69**
Station 109+30, 33' Protected Side									
Wedge	8.3	0.237	0.9726	1.023	0.123		2.283	0.274	
0' - 1'	5.1	0.146	0.1430	0.193	0.023		1.453	0.174	
1' - 2'	0.61	0.017	0.0414	0.091	0.011		1.351	0.162	
2' - 3'	0.14	0.004	0.0097	0.060	0.007		1.320	0.158	
Totals					**0.16**	**0.44**		**0.77**	**2.05**
Station 120+39, 69' Protected Side									
0 - 1'	34.59	0.988	0.7732	0.823	0.099		2.083	0.250	
1' - 2'	5.25	0.150	0.2447	0.295	0.035		1.555	0.187	
2' - 3'	10.58	0.302	0.3840	0.434	0.052		1.694	0.203	
3' - 4'	7.1	0.203	0.2684	0.318	0.038		1.578	0.189	
Totals					**0.22**	**0.45**		**0.83**	**1.66**
Station 121+46, 15' Protected Side									
0 - 1'	8.55	0.244	0.2790	0.329	0.039		1.589	0.191	
1' - 2'	3.8	0.109	0.1621	0.212	0.025		1.472	0.177	
2' - 3'	2.24	0.064	0.0897	0.140	0.017		1.400	0.168	
3' - 3.5'	1.1	0.031	0.1229	0.173	0.021		1.433	0.172	
Totals					**0.10**	**0.23**		**0.71**	**1.62**

Table 10-8 cont'd Additional Settlement Due to Wood Decay									
				% Wood Bulk Sample =		0.05	% Wood Bulk Sample =		1.31
Depth	Total Weight of Wood ≥ 6 inches long (lbs)	Wood Vol Assuming Wood Density of 35 pcf (cu ft)	All Wood ≥ 6 inches as % of Total Layer Volume (%)	Wood Vol + Bulk Sample Vol (%)	Settlement due to Wood Decay (inches)	Settlement Prorated through 8-ft Fill (inches)	Wood Vol + Bulk Sample Vol (%)	Settlement due to Wood Decay (inches)	Settlement Prorated through 8-ft Fill (inches)
Station 136+07, Centerline									
0 - 1'	6.77	0.193	0.3350	0.385	0.046		1.645	0.197	
1' - 2'	2.39	0.068	0.0960	0.146	0.018		1.406	0.169	
2' - 3'	0.47	0.013	0.0178	0.068	0.008		1.328	0.159	
3' - 4' (left)	0.47	0.013	0.0186	0.069	0.008		1.329	0.159	
Totals					**0.08**	**0.16**		**0.68**	**1.37**
Station 141+46, 118' Protected Side									
0' - 1'	0.53	0.015	0.0193	0.069	0.008		1.329	0.160	
1' - 2'	1.44	0.041	0.0580	0.108	0.013		1.368	0.164	
2' - 3'	0.69	0.020	0.0399	0.090	0.011		1.350	0.162	
3' - 4'	0.58	0.017	0.0246	0.075	0.009		1.335	0.160	
Totals					**0.04**	**0.08**		**0.65**	**1.29**
Station 154+50, 12' Floodside									
0' - 1'	0.29	0.008	0.0103	0.060	0.007		1.320	0.158	
1' - 2'	1.21	0.035	0.0300	0.080	0.010		1.340	0.161	
2' - 3'	13.09	0.374	0.4446	0.495	0.059		1.755	0.211	
3' - 4'	6.54	0.187	0.2675	0.318	0.038		1.578	0.189	
4' - 5'	23.21	0.663	0.7160	0.766	0.092		2.026	0.243	
Totals					**0.21**	**0.33**		**0.96**	**1.54**
Station 162+50, Centerline									
0' - 1'	1.01	0.029	0.0313	0.081	0.010		1.341	0.161	
1' - 2'	1.02	0.029	0.0335	0.084	0.010		1.344	0.161	
2' - 3'	5.45	0.156	0.2082	0.258	0.031		1.518	0.182	
3' - 4'	12.09	0.345	0.5223	0.572	0.069		1.832	0.220	
4' - 5'	11.21	0.320	0.4798	0.530	0.064		1.374	0.165	
Totals					**0.18**	**0.29**		**0.89**	**1.42**

Table 10-8 cont'd Additional Settlement Due to Wood Decay									
Depth	Total Weight of Wood ≥ 6 inches long (lbs)	Wood Vol Assuming Wood Density of 35 pcf (cu ft)	All Wood ≥ 6 inches as % of Total Layer Volume (%)	% Wood Bulk Sample = 0.05			% Wood Bulk Sample = 1.31		
				Wood Vol + Bulk Sample Vol (%)	Settlement due to Wood Decay (inches)	Settlement Prorated through 8-ft Fill (inches)	Wood Vol + Bulk Sample Vol (%)	Settlement due to Wood Decay (inches)	Settlement Prorated through 8-ft Fill (inches)
Station 165+08, 31' Protected Side									
0 - 1'	3.14	0.090	0.0977	0.148	0.018		1.408	0.169	
1' - 2'	12.65	0.361	0.4135	0.463	0.056		1.723	0.207	
2' - 3'	1.02	0.029	0.0762	0.126	0.015		1.386	0.166	
Totals					**0.09**	**0.24**		**0.54**	**1.45**
Station 166+90, Centerline									
0' - 1'	6.69	0.191	0.2002	0.250	0.030		1.510	0.181	
1' - 2'	3.89	0.111	0.2113	0.261	0.031		1.521	0.183	
2' - 3'	3.11	0.089	0.1224	0.172	0.021		1.432	0.172	
3' - 4'	12.87	0.368	0.6788	0.729	0.087		1.989	0.239	
Totals					**0.17**	**0.34**		**0.77**	**1.55**
Station 172+08, 55' Protected Side									
0 - 1'	2.15	0.061	0.0710	0.121	0.015		1.381	0.166	
1' - 2'	2.56	0.073	0.1270	0.177	0.021		1.437	0.172	
2' - 3'	25.98	0.742	1.3678	1.418	0.170		2.678	0.321	
Totals					**0.21**	**0.55**		**0.66**	**1.76**
Station 174+00, Centerline									
0 - 1'	3.81	0.109	0.0893	0.139	0.017		1.399	0.168	
1' - 2'	6.6	0.189	0.1444	0.194	0.023		1.454	0.175	
3' - 4'	11.53	0.329	0.3733	0.423	0.051		1.683	0.202	
Totals					**0.09**	**0.18**		**0.54**	**1.09**
Station 179+80, Centerline									
0 - 1'	7.92	0.226	0.1955	0.246	0.029		1.506	0.181	
1' - 2'	15.93	0.455	0.5006	0.551	0.066		1.811	0.217	
2' - 3'	9.96	0.285	0.2715	0.322	0.039		1.582	0.190	
3' - 4'	26.34	0.753	0.6109	0.661	0.079		1.921	0.231	
Totals					**0.21**	**0.43**		**0.82**	**1.64**
Station 180+01, 187' Protected Side									
0 - 1'	3.52	0.101	0.0970	0.147	0.018		1.407	0.169	
1' - 2'	12.85	0.367	0.4145	0.464	0.056		1.724	0.207	
2' - 3'	10.31	0.295	0.3707	0.421	0.050		1.681	0.202	
3' - 3.5'	12.66	0.362	0.6301	0.680	0.082		1.940	0.233	
Totals					**0.21**	**0.47**		**0.81**	**1.85**

Seepage/Wet Areas

During construction, the SLFPA-W reported wet areas along an approximate 1-mile long portion of the Westminster East-West Levee between the toe of the protected side berm and the drainage canal. The USACE prepared a letter report (reference c.(4) and Appendix Q) describing their investigations, opinions and recommendations regarding the wet areas. The report concluded that the wet areas were not the result of underseepage. The report indicates that the wet areas were generally located along a line approximately 110 feet to the protected side of the existing levee. It was concluded that the wet areas were near the end of the "drainage blanket", and that the observed water was bleeding from the blanket into low areas adjacent to the blanket and/or pumping up to the surface of the overlying fill. In an effort to mitigate these wet areas and facilitate future maintenance (mowing) of the levee, a modification of the WBV 14C.2 contract was issued to widen the protected side stability berms by 32 feet to extend beyond the wet areas. The wet areas disappeared along the majority of the project after the berms were widened. However, wet areas continued to be observed during and after construction in the vicinity of Station 140+00 over about a 200 length along the toe of the levee. Some Tiger Team members expressed concern that the issue had not been adequately addressed due to these continued observations of wet areas near Sta. 140+00. Accordingly, available subsurface data was reviewed and parametric studies were made by the Tiger Team.

Borings WL-15 through WL-20 were made at 800-foot to 1000-ft intervals along the existing levee alignment in 1986. No sands were encountered above elevation -50 in these borings. The typical section for the existing levee is shown on Figure Q-13. This section shows that construction included the placement of a sand layer at the original ground surface. The elevation of the original ground surface varied from about 1.5 to -1. The top of the sand fill layer is shown at elevation 2.5, and the sand fill layer extends 45 feet to the protected side and 55 feet to the flood side of the existing levee centerline. Clay fill was to be placed to the protected side and flood side of the sand fill layer, and then the levee and berms were constructed above to encapsulate the sand fill layer in clay. The typical section also shows a "drainage berm" extending 80 feet beyond the protected side berm. The "drainage berm" consists of a thin layer of sand fill (1-2 feet) capped with 9 inches of compacted fill.

Cone penetration tests (CPT) were performed along the existing levee centerline and to the flood side and protected side of the existing levee in 2008. WWHCCPT-18 through WWHCCPT-21 were located along the Westminster East-West Levee. An approximate 3-foot to 4-foot thick sand layer was encountered in all of the CPT's made along the centerline and on the flood side. The top elevation of the sand varied from about -2.5 to -6.5. An approximate 1-foot to 2-foot thick sand layer was encountered in the CPT's made along the protected side. Considering the absence of shallow sands in the 1986 foundation borings and the consistent thickness and elevation of the sands encountered in the 2008 CPT's, the logical conclusion is that the shallow sands encountered in the CPT's are the sand fill materials placed during levee construction. If the levee was constructed in accordance with the plans, the sand fill materials are encapsulated with clay fill and are not hydraulically connected to water in the marsh. Design verification boring V-WW23 was made 150 feet floodside of the levee centerline at Sta. 140+00. No sand layer was observed within boring V-WW23 that demonstrates hydraulic connectivity to water levels in the marsh.

Tiger Team members agreed that seepage analyses would be performed for a hypothetical, worst case scenario. If the results of these analyses indicated that the levee is safe in terms of underseepage, then additional investigations and/or analyses by the Tiger team may not be required.

For the hypothetical, worst case scenario, it was assumed that there is a 4-foot thick layer of sand beneath the levee and berms between elevation -3 and -7. The sand was assumed to extend to the ground surface beyond the flood side berm. The sand was also assumed to extend to the ground surface on the protected side, beginning at the toe of the berm and ending at a point 12 feet beyond the toe of the berm. Analyses were performed for two flood side water level conditions – a normal case with the water at elevation 2 and a hurricane condition with water at elevation 13.5. It should be re-iterated that the assumption of a continuous natural sand layer between elevations -3 and -7, which is hydraulically connected to the marsh, is not supported by the borings, CPTs and project plans reviewed by the Tiger Team and that these assumptions are purely hypothetical.

The seepage analyses were performed using the SEEP/W, Version 7.17 computer program and the Finite Element Method of analysis. For the computer model, permeabilities were assigned to the various soil types based on recommendations developed by GCAT (Geotechnical Criteria and Analysis Team) during analyses of the London Canal load test data. The following boundary conditions were used for the analyses:

1. A constant head boundary equal to the analysis flood side water level was used on the flood side.
2. A constant head boundary of -8.5 feet was used within the limits of the canal.
3. A potential seepage boundary was used along the existing ground surface on the protected side (except within the limits of the canal).
4. The far field boundary on the protected side was set with water to the ground surface.

Parametric analyses were performed to investigate the sensitivity of the results to the proximity of the seepage entrance to the flood side toe, the width of the open seepage exit at the protected side toe, the water level in the canal and the permeability of the sands. These analyses indicate that moving the seepage entrance from the toe of the flood side berm to a point 130 feet from the toe of the berm reduced the seepage flow by 40% but had negligible effect on the exit gradient. Varying the width of the open seepage exit from 12 feet to 24 feet had a negligible effect on both the seepage flow and the exit gradient. Increasing the permeability of the sands resulted in a significant increase in the seepage flow and a slight increase in the exit gradient. Varying the water level in the canal did not result in changes to either the estimated flow or the exit gradients. The results of the final analyses for the worst case scenario described in a preceding paragraph are summarized in Table 10-9.

Table 10-9 Results of SEEP/W Analyses for Hypothetical Worst Case (Note 1)				
Flood Side Water Level	**Sand Layer**		**Flow gal/day/100'**	**Exit Gradient**
	Class.	**Permeability, cm/sec**		
2.0	SM	$7x10^{-4}$	46	0.05
2.0	SP	$1.5x10^{-2}$	1,278 (Note 2)	0.06
13.5	SM	$7x10^{-4}$	256	0.08
13.5	SP	$1.5x10^{-2}$	5,400	0.08

Notes:
1 – Sand layer from elevation -3 to -7, exposed at the ground surface beyond the flood side berm, exposed at the ground surface for a distance of 12 feet beyond the protected side berm toe.
2 – Equivalent to a water level rise of 0.14 feet per day in a strip 12 feet wide along the toe of the protected side berm.

The exit gradients for this worst case condition correspond to factors of safety against piping greater than 5. This factor of safety is well above current criteria, which require a factor of safety of 1.0 against piping at the toe of the berm.

Analyses were also performed for a condition where a thin clay blanket overlies the sand beyond the protected side toe. Results of these analyses indicate no excess head within the limits of the protected side berm, and an excess head of 3 feet at the protected side toe for flood side water at elevation 13.5. The factor of safety for uplift of the thin clay blanket is well below 1.0, indicating that the clay blanket would be ruptured and that an open exit would quickly develop. Once the blanket is ruptures, the excess heads would presumably decrease and the exit gradient would drop to those presented in the preceding table.

Comparative analyses were performed for the blocked exit and open exit conditions with a silty sand stratum using blanket theory (reference b.(5)). For the blocked exit, the blanket theory yielded an excess head of 4 feet at the protected side toe as compared to 3 feet in the SEEP/W analysis. For the open exit, the blanket theory yielded an exit gradient of 0.06 as compared to 0.05 in the SEEP/W analysis. The blanket theory analysis results are similar to the SEEP/W analysis results and indicate adequate factors of safety against piping.

Additional analyses were performed based on Bligh's creep ratio to check the safety of the levee in terms of seepage and to compare the seepage potential of the new levee to the seepage potential of the previous levee. Bligh's creep ratio is simply the seepage path length divided by the excess head and is considered to be a conservative means of assessing the safety of structures underlain by sand in terms of seepage. The recommended minimum Bligh's creep ratios for very

fine sand and fine to medium sand foundations are 15 and 18, respectively(reference b.(5)). For the hypothetical, worst case scenario, Bligh's creep ratio for the previous levee is 14, and Bligh's creep ratio for the new levee is 22. The results of this analysis are consistent with the results of the SEEP/W and blanket theory analyses and indicate adequate factors of safety against piping. Also, a comparison of Bligh's creep ratios for the old and new levees indicates that the potential for underseepage has been reduced by the new construction, which resulted in a significantly wider levee footprint as compared to the excess head.

The source of water creating the persistent wet area has not been identified by the Tiger team. Rather, analyses were performed for a hypothetical, worst case seepage condition, and the results of these analyses indicate that the levee satisfies current HSRRSDG criteria for seepage.

CHAPTER 11: CONCLUSIONS

The Tiger Team created a decision tree during development of its scope of work (Appendix J). The decision tree shows three main items requiring conclusions from the team based on the field investigation, laboratory investigation, engineering analyses and documentation review. During the course of its investigations, the Team determined that a fourth item, "Identified Shortcomings with Specifications", should be added. The four concluding items are as follows:

1.) Determination if WBV 14C.2 project was constructed in compliance with the contract Plans and Specifications.
2.) Performance of the as-built levee based on engineering considerations such as shear strength, unit weight, slope stability, seepage, maintenance (safety/settlement).
3.) Review of the Contractor-Quality-Control/Quality-Assurance (CQC/QA) process in place during construction.
4.) Identified Shortcomings with Specifications.

The conclusions regarding each of these items are discussed in this chapter**.**

COMPLIANCE WITH CONTRACT SPECIFICATIONS

Percent Wood by Volume:

The Tiger Team never reached consensus on interpretation of specified limits of objectionably sized wood. The team discussed these differing interpretations of the allowable percent (by volume) of wood:

(a) Volume of all objectionably sized wood recovered from a trench divided by total volume of trench excavation.
(b) Volume of objectionably sized wood recovered from an incremental depth of excavation divided by the volume of that incremental trench excavation.
(c) Volume of objectionably sized wood divided by the 1 cubic yard of levee fill that encapsulates it.

The team considered the lack of clarity in the specification as it pertains to measuring the 1%, especially what volume of excavated soil should be considered. The team discussed the appropriate size (area and depth) of investigation trenches. As excavated, the trenches are nominally 10' by 10' with 12-inch deep incremental excavations. Another alternative to this size could be 6' by 6' by 9-inches which yields one cubic yard of excavation. These alternatives must be considered when revising the specifications. The Tiger Team discussed various ways to provide more practical language to clarify the specification.

The team considered how the construction quality control and quality assurance personnel (QA/QC) used certain subjective methods of interpreting and enforcing the specifications related to objectionably sized wood. Although the length of a 12-inch piece of wood can be reliably determined using a ruler, the wood pieces were usually not of a uniform cross section, so the additional requirement of 4 square inches of end area is subjective. Whereas, the Tiger Team had detailed survey and wood volume measurements at its disposal, the construction quality

control and quality assurance personnel did not. (The CQC/QA personnel had no specified methods to quantify the percent wood by volume in the levee fill.) Based on detailed measurements, the Tiger Team's investigation program found one instance of objectionably sized wood that violated the 1% limit using interpretation (c). However, based on the subjective measurement available to the CQC/QA personnel, there would have been nine such violations recognized in the Tiger Team investigation. The Tiger Team is aware that myriad other combinations of excavation size and depth exist to define the percentage volume of wood, and there may be other ways to measure or estimate wood volume. The choice of any other of these could result in more/less violations of the specification. These other paradigms must be considered when revising the specifications. The Tiger Team discussed various phrases that might be included in the specification to provide more practical language to the field QA/QC.

Mr. Glenn Gremillion, WBV14C.2 Administrative Contracting Officer, provided verbal and written statements to the Tiger Team. Mr. Gremillion's position is the levee is built by lifts and not by the cubic yard. It is this interpretation that caused the Tiger Team to craft an investigation plan that determined the percent volume of objectionably sized wood based on the volume of incremental trench excavations (interpretation (b)). The size and thickness of the excavations were fashioned to mimic "lift by lift" construction.

The Tiger Team completed its investigation using 10' by 10' excavations. The Phase I trenches were excavated to the desired depth without intermediate surveys of the incremental excavations, so the percent volume of objectionably sized wood from the Phase I trenches was calculated using interpretation (a). The Phase II trenches included intermediate surveys as the 12-inch deep incremental excavations progressed, so the percent volume of objectionably sized wood from the Phase II trenches was calculated using interpretation (b).

Based on the weight and volume measurements of the wood collected from the incrementally excavated investigation trenches, the largest percentage of objectionably sized woody material found by this testing, in fill placed by the WBV14C.2 contractor, is 0.41 percent based on interpretation (b). This was measured at a depth of 0 to 1 feet of the excavation at project station 108+18, offset 60 feet to the protected side. This volume of objectionably sized wood meets the USACE specification for clay, hereafter, the specification.

As indicated previously, the ambiguity of the specification allowed for another interpretation which defines the 1% limit as the volume of the wood divided by the cubic yard of clay that encapsulates it (interpretation (c)). Although CEMVN did not enforce the specification by this interpretation, the Tiger Team considered it. The Tiger Team found one piece of objectionably sized wood at project station 179+80, on the centerline at a depth of 1 to 2 feet, with measured volume of .29 cu-ft. This individual, objectionably sized piece of wood violates the specification if interpretation (c) is applied.

Based on interpretation (b), which the Tiger Team considers to be the method most consistent with the interpretation made by the WBV14C.2 CQC/QA personnel, and quantitative measurements, the Tiger Team concludes that the as built levee is in compliance with the specifications. The Tiger Team also concludes that the specification should be revised to provide quantitative details clearly defining how the percentage limit on objectionably sized

wood is to be determined. The Tiger Team also concludes that the specification should be revised to include limits on the total amount of wood, of all sizes allowed in embankment fill.

Summary of Findings Based on CQC/QA Data Review

It is the opinion of the Tiger Team reviewers the CQC and QA materials testing completed on the WBV 14c.2 project followed typical regional standards of practice for materials testing and generally followed relevant ASTM standards. Review of the CQC and QA testing data provided to the Tiger Team indicates the materials quality control was completed in accordance with the specifications and the New Orleans District Construction Control Manual (NODCC). However, several types of errors have been identified, possibly resulting in non-compliance in a maximum of 4.2 percent of all CQC tests for moisture requirements and 0.9 percent of all CQC tests for density requirements. However, it is the opinion of the Tiger Team QC/QA Data sub-committee the review indicates general compliance of the Contractor with respect to organic content, sand content, classification, compaction and moisture control of the completed embankment. No evidence was apparent that any discrepancies or errors were the result of intentional falsification of field/laboratory data on the part of the Contractor or USACE QA personnel.

Non-Woody Debris

There is an area of the project from approximate Station 30+00 to 39+00 where significant amounts of debris were encountered during the field investigation. This significant amount of debris was not encountered within the fill material placed by the WBV 14C.2 contractor. The Tiger Team concluded during the field trenching operations in this area that there were performance concerns within those stations that need to be addressed by MVN. Recommendations to that effect are included in Chapter 12.

Outside of the areas discussed above, numerous pieces of isolated non-woody debris were recovered from the inspection trench cuttings including pieces of brick, stones, shards of concrete pavement and pipe, lengths of plastic pipe and metal pipe and a variety of metal pieces. The smaller pieces of debris were taken to the New Orleans testing laboratory for inventory while the large pieces were left on-site. The data identifies occurrences of all fill types yielding non-woody debris, but a closer study indicates the largest pieces of non-woody debris tending to be recovered from excavations in Existing Levee or Original Ground materials.

The relative size and isolated nature of the non-woody debris encountered within fill materials placed by the WBV 14C.2 contractor are such that there is no evidence to demonstrate contractual non-compliance with the WBV 14C.2 specifications.

An opposing viewpoint is provided by Tiger Team member, Mr. Michael Merritt, who observed USACE construction project management was able to slow down, but never stop, the flow of objectionable materials into the levee throughout the project. Materials such as wood, brick, broken glass, terra cotta, concrete or rocks as well as woody or non-woody materials were still being delivered to the site in November, 2011 and being mixed in the so called “clean” clay fill used to refill the trenches dug by the Tiger Team. Mr. Merritt said, on November 5, 2011, SLFPA-W’s crew easily found enough wood and non-wood debris to fill several sand bags in the building (clay) material.

Mr. Merritt stated, prior to Tiger Team trenching project, USACE officials had dismissed SLFPA-W concerns by explaining debris inspectors had seen and reported debris which was subsequently removed by additional contractor litter pickup crews. Mr. Merritt's said this explanation was not convincing because:

1. At best it shows a lack of documentation and USACE follow up on issues reported in writing by SLFPA-W. The resolution of these concerns were not tracked to the end of the building process with written responses to report and resolve concerns sufficient to close the files.
2. At worst, the explanation is not what happened. Merritt observed, as he drove down completed sections of the levee (when the Tiger Team ended its field work), objectionable wood and obstacles to mowing still remain on the completed levee. (See Appendix Y for documentation.)

As a clarifying viewpoint, the Tiger Team lead states that no other Tiger Team members witnessed the inspection trench backfilling procedures. CEMVN QA reports from this time frame are included in Appendix S.

Grubbing and Scarifying

Review of the Quality Assurance Reporting documents indicate that grubbing and scarifying were performed in general accordance with the specs.

Mr. Merritt takes the opposing viewpoint that the field conditions met certain requirements of the grubbing specifications but were ignored. The occurrences of vertical pipe protrusions were significant enough to trigger enforcement of the 36-inch deep excavation requirement of the grubbing specifications. If the grubbing specification had been properly enforced, the contractor would have been required to remove much of the non-wood debris found in the debris field near project station 39+00.

However the majority of the team agrees that the contract specifications, including the grubbing requirements, did not address removal of debris as now recognized in the area of station 39+00. This debris field was not shown on the contract plans. The contract documents would have required additional information and details regarding area and depths of excavation and disposal of waste materials for removal of debris such as this. Additionally, Mr. Merritt's reference to a "vertical pipe protrusion" was not recognized by other team members during the investigation, nor is it considered a basis to declare a violation of the grubbing specifications. No such pipe protrusion was identified on the contract drawings, and the contractor would have anticipated only stripping of grass to comply with grubbing specifications in this area. There is no indication anyone was aware of this pipe protrusion reported by Mr. Merritt.

PERFORMANCE OF AS BUILT LEVEE

The conclusions regarding the ability of the as-built WBV 14C.2 levee to perform are based on observations during completion of the field/laboratory investigations, the measured data from the field/laboratory investigations, additional analyses, and review of project documentation. Classical geotechnical theory was used to analyze various scenarios to evaluate the levee performance in conjunction with the measured data. Tiger Team members also used their

collective background of geotechnical, geophysical, geological, and civil engineering experiences to render engineering conclusions.

As documented earlier, the Tiger Team's field investigation encountered significant amounts of debris from approximate project station 30+00 to 39+00. Levee performance concerns due to the presence of non-woody debris are described later in this chapter. Therefore, the discussion in this chapter regarding the performance of the as-built levee excludes this prominent debris area.

Shear Strength:
Based on the Team's visual observation of inspection trenches, as well as Unconsolidated-Undrained (UU) triaxial compression tests completed on undisturbed, trimmed soil samples obtained from the Design Verification Boring program and testing of two larger, full-size samples from Shelby tubes chosen by the Team, all shear strengths measured exceed the shear strength used in the design. The soils observed in the trenches consisted of high plasticity clay (CH) that visually appeared to be well compacted with consistencies ranging from medium stiff to very stiff. The team noted the general absence of clearly defined lifts/laminations within the trench walls. Nor did the team notice any poorly compacted layers evident by clay clods in the trench walls. Pocket penetrometer readings in levee embankment exposed in the walls of inspection trenches showed no readings indicative of unconfined compression strength less than the design strength. Subsequent laboratory testing of samples obtained from the Design Verification borings revealed that soft clay (CH) soils were not present within any fill material placed by the WBV 14C.2 contractor.

The conclusions regarding shear strength based on the visual observations were confirmed by the UU triaxial compression tests completed on undisturbed soil samples obtained from the Design Verification Boring program (results plotted on Figures Q1, Q2, and Q3 in Appendix Q). In these sample tests, all measured shear strengths exceeded the shear strength assumed in the design. The majority of the compression tests from the verification borings were performed on 1.5-inch diameter samples trimmed from 5-inch undisturbed Shelby tube samples. If wood was present in these samples, it did not reduce the strength of samples below the design value. Two hand-picked samples were selected by the Tiger Team to test larger samples with the full 5-inch diameter of the Shelby tube. The full size sample from Design Verification Boring VWW-21, sample 5b from the 8.8-foot depth showed a shear strength exceeding the design value, even though this sample contained a single 0.5" by 0.5" by 5" piece of wood.

It is the opinion of most of the Tiger Team that the strength of the existing WBV 14C.2 levee fill is adequate, exhibits no performance issues related to shear strength, and meets design expectation and criteria for shear strength.

Unit Weight:
The measured unit weights of the trimmed and full size undisturbed soil samples obtained from the Design Verification Boring program exceeds that used in the design. The design value is 110 pcf. The Design Verification Borings program showed the as-built, average unit weight of the compacted fill to be 116 pcf, while the Bulk Sample testing program showed an average of 115 pcf. The Tiger Team review of the QA/QC data showed the average unit weight measured during construction to be 113.9 pcf. The difference in unit weights is likely related to the sample

population size of the various testing programs. The QA/QC program determined the in-place density of the levee in over 1200 locations. The Design Verification boring program determined the in-place density of the levee in 80 locations, and the bulk sample testing program determined unit weight of 6 locations. Based on the number of test locations of the QA/QC program and the fact it represents test data throughout the entire levee, its average value is likely more representative of the completed levee than the other test programs.

The earthwork specification requires the contactor to meet certain minimum unit weights for compacted fill. Evidence of unit weights exceeding the minimum are not considered as a specification violation.

The Tiger Team determined whether the measured difference between the design unit weight and the measured unit weight would have an impact on the performance of the levee. This evaluation included global slope stability analyses to assess whether the higher measured unit weight would reduce the factors of safety and an assessment whether the in-situ unit weight would increase the settlement of the levee. The conclusions reached regarding these factors are discussed further in this chapter.

Global Stability:
As demonstrated in the slope stability analyses for water at the Still Water Level (presented in Chapter 10), use of 116 pcf as the unit weight in the WBV14C.2 embankment reduces the factor of safety for global stability to 1.45, which is less than the current USACE criteria. Chapter 10 provides the detailed analyses.

Although the Tiger Team stability analyses were completed using measured embankment shear strength that are higher than assumed in design, the increase in embankment shear strength did not overcome the increased driving forces caused by the additional embankment density. Also, the majority of the critical failure surface in the current analyses is located within the in-situ soils, the same as in the original design analyses. The lower strength of the in-situ soils exerts a controlling effect on the global stability and the increased embankment strengths cannot overcome this. The benefit of the increased shear strength is also reduced by the assumed presence of a tension crack in the compacted embankment.

The Tiger Team recognizes that the factor of safety computed using post-construction data (strengths, unit weights, etc.) can vary as compared to the assumptions made using pre-construction design information. The current post-construction condition of the levee suggests that the levee is performing as expected (no excessive settlement or evidence of stability failure have been observed). The factor of safety for global stability of the levee is expected to continue to increase as the subsurface soils consolidate and gain strength. Advances in the ability of slope stability software to optimize the shape of the critical failure surface far exceed the current state of practice of assigning appropriate shear strength parameters to such failure plane orientations. For instance, direct simple shear (DSS) strengths would be more appropriate for some parts of the failure plane. Such effects may offset minor differences in the computed factors of safety using post-construction data (strengths, unit weights, etc.).

The Tiger Team concludes that additional stability analyses accounting for all current geotechnical design parameters of the levee and foundation soils should be completed and done so in light of upcoming FEMA certification.

Settlement:
Levee settlement, or loss of elevation of the levee crown over time, consists of settlement due to foundation soils consolidation, settlement due to internal settlement and shrinkage of the compacted embankment.

Foundation soil settlement due to the weight of the levee embankment on the existing foundations is calculated and compensated for by adding necessary overbuild (additional height) to the levee. Internal settlement and lateral spread of the compacted levee fill is considered by application of a shrinkage factor to the levee height. The foundations and internal settlement computations result in the levee being overbuilt (designed/constructed to a grade higher than the design grade) so that the top of the levee always remains above its design grade. Also, future construction would be scheduled to raise the construction grade (with additional lifts) of the levee to mitigate for settlement if authorization is granted and funding becomes available.

The estimated schedule for future lifts presented in the geotechnical design report is included as Figure Q-12 in Appendix Q and was developed based on past settlement history at the project site. As described in the design report, historic surveys of the previously constructed levee show that the levee experienced 2 to 3.5 feet of settlement during the first 4 to 5 years after construction and approximately 1.5 feet of additional settlement over the following 5 years. A review of the project plans for the new and old levees indicates that the average fill thickness beneath the crown of the new levee varies from about 5 feet to 8 feet (refer to Appendix G-2 for WBV 14C.2 construction plans), while the thickness of fill beneath the crown of the old levee varied from about 8 to 11 feet (refer to Appendix G-3 for 1996 construction plans). Since the fill thickness beneath the new levee crown is less than the fill thickness beneath the old levee crown, it would be expected that settlements of the new levee would be less than those reported for the old levee.

From lab testing presented in the geotechnical design report, the average unit weight of the compacted soils in the existing levee is 115 pcf. The soils testing obtained from the Design Verification boring program of this WBV14C.2 embankment shows that the average unit weight of the compacted levee embankment is 116 pcf. Pro-rating the ultimate settlement (obtained from historic surveys of the previously constructed levee) by a factor of 116/115, the additional settlement due to the slightly increased levee weight is 0.5 inches.

Some members of the Tiger Team expressed concern about loss of levee height as wood decays creating voids, and collapsing voids reduce the levee height. The idea that all wood encapsulated by the stiff, heavy clays of the levee embankment will decay is not accepted by all Tiger Team members. Although computations of this nature may seem speculative, they are included to suggest a maximum upper bound of this kind of settlement. These computations indicate no more than 1.5 to 2.0 inches (on average) of internal settlement due to wood decay.

As an opposing viewpoint, some members of the Tiger Team do not believe that the wood will rapidly decay in the environment in which the woody debris has been placed. The most rapid condition for decomposition of wood is in an aerobic environment. The woody debris encountered within the test trenches was visually observed to be encapsulated by well compacted high plasticity clay (CH). Aerobic decomposition requires a combination of water and oxygen, neither of which is present in abundant supply to the wood encountered in the test trenches on the WBV 14C.2 project. The as-built environment is not conducive to rapid decomposition of woody debris.

The presence of woody debris in fill materials encountered within the existing levee materials of previous WBV 14C.2 construction contracts is an indication that significant decomposition of woody debris is unlikely and will occur slowly. Furthermore, the "maximum" potential values of settlement due to wood decay presented in this report (1.5 to 2.0 inches) are outside of the confidence level of the consolidation settlement predictions for this project based on the amount of fill placed under the centerline of the new levee.

An opposing viewpoint states that there are no comprehensive studies to conclusively confirm that decay and/or termite activity will not occur in the top few feet of the embankment that is subject to shrinkage cracking and imbibing of oxygenated rain water.

Change in Shear Strength Over Time

Based on the review of the trenches and field/laboratory investigations, it is the opinion of some members of the Tiger Team that the observed woody and non-woody debris does not pose a risk of reduction of shear strength of the levee fill that would inhibit the ability of this levee to perform as designed and protect the public. Some members of the Tiger Team believe that future reductions in shear strength due to the presence of the observed and documented debris would be negligible.

Reductions in shear strength due to the presence of woody and non-woody debris are possible and were considered by the Tiger Team. The greatest potential loss to shear strength would mainly be attributed to decay of the woody debris. Decayed woody debris could potentially result in small voids within the fill matrix. A localized loss in shear strength could occur around a void if moisture accumulated within the void. The potential loss of shear strength of the clay fill due to wood decay and water softening around any voids is obviously a complex phenomenon that cannot be predicted with confidence. The premise of shear strength loss is that the woody debris will decay into organic material allowing voids to form, and water will permeate to the voids and soften the surrounding soil.

Each of these assumptions was evaluated in terms of the likelihood of occurrence from a technical perspective as well as observations from the Phase I and Phase II test trenches. A number of the test trenches penetrated through the fill placed for the current WBV 14C.2 contract into the underlying, existing levee material. Wood and debris was observed within the existing levee material, and in some cases the wood debris volume was comparable to or exceeded that found in the new levee fill. These observations within the existing levee fill provided key insights into assessing future shear strength of the levee.

Voids were not observed within trenches excavated into the existing levee material. Unexpectedly low shear strengths were not observed during excavation of trenches within the existing levee material that was attributed to voids created as a result of decay of wood materials. Based on these observations of the existing levee materials some members of the Tiger Team do not believe that a drastic reduction of shear strength of the levee material is plausible due to wood decay.

Local Stability Analyses

Some Tiger Team members expressed concern that weakening of the levee fill could occur along horizontal layers that contain the highest concentration of woody debris, and this weakening could contribute to failure of the levee embankment slope. The team discussed possible mechanisms that could lead to weakening of the fill, such as voids created by decomposing wood and softening of clays adjacent to water filled voids, as well as possible approaches to quantify the weakening. While all team members agreed that decomposition of woody debris in the fill would result in some decrease in shear strength, no consensus could be reached on the likelihood of significant decomposition of the woody debris or the magnitude of the strength decrease.

The Tiger Team completed additional slope stability analyses using Spencer's Method according to current Hurricane and Storm Damage Risk Reduction System (HSDRRS) standards to investigate this issue. For these analyses, horizontal strata were included in the compacted fill in the depth intervals from 3 feet to 4 feet, 6 feet to 7 feet and 9 feet to 10 feet. Simple wedge-type failure surfaces were evaluated for sliding along horizontal surfaces within each of these depth intervals for water at elevation 13.5 feet (top of levee). These analyses indicate that the factor of safety will be greater than 1.4 even if the cohesion in a clay layer is reduced to 10 psf.

Tiger Team members do agree that shear strength low enough to cause localized stability failure due to wood decay are unlikely below some depth. CEMVN should independently confirm such conclusions. However, as discussed further in this chapter, there is not a consensus among the Tiger Team whether a localized loss of shear strength due to wood decay could have an impact on the TRM anchors.

Levee Through Seepage:

The team discussed the nature of the low permeability clay used to construct the levee and classic theories of development of the steady-state line of saturation through the embankment. The team discussed the potential impacts of wood encapsulated in the compacted embankment. The MVS team member brought forth his experience with through seepage in clay levees during the 1993 Mississippi River flood which loaded the levee in excess of 30 days. The MVK and NFS team members discussed their experience during the 2011 Mississippi River flood which loaded those clay levees for 60 days. In each of those experiences, very small amounts of through seepage appeared on the landside slope above the landside levee toe, but not before 30 days of flood loading. Based on the Tiger Team's observations of the side walls and floors of the trenches excavated into the completed levee embankment, the results of the Design Verification boring program, and the relatively short duration of hurricane events, most of the Tiger Team expressed no concern about through seepage in this constructed levee. Some expressed a minimal concern..

Seepage at the Station 140+00 Wet Spot:
The Tiger Team investigated the on-going "wet-spots" located landside of the protected side berm toe in the vicinity of project station 140+00. Plans for the "New Westwego Pumping Station to Orleans Village", dated October 1995 (Figure Q-13 in Appendix Q), show a sand platform to be constructed under the levee right of way between "confining embankments" of uncompacted clay under the protected side and marsh side berm toes. The drawing also shows an 80-foot wide "drainage berm" consisting of a 1.0-foot thick sand layer capped with a 9-inch thick layer of uncompacted clay fill. The drainage berm detail on the October 1995 drawing shows the 1.0-foot thick sand layer ends slightly below the prevailing ground surface and is capped with clay fill. This 80-foot wide drainage berm is located immediately landside of the protected side berm toe. The wet spots are located within this drainage berm.

In order to set a very cautious, conservative, bounding condition for this situation, the Tiger Team completed a seepage analysis that includes extending the sand layer platform beyond the levee centerline into the marsh. This model contains neither of the two confining embankments shown on the drawing. For the hypothetical, worst case scenario, it was assumed that there is a 4-foot thick layer of sand beneath the levee and berms between elevation -3 and -7, neither of the two confining embankments are in place to seal the ends of the sand layer so the model presumes the sand extends to the ground surface beyond the flood side berm and to the ground surface on the protected side, beginning at the toe of the berm and ending at a point 12 feet beyond the toe. Analyses were performed for two flood side water level conditions; a daily normal case with the water at elevation 2 and a hurricane condition with water at elevation 13.5. With the water at elevation 13.5, this conservative analysis shows small, horizontal flows through the sand layer with small exit gradients (0.08) at the landside.

For the condition where a 1-foot thick clay layer is placed upon the sand surface beyond the protected side berm, pressures build up in the sand layer, but the total head elevations remain below the protected side berm surface. Computed seepage gradients in the thin clay blanket exceed current USACE criteria indicating that the clay blanket would develop tension cracks and that an open exit would quickly develop with a small hydraulic gradient.

Based on its interpretations of these sensitivity analyses, the Tiger Team concludes seepage in the area of the wet spot is a nuisance and O&M issue and not a stability concern. Tiger Team members believe that these analyses are very conservative, but they demonstrate that a small confining layer of clay will create upward vertical seepage through the clay blanket. Subsequent tractor or mower traffic on the clay layer will rut the clay layer.

The wet spot is persistent and has been observed for over 10-years. Recent observations of the drainage berm show that the amounts of water in the vicinity of the wet spots increases after rain fall events and persists for some time after the rain abates. Other observations show that during dry weather, the wet spots tend to get smaller.

The Tiger Team considers this wet spot to be a maintenance issue.

Impacts of Debris Field in Vicinity of Project Stations 30+00 to 39+00:
Discussion in this chapter regarding the performance of the as-built levee excludes this prominent debris area shown on Figure 11-1. As documented herein, there is an area of the project, from approximate Station 30+00 to 39+00 where many Geophysical anomalies (Figure 11-2) were identified by the FFEB/Fugro Geophysical Report (Appendix H). Significant debris was encountered during the Tiger Team's excavation of the trench at station 37+23; o/s 139-ft protected side.

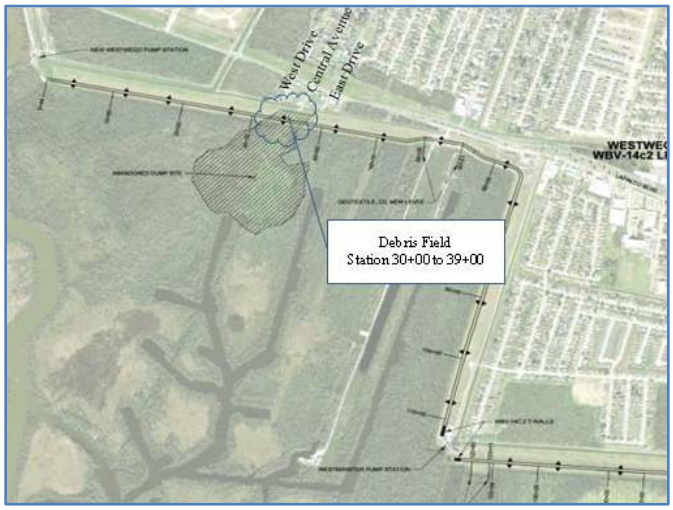


Fig 11-1: Location of Debris Field

At the time of this report, the Tiger Team reviewed draft documents from CEMVN referencing Louisiana Department of Environmental Quality (LDEQ) documents indicating the Westwego City Government (WCG) performed disposal activities at lands south of the Mayronne Canal as early as the mid-1950's and as late as in the mid-1980's at a facility known locally as the Westwego Landfill. Other LDEQ documents show that USACE's WBV-14c.2 levee construction centerline and construction ROW do not overlap with the clay-capped main cells of the closed Westwego Landfill. Other LDEQ documents declare the landfill officially closed on 23 October 1986. The referenced Tiger Team inspection trench is located in the vicinity of Central Avenue, the road that served as access to the Westwego Landfill. Because the CEMVN documents are considered "draft" documents, the Tiger Team chose not to include them in its report.

Tiger Team review of the project's soils report (Appendix W) finds no mention of this debris field. The absence of debris field discussion in the soils report suggests to the Tiger Team the debris field was not considered in the CEMVN levee design.

The presence of the debris field has been verified by Geophysical Testing, Trenching and Augering. However, the thickness and areal extent of the debris field is still unknown, and an accurate delineation of the debris and an adequate determination of the engineering properties of the debris may not be possible. Although useful information was gathered during trenching and performance of auger borings and CPT's, Tiger Team members feel there are still significant uncertainties regarding the debris field's influence on the performance of the levee.

The Tiger Team concludes there are levee performance concerns due to the presence of non-woody debris that should be addressed by CEMVN. Related Team recommendations are included in Chapter 12.

The Tiger Team concludes the technical issues associated with the debris field will necessitate a comprehensive and conservative assessment to develop appropriate remedial measures in coordination with the Non-Federal Sponsors.

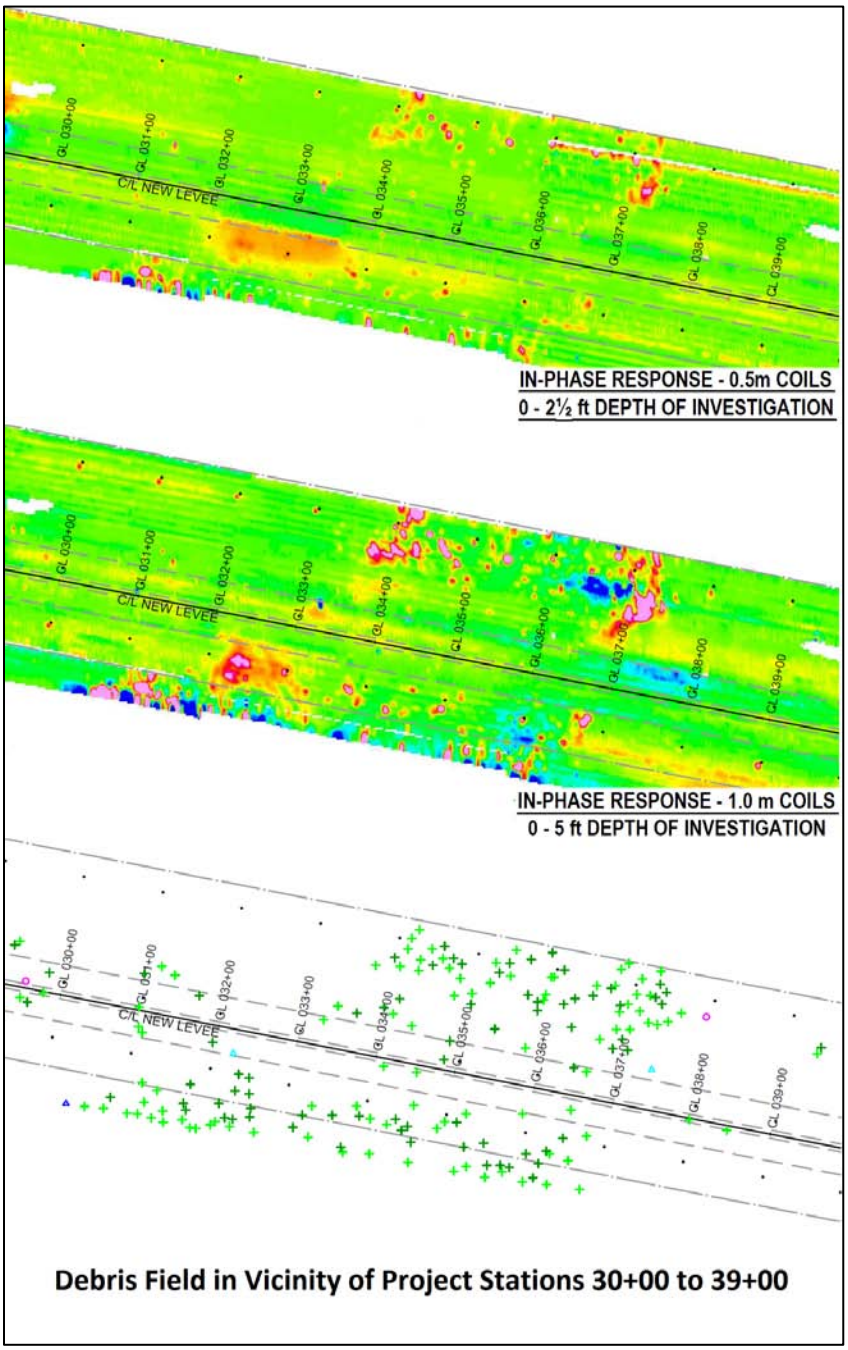


Fig 11-2: Extent of Debris Field (From Geophysical Survey)

Impacts of Wood and Other Debris on Turf Reinforcement Mat (TRM) Installation and Future Levee Lifts:

The earthen levees of the project site are scheduled to be armored with high performance turf reinforcement mat with anchors driven into the levee fill. Due to the presence of wood and other debris in the levee, NFS Tiger Team members expressed the concern that such debris can adversely affect the planned USACE Levee Armoring program:

- The presence of excessive debris in the levee could pose installation difficulties in anchor trenches as well as the installation of the anchors.

- Presence of wood debris will also reduce the load capacity of the anchors under both short-term (intact wood) and long-term (decayed wood) conditions.

- Presence of excessive wood and other debris near the surface of the levee could contribute to reduced erosion resistance (increased scour potential) of the compacted clays to overtopping and wave action during a hurricane event.

- Wood and other debris could also tear/damage the TRM if it comes in contact with TRM under repeated wheel loads.

- Rotting wood creates a potential for formation of voids within the levee which can contribute to increased stresses in TRM under wheel loads.

- Shoving wood debris down during anchor installation will create voids and reduce bearing (pull-out) capacity of the anchors.

- The use of HPTRM (High Performance Turf Reinforcement Mat) in these applications is a new development and caution is justified in using very clean fill (cleaner than allowed by the current specification). It should be noted that the design and specifications of the HPTRM system are still under development and are meant to address additional resiliency for greater than 100 year storm event. Long term performance experience of these systems is not available for their application in either clean fill or fill with both woody and non-woody debris.

- Future levee lifts will necessitate benching up to 2 feet thick to accommodate the new lift. Wood debris in the vicinity of such benching could affect its effectiveness.

Figure 11-3 is a scaled representation of the amount of wood recovered from Sta. 179+80 at depth of 3 to 4 feet in River Birch fill. The total number of wood debris pieces were measured and counted in the lab. The intent of the following figure is to show what the wood debris coverage would look like if that wood debris is spread across the surface of 100 ft^2 area. The objectionable sized wood debris is 0.16% by volume for a one foot thick layer. If all wood debris pieces larger than 6 inches are considered, the percentage increases to 0.61%. If all recovered wood debris pieces are considered the percentage further increases to 0.74%. The percentage of

wood debris will further increase beyond 1% if the bulk sample results (not included in the scaled representation) are considered and added to the percentage.

As an opposing viewpoint, USACE members of the Tiger Team do not believe that woody debris in the levee fill will hinder the installation of TRM anchors. If instances of shallow anchor refusal do occur, anchor locations can be shifted and/or additional anchors can be installed.

As an opposing viewpoint, USACE members of the Tiger Team do not believe the presence of woody debris will reduce the short-term pullout capacity of the anchors. Since these Tiger team members do not expect significant decay of wood encapsulated in the clay fill, the long-term capacity of the anchors will not be impacted by woody debris. Design criteria for the TRM anchors were not provided to the Tiger Team, so a meaningful assessment of the potential impact of woody debris on the anchor design cannot be made. Intuitively, one would expect that the weaker link in the TRM/anchor system is the tensile capacity of the TRM rather than the pullout capacity of the anchor. Further, if the TRM anchors have been designed considering the shear strength assumed for levee fill in the geotechnical design report (i.e., 400 psf), the measured shear strengths of the levee fill are considerably higher, suggesting that the factor of safety for anchor capacity is higher than required by design. It is the opinion of these Tiger team members that any decision to remove woody debris to facilitate anchor installation and/or affect anchor performance should be based on input from the TRM/anchor designer of record.

As an opposing viewpoint, USACE members of the Tiger Team believe that Figure 11-3 is an inaccurate representation of how the wood recovered from Sta. 179+80 from 3 to 4 feet existed in the excavated trench. This 2-D representation presents a “worst-case” layout of all wood encountered in the trenches within this depth interval. It assumes that no wood overlaps within the entire trench. A 3-D representation would provide a more representative illustration. Figure 11-4, 11-5, and 11-6 are photos of the investigation trench at Sta. 179+80 at various depths. Also, it should be noted that the amount of wood recovered from the trench at this station/depth is one of the highest found in the investigation. Other trenches in the vicinity did not recover as much wood.

As an opposing viewpoint, USACE team members believe that the woody and non-woody debris does not pose a significant hazard that would tear/damage the TRM under repeated wheel loads. It is the opinion of these Tiger Team members that only a surficial scarifying and picking of debris during turfing operations is necessary to reduce this concern to an acceptable level.

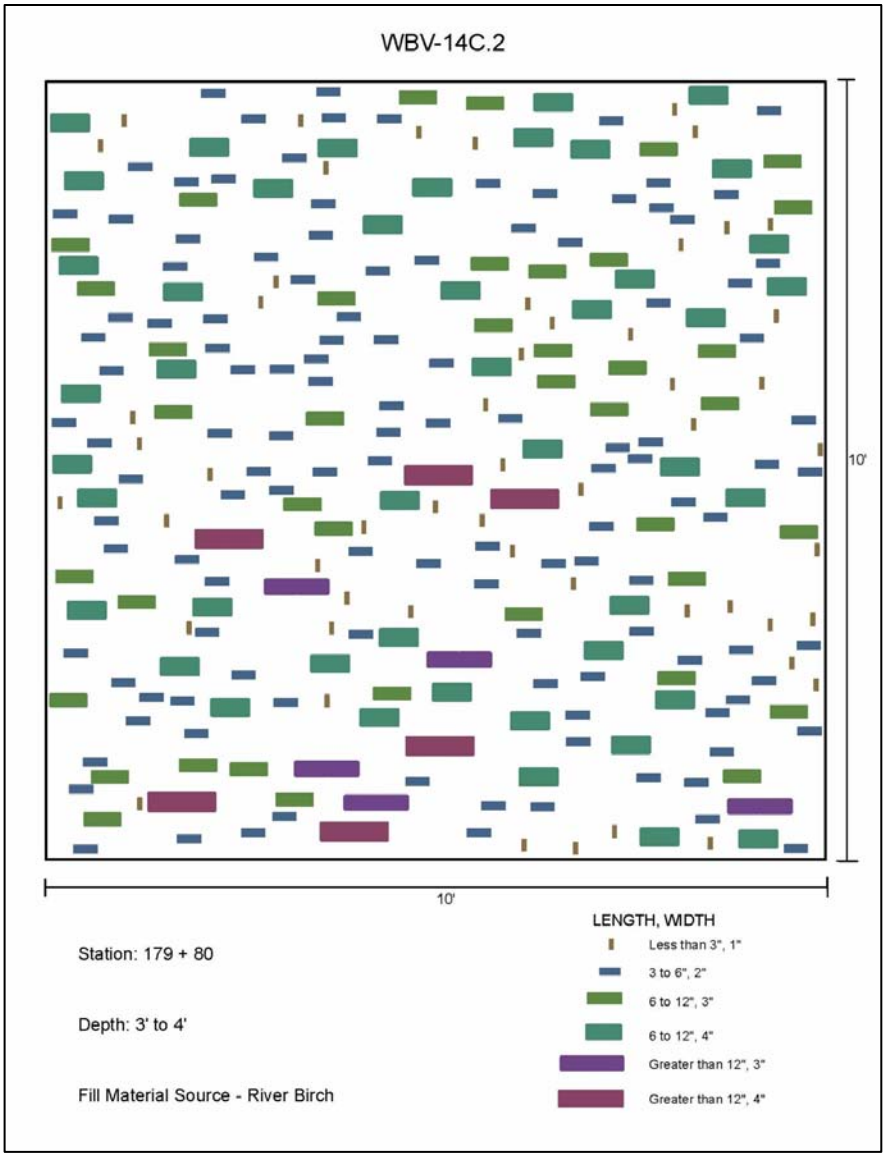


Figure 11-3: Scale Representation of wood recovered from Sta. 179+80 at depth of 3 to 4 feet in River Birch fill.

Figure 11-4: Photo of investigation trench at Sta. 179+80

Figure 11-5: Photo of investigation trench at Sta. 179+80

Figure 11-6: Photo of investigation trench at Sta. 179+80

Impacts of Wood on Resiliency

The Tiger Team did not perform any field or laboratory testing to evaluate erosion resistance of the WBV 14C.2 levee during an overtopping event as part of its investigation. A true quantitative assessment of the impact of the wood debris within the WBV 14C.2 levee during an overtopping event can only be made with field and/or laboratory testing. This testing would have to compare the erodibility of the as-built levee to a levee constructed out of the same fill material and constructed in a similar manner, but with a documented reduced volume of wood. There are no documented case studies of levees that have experienced overtopping (due to surge or surge plus waves) where wood or debris volumes are documented in a manner that can be directly compared to the WBV 14C.2 project. Therefore, any assessment of the erodibility of the WBV 14C.2 levee is qualitative and based on engineering judgment without the benefit of specific erodibility testing.

A qualitative assessment of the erodibility of the as-built WBV 14C.2 levee was made by some members of the Tiger Team based on their visual observations during trenching, the results of laboratory test completed during the Tiger Team investigation, review of the CQC and QA materials testing documentation, review of overtopping case studies, and personal experience. This qualitative assessment is not intended to address either the need for HPTRM, nor question the proposed use of HPTRM to armor the as-built levee, or determine whether the as-built levee will suffer significant erosion if overtopped. Rather, this assessment compares the erosion resistance of the as-built levee to the erosion resistance of a levee constructed of leaner, sandier clays allowed by the current specification.

The data presented in Chapter 7 of this report shows that the compacted fill for this project consists of clay (CH) soils with an average liquid limit of 69, plasticity index of 46, and sand content of 4.9 percent. The CQC compaction data indicates that the WBV 14C.2 levee was compacted to an average percent compaction of 96.9 percent. This data, combined with the observations during trenching activities and the test results from the design verification borings shows that the clay (CH) soils have been well compacted.

Although there are a number of factors that influence the erodibility of compacted earthen levees (i.e. compaction, material type, grass cover, construction methods, slope inclination, seasonal climate change, overtopping rates, etc.), it is the opinion of some Tiger Team members that the erosion resistance of earthen levees typically increases as the liquid limit and percent compaction of the fill soils increases. The erosion resistance also generally increases as the sand content decreases. The higher average liquid limit and percent compaction, and low sand content combine to increase the erosion resistance of the clay matrix in the as-built levee. The presence of wood will have some unknown negative impact on the erosion resistance of the as-built levee.

The current Earthwork specifications allow for leaner clay materials with lower liquid limit, slightly less compaction, and sand content up to 35%. This type of levee fill, combined with the wood debris documented herein would likely exhibit less erosion resistance than the as-built WBV 14C.2 levee. However, the use of sandier clays allowed by the specification is not advocated by the Tiger Team.

The erosion resistance of this well constructed levee built of stiff, compacted CH clays containing wood will likely be less resistant than the same levee built without wood. But the stiff CH clays forming the majority of the clay/wood matrix should still offer substantial erosion resistance. The TRM installation will enhance this erosion resistance.

Impacts of Wood and Non-Wood Debris on Safety and Maintenance

In areas not covered by TRM, wood and other debris (concrete, metal, etc.) found near the surface of the levee could become projectiles damaging equipment or property during mowing operations. All Tiger Team members expressed concern regarding safety for such conditions.

All Tiger Team members agreed that these safety concerns need to be addressed. However, no consensus could be reached on how to address these concerns. Some Tiger Team members feel that the wood and debris within the levee will rise to the surface primarily as a result of shrink/swell movements of the compacted clay soils or due to movement induced by tractor/vehicular wheel loading, etc... These members of the team support the more extensive excavation and re-picking of the levee or replacing with new, clean material. Other members of the Tiger Team do not believe that wood and debris will rise to the surface over time and that the primary safety hazard is only materials that are currently at or immediately near the surface. Those team members are in support of only additional picking during the surficial scarification prior to turfing.

Summary of Findings Based on CQC/QA Data Review

The Tiger Team review of the CQC and QA material testing data for the WBV 14C.2 levee is presented in Chapter 7. Potential CQC and QA material testing errors were identified by Tiger

team reviewers and discussed in detail in Chapter 7. The Tiger Team reviewers believe the overall impact of these errors are negligible and provide no evidence that the levee will not perform as designed.

REVIEW OF QUALITY CONTROL/QUALITY ASSURANCE PROCESS

Summary of Findings Based on QC/QA Process Review

The review of the project QA and QC documents reveals that an overall acceptable quality program existed during this contract with both QC and QA systems in place to ensure that the definable features of work were constructed in accordance with the contract documents.

The Contractor's Quality Control Plan and the Corps' Quality Assurance Plan are both complete and acceptable for general levee construction. They adequately address the project's definable features of work, reference their applicable specification section, and identify the method and frequency of required testing. Some members of the Tiger Team feel the Contractor's QC Process with regards to the debris inspection was insufficient to handle the amount of debris being observed in the borrow material. No formal plan was laid out to ensure the embankment was being inspected properly and eventually the accepted plan was abandoned. Due to the lack of a formal organized QC Plan for debris inspection the USACE QAR at times assumed a role as Quality Control inspector.

The three phase system of Preparatory, Initial, and Follow-up Inspections was implemented by the contractor and documented. QA reports indicate the Corps Inspector was fully engaged in verifying the contractor's QC program was in place and functioning to control quality. Available reports indicate a presence of QC and QA staff on site during construction activities and further indicated they appeared to have full knowledge of the contract requirements. Documentation and tracking of QC testing as well as visual observations of contractor's performance was generally adequate by the contractor. Corps daily reports documenting QA testing as well as visual observations, directions to the contractor, performance, and decisions made were generally thorough, comprehensive, detailed, and well written. However, resolution of deficiencies noted on reports should be better documented. The Corps Testing Discrepancy Report indicates that QC and QA testing was being monitored and checked by the Corps and action was taken to correct noted discrepancies or errors in testing.

Based on the Tiger Team's experience, the fill used appears to have more objectionable and non-objectionable wood pieces than is typically observed. No tests were specified to determine contract compliance. Pass/fail of this contract requirement was both visual and subjective as outlined by the USACE Resident Engineer. QA reports document site visits by the USACE technical design staff evaluating the issue. However, the lack of specified test procedures likely contributed to the appearance that the Corps acted slowly in forming the Corps' position on the interpretation of the specification, determining the acceptability of the borrow source, and implementing methods to ensure fill met contract requirements.

The fact that the borrow source was contractor provided, further complicated the issue. Changing borrow location by rejecting the fill without a specification violation, or by modifying

the contract without a performance issue, subjects the Corps and non-federal sponsor to potential high, unnecessary cost increases.

Some members of the Tiger Team feel this approach contributed to the belief of the Levee Authority the Corps position on the debris matter was dictated more by the contract specification than by an engineering opinion. Some members also believe no real attempt was made to respond to and resolve the differences between the USACE and the Non-Federal Partners prior to substantial completion of the levee and that delaying a formal response to the debris/wood issue without suspending operations made it seem that schedule was more paramount than the quality of construction. . However, QA Report # 217, dated January 24, 2011, did note the contractor was directed to suspend placement of material in the vicinity of Stations 165+00 to 170+00 because the material did not appear to meet contract requirements regarding debris content.

During review of this project, questions arose among the tiger team members regarding effectiveness of prior communication between USACE and the SLFPA-W and CPRA, and whether ineffective communication might have contributed to escalation of issues on this project. Review of QA and QC records, inspection reports from all parties and correspondence furnished to this team (as referenced in Chapter 8) indicates both positive and negative comments were being made by SLFPA-W and CPRA and regularly shared with USACE. There are also records of routine meetings and inspections conducted on site with representatives of all concerned parties, as well as meetings to specifically address the debris issues.

However, written documentation furnished to this team is sparse regarding clarification of concerns and subsequent resolution. While verbal discussions were apparently routinely occurring, written response regarding the USACE contract interpretation, directions given to the contractor, and USACE position regarding the identified issues was lacking until late in the project. Given that verbal discussions were occurring, it is unclear if more written communication would have prevented escalation of issues on this project, or simply if disagreements and opposing opinions resulted in escalation of issues. However, it is believed that more written communication between USACE and SLFPA-W and CPRA could have minimized the potential for any misunderstandings and would have assured upper level management on both sides had clear, current and correct information regarding the other's viewpoint.

QA Materials Testing Review Process

A component of the QA process discussed above is QA materials testing review. The Tiger Team review of the CQC and QA material testing data for WBB C.2 is presented in Chapter 7. Potential CQC material testing errors were identified by Tiger team reviewers and discussed in detail in Chapter 7. As previously discussed in this report, the overall impact of potential errors to contractor compliance with testing specifications are negligible and provide no evidence that the levee will not perform as designed. However, these potential errors should have been identified, addressed, and documented by USACE QA personnel during the course of this project. Similar errors could result in specification and performance problems on future projects. Consequently, it is important that the QA testing review process be improved. A specific example of a potential error that should have been identified by QA personnel is the failure to

recognize incorrect reference proctor curves and incorrectly interpreted proctor curves presented by CQC laboratory.

Recommendations are made in this report to reduce potential for these errors to occur in the future by improving the QA Materials testing process. A substantial component of these recommendations deals with specific shortcomings identified in current project specifications. These shortcomings are discussed further in chapter 11. Improvements to eliminate the shortcomings will greatly minimize the potential for further errors on future projects.

IDENTIFIED SHORTCOMINGS IN USACE TECHNICAL SPECIFICATIONS

Difficulty with Quantifying and Enforcing Requirements Related to Wood

The particular specification under close scrutiny by the Tiger Team is found in paragraph 2.1 "Materials", of Section 31 24 00.00 12 "EMBANKMENT" (Appendix G1). This specification has been subject to multiple interpretations especially as to what constitutes objectionable material, how much objectionable material is allowed, and what volume of earthwork should be considered when determining the percentage of objectionable material.

The Tiger Team concludes the specification should be rewritten to prevent unacceptable amounts of wood of all sizes from being placed in future levees. The earthwork specification is currently silent on allowable amounts of wood less than the objectionable size. The amount of wood observed, although within existing specifications, is considered undesirable by the Tiger Team. Improvements to this part of the specification will remove unclear requirements and reduce future conflicts between USACE and stakeholders of flood protection projects. Further, it is the opinion of the Tiger Team that fill containing lesser amounts of woody debris can be reasonably achieved through more thorough picking and better control at the borrow source.

The specifications on wood debris are vague and the terms "masses, pockets and/or zones of wood" are undefined leaving some latitude in enforcement of the specifications. Use of the word "masses" must be clarified to clearly indicate what is referred to: organic matter only; or sticks, branches, roots, and debris as well.

As reported earlier, the team never reached consensus on interpretation of specified limits of objectionably sized wood. The team considered the lack of clarity in the specification as it pertains to measuring the 1% limit in the Embankment specification, especially what volume of excavated soil should be considered. The team discussed a number of ways to appropriately size the investigation trenches. These alternatives must be considered when revising the specifications.

Because no ASTM standards exist to measure amounts of wood, the Tiger Team concludes the specification must be rewritten to make its terms and meanings clearer and also define the means and methods to be used to investigate/determine the percentage of wood in a given volume of embankment fill. The bulk sample process designed by the Tiger Team represented a laboratory field sampling method for determining the percentage volume of wood in a sample of clay. The volume of wood and the volume of excavation were precisely measured to accurately determine the percentage of wood contained in the samples. However, the process is labor and time

intensive, especially the process requiring sample to be pushed through the #4 sieve. The Tiger Team concludes this method may be best reserved to handle contract disputes.

Subjectivity of Enforcement of The 1% Woody Debris Specification

Specification enforcement subjectivity and variation of interpretation may have occurred for wood debris removal due to the inability to discern 1% debris based on visual observation. For example subjectively, there were 9 instances of objectionable wood violations, whereas quantitatively there was only 1 instance where the objectionable wood size exceeded 1% per cubic yard requirement (based on interpretation (c) defined at the beginning of this chapter).

The team considered how the construction quality control and quality assurance personnel (QA/QC) were limited to certain subjective methods of interpreting and enforcing the specifications related to objectionably sized wood. These methods and associated limitations must be considered when revising the specifications.

The Tiger Team concludes that the specifications should be revised to provide construction personnel practical language to address the allowable in-place amounts of wood and other debris, observable and measureable field and laboratory QA/QC procedures to measure in-situ debris, and consequences that the contractor faces if he does not meet the new specification. Practical quantitative procedures are required for consistency of acceptance.

Borrow Site Acceptance

The contractual mechanism to review the acceptance of contractor furnished borrow pit changes were inadequate to assess the appropriateness of the new proposed borrow pit, changed after the project was awarded. The allowance of typical onsite processing of the fill coming from this contractor furnished borrow pit, known to contain significant amount of wood, contributed to the presence of wood debris in the levee embankment. The specification should be revised to provide more investigation of contractor furnished borrow pits and ensure that layers of borrow with heavy concentrations of wood are wasted and not brought onto the job site.

Modifications to the specifications should provide construction personnel practical language to address borrow material acceptance and consequences that the contractor faces if he does not meet the new specification. Consequences might include additional disking and picking, or lift replacement, or a field test to determine compliance with the specification. Practical quantitative procedures are required for consistency of acceptance. It should also be noted that any specification changes should not result in increased burdens to Contractors using standard levee borrow material and should focus on extreme cases of borrow material containing excessive amounts of debris. The language should clearly focus the burden of debris removal on the contractor while minimizing cost increases to the owner. The specification should be a deterrent for using borrow pits with excessive debris unless other borrow pits are not financially feasible and robust counter measures are aggressively taken to control debris in clay.

The Tiger Team also concludes that the specifications should be revised to require picking operations at the borrow pit as well as picking operations on the job site. The specifications should be revised to prohibit contractor deliveries of borrow containing amounts of objectionable woody and non-woody debris far in excess of specified limits onto the construction site.

Wood Cut into Small Pieces by Disking Operations

The non-federal sponsor members of the Tiger Team expressed concern that the contractor's disking operations during the processing may have quantitatively reduced potential specification violations regarding unsuitable wood by reducing the size of the wood debris. The team discussed how disking of clay borrow to reduce the placement moisture content is a typical construction method used in all manner of earthwork. The specifications do not address this issue, nor should they. To do so would severely limit the contactor's ability to efficiently adjust the borrow materials moisture content. Of course, the contractor should be prohibited from disking for the sole purpose of reducing the size of the wood. As a reminder, the problem is not that the contractor's disking operations are cutting the wood into smaller pieces, the problem is that clay borrow containing excessive amounts of wood is being hauled to the site.

Documented Use of "Family of Curves" Should Be Required

Recommendations for improvements to the QA and CQC materials testing process have been presented in Chapter 7. The most complicated issue identified during review of the QA and CQC materials testing documentation was no documented use of the "family of curves". The CQC data reviewed did not include a plot of the "family of curves" with all of the completed proctor graphs for each borrow source. The lack of this information highlights a problem with the P&S. Although the specifications and NODCC manual require the contractor to use the one-point compaction data in combination with a "family of curves" for each borrow source, there are no submittal requirements for this "family of curves". The submittal should also require subsequent updates as new Proctor curves are added. The lack of this submittal requirement and more detailed guidance for reporting and using one-point compaction test results with a "family of curves" makes it difficult to implement and enforce these requirements during construction. Recommendations are provided in Chapter 7 and Chapter 12 to modify the P&S to require formal submittals of "family of curves" to allow for proper use of one-point proctors. Adoption of these recommendations will require more rigorous review of the proctors and field moisture/density data during construction. This should minimize the potential for reference proctors to be reported incorrectly and minimize the potential for selection of incorrect reference Proctor curves.

Identifying Wood Smaller Than Objectionable Sizes

The process of the investigation to identify the amount of wood and debris in the constructed levee and berms was conducted by using three methods: (1) large volume trenching (10 to 20 cubic yard size), (2) bulk sampling and testing (1 to 3 cubic feet size), and (3) undisturbed sample testing (0.06 to 0.10 cubic foot size). A series of selected samples of clay with visibly high organic contents and some with visibly no organic content were sent for testing in order to determine an organic content for higher "extreme" samples and visibly "clean" samples of clay. The results for "extreme" samples ranged from 5.3% to 10.2% by weight, while the "clean" sample ranged from 5.3% to 5.5% by weight.

The bulk sample process designed by the Tiger Team represented a field sampling method and laboratory procedure for determining the percentage volume of wood in a sample of clay. The volume of wood and the volume of bulk sample excavation were precisely measured to accurately determine the percentage of wood contained in the samples. However, the process

was labor and time intensive, especially the process requiring samples to be pushed through the No. 4 sieve. From these bulk samples, the plus No. 4 wood or debris ranged from 0.05 to 1.31% by volume. The organic content of minus No. 4 clay ranged from 3.6 to 6.2% by weight. While the specified limit of organic content is 9% by weight, there is no specified limit for the volume of wood smaller than the objectionable size.

Verification boring samples selected for determining wood and debris content were also visually identified as samples with higher concentrations of wood or debris. From these undisturbed samples, the plus No. 4 wood or debris ranged from 0.1 to 1.18 % by volume, with one additional sample identified with 8.48% by volume of wood. This single sample of higher plus No. 4 wood content represented a small sample size with a larger chunk of wood cut into the undisturbed tube and is likely not representative of the larger encapsulated area of clay surrounding the wood. The organic content of minus No. 4 clay for these undisturbed samples ranged from 3.7 to 6.8% by weight.

It is important to note that these three sample selective processes were not representative of an entire trench nor section of levee, yet the test results can be attributed to specific sampling locations having the highest visible wood and organic content. Of the three methods identified above, the bulk sampling and laboratory determination of wood or debris volume was considered to yield the most reliable results for plus No. 4 wood and smaller than objectionable: (1) due to sampling size in relation to the small wood and debris, and (2) due to the accuracy in measuring hole volume as well as wood and debris volume.

Statement of Non-Concurrence by Mr. Merritt

Tiger Team member, Michael Louis Merritt, M.S., M.B.A., C.P.G., has determined he cannot, in good conscience, agree to the findings of many of the other team members in regard to Chapters 7, 8, 10, 11, and 12, of the final Tiger Team report. To avoid further delay of the report he is issuing this "statement of non-concurrence." Mr. Merritt's individual findings and conclusions may be reviewed in Appendices Y and Y1 of this report.

Chapter 12: RECOMMENDATIONS

Recommendations have been developed by the Tiger Team members based on the observations of the side walls and floors of the excavated inspection trenches, the results of cuttings inspection, wood collection and subsequent wood volume testing, the results of the soils testing program completed during the Design Verification Boring Program, the review the QA/QC test data, the review of the QA/QC system documents, the review of contract documents, and the results of additional engineering analyses. A consensus on all recommendations could not be reached by all Tiger Team members; therefore, this report presents recommendations shared by all Tiger Team members; recommendations of the CPRA Team members; recommendations of the USACE Team members; and recommendations of the SLFPA Team member.

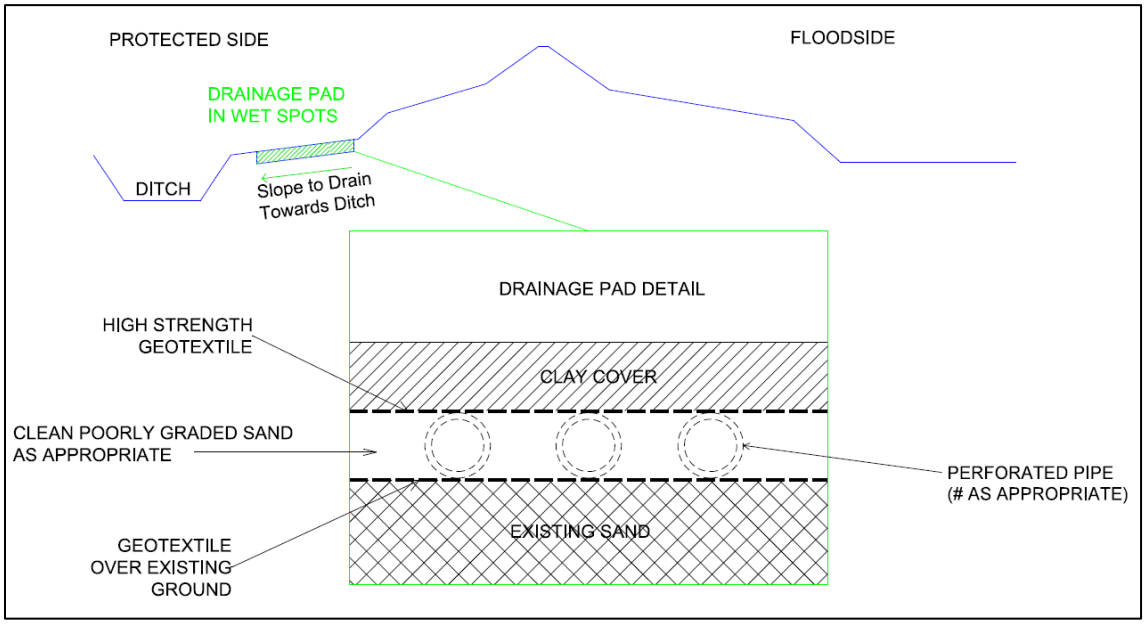
A. The following 8 recommendations are agreed to by all Tiger Team members and provided to the New Orleans District Corps of Engineers:

1. Slope Stability of WBV14C.2 Embankment.
    a. Because of the higher unit weight of embankment fill material, conduct the necessary studies to ensure that the WBV14C.2 embankment meets the current HSDRRSDG and USACE requirements for slope stability. If deemed necessary by the New Orleans District, remedial measures should be constructed to ensure that those requirements are satisfied. USACE should evaluate this issue with the NFS's in light of upcoming FEMA certification.

2. Debris Field in Vicinity of Project Stations 30+00 To 39+00.
    a. Conduct the necessary studies to ensure that all engineering aspects of the WBV14C.2 levee meet all current HSDRRSDG and USACE requirements in the vicinity of the Central Avenue debris field near project station 39+90. Tiger Team members expressed tangible concerns regarding seepage and stability including uncertainty of the lateral and vertical extent of the debris and uncertainty of the nature of the debris. The presence of the debris field has been verified by geophysical testing, trenching and augering. There are still significant concerns that the field testing completed to date is inadequate to satisfy the Tiger Team regarding the debris field's influence on the performance of the levee. These issues necessitate a comprehensive and conservative assessment that should be coordinated with the Non-Federal sponsors. Tiger Team recommends that future engineering studies completed in the vicinity of old landfill locations investigate the routes of access to the landfill searching for promiscuous dumping on the way to the landfill.

3. Wet Area at Project Station 140+00.
    a. Based on the sensitivity analysis performed by the Tiger Team, seepage in the area of the wet spot does not pose a stability concern, but is a nuisance, and

maintenance issue. The Tiger Team recommends constructing the necessary improvements to ensure that the wet area located immediately landside of the protected side stability berm in the vicinity of Station 140+00 is remediated to prevent rutting during mowing and not pose a maintenance issue. Remediation can include placement of additional fill over the wet area (if stability of canal bank is not compromised) and/or construction of a shallow toe drain to collect water in the subsurface. An example drainage control scheme is shown below. The USACE should independently evaluate the Tiger Team's assessment of the seepage issue and develop corrective actions to minimize NFS's concerns regarding access and O&M issues.



Example Drainage Control Scheme

4. Levee Design.
    a. Future levee designs should consider the impacts that a range of unit weights has on the project related to settlement and slope stability. The Tiger Team recommends that the New Orleans District Corp of Engineers review post-construction design verification boring data and field moisture/density data collected on a wide range of projects constructed using the current P&S and construction methodology to determine appropriate unit weights to be considered in design. It is likely that most projects have been constructed with high plasticity clay (CH) soils and that the database of field data will be consistent with that material type. If the database has insufficient data for lean clay (CL) soils with higher sand contents, then that should be a consideration in providing

guidance in regards to unit weight. After such reviews, the Tiger Team recommends that MVN develop unit weight guidance for USACE and AE designers to consider in future designs. In addition to consideration of material type, development of this guidance could consider the type of project being constructed (i.e. straddle raise, "new" stability berms with no levee raise, levee shifts, new levee, etc.) so that the unit weight used in design may be conservatively selected depending on the project type.

5. Specification and Enforcement Issues.
    a. In future contracts, USACE should revise paragraph 2.1 "Materials" of technical section 31 24 00.00 12 "EMBANKMENT" to address the following issues:
        i. Decrease the allowable percentage of objectionable size wood;
        ii. Include an allowable percentage of smaller than objectionable size wood;
        iii. Define when allowable percentages are considered for measurement (prior to compaction or in-place compacted fill, at the discretion of the USACE, etc);
        iv. To avoid specification enforcement subjectivity and variation of interpretation, better define how percentages are measured (per individual cubic yard, per cubic yard for a lift of a certain length, per a number of cubic yards);
        v. Modifications to the specifications should provide construction personnel practical language to address the borrow material acceptance, allowable in-place amounts of wood and other debris, observable and measureable field and laboratory QA/QC procedures to measure in-situ debris, and consequences that the contractor faces if he does not meet the specification. Practical quantitative procedures are required for consistency of acceptance. Reference test methods from Tiger Team report (trenching and associated testing for objectionable sizes and bulk sample testing for smaller than objectionable sizes) or other acceptable methods;
        vi. Require the reference test methods only if deemed necessary by the Contracting Officer's Representative;
        vii. Clearly define the word "masses" and to what it applies (i.e., organic matter only, or also sticks, branches, roots, and debris) and the words "pockets and zones";
        viii. Require contractor to remove all objectionable size wood that is visible during lift inspections;
        ix. Modify the specification to define a basis for disapproval of a previously approved borrow source or sections of a borrow source if the material as delivered to the site contains excessive amounts of objectionable debris

that results in excessive on site processing to bring the material into contract compliance. Consider disallowing contractor deliveries of borrow containing excessive amounts of objectionable debris onto the construction site. "Excessive" will require definition in contract.

x. Include QC requirements for documentation of wood/debris inspections on a lift-by-lift basis.

xi. Modify the specification to require the contractor to meet all borrow pit acceptance criteria when the contractor requests borrow pit changes after contract award.

6. Borrow Pit Pre-Approval Process.
   a. During the pre-approval process for all borrow pits, whether government furnished or contractor furnished, CEMVN should consider additional exploration techniques to assist the identification and evaluation of layers containing high wood concentrations. The use of inspection trenches and firsthand observations of these inspection trenches by experienced geotechnical engineers or construction engineers will help identify the unsuitable layers. Where unsuitable layers of excess wood or woody debris are identified, blending of the unsuitable layer with suitable clay should be explicitly forbidden.

7. Quality Assurance Reporting.
   a. When an issue listed on a daily report is resolved, follow up reports should state that fact. No comment to that affect leaves a question as to whether the issue remains.

   b. For Initial Inspection minutes, be specific in documenting the quality standard. This is especially important for features or sub-features of work where visual inspection and subjectivity is involved with no detailed test to determine acceptance.

   c. When quality standards or specification interpretations become an issue during the contract performance period, hold additional Preparatory and Initial Inspections to further clarify and document specification interpretations and acceptance criteria with all parties involved to ensure full consensus. The purpose, in this case, is to set the standard of acceptance and to document all agreed upon methods and inspections to be utilized in order to control quality of fill in relation to amounts of objectionable wood and debris. Interpretations, acceptance criteria, and changes to inspection procedures should be documented and adhered to for the duration of the project.

d. Utilize lift charts and photos to provide documentation of quality for features of work where acceptance is based primarily on visual observation and is subjective or controversial. A pass/fail tracking of inspections for objectionable wood or debris using lift charts is recommended when fill contains significant amounts of wood or debris.

e. Establish better communication between the Corps and the Levee Authority and better documentation of this communication to include agreements and disagreements on field observations and interpretations made.

8. QA/QC Data.

a. Improved documentation of borrow source locations are needed on applicable field/lab forms. This could be accomplished by properly filling out the "Material Source" lines with the exact borrow source location rather than generic terms such as "Borrow Pit". Additionally, clarification of borrow source location (i.e. such as excavation elevation from pit, more detailed pit location, etc.) could be accomplished by better use of the "Remarks" section of the standard reporting forms.

b. QC and QA laboratories should not report Proctor curves with obvious incorrect shapes (i.e. S-shaped curves, etc.). Such shapes should quickly be identified and any errors in development of incorrectly shaped Proctor curves identified and corrected. Where required due to difficulty in plotting some curves, the laboratory should plot "points only" for interpretation of curve fitting by others while still providing their interpretation of maximum dry density and optimum water content.

c. The maximum dry density and optimum water content reported should be obtained directly from the graph of the smooth Proctor curve as dictated by ASTM. There should be no discrepancy between the reported values and the smooth Proctor graph values. Discrepancies may occur because QC/QA laboratories initially use their own proprietary software to develop the Proctor curves for determination of the maximum dry density and optimum water content. Later the laboratories input the data on the official USACE forms. The reported maximum dry density and optimum water content should match the official QC and QA forms that are part of the permanent record for the project. The use of the proprietary software by the QC/QA laboratories could be approved by the CEMVN Quality Control Branch provided they are satisfactory for official reporting and provide all information requested on the official USACE forms.

d. As a matter of practice, QC and QA personnel should be trained to conduct a more thorough review of all tests with a percent compaction greater than 102 percent for potential errors in testing or to determine whether the appropriate material source and reference Proctor has been selected.

e. One-point Proctor tests should be compacted at the moisture content ranges specified in the P&S.

f. The formal use and presentation of a true "family of Proctor curves" should be used for levee construction. The current NODCC Manual and P&S require the use of a family of Proctor curves; however, there are no formal submittals of the family of curves required. The one-point Proctors should be used in conjunction with the family of curves that is based on individual Proctor curves and not based on averaged values. The attached document discusses how the one-point Proctors should be used in conjunction with the family of Proctor curves.

g. Eliminate the practice of averaging two separate Proctor curves for determination of maximum dry density and optimum water content. Contractors are inconsistent with how they average the data and the effect of the averaging has a negative impact on the use of a true family of Proctor curves and the one-point Proctor data.

B. The following recommendations are agreed to by the CPRA members of the Tiger Team and provided to the New Orleans District Corps of Engineers.

1. Presence of Wood and Debris

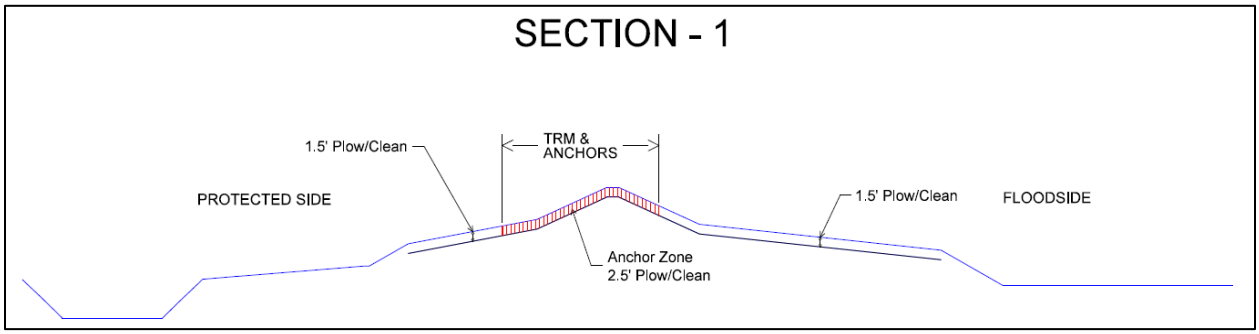
i. CPRA recommends the following measures or equivalent be taken to address all concerns on wood and non-wood debris. The table that follows provides the guidance on the application of the remedial actions based on levee stations and location within the levee section.

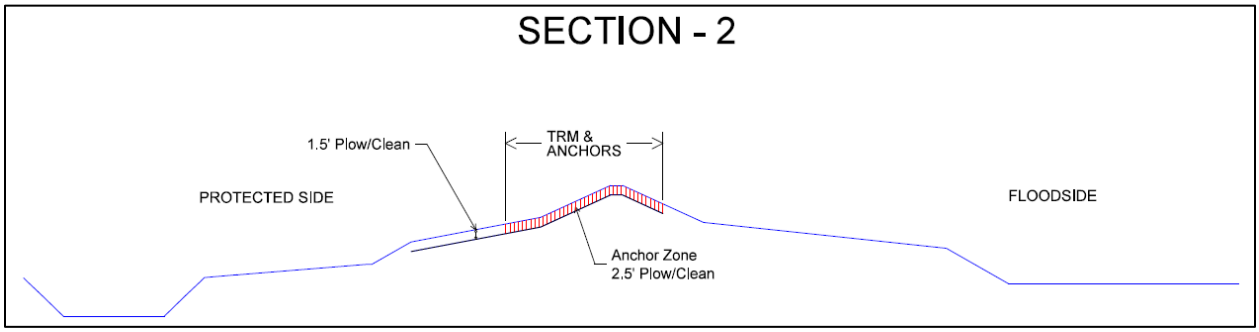
1. <u>Section -1:</u> For areas to be covered by TRM, plow and clean the top 2 ½ ft of compacted fill. For areas outside of TRM on both flood side and protected side of the levee, plow and clean the top 1 ½ ft of compacted fill.
2. <u>Section -2:</u> For areas to be covered by TRM, plow and clean the top 2 ½ ft of compacted fill. For areas outside of TRM on protected side of the levee, plow and clean the top 1 ½ ft of compacted fill.
3. <u>Section -3:</u> Plow and clean the top 1 ½ ft of compacted fill on protected side berm.
4. <u>Section -4:</u> For areas to be covered by TRM, plow and clean the top 2 ½ ft of compacted fill and add ½ foot layer of compacted fill to compensate for settlement and shrinkage in the levee. For areas outside of TRM on both flood side and protected side of the levee, plow and clean the top 1 ½ ft of compacted fill.
5. <u>Section -5:</u> Add additional fill on protected side of the levee similar to rest of the East West reach. Plow and clean 1½ foot layer of compacted fill from crown to flood side toe. The previous East West reach levee modifications from Sta. 165+00 to Sta. 182+15 were done

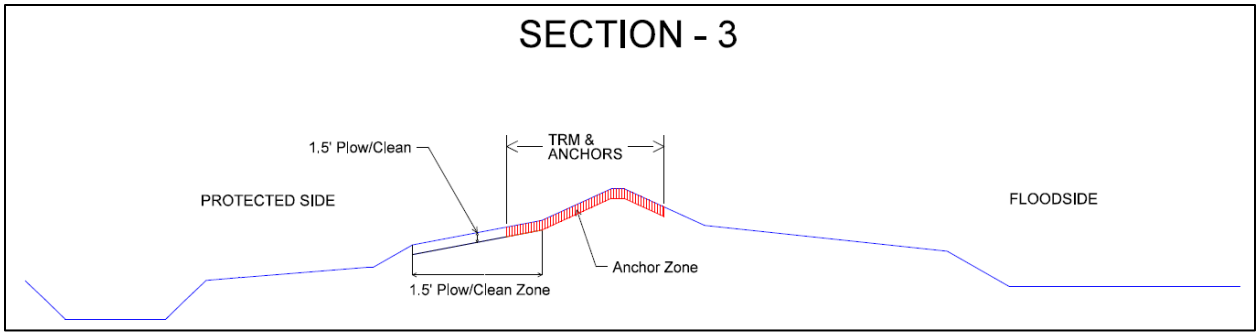
in order to address the wet spots and to cover the debris in existing levee material. Tiger Team investigations showed that the limits of the debris field uncovered in the original trenching operations extended well beyond the limits of the clay cap installed by contract modification.

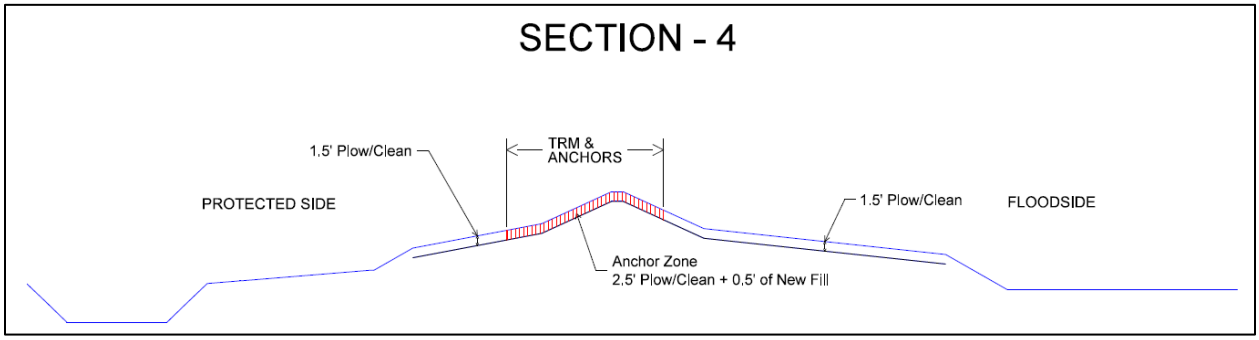
Following table summarizes the NFS recommendations for the corrective actions for wood & debris outside the abandoned landfill:

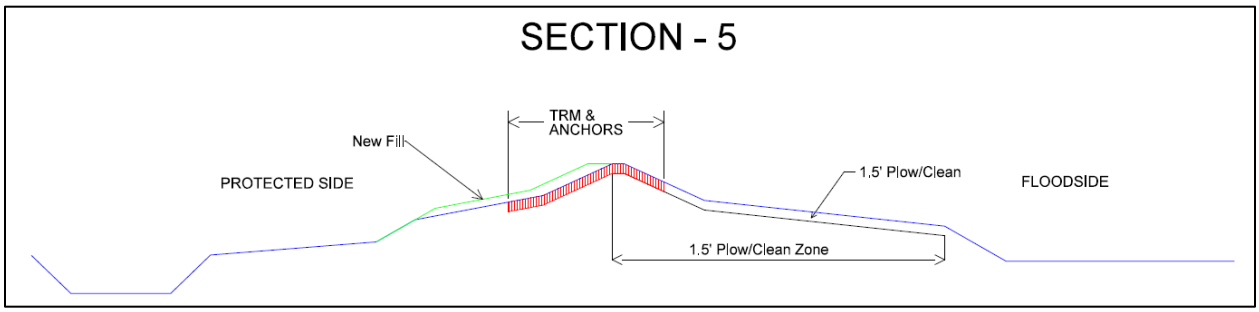
Station		Issues			NFS Proposed Solutions
From	To	FS Outside TRM	Under TRM	PS Outside TRM	
0+44	52+50	Wood	Wood/Concrete	Wood/Concrete	Section 1
65+00	79+00	-	Concrete	Concrete	Section 2
79+00	105+00	-	-	Wood/Concrete	Section 3
105+00	110+00	-	Concrete	Wood/Concrete	Section 2
120+61	165+00	Wood	Wood	Wood/Concrete	Section 4 or 5
165+00	182+15	Wood	Wood	Wood/Concrete	Section 4











C. The following recommendations are agreed to by the USACE members of the Tiger Team members and provided to the New Orleans District Corps of Engineers.
   1. Presence of Wood and Debris. After scarifying the entire surface of the levee slopes, levee crown, protected side and flood side berms to a depth of 4-inches, in preparation for final seeding, these entire areas should be inspected and “picked” clean of woody and non-woody debris revealed during the process. After the scarification and picking process is completed, the final seeding should be performed.

D. Tiger Team member, Michael Louis Merritt, M.S., M.B.A., C.P.G., has determined he cannot, in good conscience, agree to the findings of many of the other team members in regard to Chapters 7, 8, 10, 11, and this Chapter 12, of the final Tiger Team report. To avoid further delay of the report he is issuing this "statement of non-concurrence." Mr. Merritt's individual findings and conclusions may be reviewed in Appendices Y and Y1 of this report. Mr. Merritt does offer the following recommendations to the New Orleans District Corps of Engineers.

1. Recommend additional field inspections of all inspection trenches and remediation by recompletion of improperly benched inspection trenches refilled with debris laden material.

2. Recommend repeating geophysical surveys of levee right of way, this time using resistive and seismic shear wave methods. The resistive methods as a check on efficiency of grubbing and removing every and all previously detected (debris) anomalies and the latter as a proxy for material (shear) strength to "tie" trench data and boring data together to verify levee stability and provide a resource for a new physical geology interpretation of the foundation soils. If detected debris is not found by a ten foot by ten foot trench, at the maximum estimated depth, the area should be grubbed an additional 3 feet deep and benched in to a depth appropriate new perimeter, or 30 square foot perimeter, whichever perimeter is larger.

3. Notable contractor motor fuel spills will adversely impact turf armoring efforts. Recommend address construction legacy pollution with new USACE policy and practice indemnifying non-federal sponsors whenever problems are discovered.

4. Geophysical recommendations including seismic profiling of entire levee continuously (connecting many trenches and design borings) to delineate stronger and weaker clay layers, inform work on seepage concerns, explain local contrasts in earlier geophysical studies and inform estimates of the stability of the levee including survivability of a Richter 6 earthquake.

5. Geological recommendations including a detailed review and new digital geologic map (1"=200') on LIDAR base map, differentiating the three alloformations present in vicinity of levee and clay quarries used to provide building material. Additional purpose of new geological review is to define the relationship of buried sands of the Saint Bernard Distributary Delta Lobe beneath the levee, especially as their presence affects settlement or seepage. Placement of piezometers and other instruments will examine wet clay layers to better define the hydraulic characteristics beneath the levee. Together with marker fossils and soil chemistry evidence found and noted by Tiger Team, create new maps and cross sections to inform action on settlement, seepage or flood fighting issues.

6. Recommend USACE collaborate with NFS to define specific target values of important geotechnical factors, for example: "the follow up tests of compaction of inspection trenches should leave none with less than 1700 psf unconfined compressive strength or equivalent to adjacent clays, whichever is higher".

7. Recommend additional computer automated modeling of seepage to obtain a model matching and simulating currently observed circumstances to confirm or deny the seepage water occurring during drought was, or was not, compaction water and possibly explain why levee settlement rates are exaggerated by heavy truck traffic during construction events.

8. Recommend review and recalculation of Tiger Team work using survey data to determine actual margin of error of surveys when compared to several instances of measurement variances of 10 inches by GPS survey during Tiger Team field work.

9. Recommend new specification and construction practice requiring medium stiff clay, (by raising the traditional, Pre-Katrina & Rita spillway mud standard, of 400 psf), and requiring more objective measures of clay characteristics during construction, especially including any gain above planned (design) density.

10. Recommend new levee right of way cross sections and maps based on lift charts and Tiger Team data be created to better define the areal extent of particular lift layers with objectionable material to define the thickness and lateral extent of such layers with the object of assessing how much of the levee to degrade and rebuild and to inform subsequent (and newly recommended) seismic and resistivity reconnaissance.