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“INVESTIGACIÓN DE MATERIALES DE FILTRO DE TRANSICIÓN PARA LAS
REPRESAS BORINQUEN, PROYECTO DE AMPLIACIÓN DEL CANAL”

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Dedicatoria

"A Dios le dedico este trabajo, para agradecerle por haberme dado todas las maravillosas cosas de mi vida, mis padres, mis hermanos y mi familia, la cual no cambiaría por nada. Gracias a ellos soy quien soy y siempre me han dado aliento para seguir adelante y buscar mejores cosas en la vida. Le doy gracias por dejarme tener personas maravillosas como mis amigos que sin ellos tampoco estaría donde estoy."

-Rodrigo A. Jaén Ruiz

"La posibilidad de realizar un sueño es lo que hace que la vida sea interesante."-Paulo Coelho

"La sabiduría es un don adquirido mediante los estudios y la comprensión de cómo funciona el mundo a nuestro alrededor. Le dedico esta investigación a mi madre, Irma T. Quiróz, gracias a ella siempre me he preguntado el por qué de las cosas y he tenido esas ganas de conocer y emprender en nuevas oportunidades. Sin la ayuda de mi madre, Dios y mis amigos que me apoyaron a lo largo de esta maravillosa experiencia, no hubiera podido ser lo que soy hoy en día."

-Krisnar E. Cruz Quiróz

"Los científicos estudian el mundo como es y como existe... Los ingenieros crean el mundo que nunca ha existido"

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Índice:

1. Introducción	6
2. Justificación	8
2.1. Conceptos Básicos	9
3. Métodos de Ensayo	13
3.1 Ensayos en el Material de Origen	15
3.2 Ensayos en Sitio	15
4. Configuración de los Campos de Ensayo	16
5. Ubicación	19
6. Resumen de los Campos de Ensayo	20
6.1 Resultados de Laboratorio	20
6.1.1 Ensayos en el Material de Origen	20
6.1.2 Control de Asentamiento	23
6.1.3 Ensayos de Granulometría	23
6.1.4 Ensayo Proctor Estándar	26
6.1.5 Ensayo de Cono de Arena	26
6.1.6 Ensayo de Densímetro Nuclear	27
6.1.7 Densidad Relativa Mínima y Máxima	27
6.1.8 Ensayo de Percolación	29
6.1.9 Ensayo de Placa de Carga	30
6.2 Trinchera de Estudio	30
6.3 Ensayos Adicionales en Material de Acopio	31
7. Conclusiones y Recomendaciones	34
8. Documentos de Referencia	37
8.1 Documentos del Contratista	37
8.2 Métodos Estándares de Ensayo	37
8.3 Bibliografía	39
9. Índice de Imágenes	40
10. Índice de Tablas	41
11. Índice de Graficas	42

Apéndices

APÉNDICE 1: MAPA DE UBICACIÓN DE LOS CAMPOS DE ENSAYO	43
APÉNDICE 2: CONFIGURACION DEL CAMPO DE ENSAYO	45
APÉNDICE 3: RESULTADOS DE ENSAYOS DEL MATERIAL DE ORIGEN	48
APÉNDICE 4: RESULTADOS DE ASENTAMIENTO	106
APÉNDICE 5: RESULTADOS DE ENSAYOS DE GRANULOMETRÍA Y DENSIDAD RELATIVA	135
APÉNDICE 6: RESULTADOS DE ENSAYO PROCTOR ESTÁNDAR	328
APÉNDICE 7: RESULTADOS DE ENSAYOS DEL CONO DE ARENA	330
APÉNDICE 8: RESULTADOS DE ENSAYOS DEL DENSÍMETRO NUCLEAR	484
APÉNDICE 9: RESULTADOS DE ENSAYOS DE PERCOLACIÓN	489
APÉNDICE 10: RESULTADOS DE ENSAYOS DE PLACA DE CARGA	513
APÉNDICE 11: RESULTADOS DE ENSAYOS DE LA TRINCHERA	534
APÉNDICE 12: RESULTADOS DE ENSAYOS DE CAPAS ADICIONALES	557
APÉNDICE 13: FOTOGRAFÍAS	700

1. Introducción

El siguiente trabajo de investigación tiene como finalidad presentar los resultados de los ensayos de compactación, ejecutados para los materiales a utilizarse en las represas de tierra Borinquén tipo 3A y tipo 3B (Filtro Transitorio Bien Graduado) en el relleno de estas estructuras para el proyecto Tercer Juego de Esclusas del Canal de Panamá.

El objetivo de la siguiente investigación es realizar un estudio a fondo de las propiedades geotécnicas de los materiales a ser utilizados como filtros de transición en las represas Borinquén (1W, 2W y 2E), proyecto de ampliación del canal. Los materiales a utilizarse son gravas finas tipo 3A y tipo 3B, productos obtenidos de la trituración y tamizado de roca tipo basáltica, obtenida dentro del proyecto y procesada para cumplir con las granulometrías mencionadas.

La investigación consiste en la construcción de un campo de prueba con los materiales antes mencionados, variando los espesores de capas, siendo compactadas utilizando un equipo de vibro-compactación de 12 Ton. Cada capa será expuesta a diferentes cantidades de pases de la compactadora, variando

con ello no sólo el espesor de la capa, sino el método de compactación aplicado a cada una de ellas.

En cada capa a determinadas cantidades de pases del compactador se realizarán ensayos de laboratorio (con un laboratorio certificado) para determinar la variación en la granulometría a distintos esfuerzos de compactación y espesores de capas, la densidad alcanzada a distintos esfuerzos de compactación, el ensayo de percolación para determinar la característica filtrante del material y la revisión de asentamiento del material.

Los campos de ensayo de la investigación serán de 5 a 6 capas, dependiendo de la dificultad de construcción de la misma. Luego de terminados los campos de ensayo, se realizarán trincheras a través de cada uno de ellos, para realizar una inspección visual del material y el comportamiento de este después del esfuerzo ejercido.

2. Justificación

La investigación de los materiales para las represas Borinquén, se llevan a cabo para poder cumplir con el diseño y construcción del proyecto de ampliación del Canal de Panamá, donde nos vemos forzados a construir cuatro represas (1E, 2E, 1W Y 2W), debido a que el diseño escogido de tres esclusas brindará un transporte marítimo mucho más ágil, conectando las nuevas esclusas del Pacífico con el Corte Culebra, reduciendo así el tiempo de traslado. Esto crea nuevos retos para los ingenieros, ya que esta represa separará el lago Miraflores con una elevación aproximada de 16.75 PLD¹ (por sus siglas en inglés Precise Level Datum) con el nuevo canal de navegación a una elevación de 25.90 PLD. El material estudiado formará parte del núcleo de las represas Borinquén que serán construidas por el Consorcio GUPC (1W, 2W Y 2E), ya que es necesario cumplir un criterio de diseño sísmico, ya que existen ciertas fallas geológicas en el subsuelo con potencial de desplazamiento horizontal y vertical. El núcleo debe poder adaptarse a las fallas de una zona de casi 50 metros.

¹ PLD: es la unidad utilizada por la Autoridad del Canal de Panamá para mayor control de las operaciones del canal. En si es el nivel medio del Mar Caribe y el Océano Pacífico

Algunos conocimientos básicos necesarios para poder realizar y comprender los estudios a continuación son de carácter ingenieriles específicos de la rama de la geotécnica, ciencia que estudia las propiedades mecánicas, hidráulicas e ingenieriles de los materiales provenientes de la tierra. A continuación mencionaremos algunos de los criterios utilizados para la investigación, junto con una breve definición de los conceptos.

2.1. Conceptos Básicos

Granulometría: es la clasificación, medición y graduación de los granos de formaciones sedimentarias, materiales sedimentarios, así como de los suelos, con el fin de analizar tanto los orígenes de dicho material, sus propiedades ingenieriles y el cálculo de la abundancia del material, correspondiente a los tamaños previstos por una escala granulométrica.

Ensayo de Tamizado: Utilizando una serie de tamices regulados, ensamblados en una columna, se realiza la clasificación granulométrica de los materiales. En la parte superior se encuentra el tamiz de mayor diámetro,

en donde se vierte el material original, luego éste es sometido a vibración y rotación mediante una máquina especial. A lo largo de algunos minutos, se separa la columna y se pesan los tamices con el material que ha sido retenido en cada uno de ellos, sabiendo así el porcentaje de material retenido y pasante de cada tamiz.

Compactación: Es el término que se utiliza para describir el proceso de densificación de un material mediante medios mecánicos. Su objetivo es aumentar la resistencia al corte y por consiguiente mejorar la estabilidad y capacidad de carga de los suelos. El grado de compactación de un suelo o de un relleno se mide cuantitativamente mediante la densidad seca. La compactación depende mucho de la energía de compactación, la densidad seca y el contenido de humedad del material. Para un porcentaje de compactación óptima o densidad óptima existe una humedad óptima del material.

Método del Cono de Arena: el método del cono de arena, se aplica en general a partir de la superficie del material compactado. Este método se centra en la determinación del

volumen de una pequeña excavación cilíndrica, de donde se ha retirado el material previamente compactado, sin pérdidas del material, ya que el peso del material retirado dividido por el volumen del hueco cilíndrico nos permite determinar la densidad húmeda. Luego de determinar en el laboratorio el contenido de humedad de la muestra extraída de campo, se puede determinar la densidad seca del material.

Densímetro Nuclear: El densímetro nuclear consiste en un equipo portátil que puede determinar la compactación, humedad y densidad de un área determinada (suelos, hormigón o asfalto). Utiliza fuentes radioactivas como el Americio 241 para medir la humedad y el Cesio 137 para la densidad. Cuando se maneja este tipo de aparato es necesario tener un plan de seguridad establecido; el uso y manejo del mismo debe realizarse sólo por personal entrenado; así como el mantenimiento adecuado que debe tener, ya que la exposición al Cesio 137 daña las células del cuerpo y el Americio 241 genera cáncer en los huesos. Sin embargo, este método se utiliza porque brinda los resultados al instante de su aplicación.

Percolación: Los ensayos de percolación se utilizan para conocer la infiltración de agua por los poros del material estudiado. El ensayo de percolación se realiza haciendo una pequeña calicata², dentro del campo de ensayo de dimensiones conocidas y al menos una capa de profundidad. Una vez se tiene el pozo preparado se llena de agua y se hacen mediciones cada cierto tiempo para conocer cuánta agua se filtra en determinada cantidad de tiempo. La permeabilidad del material se determina mediante el coeficiente de permeabilidad (k) dado luego de los cálculos, utilizando los valores de mediciones obtenidos en el ensayo de percolación.

Ensayo de Compactación Proctor Estándar: El ensayo de compactación Proctor es uno de los más importantes estudios a realizarse, ya que éste determina los grados de compactación en relación a la humedad del material. Esto optimiza el inicio de obra, su desarrollo y costo. El ensayo Proctor consiste en un muestreo el cual es sometido a compactación mediante un pisón que cae sobre

²Calicata: es una técnica de prospección para facilitar el reconocimiento geotécnico, es el único medio de exploración que puede entregar información confiable en suelos con grava.

la muestra a determinada altura con un peso determinado del pisón.

Ensayo de placa de carga: Este ensayo consiste en aplicar carga sobre una placa rígida colocada sobre la superficie del terreno a estudiar. En este ensayo se miden los asentamientos producidos por el aumento de la carga en la superficie. Con este ensayo se llega a la condición límite de rotura de la muestra o falla; de no ser así, se toman los valores máximos, los cuales se asignan a los suelos no friccionantes.

3. Métodos de Ensayo

Para la evaluación de los esfuerzos de compactación obtenidos a diferentes espesores de capas, se realizan ensayos en sitio y en laboratorio para cada capa y para los diferentes pases de la compactadora. Los ensayos incluyen ensayos iniciales en la fuente del material para determinar la granulometría, densidades relativas mínimas y máximas de los materiales previos a la colocación de las capas, para poder producir en la planta de trituración el material más acorde a las especificaciones técnicas del proyecto.

Una vez que el material es instalado y nivelado con la moto niveladora, se realizan nuevamente ensayos de granulometría, densidad relativa mínima y máxima, y ensayos de cono de arena. Estos ensayos se realizan a cada cantidad determinada, obtenida de los pases de la compactadora, para determinar el número de pases necesarios, y así conseguir la compactación requerida del 70% de la densidad relativa. Luego de los ensayos realizados en cada capa, se realizaron ajustes en la planta de trituración, al igual que el número de pases, para lograr la densidad relativa requerida y establecer un método viable para la colocación y compactación del material en la instalación de los filtros durante la construcción de las Presas Borinquén.

En adición a las pruebas realizadas, se instaló una cuadrícula en conjunto con el equipo de topografía del proyecto que consistió en 15 puntos "n" monitoreados cada 1, 2, 4, 6, 8, 10 y 12 pases del equipo vibro-compactador en la capa inicial de nivelación. El objetivo de este monitoreo es definir el asentamiento del material y su comportamiento a medida que se incrementan los números de pases. La cantidad de pases del equipo de vibro-compactación se fue reduciendo en las siguientes capas,

como ajuste para lograr las densidades relativas necesarias.

3.1 Ensayos en el Material de Origen

Los siguientes ensayos fueron realizados al material de origen, previo a su instalación y nivelación:

- Granulometría (ASTM C136 y C117)
- Índice de densidad máxima y mínima de suelos (ASTM D4253 y D4253)
- Proctor Estándar (ASTM D1557 y D698)
- Contenido de humedad natural (ASTM C566 y D2216)

3.2 Ensayos en Sitio

Para determinar la densidad del material a ser usado, el principal método de ensayo fue el del cono de arena y ensayo de granulometría. Estos ensayos fueron realizados en diferentes pases de compactación para poder establecer así, la cantidad de pases necesarios y lograr alcanzar la densidad relativa mínima necesaria de las especificaciones técnicas. Los siguientes ensayos fueron realizados para generar una correlación entre la

granulometría en sitio, la densidad del material y los esfuerzos de compactación:

- Densidad en sitio mediante cono de arena (ASTM D1556) y Densímetro Nuclear (ASTM D2922-05)
- Ensayo de percolación (EM 1110-2-2301)

Se realizaron muestreos de campo del material para luego ser ensayados en el laboratorio, luego de la compactación. Estos muestreos fueron tomados de distintas áreas del campo, donde se realizaron las pruebas a los diferentes pases de compactación, para evitar usar el material alterado por previos muestreos. Estos muestreos de campo se basaron en las siguientes pruebas:

- Ensayo de granulometría (ASTM C136 y C117)
- Índice de densidad máximo y mínimo para suelos (ASTM D4254 y D4253)

4. Configuración de los Campos de Ensayo

Los campos de ensayos de compactación fueron construidos para recrear las condiciones similares a las que se experimentarán durante la construcción de los filtros de las presas Borinquen. Para la fundación de los campos de ensayos fue necesario construir una plataforma estable,

compuesta de roca basáltica nivelada y compactada para proveer un área competente que soportase y estuviese acorde con la construcción del campo de ensayos y los esfuerzos de compactación que se realizaron en la misma.

Luego de la preparación de la fundación, un equipo de topografía del proyecto confeccionó una cuadrícula que consistió en 15 puntos fijos con coordenadas Norte y Este usando sistema UTM (siglas en inglés del Universal Transverse Mercator) para el monitoreo de los asentamientos del material a medida que incrementaban los esfuerzos de compactación para cada tipo de material. La ubicación de los campos de ensayos se encuentra en el Apéndice 1 y su configuración en el Apéndice 2. La capa de fundación fue seguida por una capa de nivelación de cada material (Tipo 3A y Tipo 3B para cada campo de ensayo) y 5 capas de prueba. Antes de instalar la capa de nivelación, se realizaron ensayos para asegurar que se estuviese utilizando la granulometría acorde a las especificaciones técnicas del proyecto. Los ensayos en la capa de nivelación y las demás capas de prueba, ayudaron a realizar pequeños ajustes en la curva granulométrica dentro de la planta de trituración.

Luego de esparcir el material y llevarlo al nivel deseado, se instaló la cuadrícula de 15 puntos fijos con el equipo de topografía para poder monitorear el asentamiento del material cada 1, 2, 4, 6, 8, 10 y 12 pasadas del equipo de vibro-compactación variando en cada capa, dependiendo de los resultados logrados en los ensayos de densidad relativa. El campo de ensayo consistió en una capa de nivelación y cinco capas de prueba. La capa de nivelación contó de un espesor de 200mm, seguida de tres capas de prueba de 300mm y dos capas de 450mm, en ese orden, una sobre otra. La nivelación de las capas se realizó con una moto niveladora tipo Caterpillar CAT-14H. La compactación del material se llevó a cabo utilizando un vibro-compactador tipo Bomag BW 219 DH con un tambor liso; esta compactación fue realizada sin vibración con el fin de no crear más material fino de los necesarios y cumplir con la compactación requerida mediante cargas de peso verticales. Cabe resaltar que la velocidad del compactador fue lenta durante los pases, ya que el objetivo era compactar el material de forma vertical y no empujarlo con una velocidad alta del equipo.

5. Ubicación

El campo de ensayo donde se realizaron los análisis de compactación tuvo como ubicación el Cerro Presa, ubicado hacia el Este de la calle Borinquen. Este Cerro forma parte de la unión entre la Presa Borinquen 1W y la presa Borinquen 2W. En la fotografía adjunta se muestra la ubicación de los campos de ensayos.



Imagen #1: Ubicación de campo de ensayos.

Las presas Borinquen se ubicaran en el canal de acceso para las esclusas del Pacifico, como se muestra en la siguiente imagen.



Imagen #2: Ubicación de represas Borinquen.

6. Resumen de los Campos de Ensayo

6.1 Resultados de Laboratorio

6.1.1 Ensayos en el Material de Origen

Los ensayos del material de origen fueron realizados previos a la instalación de cada capa. Estos ensayos incluyeron granulometría, densidades mínimas y máximas y ensayos Proctor estándar para la capa número cinco. Los resultados de estos ensayos se muestran en la tabla de resumen siguiente:

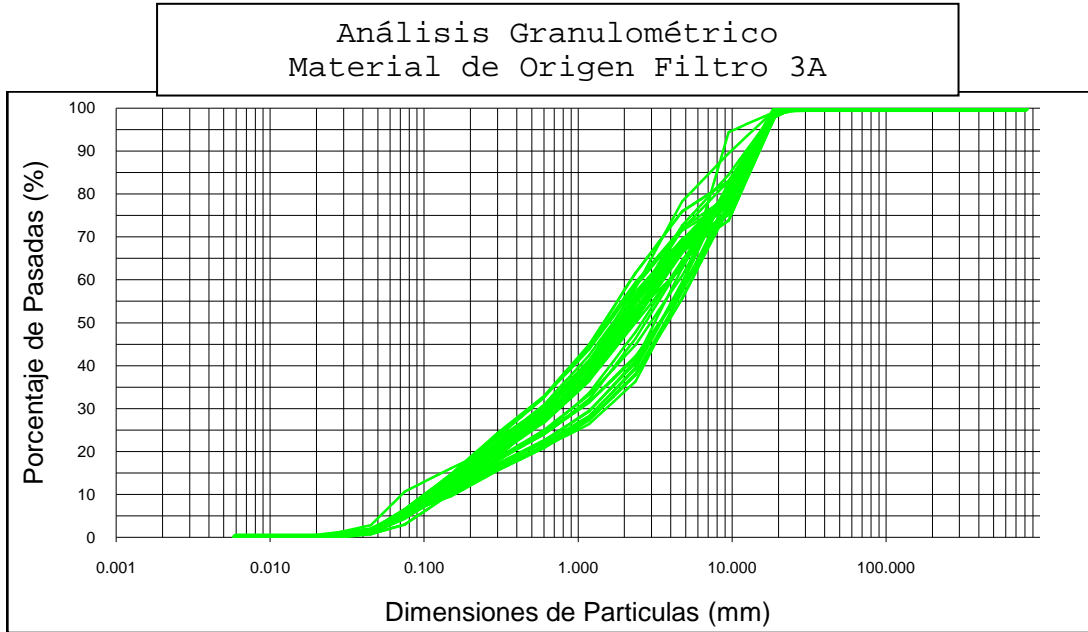
Material Tipo 3A						
Capa	Granulometría		Densidad Relativa		Proctor Estándar	
	0.015 Tamiz #100	0.075 Tamiz #200	Mínima (t/cm ³)	Máxima (t/cm ³)	MDD (g/cm ³)	OMC (%)
Planta de Trituración	12.5	6.2	1.857	2.122	-	-
Nivelación	10.1	5.5	1.807	2.082	-	-
Capa 1	10.6	6.3	1.844	2.101	-	-
Capa 2	10.2	6.1	1.727	2.034	-	-
Capa 3	12.2	4.4	1.753	2.035	-	-
Capa 4	13.1	4.95	1.820	2.035	-	-
Capa 5	11.3	4.4	1.826	2.073	1.912	12.1

Tabla #1: Resumen de ensayos en el material de origen tipo 3A.

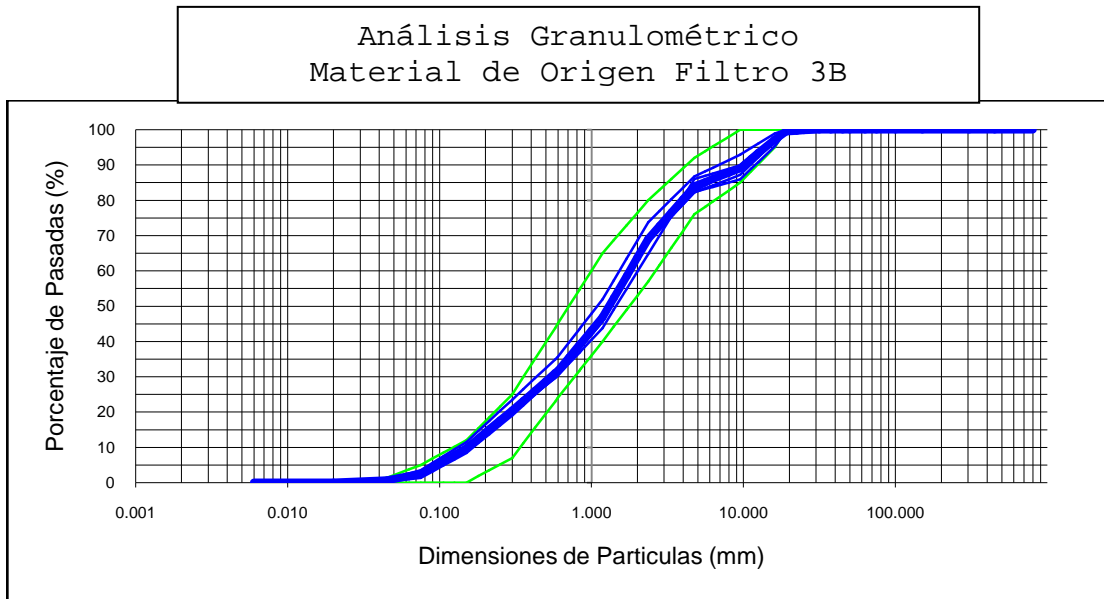
Material Tipo 3B					
Capa	Granulometría		Densidad Relativa		
	0.015 Tamiz #100	0.075 Tamiz #200	Mínima (t/cm ³)	Máxima (t/cm ³)	Máxima Método Húmedo (t/cm ³)
Planta de Trituración	-	-	-	-	-
Nivelación	-	-	-	-	-
Capa 1	9.7	2.8	1.746	1.979	2.017
Capa 2	11.5	3.5	-	-	-
Capa 3	8.9	1.7	-	-	-
Capa 4	8.4	1.3	-	-	-
Capa 5	9.9	2.9	-	-	-

Tabla #2: Resumen de ensayos en el material de origen tipo 3B.

Curvas granulométricas del material de origen:



Gráfica#1: Curvas granulométricas del material tipo 3A en origen.



Gráfica#2: Curvas granulométricas del material tipo 3B en origen.

Los resultados oficiales de los ensayos de laboratorio se muestran en el Apéndice 3.

6.1.2 Control de Asentamiento

Se realizó un levantamiento topográfico a la fundación del campo de ensayos donde se fijaron 15 puntos con coordenadas como se muestra en el Apéndice 4. El levantamiento topográfico de los puntos fue ejecutado en la capa de nivelación luego de esparcida y nivelada y cada 1, 2, 4, 6, 8, 10 y 12 pases. En las siguientes capas el levantamiento fue realizado luego de cada 1, 2, 4, 6 y 8 pases del compactador; esta cantidad fue variando a medida que se iban obteniendo los resultados de densidad necesarios.

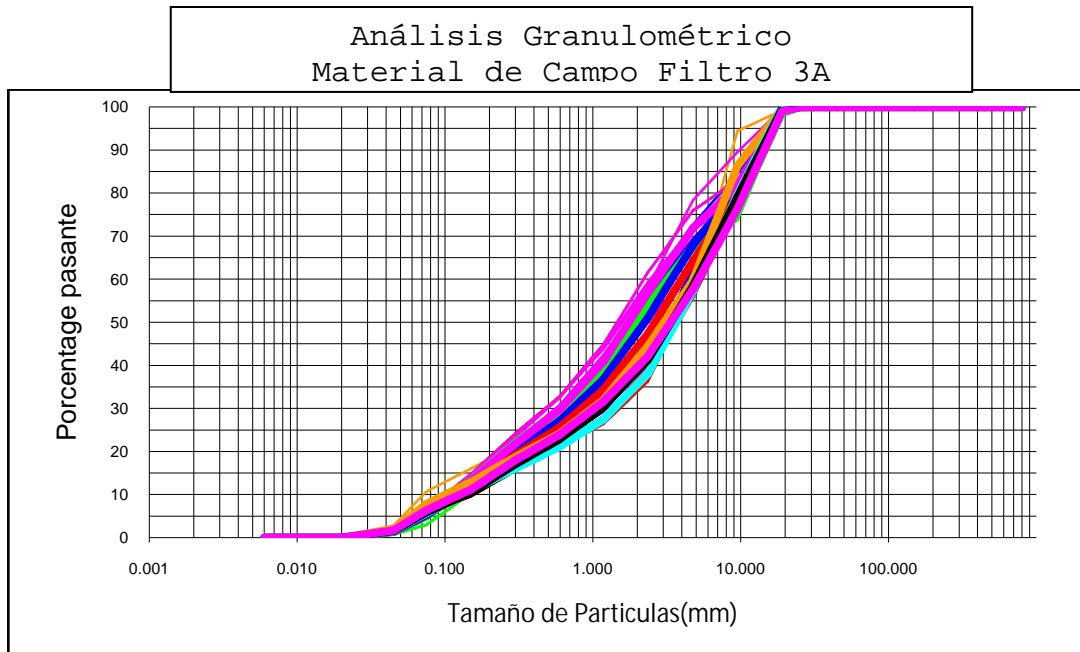
El espesor y asentamiento de cada capa y el monitoreo de los puntos luego de los pases del compactador, al igual que los valores promedios de asentamiento, pueden encontrarse en el Apéndice 4.

6.1.3 Ensayos de Granulometría

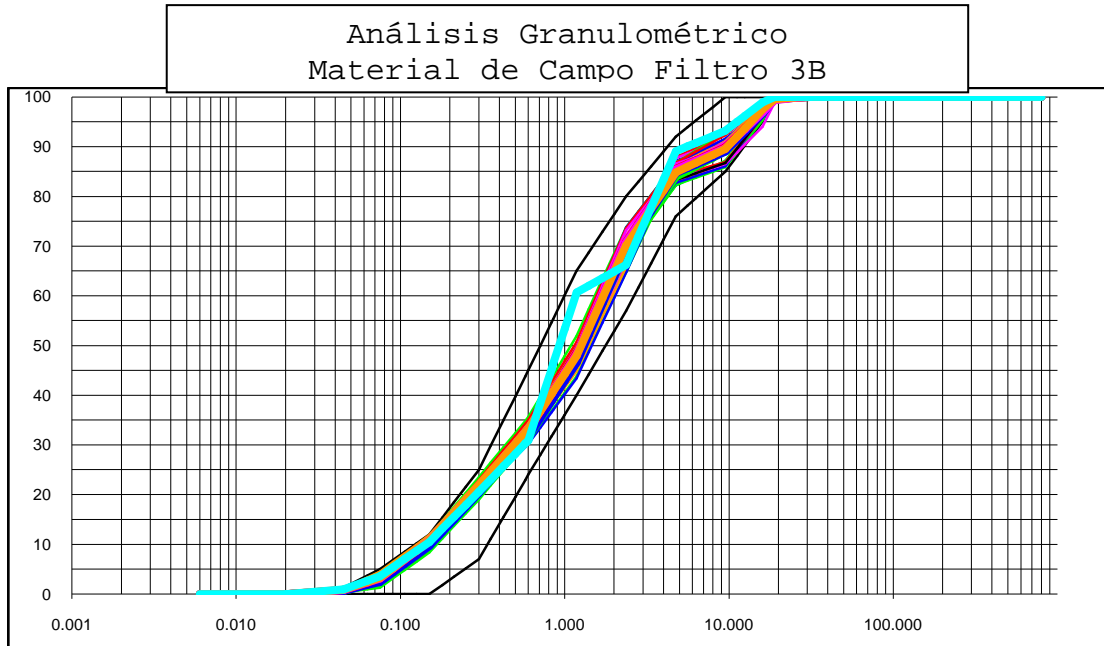
Se realizaron ensayos de granulometría en cada capa para distintos números de pases del compactador. Estos

ensayos granulométricos fueron realizados con el fin de tener una idea de la generación de finos en las distintas etapas y pases de compactación. Los resultados de los ensayos de granulometría emitidos por el laboratorio se encuentran en el Apéndice 5.

La gráfica a continuación muestra las curvas de granulometría luego de la compactación, divididas por la cantidad de pases del compactador.



Gráfica#3: Curvas granulométricas del material tipo 3A en el campo de ensayo.



Gráfica#4: Curvas granulométricas del material tipo 3A en el campo de ensayo.

0	1	2	3	4	6	8	12
Pases	Pase	Pases	Pases	Pases	Pases	Pases	Pases

Luego de ver los resultados de granulometrías y hacer un análisis de los promedios, se puede observar que luego de los pases 1 y 2 hay un pequeño incremento en la cantidad de finos. En los siguientes pases no se nota un incremento abrupto o una tendencia lineal en la generación de finos, sólo luego del pase 12 se ve la generación de una cantidad de finos mayor a las anteriores. Sin embargo, esta cantidad alta de pases

no es necesaria para alcanzar la densidad relativa requerida para cumplir con las especificaciones. Se puede denotar que los ajustes iniciales fueron realizados en la planta de trituración para producir un material de filtros con un porcentaje de finos menor a 5%.

6.1.4 Ensayo Proctor Estándar

Los ensayos Proctor Estándar se realizaron en la quinta capa a diferentes pases. Los resultados de estos ensayos se encuentran en el Apéndice 6.

6.1.5 Ensayo de Cono de Arena

Se realizaron tres ensayos de cono de arena a distintos pases de la compactadora. En la capa de nivelación se realizaron tres conos de arena en la superficie de la capa a 8 y 12 pases del compactador. En las capas siguientes la metodología de los conos de arena fue la siguiente: dos conos de arena a la mitad de la profundidad de la capa y un ensayo de cono de arena en la superficie para cada número de pases del compactador analizados.

Los resultados de los conos de área con respecto a la densidad seca, muestran una tendencia de incremento en densidad proporcional al incremento del esfuerzo de compactación. Los resultados de los conos de arena son utilizados para calcular la densidad relativa del material y los resultados de los ensayos de los conos de arena se presentan en el Apéndice 7.

6.1.6 Ensayo de Densímetro Nuclear

La prueba con el densímetro nuclear se llevó a cabo en la quinta capa del filtro Tipo 3B, después de varios pases de la compactadora. No se pudieron realizar ensayos en el material tipo 3A, ya que no se tenía la autorización de dicho equipo en el lugar de trabajo en ese momento. Los resultados se muestran en el Apéndice 8.

6.1.7 Densidad Relativa, Mínima y Máxima

Los ensayos de densidad relativa para determinar las densidades mínimas y máximas se realizaron paralelos a las granulometrías realizadas para la capa de

nivelación y las capas de prueba. Los resultados de estos ensayos se presentan en el Apéndice 6.

La densidad mínima del material varió de 1.716 t/m³ (toneladas por metros cúbico) a 1.869 t/m³. Por consiguiente, la densidad mínima promedio de este material se determinó en 1.798 t/m³.

Por otro lado, la densidad máxima del material varió de 2.031 t/m³ a 2.122 t/m³. Debido a esto, la densidad máxima promedio de este material fue calculada en 2.069 t/m³.

Como se observa, hay una tendencia clara entre el incremento de la densidad relativa vs el esfuerzo de compactación. Las especificaciones técnicas del proyecto para el material de filtro/transición indican un mínimo de 70% de densidad relativa. Luego de esparcir el material y nivelarlo al grado necesario, se realizaron dos ensayos; el primero de ellos alcanzó el 70% de compactación relativa, el segundo no. Luego de 1 pase del compactador se realizaron tres ensayos; dos de ellos alcanzaron la densidad relativa de 70% y el tercero no. Todos los resultados mostraron luego de

2 pases del compactador una densidad relativa mayor al 70% requerido.

6.1.8 Ensayo de Percolación

En las capas de prueba 2 y 5, se realizaron dos ensayos de percolación en las partes Este y Sur de la plataforma³ al final de los ensayos de compactación de cada capa. Estos ensayos fueron realizados de acuerdo a la norma EM 1110-2-2301 - Open Trench Method 11-4. Los resultados de los ensayos de percolación se muestran en el Apéndice 9.

La duración de cada ensayo de percolación varió de 360 min. a 1260 min. como establece la norma. Los valores obtenidos se encuentran en un rango de 10^{-2} cm/s (centímetros por segundo) a 10^{-3} cm/s correspondientes a gravas y arenas. Los valores del rango de 10^{-2} cm/s sugieren que el material actúa como un buen acuífero consistente de arenas y gravas. Los valores del rango de 10^{-3} sugieren que el material como acuífero se encuentra en la categoría de bueno a pobre, compuesto por arenas y gravas a arenas finas y limos.

³ Apéndice 13 tiene imágenes para corroborar la ubicación de los ensayos en general

6.1.9 Ensayo de Placa de Carga

Se realizaron dos pruebas de carga: el primero se llevó a cabo en el nivel 4, después de tres pasadas de la compactadora y la segunda, en el nivel 5, después de 3 pases de la compactadora. Los resultados se muestran en el apéndice 10.

Esta prueba se hace en terrenos de rellenos compactados para mantener un control de la capacidad portante del sitio. Cuando son estos casos, se hace la prueba sin llegar a rotura, ya que lo que se busca es la deformabilidad del terreno.

6.2 Trinchera de Estudio

Luego de haber completado las pruebas de compactación y los ensayos de laboratorio y en sitio, al material de prueba de la capa de ensayos, incluyendo la capa de nivelación y las 5 capas de prueba, se excavó una trinchera a lo largo del campo de ensayos. El propósito de esta trinchera fue la inspección del perfil de las capas luego de todos los ensayos de compactación. Esta inspección fue documentada, fotografiada y muestreada.

Se realizó una identificación visual de las capas a través del perfil de la trinchera; observándose un leve incremento en el contenido de los agregados gruesos en la capa 2 así como una concentración de finos entre el contacto de la capa 2 y 3. Se tomaron muestras de la mitad superior de la capa 2 y de la mitad inferior de la capa tres 3. Se tomó una muestra general del material excavado para obtener una combinación del material de todas las capas que conforman el campo de ensayos.

Los resultados de los ensayos de granulometría para las muestras tomadas dentro de la trinchera, se encontraron fuera de los límites especificados con respecto al porcentaje de finos pasantes de Tamiz No.200. Los valores obtenidos oscilaron entre 5.1% y 6.0%.

La descripción visual del perfil de la trinchera, al igual que las fotografías y los resultados de los ensayos de laboratorio, se encuentran adjuntos en el Apéndice 11.

6.3 Ensayos Adicionales en el Material de Acopio

Dos capas adicionales (una de un espesor de 0.5m y otra de un espesor de 0.45m) se construyeron, compactaron y ensayaron en el sitio de acopio del material tipo 3A y 3B

filtro/transición. El objetivo de estas capas adicionales fue la de confirmar el número de pases necesarios para lograr el 70% de densidad relativa del material. A estas capas adicionales se les realizaron dos ensayos de placa.

Los datos del levantamiento topográfico de estas capas adicionales se adjuntan en el Apéndice 4.

El porcentaje de finos varió entre 2.8% (en planta trituradora) y 3.1-3.8%(obtenidos en las capas de ensayo). Se realizaron conos de arena a 1, 2 y 3 pases. La densidad máxima fue determinada por ambos métodos: seco y húmedo. El método húmedo mostró valores mayores al método seco; por consiguiente, fue utilizado como valor de referencia. Sin embargo, al tercer pase se nota una disminución de la densidad relativa. Todos los resultados de los ensayos se encuentran por encima del límite mínimo de 70% de densidad relativa.

En la segunda capa de ensayos se notó una disminución en la densidad relativa después de 2 pases, en comparación con los resultados de densidad relativa luego de 1 pase. Todos los resultados de densidad relativa luego de 1 pase

se encontraron por encima del límite mínimo de densidad relativa de 70%.

Dos ensayos de placa se realizaron luego de que el compactador pasara una segunda vez en la segunda capa. Todos los ensayos de laboratorio de las capas adicionales en el sitio de acopio se presentan en el Apéndice 12.

7. Conclusiones y Recomendaciones

A continuación se presentan las conclusiones y recomendaciones del presente trabajo de investigación:

- Se construyó un campo de ensayo para los materiales Tipo 3A y 3B Filtro/Transición y se completó de manera exitosa. El esparcimiento del material y la nivelación del grado necesario se llevó a cabo utilizando una moto niveladora Caterpillar Tipo CAT 14H y la compactación se llevó a cabo con el compactador tipo Bomag BW 219 DH con tambor liso y sin utilizar vibración.
- Como resultados de los estudios y ensayos realizados a los materiales Tipo 3A y Tipo 3B se puede concluir que la densidad relativa mínima de 70% puede ser alcanzada utilizando el equipo descrito anteriormente o similares certificados con características similares y utilizando un solo pase del compactador.
- El hecho de que es posible alcanzar una densidad relativa del 70% se confirmó con las capas adicionales

que se realizaron en el sitio de acopio del material de filtro.

- Luego en la etapa de producción y construcción de las presas Borinquen, los valores de porcentaje de finos se mantuvieron menores al máximo de 5% en todas las etapas de trabajo; esto se debe a los cambios y ajustes realizados gracias a los resultados de los estudios que hicimos al material.
- Los valores obtenidos para el coeficiente de conductividad hidráulico K se encontraron dentro del rango de 10^{-2} cm/s a 10^{-3} cm/s, correspondientes a gravas arenosas buenas para acuíferos.
- De acuerdo a lo anterior, se recomienda continuar con la producción del material siguiendo los métodos utilizados y comprobados por este estudio. Es de suma importancia continuar con el monitoreo de las granulometrías de los materiales producidos para el filtro/transición tipo 3A y tipo 3B. El control del porcentaje de finos ha de ser vigilado, ya que de esto dependen mucho los factores de percolación necesarios

por las especificaciones para dichos materiales y las funciones que deben cumplir.

8. Documentos de Referencia.

8.1 Documentos del Contratista

G00/CICTSP-B0004 Technical Specifications Section 31 23
23 Fills

G00/CICTSP-B0002 Technical Specifications Section 31 23
23.53 Test Fills

P35/CICTSP-B0256 Investigation Plan - Pacific Locks
Complex Borinquen Dams - Type 3A and 3B Filters Test Fill
Program

8.2 Métodos Estándar de Ensayo

ASTM D422 Método de ensayo estándar de tamaño de
partículas para suelos.

ASTM D1556 Método de ensayo estándar de densidad y peso
unitario de suelos en sitio por el método de cono de
arena.

ASTM D2216 Método de ensayo estándar para contenido de humedad de suelos y rocas por masa en laboratorio.

ASTM D4254 Método de ensayo estándar para índice de densidad mínimo y peso unitario de suelos y cálculo de densidad relativa.

ASTM D4253 Método de ensayo estándar para índice de densidad máximo y peso unitario de suelos usando mesa vibratoria.

ASTM D4318 Método de ensayo estándar para determinar límite líquido, límite plástico e índice de plasticidad de suelos.

US Army Corps of Engineers Manual EM 1110-2-2301
Engineering and Design - Test quarries and test fills.

8.3 Bibliografía

Braja M. Das. "Fundamentals of Geotechnical Engineering".
Madrid, España. Services Copy. Third Edition. 2008.

W.L. Schroeder, F Asce. "Design and Performance of Earth
Retaining Structures" Edited By Philip C. Lamb and
Lawrence A. Hansen Published by the American Society of
Civil Engineers (A.C.S.E.).1990

Bowles Joseph E., P.E., S.E. "Foundation Analysis and
Design Fifth Edition. The McGraw-Hill Companies Inc. 1996

9. Índice de Imágenes

Imagen #1 Ubicación de campo de ensayos. **19**

Imagen #2 Ubicación de represas Borinquen. **20**

10. **Índice de Tablas**

Tabla #1: Resumen de ensayos en el material
de origen tipo 3A. **21**

Tabla #2: Resumen de ensayos en el material
de origen tipo 3B. **21**

11. Índice de Graficas

Grafica #1: Curvas granulométricas del material tipo 3A en origen. **22**

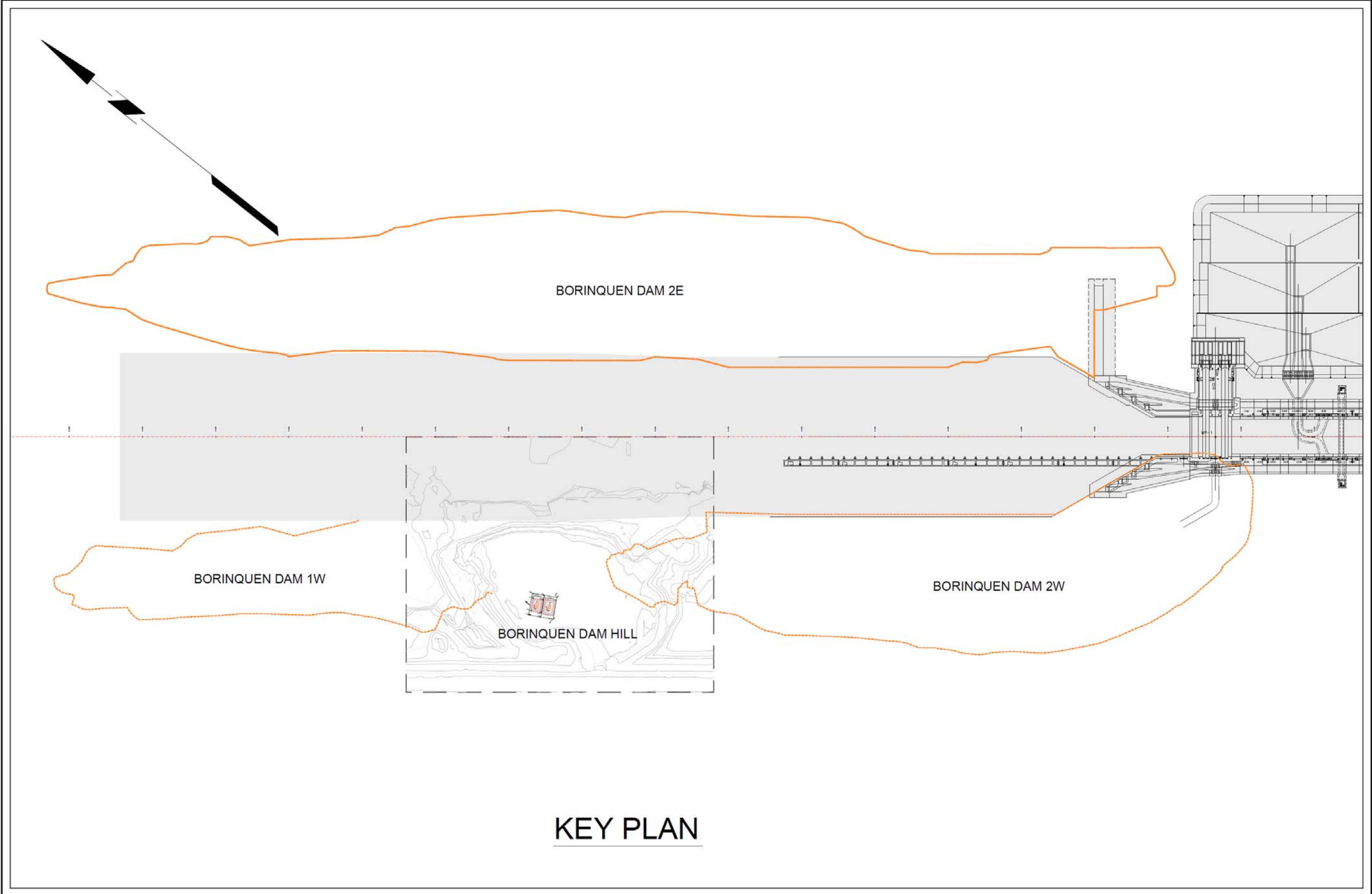
Grafica #2: Curvas granulométricas del material tipo 3B en origen. **22**

Grafica #3: Curvas granulométricas del material tipo 3A en el campo de ensayo. **24**

Grafica #4: Curvas granulométricas del material tipo 3B en el campo de ensayo. **25**

APÉNDICE 1:

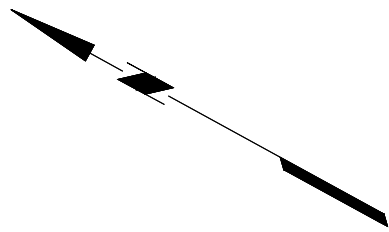
MAPA DE UBICACIÓN DE
LOS CAMPOS DE ENSAYO



KEY PLAN

APÉNDICE 2:

CONFIGURACION DEL CAMPO DE ENSAYO



N=993986.59
E=653978.06

N=993971.71
E=653986.22

MATERIAL 3A

N=993981.64
E=653972.95

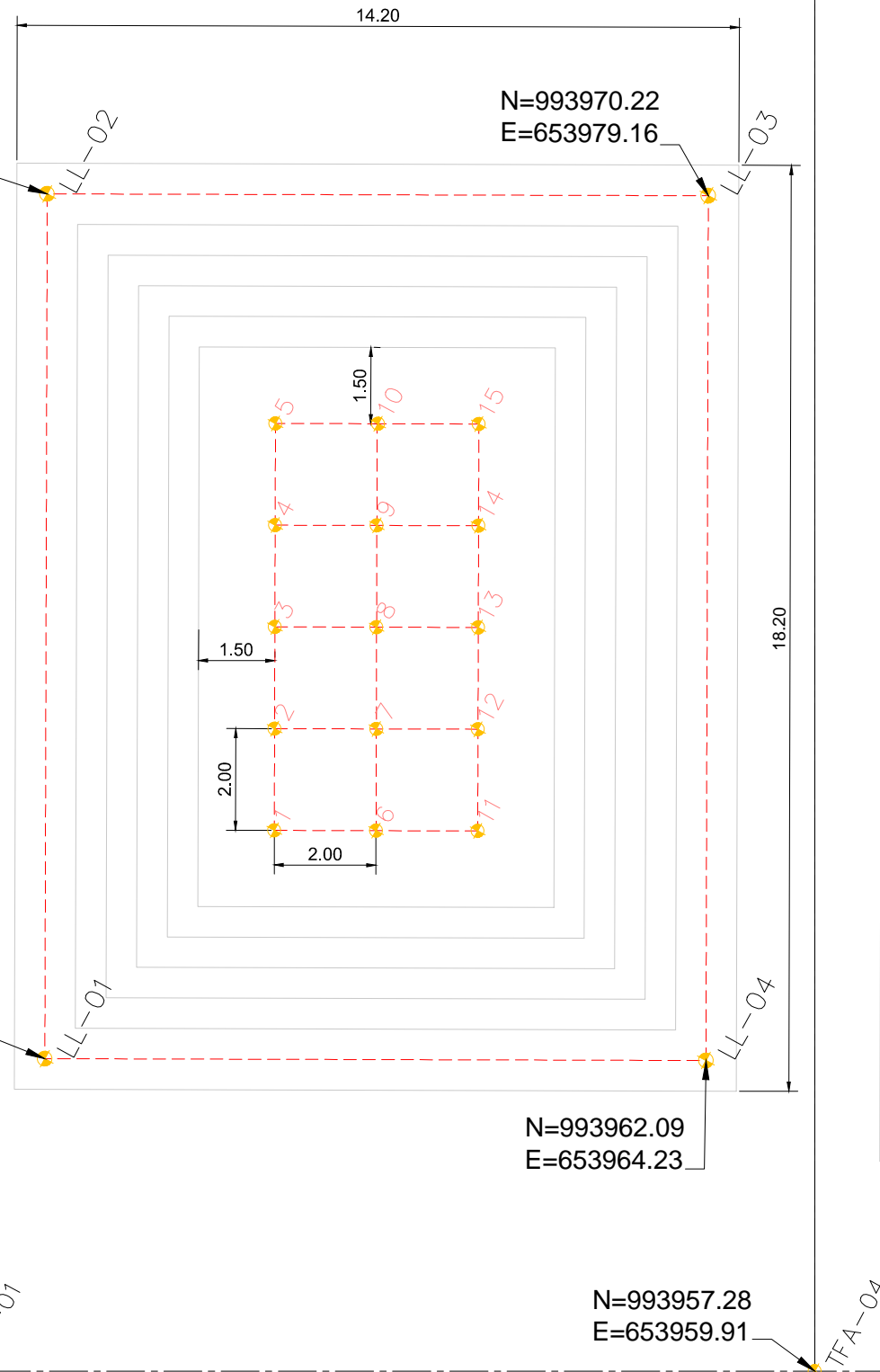
N=993970.22
E=653979.16

N=993973.51
E=653958.02

N=993962.09
E=653964.23

N=993972.17
E=653951.75

N=993957.28
E=653959.91



TEST FIELD BORINQUEN DAM HILL

Point Table

Point #	Northing	Easting
1	993971.71	653964.12
2	993972.67	653965.88
3	993973.62	653967.63
4	993974.58	653969.39
5	993975.54	653971.15
6	993969.95	653965.08
7	993970.91	653966.83
8	993971.87	653968.59
9	993972.82	653970.35
10	993973.76	653972.11
11	993968.20	653966.03
12	993969.15	653967.79
13	993970.11	653969.55
14	993971.07	653971.30
15	993972.02	653973.06

APÉNDICE 3:

RESULTADOS DE
ENSAYOS DEL MATERIAL DE ORIGEN

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	11-Jul-12	Time Sampled	10:00 AM
Sample Number	5387	Material Type	Aggregate	Date Tested	11-Jul-12	Time Tested	2:30 PM
Material Description	Filter Material Type 3a			Sampled By	NC,MP		
Material Source	CRUSHING PLANT			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	LABORATORY				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	DESCRIBED IN THE TESTS TO BE PERFORMED			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	HENAR BRAVO	Date Issued	10-Jul-12				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample: N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)

Minimum Index Density of Soils (ASTM D4254)

Moisture Content (ASTM C566, D2216)

#200 Wash (ASTM C117, D1140)

Maximum Index Density of Soils (ASTM D4253)

Report Issued By: 

Checked By: TC

Report Issue Date: 19-Jul-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Gradation Analysis (ASTM C136, C117)

Project Name: Pacific

Project Number: F 100013 P

Sample No: 5387

Technician: NC,ER,EH

Material Type: Filter Material Type
3a

Date Sampled: 11-Jul-12

Scale Check Scale Check

Before Wash	Wet Weight (g)	6338
	Moisture (%)	6.6%
	Total Dry Weight (g)	5944
After Wash Dry Weight (g)		5596
Wash Loss (%)		5.9%

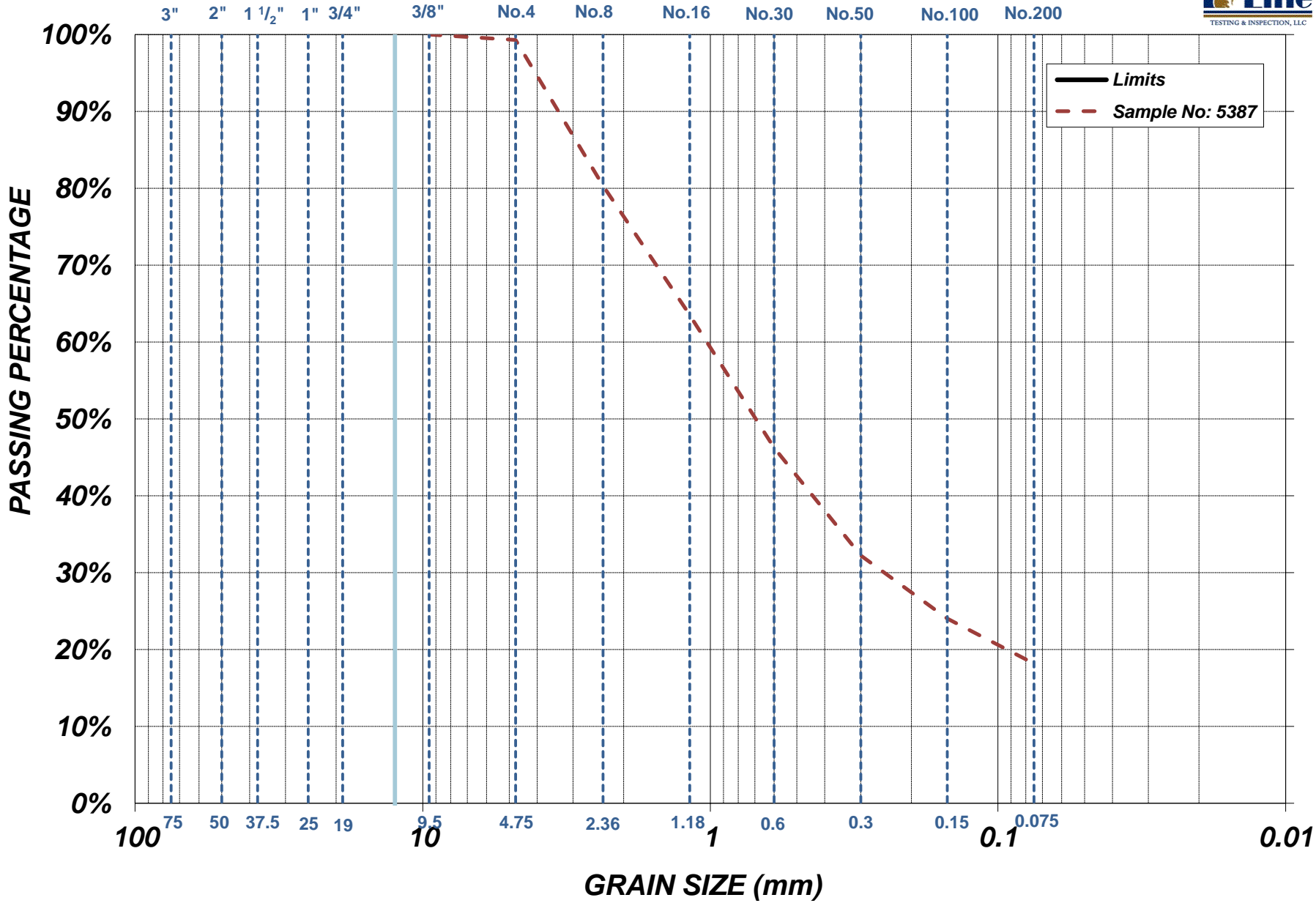
Coarse Scale ID:	N/A
Fine Scale ID:	1130
Oven ID:	Burner
Wash Sieve ID:	1780

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
25 mm (1")	0			100.0%		1232
19.05mm (3/4")	41	41.00	0.7%	99.3%		9144
9.5mm (3/8")	1127	1168.00	19.7%	80.3%		1225
4.75mm (#4)	976	2144.00	36.1%	63.9%		9188
2.36mm (#8)	1050	3194.00	53.7%	46.3%		9136
1.2mm (#16)	835	4029.00	67.8%	32.2%		9159
0.6mm (#30)	488	4517.00	76.0%	24.0%		9134
0.3mm (#50)	347	4864.00	81.8%	18.2%		1925
0.15mm (#100)	335	5199.00	87.5%	12.5%		1236
0.075mm #200	377	5576.00	93.8%	6.2%		1914
	20	5596.00				1239

Checked By: TC

Fineness Modulus	N/A
------------------	-----

Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project:

Pacific

Date:

12-Jul-12

Sample ID:

5387

Sampled By:

Fall Line

Technician

CG

Checked By:

SH&PC

Method

 A B C

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

Stock Pile

Soil
ClassificationType 3A
Transition

Scale No.

1130

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8837	8843				
Mold Tare (g)	3640	3640				
Weight of Material (g)	5197	5203				
Volume of Material (cm ³)	2448	2453				
Maximum Relative Density (g/cm ³)	2.123	2.121				

Result
Consistency

0.04%



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8837	8843				
Mold Tare (g)	3640	3640				
Weight of Material (g)	5197	5203				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.856	1.858				

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	16-Jul-12	Time Sampled	9:00am
Sample Number	B - 220	Material Type	3a Filter	Date Tested	16-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC		
Material Source	Test Fill Borinquen Dam			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	First Layer Sample taken before placing and leveling				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
				<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		
Issued By	N/A	Date Issued	N/A	Special Instructions are Acknowledged and Understood by Tech			Initial N/A

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

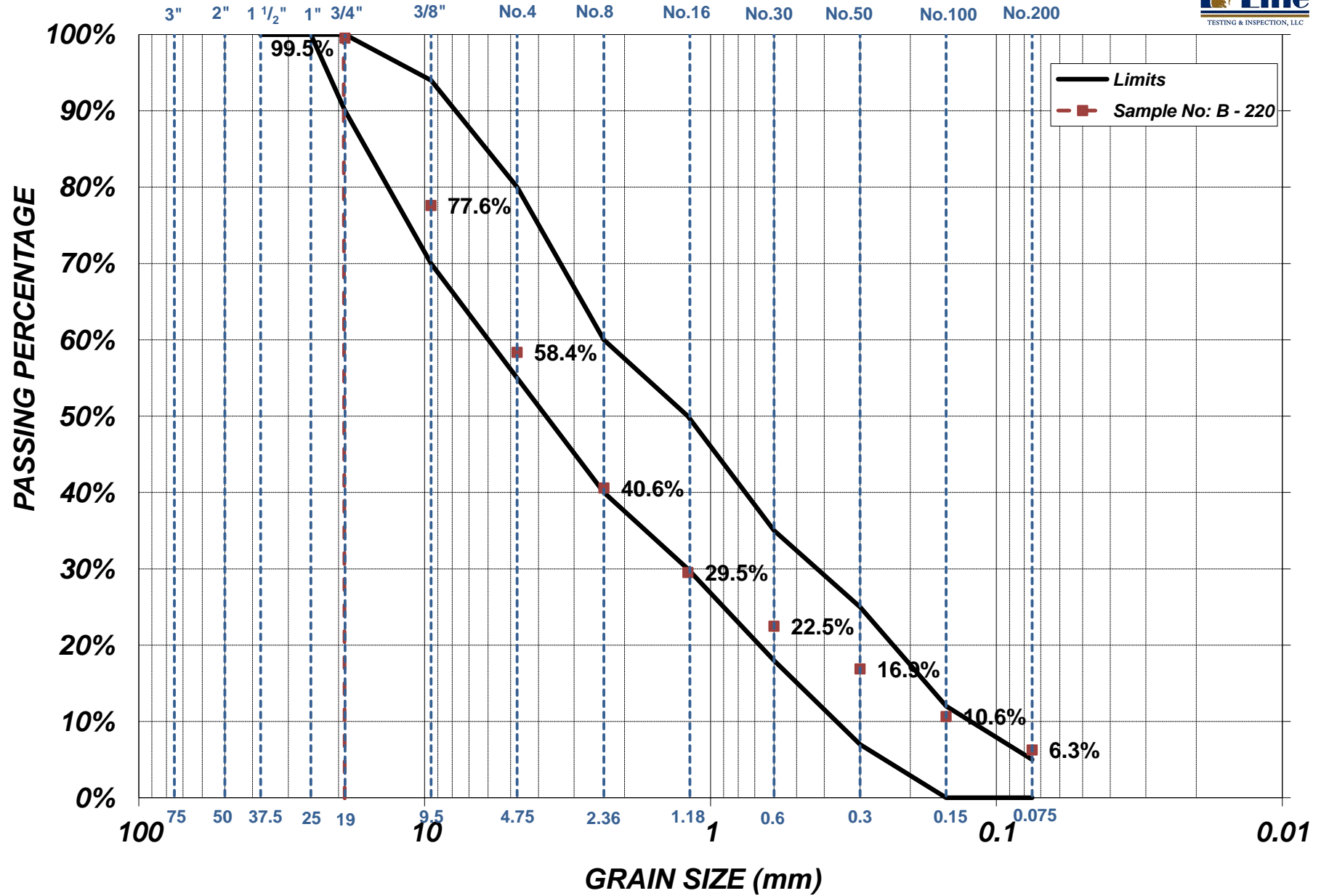
Tests to be performed:

Gradation Analysis (ASTM C136)	
#200 Wash (ASTM C117, D1140)	
Relative Density (ASTM D4253, D4254)	

Report Issued By	Robert J. Montalvo
Checked By	Report Issue Date
RJMh	19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8681	8919				
Mold Tare (g)	3637	3637				
Weight of Material (g)	5044	5282				
Volume of Material (cm ³)	2426	2489				
Maximum Relative Density (g/cm ³)	2.079	2.122				

Result Consistency



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8681	8919				
Mold Tare (g)	3637	3637				
Weight of Material (g)	5044	5282				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.801	1.886				

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	18-Jul-12	Time Sampled	8:00am
Sample Number	B - 237	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC		
Material Source	Test Fill Borinquen Dam			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Second Layer Sample taken before placing and leveling				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
Issued By	N/A	Date Issued	N/A	<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		

Are there any visual abnormalities in the sample? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes who received the client instructions regarding handing the sample?	Initial N/A
Client instructions regarding abnormal sample	N/A	

Tests to be performed:

Gradation Analysis (ASTM C136)	
#200 Wash (ASTM C117, D1140)	
Relative Density (ASTM D4253, D4254)	

Report Issued By	Robert J. Montalvo
Checked By	RJM
Report Issue Date	19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal

Third Set of Locks Project

Gradation Analysis (ASTM C136, C117)

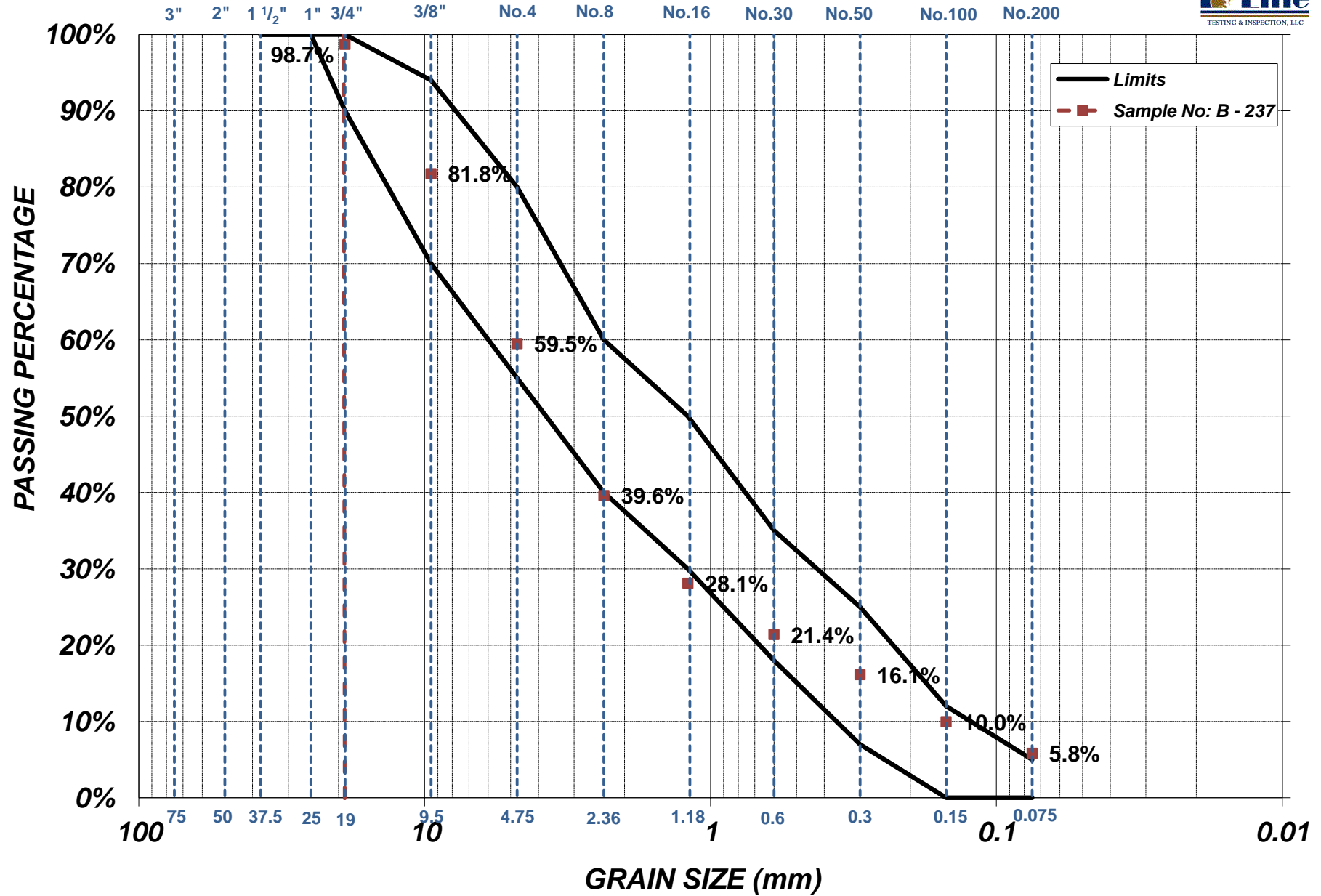
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B - 237	Technician:	EC-CG
Material Type:	Filter Type 3a	Date Sampled:	18-Jul-12

		<input type="checkbox"/> Scale Check	<input type="checkbox"/> Scale Check
Before Wash	Wet Weight (g)	5852.6	Coarse Scale ID: N/A
	Moisture (%)	5.5%	Fine Scale ID: 1453
	Total Dry Weight (g)	5547.4	Oven ID: Burner
After Wash Dry Weight (g)		5304.4	Wash Sieve ID: 1780
Wash Loss (%)		4.4%	

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
1	0			100.0		9180
3/4	72.1	72.10	1.3%	98.7%	90 to 100	9130
3/8	939.9	1012.00	18.2%	81.8%	70 to 94	9182
4	1234.7	2246.70	40.5%	59.5%	55 to 80	9189
8	1104	3350.70	60.4%	39.6%	40 to 60	9158
16	637.2	3987.90	71.9%	28.1%	30 to 50	9133
30	372.9	4360.80	78.6%	21.4%	18 to 35	9129
50	291.5	4652.30	83.9%	16.1%	7 to 25	9152
100	341.7	4994.00	90.0%	10.0%	0 to 12	9195
200	229.6	5223.60	94.2%	5.8%	0 to 5	1782
Pan	90.7	5314.30				9171

Checked By:	TC	Fineness Modulus	4.25
-------------	----	------------------	------

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project:

Pacific

Date:

18-Jul-12

Sample ID:

B-237

Sampled By:

EC

Technician

N/C

Checked By:

TC

Method

 A B C

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

Borinquen Test Fill

Soil
Classification

N/R

Scale No.

1130

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8509	8434				
Mold Tare (g)	3635	3635				
Weight of Material (g)	4874	4799				
Volume of Material (cm ³)	2384	2371				
Maximum Relative Density (g/cm ³)	2.044	2.024				

Result
Consistency

0.50%



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8509	8434				
Mold Tare (g)	3635	3635				
Weight of Material (g)	4874	4799				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.741	1.714				

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	28-Jul-12	Time Sampled	11:30am
Sample Number	B-264	Material Type	3a Filter	Date Tested	28-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG (Split with Contecon)		
Material Source	Test Fill Borinquen Dam			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Third Layer Sample taken before placing and leveling				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
				<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		
Issued By	N/A	Date Issued	N/A	Special Instructions are Acknowledged and Understood by Tech			Initial N/A

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Gradation Analysis (ASTM C136)	
#200 Wash (ASTM C117, D1140)	
Relative Density (ASTM D4253, D4254)	

Report Issued By	Robert J. Montalvo
Checked By	RJM
Report Issue Date	19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal
Third Set of Locks Project
Gradation Analysis (ASTM C136, C117)

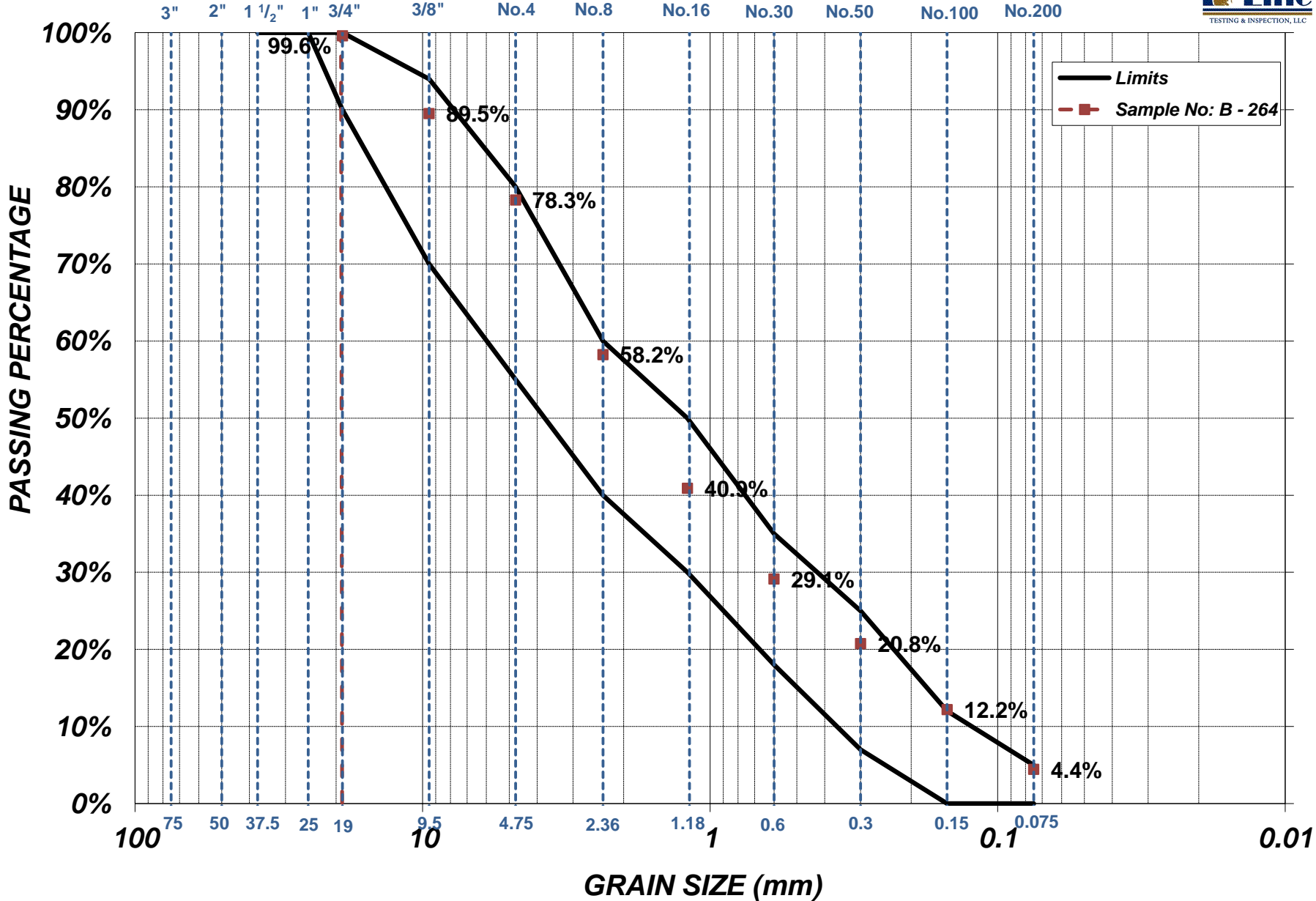
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B - 264	Technician:	CG
Material Type:	Filter Type 3a	Date Sampled:	28-Jul-12

		<input type="checkbox"/> Scale Check	<input type="checkbox"/> Scale Check
Before Wash	Wet Weight (g)	6218.2	Coarse Scale ID: N/A
	Moisture (%)	6.6%	Fine Scale ID: 1453
	Total Dry Weight (g)	5834.6	Oven ID: Burner
After Wash Dry Weight (g)		5644.3	Wash Sieve ID: 1782
Wash Loss (%)		3.3%	

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
1	0			100.0		1232
3/4	23.3	23.30	0.4%	99.6%	90 to 100	9144
3/8	588.7	612.00	10.5%	89.5%	70 to 94	1225
4	654.1	1266.10	21.7%	78.3%	55 to 80	9187
8	1170.6	2436.70	41.8%	58.2%	40 to 60	9173
16	1011.4	3448.10	59.1%	40.9%	30 to 50	9159
30	686.6	4134.70	70.9%	29.1%	18 to 35	9156
50	489.1	4623.80	79.2%	20.8%	7 to 25	1925
100	499.5	5123.30	87.8%	12.2%	0 to 12	1236
200	452.1	5575.40	95.6%	4.4%	0 to 5	1914
Pan	68.9	5644.30				9143

Checked By:	TC	Fineness Modulus	3.60
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Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8487	8597				
Mold Tare (g)	3635	3635				
Weight of Material (g)	4852	4962				
Volume of Material (cm ³)	2403	2419				
Maximum Relative Density (g/cm ³)	2.019	2.051				

Result Consistency



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8487	8597				
Mold Tare (g)	3635	3635				
Weight of Material (g)	4852	4962				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.733	1.772				

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	13-Aug-12	Time Sampled	10:14 AM
Sample Number	B - 282	Material Type	3a Filter	Date Tested	13-Aug-12	Time Tested	N/A
Material Description	3a Filter 4th Layer			Sampled By	JAG / CG		
Material Source	Test Fill			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 lift 0 pass 1 truck Samples taken before placing and leveling (Multiple gradations performed as internal quality control)				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
Issued By	N/A	Date Issued	N/A	<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		
				Special Instructions are Acknowledged and Understood by Tech	Initial		N/A

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)

Minimum Index Density of Soils(ASTM D4254)

Moisture Content (ASTM C566, D2216)

#200 Wash (ASTM C117, D1140)

Maximum Index Density of Soils(ASTM D4253)

Report Issued By

Checked By ES

Report Issue Date 20-Aug-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method



The Panama Canal Third Set of Locks Project Gradation Analysis (ASTM C136, C117)

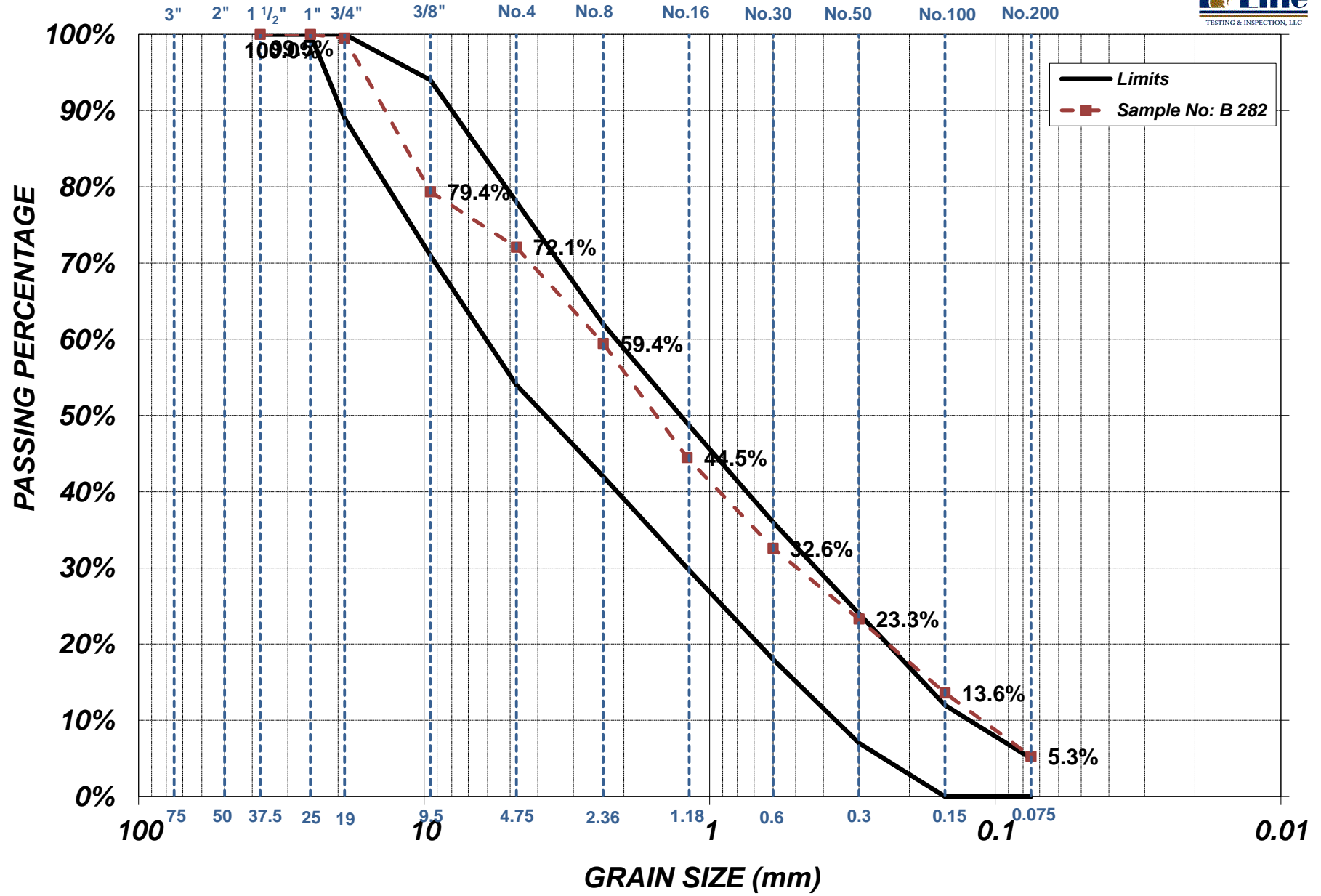
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 282	Technician:	AU
Material Type:	Filter 3a	Date Sampled:	13-Aug-12

		<input type="checkbox"/> Scale Check	<input type="checkbox"/> Scale Check	
Before Wash	Wet Weight (g)	5121.2	Coarse Scale ID:	N/A
	Moisture (%)	7.5%	Fine Scale ID:	1453
	Total Dry Weight (g)	4766	Oven ID:	Burner
After Wash Dry Weight (g)		4544.3	Wash Sieve ID:	1780
Wash Loss (%)		4.7%		

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
37.5mm (1 1/2")				100.0%	100 to 100	
25.0mm (1")	0			100.0%	100 to 100	9180
19mm (3/4")	23.4	23.4	0.5%	99.5%	89 to 100	9182
9.5mm (3/8")	960.6	984	20.6%	79.4%	71 to 94	9185
4.75mm (#4)	346.9	1330.9	27.9%	72.1%	54 to 78	9130
2.36mm (#8)	601.9	1932.8	40.6%	59.4%	42 to 62	9189
1.2mm (#16)	713.4	2646.2	55.5%	44.5%	30 to 49	9133
0.6mm (#30)	567.3	3213.5	67.4%	32.6%	18 to 36	9129
0.3mm (#50)	442.5	3656	76.7%	23.3%	7 to 24	9152
0.15mm (#100)	462.1	4118.1	86.4%	13.6%	0 to 12	9195
0.075mm #200	396.3	4514.4	94.7%	5.3%	0 to 5	1912
	29.9	4544.3				9171

Checked By:	ES	Fineness Modulus	3.55
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Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Gradation Analysis (ASTM C136, C117)

Project Name: PACIFIC

Project Number: F100013P

Sample No: B 282 A

Technician: JAG

Material Type: Filter 3a

Date Sampled: 14-Aug-12

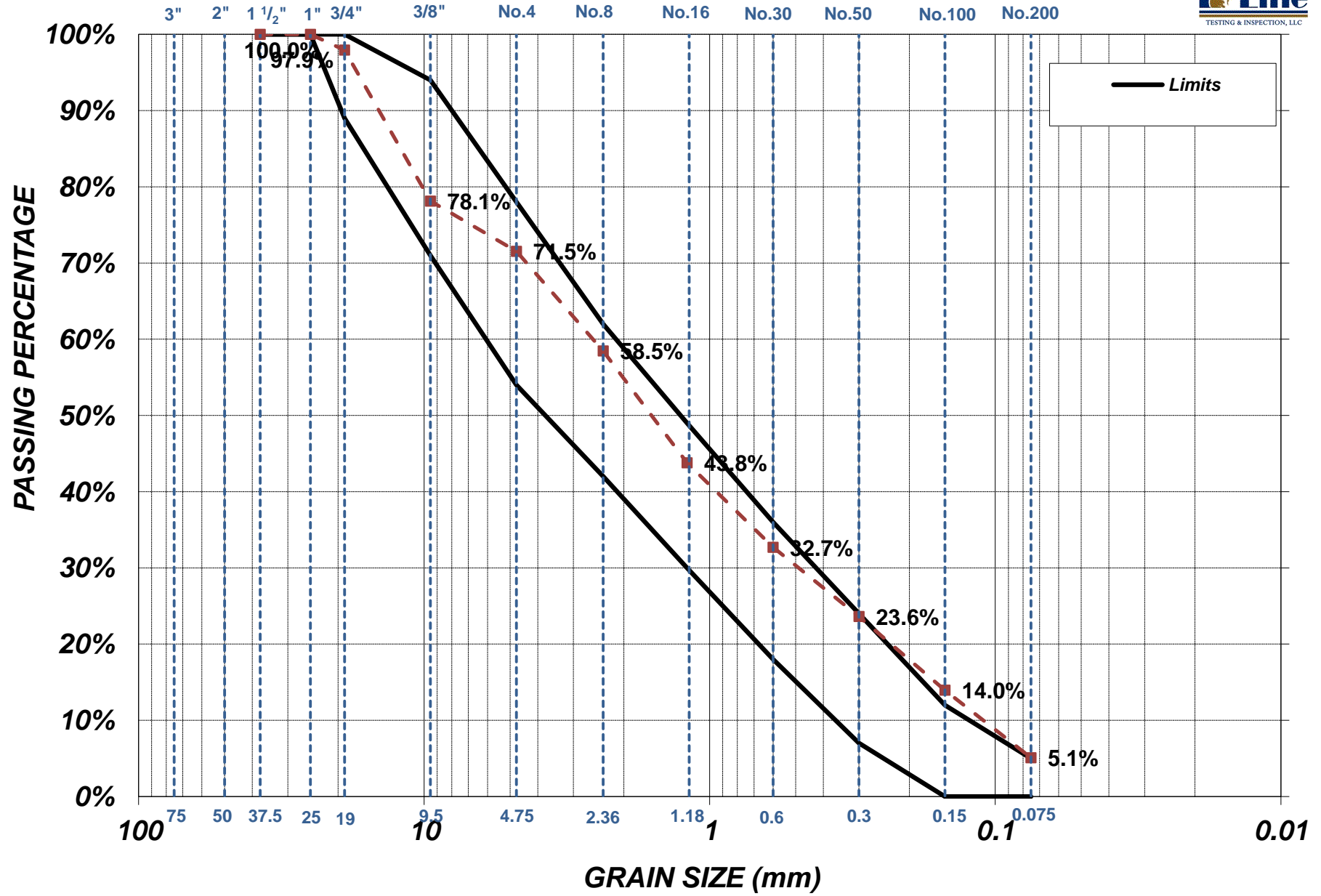
		<input type="checkbox"/> Scale Check	<input type="checkbox"/> Scale Check
Before Wash	Wet Weight (g)	4025	Coarse Scale ID: N/A
	Moisture (%)	7.8%	Fine Scale ID: 1130
	Total Dry Weight (g)	3734	Oven ID: Burner
After Wash Dry Weight (g)		3555	Wash Sieve ID: 1780
Wash Loss (%)		4.8%	

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
37.5mm (1 1/2")				100.0%	100 to 100	
25.0mm (1")	0			100.0%	100 to 100	1232
19mm (3/4")	77	77	2.1%	97.9%	89 to 100	9144
9.5mm (3/8")	740	817	21.9%	78.1%	71 to 94	1225
4.75mm (#4)	246	1063	28.5%	71.5%	54 to 78	9188
2.36mm (#8)	488	1551	41.5%	58.5%	42 to 62	9136
1.2mm (#16)	548	2099	56.2%	43.8%	30 to 49	9159
0.6mm (#30)	414	2513	67.3%	32.7%	18 to 36	9156
0.3mm (#50)	339	2852	76.4%	23.6%	7 to 24	1925
0.15mm (#100)	361	3213	86.0%	14.0%	0 to 12	9153
0.075mm #200	331	3544	94.9%	5.1%	0 to 5	1914
	11	3555				1239

Checked By: ES

Fineness Modulus: 3.56

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Minimum Relative Density of Soils(ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8708	8732				
Mold Tare (g)	3634	3634				
Weight of Material (g)	5074	5098				
Volume of Mold (cm ³)	2800	2800.0				
Minimum Relative Density (g/cm ³)	1.812	1.821				

Result Consistency



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8708	8732				
Mold Tare (g)	3634	3634				
Weight of Material (g)	5074	5098				
Volume of Mold (cm ³)	2485	2520.0				
Maximum Index Density (g/cm ³)	2.042	2.023				

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	13-Aug-12	Time Sampled	12:00 PM
Sample Number	B - 283	Material Type	3a Filter	Date Tested	13-Aug-12	Time Tested	N/A
Material Description	3a Filter 4th Layer			Sampled By	JAG / CG		
Material Source	Test Fill Borinquen 4th layer			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 layer - 0 pass - 1 truck Sample taken before placing and leveling (Multiple gradations performed as internal quality control)				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
				<input type="checkbox"/> Rain	<input type="checkbox"/> Hot	<input type="checkbox"/>	
Special Instructions	Special Instructions are Acknowledged and Understood by Tech					Initial	N/A
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed: Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)	Minimum Index Density of Soils (ASTM D4254)
Moisture Content (ASTM C566, D2216)	
#200 Wash (ASTM C117, D1140)	
Maximum Index Density of Soils (ASTM D4253)	

Report Issued By []

Checked By ES

Report Issue Date 20-Aug-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Gradation Analysis (ASTM C136, C117)

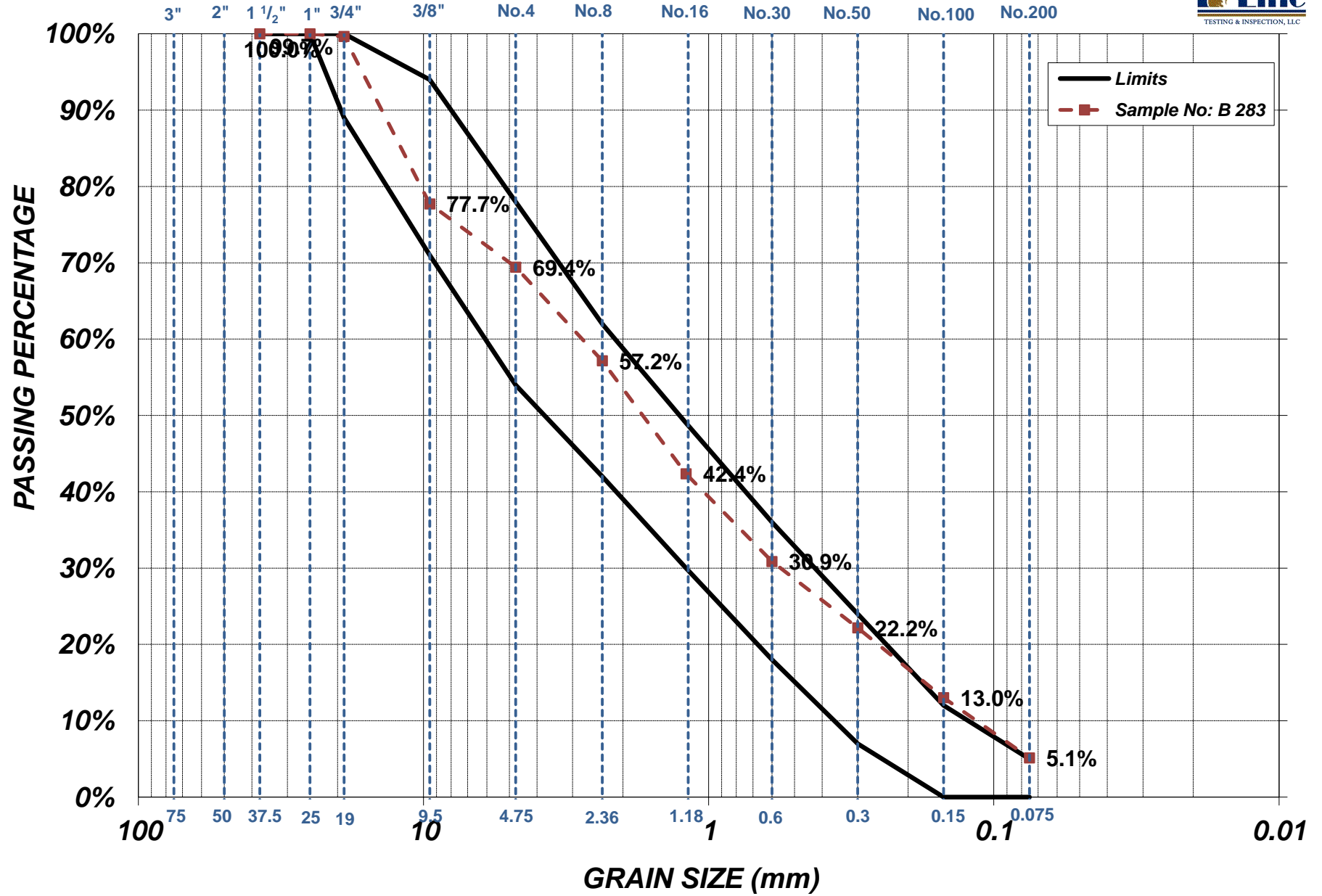
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 283	Technician:	CG JAG
Material Type:	Filter 3a	<input checked="" type="checkbox"/> Scale Check <input type="checkbox"/> Scale Check Date Sampled:	13-Aug-12

Before Wash	Wet Weight (g)	6257	Coarse Scale ID:	N/A
	Moisture (%)	7.1%	Fine Scale ID:	1453
	Total Dry Weight (g)	5842.7	Oven ID:	Burner
After Wash Dry Weight (g)		5562.8	Wash Sieve ID:	1780
Wash Loss (%)		4.8%		

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
37.5mm (1 1/2")				100.0%	100 to 100	
25.0mm (1")	0			100.0%	100 to 100	9180
19mm (3/4")	20.2	20.2	0.3%	99.7%	89 to 100	9182
9.5mm (3/8")	1282.2	1302.4	22.3%	77.7%	71 to 94	9185
4.75mm (#4)	483.9	1786.3	30.6%	69.4%	54 to 78	9130
2.36mm (#8)	716.5	2502.8	42.8%	57.2%	42 to 62	9189
1.2mm (#16)	865.3	3368.1	57.6%	42.4%	30 to 49	9133
0.6mm (#30)	671.6	4039.7	69.1%	30.9%	18 to 36	9129
0.3mm (#50)	507.7	4547.4	77.8%	22.2%	7 to 24	9152
0.15mm (#100)	534.4	5081.8	87.0%	13.0%	0 to 12	9195
0.075mm #200	461.1	5542.9	94.9%	5.1%	0 to 5	1912
	19.9	5562.8				9171

Checked By:	ES	Fineness Modulus	3.65
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Filter Material Type 3a Gradation



The Panama Canal Third Set of Locks Project

Gradation Analysis (ASTM C136, C117)

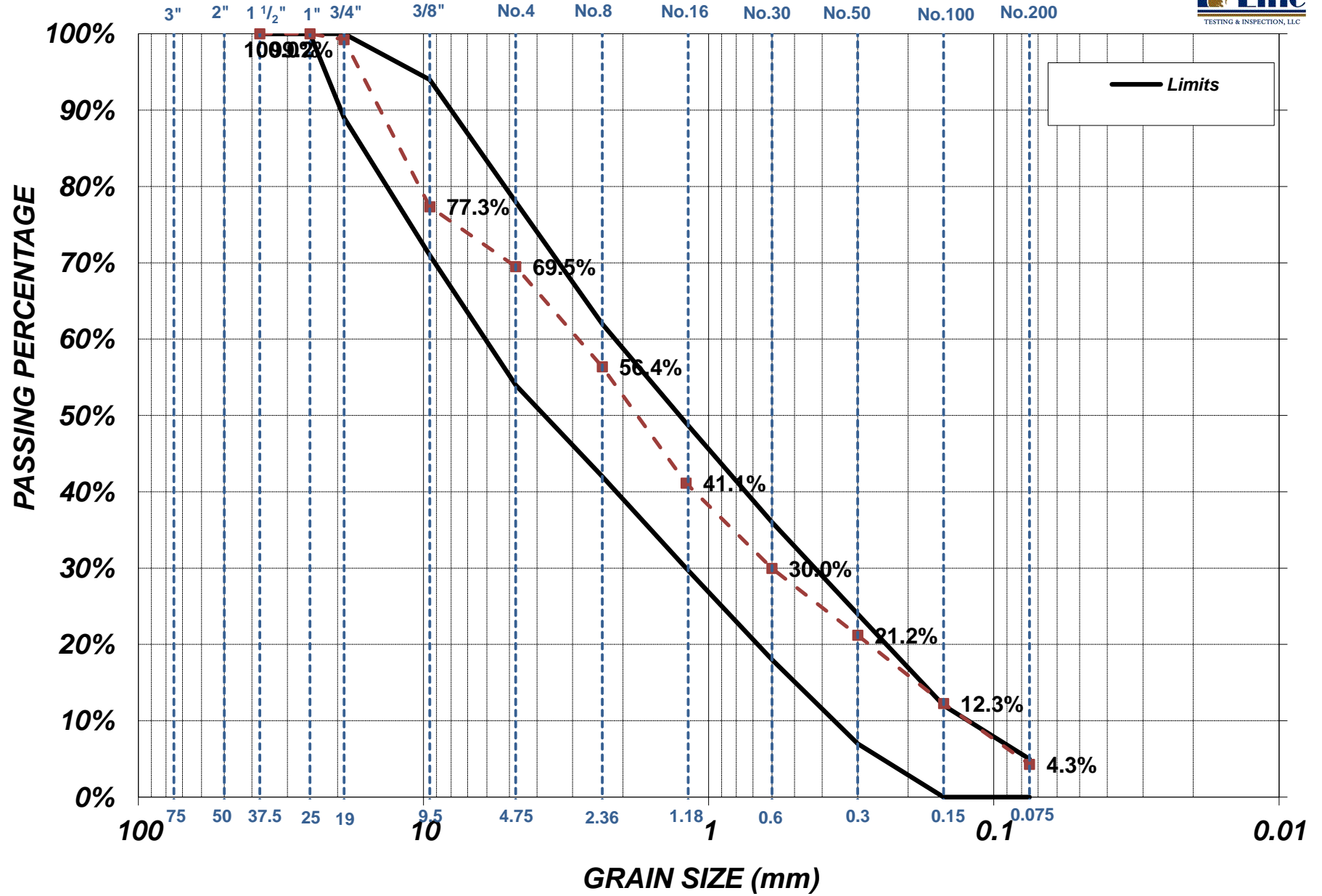
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 283 A	Technician:	ER
Material Type:	Filter 3a	Date Sampled:	13-Aug-12

		<input type="checkbox"/> Scale Check	<input type="checkbox"/> Scale Check
Before Wash	Wet Weight (g)	5036	Coarse Scale ID: N/A
	Moisture (%)	6.8%	Fine Scale ID: 1130
	Total Dry Weight (g)	4717	Oven ID: Burner
After Wash Dry Weight (g)		4527	Wash Sieve ID: 1780
Wash Loss (%)		4.0%	

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
37.5mm (1 1/2")				100.0%	100 to 100	
25.0mm (1")	0			100.0%	100 to 100	1232
19mm (3/4")	36	36	0.8%	99.2%	89 to 100	9144
9.5mm (3/8")	1033	1069	22.7%	77.3%	71 to 94	1225
4.75mm (#4)	370	1439	30.5%	69.5%	54 to 78	9188
2.36mm (#8)	619	2058	43.6%	56.4%	42 to 62	9136
1.2mm (#16)	719	2777	58.9%	41.1%	30 to 49	9159
0.6mm (#30)	527	3304	70.0%	30.0%	18 to 36	9156
0.3mm (#50)	413	3717	78.8%	21.2%	7 to 24	1925
0.15mm (#100)	422	4139	87.7%	12.3%	0 to 12	9153
0.075mm #200	376	4515	95.7%	4.3%	0 to 5	1914
	12	4527				1239

Checked By:	ES	Fineness Modulus	3.70
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Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project:

Pacific

Date:

14-Aug-12

Sample ID:

B-283

Sampled By:

JAG CG

Technician

JAG

Checked By:

ES

Method

 A B C

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

Test Fill

Soil
Classification

N/R

Scale No.

1130

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8729	8750				
Mold Tare (g)	3634	3634				
Weight of Material (g)	5095	5116				
Volume of Material (cm ³)	2487	2526				
Maximum Relative Density (g/cm ³)	2.049	2.025				

Result
Consistency

0.57%



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project:

Pacific

Date:

14-Aug-12

Sample ID:

B-283

Sampled By:

JAG CG

Technician

JAG

Checked By:

ES

Method

 1A 1B 2A 2B

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

Test Fill

Soil
Classification

N/R

Scale No.

1130

Mold ID

1443

Table ID

1443

 Scale CheckDouble Amplitude of Vertical Vibration
(if different from that specified)

N/A

Trial	1	2	3	4	5	6
Soil + Mold (g)	8729	8750				
Mold Tare (g)	3634	3634				
Weight of Material (g)	5095	5116				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.820	1.827				

Result
Consistency

0.21%

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Aug-12	Time Sampled	10:46am
Sample Number	B - 302	Material Type	3a Filter	Date Tested	20-Aug-12	Time Tested	11:00am
Material Description	3a Filter			Sampled By	AU JAG		
Material Source	Test Fill Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	5th Layer 0 passes Sample taken before placing and leveling				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

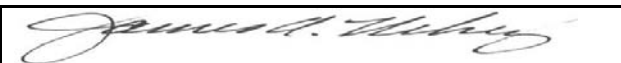
If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed: Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)	Minimum Index Density of Soils (ASTM D4254)
Moisture Content (ASTM C566, D2216)	Lab Compaction (ASTM D1557, D698)
#200 Wash (ASTM C117, D1140)	Specific Gravity and Absorption (ASTM C127, C128)
Maximum Index Density of Soils (ASTM D4253)	

Report Issued By 

Checked By ES

Report Issue Date 20-Aug-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method



The Panama Canal Third Set of Locks Project Gradation Analysis (ASTM C136, C117)

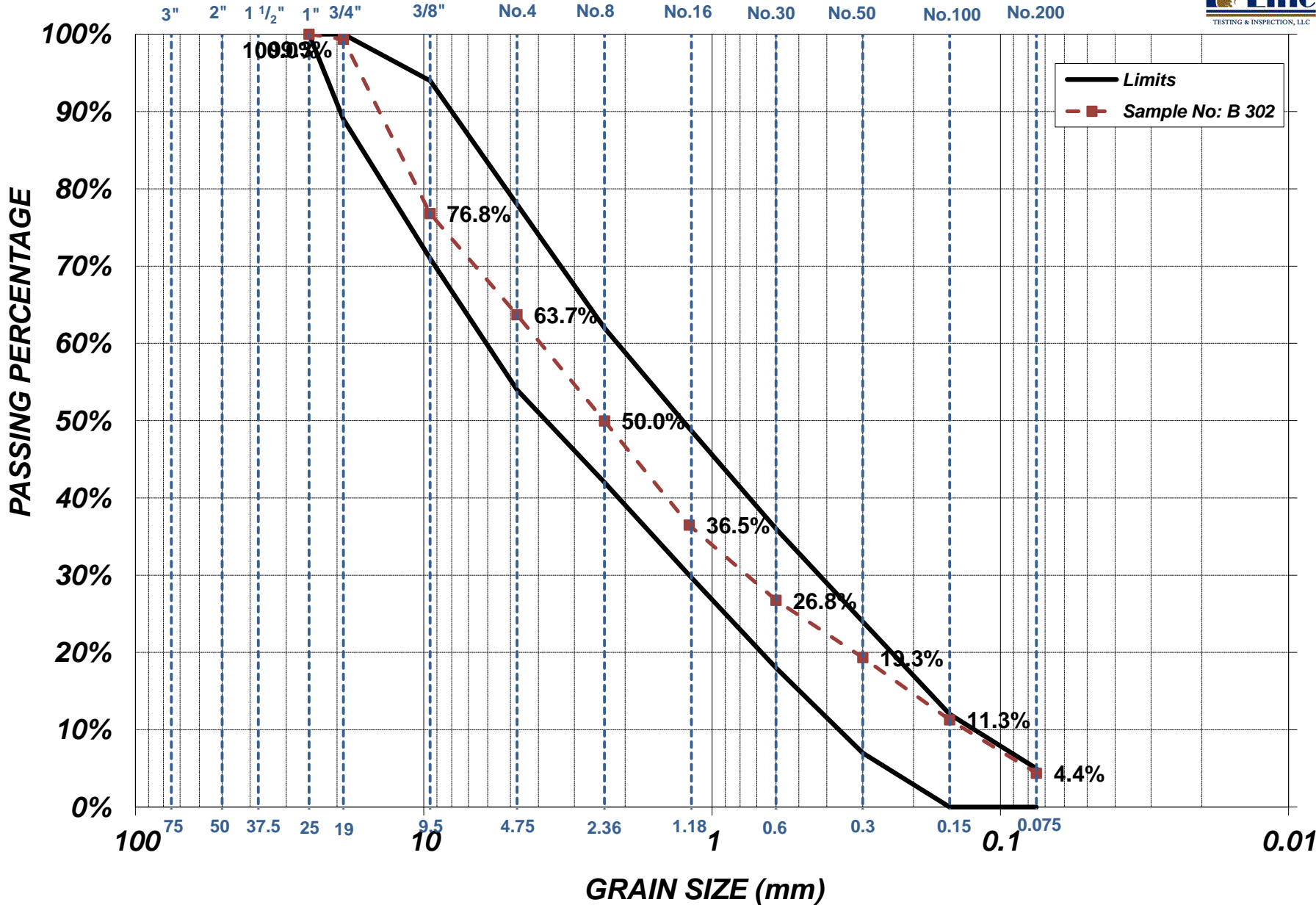
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 302	Technician:	JAG
Material Type:	Filter 3a	Date Sampled:	17-Aug-12

		<input checked="" type="checkbox"/> Scale Ch	<input type="checkbox"/> Scale Cr	
Before Wash	Wet Weight (g)	7756.9	Coarse Scale ID:	N/A
	Moisture (%)	8.1%	Fine Scale ID:	1453
	Total Dry Weight (g)	7174.6	Oven ID:	Burner
After Wash Dry Weight (g)		6901.8	Wash Sieve ID:	1780
Wash Loss (%)		3.8%		

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
25.0mm (1")	0			100.0%	100 to 100	9180
19mm (3/4")	46.8	46.8	0.7%	99.3%	89 to 100	9130
9.5mm (3/8")	1617.9	1664.7	23.2%	76.8%	71 to 94	9182
4.75mm (#4)	939.4	2604.1	36.3%	63.7%	54 to 78	9189
2.36mm (#8)	986.2	3590.3	50.0%	50.0%	42 to 62	9158
1.2mm (#16)	966.8	4557.1	63.5%	36.5%	30 to 49	9133
0.6mm (#30)	698.2	5255.3	73.2%	26.8%	18 to 36	9129
0.3mm (#50)	531.7	5787	80.7%	19.3%	7 to 24	9152
0.15mm (#100)	577.7	6364.7	88.7%	11.3%	0 to 12	9195
0.075mm #200	495.8	6860.5	95.6%	4.4%	0 to 5	1782
	41.3	6901.8				9171

Checked By:	ES		Fineness Modulus	3.92
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Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8767	8721				
Mold Tare (g)	3633	3633				
Weight of Material (g)	5134	5088				
Volume of Material (cm ³)	2479	2452				
Maximum Relative Density (g/cm ³)	2.071	2.075				

Result Consistency



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project:

Pacific

Date:

17-Aug-12

Sample ID:

B-302

Sampled By:

JAG AU

Technician

AU

Checked By:

ES

Method

 1A 1B 2A 2B

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

3a Test Fill Lift 5

Soil
ClassificationMAT. FILTER
3a

Scale No.

1130

Mold ID

1443

Table ID

1443

 Scale CheckDouble Amplitude of Vertical Vibration
(if different from that specified)

N/A

Trial	1	2	3	4	5	6
Soil + Mold (g)	8767	8721				
Mold Tare (g)	3633	3633				
Weight of Material (g)	5134	5088				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.834	1.817				

Result
Consistency

0.45%

The Panama Canal Third Set of Locks Project

Lab Compaction (ASTM D1557, D698)

Project Name:

Technician:

Method:

Sample No:

Date Sampled:

Preparation Method:

Group Name:

Checked by:

As Received Moisture (%):

Soil Description:

Specific Gravity:

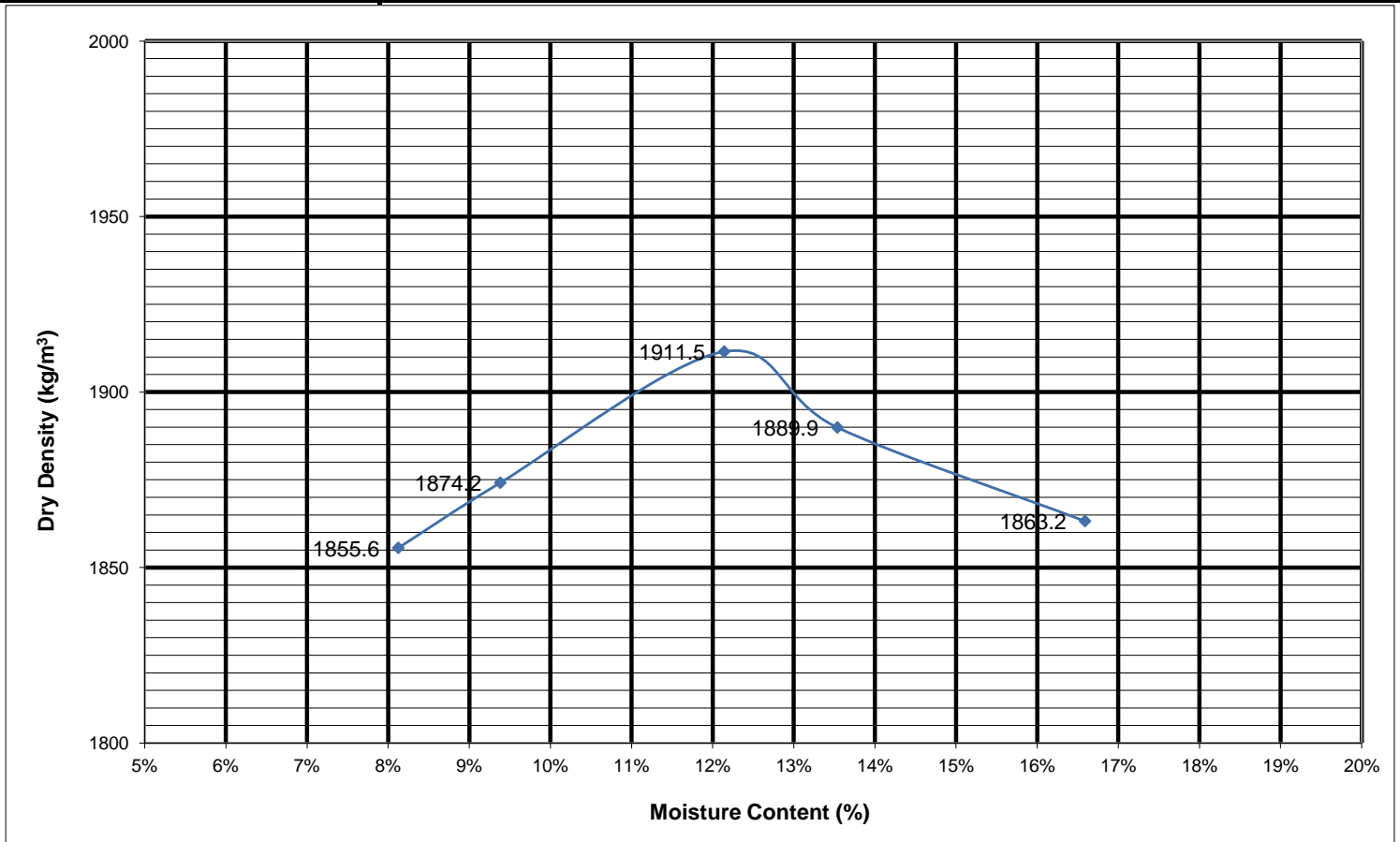
Scale ID: Scale Check

Hammer ID:

Mold ID:

Specific Gravity Method:

Scalp Fraction		Wet Density Determination					
Hammer Wt. (kg)	2.5 kg	Soil + Mold (kg)	6270	6311	6399	6401	6426
Mold Size (m³)	0.0009	Mold Tare (kg)	4384	4384	4384	4384	4384
Drop Ht. (mm)	305	Wet Wt. Of Soil (kg)	1886	1927	2015	2017	2042
Blows per Layer	25	Wet Density (kg/m³)	2006.4	2050.0	2143.6	2145.7	2172.3
No. of Layer	3	Moisture Content Determination					
Type of Hammer	Mechanical	Wet Wt. Of Soil (g)	519.0	478.0	822.0	780.0	752.0
Results:		Dry Wt. Of Soil (g)	480.0	437.0	733.0	687.0	645
Maximum Density (kg/m³) :	1912	Moisture Content (%)	8.1%	9.4%	12.1%	13.5%	16.6%
Optimum Moisture (%) :	12.1	Dry Density (kg/m³)	1855.6	1874.2	1911.5	1889.9	1863.2



The Panama Canal Third Set of Locks Project

Specific Gravity of Fine Aggregate (ASTM C128)

Project Name :

Project Number:

Sample No:

Date Sampled:

Material Type:

Technician:

Flask ID:

Oven ID:

Scale ID:

Scale Check

MASSES	Flask full of water (g) [F]	1326.6
	SSD sample (g) [A]	500.5
	Flask + sample + water (g) [B]	1647.2
	Dry sample (g) [C]	488.7
RELATIVE DENSITIES (SPECIFIC GRAVITIES)	Oven Dry (C/(A+F-B))	2.72
	SSD (A/(A+F-B))	2.78
	Apparent (C/(C+F-B))	2.91
DENSITIES	Oven Dry Density (kg/m3) 997.5*(C/(A+F-B))	2710
	SSD Density (kg/m3) 997.5*(A/(A+F-B))	2780
	Apparent Density (kg/m3) 997.5*(C/(C+F-B))	2900
Absorption (%) ((A-C)/C)*100)		2.4%

Checked By:

The Panama Canal Third Set of Locks Project

Specific Gravity of Coarse Aggregate (ASTM C127)

Project Name :

Project Number:

Sample No:

Date Sampled:

Material Type :

Technician:

Scale ID

Scale Check

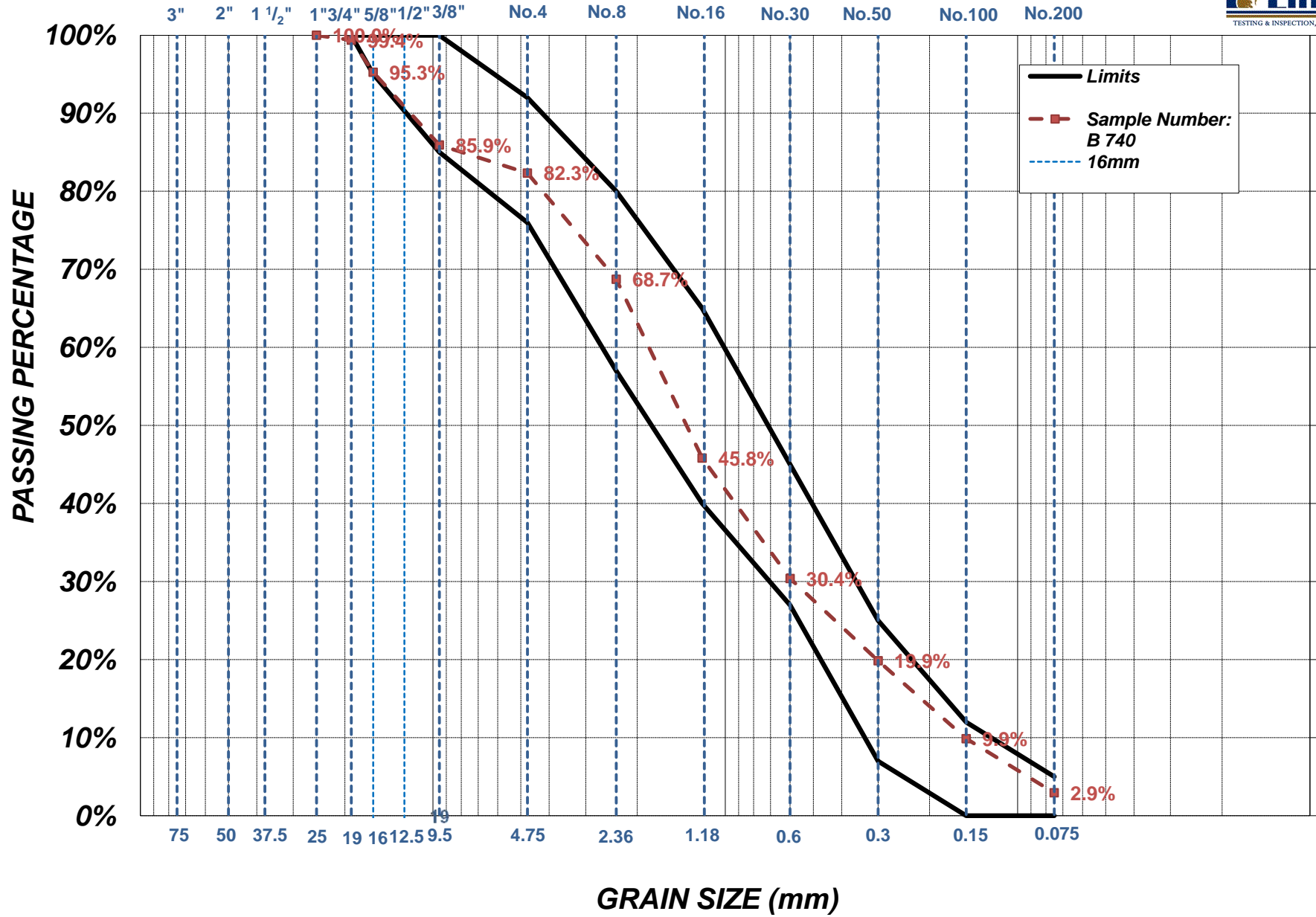
Oven ID

MASSES OF SAMPLE	SSD sample (g) [A]	3026
	Immersed sample in water (g)[B]	1942
	Oven Dry sample (g) [C]	2960
RELATIVE DENSITIES <small>(SPECIFIC GRAVITIES)</small>	Oven Dry (C/(A-B))	2.73
	SSD (A/(A-B))	2.79
	Apparent (C/(C-B))	2.91
DENSITIES	Oven Dry Density (kg/m ³) 997.5*(C/(A-B))	2720
	SSD Density (kg/m ³) 997.5*(A/(A-B))	2780
	Apparent Density (kg/m ³) 997.5*(C/(C-B))	2900

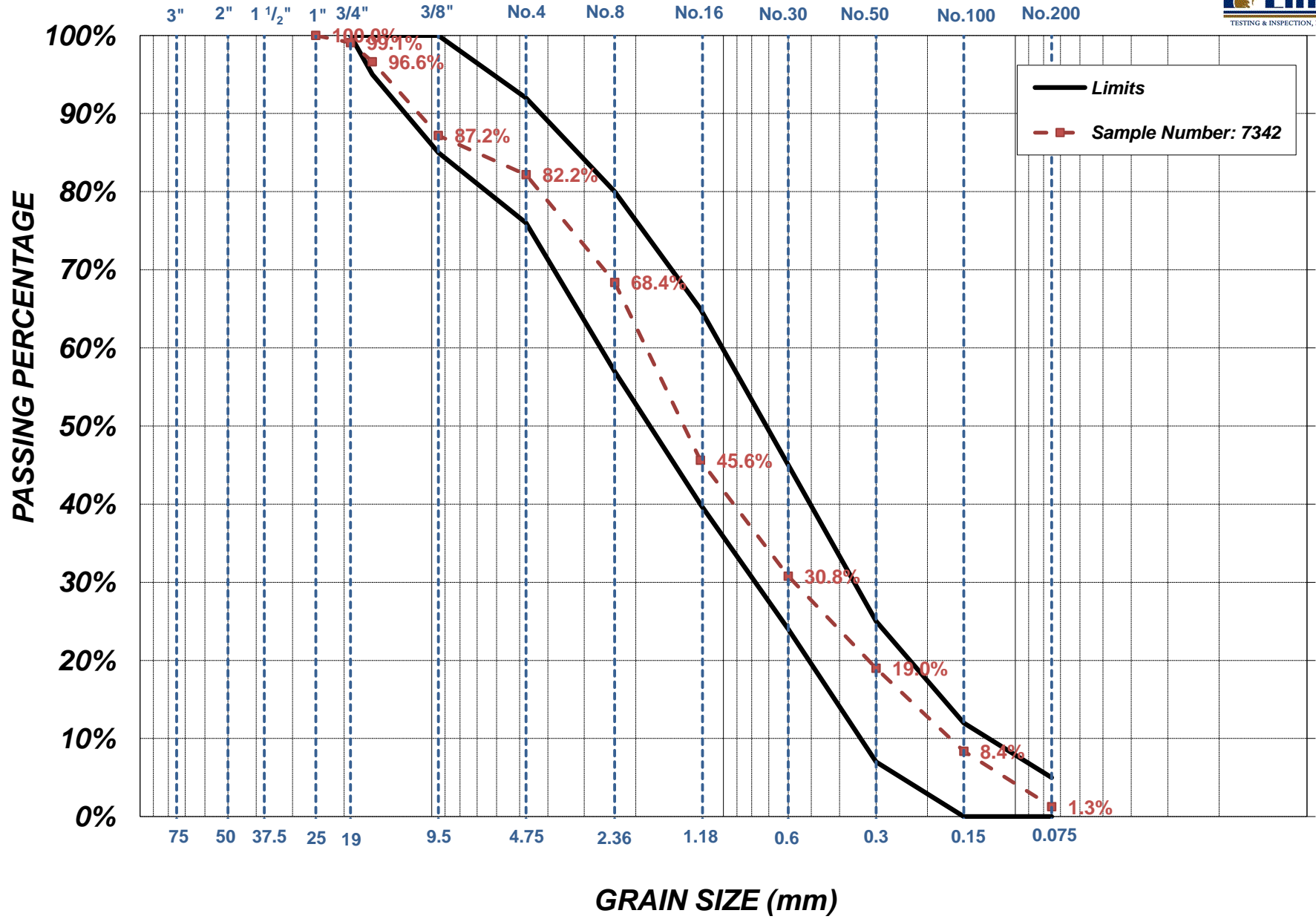
Absorption (%) ((A-C)/C) * 100	2.2%
-----------------------------------	------

Checked By:

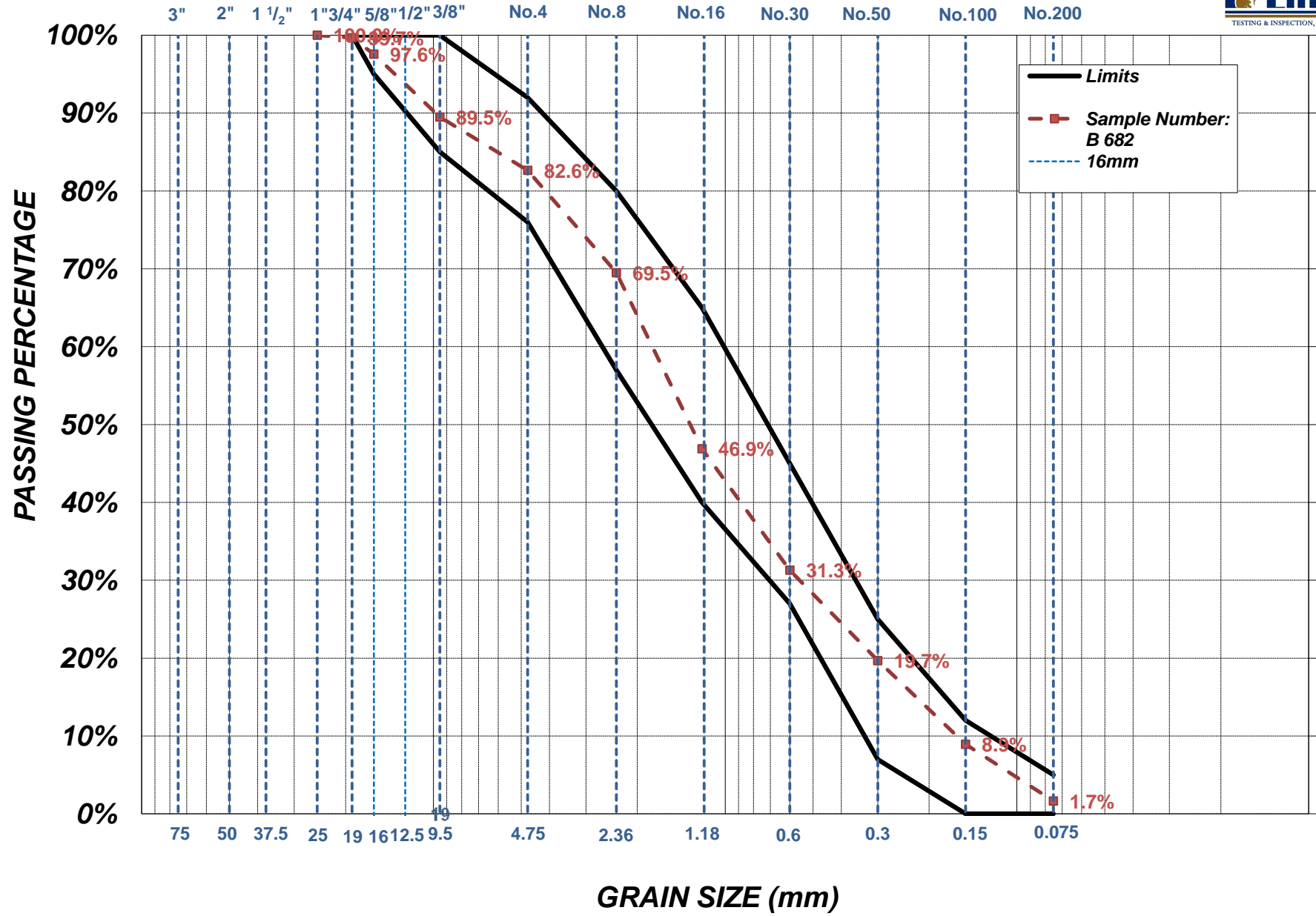
3b Filter Gradation



Gradation



3b Filter Gradation



The Panama Canal
Third Set of Locks Project
Maximum Index Density (ASTM D4253)

Project:	Pacific	Sample Number:	B 653
Date Sampled:	15-Nov-12	Material Type:	Filter
Time Sampled:	11:20 AM	Material Source:	Crushig Plant
Sampled By:	CG AU	Sample Location:	Test Fill 3b 2 capa descarga


Date Tested:	11-Dec-12	Scale ID:	1453
Technician:	J A G	Table/Mold ID:	1443
		Mold Size (m ³):	0.0028

Method Used Dry 1a Wet 1b

Trial	1	2	3	4
Soil + Mold (g)	9840	9820	0	0
Mold Tare (g)	3634	3634	3634	3634
Weight of Soil (g)	6206	6186		
Volume of Material (cm ³)	2621	2637		
Wet Density (g/cm ³)	2.367	2.346		
Moisture Content (%)	9%	10%	0%	0%
Maximum Index Dry Density (g/cm ³)	2.166	2.142		

Result Consistency 1%

Report Issued By



Date

13-Dec-12

The Panama Canal
Third Set of Locks Project
Maximum Index Density (ASTM D4253)

Project:	Pacific	Sample Number:	B 653
Date Sampled:	15-Nov-12	Material Type:	Filter
Time Sampled:	11:20 AM	Material Source:	Crushig Plant
Sampled By:	CG AU	Sample Location:	Test Fill 3b 2 capa descarga


Date Tested:	11-Dec-12	Scale ID:	1453
Technician:	J A G	Table/Mold ID:	1443
		Mold Size (m ³):	0.0028

Method Used Dry 1a Wet 1b

Trial	1	2	3	4
Soil + Mold (g)	8640	8620	0	0
Mold Tare (g)	3634	3634	3634	3634
Weight of Soil (g)	5006	4986		
Volume of Material (cm ³)	2348	2343		
Wet Density (g/cm ³)	2.132	2.128		
Moisture Content (%)	0%	0%	0%	0%
Maximum Index Dry Density (g/cm ³)	2.132	2.128		

Result Consistency 0%

Report Issued
By



Date

13-Dec-12

The Panama Canal Third Set of Locks Project Minimum Index Density (ASTM D4254)

Project: <u>Pacific</u>	Sample Number: <u>B 653</u>
Date Sampled: <u>15-Nov-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>11:20 AM</u>	Material Source: <u>Crushig Plant</u>
Sampled By: <u>CG AU</u>	Sample Location: <u>Test Fill 3b 2 capa descarga</u>

Date Tested: <u>11-Dec-12</u>	Scale ID: <u>1453</u>
Technician: <u>J A G</u>	Table/Mold ID: <u>1443</u>
	Mold Size (m ³): <u>0.0028</u>

Method Used A B C

Trial	1	2	3	4
Soil + Mold (g)	8640	8620	0	0
Mold Tare (g)	3634	3634	3634	3634
Weight of Soil (g)	5006	4986		
Volume of Material (cm ³)	2800	2800	2800	2800
Minimum Index Density (g/cm ³)	1.788	1.781		

Result Consistency 0%

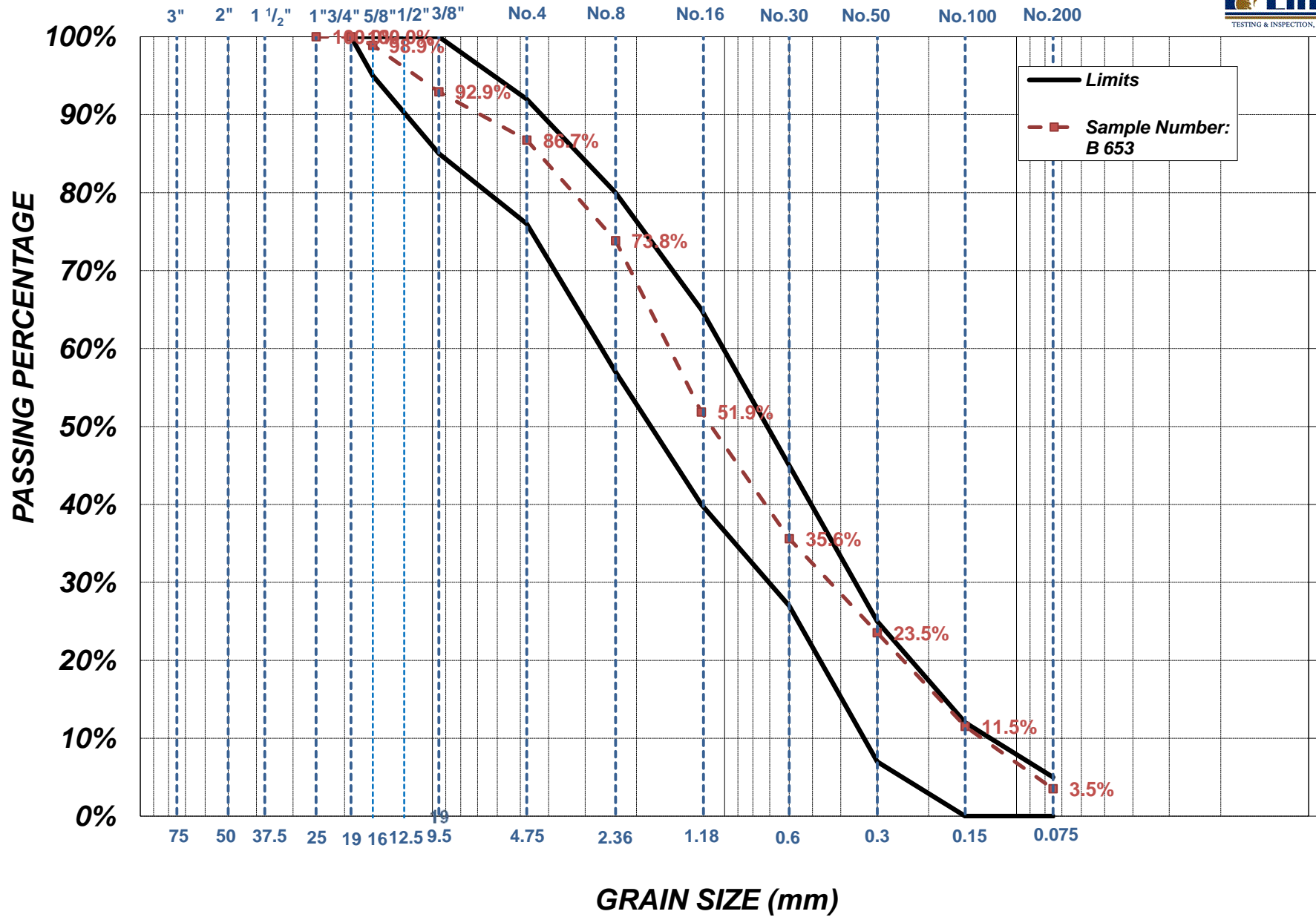
Report Issued
By



Date

13-Dec-12

3b Filter Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project:

Pacific

Date:

22-Oct-12

Sample ID:

B 513

Sampled By:

AU

Technician

JAG

Checked By:

ES

Method



Dry 1A



Wet 1B

Mold Size

0.1001 FT³0.0028m³

Origin of Material

Borinquen Dam Test Fill 3b

Soil
Classification

N/A

Scale No.

2026

Mold ID

1443

Table ID

1443

Double Amplitude of Vertical Vibration
(if different from that specified)

N/A

Trial	1	2	3	4	5	6
Soil + Mold (g)	8520	8520				
Mold Tare (g)	3630	3630				
Weight of Material (g)	4890	4890				
Volume of Mold (cm ³)	2469	2474.0				
Wet Density (g/cm ³)	N/A	N/A				
Moisture Content (%)	N/A	N/A				
Maximum Index Dry Density (g/cm ³)	1.981	1.977				

Result
Consistency

0.10%



The Panama Canal Third Set of Locks Project

Minimum Relative Density of Soils(ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

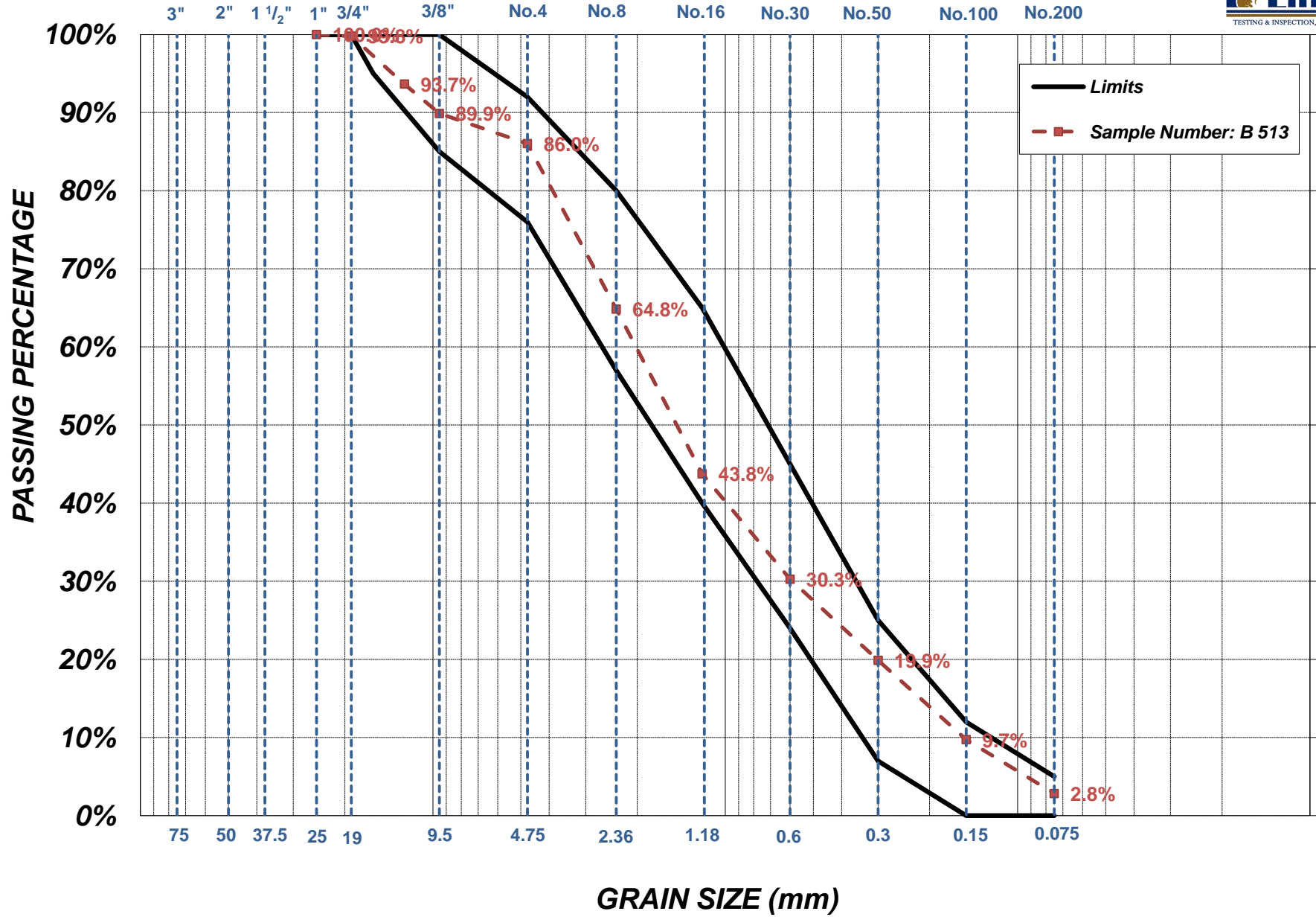
Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8520	8520				
Mold Tare (g)	3630	3630				
Weight of Material (g)	4890	4890				
Volume of Mold (cm ³)	2800	2800.0				
Minimum Relative Density (g/cm ³)	1.746	1.746				

Result Consistency

Gradation





The Panama Canal Third Set of Locks Project Gradation Analysis (ASTM C136)

Project: <u>Pacific</u>	Sample Number: <u>B 513</u>
Date Sampled: <u>22-Oct-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>11:30 AM</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>CG</u>	Sample Location: <u>Test Fill First Layer Before Leveling</u>

Date Tested: <u>22-Oct-12</u>	Scale ID: <u>1130</u>
	Oven ID: <u>Burner</u>
Technician: <u>DG</u>	Wash Sieve ID: <u>1780</u>

Wet Weight (g) <u>7370.0</u>	Moisture Content <u>6.0%</u>
Dry Weight (g) <u>6953.0</u>	
After Wash Weight (g) <u>6772.0</u>	Wash Loss <u>2.6%</u>

Sieve Size	Cumulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
1"			100.0%	100	1232
3/4"	14	0.2%	99.8%	100	9138
1/2"	441	6.3%	93.7%		1228
3/8"	703	10.1%	89.9%	85 to 100	1225
4	971	14.0%	86.0%	76 to 92	1939
8	2444	35.2%	64.8%	57 to 80	1973
16	3910	56.2%	43.8%	40 to 65	9159
30	4848	69.7%	30.3%	24 to 45	9156
50	5570	80.1%	19.9%	7 to 25	1925
100	6276	90.3%	9.7%	0 to 12	9153
200	6756	97.2%	2.8%	0 to 5	1914
Pan	6772				1239

Checked By: <u>PC</u>	Fineness Modulus <u>3.0</u>
-----------------------	-----------------------------

Report Issued
By

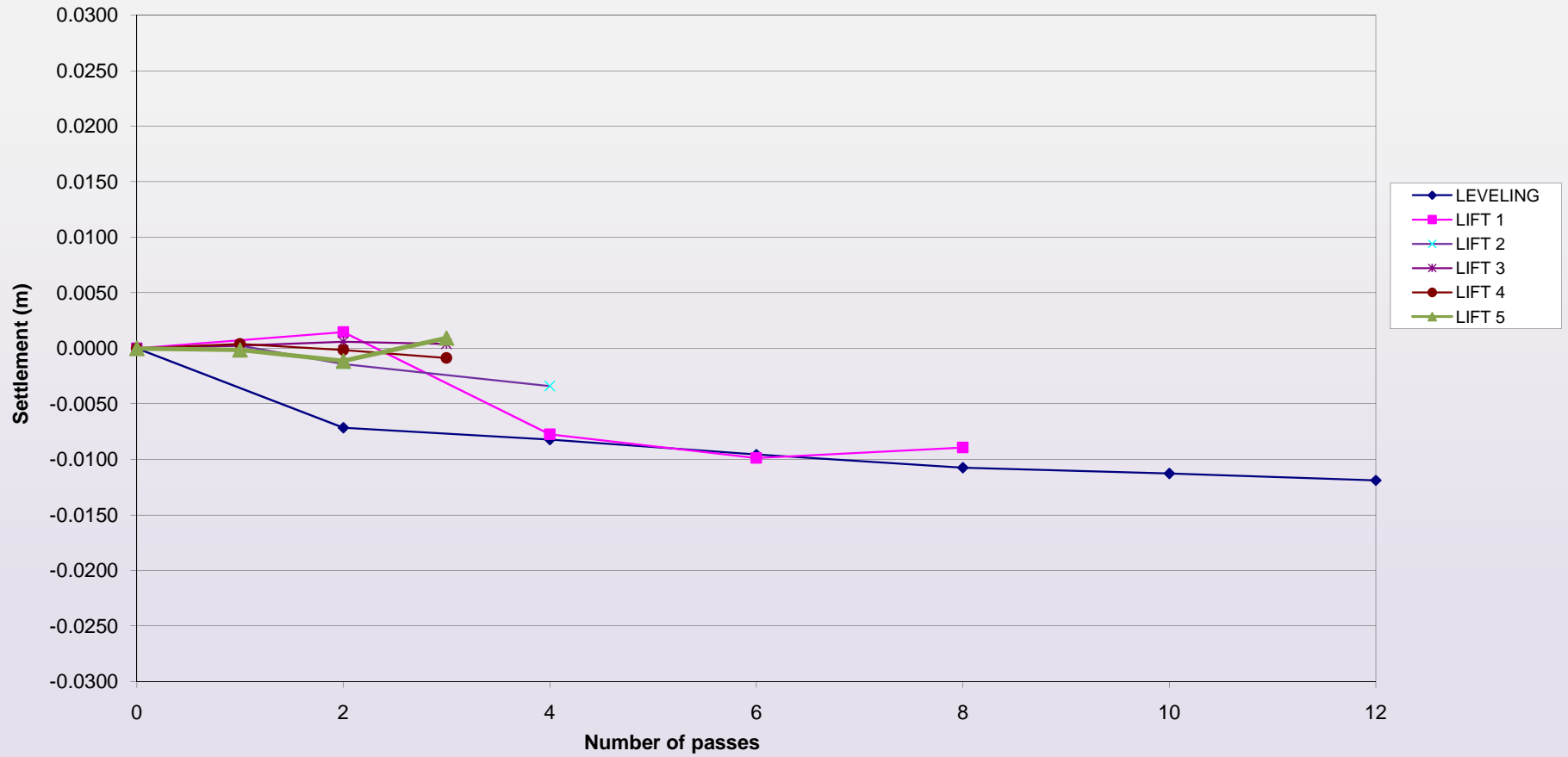
Date

23-Oct-12

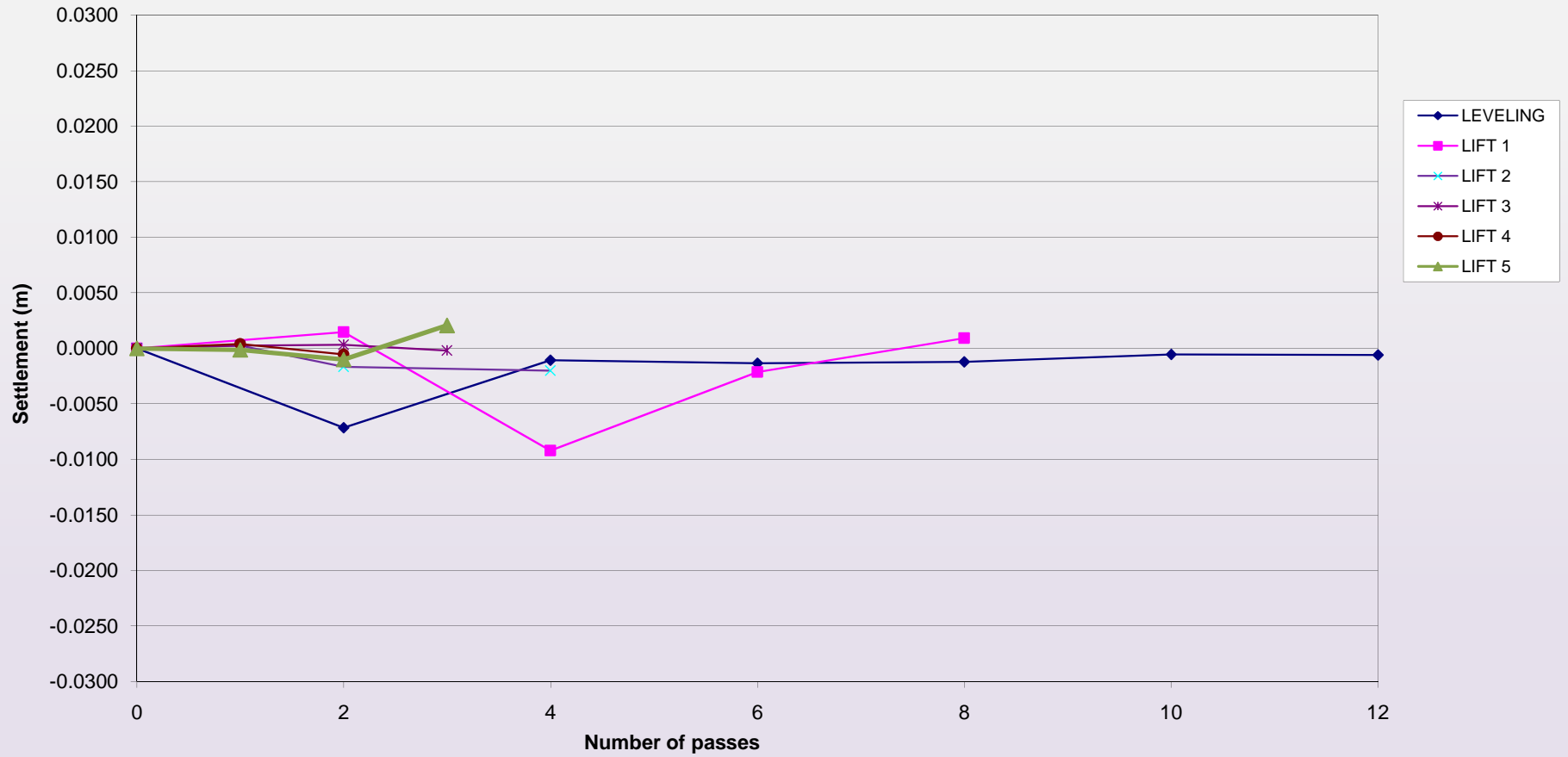
APÉNDICE 4:

RESULTADOS DE
ASENTAMIENTO

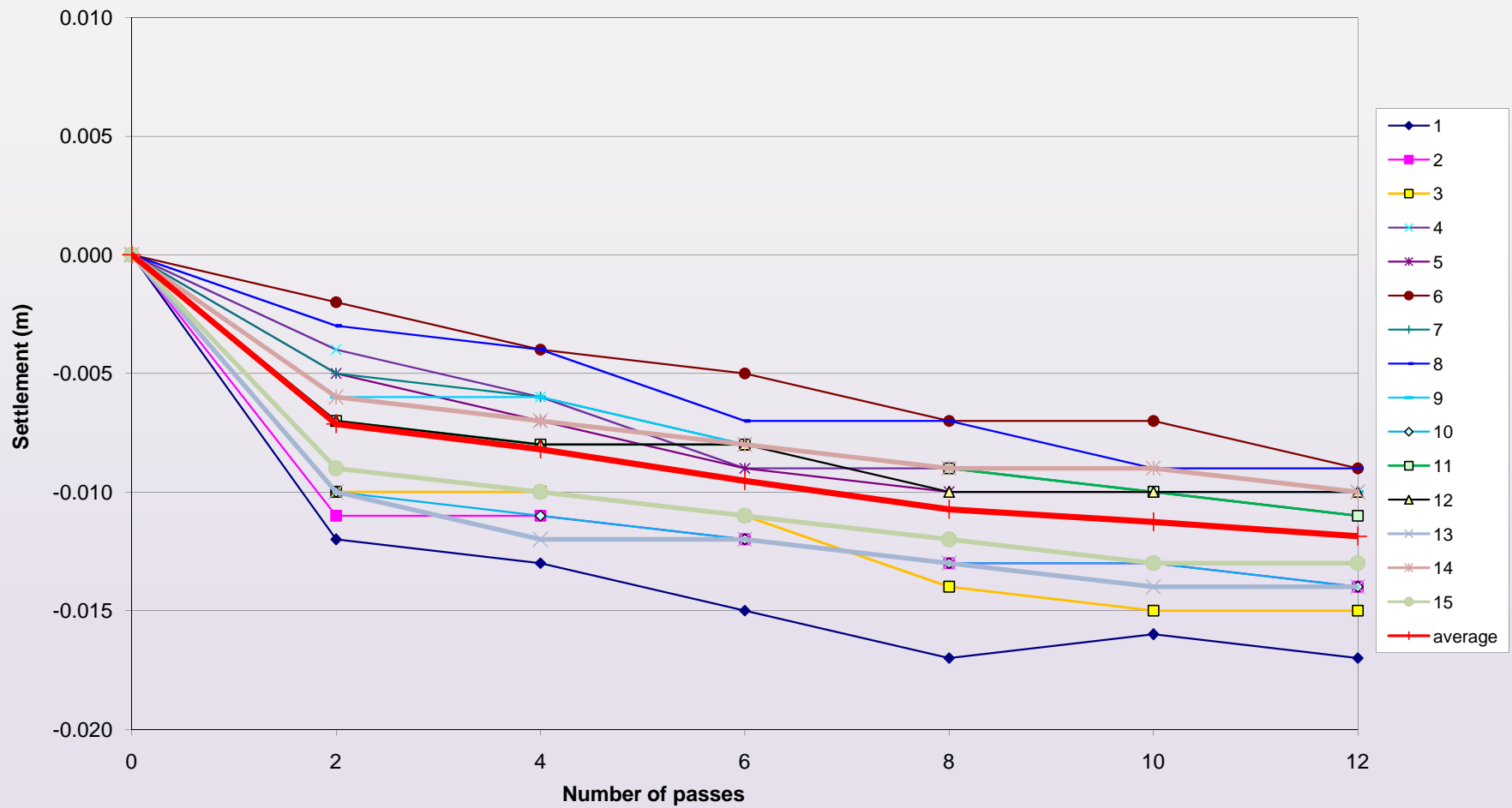
Test fill type 3A Borinquen Dam Filter Material (Interlayer) :
Average Settlement (S0 - Sn)



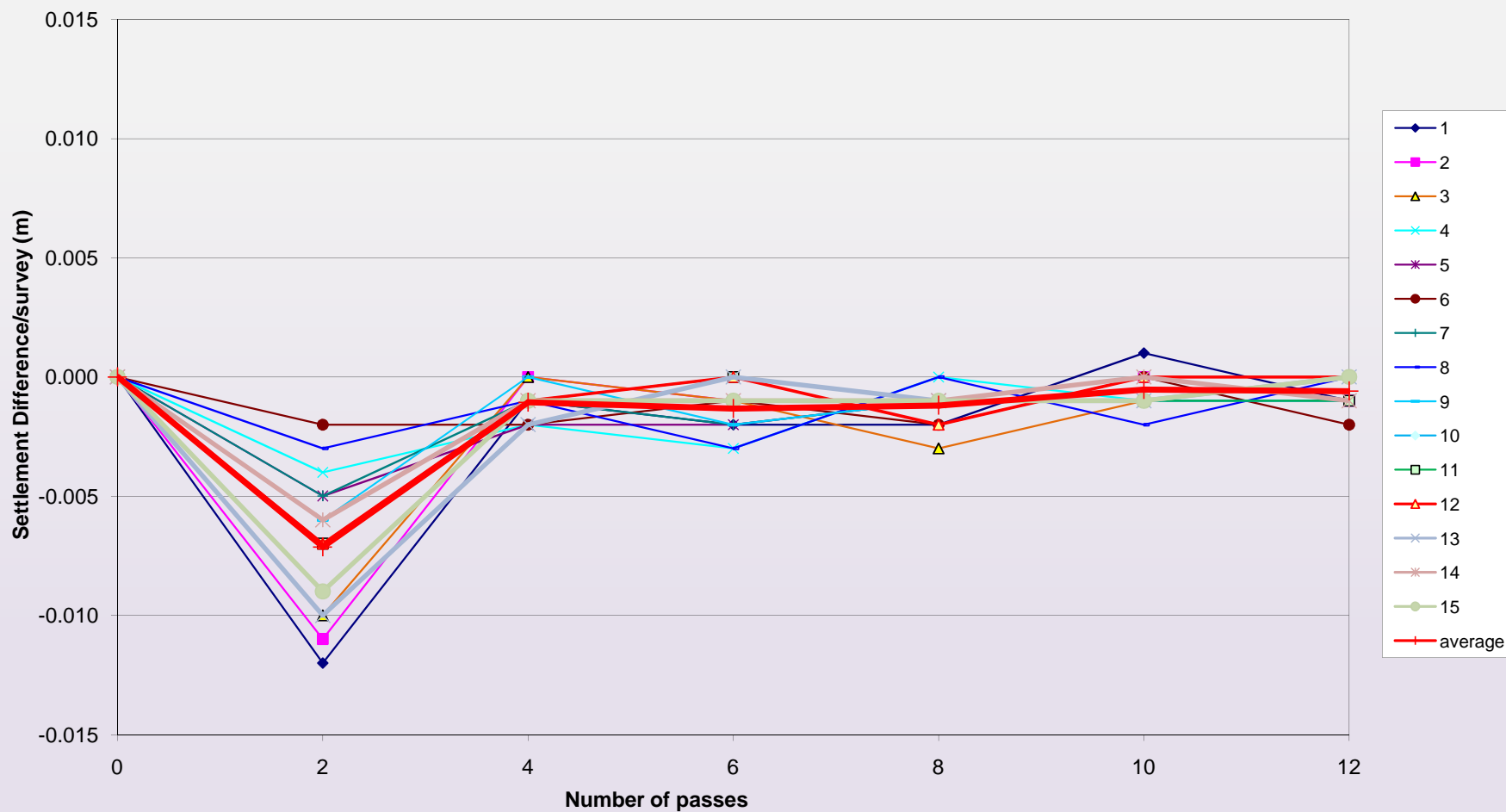
Test fill type 3A Borinquen Dam Filter Material (Interlayer) :
Average Settlement ($S_n - S_{(n-1)}$)



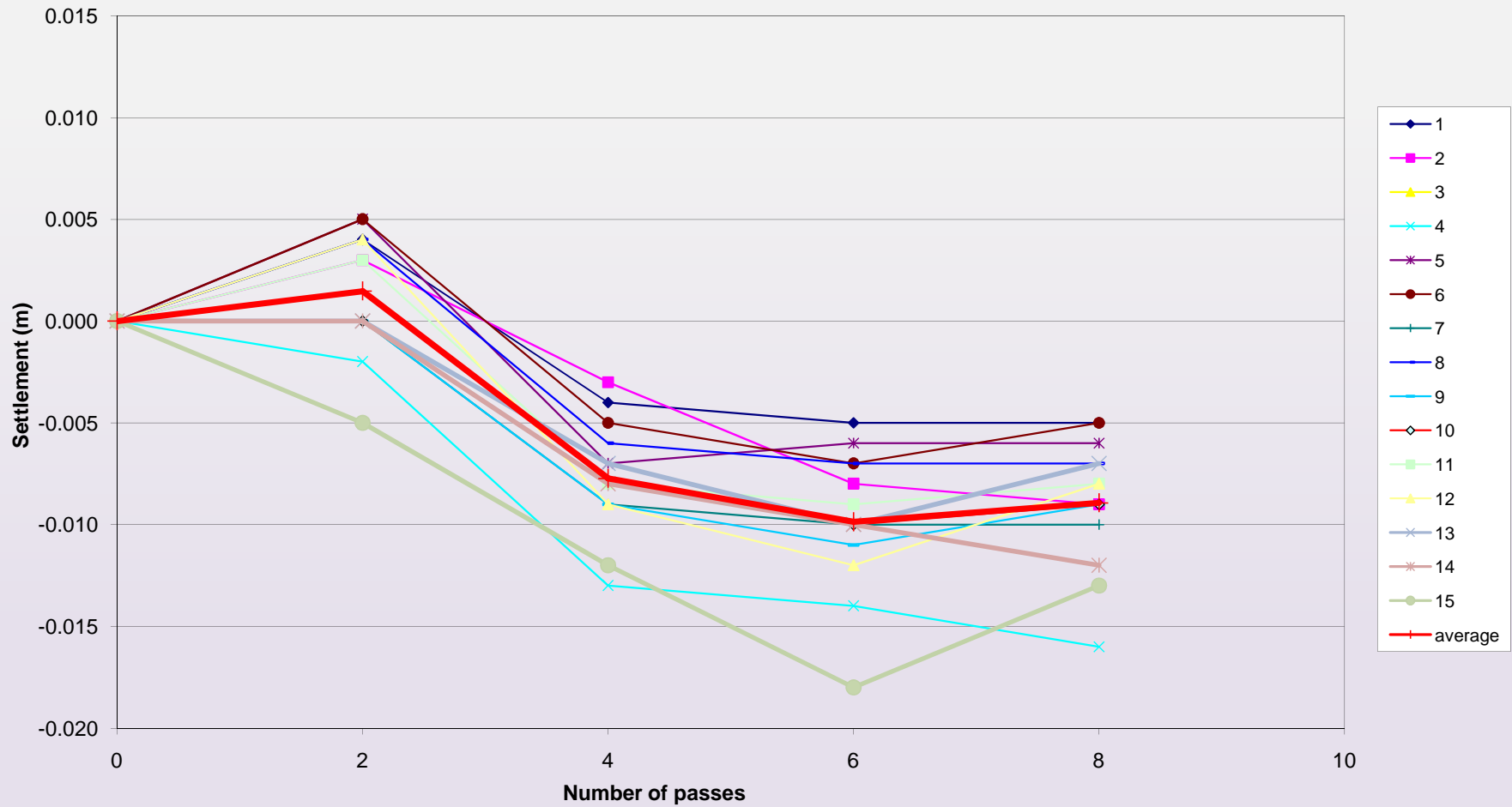
Test fill Borinquen Dam Filter Material 3A (Interlayer) : Settlement of leveling course 3
A (S0 - Sn)



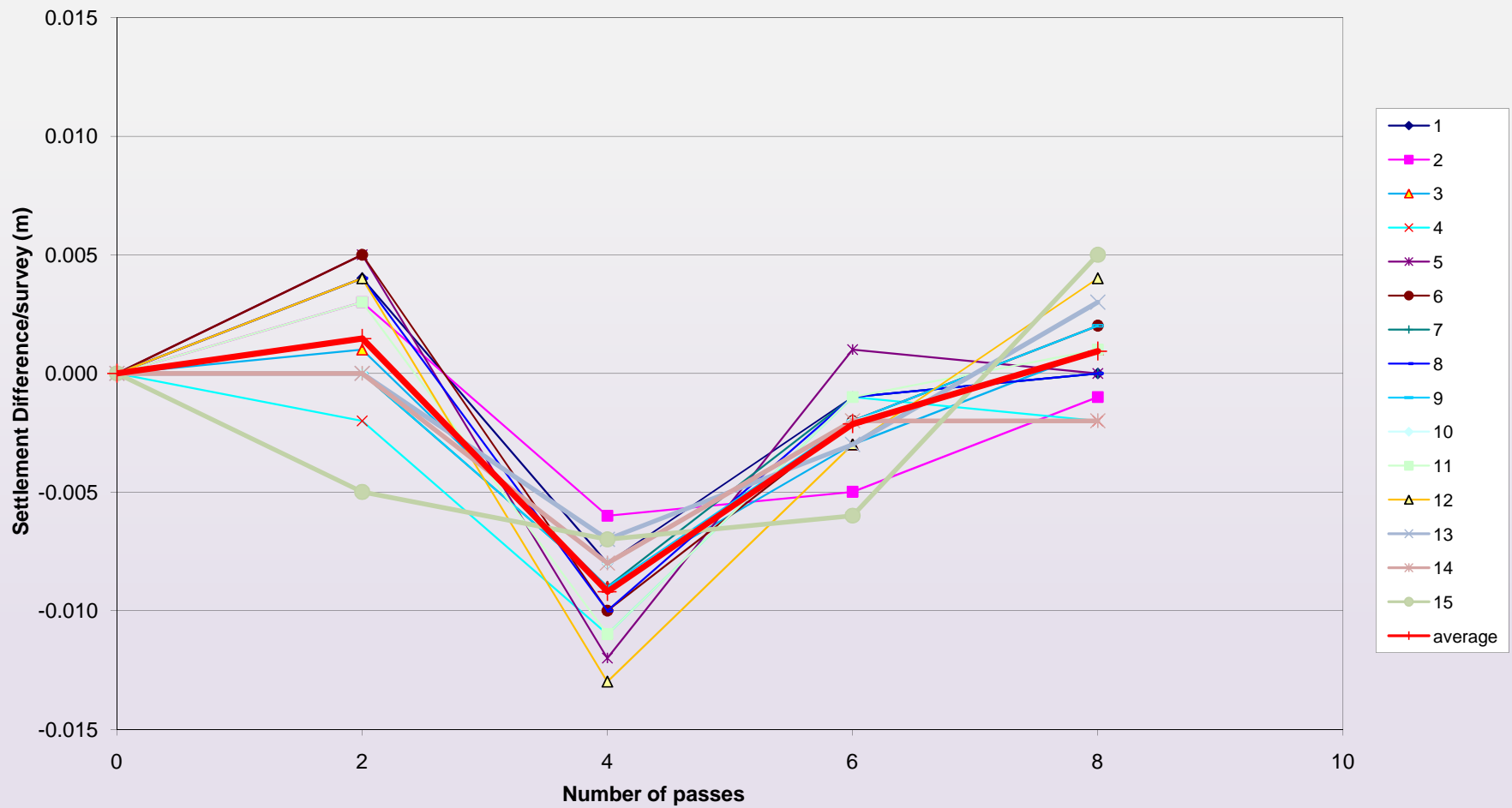
Test fill Borinquen Dam Filter Material 3A (Interlayer) : Settlement of leveling course 3A (Sn - S(n-1))



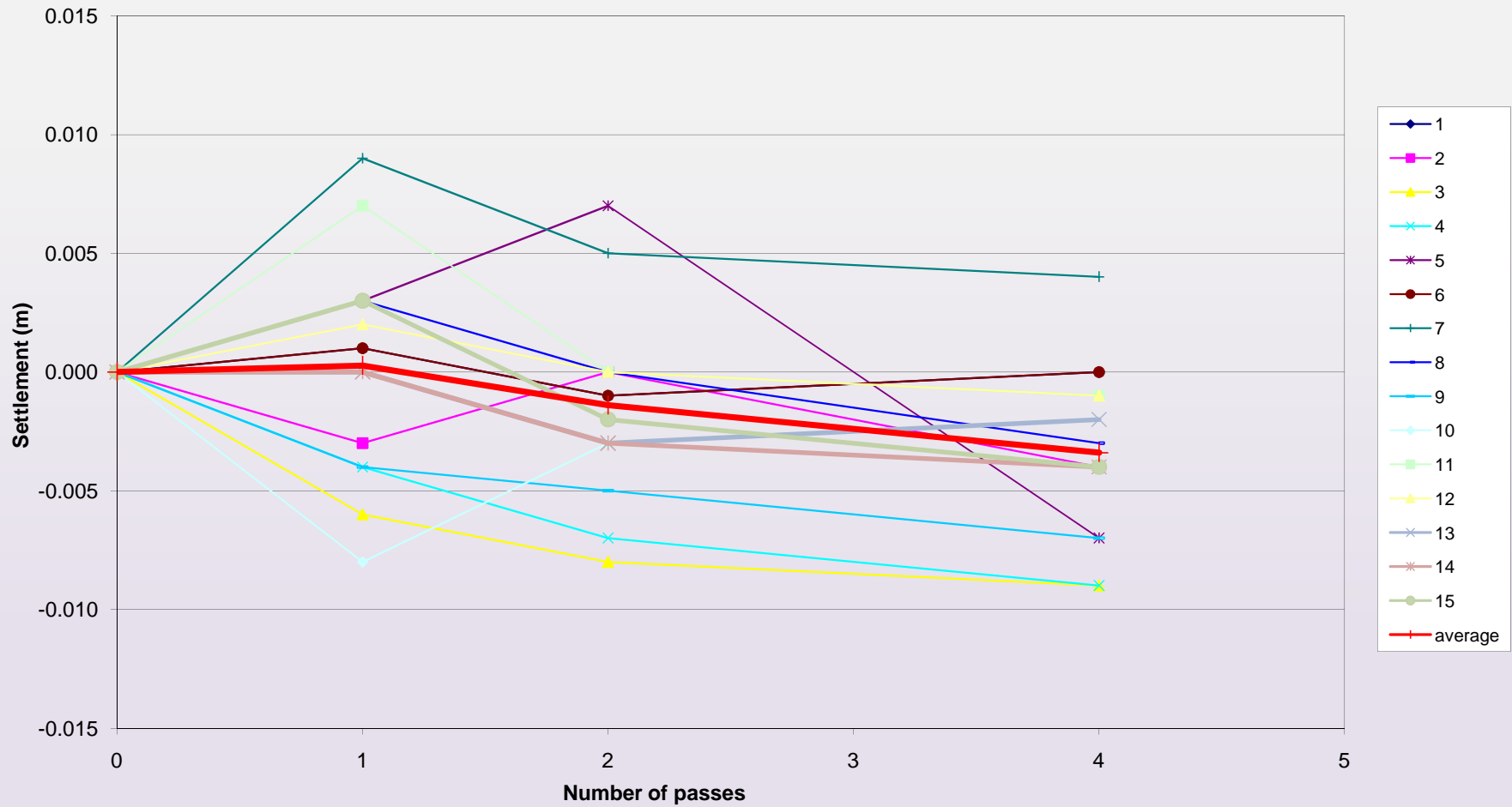
Test fill Borinquen Dam Filter Material 3A (Interlayer) : Settlement of lift 1 3A (S0 - Sn)



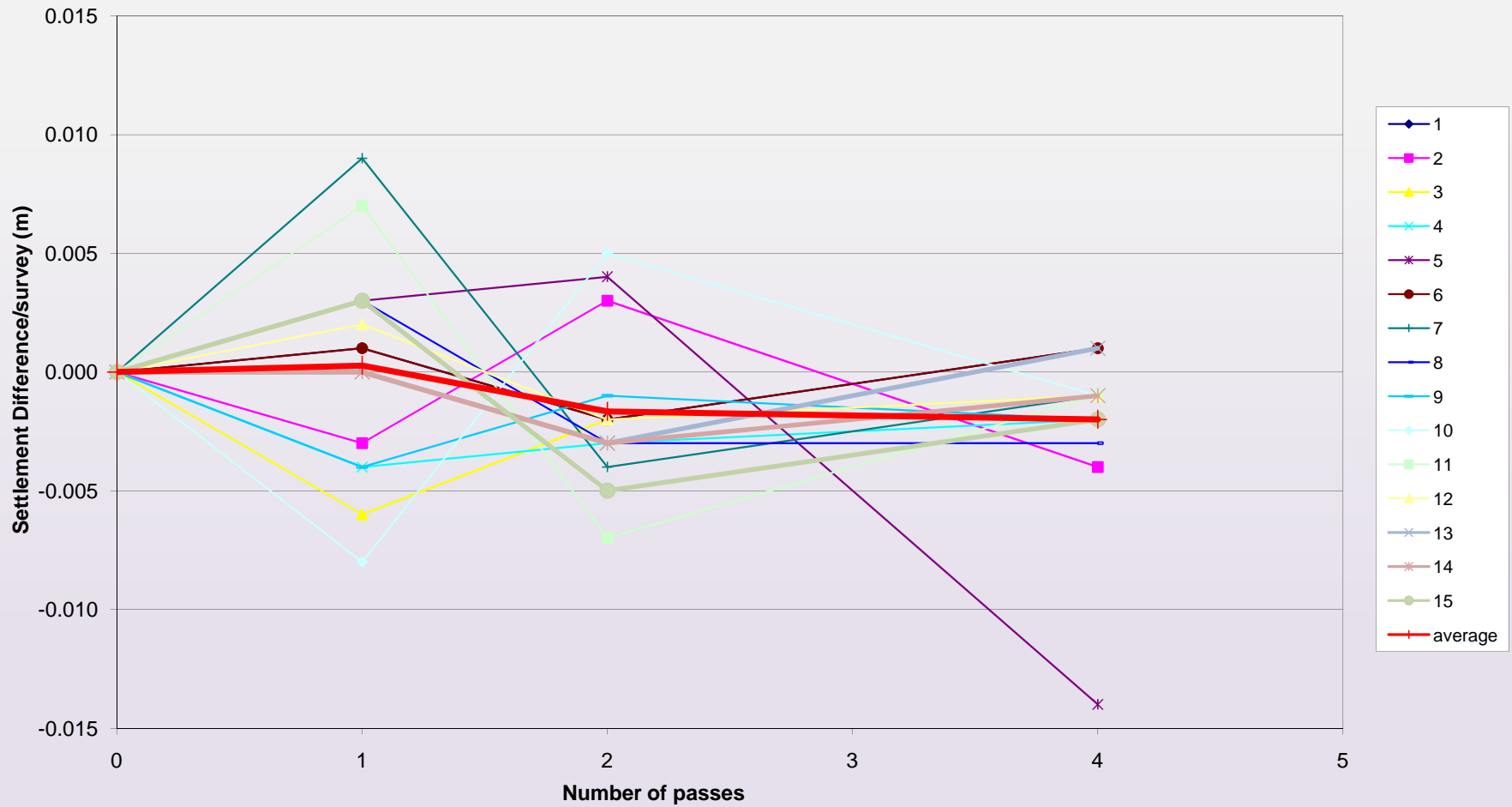
Test fill Borinquen Dam Filter Material 3A (Interlayer) : Settlement of lift 1 3A (Sn - S(n-1))



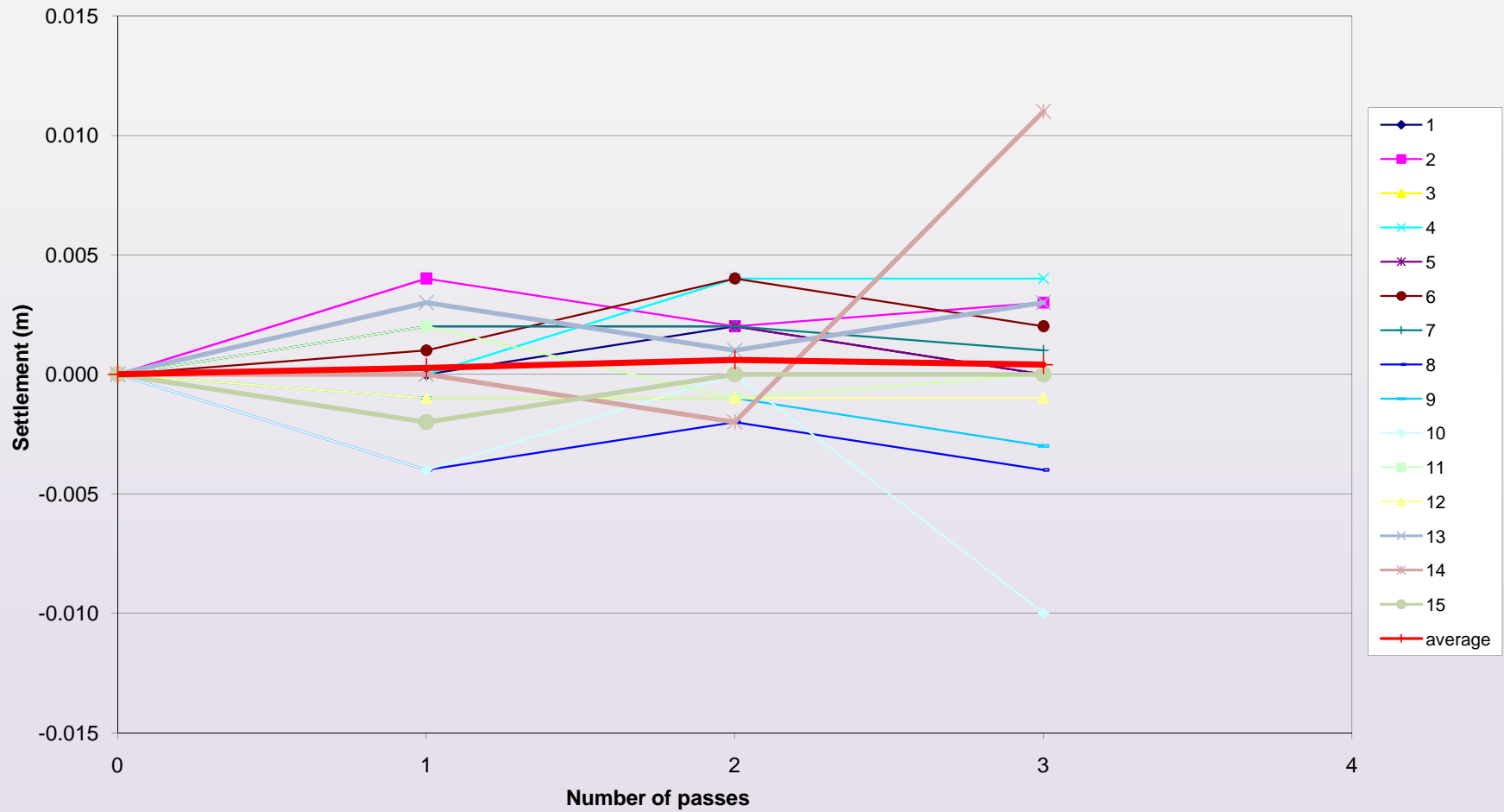
Test fill Borinquen Dam Filter Material 3A (Interlayer) : Settlement of lift 2 3A (S0 - Sn)



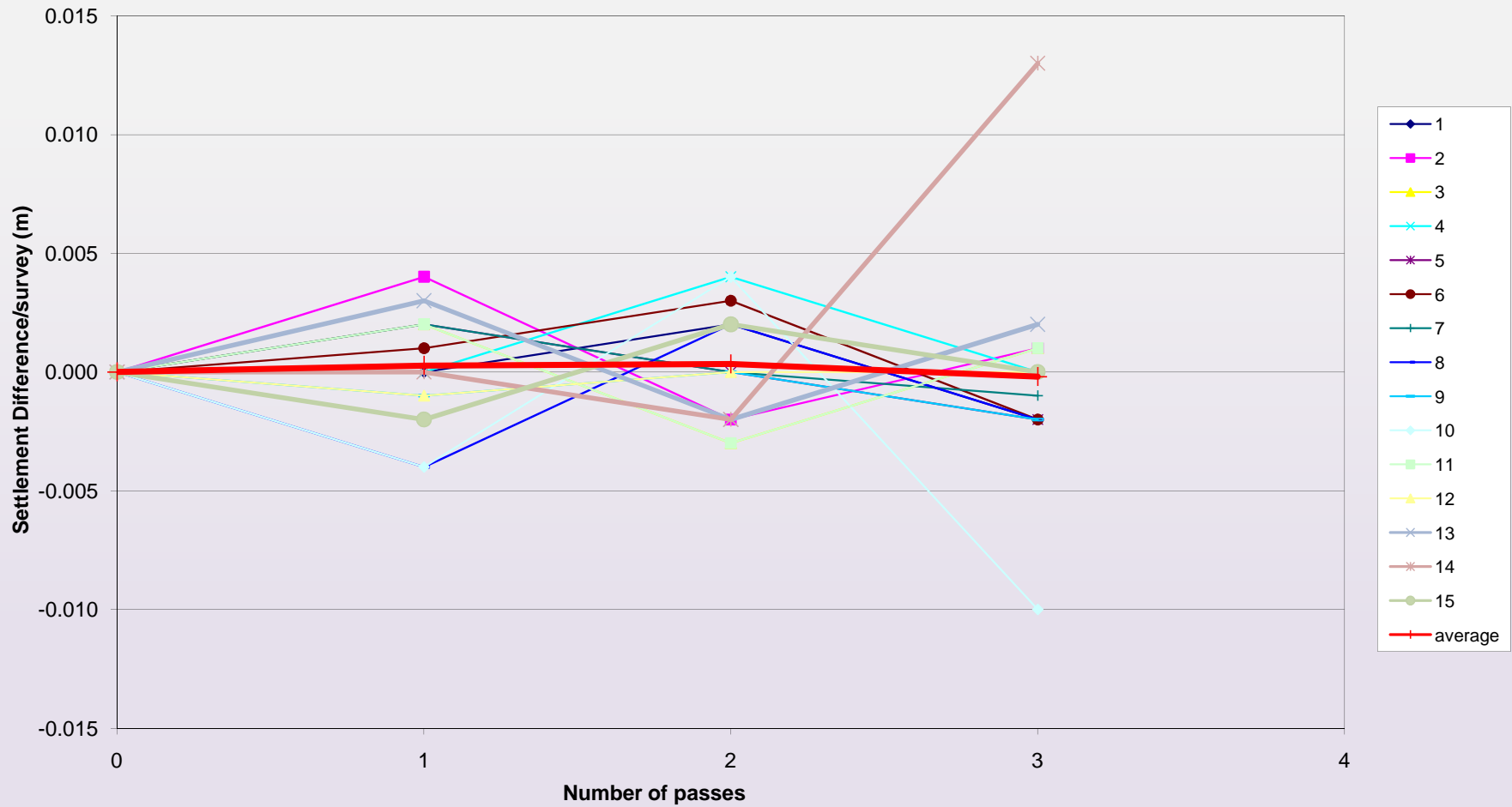
Test fill Borinquen Dam Filter Material 3A (Interlayer) : Settlement of lift 2 3A (Sn - S(n-1))



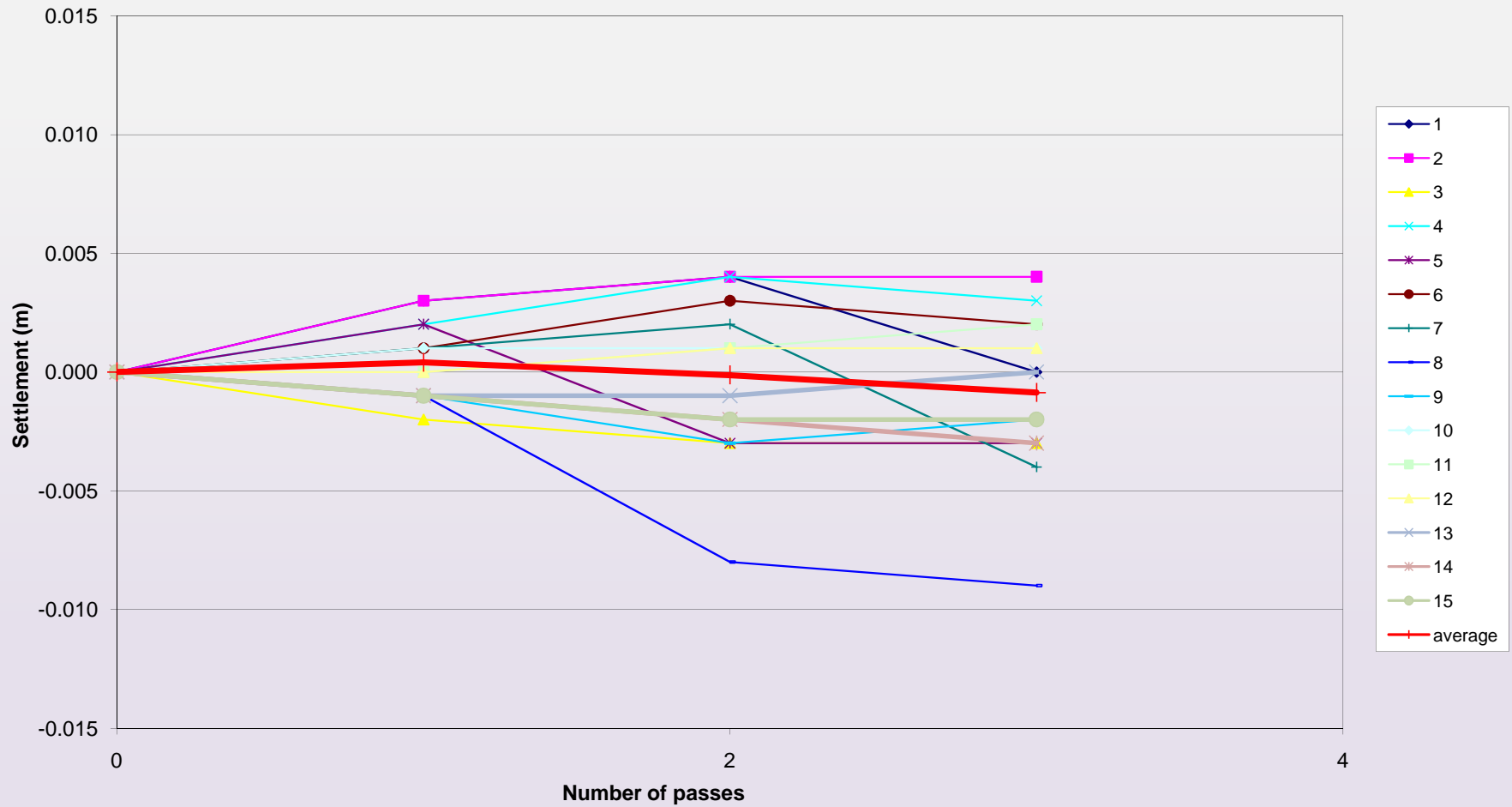
Test fill Borinquen Dam Filter Material 3A (Interlayer) : Settlement of lift 3 3A (S0 - Sn)



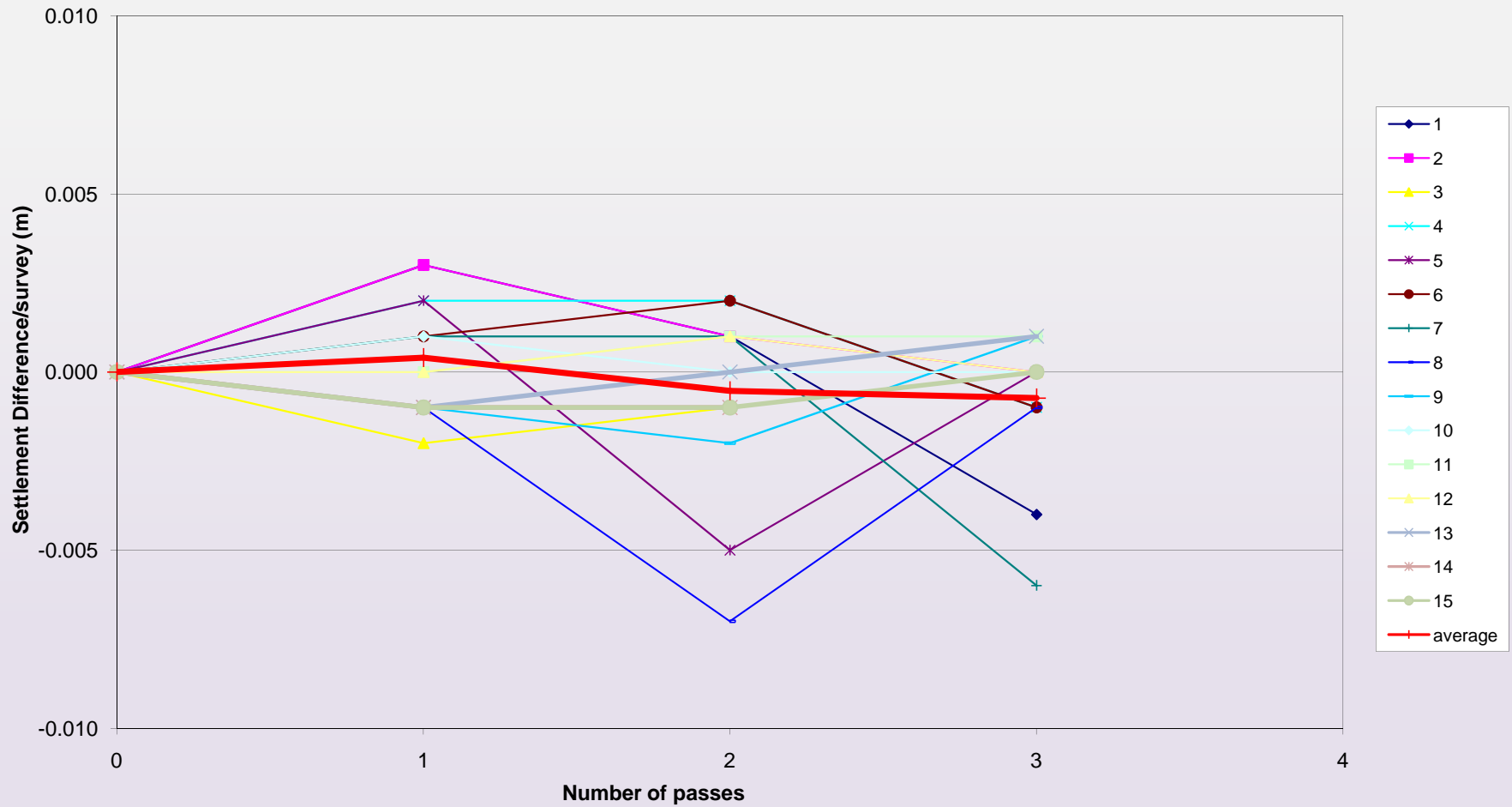
Test fill Borinquen Dam Filter Material 3A (Interlayer) : Settlement of lift 3 3A (Sn - S(n-1))



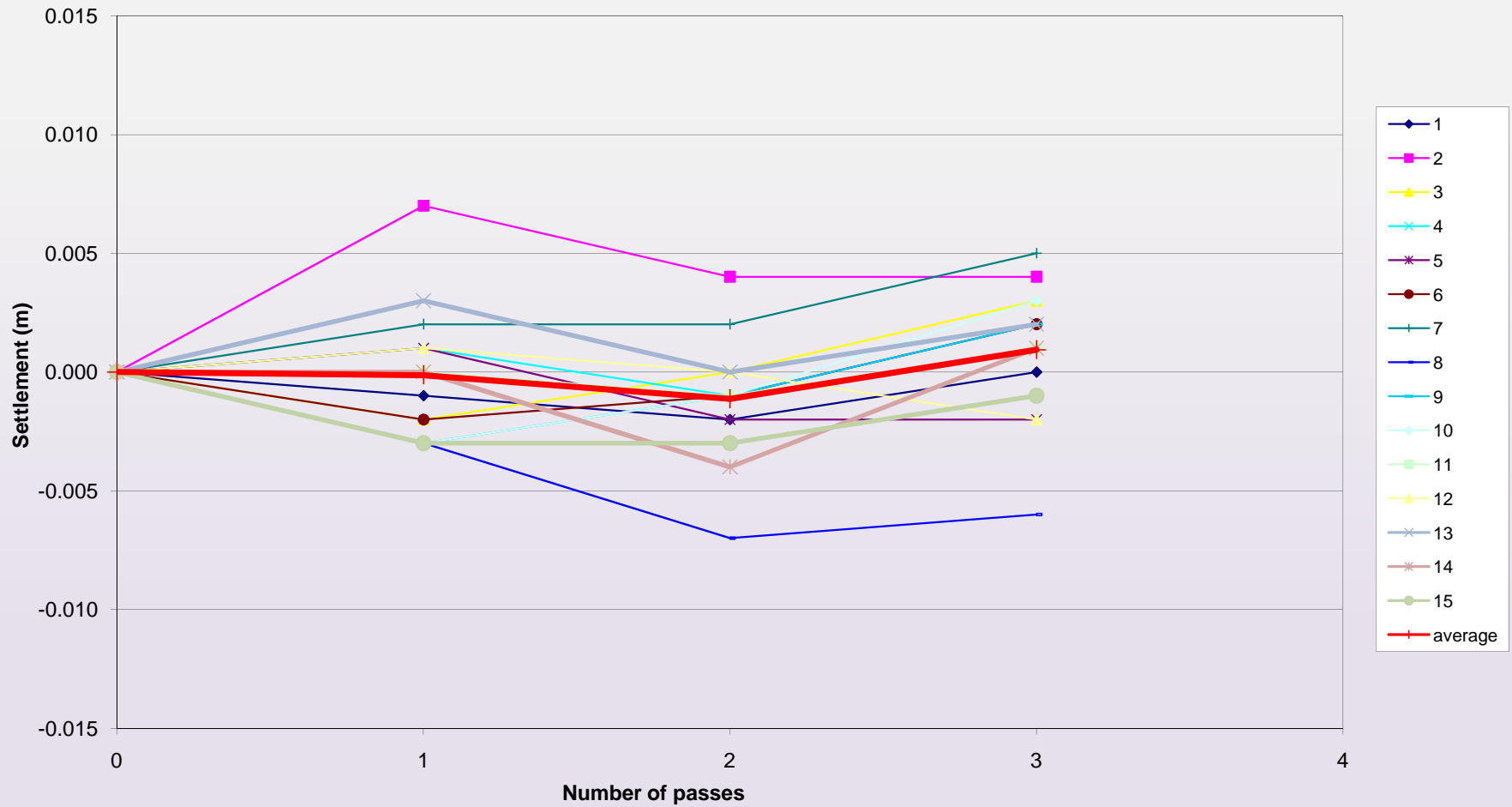
Test fill Borinquen Dam Filter Material 3A (Interlayer) : Settlement of lift 4 3A (S0 - Sn)



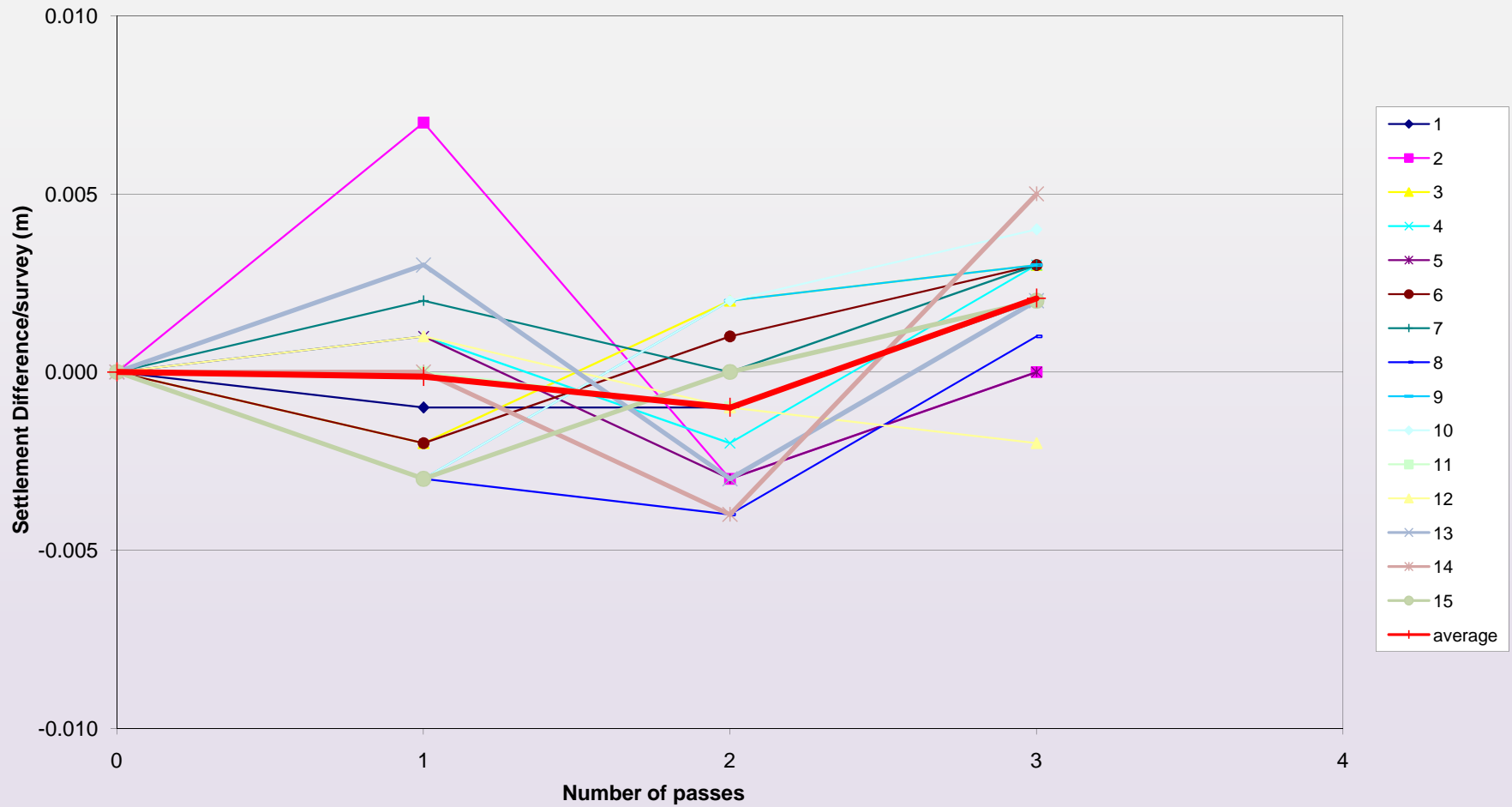
Test fill Borinquen Dam Filter Material 3A (Interlayer) : Settlement of lift 4 3A (Sn - S(n-1))



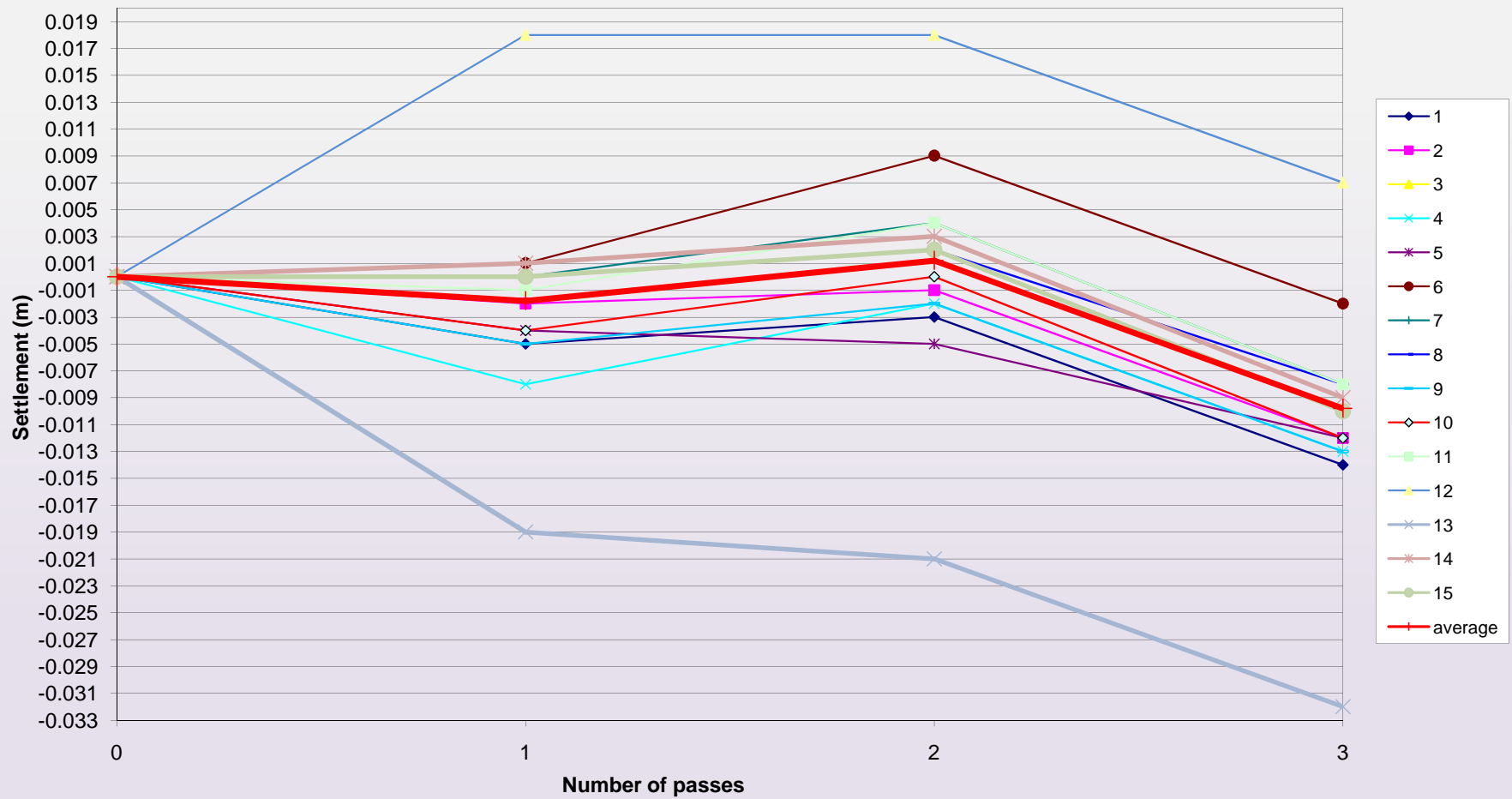
Test fill Borinquen Dam Filter Material 3A (Interlayer) : Settlement of lift 4 3A (S0 - Sn)



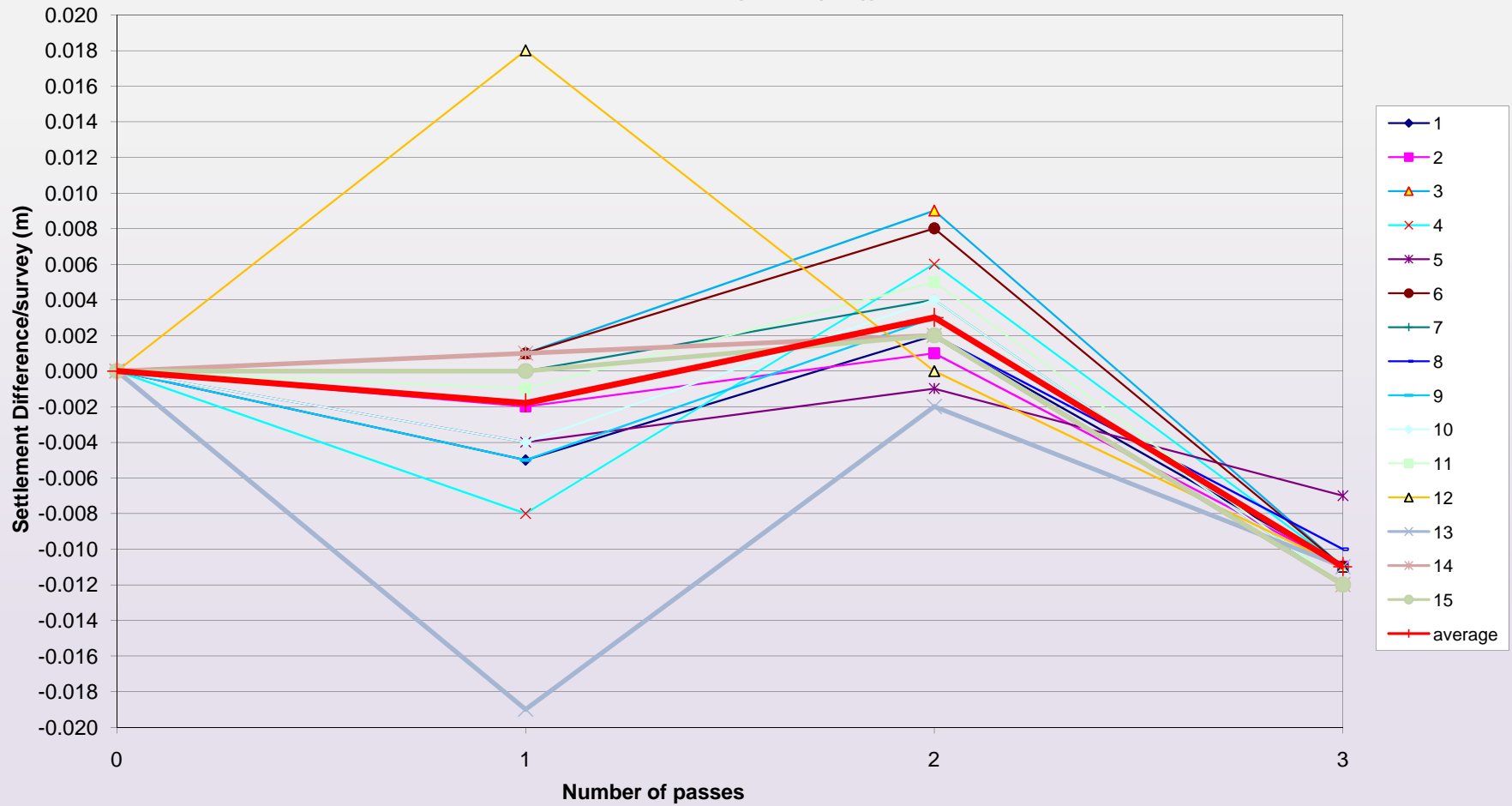
Test fill Borinquen Dam Filter Material 3A (Interlayer) : Settlement of lift 4 3A (Sn - S(n-1))



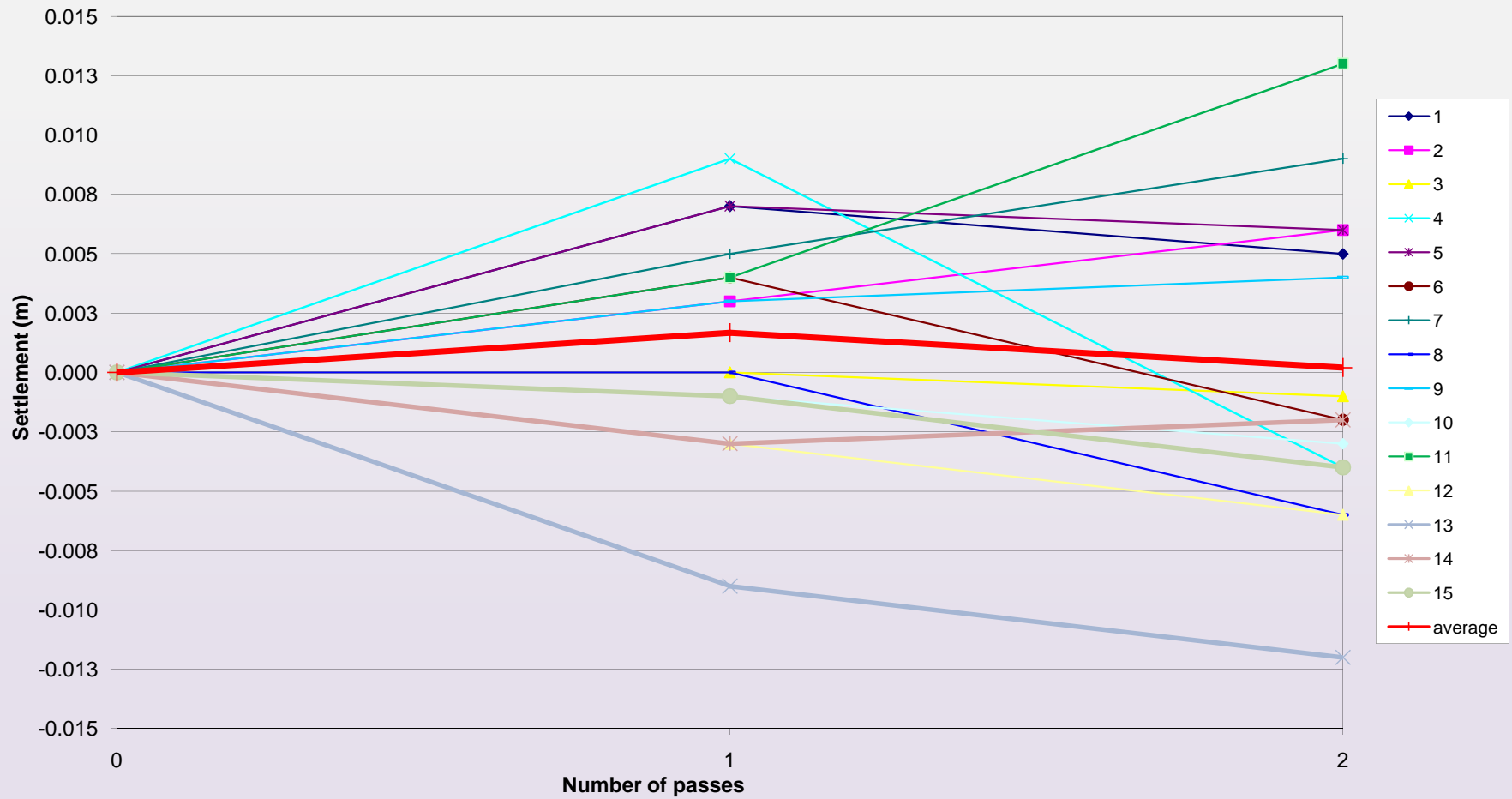
Test fill Borinquen Dam Filter Material 3A - Additional Lift 1 stockpile area :
Settlement of lift 1 3A (S0 - Sn)



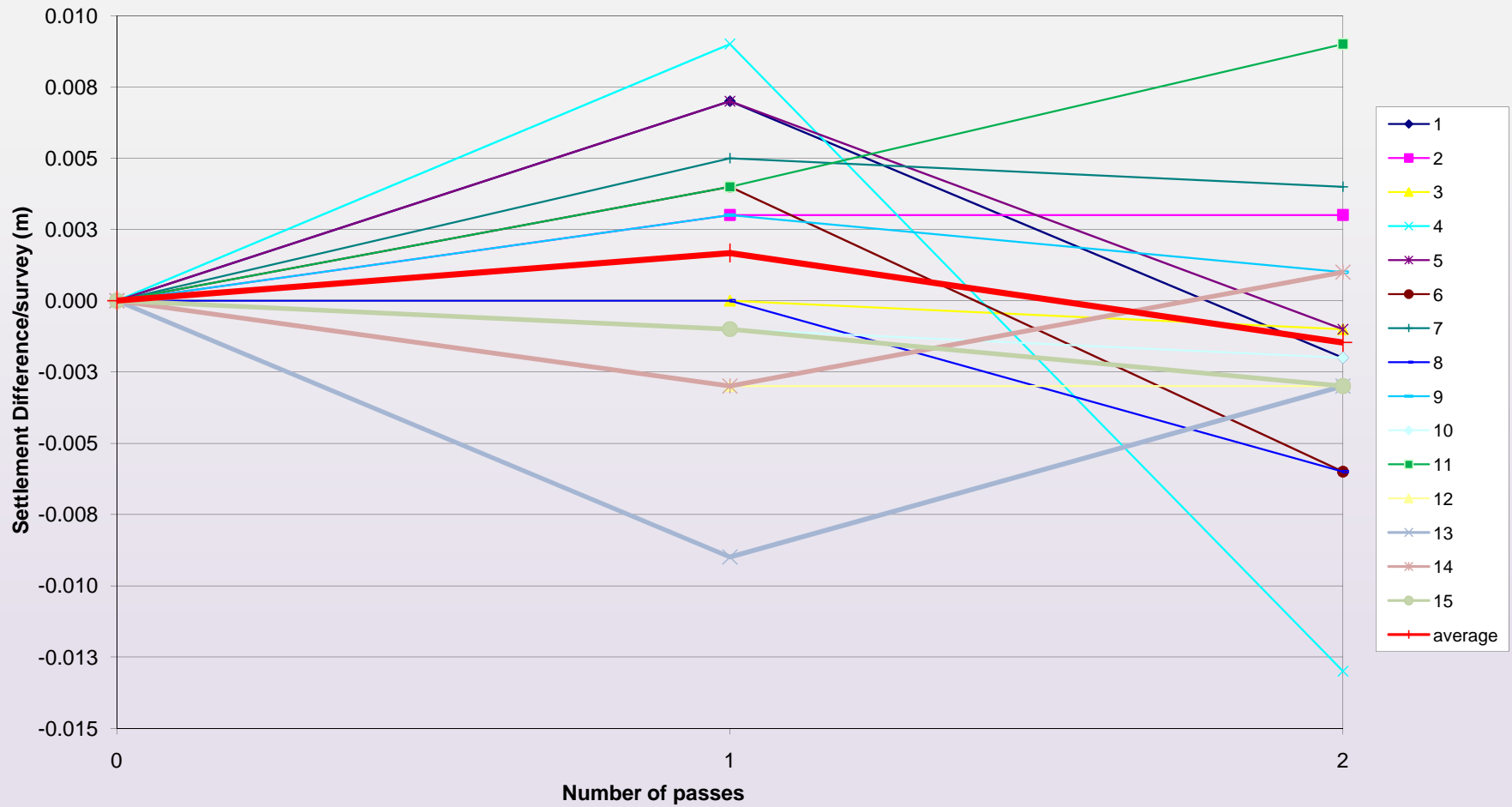
Test fill Borinquen Dam Filter Material 3A - Additional Lift 1 stockpile area :
Settlement of lift 1 3A ($S_n - S_{(n-1)}$)



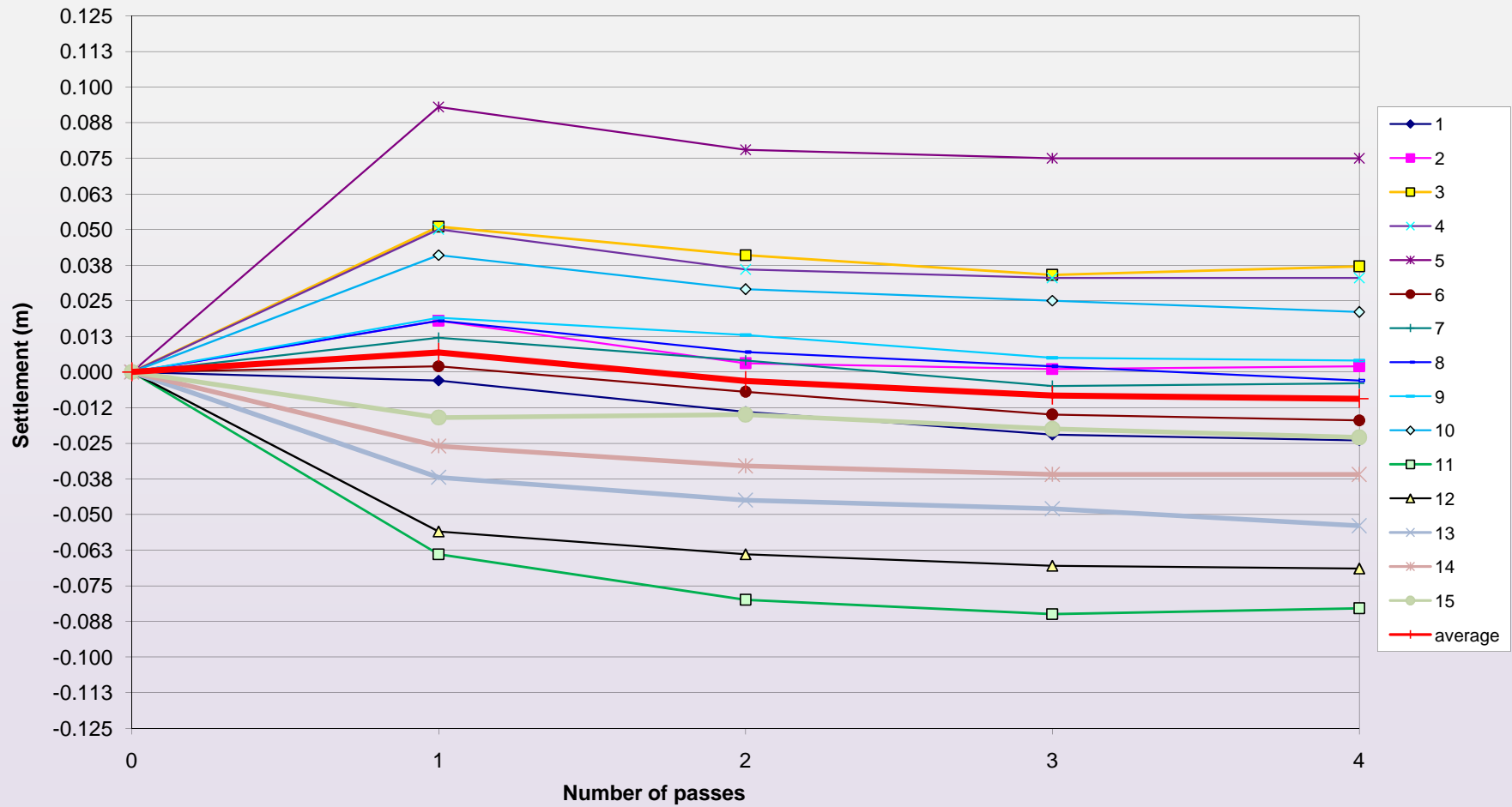
Test fill Borinquen Dam Filter Material 3A - Additional Lift 2 stockpile area :
Settlement of lift 2 3A (S0 - Sn)



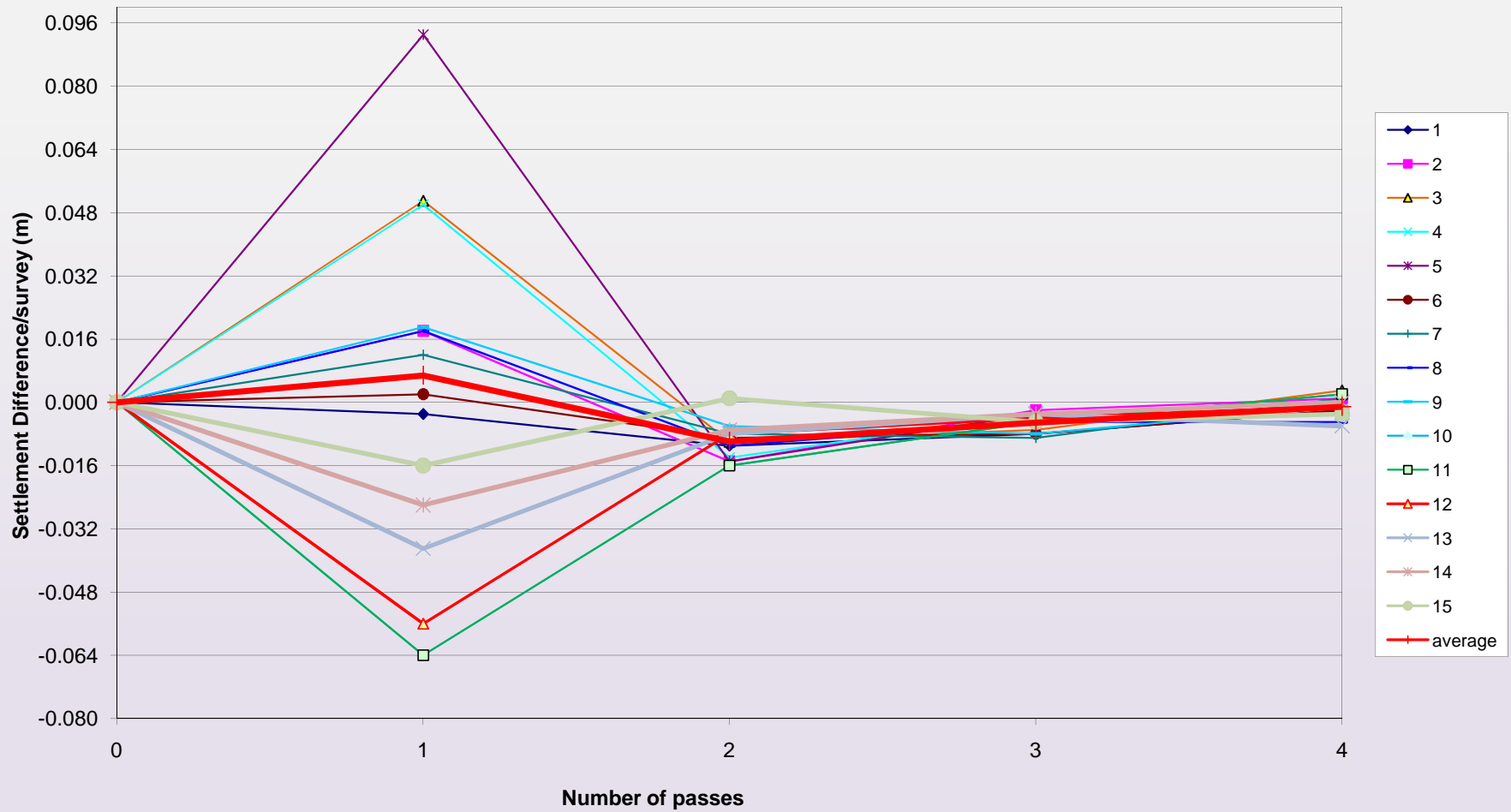
Test fill Borinquen Dam Filter Material 3A - Additional Lift 2 stockpile area :
Settlement of lift 2 3A ($S_n - S_{(n-1)}$)



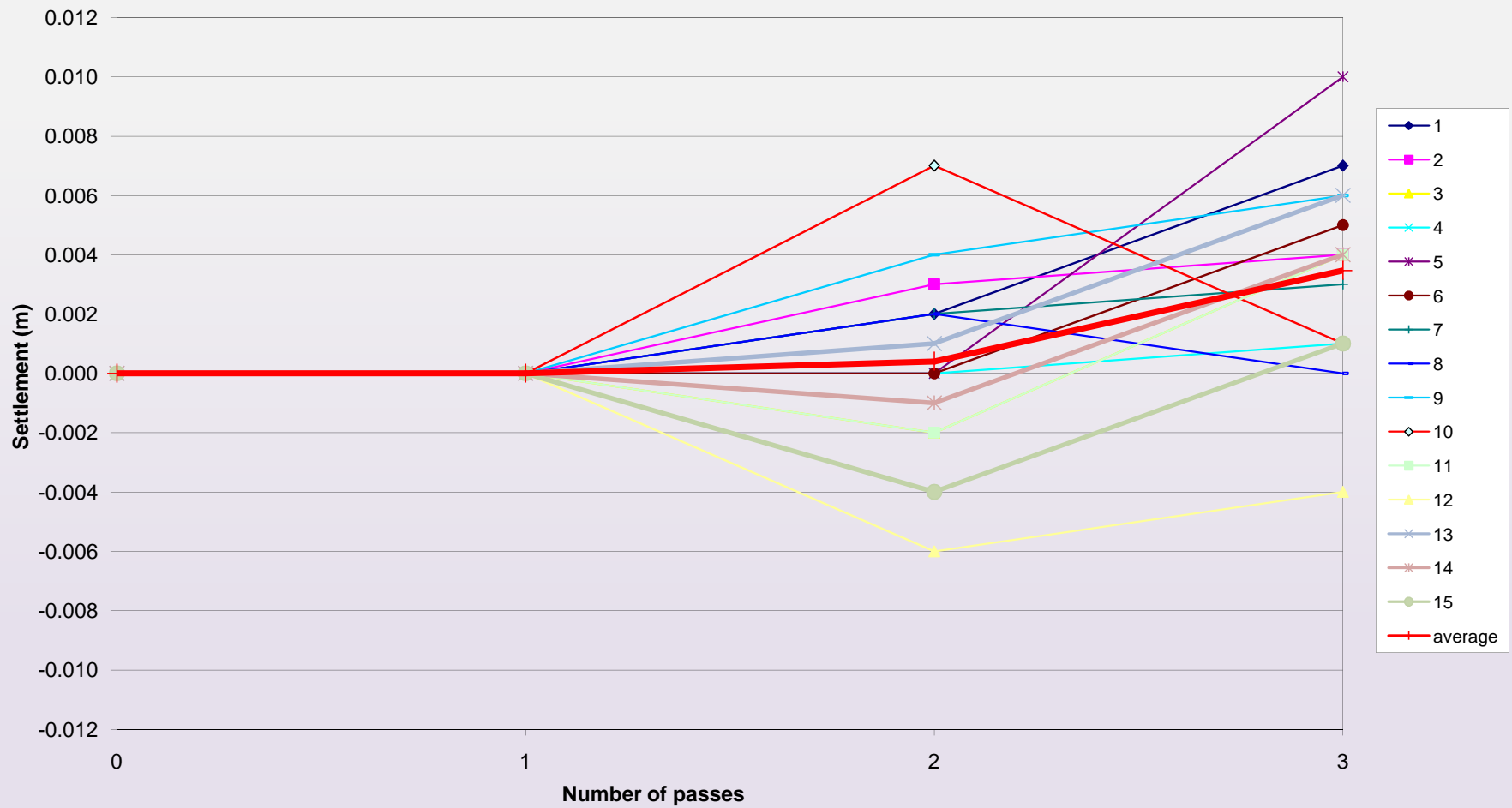
Test fill type 3B Borinquen Dam 1W filter material (Interlayer) : Settlement lift 1 3B (S0 - Sn)



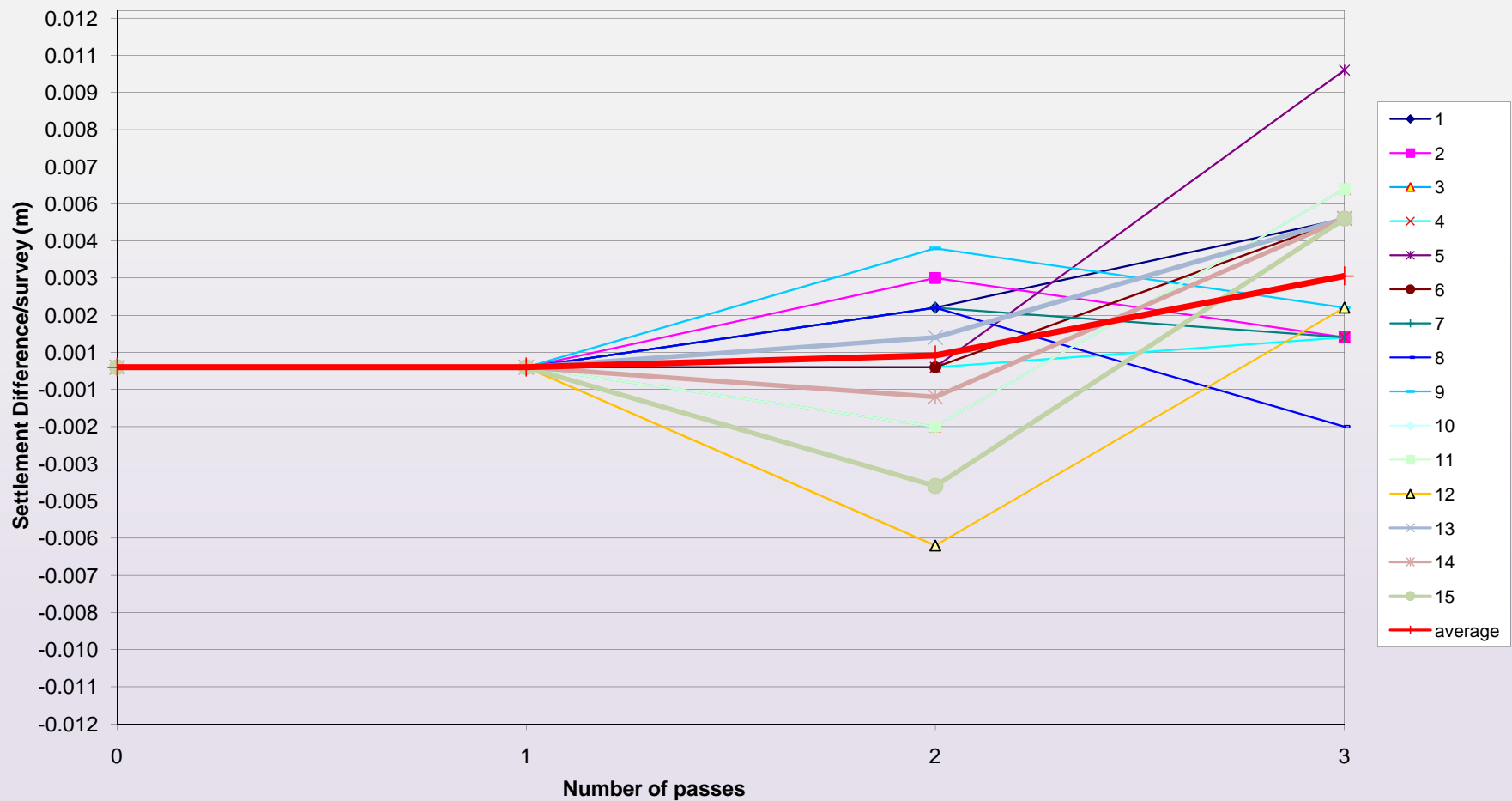
Test fill type 3B borinquen Dam 1W filter material (Interlayer) : Settlement of lift 1 3B (Sn - S(n-1))



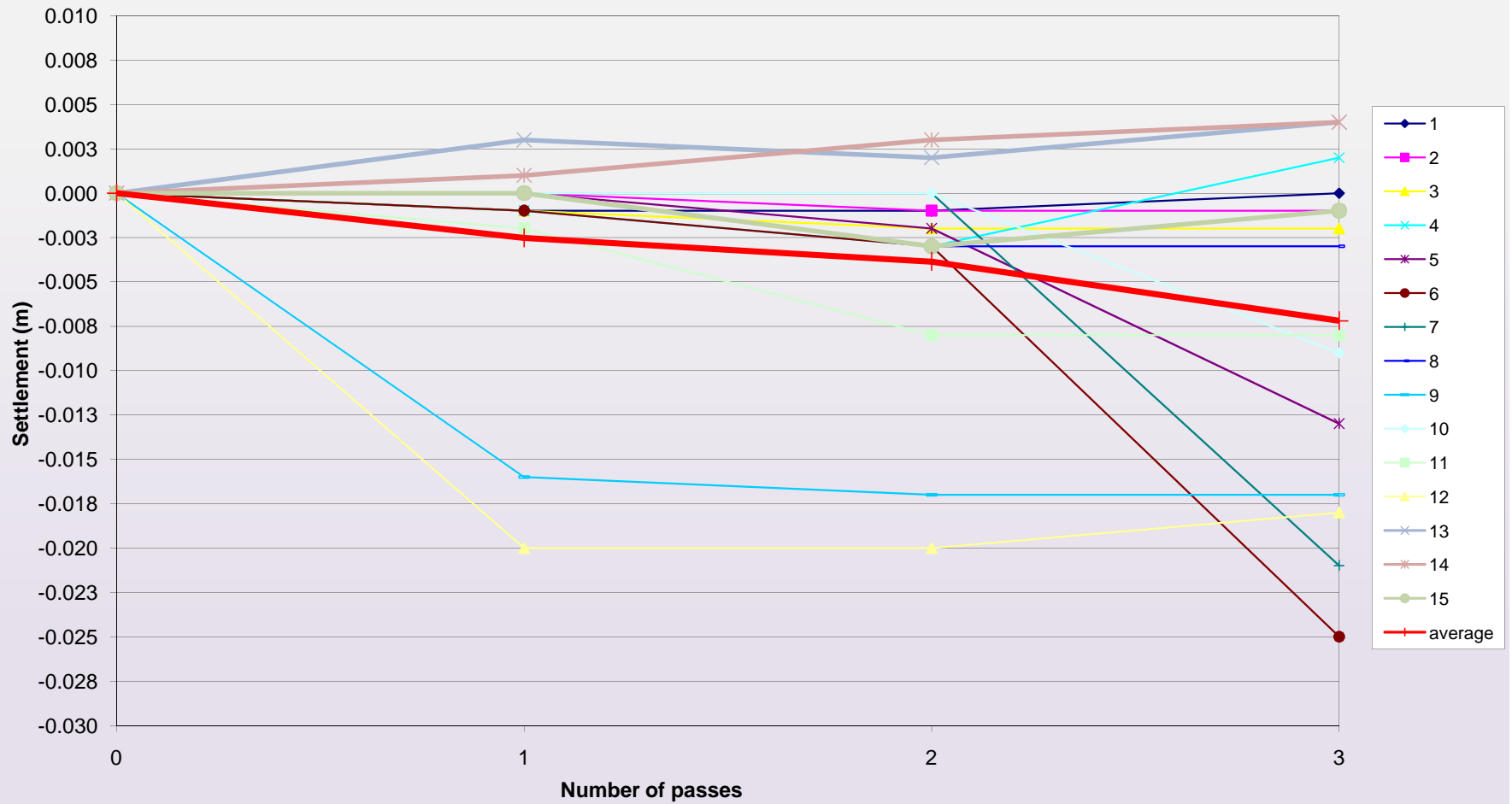
Test fill type 3B Borinquen Dam 1W filter material (Interlayer) : Settlement of lift 2 3B (S0 - Sn)



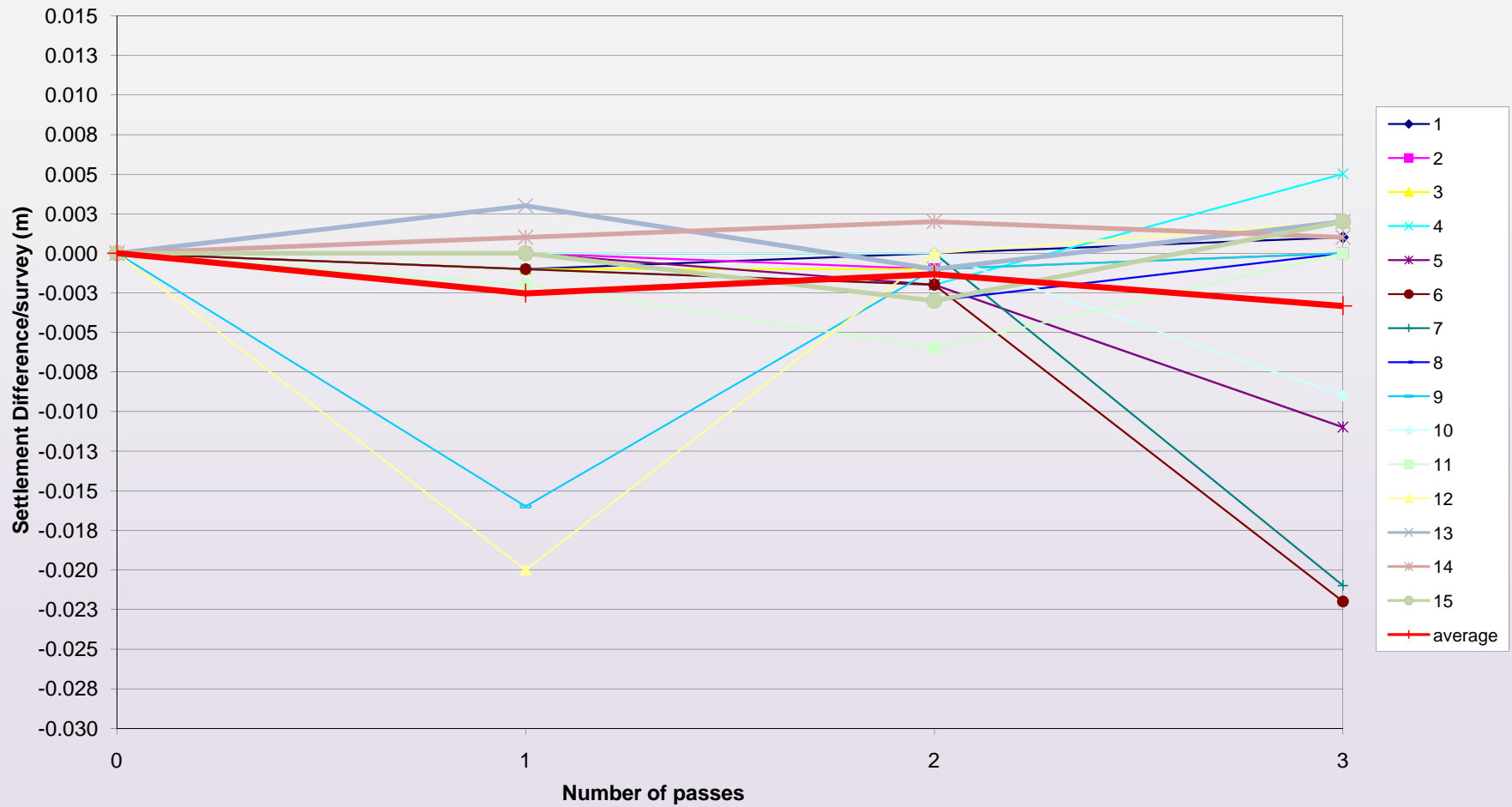
Test fill type 3B Borinquen Dam 1W filter material(Interlayer) : Settlement of lift 2 3B (Sn - S(n-1))



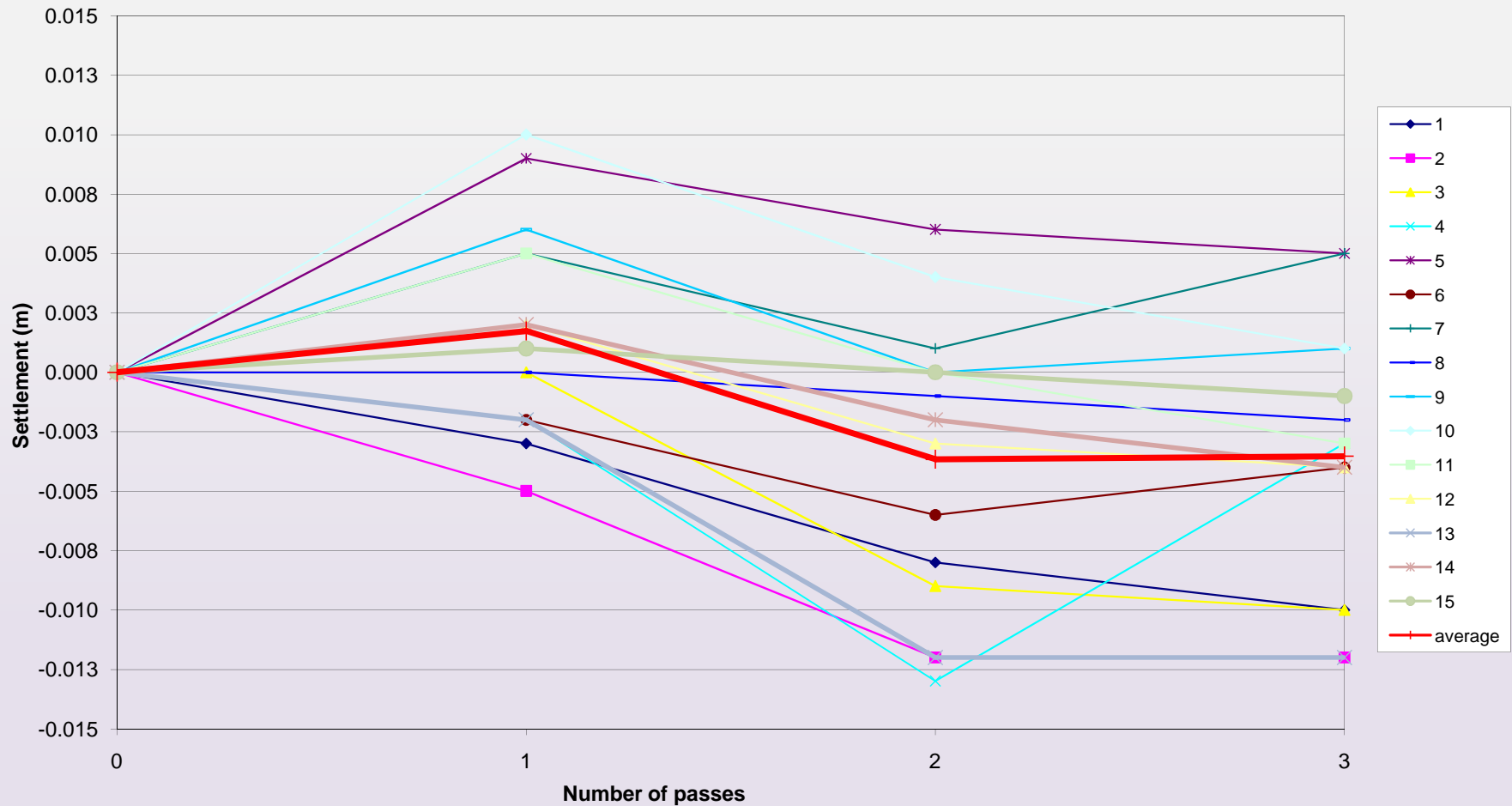
Test fill Borinquen type 3B Dam 1W filter material (Interlayer) : Settlement of lift 3 3B (S0 - Sn)



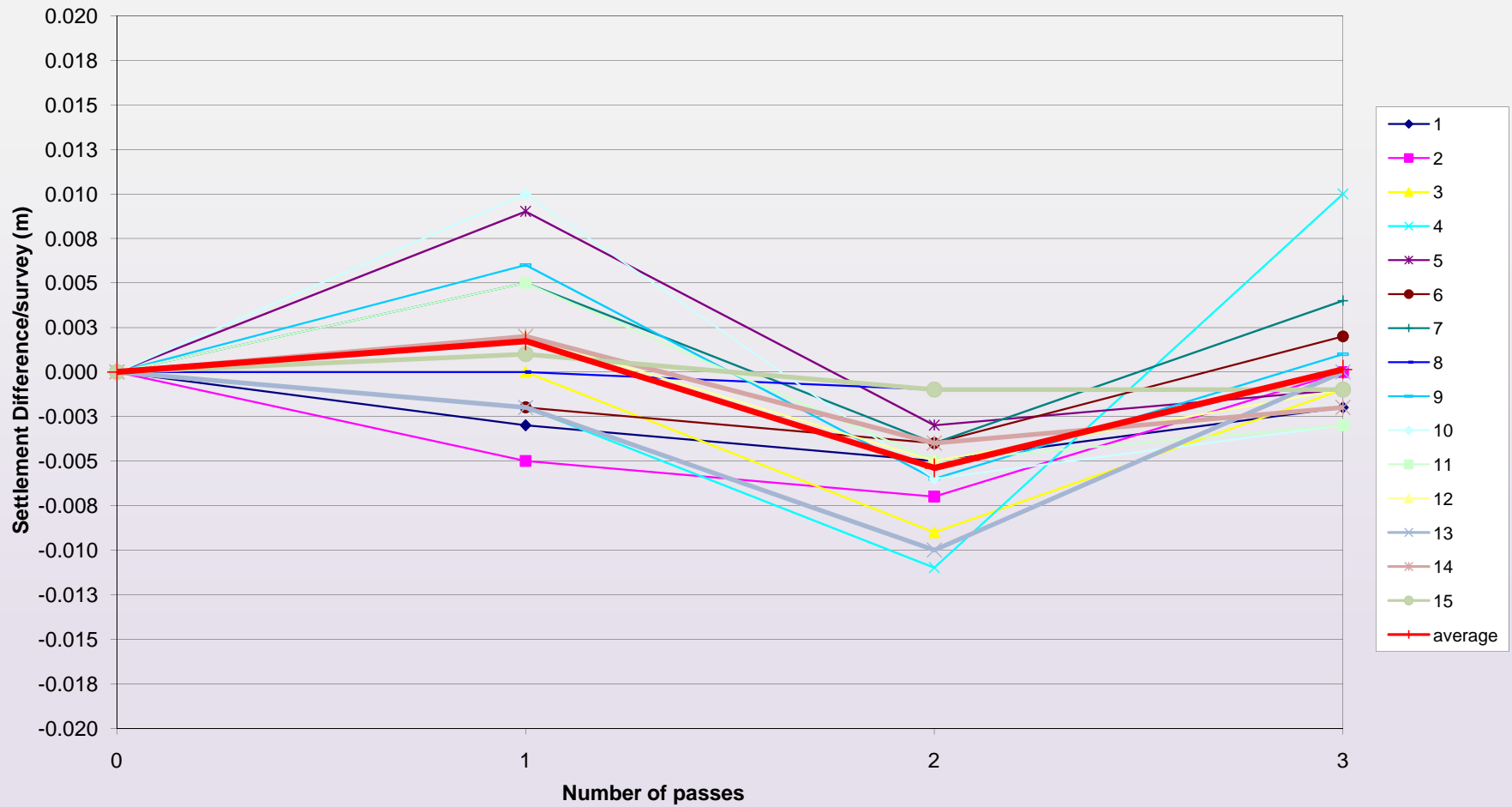
Test fill type 3B Borinquen Dam 1W filter material (Interlayer) : Settlement of lift 3 3B (Sn - S(n-1))



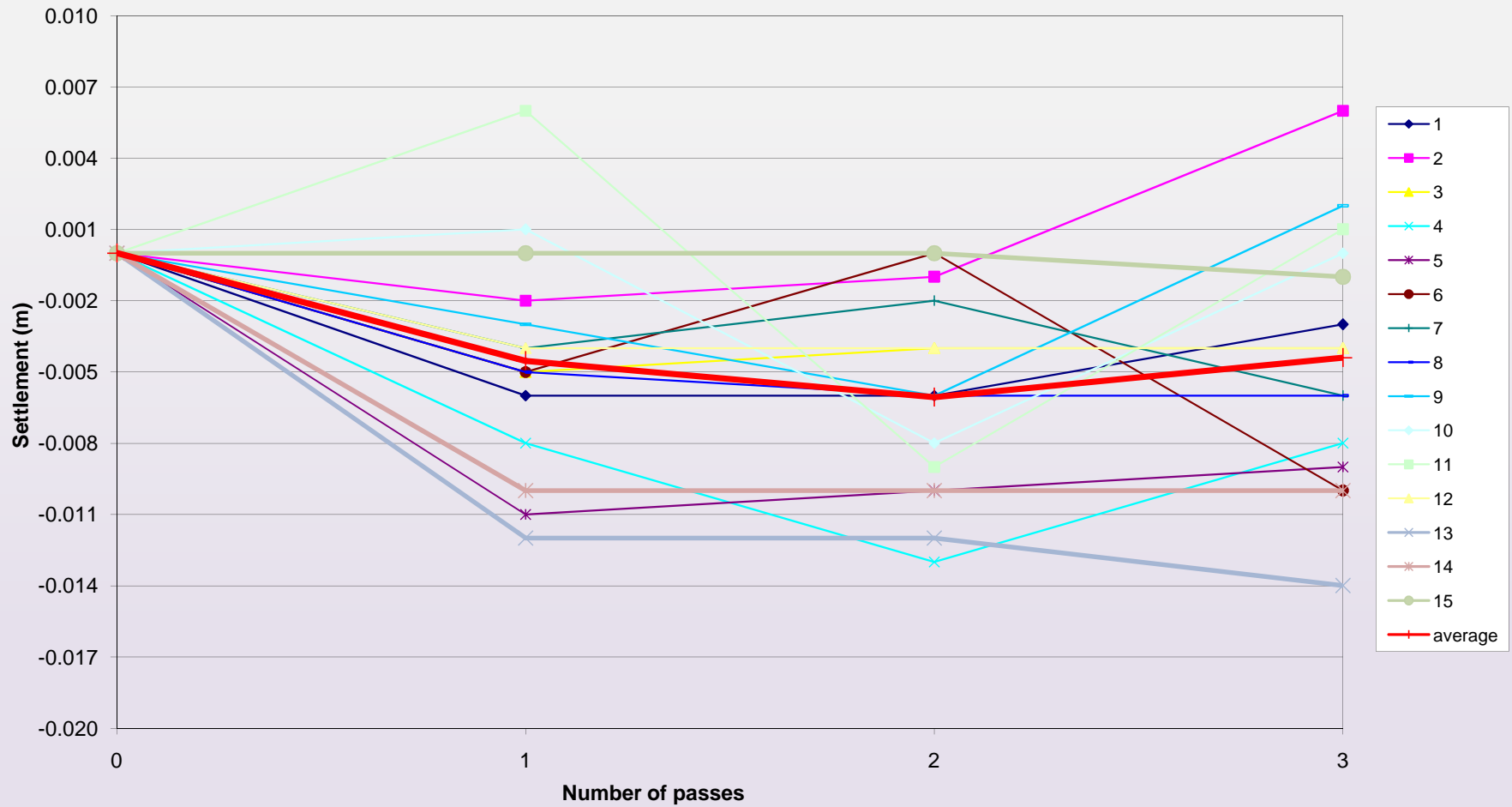
Test fill type 3B Borinquen Dam 1W filter material (Interlayer) : Settlement of lift 4 3B (S0 - Sn)



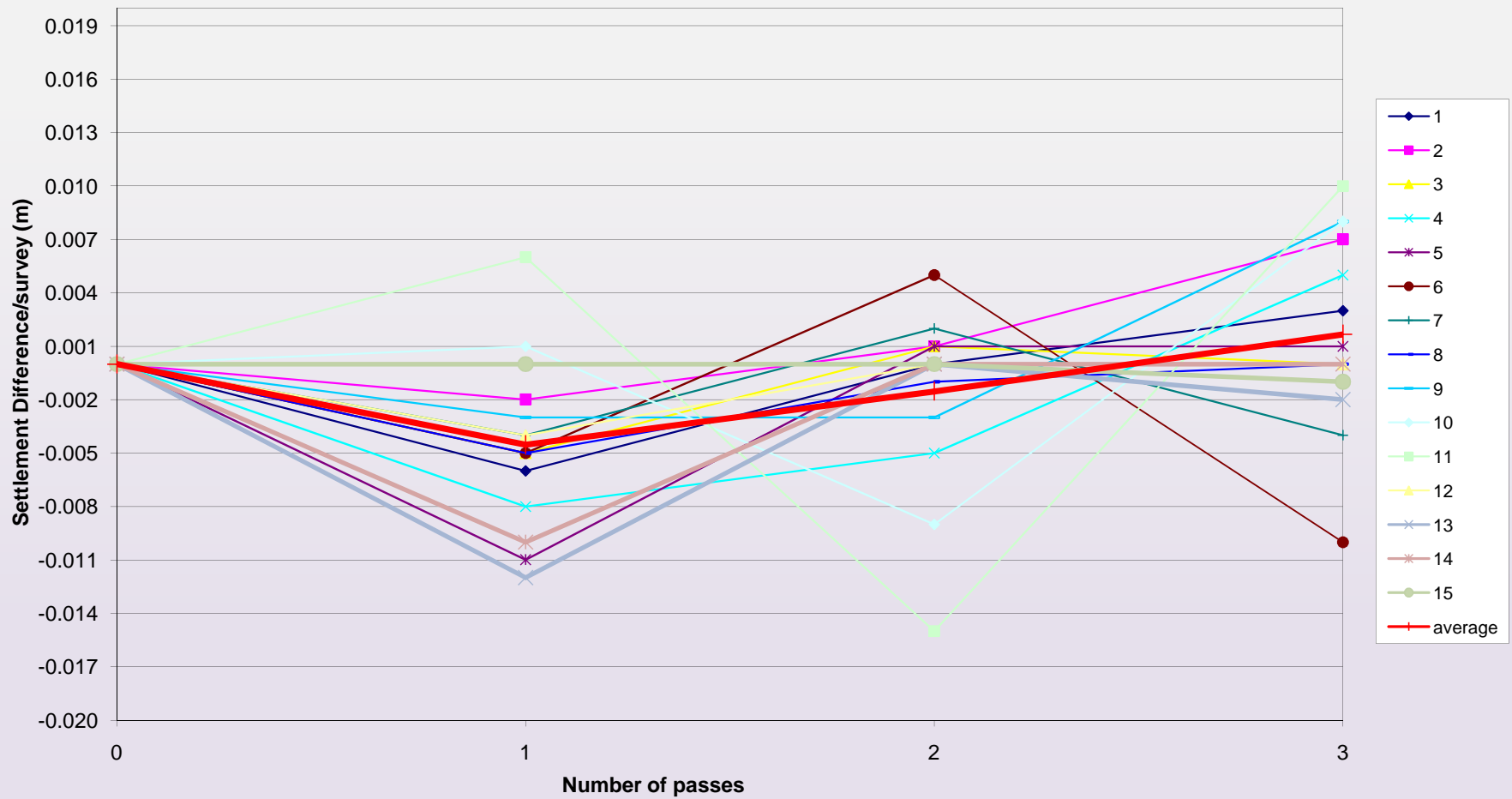
Test fill type 3B Borinquen Dam 1W filter material (Interlayer) : Settlement of lift 4 3B (Sn - S(n-1))



Test fill type 3B Borinquen Dam 1W filter material (Interlayer) : Settlement of lift 5 3B (S0 - Sn)



Test fill type 3B Borinquen Dam 1W filter material (Interlayer) : Settlement of lift 5 3B (Sn - S(n-1))



APÉNDICE 5:

RESULTADOS DE
ENSAYOS DE GRANULOMETRÍA Y DENSIDAD RELATIVA

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	13-Jul-12	Time Sampled	5:00 PM
Sample Number	B - 211	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG/JAG/EC		
Material Source	Test Fill Borinquen Dam 4 Passes			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Leveling Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Gradation Analysis (ASTM C136)	
#200 Wash (ASTM C117, D1140)	
Relative Density (ASTM D4253, D4254)	

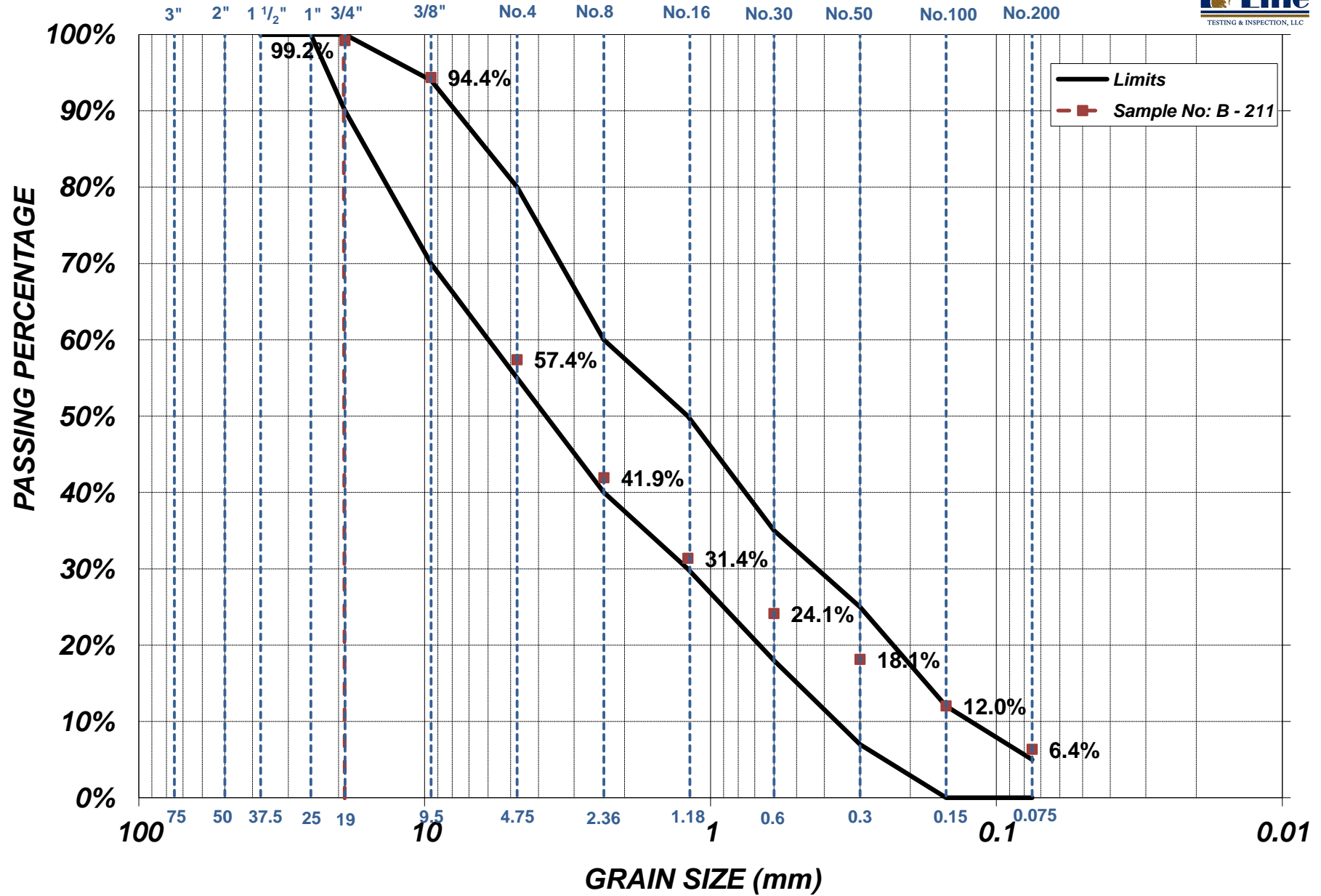
Report Issued By Robert J. Montalvo

Checked By RJMh

Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project:

Pacific

Date:

13-Jul-12

Sample ID:

B-211

Sampled By:

CG/JAG/EC

Technician

N/C

Checked By:

PC

Method

 A B C

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

#REF!

Soil
Classification

#REF!

Scale No.

1130

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8530	8737				
Mold Tare (g)	3637	3637				
Weight of Material (g)	4893	5100				
Volume of Material (cm ³)	2351	2406				
Maximum Relative Density (g/cm ³)	2.081	2.120				

Result
Consistency

0.92%



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project:

Pacific

Date:

13-Jul-12

Sample ID:

B-211

Sampled By:

CG/JAG/EC

Technician

CG

Checked By:

PC

Method

 1A 1B 2A 2B

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

#REF!

Soil
Classification

#REF!

Scale No.

1130

Mold ID

1443

Table ID

1443

 Scale CheckDouble Amplitude of Vertical Vibration
(if different from that specified)

N/A

Trial	1	2	3	4	5	6
Soil + Mold (g)	8530	8737				
Mold Tare (g)	3637	3637				
Weight of Material (g)	4893	5100				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.748	1.821				

Result
Consistency

2.12%

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	13-Jul-12	Time Sampled	5:15 PM
Sample Number	B - 212	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG/EC		
Material Source	Test Fill Borinquen Dam 8 Passes			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Leveling Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

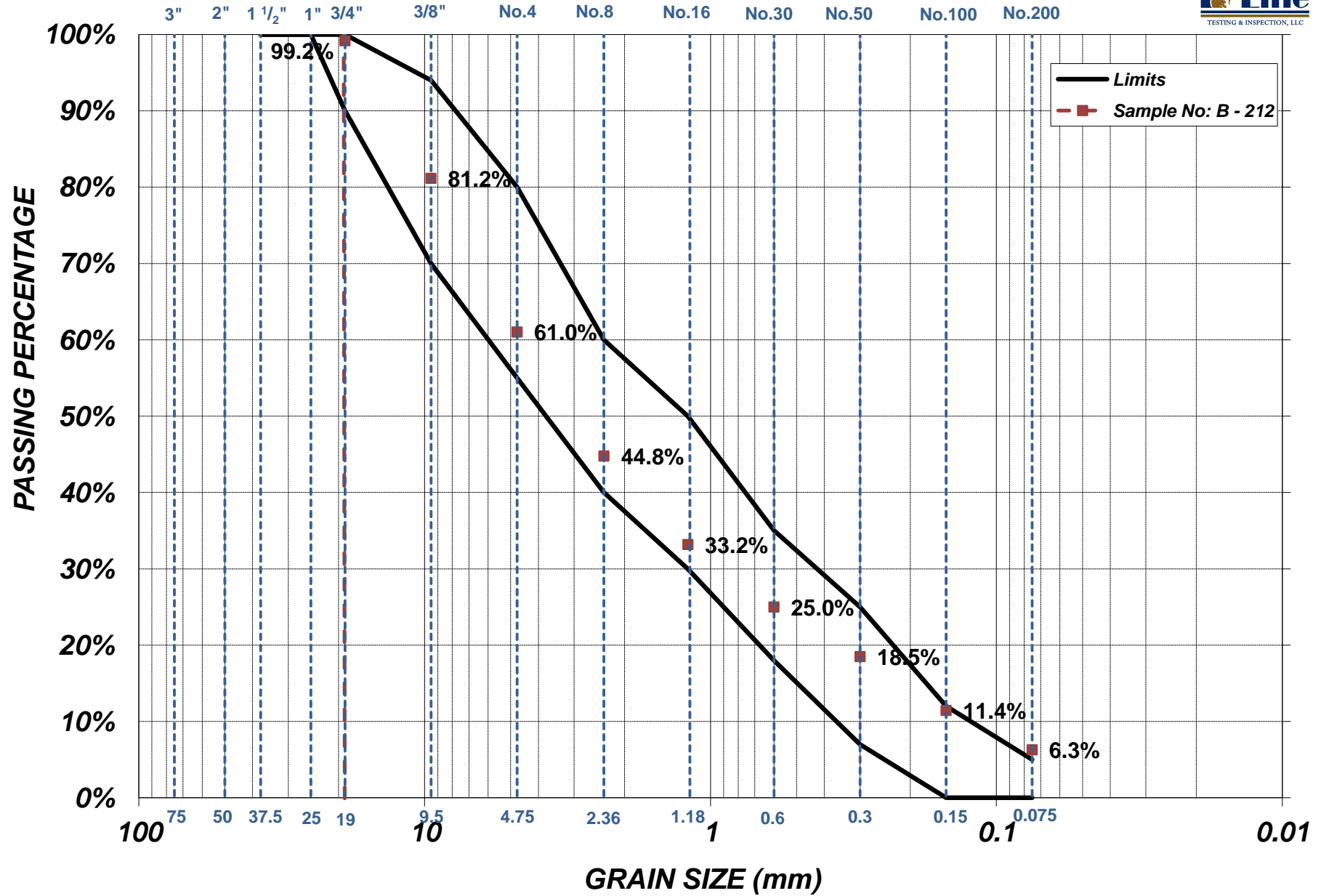
Gradation Analysis (ASTM C136)	
#200 Wash (ASTM C117, D1140)	
Relative Density (ASTM D4253, D4254)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8739	8751				
Mold Tare (g)	3637	3637				
Weight of Material (g)	5102	5114				
Volume of Material (cm ³)	2434	2417				
Maximum Relative Density (g/cm ³)	2.096	2.116				

Result Consistency



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project:

Pacific

Date:

16-Jul-12

Sample ID:

B-212

Sampled By:

JAG / EC

Technician

CG

Checked By:

PC

Method

 1A 1B 2A 2B

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

Test fill Borinquen Dam 8 pass

Soil
ClassificationMAT. 3a filtro
capa de

Scale No.

1130

Mold ID

1443

Table ID

1443

 Scale CheckDouble Amplitude of Vertical Vibration
(if different from that specified)

N/A

Trial	1	2	3	4	5	6
Soil + Mold (g)	8569	8739				
Mold Tare (g)	3637	3637				
Weight of Material (g)	4932	5102				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.761	1.822				

Result
Consistency

1.72%

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Jul-12	Time Sampled	4:00pm
Sample Number	B - 218	Material Type	3a Filter	Date Tested	14-Jul-12	Time Tested	10:00pm
Material Description	3a Filter			Sampled By	CG/EC/JAG		
Material Source	Test Fill Borinquen Dam 12 Passes			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Leveling Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Gradation Analysis (ASTM C136)	
#200 Wash (ASTM C117, D1140)	
Relative Density (ASTM D4253, D4254)	

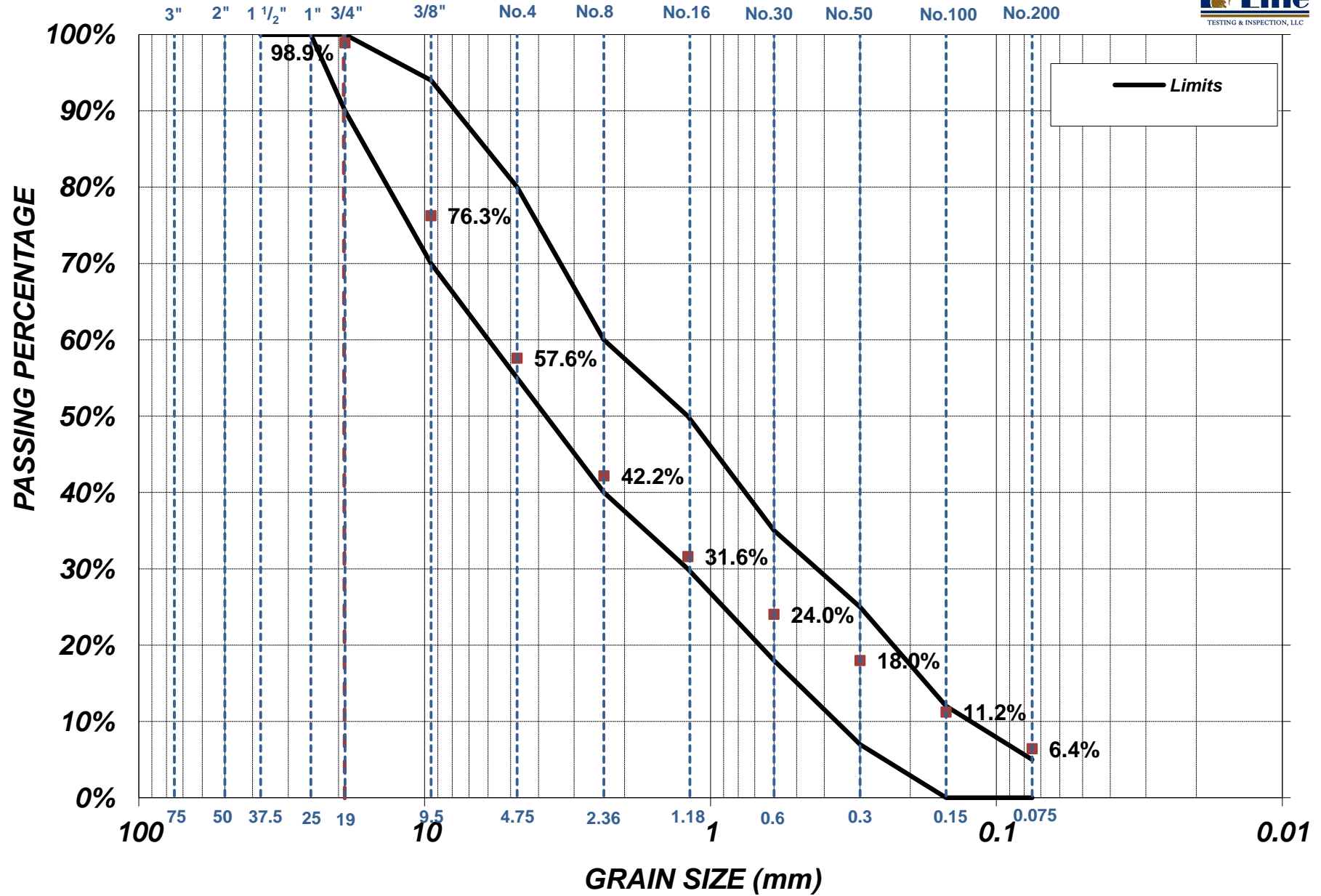
Report Issued By Robert J. Montalvo

Checked By RJMh

Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project:

Pacific

Date:

14-Jul-12

Sample ID:

B - 218

Sampled By:

CG/EC/JAG

Technician

CG

Checked By:

PC

Method

 A B C

Mold Size

0.1001 FT³
0.0028 m³

Origin of Material

Test Fill 3a Leveling Layer

Soil
Classification

N/R

Scale No.

1130

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8433	8450				
Mold Tare (g)	3638	3638				
Weight of Material (g)	4795	4812				
Volume of Material (cm ³)	2336	2325				
Maximum Relative Density (g/cm ³)	2.053	2.070				

Result
Consistency

0.41%



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project:

Pacific

Date:

14-Jul-12

Sample ID:

B - 218

Sampled By:

CG/EC/JAG

Technician

CG

Checked By:

PC

Method

1A

1B

2A

2B

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

Test Fill 3a Leveling Layer

Soil
Classification

N/R

Scale No.

1130

Mold ID

1443

Table ID

1443

 Scale CheckDouble Amplitude of Vertical Vibration
(if different from that specified)

N/A

Trial	1	2	3	4	5	6
Soil + Mold (g)	8433	8450				
Mold Tare (g)	3638	3638				
Weight of Material (g)	4795	4812				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.713	1.719				

Result
Consistency

0.18%

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	16-Jul-12	Time Sampled	5:40pm
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Sample Number	B - 222	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
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Material Description	3a Filter	Sampled By	EC/JAG
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Material Source	Test Fill Borinquen Dam 2 Passes	Remarks & Weather Conditions (SAMPLING)
Sample Location	First Layer	

Pick One from Each Column

<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm
<input type="checkbox"/> Rain	<input type="checkbox"/> Hot	

Special Instructions	N/A	Special Instructions are Acknowledged and Understood by Tech	Initial	N/A
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Issued By	N/A	Date Issued	N/A
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Are there any visual abnormalities in the sample?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	If yes who received the client instructions regarding handing the sample?	Initial	N/A
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Client instructions regarding abnormal sample	N/A
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Tests to be performed:

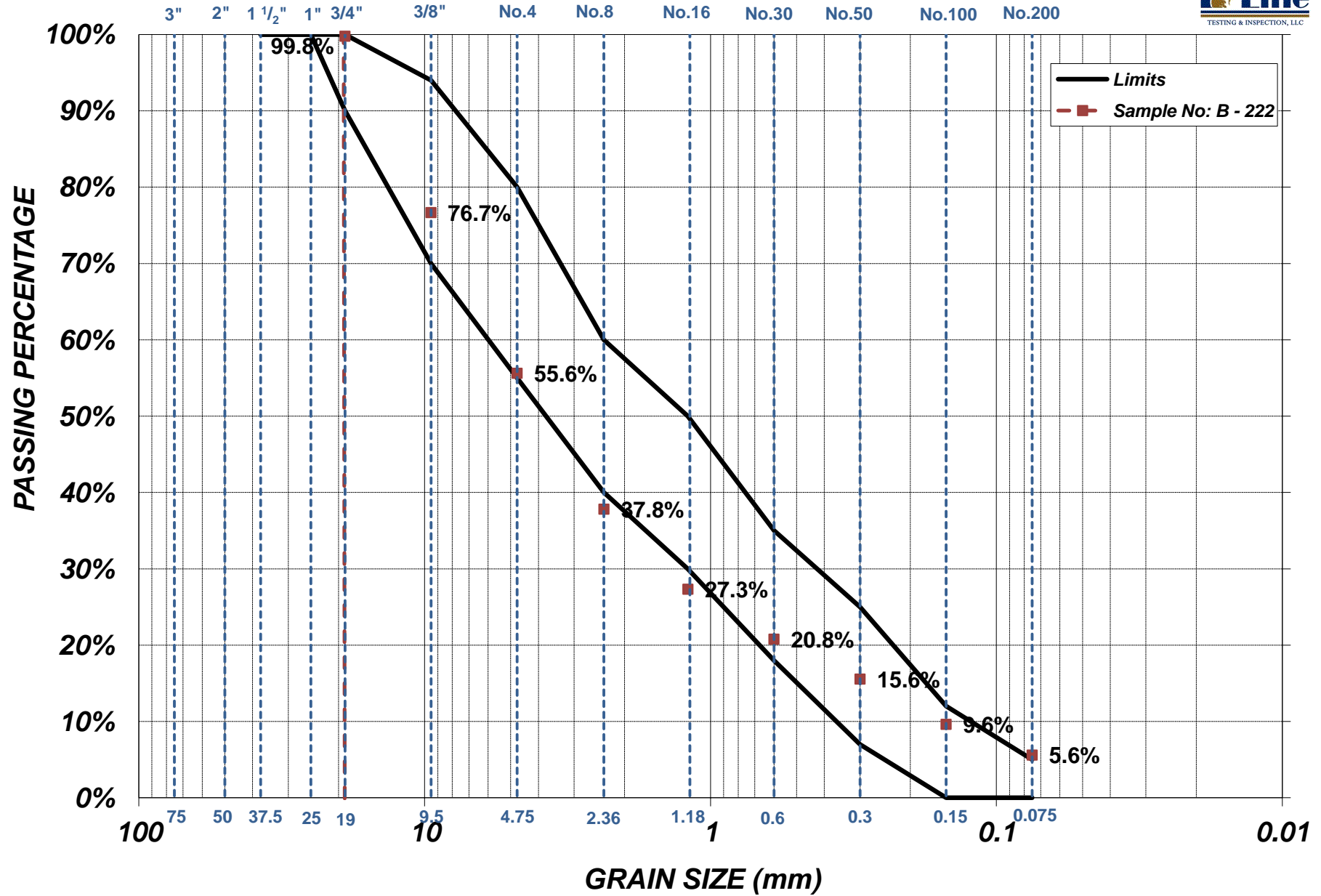
Gradation Analysis (ASTM C136)	
#200 Wash (ASTM C117, D1140)	
Relative Density (ASTM D4253, D4254)	

Report Issued By	Robert J. Montalvo
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Checked By	RJMh	Report Issue Date	19-Jul-2012
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Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8469	8436				
Mold Tare (g)	3638	3638				
Weight of Material (g)	4831	4798				
Volume of Material (cm ³)	2301	2325				
Maximum Relative Density (g/cm ³)	2.100	2.064				

Result Consistency



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No. Mold ID Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8469	8436				
Mold Tare (g)	3638	3638				
Weight of Material (g)	4831	4798				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.725	1.714				

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Jul-12	Time Sampled	2:00pm
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Sample Number	B - 228	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
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Material Description	3a Filter	Sampled By	CG/EC
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Material Source	Test Fill Borinquen Dam 4 Passes	Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	First Layer		<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A		<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm

<input type="checkbox"/> Rain	<input type="checkbox"/> Hot
-------------------------------	------------------------------

Special Instructions	N/A	Special Instructions are Acknowledged and Understood by Tech	Initial
			N/A

Issued By	N/A	Date Issued	N/A
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Are there any visual abnormalities in the sample?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	If yes who received the client instructions regarding handing the sample?	Initial
				N/A

Client instructions regarding abnormal sample	N/A
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Tests to be performed:

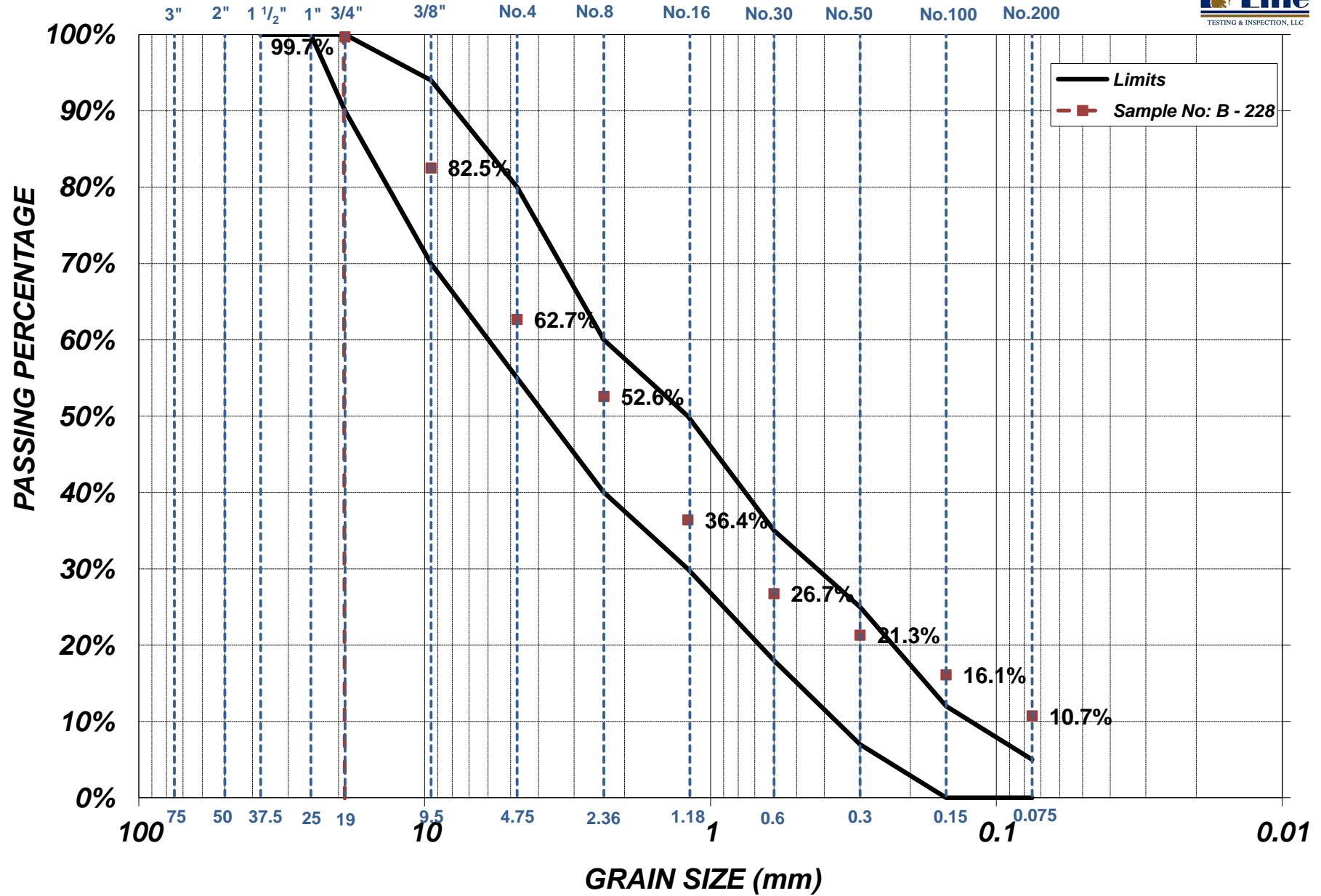
Gradation Analysis (ASTM C136)	
#200 Wash (ASTM C117, D1140)	
Relative Density (ASTM D4253, D4254)	

Report Issued By	Robert J. Montalvo
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Checked By	RJMh	Report Issue Date	19-Jul-2012
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Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project:

Pacific

Date:

17-Jul-12

Sample ID:

B-228

Sampled By:

CG/EC

Technician

N/C

Checked By:

TC

Method

 A B C

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

Test Fill 3a First Layer
4 PassesSoil
Classification

N/R

Scale No.

1130

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8737	8807				
Mold Tare (g)	3638	3638				
Weight of Material (g)	5099	5169				
Volume of Material (cm ³)	2433	2448				
Maximum Relative Density (g/cm ³)	2.096	2.112				

Result
Consistency

0.37%



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project:

Pacific

Date:

17-Jul-12

Sample ID:

B-228

Sampled By:

CG/EC

Technician

N/C

Checked By:

TC

Method

1A

1B

2A

2B

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

Test Fill 3a First Layer
4 PassesSoil
Classification

N/R

Scale No.

1130

Mold ID

1443

Table ID

1443

 Scale CheckDouble Amplitude of Vertical Vibration
(if different from that specified)

N/A

Trial	1	2	3	4	5	6
Soil + Mold (g)	8737	8807				
Mold Tare (g)	3638	3638				
Weight of Material (g)	5099	5169				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.821	1.846				

Result
Consistency

0.69%

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Jul-12	Time Sampled	2:50pm
Sample Number	B - 229	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG/EC		
Material Source	Test Fill Borinquen Dam 6 Passes			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	First Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Gradation Analysis (ASTM C136)	
#200 Wash (ASTM C117, D1140)	
Relative Density (ASTM D4253, D4254)	

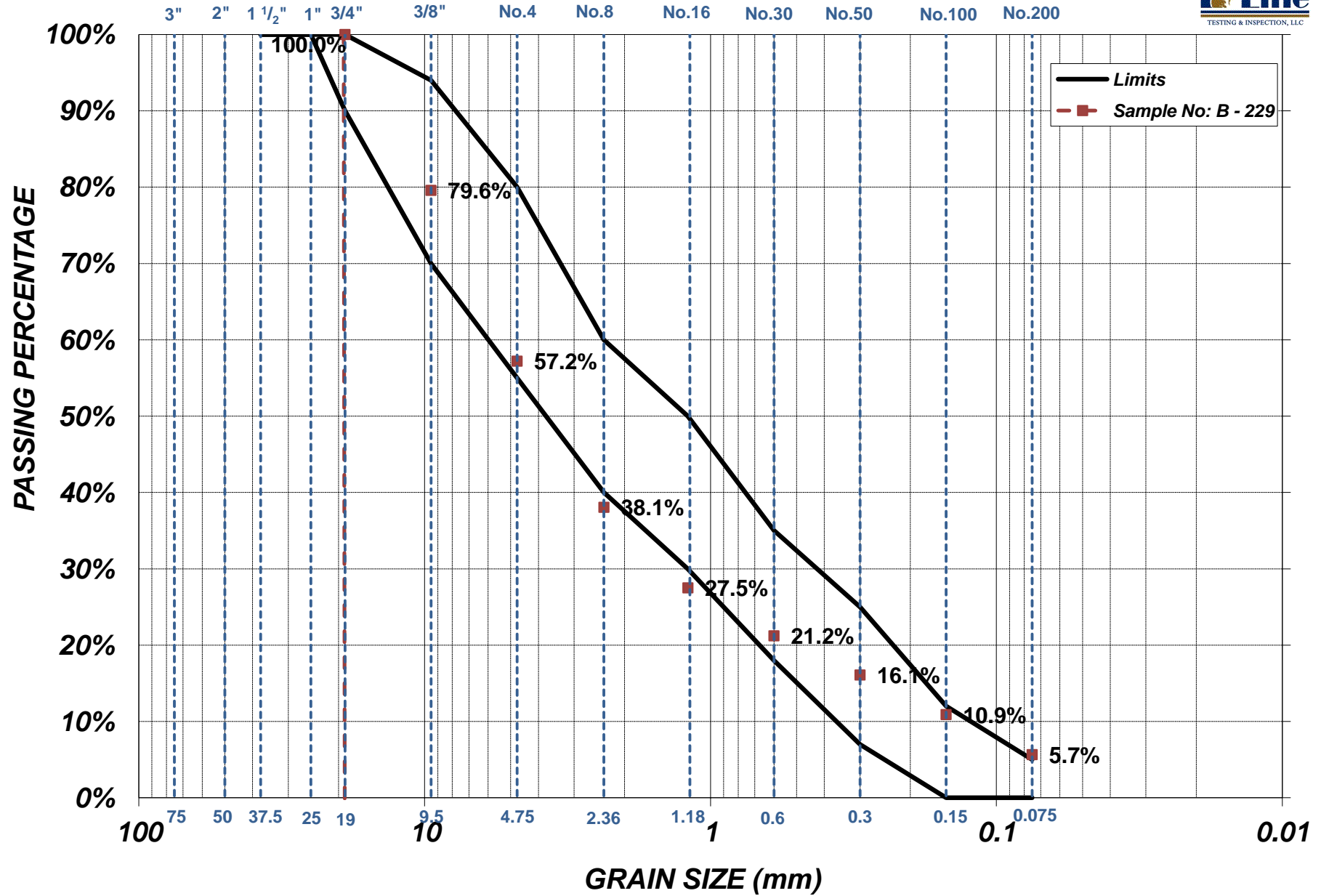
Report Issued By Robert J. Montalvo

Checked By RJMh

Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8485	8633				
Mold Tare (g)	3637	3637				
Weight of Material (g)	4848	4996				
Volume of Material (cm ³)	2387	2382				
Maximum Relative Density (g/cm ³)	2.031	2.097				

Result Consistency



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8485	8633				
Mold Tare (g)	3637	3637				
Weight of Material (g)	4848	4996				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.731	1.784				

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Jul-12	Time Sampled	3:40pm
Sample Number	B - 236	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG/EC		
Material Source	Test Fill Borinquen Dam 8 Passes			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	First Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

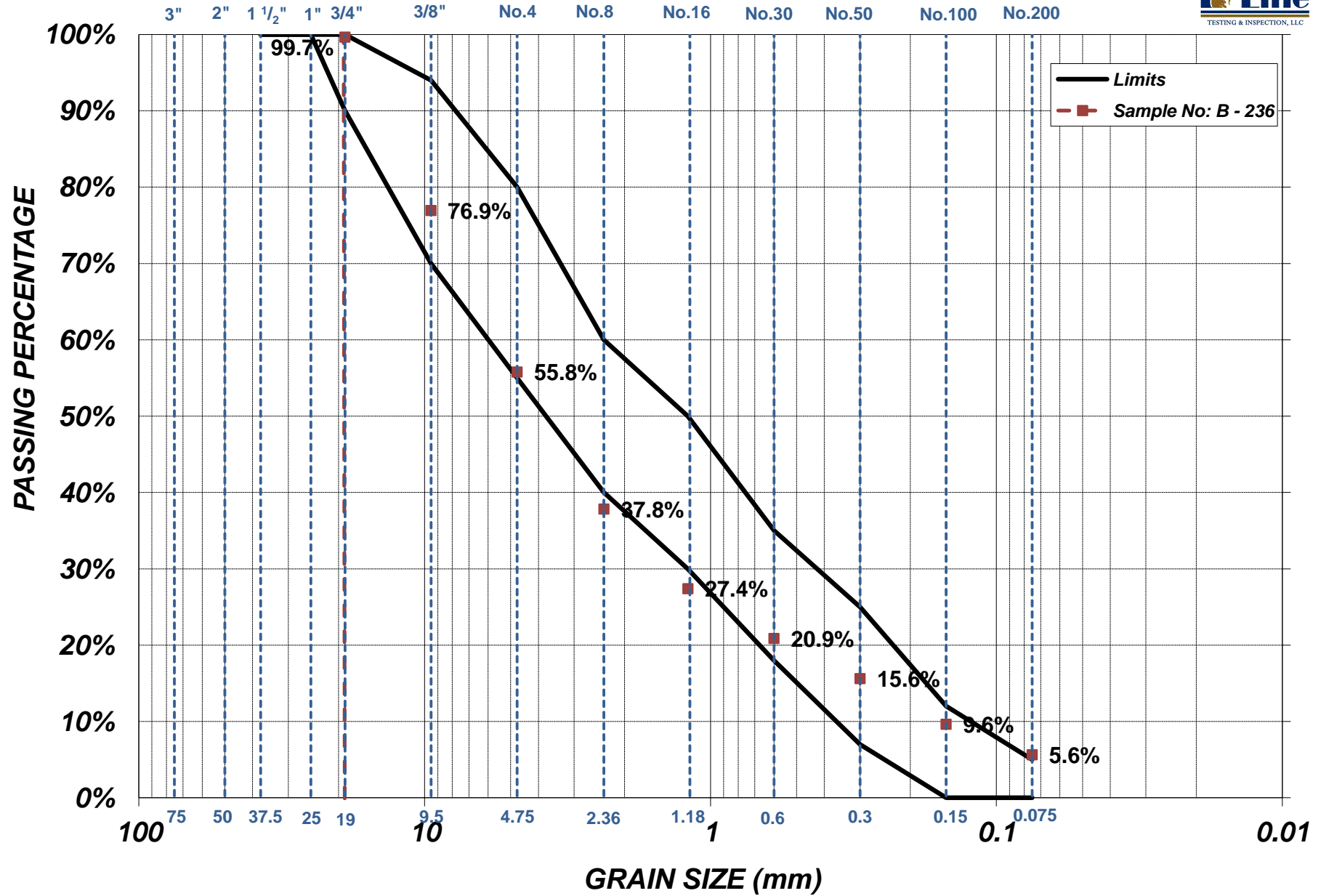
Gradation Analysis (ASTM C136)	
#200 Wash (ASTM C117, D1140)	
Relative Density (ASTM D4253, D4254)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8523	8629				
Mold Tare (g)	3636	3636				
Weight of Material (g)	4887	4993				
Volume of Material (cm ³)	2388	2385				
Maximum Relative Density (g/cm ³)	2.046	2.094				

Result Consistency



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project:

Pacific

Date:

18/7/12

Sample ID:

B-236

Sampled By:

JAG / EC

Technician

ER

Checked By:

TC

Method

 1A 1B 2A 2B

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

Test fill Borinquen Dam

Soil
Classification

N/R

Scale No.

1130

Mold ID

1443

Table ID

1443

 Scale CheckDouble Amplitude of Vertical Vibration
(if different from that specified)

N/A

Trial	1	2	3	4	5	6
Soil + Mold (g)	8523	8629				
Mold Tare (g)	3636	3636				
Weight of Material (g)	4887	4993				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.745	1.783				

Result
Consistency

1.08%

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	19-Jul-12	Time Sampled	4:30pm
Sample Number	B - 244	Material Type	3a Filter	Date Tested	19-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC/RNM		
Material Source	Test Fill Borinquen Dam Passes 4			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Second Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

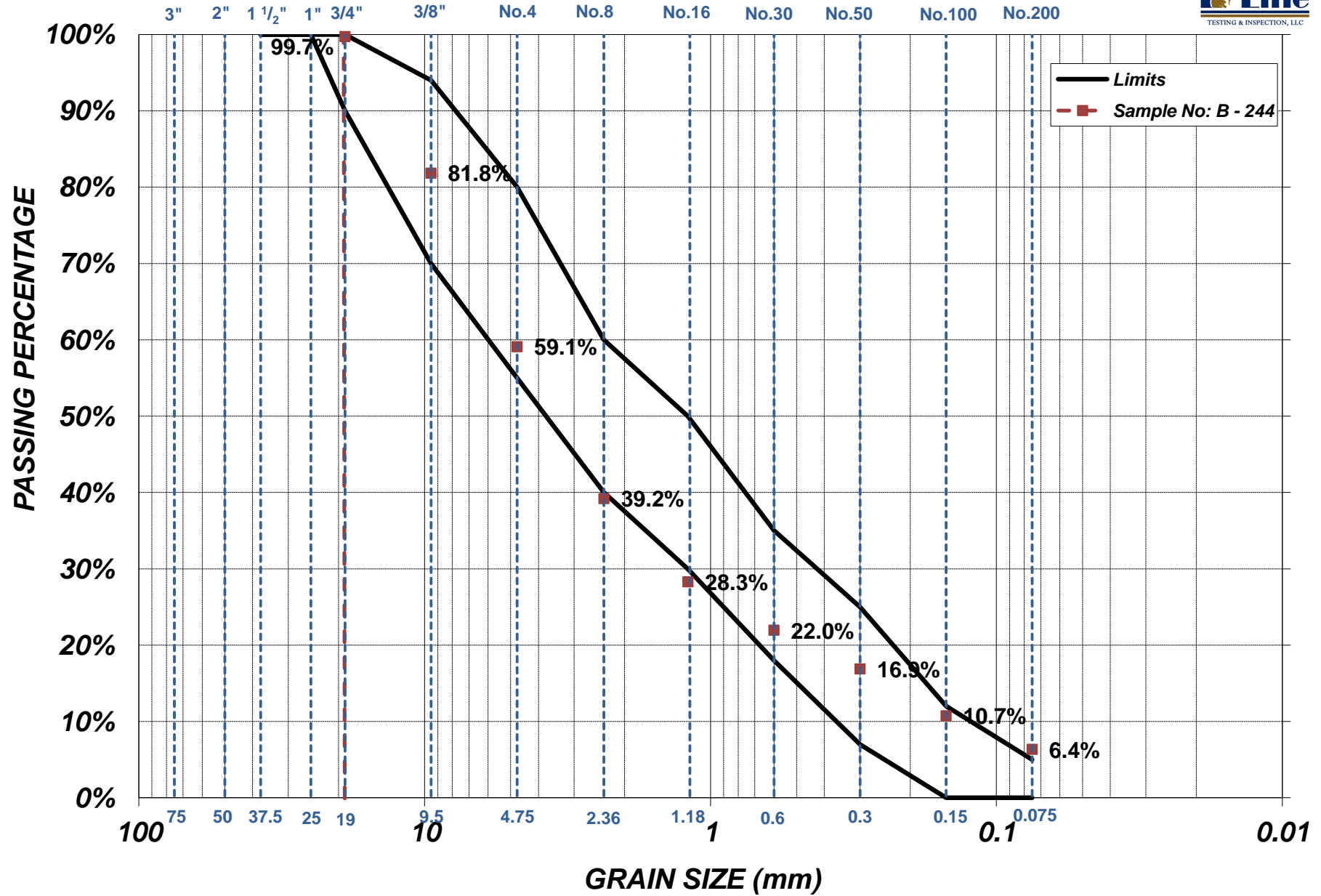
Gradation Analysis (ASTM C136)	
#200 Wash (ASTM C117, D1140)	
Relative Density (ASTM D4253, D4254)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8510	8560				
Mold Tare (g)	3635	3635				
Weight of Material (g)	4875	4925				
Volume of Material (cm ³)	2384	2371				
Maximum Relative Density (g/cm ³)	2.045	2.077				

Result Consistency



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8510	8560				
Mold Tare (g)	3635	3635				
Weight of Material (g)	4875	4925				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.741	1.759				

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name Project Number Date Sampled Time Sampled

Sample Number Material Type Date Tested Time Tested

Material Description Sampled By

Material Source Remarks & Weather Conditions (SAMPLING) Clear Cool Windy
 Overcast Warm Calm
 Rain Hot

Sample Location

Special Instructions Special Instructions are Acknowledged and Understood by Tech Initial

Issued By Date Issued

Are there any visual abnormalities in the sample? Yes No If yes who received the client instructions regarding handing the sample? Initial

Client instructions regarding abnormal sample

Tests to be performed:

<input type="text" value="Gradation Analysis (ASTM C136)"/>	<input type="text"/>
<input type="text" value="#200 Wash (ASTM C117, D1140)"/>	<input type="text"/>
<input type="text" value="Relative Density (ASTM D4253, D4254)"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

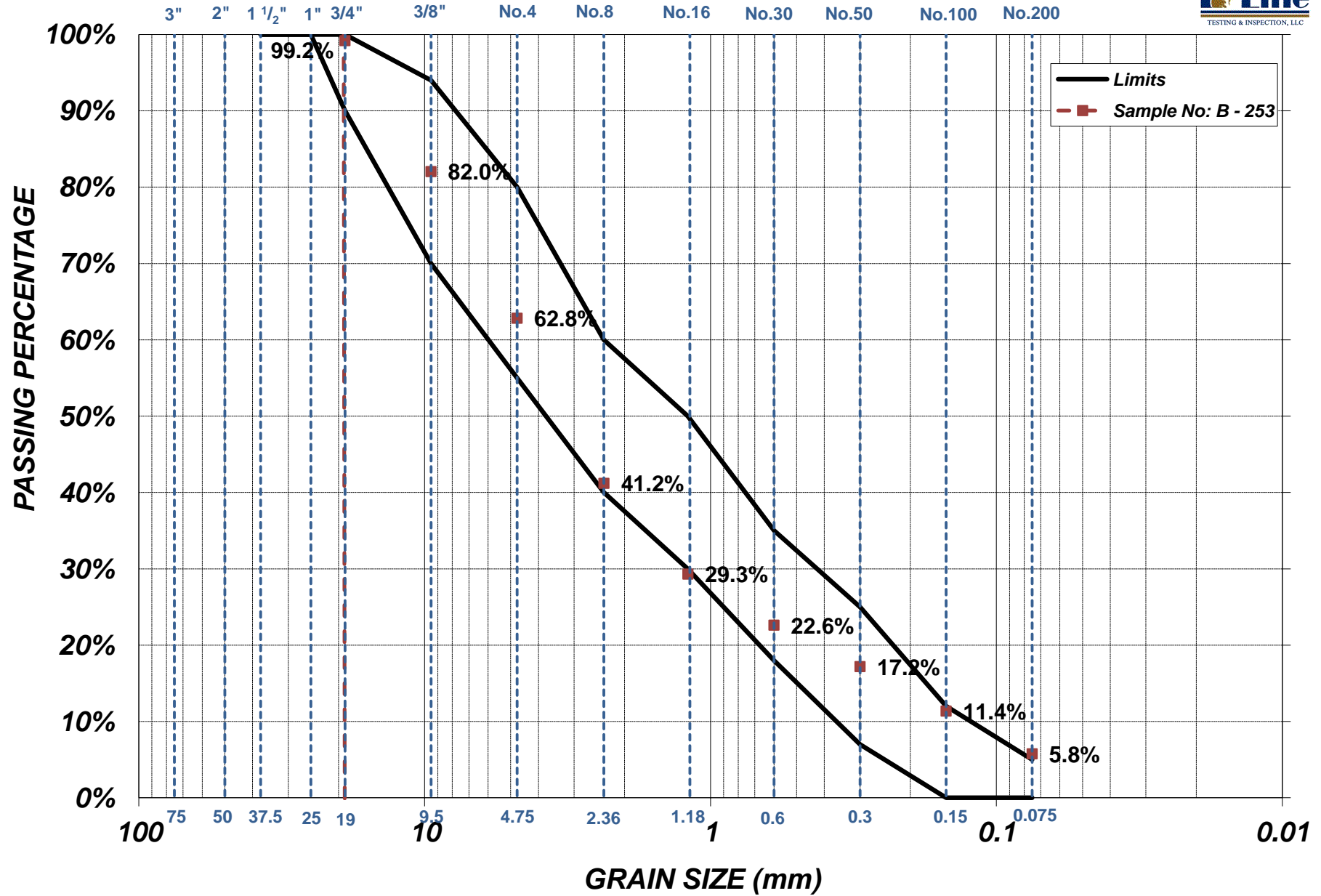
Report Issued By

Checked By

Report Issue Date

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No. Table ID Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8639	8692				
Mold Tare (g)	3635	3636				
Weight of Material (g)	5004	5056				
Volume of Material (cm ³)	2408	2422				
Maximum Relative Density (g/cm ³)	2.078	2.088				

Result Consistency



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8639	8692				
Mold Tare (g)	3635	3636				
Weight of Material (g)	5004	5056				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.787	1.806				

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	19-Jul-12	Time Sampled	N/R
Sample Number	B - 254	Material Type	3a Filter	Date Tested	19-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC		
Material Source	Test Fill Borinquen Dam 2 Passes			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Second Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

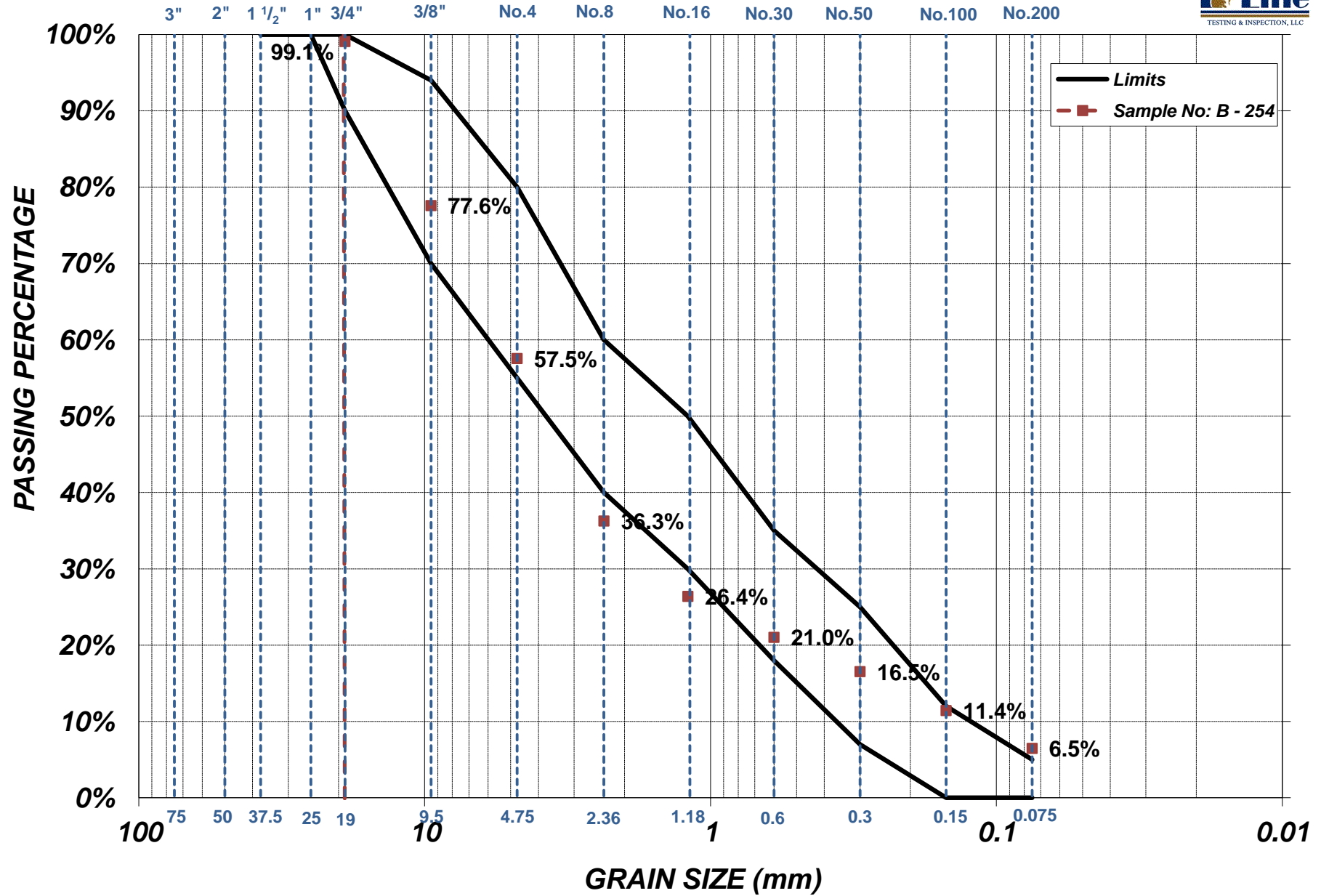
Tests to be performed:

Gradation Analysis (ASTM C136)	
#200 Wash (ASTM C117, D1140)	
Relative Density (ASTM D4253, D4254)	

Report Issued By	Robert J. Montalvo
Checked By	RJMh
Report Issue Date	19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No. Table ID Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8550	8481	8456			
Mold Tare (g)	3635	3635	3635			
Weight of Material (g)	4915	4846	4821			
Volume of Material (cm ³)	2370	2341	2345.0			
Maximum Relative Density (g/cm ³)	2.074	2.070	2.056			

Result Consistency



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8550	8481	8456			
Mold Tare (g)	3635	3635	3635			
Weight of Material (g)	4915	4846	4821			
Volume of Material (cm ³)	2800	2800	2800.0			
Minimum Index Density (g/cm ³)	1.755	1.731	1.722			

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	31-Jul-12	Time Sampled	3:40 PM
Sample Number	B271	Material Type	3a Earthfill Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Earthfill Filter			Sampled By	CG JAG		
Material Source	Test Fill Borinquem Dam Lift 3			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift 3 / 1 pass				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Moisture Content (ASTM C566, D2216)	
#200 Wash (ASTM C117, D1140)	
Relative Density of Soils, Dry Method (ASTM D4254)	

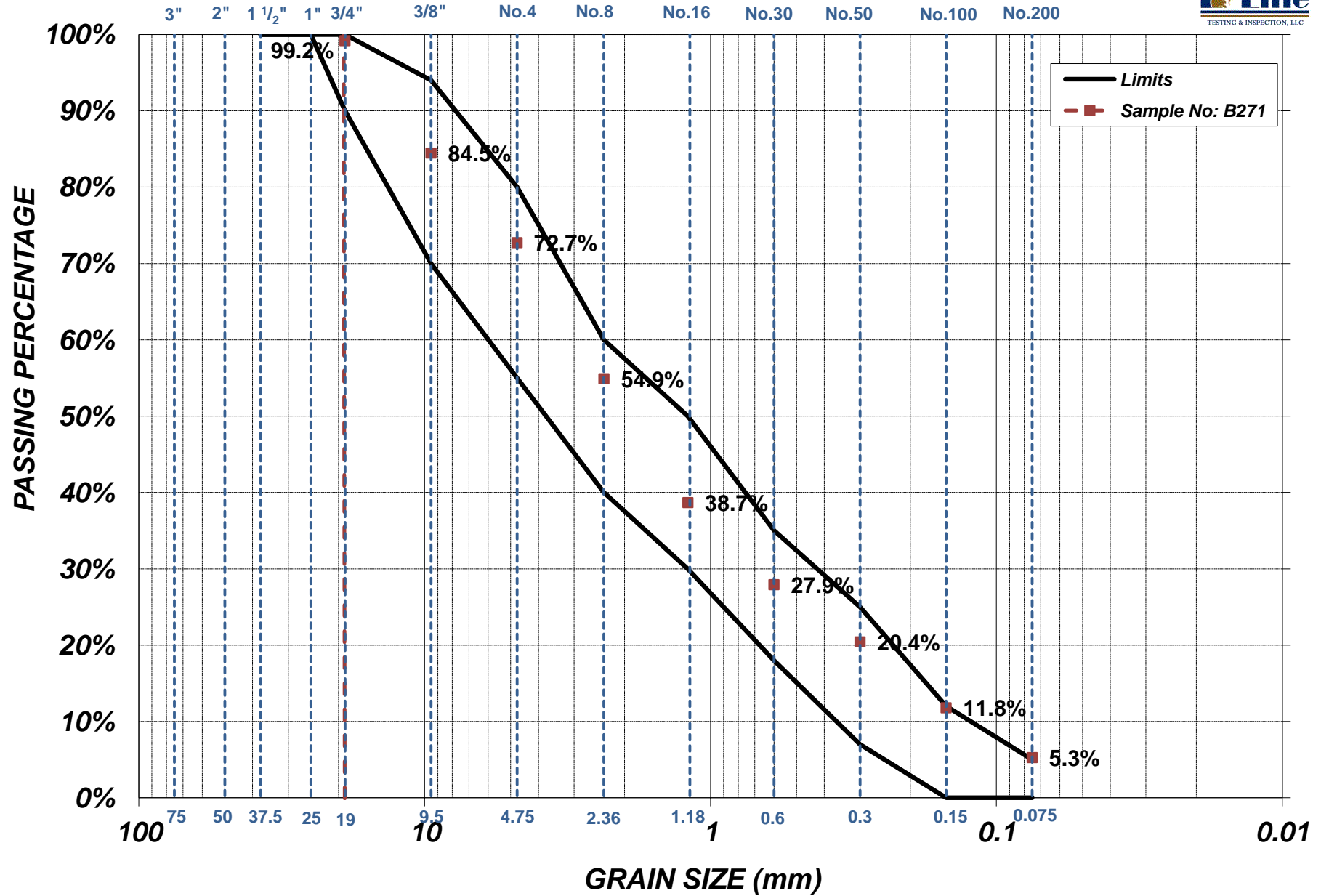
Report Issued By _____

Checked By _____

Report Issue Date 1-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Relative Density (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method A B C Mold Size

Origin of Material Soil Classification

Scale No. Table ID Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8651	8681				
Mold Tare (g)	3635	3635				
Weight of Material (g)	5016	5046				
Volume of Material (cm ³)	2466	2419				
Maximum Relative Density (g/cm ³)	2.034	2.086				

Result Consistency

Max	2.08598594	0.02596134	Differential
Min	2.03406326	0.02596134	Differential
Avg	2.0600246		
Consistency	1.26%	2.52%	



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method 1a 1b 2a 2b

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Chec

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8651	8681				
Mold Tare (g)	3635	3635				
Weight of Material (g)	5016	5046				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.791	1.802				

Result Consistency

Max	1.80214286	0.00535714	Differential
Min	1.79142857	0.00535714	Differential
Avg	1.79678571		
Consistency	0.30%	0.60%	

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	01-Aug-12	Time Sampled	8:30 AM
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Sample Number	B272	Material Type	3a Earthfill Filter	Date Tested	N/A	Time Tested	N/A
---------------	------	---------------	---------------------	-------------	-----	-------------	-----

Material Description	3a Earthfill Filter	Sampled By	CG JAG
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Material Source	Test Fill Borinquem Dam Lift 3	Remarks & Weather Conditions (SAMPLING)	<p style="text-align: center; font-size: small;">Pick One from Each Column</p> <input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm
Sample Location	Lift 3 / 2 pass		

Special Instructions	N/A	Special Instructions are Acknowledged and Understood by Tech	Initial	N/A
----------------------	-----	--	---------	-----

Issued By	N/A	Date Issued	N/A
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Are there any visual abnormalities in the sample?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	If yes who received the client instructions regarding handing the sample?	Initial	N/A
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Client instructions regarding abnormal sample	N/A
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Tests to be performed:

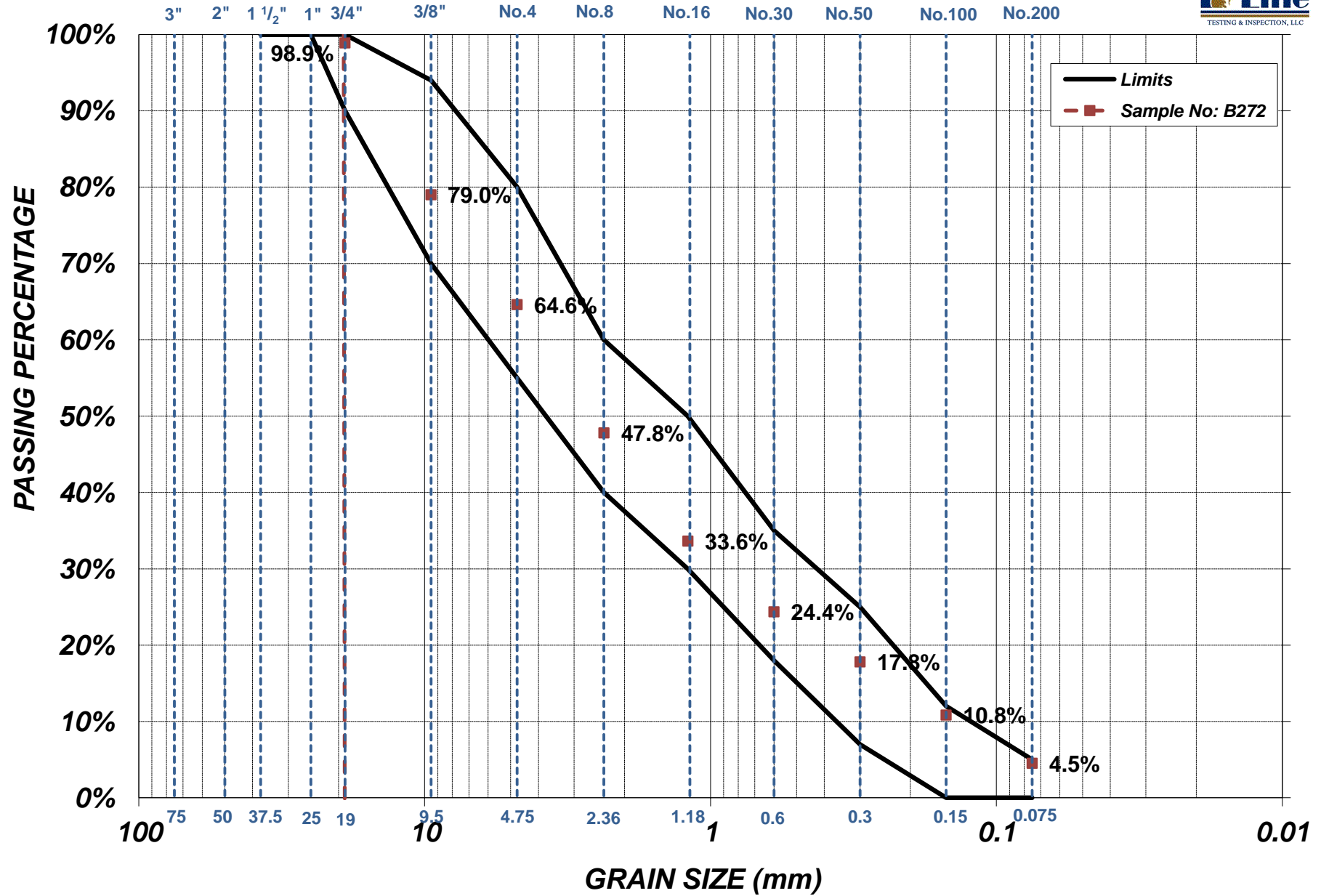
Gradation Analysis (ASTM C136)	
#200 Wash (ASTM C117, D1140)	

Report Issued By	
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Checked By		Report Issue Date	2-Aug-2012
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Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8820	8809				
Mold Tare (g)	3635	3635				
Weight of Material (g)	5185	5174				
Volume of Material (cm ³)	2487	2485				
Maximum Relative Density (g/cm ³)	2.085	2.082				

Result Consistency

Max	2.08484117	0.00137431	Differential
Min	2.08209256	0.00137431	Differential
Avg	2.08346686		
Consistency	0.07%	0.13%	



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method: 1A 1B 2A 2B 2C 2D 2E 2F 2G 2H 2I 2J 2K 2L 2M 2N 2O 2P 2Q 2R 2S 2T 2U 2V 2W 2X 2Y 2Z 3A 3B 3C 3D 3E 3F 3G 3H 3I 3J 3K 3L 3M 3N 3O 3P 3Q 3R 3S 3T 3U 3V 3W 3X 3Y 3Z 4A 4B 4C 4D 4E 4F 4G 4H 4I 4J 4K 4L 4M 4N 4O 4P 4Q 4R 4S 4T 4U 4V 4W 4X 4Y 4Z 5A 5B 5C 5D 5E 5F 5G 5H 5I 5J 5K 5L 5M 5N 5O 5P 5Q 5R 5S 5T 5U 5V 5W 5X 5Y 5Z 6A 6B 6C 6D 6E 6F 6G 6H 6I 6J 6K 6L 6M 6N 6O 6P 6Q 6R 6S 6T 6U 6V 6W 6X 6Y 6Z 7A 7B 7C 7D 7E 7F 7G 7H 7I 7J 7K 7L 7M 7N 7O 7P 7Q 7R 7S 7T 7U 7V 7W 7X 7Y 7Z 8A 8B 8C 8D 8E 8F 8G 8H 8I 8J 8K 8L 8M 8N 8O 8P 8Q 8R 8S 8T 8U 8V 8W 8X 8Y 8Z 9A 9B 9C 9D 9E 9F 9G 9H 9I 9J 9K 9L 9M 9N 9O 9P 9Q 9R 9S 9T 9U 9V 9W 9X 9Y 9Z 10A 10B 10C 10D 10E 10F 10G 10H 10I 10J 10K 10L 10M 10N 10O 10P 10Q 10R 10S 10T 10U 10V 10W 10X 10Y 10Z

Mold Size: "/>

Origin of Material:

Soil Classification:

Scale No.: Mold ID: Table ID:

Scale Chec

Double Amplitude of Vertical Vibration (if different from that specified):

Trial	1	2	3	4	5	6
Soil + Mold (g)	8820	8809				
Mold Tare (g)	3635	3635				
Weight of Material (g)	5185	5174				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.852	1.848				

Result Consistency:

Max	1.85178571	0.00196429	Differential
Min	1.84785714	0.00196429	Differential
Avg	1.84982143		
Consistency	0.11%	0.21%	

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	01-Aug-12	Time Sampled	10:00 AM
Sample Number	B276	Material Type	3a Earthfill Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Earthfill Filter			Sampled By	CG JAG		
Material Source	Test Fill Borinquem Dam Lift 3			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift 3 / 3 pass/ outside of the dials				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Moisture Content (ASTM C566, D2216)	
#200 Wash (ASTM C117, D1140)	
Gradation Analysis (ASTM C136)	

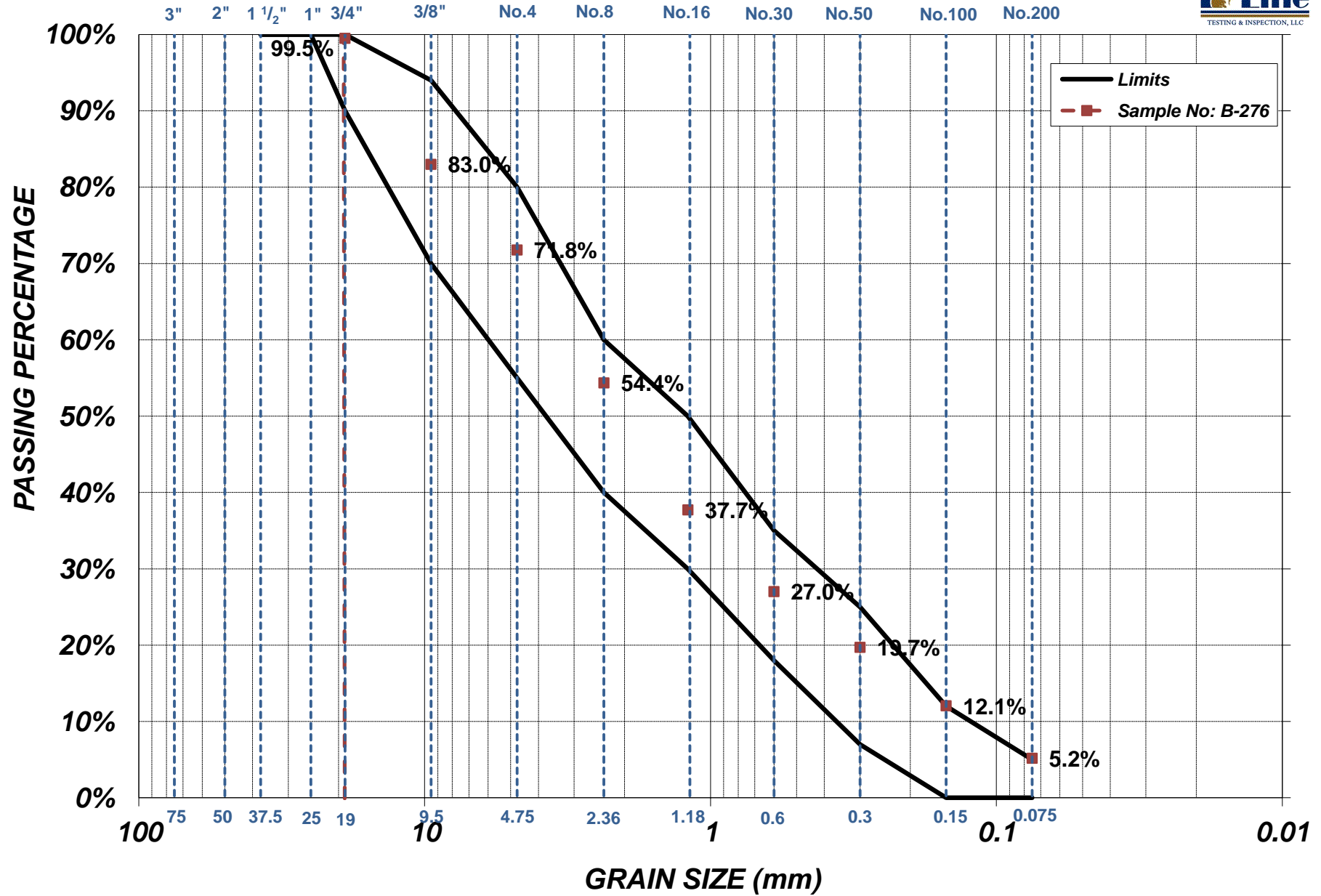
Report Issued By Robert J Montalvo

Checked By TC

Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No. Table ID Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8834	8903				
Mold Tare (g)	3635	3635				
Weight of Material (g)	5199	5268				
Volume of Material (cm ³)	2482	2483				
Maximum Relative Density (g/cm ³)	2.095	2.122				

Result Consistency

Max	2.12162706	0.01347268	Differential
Min	2.09468171	0.01347268	Differential
Avg	2.10815439		
Consistency	0.64%	1.28%	



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Pacific

Date: 01-Aug-12

Sample ID: B-276

Sampled By: CG-JAG

Technician: JAG

Checked By: TC

Method 1a 1b 2a 2b

Mold Size 0.1001 FT³
0.0028 m³

Origin of Material: Test fill Borinquen Dam

Soil Classification: MAT. 3a filtro
capa #3

01-Aug-12

Scale No. 1130

Mold ID 1443

Table ID 1443

Scale Chec

Double Amplitude of Vertical Vibration
(if different from that specified) N/A

Trial 1 2 3 4 5 6

Soil + Mold (g)	8834	8903				
Mold Tare (g)	3635	3635				
Weight of Material (g)	5199	5268				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.857	1.881				

Result Consistency 0.66%

Max	1.88142857	0.01232143	Differential
Min	1.85678571	0.01232143	Differential
Avg	1.86910714		
Consistency	0.66%	1.32%	

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	31-Jul-12	Time Sampled	3:40 PM
Sample Number	B271	Material Type	3a Earthfill Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Earthfill Filter			Sampled By	CG JAG		
Material Source	Test Fill Borinquem Dam Lift 3			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift 3 / 1 pass				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Moisture Content (ASTM C566, D2216)	
#200 Wash (ASTM C117, D1140)	
Relative Density of Soils, Dry Method (ASTM D4254)	

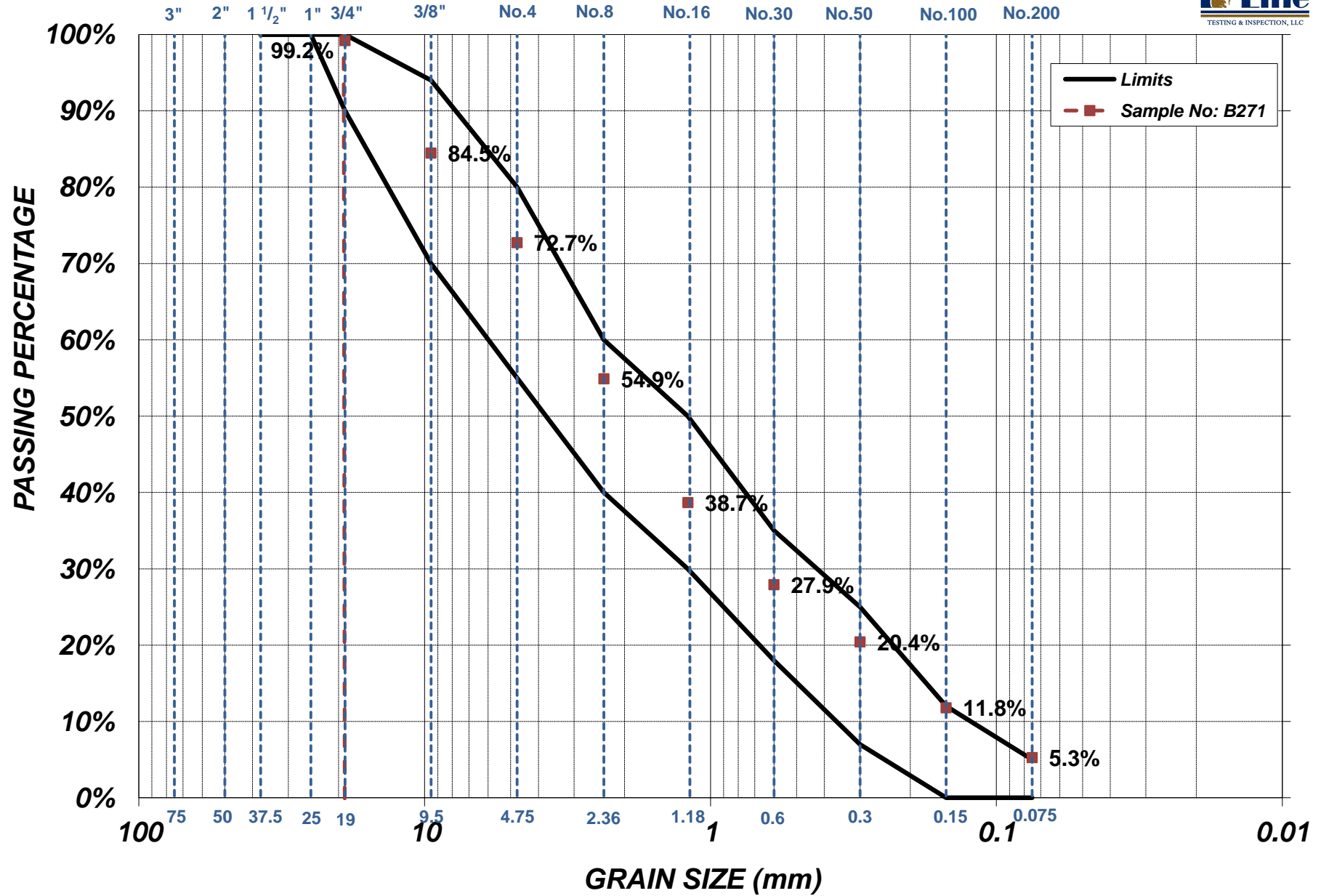
Report Issued By _____

Checked By _____

Report Issue Date 1-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Relative Density (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No. Table ID Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8651	8681				
Mold Tare (g)	3635	3635				
Weight of Material (g)	5016	5046				
Volume of Material (cm ³)	2466	2419				
Maximum Relative Density (g/cm ³)	2.034	2.086				

Result Consistency

Max	2.08598594	0.02596134	Differential
Min	2.03406326	0.02596134	Differential
Avg	2.0600246		
Consistency	1.26%	2.52%	



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method 1a 1b 2a 2b

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Chec

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8651	8681				
Mold Tare (g)	3635	3635				
Weight of Material (g)	5016	5046				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.791	1.802				

Result Consistency

Max	1.80214286	0.00535714	Differential
Min	1.79142857	0.00535714	Differential
Avg	1.79678571		
Consistency	0.30%	0.60%	

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name Project Number Date Sampled Time Sampled

Sample Number Material Type Date Tested Time Tested

Material Description Sampled By

Material Source Remarks & Weather Conditions (SAMPLING) Clear Cool Windy
 Overcast Warm Calm
 Rain Hot

Sample Location

Special Instructions Special Instructions are Acknowledged and Understood by Tech Initial

Issued By Date Issued

Are there any visual abnormalities in the sample? Yes No If yes who received the client instructions regarding handing the sample? Initial

Client instructions regarding abnormal sample

Tests to be performed:

<input type="text" value="Gradation Analysis (ASTM C136)"/>	<input type="text"/>
<input type="text" value="#200 Wash (ASTM C117, D1140)"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

Report Issued By

Checked By Report Issue Date

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method



The Panama Canal Third Set of Locks Project Gradation Analysis (ASTM C136, C117)

Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B272	Technician:	AU/JAG
Material Type:	3a Filter	Date Sampled:	01-Aug-12

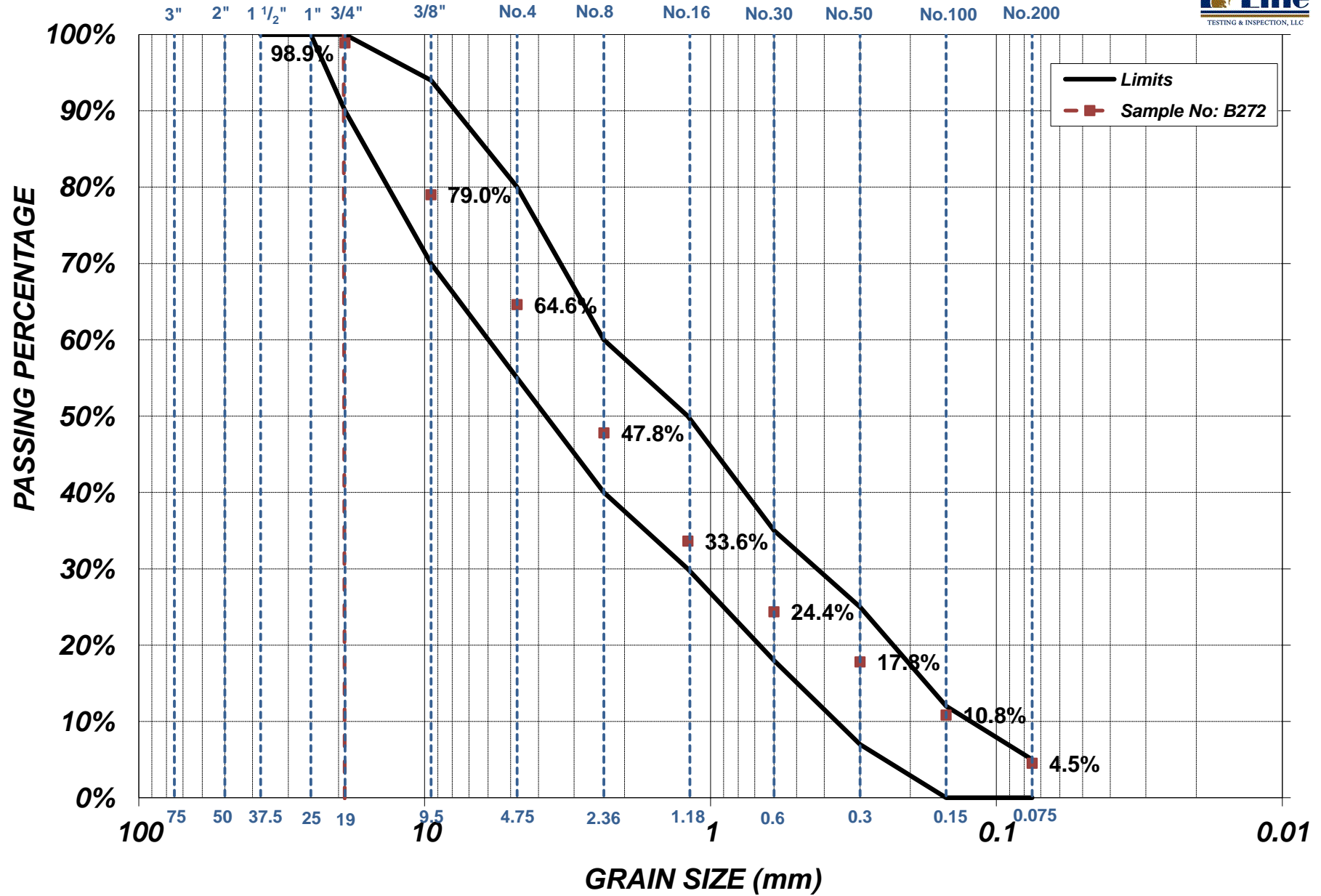
		<input type="checkbox"/> Scale Check	<input type="checkbox"/> Scale Check	
Before Wash	Wet Weight (g)	5792.8	Coarse Scale ID:	N/A
	Moisture (%)	6.3%	Fine Scale ID:	1453
	Total Dry Weight (g)	5448.7	Oven ID:	1124
After Wash Dry Weight (g)		5231.2	Wash Sieve ID:	1780
Wash Loss (%)		4.0%		

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
1	0			100.0		1232
3/4	59.9	59.90	1.1%	98.9%	90 to 100	9144
3/8	1084	1143.90	21.0%	79.0%	70 to 94	1225
4	784.3	1928.20	35.4%	64.6%	55 to 80	9187
8	915.7	2843.90	52.2%	47.8%	40 to 60	9173
16	772.3	3616.20	66.4%	33.6%	30 to 50	9159
30	504.6	4120.80	75.6%	24.4%	18 to 35	9156
50	357.8	4478.60	82.2%	17.8%	7 to 25	1925
100	379.4	4858.00	89.2%	10.8%	0 to 12	1236
200	343.9	5201.90	95.5%	4.5%	0 to 5	1914
Pan	29.3	5231.20				9143

Checked By: TC

Fineness Modulus	4.01
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Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8820	8809				
Mold Tare (g)	3635	3635				
Weight of Material (g)	5185	5174				
Volume of Material (cm ³)	2487	2485				
Maximum Relative Density (g/cm ³)	2.085	2.082				

Result Consistency

Max	2.08484117	0.00137431	Differential
Min	2.08209256	0.00137431	Differential
Avg	2.08346686		
Consistency	0.07%	0.13%	



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method: 1A 1B 2A 2B

Mold Size:

Origin of Material:

Soil Classification:

Scale No. Mold ID Table ID

Scale Chec

Double Amplitude of Veritical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8820	8809				
Mold Tare (g)	3635	3635				
Weight of Material (g)	5185	5174				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.852	1.848				

Result Consistency

Max	1.85178571	0.00196429	Differential
Min	1.84785714	0.00196429	Differential
Avg	1.84982143		
Consistency	0.11%	0.21%	

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	01-Aug-12	Time Sampled	10:00 AM
Sample Number	B276	Material Type	3a Earthfill Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Earthfill Filter			Sampled By	CG JAG		
Material Source	Test Fill Borinquem Dam Lift 3			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift 3 / 3 pass/ outside of the dials				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

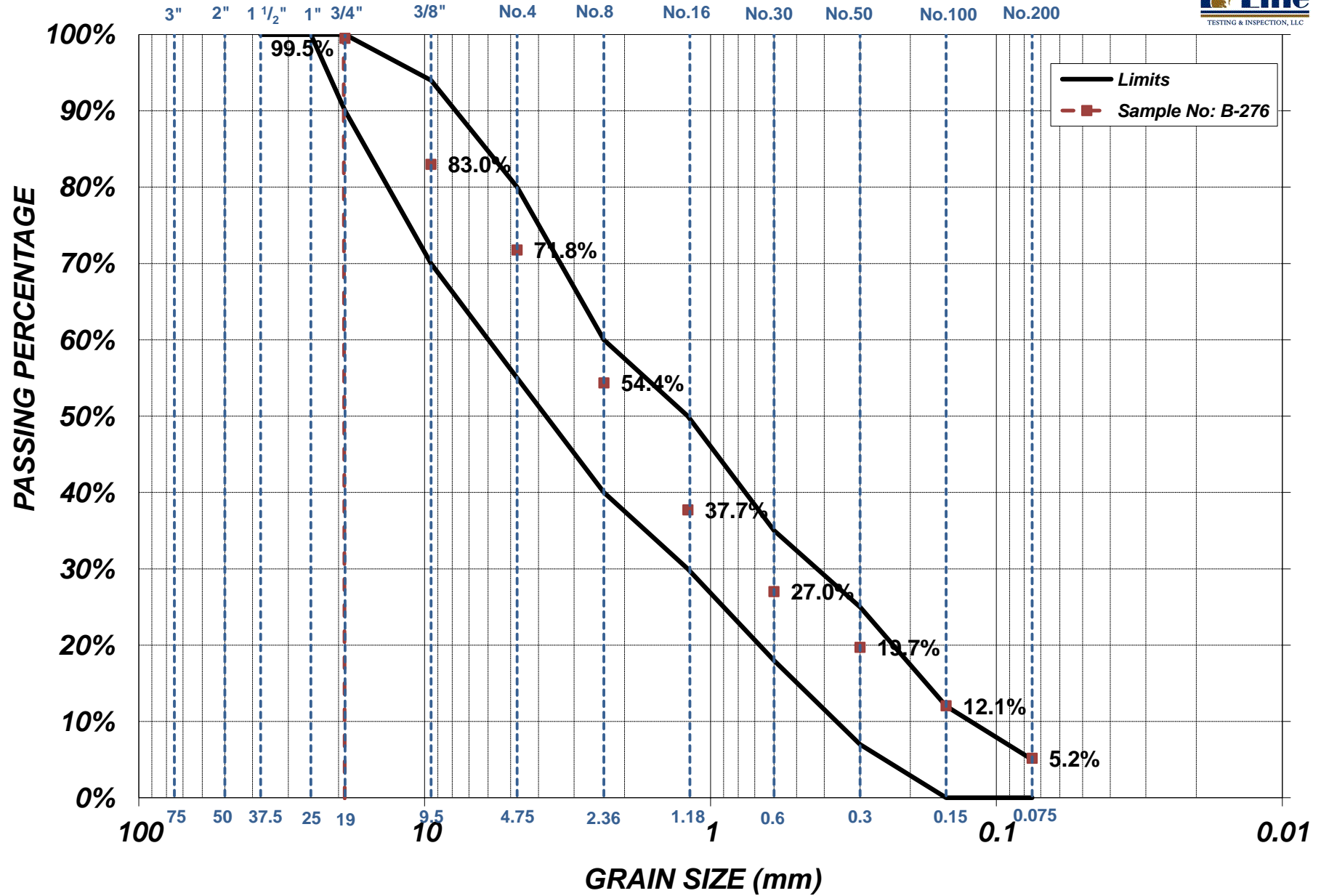
Moisture Content (ASTM C566, D2216)	
#200 Wash (ASTM C117, D1140)	
Gradation Analysis (ASTM C136)	

Report Issued By Robert J Montalvo

Checked By TC Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No. Table ID Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8834	8903				
Mold Tare (g)	3635	3635				
Weight of Material (g)	5199	5268				
Volume of Material (cm ³)	2482	2483				
Maximum Relative Density (g/cm ³)	2.095	2.122				

Result Consistency

Max	2.12162706	0.01347268	Differential
Min	2.09468171	0.01347268	Differential
Avg	2.10815439		
Consistency	0.64%	1.28%	



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method 1a 1b 2a 2b

Mold Size

Origin of Material

Soil Classification

Scale No. Mold ID Table ID

Scale Chec

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8834	8903				
Mold Tare (g)	3635	3635				
Weight of Material (g)	5199	5268				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.857	1.881				

Result Consistency

Max	1.88142857	0.01232143	Differential
Min	1.85678571	0.01232143	Differential
Avg	1.86910714		
Consistency	0.66%	1.32%	

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	3:00 PM
Sample Number	B - 287	Material Type	3a Filter	Date Tested	15-Aug-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG / CG		
Material Source	Test Fill Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Test Fill Borinquen Sample taken after placing and leveling (Multiple gradations performed for internal quality control)				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	Special Instructions are Acknowledged and Understood by Tech
Issued By	N/A	Date Issued	N/A	<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		Initial N/A

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:	Yellow means outside prescribed parameters
Gradation Analysis (ASTM C136)	
Moisture Content (ASTM C566, D2216)	
#200 Wash (ASTM C117, D1140)	
Lab Compaction (ASTM D1557, D698)	

Report Issued By [Empty Box]

Checked By ES

Report Issue Date 20-Aug-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method



The Panama Canal Third Set of Locks Project

Gradation Analysis (ASTM C136, C117)

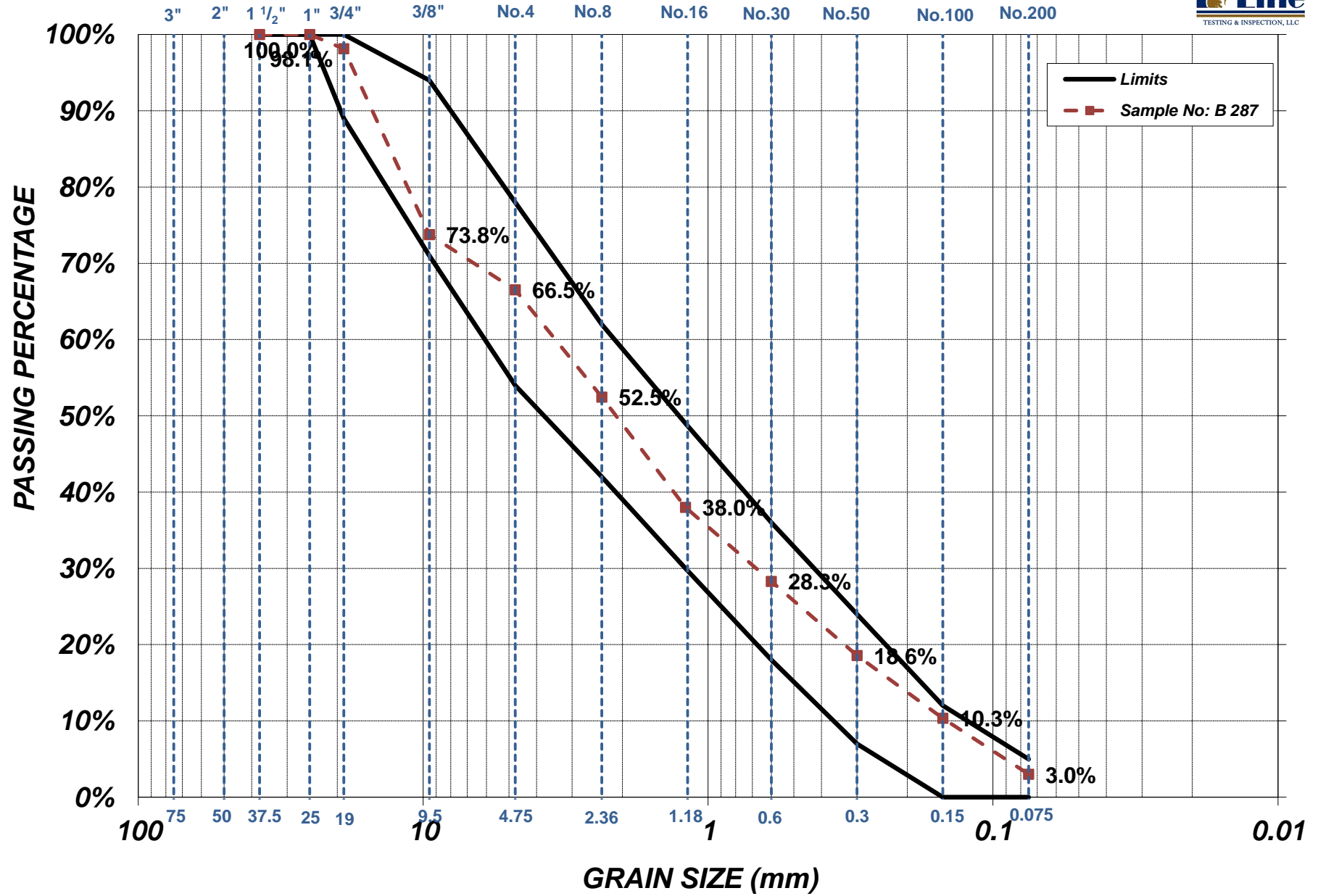
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 287	Technician:	ER
Material Type:	Filter 3a	<input checked="" type="checkbox"/> Scale Check <input type="checkbox"/> Scale Check Date Sampled:	14-Aug-12

Before Wash	Wet Weight (g)	5256	Coarse Scale ID:	N/A
	Moisture (%)	6.6%	Fine Scale ID:	1130
	Total Dry Weight (g)	4932	Oven ID:	Burner
After Wash Dry Weight (g)		4802	Wash Sieve ID:	1780
Wash Loss (%)		2.6%		

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
37.5mm (1 1/2")				100.0%	100 to 100	
25.0mm (1")	0			100.0%	100 to 100	9180
19mm (3/4")	92	92	1.9%	98.1%	89 to 100	9182
9.5mm (3/8")	1202	1294	26.2%	73.8%	71 to 94	9185
4.75mm (#4)	357	1651	33.5%	66.5%	54 to 78	9130
2.36mm (#8)	694	2345	47.5%	52.5%	42 to 62	9189
1.2mm (#16)	713	3058	62.0%	38.0%	30 to 49	9133
0.6mm (#30)	479	3537	71.7%	28.3%	18 to 36	9129
0.3mm (#50)	479	4016	81.4%	18.6%	7 to 24	9152
0.15mm (#100)	406	4422	89.7%	10.3%	0 to 12	9195
0.075mm #200	362	4784	97.0%	3.0%	0 to 5	1912
	18	4802				9171

Checked By:	ES	Fineness Modulus	3.86
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Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project Gradation Analysis (ASTM C136, C117)

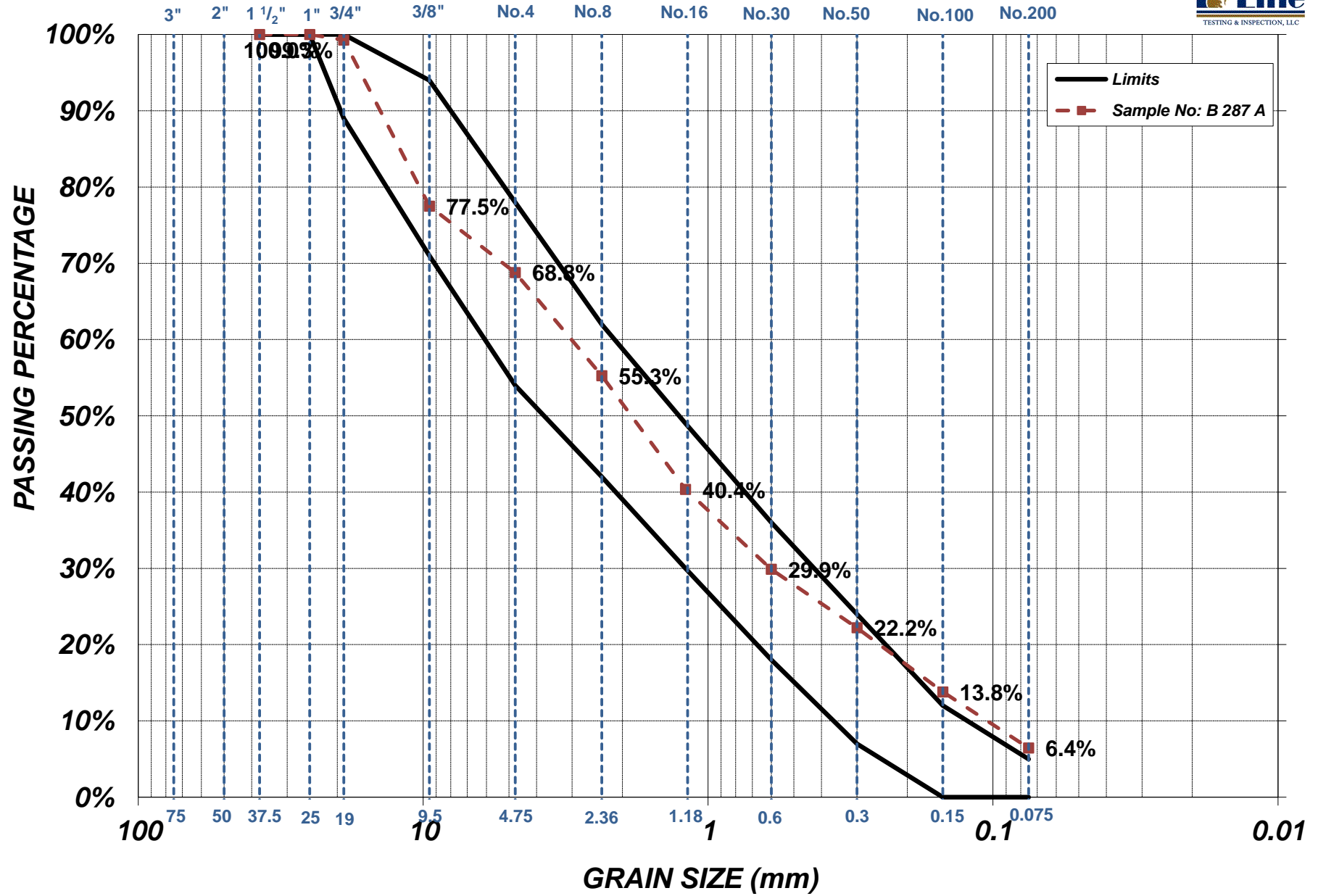
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 287 A	Technician:	JAG
Material Type:	Filter 3a	<input type="checkbox"/> Scale Check <input type="checkbox"/> Scale Check Date Sampled:	14-Aug-12

Before Wash	Wet Weight (g)	7420.5	Coarse Scale ID:	N/A
	Moisture (%)	5.7%	Fine Scale ID:	1453
	Total Dry Weight (g)	7020.7	Oven ID:	Burner
After Wash Dry Weight (g)		6602.1	Wash Sieve ID:	1780
Wash Loss (%)		6.0%		

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
37.5mm (1 1/2")				100.0%	100 to 100	
25.0mm (1")	0			100.0%	100 to 100	1232
19mm (3/4")	51.1	51.1	0.7%	99.3%	89 to 100	9144
9.5mm (3/8")	1529.3	1580.4	22.5%	77.5%	71 to 94	1225
4.75mm (#4)	611.1	2191.5	31.2%	68.8%	54 to 78	9188
2.36mm (#8)	949.7	3141.2	44.7%	55.3%	42 to 62	9136
1.2mm (#16)	1046.6	4187.8	59.6%	40.4%	30 to 49	9159
0.6mm (#30)	735.0	4922.8	70.1%	29.9%	18 to 36	9156
0.3mm (#50)	538.4	5461.2	77.8%	22.2%	7 to 24	1925
0.15mm (#100)	591.2	6052.4	86.2%	13.8%	0 to 12	9153
0.075mm #200	515.8	6568.2	93.6%	6.4%	0 to 5	1914
	33.9	6602.1				1239

Checked By:	ES	Fineness Modulus	3.70
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Filter Material Type 3a Gradation



The Panama Canal Third Set of Locks Project

Gradation Analysis (ASTM C136, C117)

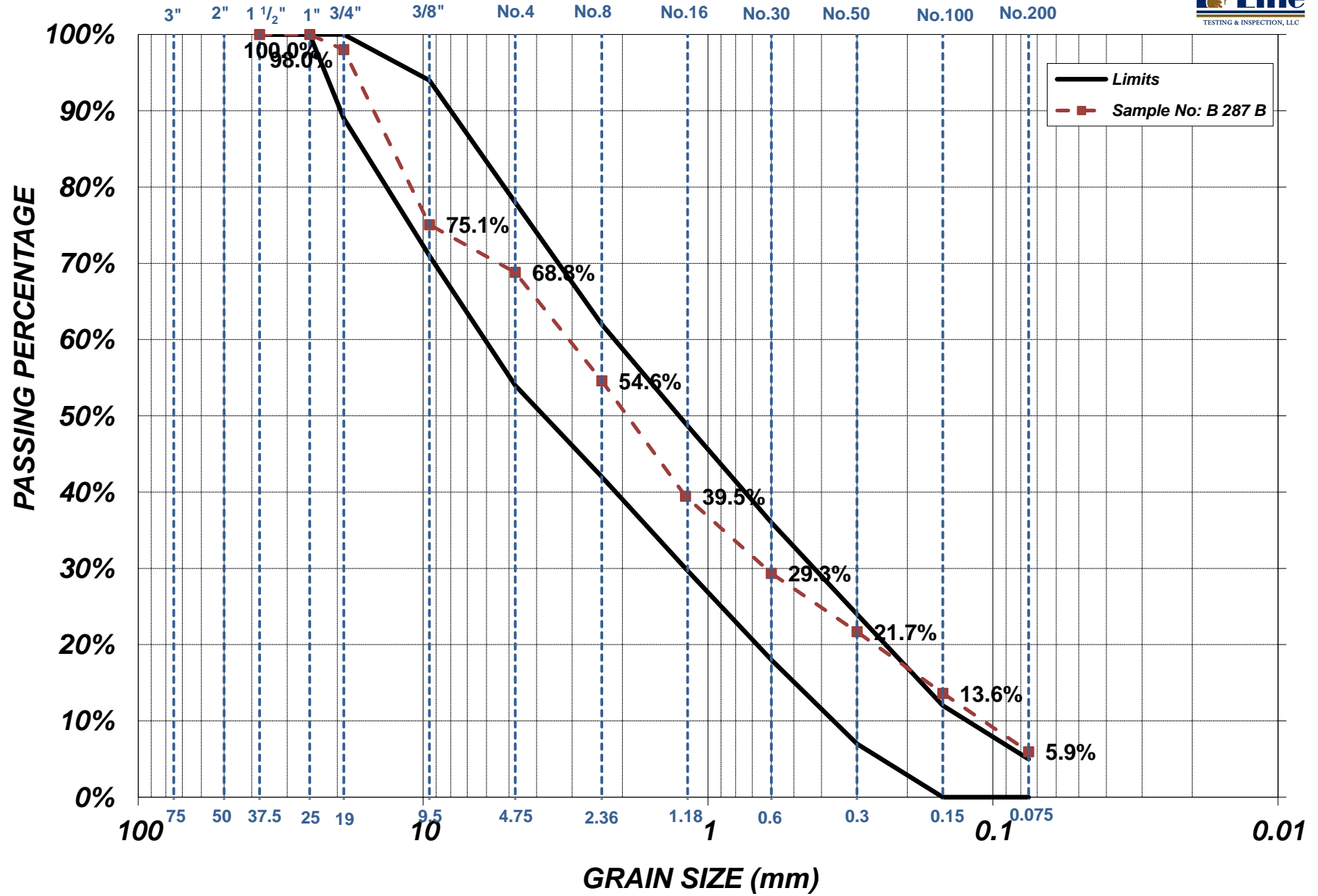
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 287 B	Technician:	AU
Material Type:	Filter 3a	<input type="checkbox"/> Scale Check <input type="checkbox"/> Scale Check Date Sampled:	14-Aug-12

Before Wash	Wet Weight (g)	6225	Coarse Scale ID:	N/A
	Moisture (%)	6.4%	Fine Scale ID:	1130
	Total Dry Weight (g)	5849	Oven ID:	Burner
After Wash Dry Weight (g)		5521	Wash Sieve ID:	1780
Wash Loss (%)		5.6%		

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
37.5mm (1 1/2")				100.0%	100 to 100	
25.0mm (1")	0			100.0%	100 to 100	1232
19mm (3/4")	116	116	2.0%	98.0%	89 to 100	9144
9.5mm (3/8")	1343	1459	24.9%	75.1%	71 to 94	1225
4.75mm (#4)	365	1824	31.2%	68.8%	54 to 78	9188
2.36mm (#8)	832	2656	45.4%	54.6%	42 to 62	9136
1.2mm (#16)	885	3541	60.5%	39.5%	30 to 49	9159
0.6mm (#30)	592	4133	70.7%	29.3%	18 to 36	9156
0.3mm (#50)	447	4580	78.3%	21.7%	7 to 24	1925
0.15mm (#100)	473	5053	86.4%	13.6%	0 to 12	9153
0.075mm #200	448	5501	94.1%	5.9%	0 to 5	1914
	20	5521				1239

Checked By:	ES	Fineness Modulus	3.72
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Filter Material Type 3a Gradation



The Panama Canal Third Set of Locks Project

Lab Compaction (ASTM D1557, D698)

Project Name:

Technician:

Method:

Sample No:

Date Sampled:

Preparation Method:

Group Name:

Checked by:

As Received Moisture (%):

Soil Description:

Specific Gravity:

Scale ID:

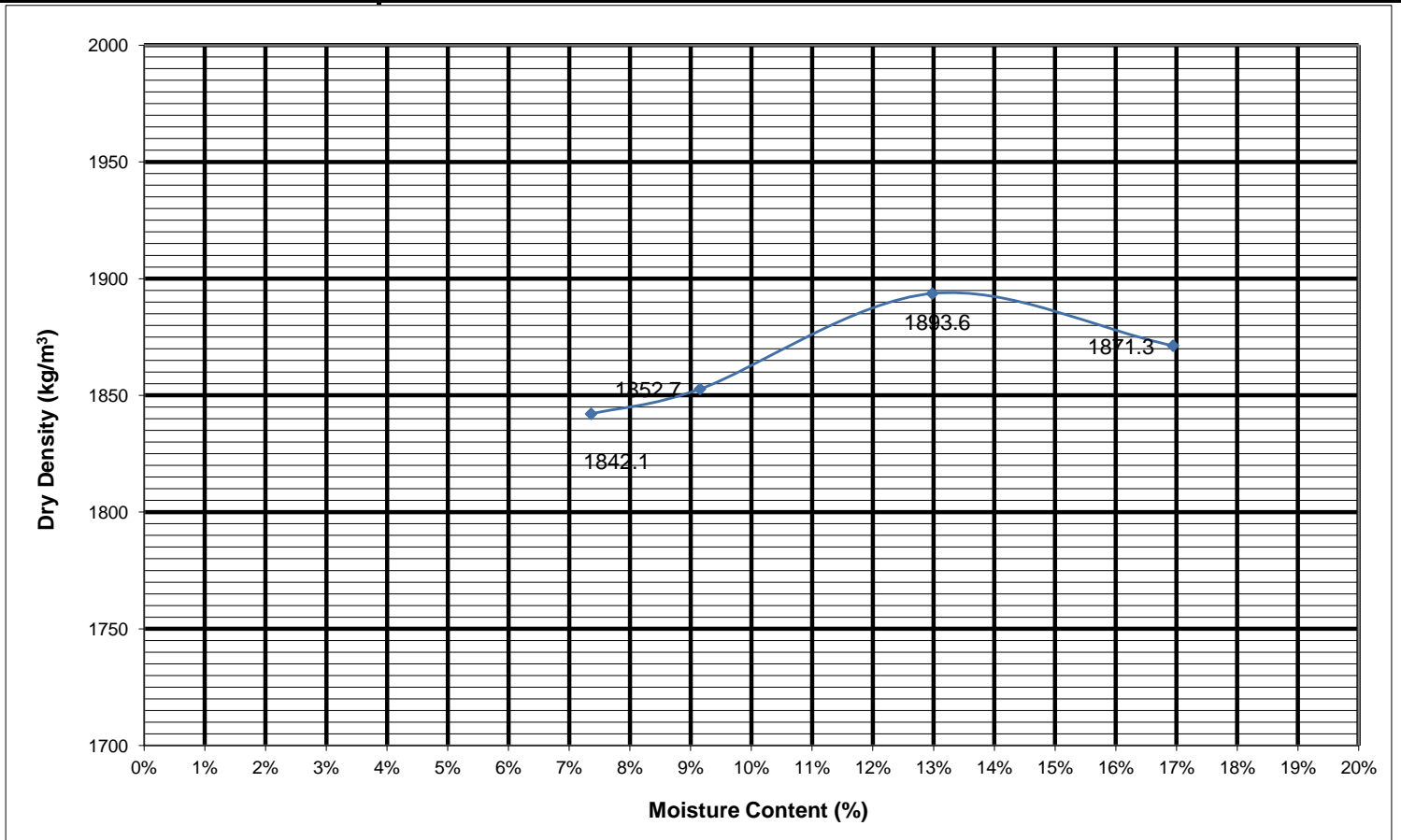
Scale Check

Hammer ID:

Mold ID:

Specific Gravity Method:

Scalp Fraction	-	Wet Density Determination				
Hammer Wt. (kg)	2.5 kg	Soil + Mold (g)	6.243	6.285	6.395	6.441
Mold Size (m ³)	0.0094	Mold Tare (g)	4.384	4.384	4.384	4.384
Drop Ht. (mm)	305	Wet Wt. Of Soil (g)	1.859	1.901	2.011	2.057
Blows per Layer	25	Wet Density (kg/m ³)	1977.66	2022.3	2139.4	2188.3
No. of Layer	3	Moisture Content Determination				
Type of Hammer	Mechanical		A	B	C	D
Results:		Wet Wt. Of Soil (g)	423.0	620.0	679.0	635.0
		Dry Wt. Of Soil (g)	394.0	568.0	601.0	543.0
Maximum Density (kg/m ³) :	1410	Moisture Content (%)	7.4%	9.2%	13.0%	16.9%
Optimum Moisture (%) :	29.8	Dry Density (kg/m ³)	1842.1	1852.7	1893.6	1871.3



The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	4:30 PM
Sample Number	B - 291	Material Type	3a Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG / CG		
Material Source	Test Fill Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 Layer 1pass				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)

Moisture Content (ASTM C566, D2216)

#200 Wash (ASTM C117, D1140)

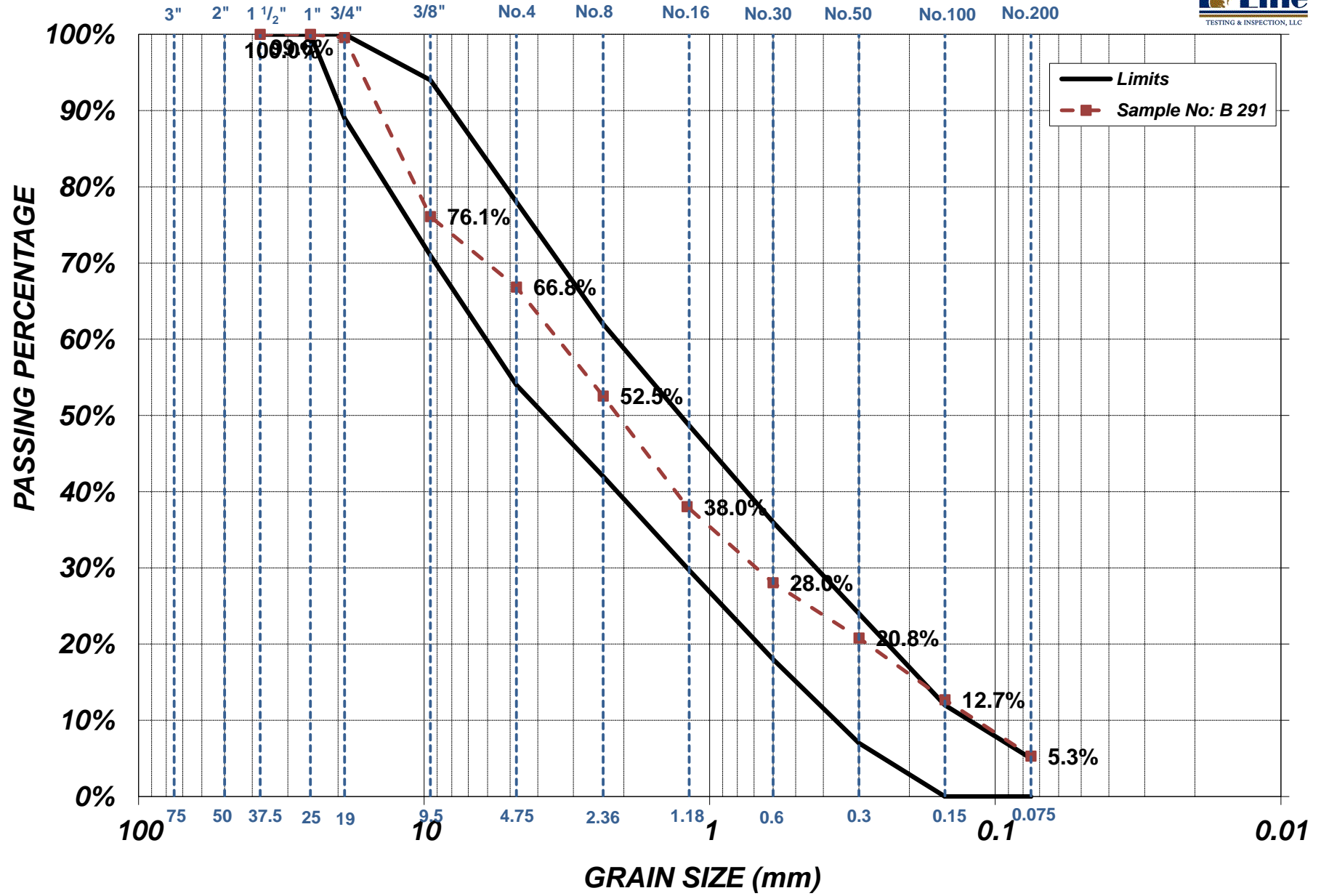
Report Issued By

Checked By

Report Issue Date

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal
Third Set of Locks Project
 Maximum Index Density of Soils(ASTM D4253)

Project:

Pacific

Date:

14-Aug-12

Sample ID:

B-291

Sampled By:

JAG AU

Technician

JAG

Checked By:

ES

Method

 A

 B

 C

Mold Size

0.1001 FT³

0.0028 m³

Origin of Material

Test Fill 3a Material

Soil
Classification

N/R

Scale No.

1130

Table ID

1443

Mold ID

1443

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8720	8782				
Mold Tare (g)	3634	3634				
Weight of Material (g)	5086	5148				
Volume of Material (cm ³)	2505	2521				
Maximum Relative Density (g/cm ³)	2.030	2.042				

Result
Consistency

0.29%



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project:

Pacific

Date:

14-Aug-12

Sample ID:

B-291

Sampled By:

JAG AU

Technician

JAG

Checked By:

ES

Method

 1A 1B 2A 2B

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

Test Fill 3a Material

Soil
Classification

N/R

Scale No.

1130

Mold ID

1443

Table ID

1443

 Scale CheckDouble Amplitude of Vertical Vibration
(if different from that specified)

N/A

Trial	1	2	3	4	5	6
Soil + Mold (g)	8720	8782				
Mold Tare (g)	3634	3634				
Weight of Material (g)	5086	5148				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.816	1.839				

Result
Consistency

0.61%

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	5:10 PM
Sample Number	B - 295	Material Type	3a Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG / CG		
Material Source	Test Fill Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 Layer 2pass				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed: Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)	
Moisture Content (ASTM C566, D2216)	
#200 Wash (ASTM C117, D1140)	

Report Issued By []

Checked By ES

Report Issue Date 20-Aug-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Gradation Analysis (ASTM C136, C117)

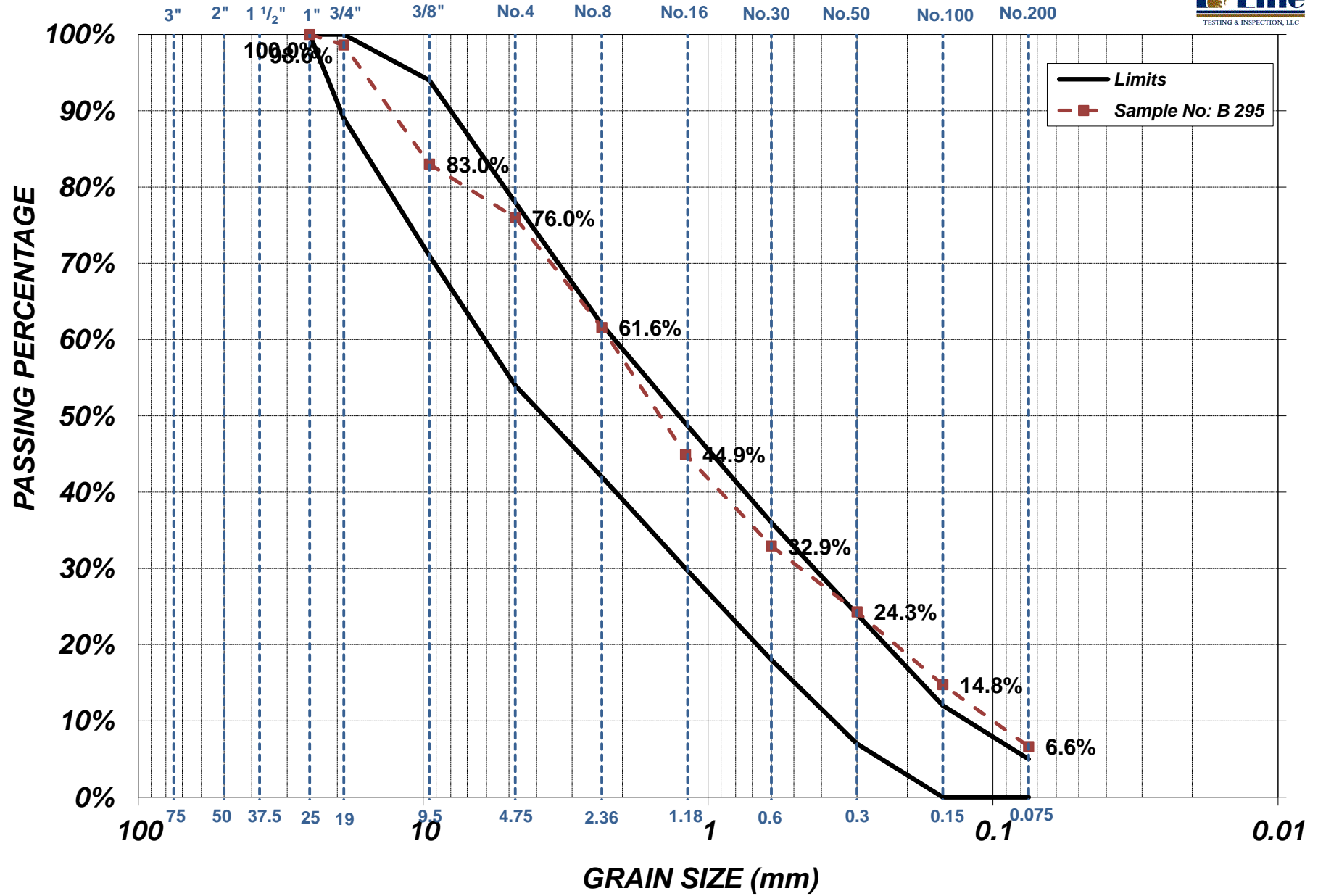
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 295	Technician:	JAG
Material Type:	Filter 3a	<input checked="" type="checkbox"/> Scale Gb <input type="checkbox"/> Scale Cbe	Date Sample: 14-Aug-12

Before Wash	Wet Weight (g)	6412.5	Coarse Scale ID:	N/A
	Moisture (%)	6.5%	Fine Scale ID:	1453
	Total Dry Weight (g)	6022.6	Oven ID:	1125
After Wash Dry Weight (g)		5660.1	Wash Sieve ID:	1780
Wash Loss (%)		6.0%		

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
25.0mm (1")	0			100.0%	100 to 100	9180
19mm (3/4")	82.5	82.5	1.4%	98.6%	89 to 100	9182
9.5mm (3/8")	940.7	1023.2	17.0%	83.0%	71 to 94	9185
4.75mm (#4)	423.2	1446.4	24.0%	76.0%	54 to 78	9130
2.36mm (#8)	867.4	2313.8	38.4%	61.6%	42 to 62	9189
1.2mm (#16)	1002.3	3316.1	55.1%	44.9%	30 to 49	9133
0.6mm (#30)	723	4039.1	67.1%	32.9%	18 to 36	9129
0.3mm (#50)	520.3	4559.4	75.7%	24.3%	7 to 24	9152
0.15mm (#100)	574.8	5134.2	85.2%	14.8%	0 to 12	9195
0.075mm #200	489.9	5624.1	93.4%	6.6%	0 to 5	1912
	36	5660.1				9171

Checked By:	ES	Fineness Modulus	3.46
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Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project:

Pacific

Date:

14-Aug-12

Sample ID:

B-295

Sampled By:

JAG CG

Technician

JAG

Checked By:

ES

Method

 A B C

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

3a Filter Test Fill

Soil
Classification

N/R

Scale No.

1130

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8720	8782				
Mold Tare (g)	3634	3634				
Weight of Material (g)	5086	5148				
Volume of Material (cm ³)	2505	2497				
Maximum Relative Density (g/cm ³)	2.030	2.062				

Result
Consistency

0.77%



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8729	8750				
Mold Tare (g)	3634	3634				
Weight of Material (g)	5095	5116				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.820	1.827				

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	5:45 PM
Sample Number	B - 299	Material Type	3a Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG / CG		
Material Source	Test Fill Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 Layer 3 pass				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed: Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)	
Moisture Content (ASTM C566, D2216)	
#200 Wash (ASTM C117, D1140)	

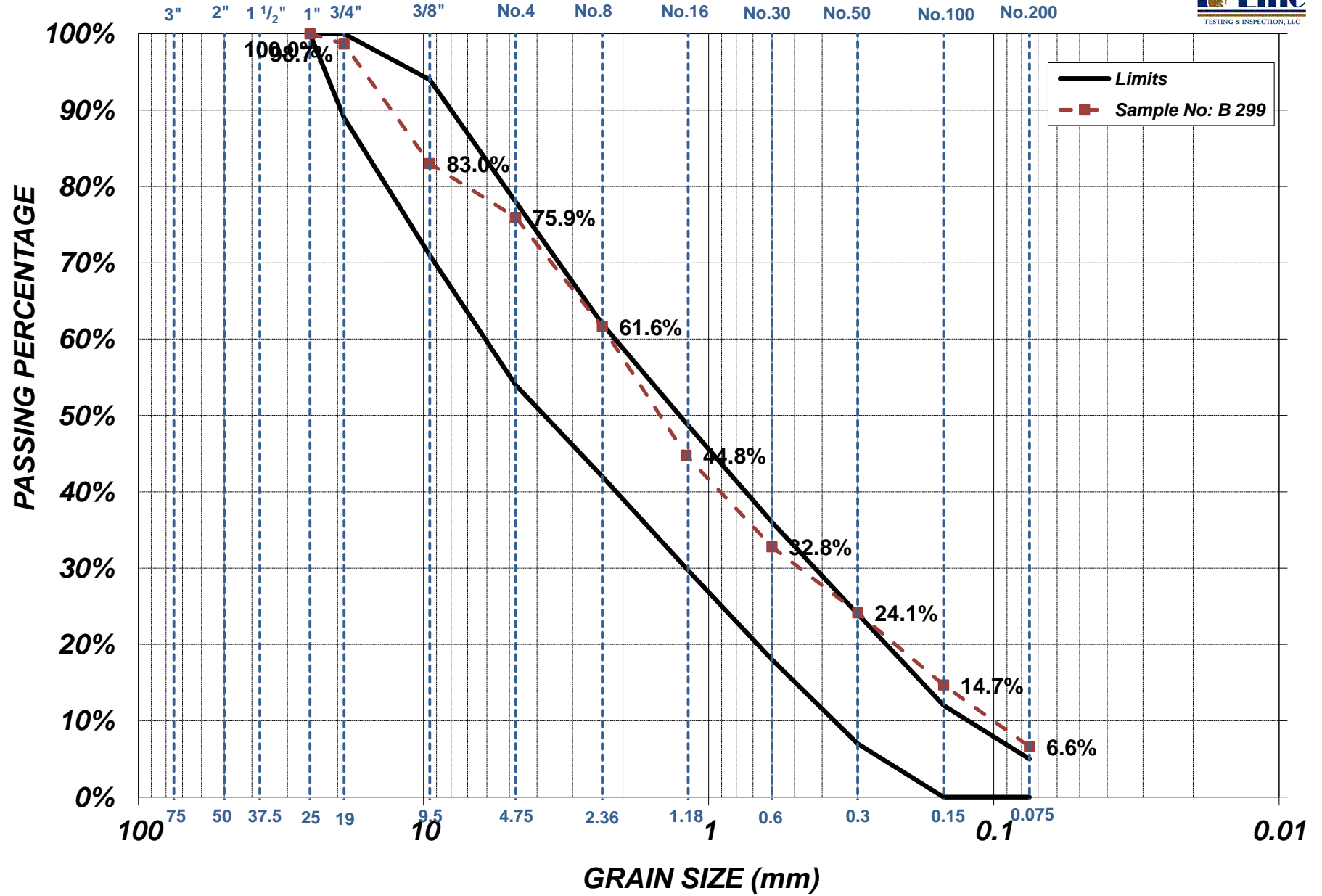
Report Issued By [Empty Box]

Checked By ES

Report Issue Date 20-Aug-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project:

Pacific

Date:

14-Aug-12

Sample ID:

B-299

Sampled By:

JAG CG

Technician

JAG

Checked By:

ES

Method

 A B C

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

3a Filter Test Fill

Soil
Classification

N/R

Scale No.

1130

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8614	8651				
Mold Tare (g)	3633	3633				
Weight of Material (g)	4981	5018				
Volume of Material (cm ³)	2452	2471				
Maximum Relative Density (g/cm ³)	2.031	2.031				

Result
Consistency

0.02%



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8614	8651				
Mold Tare (g)	3633	3633				
Weight of Material (g)	4981	5018				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.779	1.792				

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	21-Aug-12	Time Sampled	11:12 AM
Sample Number	B - 312 REV3	Material Type	3a Filter	Date Tested	21-Aug-12	Time Tested	11:20 AM
Material Description	3a Filter			Sampled By	AU /JAG		
Material Source	Test Fill Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	5 Layer ,1 Passes				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)

Minimum Index Density (ASTM D4254)

Moisture Content (ASTM C566, D2216)

Lab Compaction (ASTM D1557, D698)

#200 Wash (ASTM C117, D1140)

Maximum Index Density (ASTM D4253)

Report Issued By 

Checked By ES

Report Issue Date 03-Sep-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Gradation Analysis (ASTM C136, C117)

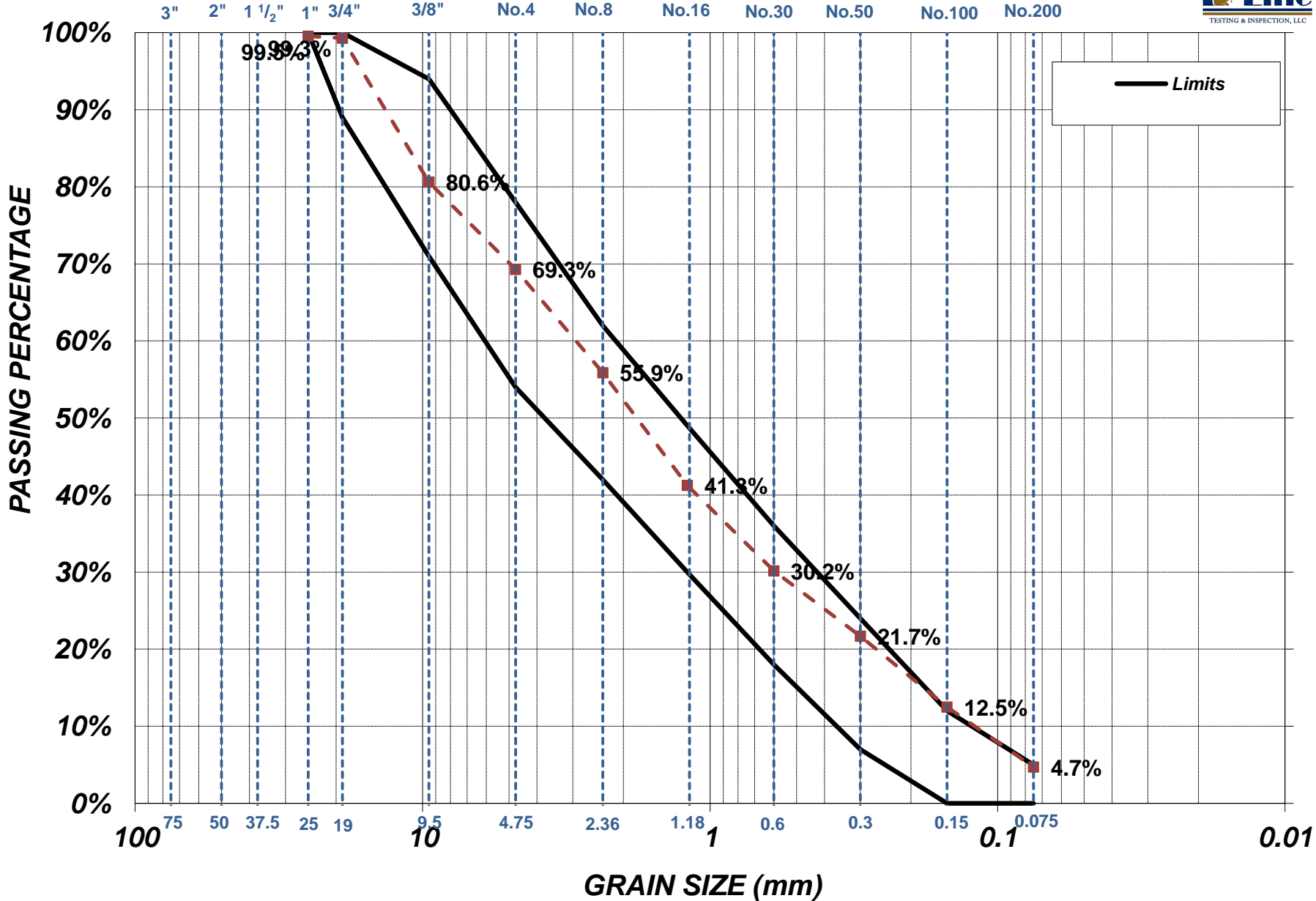
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 312 REV3	Technician:	JAG
Material Type:	Filter 3a	Date Sampled:	21-Aug-12

		<input type="checkbox"/> Scale Ch	<input type="checkbox"/> Scale Cr
Before Wash	Wet Weight (g)	5831.9	Coarse Scale ID: N/A
	Moisture (%)	6.7%	Fine Scale ID: 1453
	Total Dry Weight (g)	5465.9	Oven ID: Burner
After Wash Dry Weight (g)		5250.1	Wash Sieve ID: 1780
Wash Loss (%)		3.9%	

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
25.0mm (1")	25.0	25	0.5%	99.5%	100 to 100	9180
19mm (3/4")	14.1	39.1	0.7%	99.3%	89 to 100	9182
9.5mm (3/8")	1020.5	1059.6	19.4%	80.6%	71 to 94	9185
4.75mm (#4)	619.6	1679.2	30.7%	69.3%	54 to 78	9130
2.36mm (#8)	732.8	2412	44.1%	55.9%	42 to 62	9189
1.2mm (#16)	798.8	3210.8	58.7%	41.3%	30 to 49	9133
0.6mm (#30)	606.6	3817.4	69.8%	30.2%	18 to 36	9129
0.3mm (#50)	462.8	4280.2	78.3%	21.7%	7 to 24	9152
0.15mm (#100)	502.8	4783	87.5%	12.5%	0 to 12	9195
0.075mm #200	425.6	5208.6	95.3%	4.7%	0 to 5	1782
	41.5	5250.1				9171

Checked By:	ES	Fineness Modulus	3.69
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Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8784	8778				
Mold Tare (g)	3634	3634				
Weight of Material (g)	5150	5144				
Volume of Material (cm ³)	2449	2445				
Maximum Relative Density (g/cm ³)	2.103	2.104				

Result Consistency



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8784	8778				
Mold Tare (g)	3634	3634				
Weight of Material (g)	5150	5144				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.839	1.837				

Result Consistency

The Panama Canal Third Set of Locks Project

Lab Compaction (ASTM D1557, D698)

Project Name:

Technican:

Method

Sample No:

Date Sampled:

Preperation Method

Group Name :

Checked by:

As Received Moisture (%)

Soil Description:

Specific Gravity

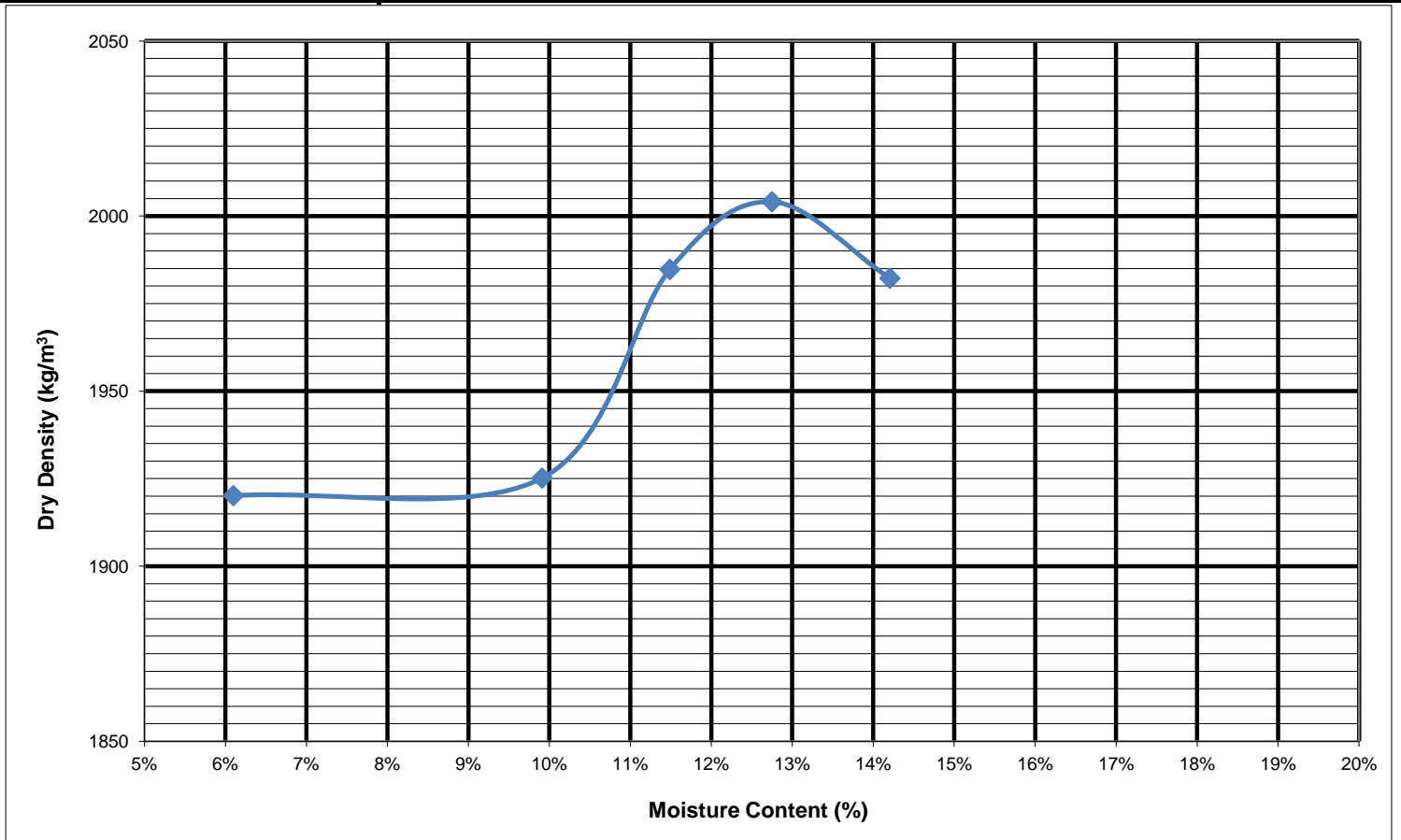
Scale ID Scale Check

Hammer ID

Mold ID

Specific Gravity Method

Scalp Fraction		Wet Density Determination					
Hammer Wt. (kg)	2.5 kg	Soil + Mold (kg)	6.302	6.376	6.467	6.511	6515
Mold Size (m³)	0.0009	Mold Tare (kg)	4.387	4.387	4.387	4.387	4387
Drop Ht. (mm)	305	Wet Wt. Of Soil (kg)	1.915	1.989	2.08	2.124	2128
Blows per Layer	25	Wet Density (kg/m³)	2037.2	2116.0	2212.8	2259.6	2263.8
No. of Layer	3	Moisture Content Determination					
Type of Hammer	Mechanical	Wet Wt. Of Soil (g)	435.0	366.0	689.0	734.0	619.0
Results:		Dry Wt. Of Soil (g)	410.0	333.0	618.0	651.0	542
Maximum Density (kg/m³) :	2005	Moisture Content (%)	6.1%	9.9%	11.5%	12.7%	14.2%
Optimum Moisture (%) :	12.7	Dry Density (kg/m³)	1920.2	1925.2	1984.7	2004.1	1982.2



The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	23-Aug-12	Time Sampled	8:38 AM
Sample Number	B - 317	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG / AU		
Material Source	Test Fill Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	5 Layer , 2 passes				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:	Yellow means outside prescribed parameters
Gradation Analysis (ASTM C136)	<input type="text"/>
Moisture Content (ASTM C566, D2216)	<input type="text"/>
#200 Wash (ASTM C117, D1140)	<input type="text"/>
<input type="text"/>	<input type="text"/>

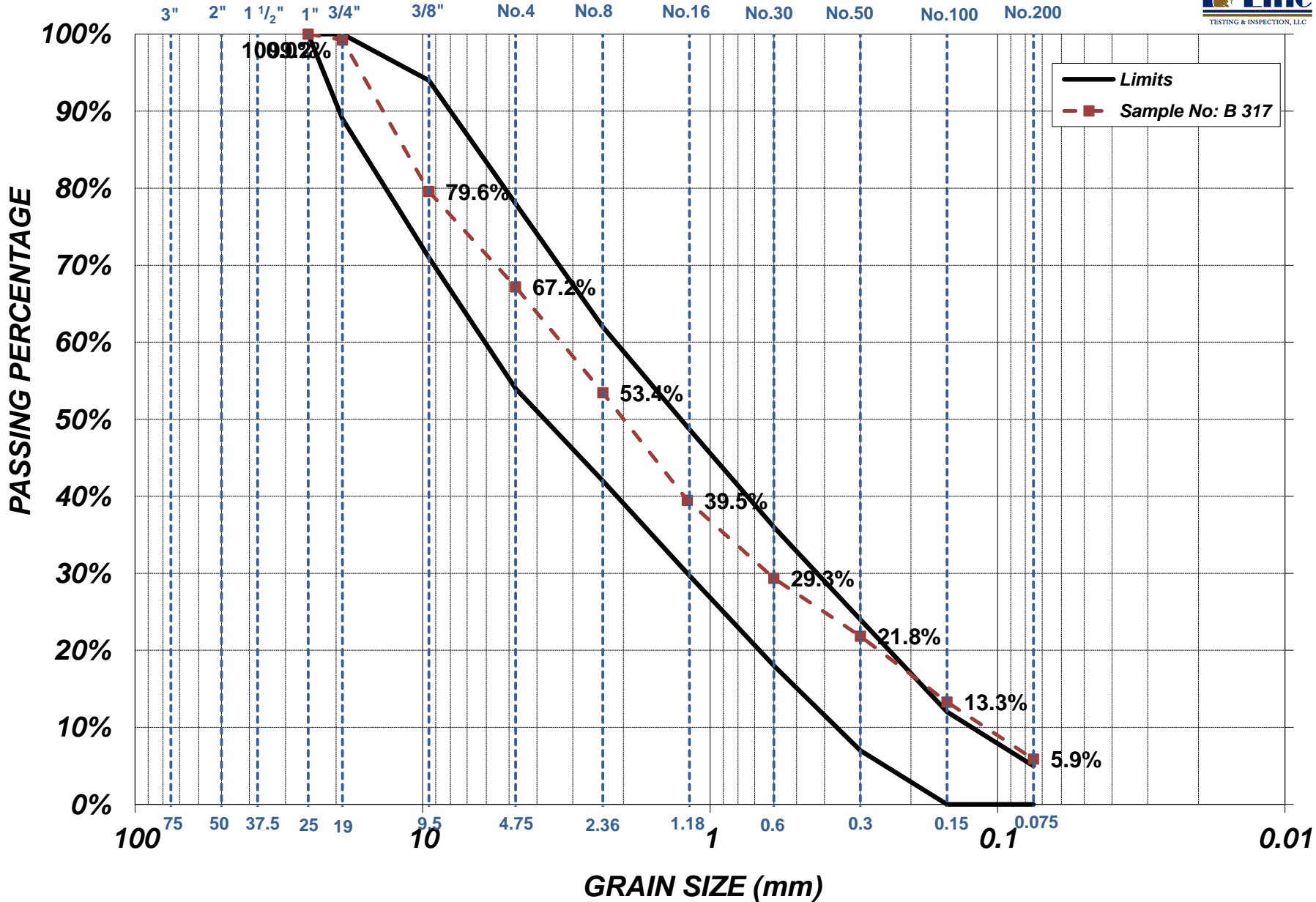
Report Issued By 

Checked By ES

Report Issue Date 03-Sep-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project:

Pacific

Date:

29-Aug-12

Sample ID:

B-317

Sampled By:

JAG / AU

Technician

AU

Checked By:

ES

Method

 A B C

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

Test Fill Borinquen Dam

Soil
ClassificationMAT. FILTER
3a

Scale No.

1130

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8724	8788				
Mold Tare (g)	3634	3634				
Weight of Material (g)	5090	5154				
Volume of Material (cm ³)	2455	2502				
Maximum Relative Density (g/cm ³)	2.073	2.060				

Result
Consistency

0.32%



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8724	8788				
Mold Tare (g)	3634	3634				
Weight of Material (g)	5090	5154				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.818	1.841				

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	23-Aug-12	Time Sampled	2:38 PM
Sample Number	B - 321 REV2	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	AU /JAG		
Material Source	Test Fill Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	5th Layer , 3 Passes				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)

Minimum Index Density (ASTM D4254)

Moisture Content (ASTM C566, D2216)

Lab Compaction (ASTM D1557, D698)

#200 Wash (ASTM C117, D1140)

Maximum Index Density (ASTM D4253)

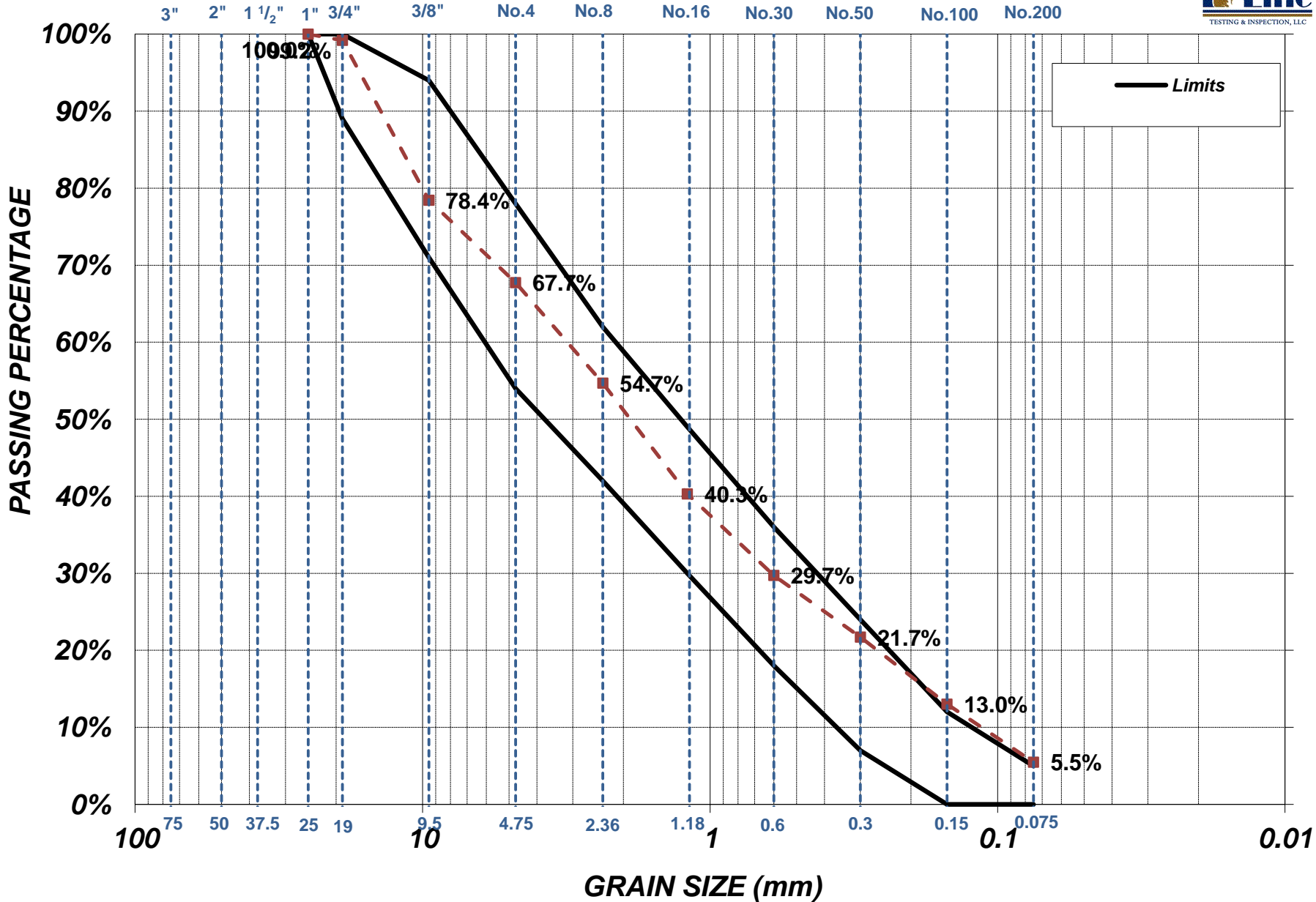
Report Issued By 

Checked By ES

Report Issue Date 04-Sep-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density of Soils(ASTM D4253)

Project:

Pacific

Date:

29-Aug-12

Sample ID:

B - 321 REV2

Sampled By:

JAG AU

Technician

AU

Checked By:

ES

Method

 A B C

Mold Size

0.1001 FT³0.0028 m³

Origin of Material

Test Fill Borinquen Dam

Soil
ClassificationMAT. FILTER
3a

Scale No.

1130

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8720	8741				
Mold Tare (g)	3634	3634				
Weight of Material (g)	5086	5107				
Volume of Material (cm ³)	2470	2492				
Maximum Relative Density (g/cm ³)	2.059	2.049				

Result
Consistency

0.24%



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method 1A 1B 2A 2B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8720	8741				
Mold Tare (g)	3634	3634				
Weight of Material (g)	5086	5107				
Volume of Material (cm ³)	2800	2800				
Minimum Index Density (g/cm ³)	1.816	1.824				

Result Consistency



The Panama Canal Third Set of Locks Project Gradation Analysis (ASTM C136)

Project: <u>Pacific</u>	Sample Number: <u>B 513</u>
Date Sampled: <u>22-Oct-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>11:30 AM</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>CG</u>	Sample Location: <u>Test Fill First Layer Before Leveling</u>

Date Tested: <u>22-Oct-12</u>	Scale ID: <u>1130</u>
	Oven ID: <u>Burner</u>
Technician: <u>DG</u>	Wash Sieve ID: <u>1780</u>

Wet Weight (g) <u>7370.0</u>	Moisture Content <u>6.0%</u>
Dry Weight (g) <u>6953.0</u>	
After Wash Weight (g) <u>6772.0</u>	Wash Loss <u>2.6%</u>

Sieve Size	Cumulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
1"			100.0%	100	1232
3/4"	14	0.2%	99.8%	100	9138
1/2"	441	6.3%	93.7%		1228
3/8"	703	10.1%	89.9%	85 to 100	1225
4	971	14.0%	86.0%	76 to 92	1939
8	2444	35.2%	64.8%	57 to 80	1973
16	3910	56.2%	43.8%	40 to 65	9159
30	4848	69.7%	30.3%	24 to 45	9156
50	5570	80.1%	19.9%	7 to 25	1925
100	6276	90.3%	9.7%	0 to 12	9153
200	6756	97.2%	2.8%	0 to 5	1914
Pan	6772				1239

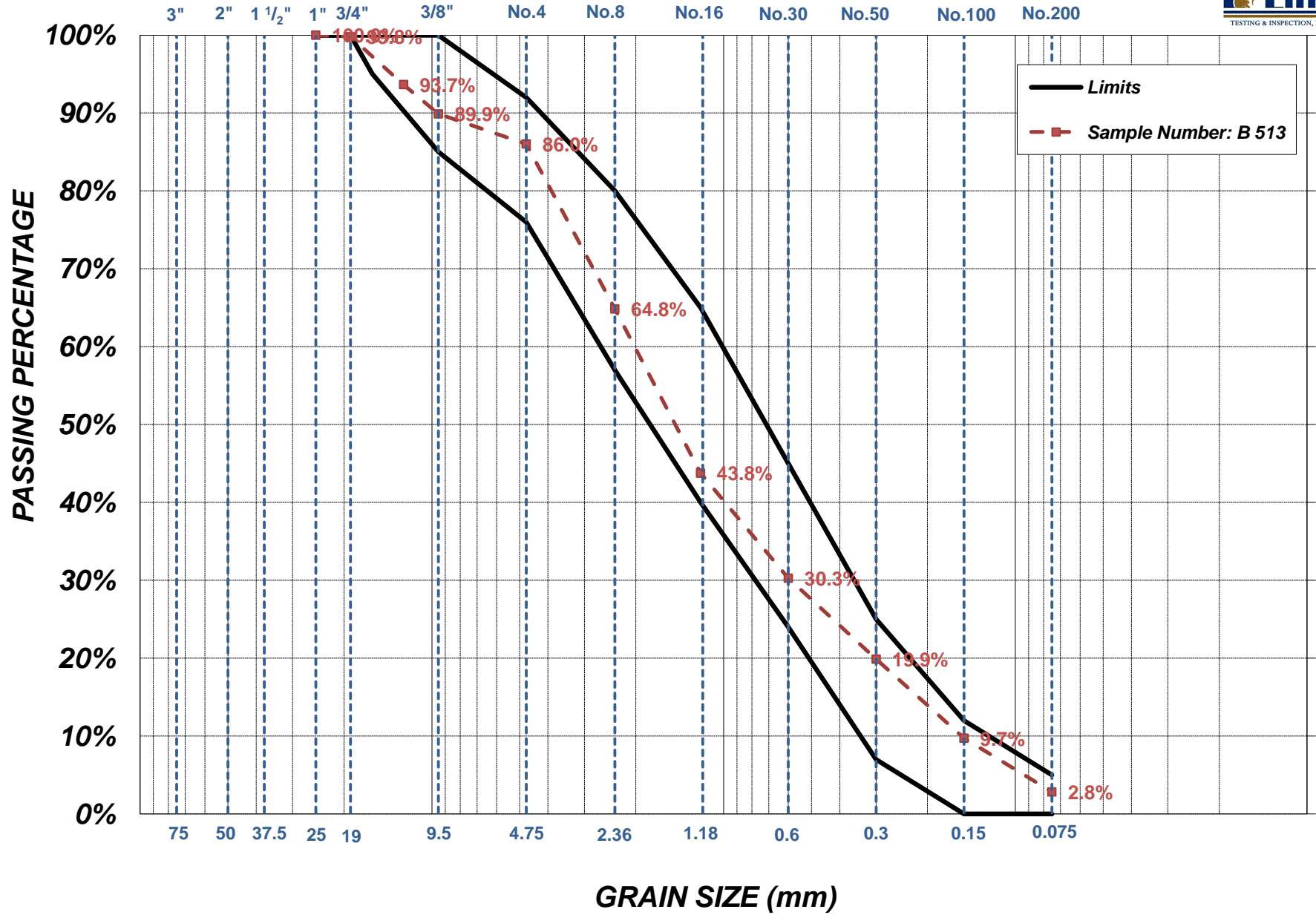
Checked By: <u>PC</u>	Fineness Modulus <u>3.0</u>
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Report Issued
By

Date

23-Oct-12

Gradation





The Panama Canal Third Set of Locks Project

Minimum Relative Density of Soils(ASTM D4254)

Project:

Pacific

Date:

22-Oct-12

Sample ID:

B 513

Sampled By:

AU

Technician

JAG

Checked By:

ES

Method

 A B C

Mold Size

0.1001 FT³0.0028m³

Origin of Material

Borinquen Dam Test Fill 3b

Soil
Classification

N/A

Scale No.

2026

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8520	8520				
Mold Tare (g)	3630	3630				
Weight of Material (g)	4890	4890				
Volume of Mold (cm ³)	2800	2800.0				
Minimum Relative Density (g/cm ³)	1.746	1.746				

Result
Consistency

0.00%



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project:

Pacific

Date:

22-Oct-12

Sample ID:

B 513

Sampled By:

AU

Technician

JAG

Checked By:

ES

Method



Dry 1A



Wet 1B

Mold Size

0.1001 FT³0.0028m³

Origin of Material

Borinquen Dam Test Fill 3b

Soil
Classification

N/A

Scale No.

2026

Mold ID

1443

Table ID

1443

Double Amplitude of Vertical Vibration
(if different from that specified)

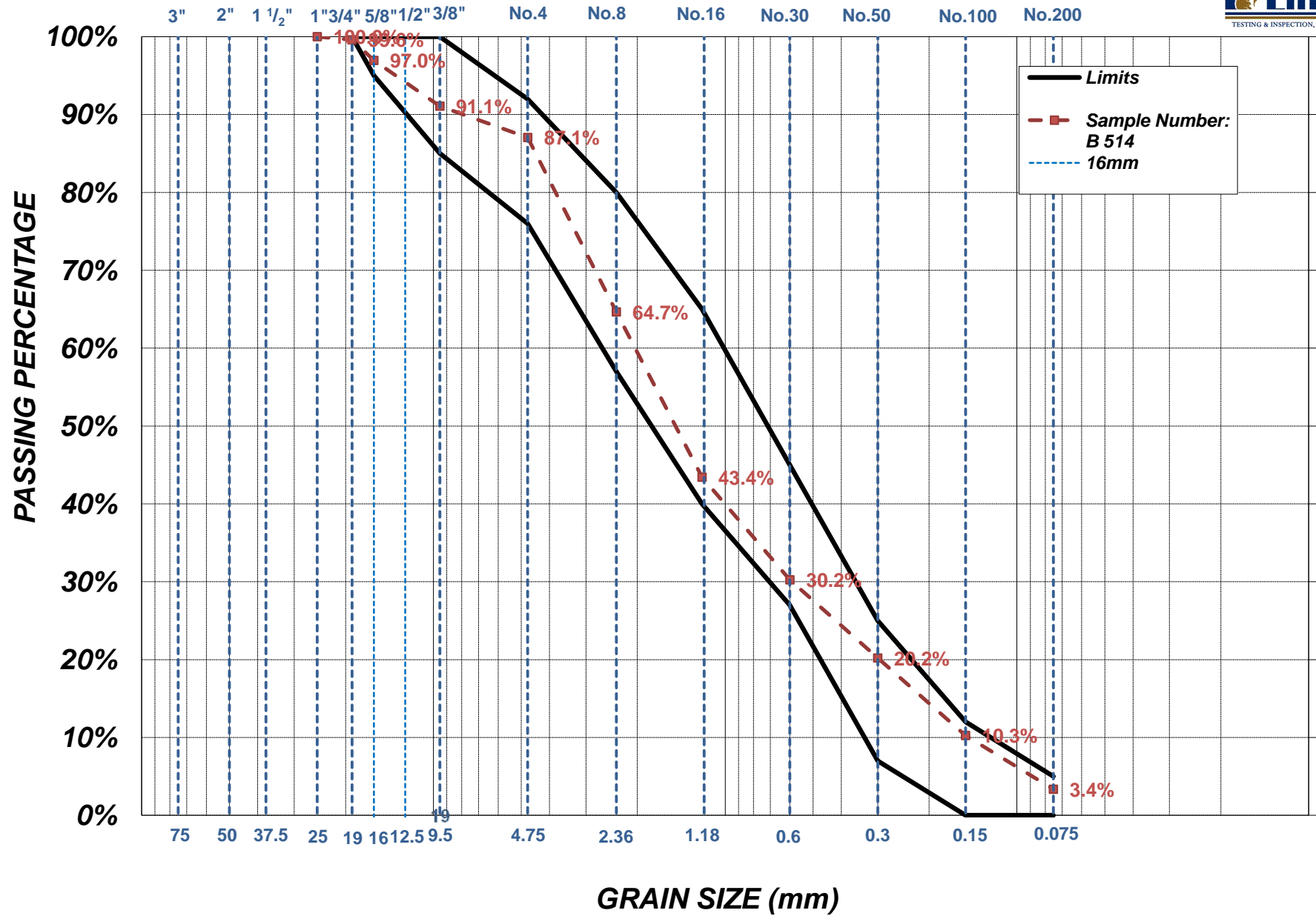
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Trial	1	2	3	4	5	6
Soil + Mold (g)	8520	8520				
Mold Tare (g)	3630	3630				
Weight of Material (g)	4890	4890				
Volume of Mold (cm ³)	2469	2474.0				
Wet Density (g/cm ³)	N/A	N/A				
Moisture Content (%)	N/A	N/A				
Maximum Index Dry Density (g/cm ³)	1.981	1.977				

Result
Consistency

0.10%

3b Filter Gradation





The Panama Canal Third Set of Locks Project

Minimum Relative Density of Soils(ASTM D4254)

Project:

Pacific

Date:

23-Oct-12

Sample ID:

B 514

Sampled By:

CG

Technician

AU

Checked By:

ES

Method

 A B C

Mold Size

0.1001 FT³0.0028m³

Origin of Material

Borinquen Dam Test Fill 3b

Soil
Classification

N/A

Scale No.

2026

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8530	8640	8560			
Mold Tare (g)	3630	3630	3630			
Weight of Material (g)	4900	5010	4930			
Volume of Mold (cm ³)	2800	2800.0	2800.0			
Minimum Relative Density (g/cm ³)	1.750	1.789	1.761			

Result
Consistency

1.28%



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method Dry 1A Wet 1B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

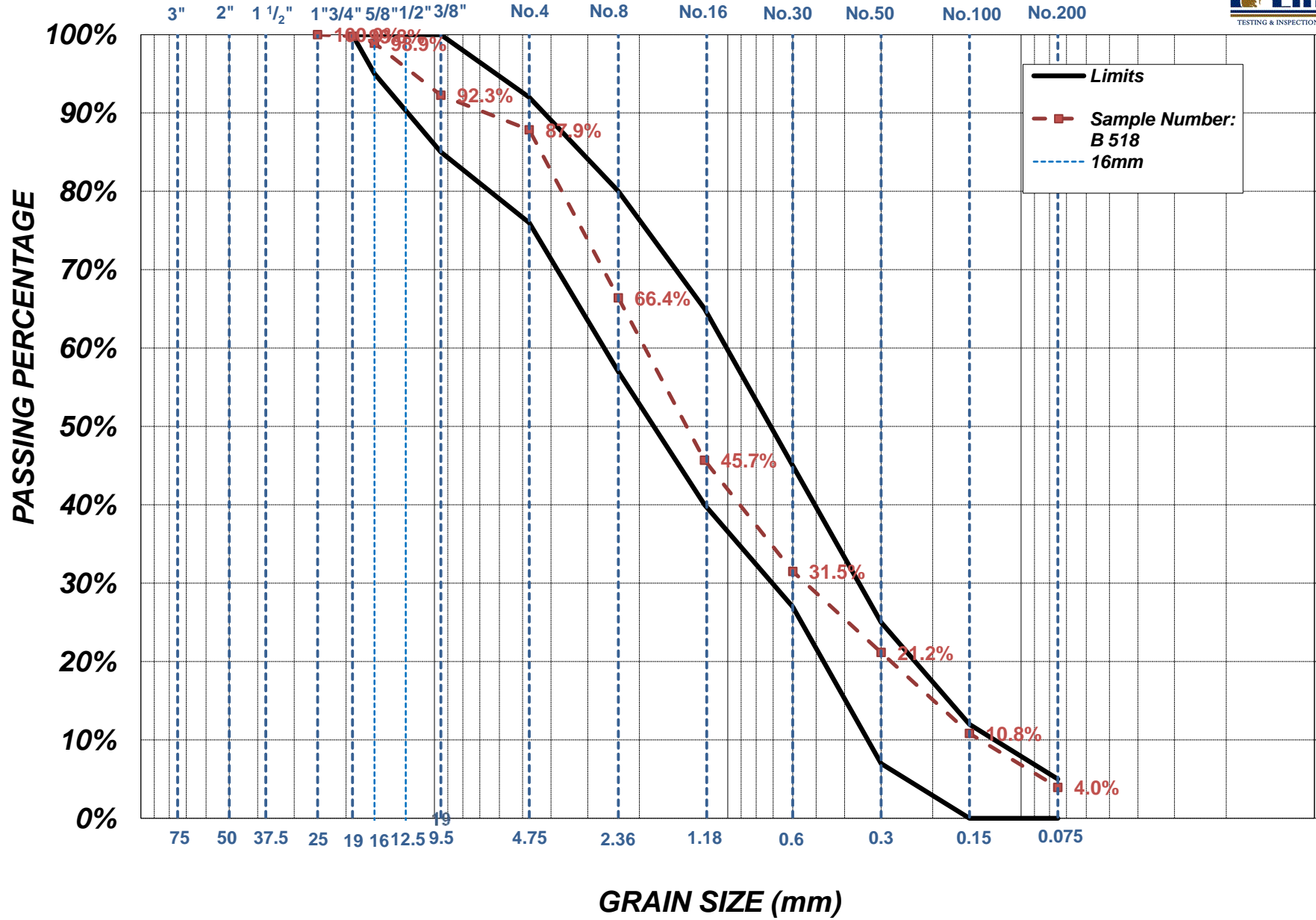
Table ID

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8530	8640	8560			
Mold Tare (g)	3630	3630	3630			
Weight of Material (g)	4900	5010	4930			
Volume of Mold (cm ³)	2471	2499.0	2487.0			
Wet Density (g/cm ³)	N/A	N/A	N/A			
Moisture Content (%)	N/A	N/A	N/A			
Maximum Index Dry Density (g/cm ³)	1.983	2.005	1.982			

Result Consistency

3b Filter Gradation





The Panama Canal Third Set of Locks Project

Minimum Relative Density of Soils(ASTM D4254)

Project:

Pacific

Date:

23-Oct-12

Sample ID:

B 518

Sampled By:

AU

Technician

JAG

Checked By:

ES

Method

 A B C

Mold Size

0.1001 FT³0.0028m³

Origin of Material

Borinquen Dam Test Fill 3b

Soil
Classification

N/A

Scale No.

2026

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8580	8570				
Mold Tare (g)	3630	3630				
Weight of Material (g)	4950	4940				
Volume of Mold (cm ³)	2800	2800.0				
Minimum Relative Density (g/cm ³)	1.768	1.764				

Result
Consistency

0.10%



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method Dry 1A Wet 1B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

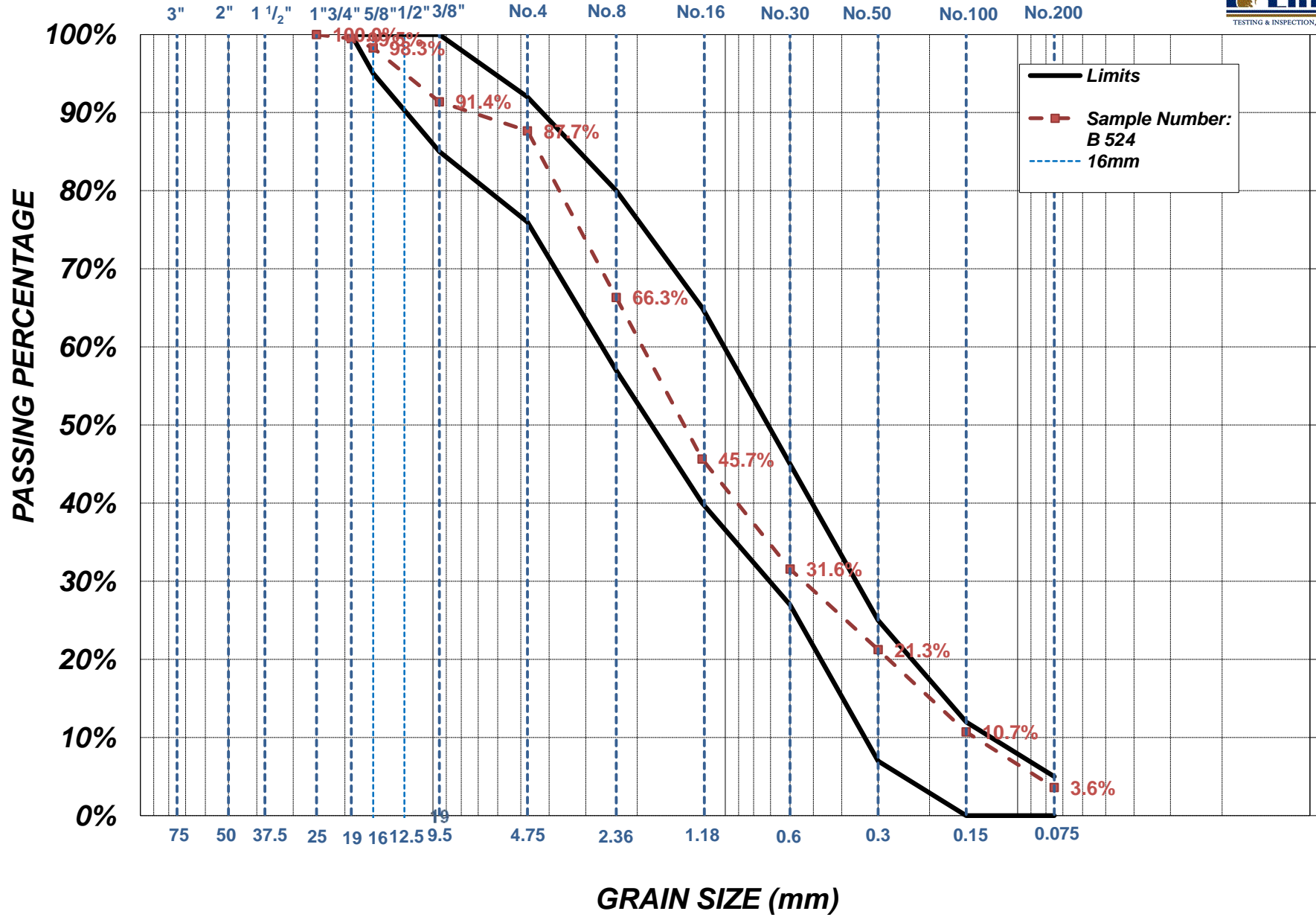
Table ID

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8580	8570				
Mold Tare (g)	3630	3630				
Weight of Material (g)	4950	4940				
Volume of Mold (cm ³)	2472	2482.0				
Wet Density (g/cm ³)	N/A	N/A				
Moisture Content (%)	N/A	N/A				
Maximum Index Dry Density (g/cm ³)	2.002	1.990				

Result Consistency

3b Filter Gradation





The Panama Canal Third Set of Locks Project

Minimum Relative Density of Soils(ASTM D4254)

Project:

Pacific

Date:

24-Oct-12

Sample ID:

B 524

Sampled By:

AU

Technician

JAG

Checked By:

ES

Method

 A B C

Mold Size

0.1001 FT³0.0028m³

Origin of Material

Borinquen Dam Test Fill 3b

Soil
Classification

N/A

Scale No.

2026

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8720	8710				
Mold Tare (g)	3630	3630				
Weight of Material (g)	5090	5080				
Volume of Mold (cm ³)	2800	2800.0				
Minimum Relative Density (g/cm ³)	1.818	1.814				

Result
Consistency

0.10%



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project:

Pacific

Date:

24-Oct-12

Sample ID:

B 524

Sampled By:

AU

Technician

JAG

Checked By:

ES

Method



Dry 1A



Wet 1B

Mold Size

0.1001 FT³0.0028m³

Origin of Material

Borinquen Dam Test Fill 3b

Soil
Classification

N/A

Scale No.

2026

Mold ID

1443

Table ID

1443

Double Amplitude of Vertical Vibration
(if different from that specified)

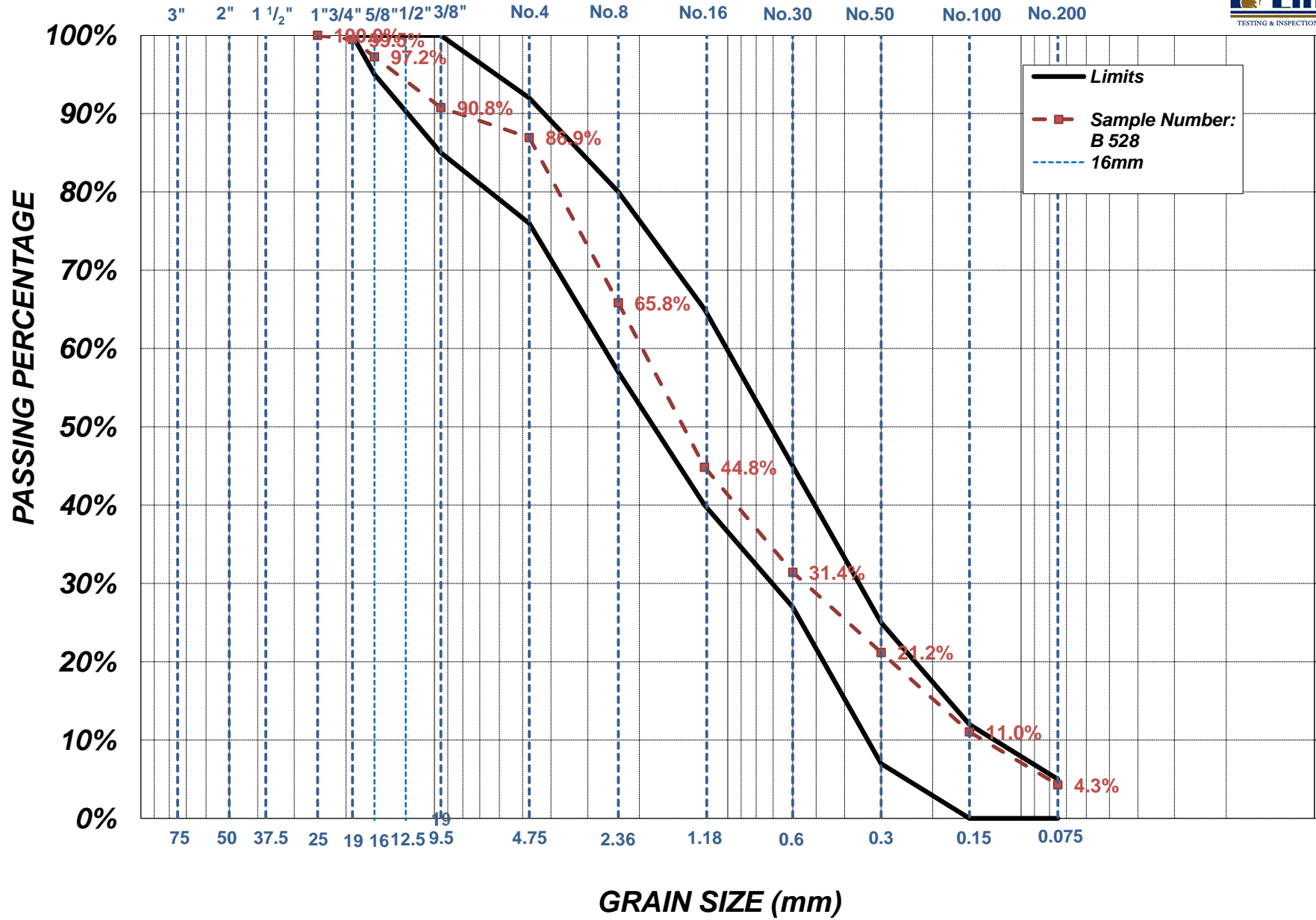
N/A

Trial	1	2	3	4	5	6
Soil + Mold (g)	8720	8710				
Mold Tare (g)	3630	3630				
Weight of Material (g)	5090	5080				
Volume of Mold (cm ³)	2525	2525				
Wet Density (g/cm ³)	N/A	N/A				
Moisture Content (%)	N/A	N/A				
Maximum Index Dry Density (g/cm ³)	2.016	2.012				

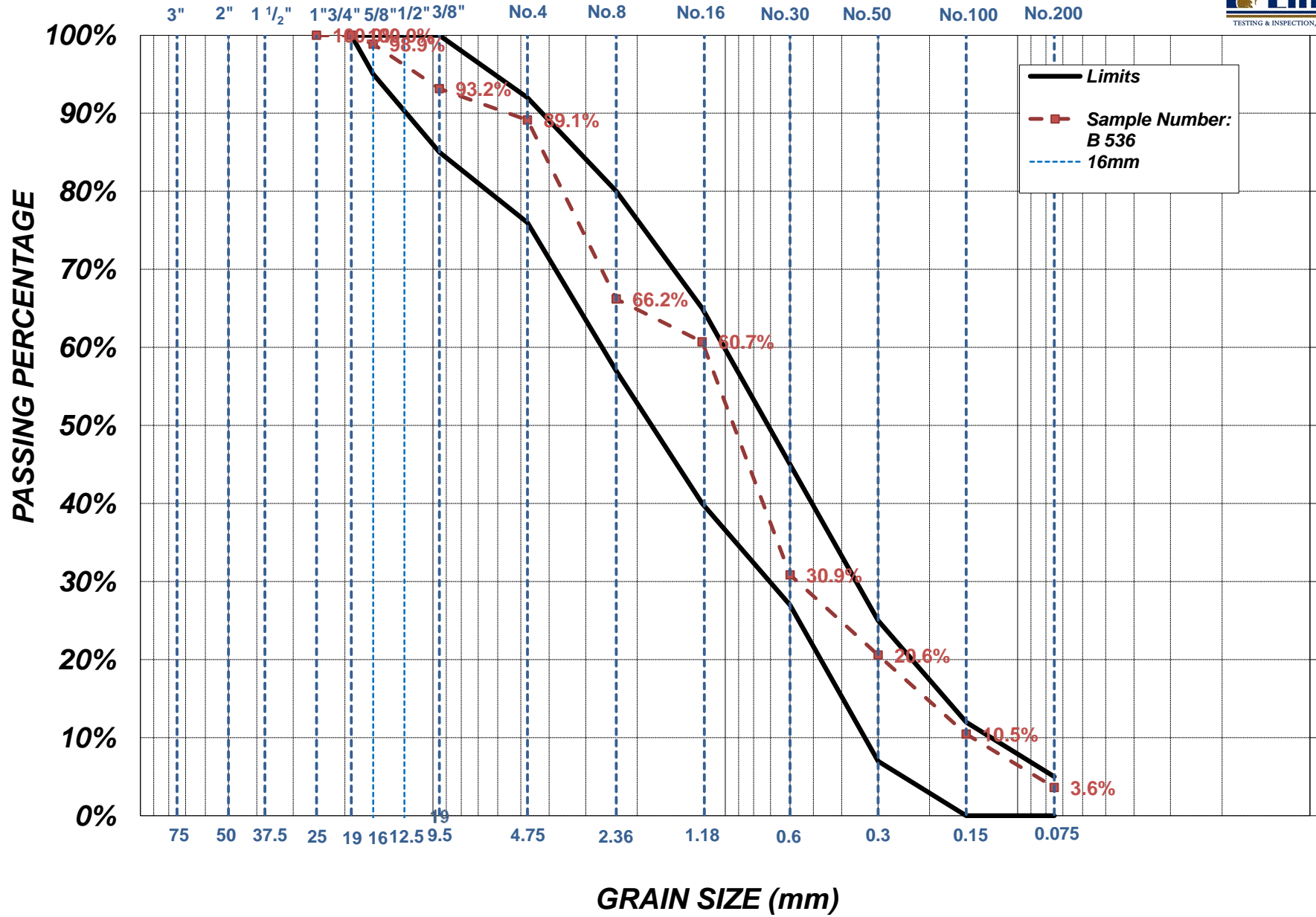
Result
Consistency

0.10%

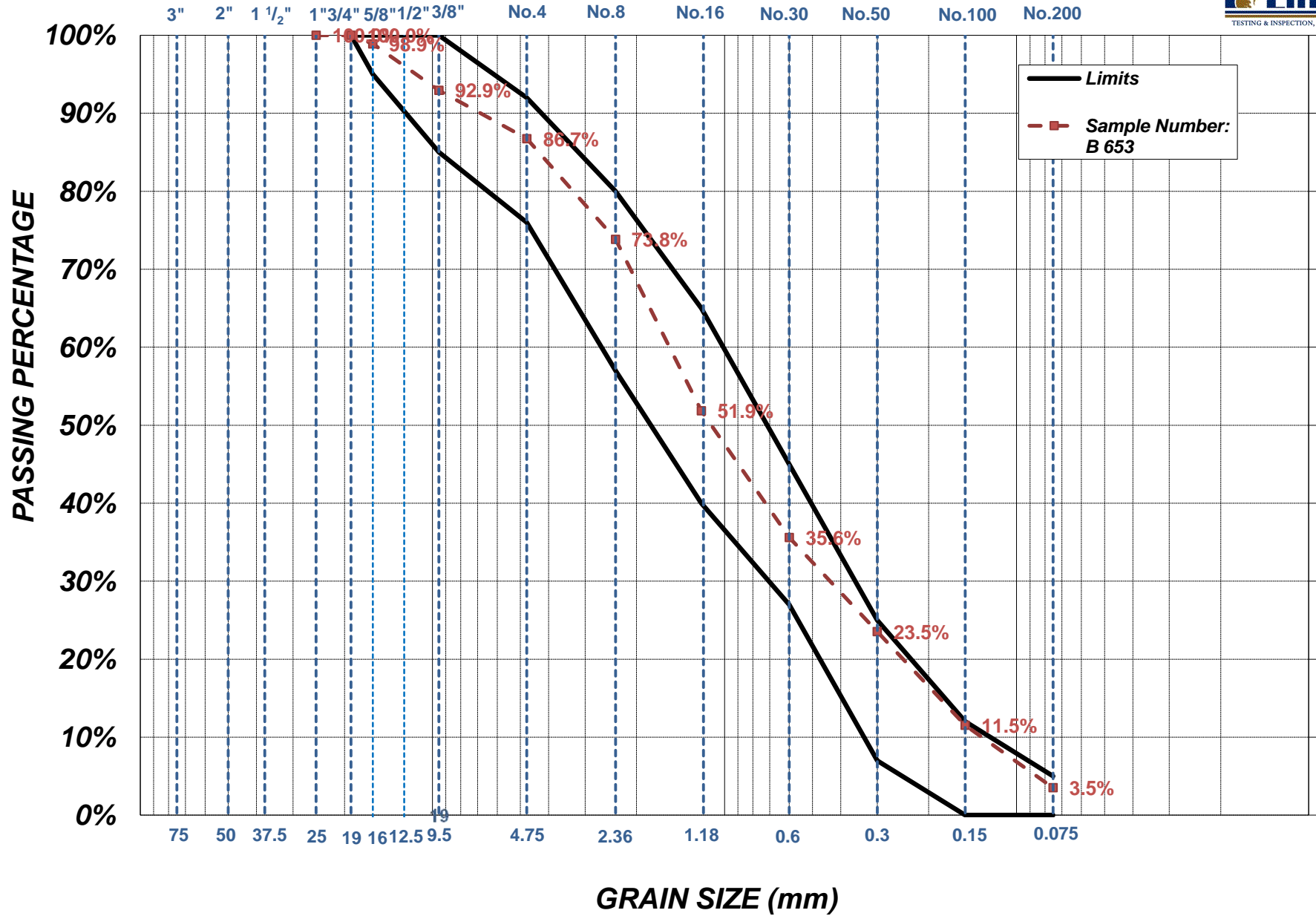
3b Filter Gradation



3b Filter Gradation



3b Filter Gradation



The Panama Canal
Third Set of Locks Project
Minimum Index Density (ASTM D4254)

Project:	Pacific	Sample Number:	B 653
Date Sampled:	15-Nov-12	Material Type:	3b Filter
Time Sampled:	11:20 AM	Material Source:	Crushig Plant
Sampled By:	CG AU	Sample Location:	Test Fill 3b 2 capa descarga

Date Tested:	11-Dec-12	Scale ID:	1453
Technician:	J A G	Table/Mold ID:	1443
		Mold Size (m ³):	0.0028

Method Used A B C

Trial	1	2	3	4
Soil + Mold (g)	8640	8620	0	0
Mold Tare (g)	3634	3634	3634	3634
Weight of Soil (g)	5006	4986		
Volume of Material (cm ³)	2800	2800	2800	2800
Minimum Index Density (g/cm ³)	1.788	1.781		

Result Consistency 0%

Report Issued
By



Date

13-Dec-12

The Panama Canal
Third Set of Locks Project
Maximum Index Density (ASTM D4253)

Project:	Pacific	Sample Number:	B 653
Date Sampled:	15-Nov-12	Material Type:	Filter
Time Sampled:	11:20 AM	Material Source:	Crushig Plant
Sampled By:	CG AU	Sample Location:	Test Fill 3b 2 capa descarga


Date Tested:	11-Dec-12	Scale ID:	1453
Technician:	J A G	Table/Mold ID:	1443
		Mold Size (m ³):	0.0028

Method Used Dry 1a Wet 1b

Trial	1	2	3	4
Soil + Mold (g)	8640	8620	0	0
Mold Tare (g)	3634	3634	3634	3634
Weight of Soil (g)	5006	4986		
Volume of Material (cm ³)	2348	2343		
Wet Density (g/cm ³)	2.132	2.128		
Moisture Content (%)	0%	0%	0%	0%
Maximum Index Dry Density (g/cm ³)	2.132	2.128		

Result Consistency 0%

Report Issued
By



Date

13-Dec-12

The Panama Canal
Third Set of Locks Project
Maximum Index Density (ASTM D4253)

Project:	Pacific	Sample Number:	B 653
Date Sampled:	15-Nov-12	Material Type:	Filter
Time Sampled:	11:20 AM	Material Source:	Crushig Plant
Sampled By:	CG AU	Sample Location:	Test Fill 3b 2 capa descarga


Date Tested:	11-Dec-12	Scale ID:	1453
Technician:	J A G	Table/Mold ID:	1443
		Mold Size (m ³):	0.0028

Method Used Dry 1a Wet 1b

Trial	1	2	3	4
Soil + Mold (g)	9840	9820	0	0
Mold Tare (g)	3634	3634	3634	3634
Weight of Soil (g)	6206	6186		
Volume of Material (cm ³)	2621	2637		
Wet Density (g/cm ³)	2.367	2.346		
Moisture Content (%)	9%	10%	0%	0%
Maximum Index Dry Density (g/cm ³)	2.166	2.142		

Result Consistency 1%

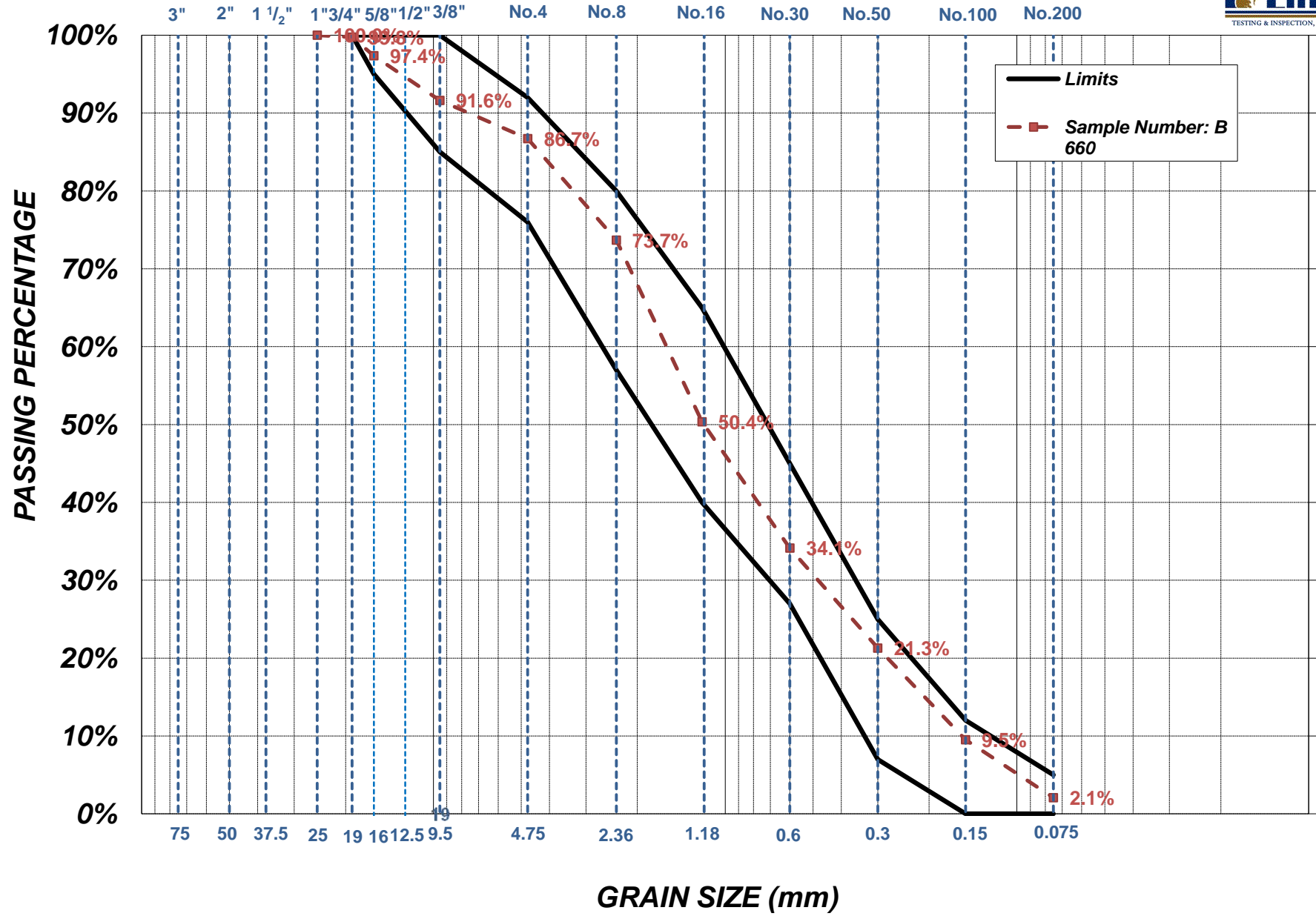
Report Issued By



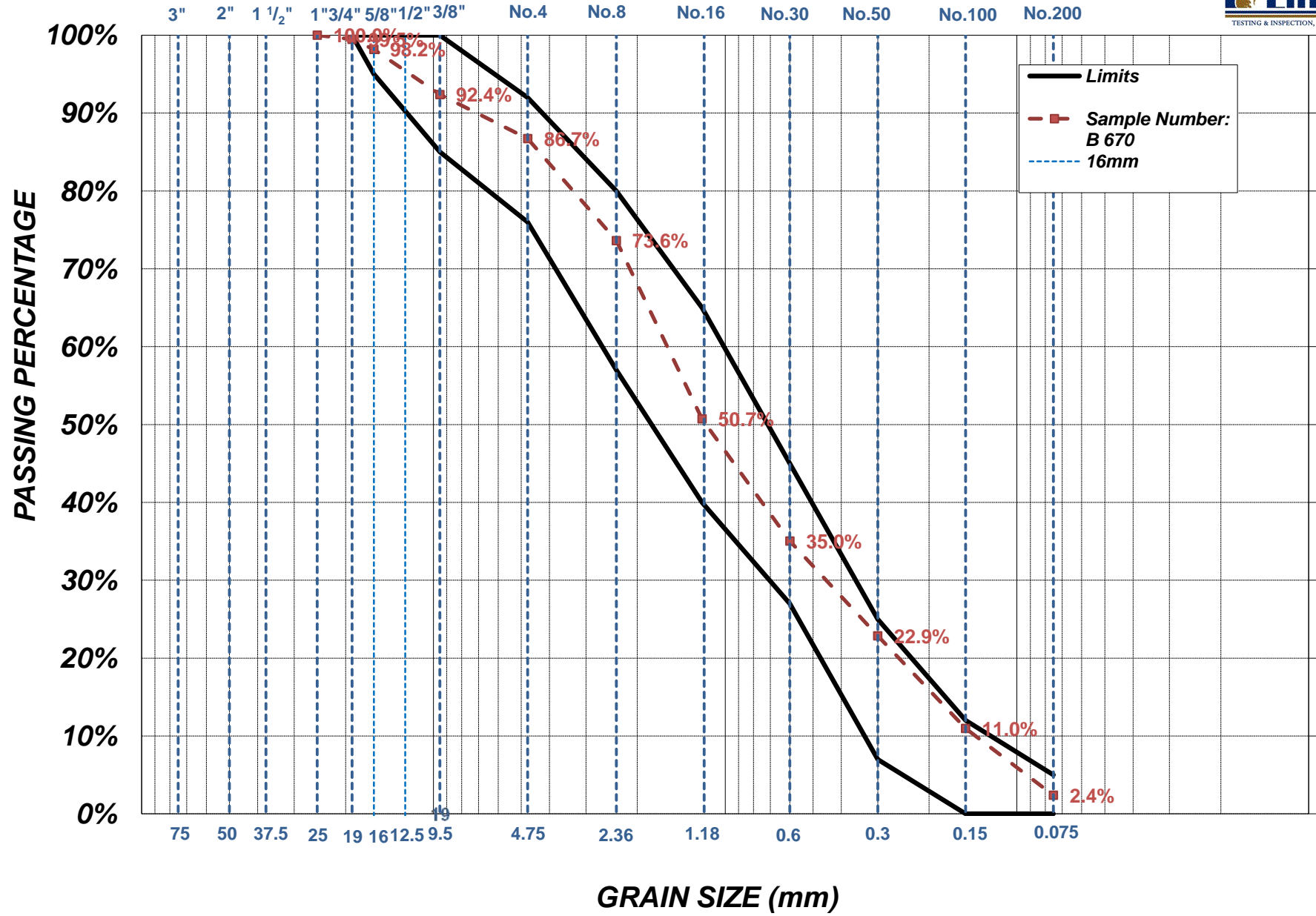
Date

13-Dec-12

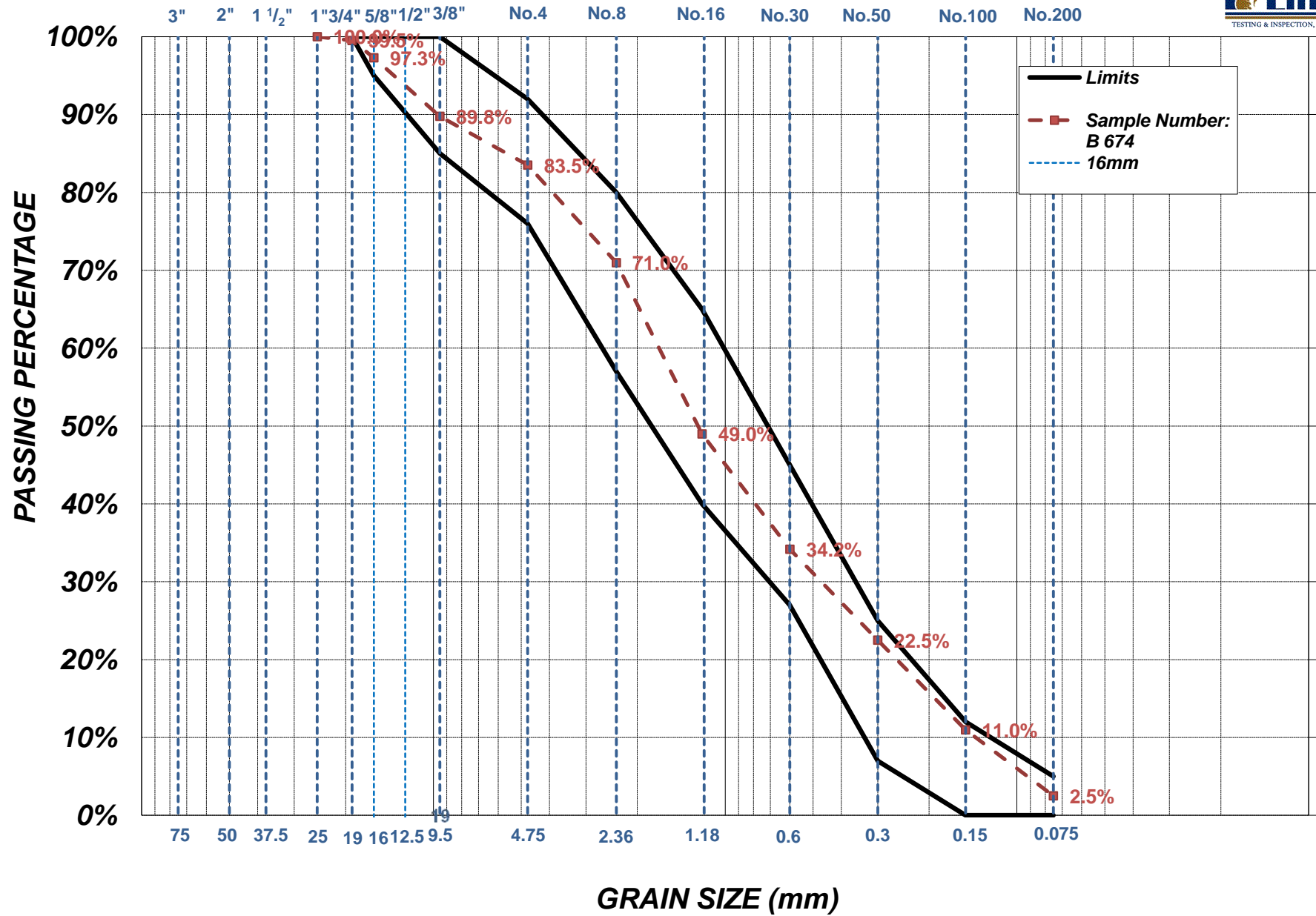
3b Filter Gradation



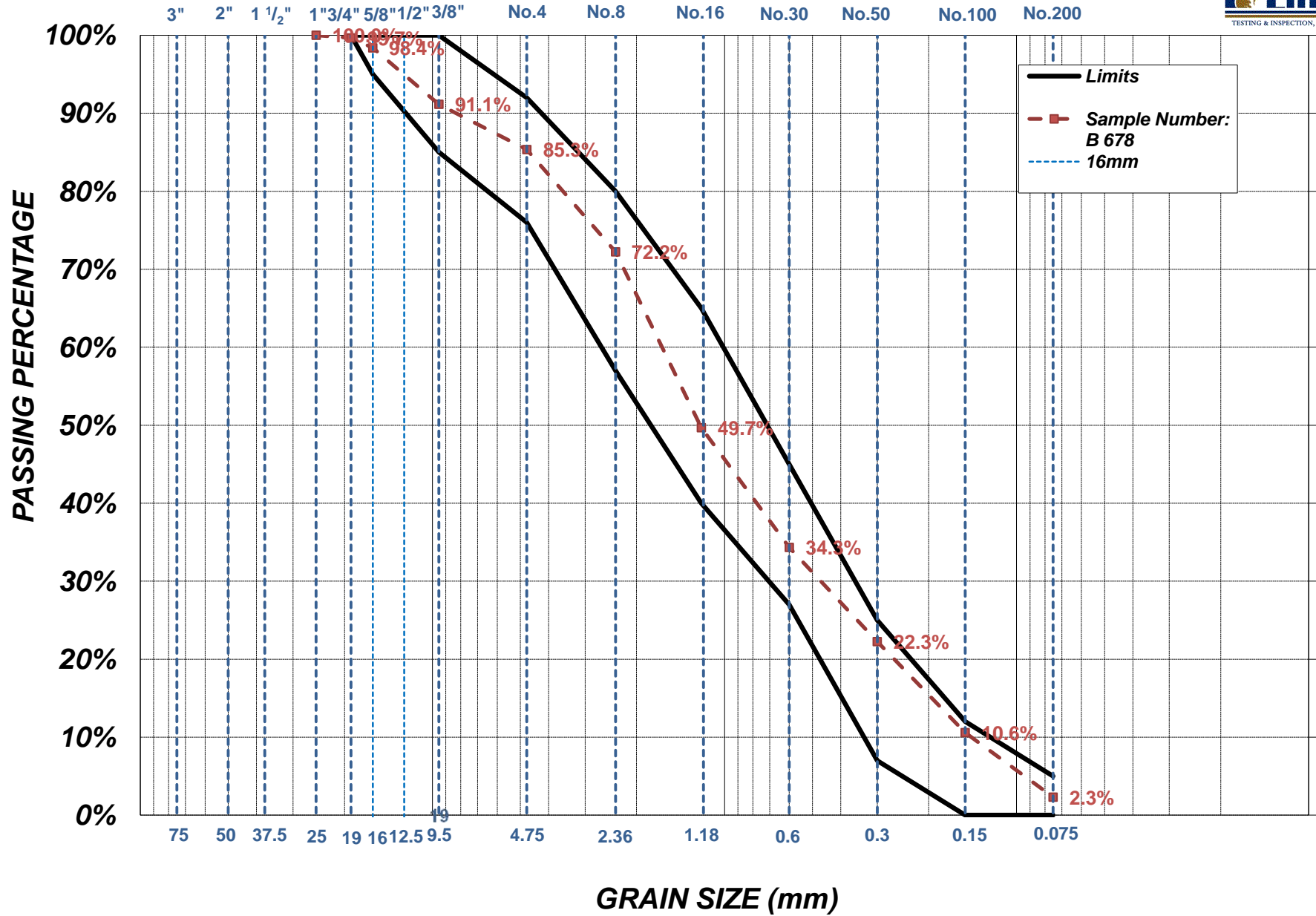
3b Filter Gradation



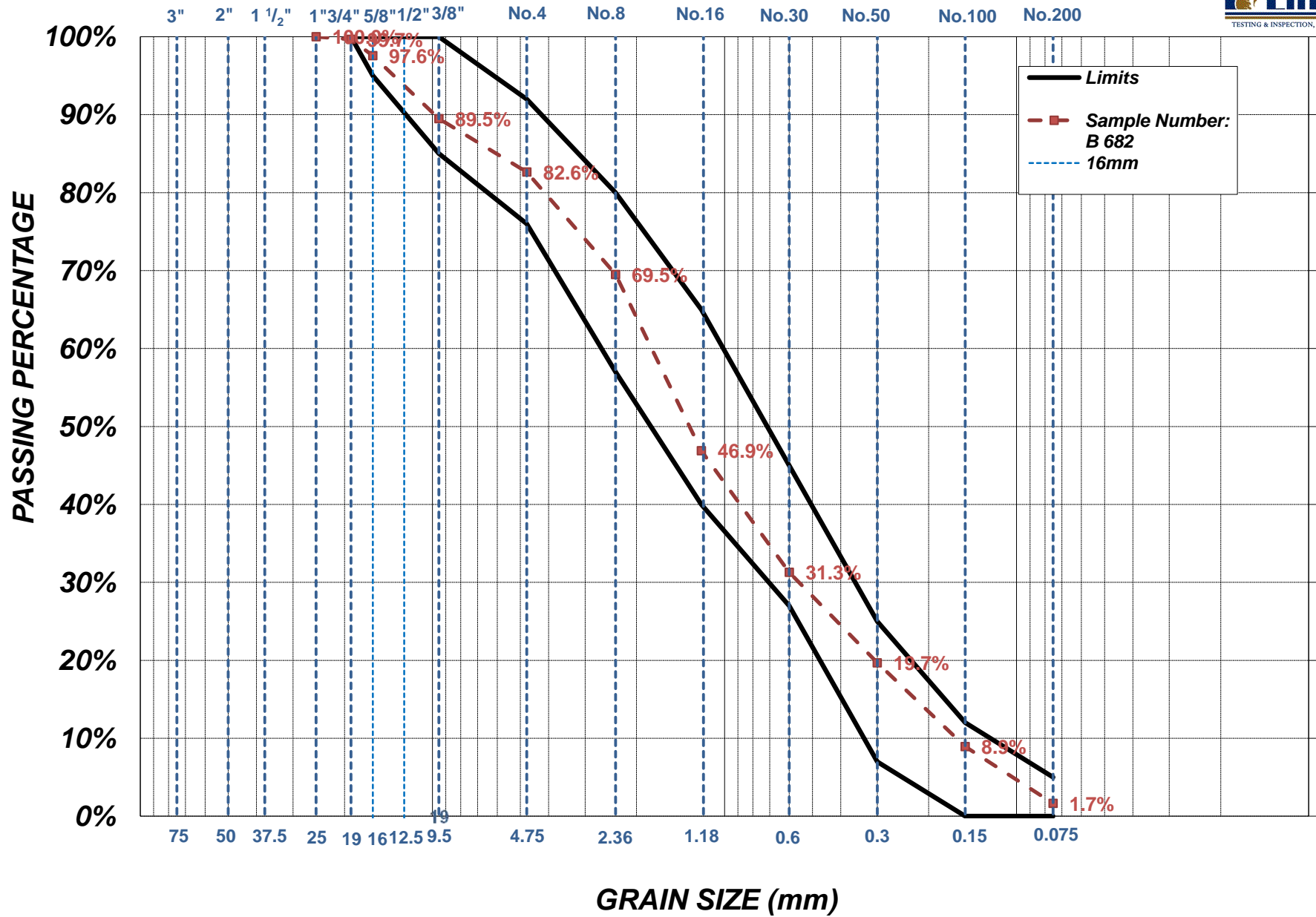
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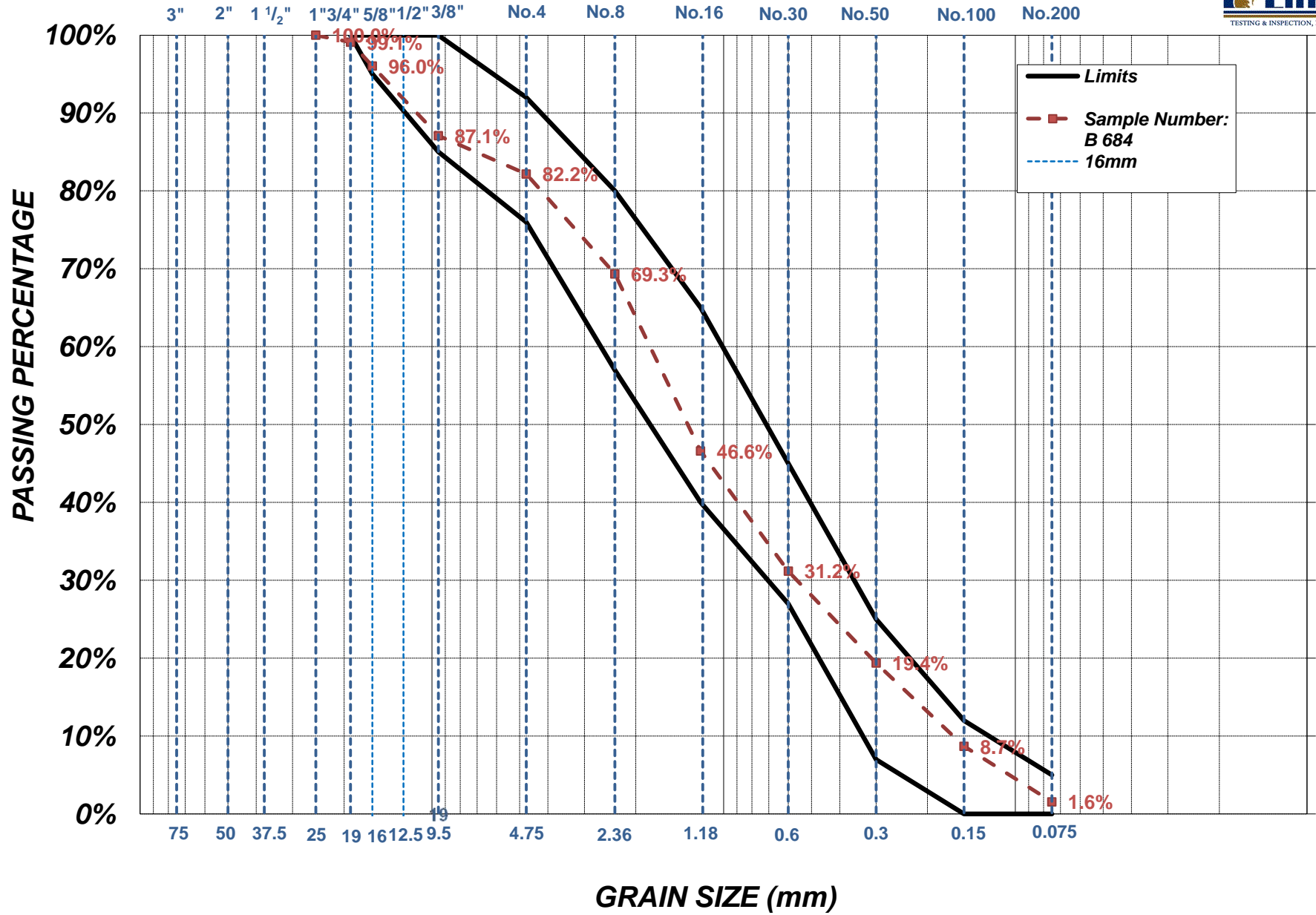
3b Filter Gradation



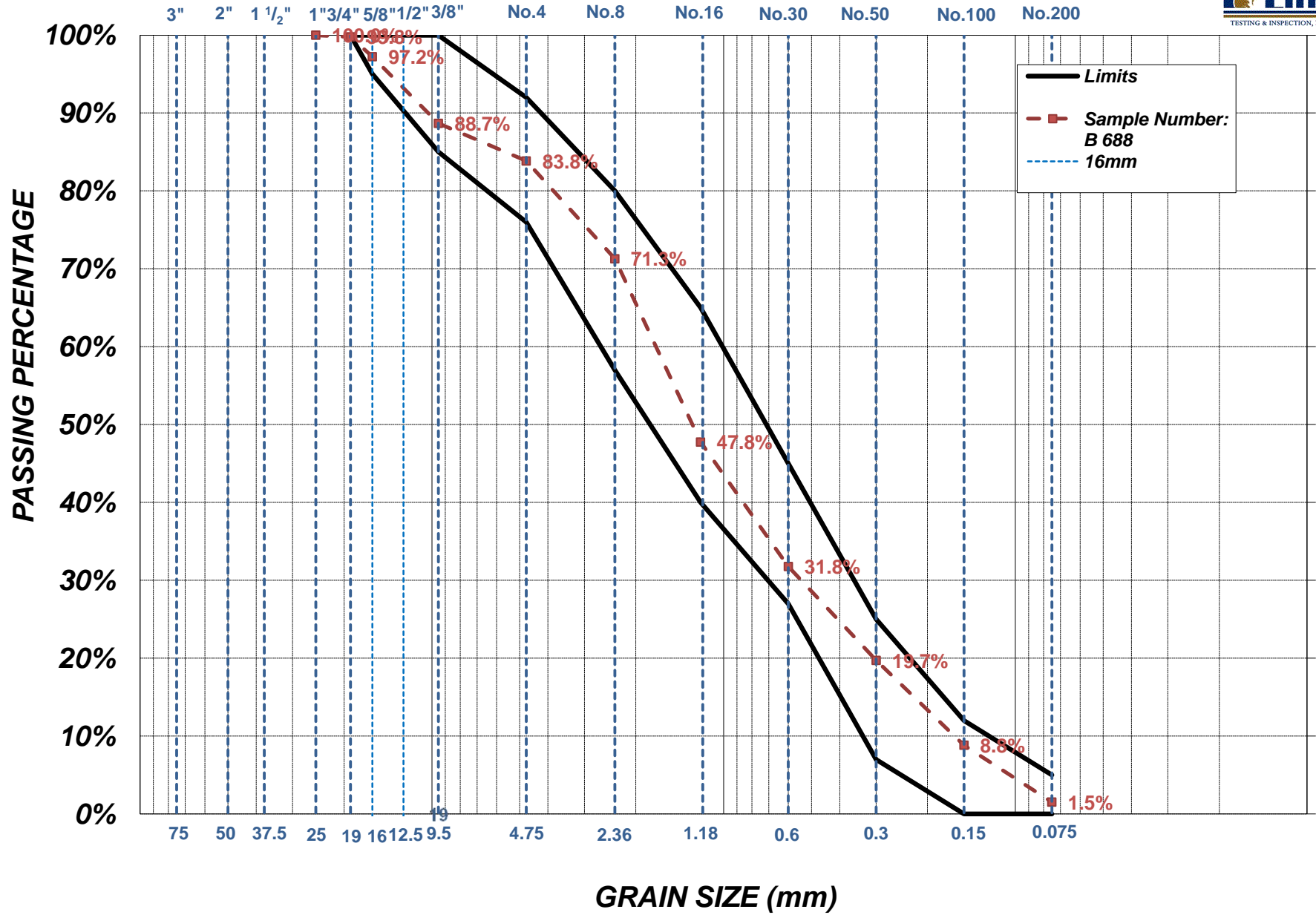
3b Filter Gradation



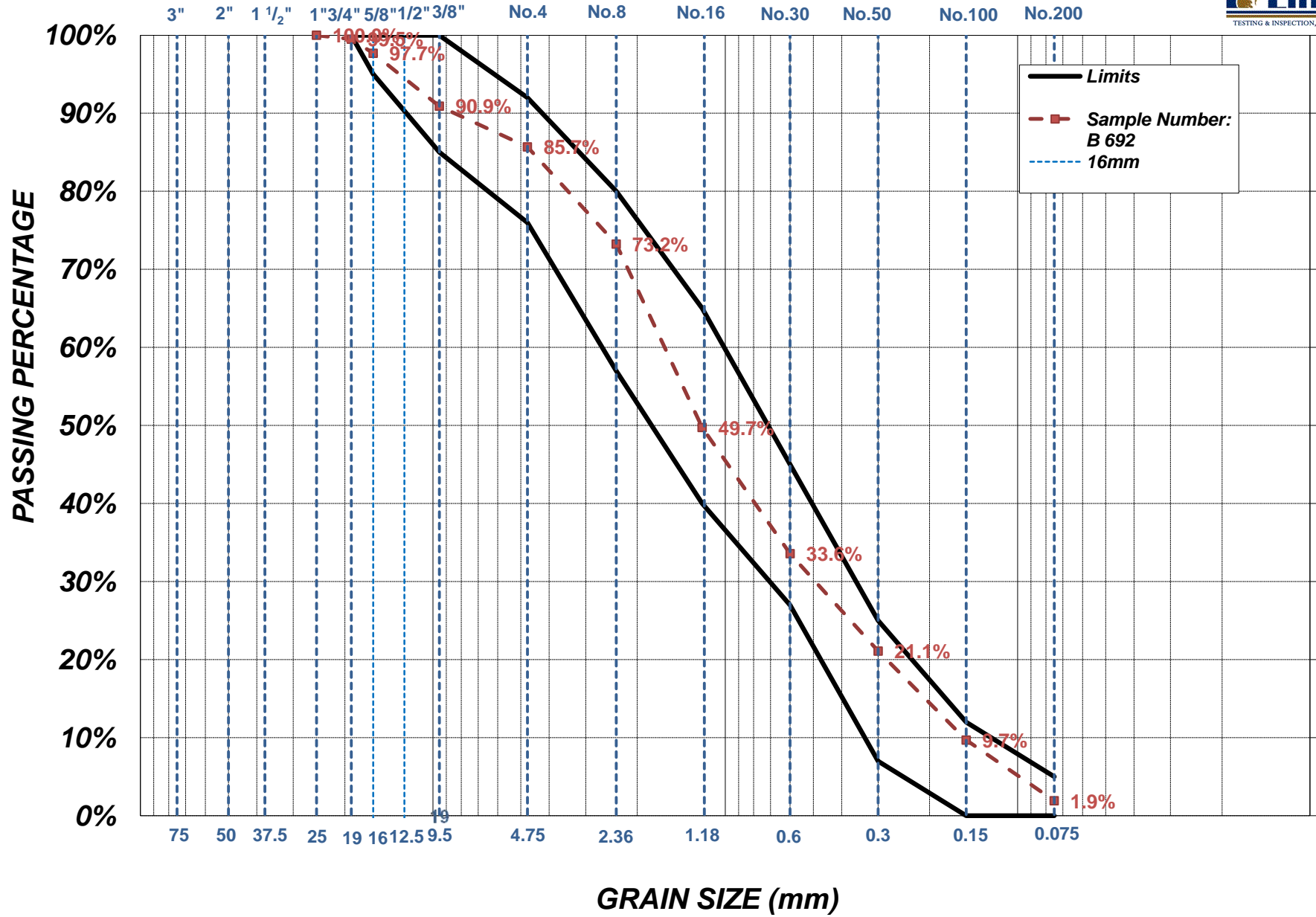
3b Filter Gradation



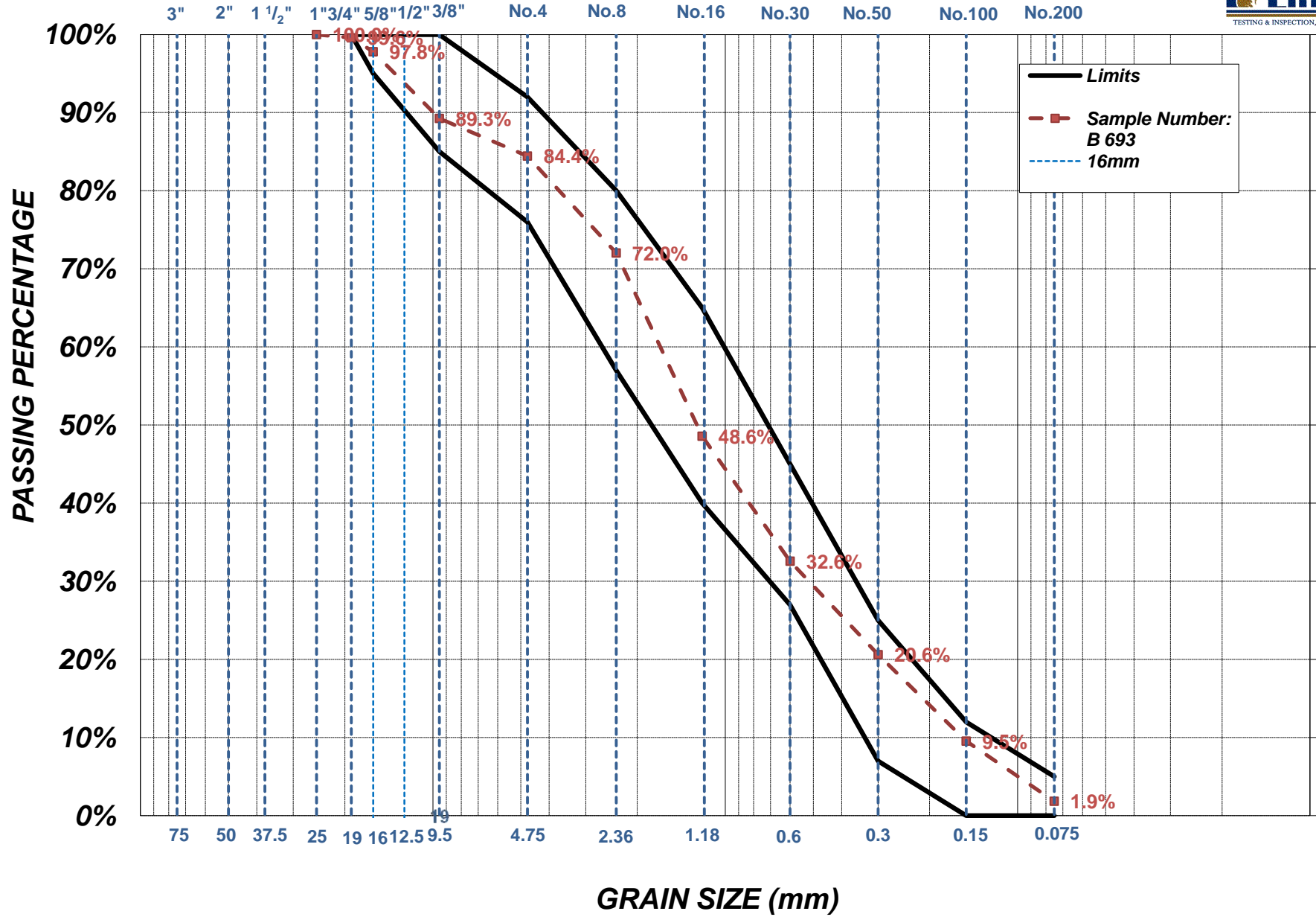
3b Filter Gradation



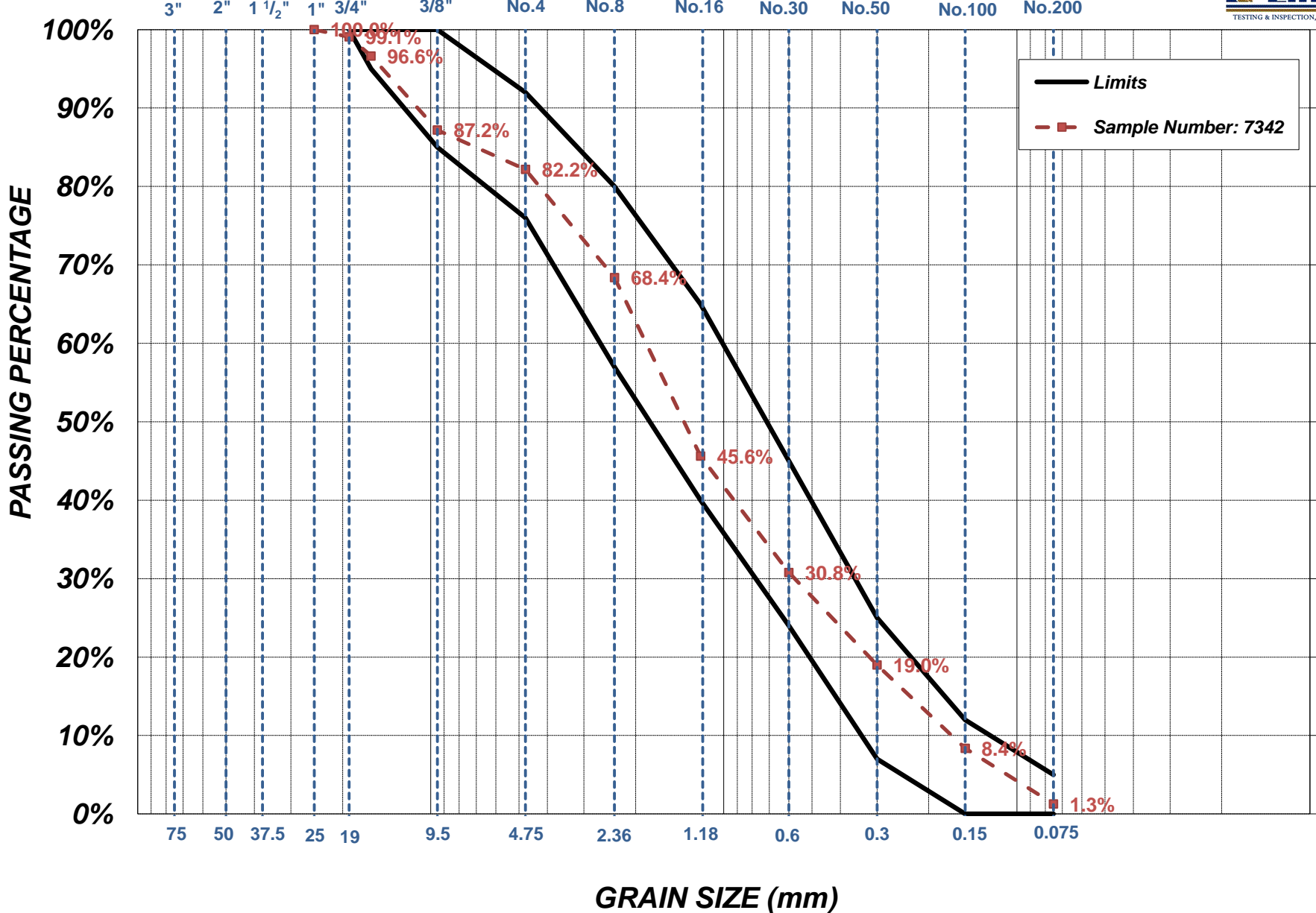
3b Filter Gradation



3b Filter Gradation



Gradation





The Panama Canal
 Third Set of Locks Project
 Gradation Analysis (ASTM C136)

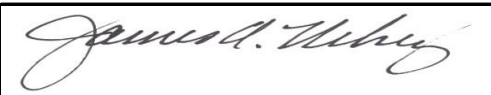
Project: Pacific Sample Number: B 702
 Date Sampled: 27-Nov-12 Material Type: 3b Filter
 Time Sampled: 11:41 AM Material Source: Crushing Plant
 Sampled By: JAG Sample Location: Test Fill Fourth Layer 1 Pass

Date Tested: 27-Nov-12 Scale ID: 1453
 Technician: AU Oven ID: Burner
 Wash Sieve ID: 1780

Wet Weight (g) 5778.0 Moisture Content 6.2%
 Dry Weight (g) 5441.6
 After Wash Weight (g) 5251.3 Wash Loss 3.5%

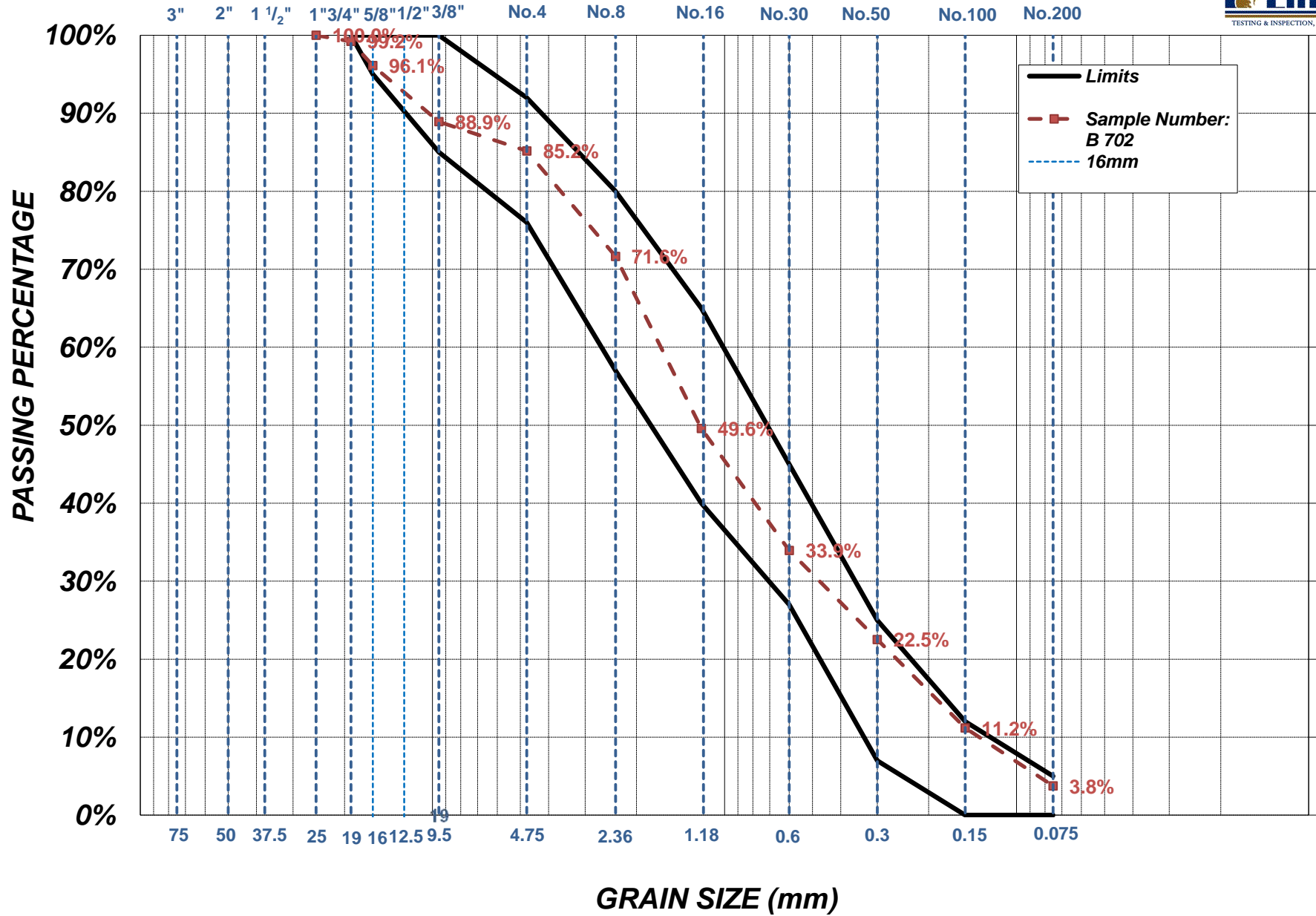
Sieve Size	Cumulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
1" (25mm)			100.0%	100	9180
3/4" (19mm)	42.4	0.8%	99.2%	100	9182
5/8" (16mm)	211.6	3.9%	96.1%	95 to 100	1630
3/8" (9.5mm)	602.7	11.1%	88.9%	85 to 100	9130
#4 (4.75mm)	807.3	14.8%	85.2%	76 to 92	9189
#8 (2.36mm)	1543.1	28.4%	71.6%	57 to 80	9158
#16 (1.2mm)	2743.5	50.4%	49.6%	40 to 65	9133
#30 (0.6mm)	3594.7	66.1%	33.9%	24 to 45	9159
#50 (0.3mm)	4216.2	77.5%	22.5%	7 to 25	9152
#100 (0.15mm)	4832.8	88.8%	11.2%	0 to 12	9195
#200 (0.075mm)	5237.2	96.2%	3.8%	0 to 5	1912
Pan	5251.3				9171

Checked By: TC Fineness Modulus _____

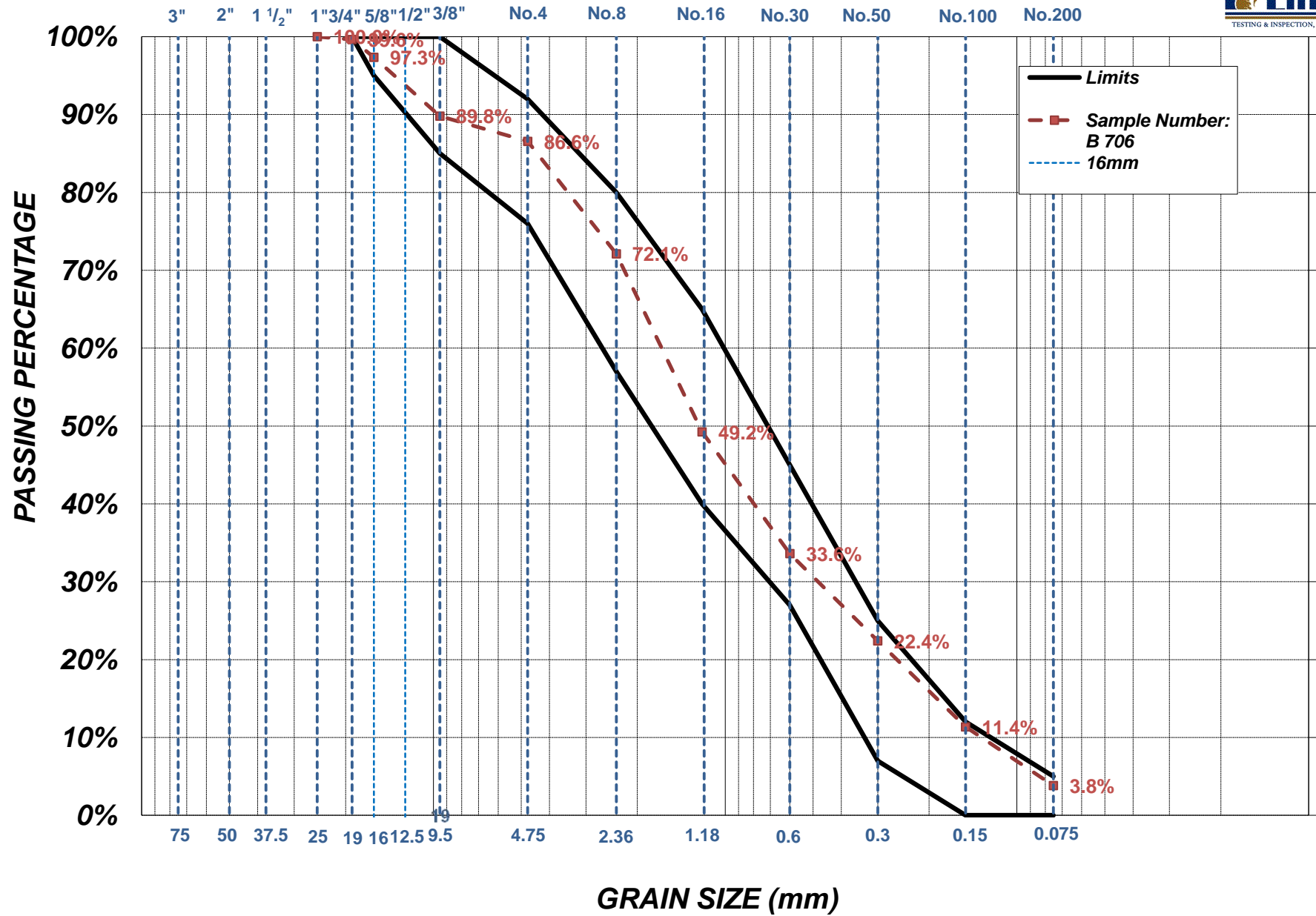
Report Issued By 

Date 28-Nov-12

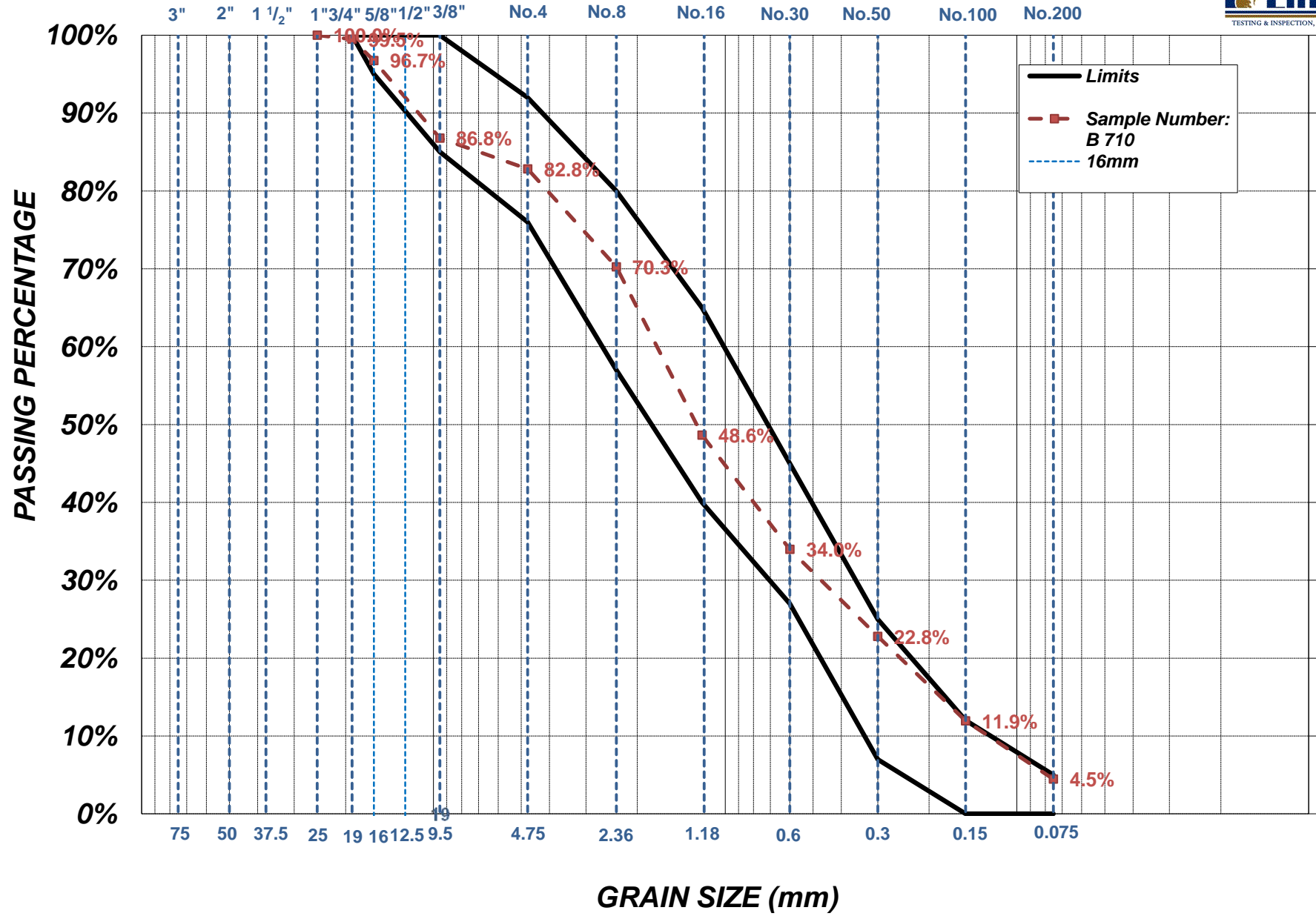
3b Filter Gradation



3b Filter Gradation



3b Filter Gradation



Robert Montalvo, note 15Dec2012:
 (ASTM D4253/D4254)Max-Min
 Relative Density results under review



The Panama Canal
 Third Set of Locks Project
 Gradation Analysis (ASTM C136)

Project: Pacific Sample Number: B 740
 Date Sampled: 29-Nov-12 Material Type: 3b Filter
 Time Sampled: 5:00 PM Material Source: Crushing Plant
 Sampled By: CG Sample Location: Test Fill Fifth Layer Discharge

Date Tested: 1-Dec-12 Scale ID: 1453
 Technician: JAG Oven ID: Burner
 Wash Sieve ID: 1780

Wet Weight (g) 6318.8 Moisture Content 6.1%
 Dry Weight (g) 5953.1
 After Wash Weight (g) 5794.2 Wash Loss 2.7%

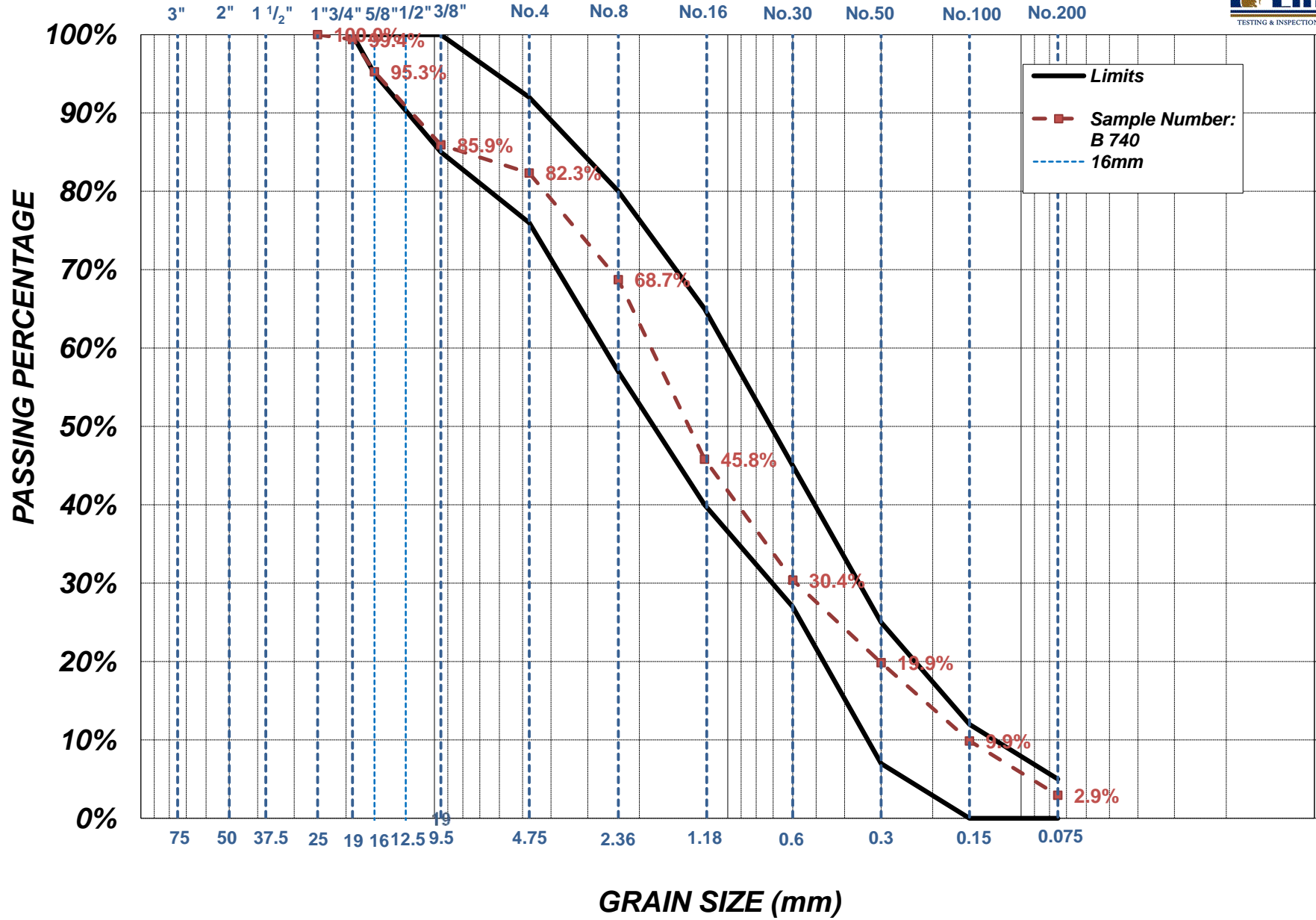
Sieve Size	Cumulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
1" (25mm)			100.0%	100	9180
3/4" (19mm)	37.5	0.6%	99.4%	100	9182
5/8" (16mm)	282.4	4.7%	95.3%	95 to 100	1630
3/8" (9.5mm)	837.1	14.1%	85.9%	85 to 100	9130
#4 (4.75mm)	1051.6	17.7%	82.3%	76 to 92	9189
#8 (2.36mm)	1861.4	31.3%	68.7%	57 to 80	9158
#16 (1.2mm)	3224.9	54.2%	45.8%	40 to 65	9133
#30 (0.6mm)	4143.7	69.6%	30.4%	24 to 45	9129
#50 (0.3mm)	4770.6	80.1%	19.9%	7 to 25	9152
#100 (0.15mm)	5365.3	90.1%	9.9%	0 to 12	9195
#200 (0.075mm)	5777.5	97.1%	2.9%	0 to 5	1912
Pan	5794.2				9171

Checked By: IC Fineness Modulus

Report Issued By 

Date 4-Dec-12

3b Filter Gradation





The Panama Canal
Third Set of Locks Project
Gradation Analysis (ASTM C136)

Robert Montalvo, note 15Dec2012:
 (ASTM D4253/D4254)Max-Min
 Relative Density results under review

Project: <u>Pacific</u>	Sample Number: <u>B 787</u>
Date Sampled: <u>1-Dec-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>8:35 AM</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>CG</u>	Sample Location: <u>Test Fill Fifth Layer After Leveling</u>

Date Tested: <u>1-Dec-12</u>	Scale ID: <u>1453</u>
	Oven ID: <u>Burner</u>
Technician: <u>ER</u>	Wash Sieve ID: <u>1780</u>

Wet Weight (g) <u>5117.5</u>	Moisture Content <u>6.0%</u>
Dry Weight (g) <u>4827.0</u>	
After Wash Weight (g) <u>4706.0</u>	Wash Loss <u>2.5%</u>

Sieve Size	Cumulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
1" (25mm)			100.0%	100	1232
3/4" (19mm)	0		100.0%	100	9144
5/8" (16mm)	183	3.8%	96.2%	95 to 100	1228
3/8" (9.5mm)	669	13.9%	86.1%	85 to 100	1225
#4 (4.75mm)	833	17.3%	82.7%	76 to 92	1939
#8 (2.36mm)	1491	30.9%	69.1%	57 to 80	1973
#16 (1.2mm)	2613	54.1%	45.9%	40 to 65	9159
#30 (0.6mm)	3328	68.9%	31.1%	24 to 45	9156
#50 (0.3mm)	3842	79.6%	20.4%	7 to 25	1925
#100 (0.15mm)	4336	89.8%	10.2%	0 to 12	9153
#200 (0.075mm)	4698	97.3%	2.7%	0 to 5	1958
Pan	4706				1239

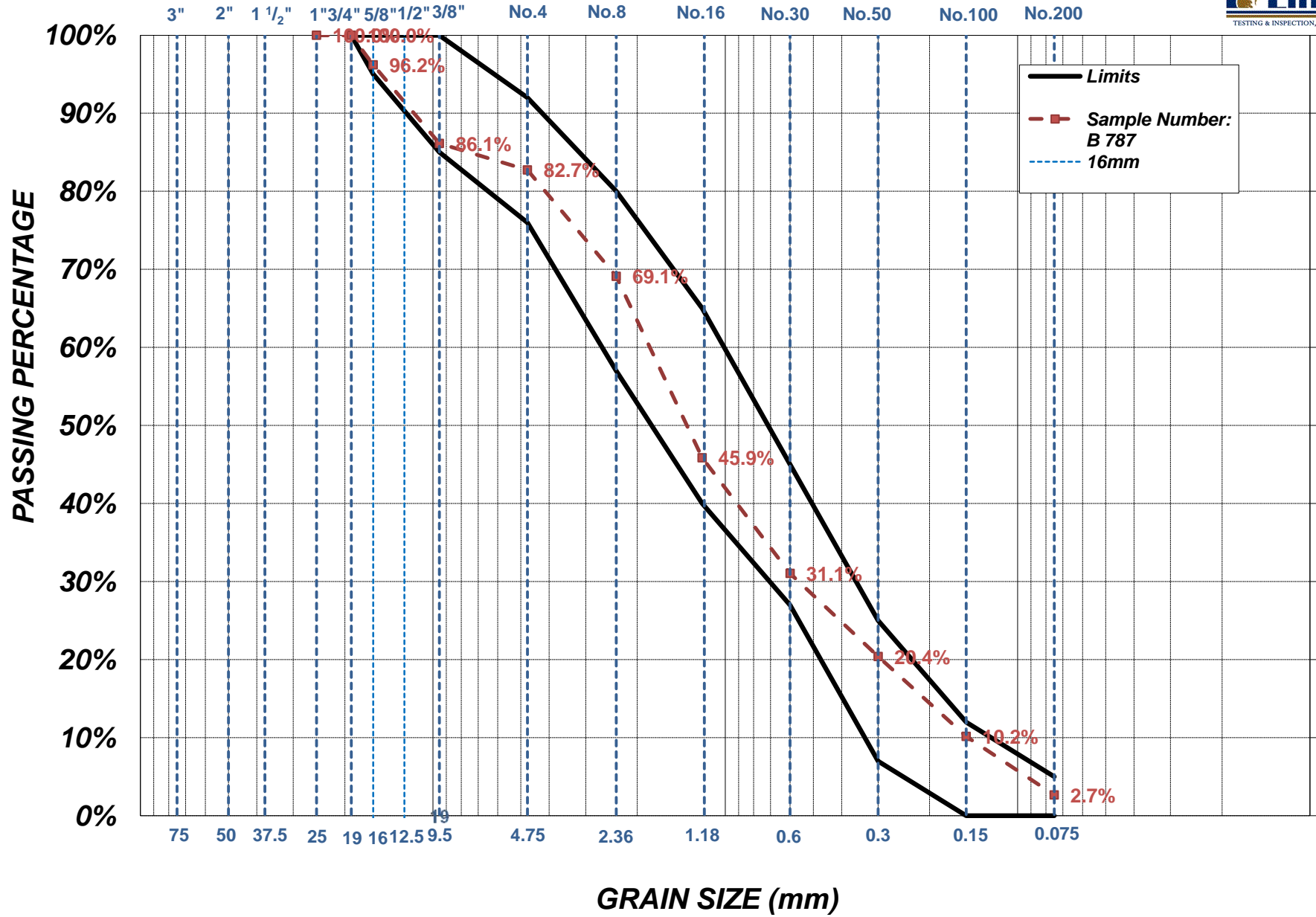
Checked By: IC Fineness Modulus

Report Issued
By

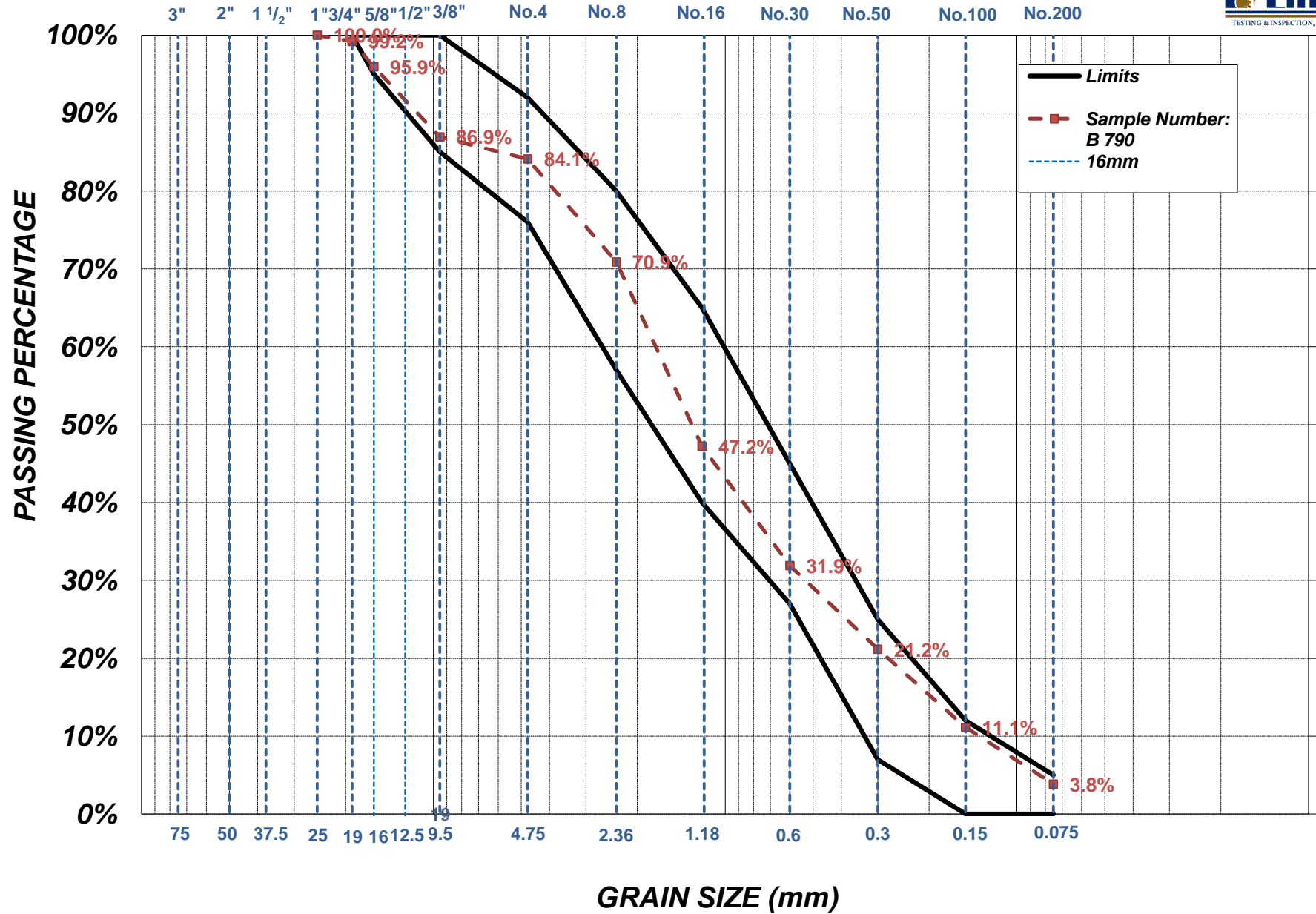
Date

4-Dec-12

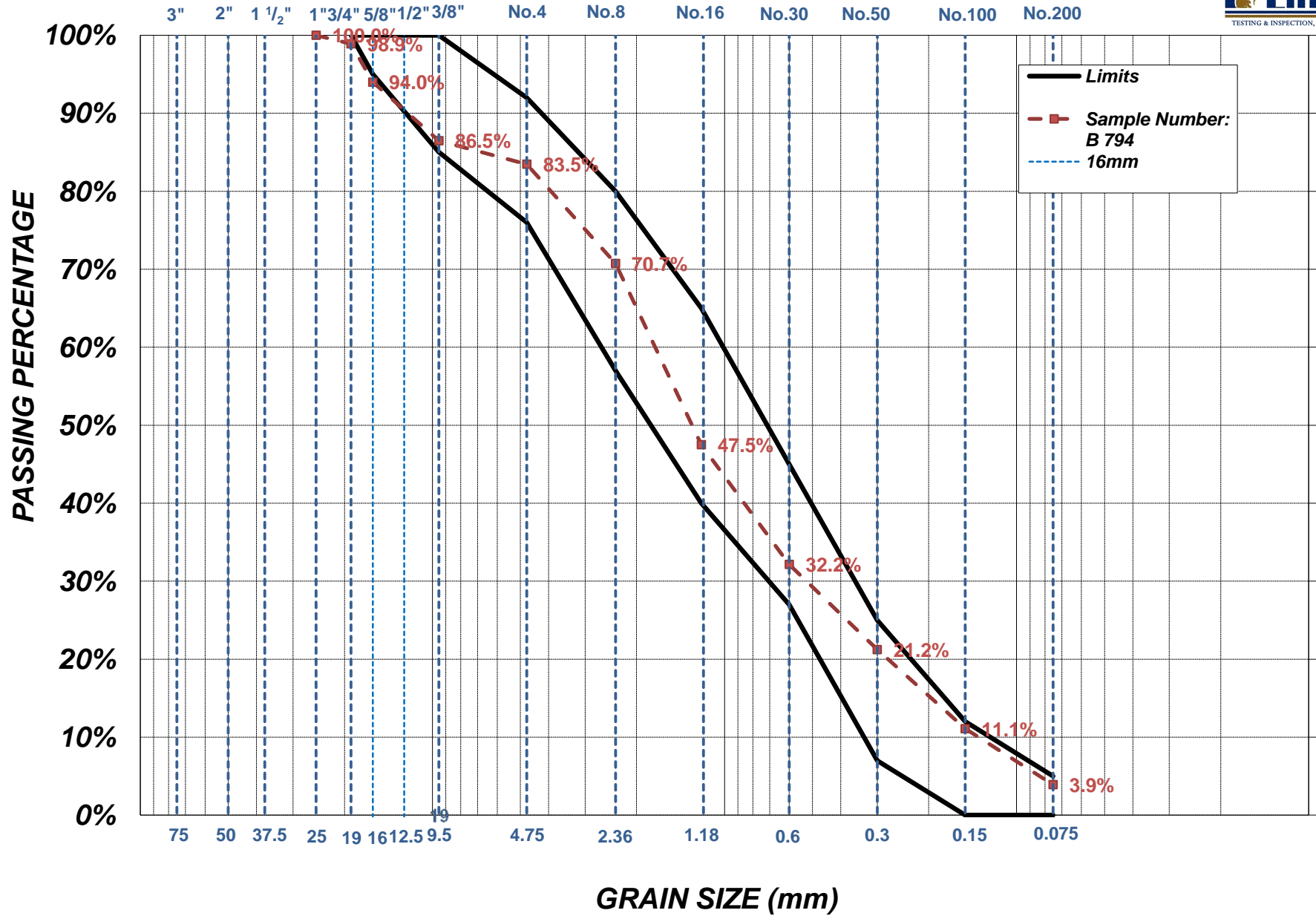
3b Filter Gradation



3b Filter Gradation



3b Filter Gradation



Robert Montalvo, note 15Dec2012:
 (ASTM D4253/D4254)Max-Min
 Relative Density results under review



The Panama Canal
 Third Set of Locks Project
 Gradation Analysis (ASTM C136)

Project:	Pacific	Sample Number:	B 797
Date Sampled:	1-Dec-12	Material Type:	3b Filter
Time Sampled:	5:00 PM	Material Source:	Crushing Plant
Sampled By:	JAG	Sample Location:	Test Fill 3b Fifth Layer 3 Passes

Date Tested:	3-Dec-12	Scale ID:	1130
Technician:	AM	Oven ID:	Burner
		Wash Sieve ID:	1780

Wet Weight (g)	6054.0	Moisture Content	6.1%
Dry Weight (g)	5705.0		
After Wash Weight (g)	5509.0	Wash Loss	3.4%

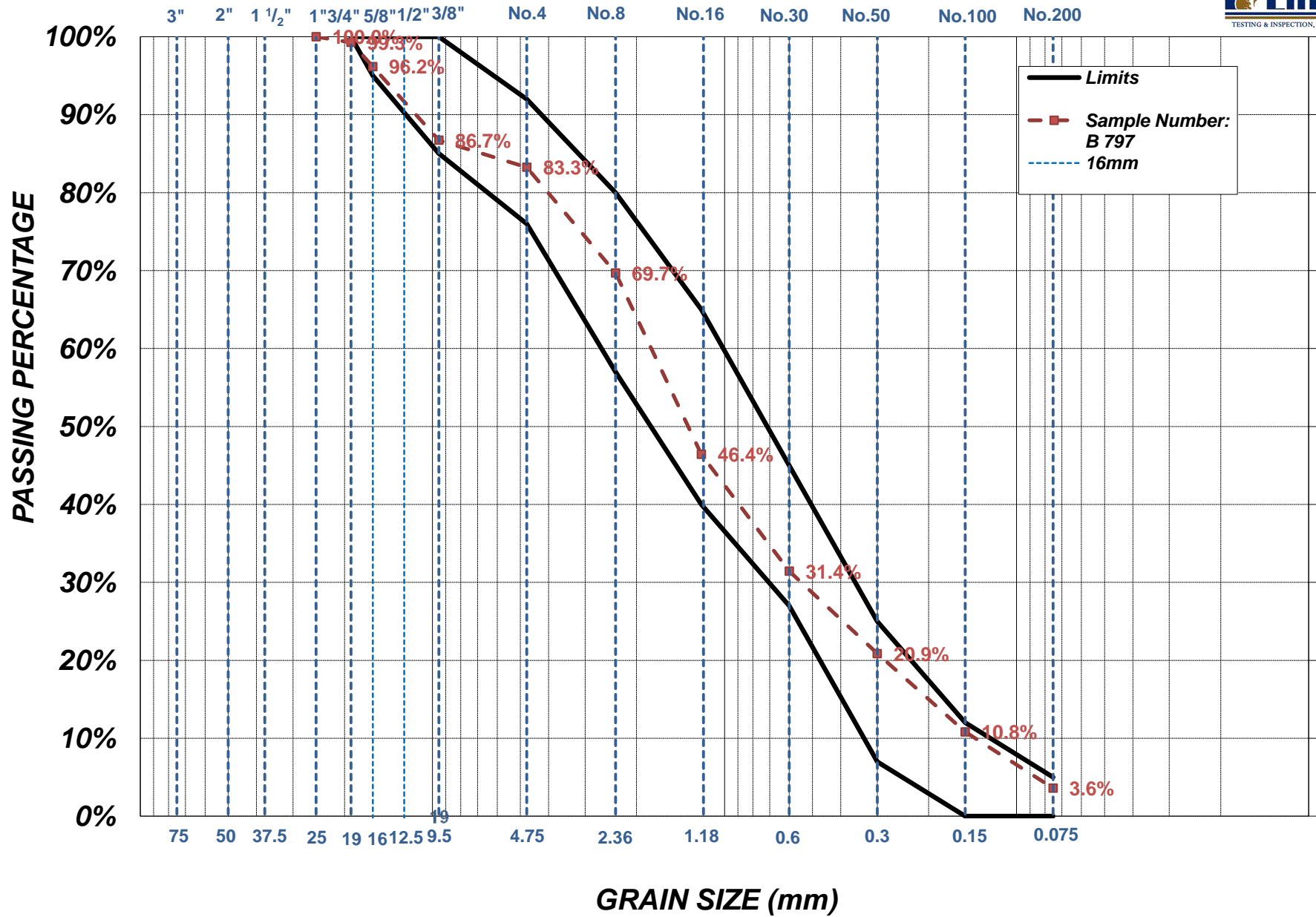
Sieve Size	Cumulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
1" (25mm)			100.0%	100	1232
3/4" (19mm)	41	0.7%	99.3%	100	9138
5/8" (16mm)	219	3.8%	96.2%	95 to 100	1228
3/8" (9.5mm)	757	13.3%	86.7%	85 to 100	1225
#4 (4.75mm)	955	16.7%	83.3%	76 to 92	1939
#8 (2.36mm)	1729	30.3%	69.7%	57 to 80	1973
#16 (1.2mm)	3056	53.6%	46.4%	40 to 65	9159
#30 (0.6mm)	3911	68.6%	31.4%	24 to 45	9156
#50 (0.3mm)	4515	79.1%	20.9%	7 to 25	1925
#100 (0.15mm)	5088	89.2%	10.8%	0 to 12	9153
#200 (0.075mm)	5499	96.4%	3.6%	0 to 5	1958
Pan	5509				1239

Checked By: IC Fineness Modulus

Report Issued By 

Date 6-Dec-12

3b Filter Gradation



APÉNDICE 6:

RESULTADOS DE
ENSAYO PROCTOR ESTÁNDAR

The Panama Canal Third Set of Locks Project

Lab Compaction (ASTM D1557, D698)

Project Name:

Technican:

Method

Sample No:

Date Sampled:

Preperation Method

Group Name :

Checked by:

As Received Moisture (%)

Soil Description:

Specific Gravity

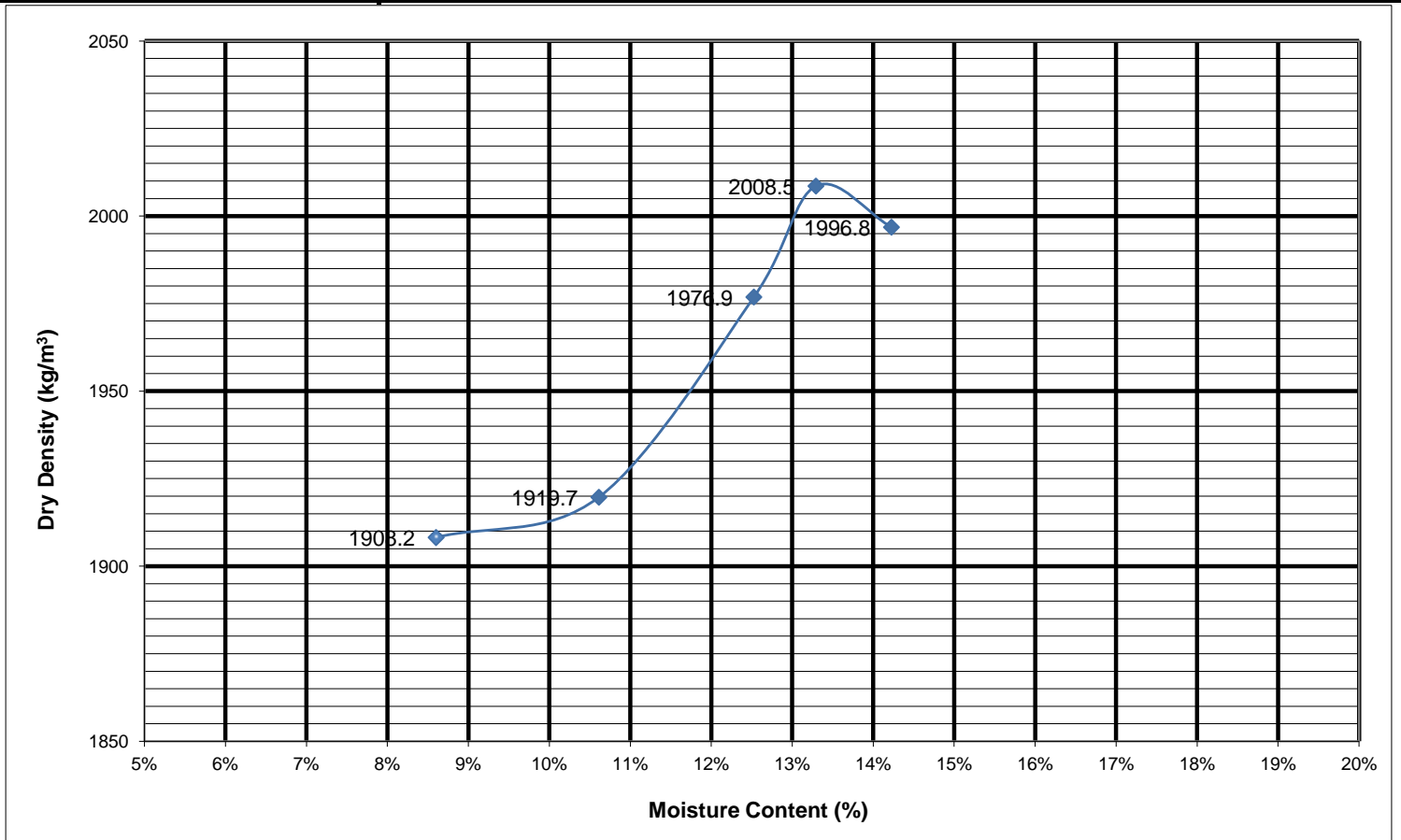
Scale ID Scale Check

Hammer ID

Mold ID

Specific Gravity Method

Scalp Fraction		Wet Density Determination					
Hammer Wt. (kg)	2.5 kg	Soil + Mold (kg)	6.335	6.383	6.478	6.526	6.531
Mold Size (m³)	0.0009	Mold Tare (kg)	4.387	4.387	4.387	4.387	4.387
Drop Ht. (mm)	305	Wet Wt. Of Soil (kg)	1.948	1.996	2.091	2.139	2.144
Blows per Layer	25	Wet Density (kg/m³)	2072.3	2123.4	2224.5	2275.5	2280.9
No. of Layer	3	Moisture Content Determination					
Type of Hammer	Mechanical	Wet Wt. Of Soil (g)	505.0	542.0	548.0	554.0	538.0
Results:		Dry Wt. Of Soil (g)	465.0	490.0	487.0	489.0	471
Maximum Density (kg/m³) :	2009	Moisture Content (%)	8.6%	10.6%	12.5%	13.3%	14.2%
Optimum Moisture (%) :	13.4	Dry Density (kg/m³)	1908.2	1919.7	1976.9	2008.5	1996.8



APÉNDICE 7:

RESULTADOS DE
ENSAYOS DEL CONO DE ARENA

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Jul-12	Time Sampled	7:50 AM
Sample Number	B - 213	Material Type	3a Filter - 8 Pass	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC,CG		
Material Source	Test Fill Borinquen Dam 8 Pass Q1			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Borinquen Dam				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
Issued By	N/A	Date Issued	N/A	<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		

Are there any visual abnormalities in the sample? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes who received the client instructions regarding handing the sample?	Initial N/A
Client instructions regarding abnormal sample	N/A	

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By	Robert J. Montalvo
Checked By	RJMh
Report Issue Date	19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	14-Jul-12
Sample No:	B - 213	Elevation:	N/A	Time:	7:50 AM
Sand Cone ID:	7035	Calibrated Volume:	N/A	Technician:	EC,CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534	
C	Wt. Of Soil Excavated (kg)	3435.300	
D	Initial Wt. Of Sand & Jar (kg)	8.244.1	
E	Wt. Of Residue & Jar (kg)	4.493.5	
F	Wt. Of Sand Used (kg) D - E	3.750.6	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.238.6	
I	Volume of Hole (m ³) H / B	0.00145893	

	Wet Density (kg/m ³) C / I	2354.71	
	Wet Weight of Soil (g)	855.5	
	Dry Weight of Soil (g)	810.2	
	% Moisture	5.6	
	Dry Density (kg/m ³)	2229.61	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2068	
T	Compaction (%)	146.7*	

* Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Jul-12	Time Sampled	8:00 AM
Sample Number	B - 214	Material Type	3a Filter - 8 Pass	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC,CG		
Material Source	Test Fill Borinquen Dam 8 Pass Q8			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Borinquen Dam				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	14-Jul-12
Sample No:	B - 213	Elevation:	N/A	Time:	8:00 AM
Sand Cone ID:	3106	Calibrated Volume:	N/A	Technician:	EC,CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534	
C	Wt. Of Soil Excavated (kg)	3123.500	
D	Initial Wt. Of Sand & Jar (kg)	8270.900	
E	Wt. Of Residue & Jar (kg)	4741.5	
F	Wt. Of Sand Used (kg) D - E	3529.400	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2017.400	
I	Volume of Hole (m ³) H / B	0.001315123	

	Wet Density (kg/m ³) C / I		2375.06
	Wet Weight of Soil (g)		820.2
	Dry Weight of Soil (g)		779.7
	% Moisture		5.2
	Dry Density (kg/m ³)		2257.66
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2068	
T	Compaction (%)	154.3*	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Jul-12	Time Sampled	8:00 AM
Sample Number	B - 215	Material Type	3a Filter - 12 Pass	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC,CG		
Material Source	Test Fill Borinquen Dam 12 Pass Q6			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Leveling Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By	Robert J. Montalvo
Checked By	RJMh
Report Issue Date	19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	14-Jul-12
Sample No:	B - 215	Elevation:	N/A	Time:	10:40 AM
Sand Cone ID:	848	Calibrated Volume:	N/A	Technician:	EC

	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534	
C	Wt. Of Soil Excavated (kg)	3287.400	
D	Initial Wt. Of Sand & Jar (kg)	8035.900	
E	Wt. Of Residue & Jar (kg)	4447.1	
F	Wt. Of Sand Used (kg) D - E	3.589	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.077	
I	Volume of Hole (m ³) H / B	0.001353846	

	Wet Density (kg/m ³) C / I		2428.19
	Wet Weight of Soil (g)		759
	Dry Weight of Soil (g)		721.9
	% Moisture		5.1
	Dry Density (kg/m ³)		2310.36
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2.061	
T	Compaction (%)	153.6*	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Jul-12	Time Sampled	11:00 AM
Sample Number	B - 216	Material Type	3a Filter - 12 Pass	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC,CG		
Material Source	Test Fill Borinquen Dam 12 Pass Q4			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column <input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Sample Location	Leveling Layer						
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial <div style="border: 1px solid black; padding: 2px; text-align: center;">N/A</div>		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample?

Initial

N/A

Client instructions regarding abnormal sample

N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By

Robert J. Montalvo

Checked By

RJMh

Report Issue Date

19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	14-Jul-12
Sample No:	B - 216	Elevation:	N/A	Time:	11:00 AM
Sand Cone ID:	848	Calibrated Volume:	N/A	Technician:	EC

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534.0	
C	Wt. Of Soil Excavated (kg)	3345.90	
D	Initial Wt. Of Sand & Jar (kg)	8019.50	
E	Wt. Of Residue & Jar (kg)	4359.3	
F	Wt. Of Sand Used (kg) D - E	3660.20	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.148	
I	Volume of Hole (m ³) H / B	0.001400391	
	Wet Density (kg/m ³) C / I		2389.26
	Wet Weight of Soil (g)		924.2
	Dry Weight of Soil (g)		881.5
	% Moisture		4.8
	Dry Density (kg/m ³)		2279.83
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2061	
T	Compaction (%)	147.8*	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Jul-12	Time Sampled	11:20 AM
Sample Number	B - 217	Material Type	3a Filter - 12 Pass	Date Tested	14-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC,CG		
Material Source	Test Fill Borinquen Dam 12 Pass Q2			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Leveling Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	14-Jul-12
Sample No:	B - 217	Elevation:	N/A	Time:	11:20 AM
Sand Cone ID:	1013	Calibrated Volume:	N/A	Technician:	EC

	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534.0	
C	Wt. Of Soil Excavated (kg)	3673.10	
D	Initial Wt. Of Sand & Jar (kg)	8644.90	
E	Wt. Of Residue & Jar (kg)	4818.7	
F	Wt. Of Sand Used (kg) D - E	3826.20	
G	Wt. Of Sand in Cone & Ring (kg)	1512	
H	Wt. Of Sand in Hole (kg) F - G	2314.200	
I	Volume of Hole (m ³) H / B	0.001508604	

	Wet Density (kg/m ³) C / I	2434.77	
	Wet Weight of Soil (g)	921.8	
	Dry Weight of Soil (g)	880.6	
	% Moisture	4.7	
	Dry Density (kg/m ³)	2325.47	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2061	
T	Compaction (%)	153.4	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	16-Jul-12	Time Sampled	5:30pm
Sample Number	B - 221	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC,CG		
Material Source	Test Fill Borinquen Dam 22 Pass Q5			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	First Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By	Robert J. Montalvo
Checked By	Report Issue Date
RJMh	19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	16-Jul-12
Sample No:	B - 221	Elevation:	N/A	Time:	5:30pm
Sand Cone ID:	1013	Calibrated Volume:	N/A	Technician:	EC

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534.0	
C	Wt. Of Soil Excavated (kg)	3170.40	
D	Initial Wt. Of Sand & Jar (kg)	8221.10	
E	Wt. Of Residue & Jar (kg)	4491.6	
F	Wt. Of Sand Used (kg) D - E	3729.50	
G	Wt. Of Sand in Cone & Ring (kg)	1512	
H	Wt. Of Sand in Hole (kg) F - G	2217.500	
I	Volume of Hole (m ³) H / B	0.0014455	
	Wet Density (kg/m ³) C / I		2193.29
	Wet Weight of Soil (g)		926.9
	Dry Weight of Soil (g)		886
	% Moisture		4.6
	Dry Density (kg/m ³)		2096.8
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2083	
T	Compaction (%)	103.2*	

*Reported as % Relative Density

Checked By: RJMh

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Jul-12	Time Sampled	8:40am
Sample Number	B - 223	Material Type	3a Filter	Date Tested	17-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC		
Material Source	Test Fill Borinquen Dam 2 Pass Q4			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	First Layer - 45cm				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMh

Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	17-Jul-12
Sample No:	B - 223	Elevation:	N/A	Time:	8:40am
Sand Cone ID:	1013	Calibrated Volume:	N/A	Technician:	EC

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534.0	
C	Wt. Of Soil Excavated (kg)	3979.90	
D	Initial Wt. Of Sand & Jar (kg)	8025.10	
E	Wt. Of Residue & Jar (kg)	3755.3	
F	Wt. Of Sand Used (kg) D - E	4269.80	
G	Wt. Of Sand in Cone & Ring (kg)	1512	
H	Wt. Of Sand in Hole (kg) F - G	2757.800	
I	Volume of Hole (m ³) H / B	0.0017977	

	Wet Density (kg/m ³) C / I	2213.88	
	Wet Weight of Soil (g)	992.3	
	Dry Weight of Soil (g)	947.3	
	% Moisture	4.8	
	Dry Density (kg/m ³)	2112.48	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2083	
T	Compaction (%)	106.5*	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Jul-12	Time Sampled	8:56am
Sample Number	B - 224	Material Type	3a Filter	Date Tested	17-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC		
Material Source	Test Fill Borinquen Dam 2 Pass Q7			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	First Layer - 45cm				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	17-Jul-12
Sample No:	B - 224	Elevation:	N/A	Time:	8:56am
Sand Cone ID:	1013	Calibrated Volume:	N/A	Technician:	EC

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534.0	
C	Wt. Of Soil Excavated (kg)	3702.50	
D	Initial Wt. Of Sand & Jar (kg)	8210.00	
E	Wt. Of Residue & Jar (kg)	4155.9	
F	Wt. Of Sand Used (kg) D - E	4054.10	
G	Wt. Of Sand in Cone & Ring (kg)	1512	
H	Wt. Of Sand in Hole (kg) F - G	2542.100	
I	Volume of Hole (m ³) H / B	0.0016571	
	Wet Density (kg/m ³) C / I		2234.33
	Wet Weight of Soil (g)		906.1
	Dry Weight of Soil (g)		862.4
	% Moisture		5.1
	Dry Density (kg/m ³)		2125.91
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2083	
T	Compaction (%)	109.6*	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Jul-12	Time Sampled	9:55AM
Sample Number	B - 225	Material Type	3a Filter	Date Tested	17-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC		
Material Source	Test Fill Borinquen Dam 4 Pass Q1			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	First Layer - 45cm				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	17-Jul-12
Sample No:	B - 225	Elevation:	N/A	Time:	9:55AM
Sand Cone ID:	3606	Calibrated Volume:	N/A	Technician:	EC

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534.0	
C	Wt. Of Soil Excavated (kg)	4230.60	
D	Initial Wt. Of Sand & Jar (kg)	8911.80	
E	Wt. Of Residue & Jar (kg)	4604.6	
F	Wt. Of Sand Used (kg) D - E	4307.20	
G	Wt. Of Sand in Cone & Ring (kg)	1512	
H	Wt. Of Sand in Hole (kg) F - G	2795.200	
I	Volume of Hole (m ³) H / B	0.0018222	
	Wet Density (kg/m ³) C / I		2321.70
	Wet Weight of Soil (g)		909.4
	Dry Weight of Soil (g)		863.7
	% Moisture		5.3
	Dry Density (kg/m ³)		2204.84
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2104	
T	Compaction (%)	104.8*	

*Reported as % Relative Density

Checked By: RJMh

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Jul-12	Time Sampled	10:32AM
Sample Number	B - 226	Material Type	3a Filter	Date Tested	17-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC		
Material Source	Test Fill Borinquen Dam 4 Pass Q5			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	First Layer - 45cm				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By	Robert J. Montalvo
Checked By	RJMH
Report Issue Date	19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	17-Jul-12
Sample No:	B - 226	Elevation:	N/A	Time:	10:32AM
Sand Cone ID:	3606	Calibrated Volume:	N/A	Technician:	EC

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534.0	
C	Wt. Of Soil Excavated (kg)	4116.70	
D	Initial Wt. Of Sand & Jar (kg)	7802.00	
E	Wt. Of Residue & Jar (kg)	3545.4	
F	Wt. Of Sand Used (kg) D - E	4256.60	
G	Wt. Of Sand in Cone & Ring (kg)	1512	
H	Wt. Of Sand in Hole (kg) F - G	2744.600	
I	Volume of Hole (m ³) H / B	0.001789	

	Wet Density (kg/m ³) C / I	2301.12	
	Wet Weight of Soil (g)	910.7	
	Dry Weight of Soil (g)	873.8	
	% Moisture	4.2	
	Dry Density (kg/m ³)	2208.37	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2104	
T	Compaction (%)	131.6*	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Jul-12	Time Sampled	10:46AM
Sample Number	B - 227	Material Type	3a Filter	Date Tested	17-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC		
Material Source	Test Fill Borinquen Dam 4 Pass Q8			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column <input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Sample Location	First Layer - 45cm						
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial <div style="border: 1px solid black; padding: 2px; text-align: center;">N/A</div>		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample?

Initial

N/A

Client instructions regarding abnormal sample

N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By

Robert J. Montalvo

Checked By

RJMh

Report Issue Date

19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	17-Jul-12
Sample No:	B - 227	Elevation:	N/A	Time:	10:46AM
Sand Cone ID:	7035	Calibrated Volume:	N/A	Technician:	EC

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534.0	
C	Wt. Of Soil Excavated (kg)	1437.52	
D	Initial Wt. Of Sand & Jar (kg)	7518.00	
E	Wt. Of Residue & Jar (kg)	3142.1	
F	Wt. Of Sand Used (kg) D - E	4375.90	
G	Wt. Of Sand in Cone & Ring (kg)	1512	
H	Wt. Of Sand in Hole (kg) F - G	2863.900	
I	Volume of Hole (m ³) H / B	0.001867	

	Wet Density (kg/m ³) C / I		2343.44
	Wet Weight of Soil (g)		945.9
	Dry Weight of Soil (g)		907.5
	% Moisture		4.2
	Dry Density (kg/m ³)		2248.98
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2104	
T	Compaction (%)	143.6*	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Jul-12	Time Sampled	1:40pm
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Sample Number	B - 230	Material Type	3a Filter	Date Tested	17-Jul-12	Time Tested	N/A
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Material Description	3a Filter	Sampled By	CG
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Material Source	Test Fill Borinquen Dam 6 Pass Q6	Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column <input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot
Sample Location	First Layer - 45cm		

Special Instructions	N/A	Special Instructions are Acknowledged and Understood by Tech	Initial N/A
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Issued By	N/A	Date Issued	N/A
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Are there any visual abnormalities in the sample? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes who received the client instructions regarding handing the sample?	Initial N/A
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Client instructions regarding abnormal sample	N/A
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Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By	Robert J. Montalvo
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Checked By	RJMh	Report Issue Date	19-Jul-2012
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Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	17-Jul-12
Sample No:	B - 230	Elevation:	N/A	Time:	10:46AM
Sand Cone ID:	7035	Calibrated Volume:	N/A	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534.0	
C	Wt. Of Soil Excavated (kg)	3260.40	
D	Initial Wt. Of Sand & Jar (kg)	7682.80	
E	Wt. Of Residue & Jar (kg)	3875.8	
F	Wt. Of Sand Used (kg) D - E	3807.00	
G	Wt. Of Sand in Cone & Ring (kg)	1512	
H	Wt. Of Sand in Hole (kg) F - G	2295.000	
I	Volume of Hole (m ³) H / B	0.0014961	
	Wet Density (kg/m ³) C / I		2179.27
	Wet Weight of Soil (g)		880.9
	Dry Weight of Soil (g)		848.2
	% Moisture		3.9
	Dry Density (kg/m ³)		2097.47
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2064	
T	Compaction (%)	109*	

*Reported as % Relative Density

Checked By: RJMh

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Jul-12	Time Sampled	2:20pm
Sample Number	B - 231	Material Type	3a Filter	Date Tested	17-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG		
Material Source	Test Fill Borinquen Dam 6 Pass Q7-8			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	First Layer - 45cm				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample: N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMh Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	17-Jul-12
Sample No:	B - 231	Elevation:	N/A	Time:	2:20pm
Sand Cone ID:	3124	Calibrated Volume:	N/A	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534.0	
C	Wt. Of Soil Excavated (kg)	3196.60	
D	Initial Wt. Of Sand & Jar (kg)	7730.10	
E	Wt. Of Residue & Jar (kg)	3988.1	
F	Wt. Of Sand Used (kg) D - E	3742.00	
G	Wt. Of Sand in Cone & Ring (kg)	1512	
H	Wt. Of Sand in Hole (kg) F - G	2230.000	
I	Volume of Hole (m ³) H / B	0.0014537	
	Wet Density (kg/m ³) C / I		2198.94
	Wet Weight of Soil (g)		720.6
	Dry Weight of Soil (g)		686.2
	% Moisture		5
	Dry Density (kg/m ³)		2094.23
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2064	
T	Compaction (%)	107.9*	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Jul-12	Time Sampled	2:20pm
Sample Number	B - 232	Material Type	3a Filter	Date Tested	17-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG		
Material Source	Test Fill Borinquen Dam 6 Pass Q2			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	First Layer - 45cm				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	17-Jul-12
Sample No:	B - 232	Elevation:	N/A	Time:	2:20pm
Sand Cone ID:	3124	Calibrated Volume:	N/A	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534.0	
C	Wt. Of Soil Excavated (kg)	3189.00	
D	Initial Wt. Of Sand & Jar (kg)	8094.20	
E	Wt. Of Residue & Jar (kg)	4398.4	
F	Wt. Of Sand Used (kg) D - E	3695.80	
G	Wt. Of Sand in Cone & Ring (kg)	1512	
H	Wt. Of Sand in Hole (kg) F - G	2183.800	
I	Volume of Hole (m ³) H / B	0.0014236	
	Wet Density (kg/m ³) C / I		2240.10
	Wet Weight of Soil (g)		905.5
	Dry Weight of Soil (g)		871
	% Moisture		4
	Dry Density (kg/m ³)		2153.94
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2064	
T	Compaction (%)	123.9*	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Jul-12	Time Sampled	3:40pm
Sample Number	B - 233	Material Type	3a Filter	Date Tested	17-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG		
Material Source	Test Fill Borinquen Dam 8 Pass Q3-7			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	First Layer - 45cm				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	17-Jul-12
Sample No:	B - 233	Elevation:	N/A	Time:	3:40pm
Sand Cone ID:	3124	Calibrated Volume:	N/A	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534.0	
C	Wt. Of Soil Excavated (kg)	2902.60	
D	Initial Wt. Of Sand & Jar (kg)	6356.80	
E	Wt. Of Residue & Jar (kg)	3122.1	
F	Wt. Of Sand Used (kg) D - E	3234.70	
G	Wt. Of Sand in Cone & Ring (kg)	1512	
H	Wt. Of Sand in Hole (kg) F - G	1722.700	
I	Volume of Hole (m ³) H / B	0.00112301	
	Wet Density (kg/m ³) C / I		2584.66
	Wet Weight of Soil (g)		852.1
	Dry Weight of Soil (g)		820.9
	% Moisture		3.8
	Dry Density (kg/m ³)		2490.04
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2070	
T	Compaction (%)	197.0*	

*Reported as % Relative Density

Checked By: RJMh

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Jul-12	Time Sampled	3:45pm
Sample Number	B - 234	Material Type	3a Filter	Date Tested	17-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG		
Material Source	Test Fill Borinquen Dam 8 Pass Q2-4			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column <input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Sample Location	First Layer - 45cm						
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial <div style="border: 1px solid black; padding: 2px; text-align: center;">N/A</div>		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial

N/A

Client instructions regarding abnormal sample

N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By	Robert J. Montalvo
Checked By	Report Issue Date
<div style="border: 1px solid black; padding: 2px;">RJMh</div>	<div style="border: 1px solid black; padding: 2px;">19-Jul-2012</div>

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	17-Jul-12
Sample No:	B - 234	Elevation:	N/A	Time:	3:45pm
Sand Cone ID:	3124	Calibrated Volume:	N/A	Technician:	CG

	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534.0	
C	Wt. Of Soil Excavated (kg)	2697.00	
D	Initial Wt. Of Sand & Jar (kg)	5906.40	
E	Wt. Of Residue & Jar (kg)	2470.9	
F	Wt. Of Sand Used (kg) D - E	3435.50	
G	Wt. Of Sand in Cone & Ring (kg)	1512	
H	Wt. Of Sand in Hole (kg) F - G	1923.500	
I	Volume of Hole (m ³) H / B	0.0012539	

	Wet Density (kg/m ³) C / I	2150.89	
	Wet Weight of Soil (g)	870.5	
	Dry Weight of Soil (g)	833.5	
	% Moisture	4.4	
	Dry Density (kg/m ³)	2060.24	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2070	
T	Compaction (%)	96.9*	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	17-Jul-12	Time Sampled	3:23pm
Sample Number	B - 235	Material Type	3a Filter	Date Tested	17-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG		
Material Source	Test Fill Borinquen Dam 8 Pass Q1-5			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	First Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMh

Report Issue Date 19-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	17-Jul-12
Sample No:	B - 235	Elevation:	N/A	Time:	3:23pm
Sand Cone ID:	3124	Calibrated Volume:	N/A	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1534.0	
C	Wt. Of Soil Excavated (kg)	2830.70	
D	Initial Wt. Of Sand & Jar (kg)	7342.40	
E	Wt. Of Residue & Jar (kg)	3820.9	
F	Wt. Of Sand Used (kg) D - E	3521.50	
G	Wt. Of Sand in Cone & Ring (kg)	1512	
H	Wt. Of Sand in Hole (kg) F - G	2009.500	
I	Volume of Hole (m ³) H / B	0.00130997	

	Wet Density (kg/m ³) C / I	2160.89	
	Wet Weight of Soil (g)	847.1	
	Dry Weight of Soil (g)	805.6	
	% Moisture	5.2	
	Dry Density (kg/m ³)	2054.08	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2070	
T	Compaction (%)	95.2*	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	19-Jul-12	Time Sampled	8:20 AM
Sample Number	B - 238	Material Type	3a Filter	Date Tested	19-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC RNM		
Material Source	Test Fill Borinquen Dam 1 Pass Q5			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Leveling Layer #2				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 31-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	19-Jul-12
Sample No:	B - 238	Elevation:	2nd Layer - Leveling	Time:	8:20 AM
Sand Cone ID:	848	Calibrated Volume:	N/A	Technician:	EC - RNM

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.3	
C	Wt. Of Soil Excavated (kg)	4.165	
D	Initial Wt. Of Sand & Jar (kg)	8.006	
E	Wt. Of Residue & Jar (kg)	4.298	
F	Wt. Of Sand Used (kg) D - E	3.708	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.196	
I	Volume of Hole (m ³) H / B	0.0014	
	Wet Density (kg/m ³) C / I		2918.99
	Wet Weight of Soil (g)		561.3
	Dry Weight of Soil (g)		534
	% Moisture		5.1
	Dry Density (kg/m ³)		2777.35
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2083*	
T	Compaction (%)	256.4	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	19-Jul-12	Time Sampled	8:46 AM
Sample Number	B - 239	Material Type	3a Filter	Date Tested	19-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC RNM		
Material Source	Test Fill Borinquen Dam 1 Pass Q4			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Leveling Layer #2				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 31-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	19-Jul-12
Sample No:	B - 239	3a Filter	2nd Layer - Leveling	Time:	8:46 AM
Sand Cone ID:	3124	Calibrated Volume:	N/A	Technician:	EC RNM

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.3	
C	Wt. Of Soil Excavated (kg)	4.220	
D	Initial Wt. Of Sand & Jar (kg)	8.214	
E	Wt. Of Residue & Jar (kg)	4.322	
F	Wt. Of Sand Used (kg) D - E	3.892	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.38	
I	Volume of Hole (m ³) H / B	0.0015	

Wet Density (kg/m ³) C / I		2727.99
Wet Weight of Soil (g)		676.9
Dry Weight of Soil (g)		643.4
% Moisture		5.1
Dry Density (kg/m ³)		2595.61

c	Wt. Of soil Excavated (kg)	
J	Wt. Of Oversize Rock (kg)	
K	% Oversize Rock Retained (J / C) x 100%	{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J	
M	Specific Gravity	
N	Volume of Hole (m ³) from Line (K) above	
O	Volume of Oversize Mat. J/162.24	
P	Volume of Minus Mat. N - O	
Q	Rock Corrected Density L / P	
R	Rock Corrected Dry Density	
S	Maximum Density(kg/m ³)	2083*
T	Compaction (%)	223.6

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	19-Jul-12	Time Sampled	9:05 AM
Sample Number	B - 240	Material Type	3a Filter - 1 Pass	Date Tested	19-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC RNM		
Material Source	Test Fill Borinquen Dam 1 Pass Q2			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Leveling Layer #2				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 31-Jul-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	19-Jul-12
Sample No:	B - 240	Elevation:	2nd Layer - Leveling	Time:	9:05 AM
Sand Cone ID:	1013	Calibrated Volume:	N/A	Technician:	EC RNM

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.3	
C	Wt. Of Soil Excavated (kg)	4.244	
D	Initial Wt. Of Sand & Jar (kg)	8.085	
E	Wt. Of Residue & Jar (kg)	3.768	
F	Wt. Of Sand Used (kg) D - E	4.317	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.805	
I	Volume of Hole (m ³) H / B	0.0018	

Wet Density (kg/m ³) C / I		2326.75
Wet Weight of Soil (g)		633.7
Dry Weight of Soil (g)		602.4
% Moisture		5.2
Dry Density (kg/m ³)		2211.74

c	Wt. Of soil Excavated (kg)	
J	Wt. Of Oversize Rock (kg)	
K	% Oversize Rock Retained (J / C) x 100%	{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J	
M	Specific Gravity	
N	Volume of Hole (m ³) from Line (K) above	
O	Volume of Oversize Mat. J/162.24	
P	Volume of Minus Mat. N - O	
Q	Rock Corrected Density L / P	
R	Rock Corrected Dry Density	
S	Maximum Density(kg/m ³)	2083*
T	Compaction (%)	136.4

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	19-Jul-12	Time Sampled	9:52 AM
Sample Number	B - 241	Material Type	3a Filter	Date Tested	19-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC RNM		
Material Source	Test Fill Borinquen Dam 2 Pass Q1			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift #2				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	19-Jul-12
Sample No:	B - 241	Elevation:	2nd Layer - Leveling	Time:	9:52 AM
Sand Cone ID:	F L	Calibrated Volume:	N/A	Technician:	EC RNM

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.3	
C	Wt. Of Soil Excavated (kg)	3.595	
D	Initial Wt. Of Sand & Jar (kg)	8.279	
E	Wt. Of Residue & Jar (kg)	4.481	
F	Wt. Of Sand Used (kg) D - E	3.798	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.286	
I	Volume of Hole (m ³) H / B	0.0015	

Wet Density (kg/m ³) C / I		2419.25
Wet Weight of Soil (g)		634.2
Dry Weight of Soil (g)		607.5
% Moisture		4.4
Dry Density (kg/m ³)		2317.29

c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2066*	
T	Compaction (%)	157	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	19-Jul-12	Time Sampled	10:36 AM
Sample Number	B - 242	Material Type	3a Filter	Date Tested	19-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC RNM		
Material Source	Test Fill Borinquen Dam 2 Pass Q7			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift #2				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	19-Jul-12
Sample No:	B - 242	Elevation:	2nd Layer - Leveling	Time:	10:36 AM
Sand Cone ID:	3106	Calibrated Volume:	N/A	Technician:	EC RNM

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.3	
C	Wt. Of Soil Excavated (kg)	3.401	
D	Initial Wt. Of Sand & Jar (kg)	8.349	
E	Wt. Of Residue & Jar (kg)	4.42	
F	Wt. Of Sand Used (kg) D - E	3.9287	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.4167	
I	Volume of Hole (m ³) H / B	0.0016	

Wet Density (kg/m ³) C / I		2164.61
Wet Weight of Soil (g)		626.4
Dry Weight of Soil (g)		591
% Moisture		5.8
Dry Density (kg/m ³)		2045.9

c	Wt. Of soil Excavated (kg)	
J	Wt. Of Oversize Rock (kg)	
K	% Oversize Rock Retained (J / C) x 100%	{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J	
M	Specific Gravity	
N	Volume of Hole (m ³) from Line (K) above	
O	Volume of Oversize Mat. J/162.24	
P	Volume of Minus Mat. N - O	
Q	Rock Corrected Density L / P	
R	Rock Corrected Dry Density	
S	Maximum Density(kg/m ³)	2066*
T	Compaction (%)	94.8

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	19-Jul-12	Time Sampled	10:50 AM
Sample Number	B - 243	Material Type	3a Filter	Date Tested	19-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC RNM		
Material Source	Test Fill Borinquen Dam 2 Pass Q8			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift #2				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	19-Jul-12
Sample No:	B - 243	Elevation:	2nd Layer - Leveling	Time:	10:50 AM
Sand Cone ID:	7035	Calibrated Volume:	N/A	Technician:	EC RNM

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.3	
C	Wt. Of Soil Excavated (kg)	3.783	
D	Initial Wt. Of Sand & Jar (kg)	8.087	
E	Wt. Of Residue & Jar (kg)	4.0709	
F	Wt. Of Sand Used (kg) D - E	4.0163	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.5043	
I	Volume of Hole (m ³) H / B	0.0016	

Wet Density (kg/m ³) C / I		2320.84
Wet Weight of Soil (g)		604.9
Dry Weight of Soil (g)		571.6
% Moisture		5.8
Dry Density (kg/m ³)		2193.61

c	Wt. Of soil Excavated (kg)	
J	Wt. Of Oversize Rock (kg)	
K	% Oversize Rock Retained (J / C) x 100%	{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J	
M	Specific Gravity	
N	Volume of Hole (m ³) from Line (K) above	
O	Volume of Oversize Mat. J/162.24	
P	Volume of Minus Mat. N - O	
Q	Rock Corrected Density L / P	
R	Rock Corrected Dry Density	
S	Maximum Density(kg/m ³)	2066*
T	Compaction (%)	130.6

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	20-Jul-12	Time Sampled	11:29 AM
Sample Number	B - 248	Material Type	3a Filter	Date Tested	20-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC		
Material Source	Test Fill Borinquen Dam 4 Pass Q1-5			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift #2				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMh

Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	20-Jul-12
	B - 248	Elevation:	2nd Layer - Leveling	Time:	11:29 AM
Sand Cone ID:	KK	Calibrated Volume:	N/A	Technician:	EC

	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.3	
C	Wt. Of Soil Excavated (kg)	4.169	
D	Initial Wt. Of Sand & Jar (kg)	8.030	
E	Wt. Of Residue & Jar (kg)	3.7172	
F	Wt. Of Sand Used (kg) D - E	4.3125	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.8005	
I	Volume of Hole (m ³) H / B	0.0018	
	Wet Density (kg/m ³) C / I		2290.88
	Wet Weight of Soil (g)		813.1
	Dry Weight of Soil (g)		776.4
	% Moisture		4.7
	Dry Density (kg/m ³)		2188.04
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2061*	
T	Compaction (%)	132.7	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	20-Jul-12	Time Sampled	11:39 AM
Sample Number	B - 249	Material Type	3a Filter	Date Tested	20-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC		
Material Source	Test Fill Borinquen Dam 4 Pass Q6			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column <input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Sample Location	Lift #2						
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial <div style="border: 1px solid black; padding: 2px; text-align: center;">N/A</div>		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial

N/A

Client instructions regarding abnormal sample

N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By

Robert J. Montalvo

Checked By

RJMh

Report Issue Date

2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	20-Jul-12
	B - 249	Elevation:	2nd Layer - Leveling	Time:	11:29 AM
Sand Cone ID:	3124	Calibrated Volume:	N/A	Technician:	EC

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.3	
C	Wt. Of Soil Excavated (kg)	3.368	
D	Initial Wt. Of Sand & Jar (kg)	7.811	
E	Wt. Of Residue & Jar (kg)	3.8899	
F	Wt. Of Sand Used (kg) D - E	3.9215	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.4095	
I	Volume of Hole (m ³) H / B	0.0016	

	Wet Density (kg/m ³) C / I		2150.90
	Wet Weight of Soil (g)		769.9
	Dry Weight of Soil (g)		734.6
	% Moisture		4.8
	Dry Density (kg/m ³)		2052.4
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2061*	
T	Compaction (%)	97.6	

*Reported as % Relative Density

Checked By: RJMh

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	20-Jul-12	Time Sampled	12:05 PM
Sample Number	B - 250	Material Type	3a Filter	Date Tested	20-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	EC		
Material Source	Test Fill Borinquen Dam 4 Pass Q3			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column <input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Sample Location	Lift #2						
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial <div style="border: 1px solid black; padding: 2px; text-align: center;">N/A</div>		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial

N/A

Client instructions regarding abnormal sample N/A

N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMh Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	20-Jul-12
B - 250	B - 250	Elevation:	2nd Layer - Leveling	Time:	12:05 PM
Sand Cone ID:	3106	Calibrated Volume:	N/A	Technican:	EC

Test Fill Borrinquen Dam 4 Pass Q3

	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.3	
C	Wt. Of Soil Excavated (kg)	4.142	
D	Initial Wt. Of Sand & Jar (kg)	7.902	
E	Wt. Of Residue & Jar (kg)	3.4949	
F	Wt. Of Sand Used (kg) D - E	4.407	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.895	
I	Volume of Hole (m ³) H / B	0.0019	
	Wet Density (kg/m ³) C / I		2201.80
	Wet Weight of Soil (g)		894.8
	Dry Weight of Soil (g)		849.4
	% Moisture		5.3
	Dry Density (kg/m ³)		2090.19
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2061*	
T	Compaction (%)	107.9	

*Reported as % Relative Density

Checked By: RJMh

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	31-Jul-12	Time Sampled	11:34 AM
Sample Number	B - 265	Material Type	3a Filter	Date Tested	31-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG CG		
Material Source	Test Fill Borinquen Dam Q3&7			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	3rd Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	31-Jul-12
Sample No:	B - 265	Elevation:	3rd Layer	Time:	11:34 AM
Sand Cone ID:	FL	Calibrated Volume:	N/A	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.62	
C	Wt. Of Soil Excavated (kg)	3.742	
D	Initial Wt. Of Sand & Jar (kg)	7.993	
E	Wt. Of Residue & Jar (kg)	3.89	
F	Wt. Of Sand Used (kg) D - E	4.1026	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.5906	
I	Volume of Hole (m ³) H / B	0.001684	
	Wet Density (kg/m ³) C / I		2222.21
	Wet Weight of Soil (g)		934.6
	Dry Weight of Soil (g)		877.6
	% Moisture		6.5
	Dry Density (kg/m ³)		2086.6
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2035*	
T	Compaction (%)	115.4	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	31-Jul-12	Time Sampled	11:37 AM
Sample Number	B - 266	Material Type	3a Filter	Date Tested	31-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG CG		
Material Source	Test Fill Borinquen Dam Q1			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	3rd Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	31-Jul-12
Sample No:	B - 266	Elevation:	3rd Layer	Time:	11:37 AM
Sand Cone ID:	848	Calibrated Volume:	N/A	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.62	
C	Wt. Of Soil Excavated (kg)	2.716	
D	Initial Wt. Of Sand & Jar (kg)	7.487	
E	Wt. Of Residue & Jar (kg)	3.8342	
F	Wt. Of Sand Used (kg) D - E	3.6531	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.1411	
I	Volume of Hole (m ³) H / B	0.001392	
	Wet Density (kg/m ³) C / I		1951.29
	Wet Weight of Soil (g)		921
	Dry Weight of Soil (g)		864.3
	% Moisture		6.6
	Dry Density (kg/m ³)		1830.48
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2035*	
T	Compaction (%)	30.5	

*Reported as % Relative Density

Checked By: RJMh

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	31-Jul-12	Time Sampled	11:47 AM
Sample Number	B - 267	Material Type	3a Filter	Date Tested	31-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG CG		
Material Source	Test Fill Borinquen Dam Q8			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	3rd Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	31-Jul-12
Sample No:	B - 267	Elevation:	3rd Layer	Time:	11:47 AM
Sand Cone ID:	H D P	Calibrated Volume:	N/A	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.62	
C	Wt. Of Soil Excavated (kg)	3.078	
D	Initial Wt. Of Sand & Jar (kg)	7.715	
E	Wt. Of Residue & Jar (kg)	3.9363	
F	Wt. Of Sand Used (kg) D - E	3.7784	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.2664	
I	Volume of Hole (m ³) H / B	0.001473	
	Wet Density (kg/m ³) C / I		2089.48
	Wet Weight of Soil (g)		928.3
	Dry Weight of Soil (g)		871.2
	% Moisture		6.6
	Dry Density (kg/m ³)		1960.11
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2035*	
T	Compaction (%)	76.2	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	31-Jul-12	Time Sampled	3:15 PM
Sample Number	B - 268	Material Type	3a Filter	Date Tested	31-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG CG		
Material Source	Test Fill Borinquen Dam Q4			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	3rd Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By	Robert J. Montalvo
Checked By	Report Issue Date
RJMh	2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	31-Jul-12
Sample No:	B - 268	Elevation:	3rd Layer	Time:	3:15 PM
Sand Cone ID:	KK	Calibrated Volume:	N/A	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.62	
C	Wt. Of Soil Excavated (kg)	3.151	
D	Initial Wt. Of Sand & Jar (kg)	8.101	
E	Wt. Of Residue & Jar (kg)	4.1084	
F	Wt. Of Sand Used (kg) D - E	3.9921	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.4801	
I	Volume of Hole (m ³) H / B	0.001612	

	Wet Density (kg/m ³) C / I	2179.90	
	Wet Weight of Soil (g)	757.5	
	Dry Weight of Soil (g)	710.7	
	% Moisture	6.6	
	Dry Density (kg/m ³)	2044.93	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2035*	
T	Compaction (%)	103	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	31-Jul-12	Time Sampled	3:16 PM
Sample Number	B - 269	Material Type	3a Filter	Date Tested	31-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG CG		
Material Source	Test Fill Borinquen Dam Q5			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	3rd Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	31-Jul-12
Sample No:	B - 269	Elevation:	3rd Layer	Time:	3:16 PM
Sand Cone ID:	7035	Calibrated Volume:	N/A	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.62	
C	Wt. Of Soil Excavated (kg)	3.452	
D	Initial Wt. Of Sand & Jar (kg)	7.800	
E	Wt. Of Residue & Jar (kg)	3.7938	
F	Wt. Of Sand Used (kg) D - E	4.0066	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.494	
I	Volume of Hole (m ³) H / B	0.001621	
	Wet Density (kg/m ³) C / I		2129.55
	Wet Weight of Soil (g)		855.9
	Dry Weight of Soil (g)		806.8
	% Moisture		6.1
	Dry Density (kg/m ³)		2007.12
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2035*	
T	Compaction (%)	91.4	

*Reported as % Relative Density

Checked By: RJMh

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	31-Jul-12	Time Sampled	3:30 PM
Sample Number	B - 270	Material Type	3a Filter	Date Tested	31-Jul-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG CG		
Material Source	Test Fill Borinquen Dam Q2&6			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	3rd Layer				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J. Montalvo

Checked By RJMH Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	31-Jul-12
Sample No:	B - 270	Elevation:	3rd Layer	Time:	3:30 PM
Sand Cone ID:	3124	Calibrated Volume:	N/A	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.62	
C	Wt. Of Soil Excavated (kg)	3.576	
D	Initial Wt. Of Sand & Jar (kg)	8.098	
E	Wt. Of Residue & Jar (kg)	4.0744	
F	Wt. Of Sand Used (kg) D - E	4.024	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.512	
I	Volume of Hole (m ³) H / B	0.001633	

	Wet Density (kg/m ³) C / I	2189.83	
	Wet Weight of Soil (g)	873	
	Dry Weight of Soil (g)	830.5	
	% Moisture	5.1	
	Dry Density (kg/m ³)	2083.57	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2035*	
T	Compaction (%)	114.5	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	01-Aug-12	Time Sampled	8:50 AM
Sample Number	B - 273	Material Type	3a Filter - 2 Pass	Date Tested	01-Aug-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG CG		
Material Source	Test Fill Borinquen Dam 2 Pass Q6			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift #3 / 45cm				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J Montalvo

Checked By TC Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	1-Aug-12
Sample No:	B - 273	Elevation:	3 Lift	Time:	8:50 AM
Sand Cone ID:	1013	Calibrated Volume:	N/A	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.62	
C	Wt. Of Soil Excavated (kg)	3.540	
D	Initial Wt. Of Sand & Jar (kg)	7.614	
E	Wt. Of Residue & Jar (kg)	3.7154	
F	Wt. Of Sand Used (kg) D - E	3.8986	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.3866	
I	Volume of Hole (m ³) H / B	0.001551	
	Wet Density (kg/m ³) C / I		2281.19
	Wet Weight of Soil (g)		843.9
	Dry Weight of Soil (g)		789.9
	% Moisture		6.8
	Dry Density (kg/m ³)		2135.95
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2084	
T	Compaction (%)	119.2*	

*Reported as % Relative Density

Checked By: TC

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	01-Aug-12	Time Sampled	9:00 AM
Sample Number	B - 274	Material Type	3a Filter - 2 Pass	Date Tested	01-Aug-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG CG		
Material Source	Test Fill Borinquen Dam 2 Pass Q1 y 5			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column <input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Sample Location	Lift #3						
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial <div style="border: 1px solid black; padding: 2px; text-align: center;">N/A</div>		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial

N/A

Client instructions regarding abnormal sample

N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By

Robert J Montalvo

Checked By

TC

Report Issue Date

2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	1-Aug-12
Sample No:	B - 274	Elevation:	3 Lift	Time:	9:00 AM
Sand Cone ID:	F L	Calibrated Volume:	N/A	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.62	
C	Wt. Of Soil Excavated (kg)	2.974	
D	Initial Wt. Of Sand & Jar (kg)	7.288	
E	Wt. Of Residue & Jar (kg)	3.6807	
F	Wt. Of Sand Used (kg) D - E	3.6073	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.0953	
I	Volume of Hole (m ³) H / B	0.001362	

	Wet Density (kg/m ³) C / I	2183.70	
	Wet Weight of Soil (g)	928.5	
	Dry Weight of Soil (g)	873.5	
	% Moisture	6.3	
	Dry Density (kg/m ³)	2054.28	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2084	
T	Compaction (%)	88.6*	

*Reported as % Relative Density

Checked By: TC

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	01-Aug-12	Time Sampled	9:08 AM
Sample Number	B - 275	Material Type	3a Filter - 2 Pass	Date Tested	01-Aug-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG CG		
Material Source	Test Fill Borinquen Dam 2 Pass Q3			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift #3 / 20 cm				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J Montalvo

Checked By TC Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	1-Aug-12
Sample No:	B - 275	Elevation:	3 Lift	Time:	9:08 AM
Sand Cone ID:	HDP	Calibrated Volume:	N/A	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.62	
C	Wt. Of Soil Excavated (kg)	3.774	
D	Initial Wt. Of Sand & Jar (kg)	8.395	
E	Wt. Of Residue & Jar (kg)	4.2893	
F	Wt. Of Sand Used (kg) D - E	4.1057	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.5937	
I	Volume of Hole (m ³) H / B	0.001686	
	Wet Density (kg/m ³) C / I		2238.40
	Wet Weight of Soil (g)		944.2
	Dry Weight of Soil (g)		889
	% Moisture		6.2
	Dry Density (kg/m ³)		2107.7
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2084	
T	Compaction (%)	108.9*	

*Reported as % Relative Density

Checked By: TC

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	01-Aug-12	Time Sampled	10:20 AM
Sample Number	B - 277	Material Type	3a Filter - 3 Pass	Date Tested	01-Aug-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG CG		
Material Source	Test Fill Borinquen Dam 3 Pass Q4 y 8			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column <input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Sample Location	Lift #3 / Superficial						
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial <div style="border: 1px solid black; padding: 2px; text-align: center;">N/A</div>		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes who received the client instructions regarding handing the sample?	Initial <div style="border: 1px solid black; padding: 2px; text-align: center;">N/A</div>
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Client instructions regarding abnormal sample	N/A
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Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By	Robert J Montalvo
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Checked By	TC	Report Issue Date	2-Aug-2012
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Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	1-Aug-12
Sample No:	B - 277	Elevation:	3rd Lift	Time:	10:20am
Sand Cone ID:	848	Calibrated Volume:	N/A	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.62	
C	Wt. Of Soil Excavated (kg)	3.661	
D	Initial Wt. Of Sand & Jar (kg)	7.132	
E	Wt. Of Residue & Jar (kg)	3.1522	
F	Wt. Of Sand Used (kg) D - E	3.9793	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.4673	
I	Volume of Hole (m ³) H / B	0.001604	
	Wet Density (kg/m ³) C / I		2282.29
	Wet Weight of Soil (g)		929.8
	Dry Weight of Soil (g)		880.4
	% Moisture		5.6
	Dry Density (kg/m ³)		2161.26
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2108	
T	Compaction (%)	100*	

*Reported as % Relative Density

Checked By: TC

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	01-Aug-12	Time Sampled	10:22 AM
Sample Number	B - 278	Material Type	3a Filter - 3 Pass	Date Tested	01-Aug-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG CG		
Material Source	Test Fill Borinquen Dam 3 Pass Q2			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift #3 / 20 cm				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J Montalvo

Checked By TC

Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	1-Aug-12
Sample No:	B - 278	Elevation:	3 Lift	Time:	10:22 AM
Sand Cone ID:	C J	Calibrated Volume:	N/A	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.62	
C	Wt. Of Soil Excavated (kg)	3.881	
D	Initial Wt. Of Sand & Jar (kg)	8.022	
E	Wt. Of Residue & Jar (kg)	3.7551	
F	Wt. Of Sand Used (kg) D - E	4.2673	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.7553	
I	Volume of Hole (m ³) H / B	0.001791	
	Wet Density (kg/m ³) C / I		2166.72
	Wet Weight of Soil (g)		934
	Dry Weight of Soil (g)		879.9
	% Moisture		6.1
	Dry Density (kg/m ³)		2042.15
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2108	
T	Compaction (%)	74.8*	

*Reported as % Relative Density

Checked By: TC

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	01-Aug-12	Time Sampled	10:40 AM
Sample Number	B - 279	Material Type	3a Filter	Date Tested	01-Aug-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG CG		
Material Source	Test Fill Borinquen Dam 3 Pass Q7			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift #3 / 20 cm				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By Robert J Montalvo

Checked By TC Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	1-Aug-12
Sample No:	B - 279	Elevation:	3 Lift	Time:	10:40 AM
Sand Cone ID:	3106	Calibrated Volume:	N/A	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.62	
C	Wt. Of Soil Excavated (kg)	3.942	
D	Initial Wt. Of Sand & Jar (kg)	8.404	
E	Wt. Of Residue & Jar (kg)	4.1158	
F	Wt. Of Sand Used (kg) D - E	4.2881	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.7761	
I	Volume of Hole (m ³) H / B	0.001804	
	Wet Density (kg/m ³) C / I		2185.31
	Wet Weight of Soil (g)		919
	Dry Weight of Soil (g)		865.3
	% Moisture		6.2
	Dry Density (kg/m ³)		2057.73
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2108	
T	Compaction (%)	80.9*	

*Reported as % Relative Density

Checked By: TC

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	11:48 AM
Sample Number	B 284	Material Type	3A Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3A Filter			Sampled By	AU - CG		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 layer Q2 y Q6 0 Pass				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
Issued By	N/A	Date Issued	N/A	<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		
				Special Instructions are Acknowledged and Understood by Tech			Initial N/A

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By

Checked By ES

Report Issue Date 20-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	14-Aug-12
Sample No:	B 284	Elevation:	4 Layer	Time:	11:48 AM
Sand Cone ID:	H. D. P.	Calibrated Volume:	0.0038396 m3	Technican:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	2.927	
D	Initial Wt. Of Sand & Jar (kg)	7.388	
E	Wt. Of Residue & Jar (kg)	3.812	
F	Wt. Of Sand Used (kg) D - E	3.576	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.064	
I	Volume of Hole (m ³) H / B	0.001342	
	Wet Density (kg/m ³) C / I		2181.38
	Wet Weight of Soil (g)		1368.2
	Dry Weight of Soil (g)		1292.2
	% Moisture		5.9
	Dry Density (kg/m ³)		2059.84
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2035	Min 1821
T	Compaction (%)	110.3*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	12:07 PM
Sample Number	B 285	Material Type	3A Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3A Filter			Sampled By	AU - CG		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 layer Q8 0 Pass 20cm profundidad				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By _____

Checked By ES

Report Issue Date 20-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	14-Aug-12
Sample No:	B 285	Elevation:	4 Layer	Time:	12:07 PM
Sand Cone ID:	1013	Calibrated Volume:	0.0038396 m3	Technician:	CG

	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	2.398	
D	Initial Wt. Of Sand & Jar (kg)	7.718	
E	Wt. Of Residue & Jar (kg)	4.4006	
F	Wt. Of Sand Used (kg) D - E	3.317	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	1.805	
I	Volume of Hole (m ³) H / B	0.001174	
	Wet Density (kg/m ³) C / I		2042.69
	Wet Weight of Soil (g)		1100.9
	Dry Weight of Soil (g)		1023.2
	% Moisture		7.6
	Dry Density (kg/m ³)		1898.41
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2035	
T	Compaction (%)	38.8*	

* Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	12:16 PM
Sample Number	B 286	Material Type	3A Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3A Filter			Sampled By	AU - CG		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column <input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Sample Location	4 layer Q1 0 Pass 20cm profundidad						
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial <div style="border: 1px solid black; padding: 2px; text-align: center;">N/A</div>		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample?

Initial

N/A

Client instructions regarding abnormal sample

N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By

Checked By

ES

Report Issue Date

20-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	14-Aug-12
Sample No:	B 286	Elevation:	4 Layer	Time:	12:16 PM
Sand Cone ID:	1013	Calibrated Volume:	0.0038396 m3	Technician:	AU

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.052	
D	Initial Wt. Of Sand & Jar (kg)	7.553	
E	Wt. Of Residue & Jar (kg)	3.6432	
F	Wt. Of Sand Used (kg) D - E	3.912	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.400	
I	Volume of Hole (m ³) H / B	0.001561	

Wet Density (kg/m ³) C / I		1955.85
Wet Weight of Soil (g)		1103.6
Dry Weight of Soil (g)		1029.5
% Moisture		7.2
Dry Density (kg/m ³)		1824.49

c	Wt. Of soil Excavated (kg)	
J	Wt. Of Oversize Rock (kg)	
K	% Oversize Rock Retained (J / C) x 100%	{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J	
M	Specific Gravity	
N	Volume of Hole (m ³) from Line (K) above	
O	Volume of Oversize Mat. J/162.24	
P	Volume of Minus Mat. N - O	
Q	Rock Corrected Density L / P	
R	Rock Corrected Dry Density	
S	Maximum Density(kg/m ³)	2035
T	Compaction (%)	1.8*

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	4:03 PM
Sample Number	B 288	Material Type	3A Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3A Filter			Sampled By	JAG CG		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 layer Q1 y Q5 1 Pass Superficial				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By	
Checked By	ES
Report Issue Date	20-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	14-Aug-12
Sample No:	B 288	Elevation:	4 Layer 45cm	Time:	4:03 PM
Sand Cone ID:	3124	Calibrated Volume:	0.0038396 m3	Technician:	CG

	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	2.649	
D	Initial Wt. Of Sand & Jar (kg)	8.037	
E	Wt. Of Residue & Jar (kg)	4.5862	
F	Wt. Of Sand Used (kg) D - E	3.451	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	1.939	
I	Volume of Hole (m ³) H / B	0.001261	
	Wet Density (kg/m ³) C / I		2100.82
	Wet Weight of Soil (g)		1410.2
	Dry Weight of Soil (g)		1330.4
	% Moisture		6.0
	Dry Density (kg/m ³)		1981.91
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2036	
T	Compaction (%)	76.0*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	4:10 PM
Sample Number	B 289	Material Type	3A Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3A Filter			Sampled By	JAG CG		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 layer Q4 1 Pass 20cm profundidad				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By [Empty Box]

Checked By ES

Report Issue Date 20-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	14-Aug-12
Sample No:	B 289	Elevation:	4 Layer 45cm	Time:	4:10 PM
Sand Cone ID:	F - L	Calibrated Volume:	0.0038396 m3	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	2.747	
D	Initial Wt. Of Sand & Jar (kg)	7.360	
E	Wt. Of Residue & Jar (kg)	3.8684	
F	Wt. Of Sand Used (kg) D - E	3.492	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	1.980	
I	Volume of Hole (m ³) H / B	0.001288	

	Wet Density (kg/m ³) C / I		2133.44
	Wet Weight of Soil (g)		1249.2
	Dry Weight of Soil (g)		1168.3
	% Moisture		6.9
	Dry Density (kg/m ³)		1995.73
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2036	
T	Compaction (%)	82.3*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	4:15 PM
Sample Number	B 290	Material Type	3A Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3A Filter			Sampled By	JAG CG		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 layer Q4 1 Pass 20cm profundidad				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By	
Checked By	Report Issue Date
ES	20-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	14-Aug-12
Sample No:	B 290	Elevation:	4 Layer 45cm	Time:	4:15 PM
Sand Cone ID:	K - K	Calibrated Volume:	0.0038396 m3	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.061	
D	Initial Wt. Of Sand & Jar (kg)	7.482	
E	Wt. Of Residue & Jar (kg)	3.7669	
F	Wt. Of Sand Used (kg) D - E	3.715	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.203	
I	Volume of Hole (m ³) H / B	0.001433	

	Wet Density (kg/m ³) C / I		2136.54
	Wet Weight of Soil (g)		1168.8
	Dry Weight of Soil (g)		1089.3
	% Moisture		7.3
	Dry Density (kg/m ³)		1991.18
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2036	
T	Compaction (%)	80.2*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	4:52 PM
Sample Number	B 292	Material Type	3A Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3A Filter			Sampled By	JAG CG		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 layer Q3 y Q7 2 Pass				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By

Checked By ES Report Issue Date 20-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	14-Aug-12
Sample No:	B 292	Elevation:	4 Layer 45cm	Time:	4:52 PM
Sand Cone ID:	7035	Calibrated Volume:	0.0038396 m3	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.215	
D	Initial Wt. Of Sand & Jar (kg)	8.031	
E	Wt. Of Residue & Jar (kg)	4.222	
F	Wt. Of Sand Used (kg) D - E	3.809	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.297	
I	Volume of Hole (m ³) H / B	0.001493	

Wet Density (kg/m ³) C / I		2152.81
Wet Weight of Soil (g)		952.4
Dry Weight of Soil (g)		891.8
% Moisture		6.8
Dry Density (kg/m ³)		2015.74

c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2046	
T	Compaction (%)	87.7*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	4:55 PM
Sample Number	B 293	Material Type	3A Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3A Filter			Sampled By	JAG CG		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 layer Q6 2 Pass 20 cm profundidad				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By

Checked By ES Report Issue Date 20-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	14-Aug-12
Sample No:	B 293	Elevation:	4 Layer 45cm	Time:	4:55 PM
Sand Cone ID:	848	Calibrated Volume:	0.0038396 m3	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.211	
D	Initial Wt. Of Sand & Jar (kg)	7.428	
E	Wt. Of Residue & Jar (kg)	3.6202	
F	Wt. Of Sand Used (kg) D - E	3.807	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.295	
I	Volume of Hole (m ³) H / B	0.001492	

Wet Density (kg/m ³) C / I		2151.71
Wet Weight of Soil (g)		746.6
Dry Weight of Soil (g)		700.7
% Moisture		6.6
Dry Density (kg/m ³)		2018.49

c	Wt. Of soil Excavated (kg)	
J	Wt. Of Oversize Rock (kg)	
K	% Oversize Rock Retained (J / C) x 100%	{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J	
M	Specific Gravity	
N	Volume of Hole (m ³) from Line (K) above	
O	Volume of Oversize Mat. J/162.24	
P	Volume of Minus Mat. N - O	
Q	Rock Corrected Density L / P	
R	Rock Corrected Dry Density	
S	Maximum Density(kg/m ³)	2046
T	Compaction (%)	88.9*

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	5:05 PM
Sample Number	B 294	Material Type	3A Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3A Filter			Sampled By	JAG CG		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 layer Q3 2 Pass 20 cm profundidad				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By

Checked By ES

Report Issue Date 20-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	14-Aug-12
Sample No:	B 294	Elevation:	4 Layer 45cm	Time:	5:05 PM
Sand Cone ID:	CJ	Calibrated Volume:	0.0038396 m3	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	2.738	
D	Initial Wt. Of Sand & Jar (kg)	8.122	
E	Wt. Of Residue & Jar (kg)	4.5623	
F	Wt. Of Sand Used (kg) D - E	3.559	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.047	
I	Volume of Hole (m ³) H / B	0.001331	
	Wet Density (kg/m ³) C / I		2056.80
	Wet Weight of Soil (g)		736.3
	Dry Weight of Soil (g)		686.1
	% Moisture		7.1
	Dry Density (kg/m ³)		1920.45
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2046	
T	Compaction (%)	46.6*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	5:35 PM
Sample Number	B 296	Material Type	3A Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3A Filter			Sampled By	JAG CG		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 layer 3 Pass				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By _____

Checked By ES

Report Issue Date 20-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	14-Aug-12
Sample No:	B 296	Elevation:	4 Layer 45cm	Time:	5:35 PM
Sand Cone ID:	KK	Calibrated Volume:	0.0038396 m3	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.101	
D	Initial Wt. Of Sand & Jar (kg)	8.233	
E	Wt. Of Residue & Jar (kg)	4.4685	
F	Wt. Of Sand Used (kg) D - E	3.765	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.253	
I	Volume of Hole (m ³) H / B	0.001465	
	Wet Density (kg/m ³) C / I		2117.17
	Wet Weight of Soil (g)		764.8
	Dry Weight of Soil (g)		716.2
	% Moisture		6.8
	Dry Density (kg/m ³)		1982.37
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2031	
T	Compaction (%)	82.1*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	5:37 PM
Sample Number	B 297	Material Type	3A Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3A Filter			Sampled By	JAG CG		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 layer 3 Pass 20cm profundidad				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By	
Checked By	Report Issue Date
ES	20-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	14-Aug-12
Sample No:	B 297	Elevation:	4 Layer 45cm	Time:	5:37 PM
Sand Cone ID:	F L	Calibrated Volume:	0.0038396 m3	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	2.288	
D	Initial Wt. Of Sand & Jar (kg)	8.249	
E	Wt. Of Residue & Jar (kg)	5.0809	
F	Wt. Of Sand Used (kg) D - E	3.168	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	1.656	
I	Volume of Hole (m ³) H / B	0.001077	
	Wet Density (kg/m ³) C / I		2125.69
	Wet Weight of Soil (g)		787.6
	Dry Weight of Soil (g)		733.7
	% Moisture		7.3
	Dry Density (kg/m ³)		1981.1
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2031	
T	Compaction (%)	81.6*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	14-Aug-12	Time Sampled	5:48 PM
Sample Number	B 298	Material Type	3A Filter	Date Tested	14-Aug-12	Time Tested	N/A
Material Description	3A Filter			Sampled By	JAG CG		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	4 layer 3 Pass 20cm profundidad				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By _____

Checked By ES

Report Issue Date 20-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	14-Aug-12
Sample No:	B 298	Elevation:	4 Layer 45cm	Time:	5:48 PM
Sand Cone ID:	3124	Calibrated Volume:	0.0038396 m3	Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	2.471	
D	Initial Wt. Of Sand & Jar (kg)	8.256	
E	Wt. Of Residue & Jar (kg)	4.9472	
F	Wt. Of Sand Used (kg) D - E	3.308	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	1.796	
I	Volume of Hole (m ³) H / B	0.001168	
	Wet Density (kg/m ³) C / I		2125.68
	Wet Weight of Soil (g)		809.1
	Dry Weight of Soil (g)		755.7
	% Moisture		7.1
	Dry Density (kg/m ³)		1975.42
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2031	
T	Compaction (%)	79.5*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	18-Aug-12	Time Sampled	12:45 PM
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Sample Number	B 303	Material Type	3A Filter	Date Tested	18-Aug-12	Time Tested	1:00 PM
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Material Description	3A Filter	Sampled By	AU-JAG
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Material Source	Test Fill 3A Borinquen	Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column <input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot
Sample Location	5 Layer, Q- 4, 0 Pass		

Special Instructions	N/A	Special Instructions are Acknowledged and Understood by Tech	Initial N/A
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Issued By	N/A	Date Issued	N/A
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Are there any visual abnormalities in the sample? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes who received the client instructions regarding handing the sample?	Initial N/A
--	---	----------------

Client instructions regarding abnormal sample	N/A
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Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By	
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Checked By	ES	Report Issue Date	3-Sep-2012
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Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	18-Aug-12
Sample No:	B 303	Elevation:	5 Layer	Time:	12:45 PM
Sand Cone ID:	CJ	Calibrated Volume:	0.0038396 m3	Technician:	AU

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	4151.400	
D	Initial Wt. Of Sand & Jar (kg)	8.173	
E	Wt. Of Residue & Jar (kg)	3788.7	
F	Wt. Of Sand Used (kg) D - E	4.384	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.872	
I	Volume of Hole (m ³) H / B	0.001867	

Wet Density (kg/m ³) C / I		2223.35
Wet Weight of Soil (g)		450.1
Dry Weight of Soil (g)		415.6
% Moisture		8.3
Dry Density (kg/m ³)		2055.1

c	Wt. Of soil Excavated (kg)	
J	Wt. Of Oversize Rock (kg)	
K	% Oversize Rock Retained (J / C) x 100%	{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J	
M	Specific Gravity	
N	Volume of Hole (m ³) from Line (K) above	
O	Volume of Oversize Mat. J/162.24	
P	Volume of Minus Mat. N - O	
Q	Rock Corrected Density L / P	
R	Rock Corrected Dry Density	
S	Maximum Density(kg/m ³)	2073
T	Compaction (%)	93.6*

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name Project Number Date Sampled Time Sampled

Sample Number Material Type Date Tested Time Tested

Material Description Sampled By

Material Source Remarks & Weather Conditions (SAMPLING) Clear Cool Windy
 Overcast Warm Calm
 Rain Hot

Sample Location

Special Instructions Special Instructions are Acknowledged and Understood by Tech Initial

Issued By Date Issued

Are there any visual abnormalities in the sample? Yes No If yes who received the client instructions regarding handing the sample? Initial

Client instructions regarding abnormal sample

Tests to be performed:

<input type="text" value="Sandcone (ASTM D1556, D491)"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

Report Issued By

Checked By

Report Issue Date

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	18-Aug-12
Sample No:	B 304	Elevation:	5 Layer	Time:	12:48 PM
Sand Cone ID:	3106	Calibrated Volume:	0.0038396 m3	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	2.278	
D	Initial Wt. Of Sand & Jar (kg)	8.264	
E	Wt. Of Residue & Jar (kg)	4.9996	
F	Wt. Of Sand Used (kg) D - E	3.265	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	1.753	
I	Volume of Hole (m ³) H / B	0.001140	

	Wet Density (kg/m ³) C / I	1998.25	
	Wet Weight of Soil (g)	444.6	
	Dry Weight of Soil (g)	414.9	
	% Moisture	7.2	
	Dry Density (kg/m ³)	1864.04	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2073	
T	Compaction (%)	17.1*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	18-Aug-12	Time Sampled	1:10 PM
Sample Number	B 305	Material Type	3A Filter	Date Tested	18-Aug-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	5 Layer, Q 2-6, 0 Passes				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample: N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By: *James A. Wilby*

Checked By: ES

Report Issue Date: 3-Sep-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	18-Aug-12
Sample No:	B 305	Elevation:	5 Layer	Time:	1:10 PM
Sand Cone ID:	FL	Calibrated Volume:	0.0038396 m3	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.00	
C	Wt. Of Soil Excavated (kg)	3456.400	
D	Initial Wt. Of Sand & Jar (kg)	8.0898	
E	Wt. Of Residue & Jar (kg)	4179.1	
F	Wt. Of Sand Used (kg) D - E	3.911	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.399	
I	Volume of Hole (m ³) H / B	0.001560	

Wet Density (kg/m ³) C / I		2215.38
Wet Weight of Soil (g)		456.5
Dry Weight of Soil (g)		426
% Moisture		7.2
Dry Density (kg/m ³)		2066.58

c	Wt. Of soil Excavated (kg)	
J	Wt. Of Oversize Rock (kg)	
K	% Oversize Rock Retained (J / C) x 100%	{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J	
M	Specific Gravity	
N	Volume of Hole (m ³) from Line (K) above	
O	Volume of Oversize Mat. J/162.24	
P	Volume of Minus Mat. N - O	
Q	Rock Corrected Density L / P	
R	Rock Corrected Dry Density	
S	Maximum Density(kg/m ³)	2073
T	Compaction (%)	97.7*

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	21-Aug-12	Time Sampled	10:20 AM
Sample Number	B 310	Material Type	3A Filter	Date Tested	21-Aug-12	Time Tested	10:30 AM
Material Description	3A Filter			Sampled By	JAG/AU		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	5 Layer, 1 Passes, Q1, 15cm profundidad				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

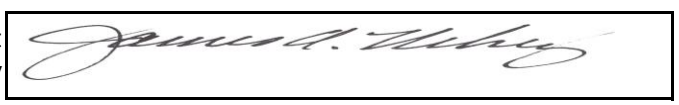
Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By ES Report Issue Date 4-Sep-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	21-Aug-12
Sample No:	B 310	Elevation:	5 Layer	Time:	10:20 AM
Sand Cone ID:	1013	Calibrated Volume:	0.0038396 m3	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.246	
D	Initial Wt. Of Sand & Jar (kg)	8.440	
E	Wt. Of Residue & Jar (kg)	4.6088	
F	Wt. Of Sand Used (kg) D - E	3.831	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.319	
I	Volume of Hole (m ³) H / B	0.001508	
	Wet Density (kg/m ³) C / I		2152.39
	Wet Weight of Soil (g)		699.1
	Dry Weight of Soil (g)		654.4
	% Moisture		6.8
	Dry Density (kg/m ³)		2015.35
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2104	
T	Compaction (%)	69.6*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	21-Aug-12	Time Sampled	10:36 AM
Sample Number	B 311	Material Type	3A Filter	Date Tested	21-Aug-12	Time Tested	10:38 AM
Material Description	3A Filter			Sampled By	JAG/AU		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	5 Layer, 1 Passes, Q3 - Q7				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample: N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By: *James A. Wilby*

Checked By: ES

Report Issue Date: 4-Sep-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	21-Aug-12
Sample No:	B 311	Elevation:	5 Layer	Time:	10:36 AM
Sand Cone ID:	848	Calibrated Volume:	0.0038396 m3	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.489	
D	Initial Wt. Of Sand & Jar (kg)	8.182	
E	Wt. Of Residue & Jar (kg)	4.2081	
F	Wt. Of Sand Used (kg) D - E	3.974	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.462	
I	Volume of Hole (m ³) H / B	0.001601	

	Wet Density (kg/m ³) C / I		2179.45
	Wet Weight of Soil (g)		616.5
	Dry Weight of Soil (g)		580
	% Moisture		6.3
	Dry Density (kg/m ³)		2050.28
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2104	
T	Compaction (%)	81.9*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	21-Aug-12	Time Sampled	10:52 AM
Sample Number	B 313	Material Type	3A Filter	Date Tested	21-Aug-12	Time Tested	11:01 AM
Material Description	3A Filter			Sampled By	JAG/AU		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	5 Layer ,1 Passes ,Q8, 15cm profundidad				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample: N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By: 

Checked By: ES

Report Issue Date: 4-Sep-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	21-Aug-12
Sample No:	B 313	Elevation:	5 Layer	Time:	10:52 AM
Sand Cone ID:	7035	Calibrated Volume:	0.0038396 m3	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.013	
D	Initial Wt. Of Sand & Jar (kg)	8.255	
E	Wt. Of Residue & Jar (kg)	4.5534	
F	Wt. Of Sand Used (kg) D - E	3.701	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.189	
I	Volume of Hole (m ³) H / B	0.001423	

	Wet Density (kg/m ³) C / I		2117.01
	Wet Weight of Soil (g)		683.6
	Dry Weight of Soil (g)		639.7
	% Moisture		6.9
	Dry Density (kg/m ³)		1980.36
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2104	
T	Compaction (%)	56.9*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	23-Aug-12	Time Sampled	8:17 AM
Sample Number	B 314	Material Type	3A Filter	Date Tested	23-Aug-12	Time Tested	8:20 AM
Material Description	3A Filter			Sampled By	JAG / AU		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	5 layer, 2 Passes, Q-6 15cm profundidad				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

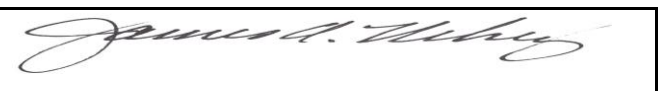
Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By ES

Report Issue Date 3-Sep-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	23-Aug-12
Sample No:	B 314	Elevation:	5 Layer 2 Passes	Time:	8:17 AM
Sand Cone ID:	JAG	Calibrated Volume:	0.0038396 m3	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.381	
D	Initial Wt. Of Sand & Jar (kg)	7.297	
E	Wt. Of Residue & Jar (kg)	3.4265	
F	Wt. Of Sand Used (kg) D - E	3.870	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.358	
I	Volume of Hole (m ³) H / B	0.001533	

Wet Density (kg/m ³) C / I		2205.28
Wet Weight of Soil (g)		588.5
Dry Weight of Soil (g)		552
% Moisture		6.6
Dry Density (kg/m ³)		2068.74

c	Wt. Of soil Excavated (kg)	
J	Wt. Of Oversize Rock (kg)	
K	% Oversize Rock Retained (J / C) x 100%	{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J	
M	Specific Gravity	
N	Volume of Hole (m ³) from Line (K) above	
O	Volume of Oversize Mat. J/162.24	
P	Volume of Minus Mat. N - O	
Q	Rock Corrected Density L / P	
R	Rock Corrected Dry Density	
S	Maximum Density(kg/m ³)	2067
T	Compaction (%)	100.7*

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	23-Aug-12	Time Sampled	8:06 AM
Sample Number	B 315	Material Type	3A Filter	Date Tested	23-Aug-12	Time Tested	8:10 AM
Material Description	3A Filter			Sampled By	JAG/AU		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	5 layer, 2 Passes, Q-3 15cm profundidad				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By ES

Report Issue Date 3-Sep-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	23-Aug-12
Sample No:	B 315	Elevation:	5 Layer 2 Passes	Time:	8:06 AM
Sand Cone ID:	KK	Calibrated Volume:	0.0038396 m3	Technician:	AU

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	2.6539	
D	Initial Wt. Of Sand & Jar (kg)	8.395	
E	Wt. Of Residue & Jar (kg)	4.9424	
F	Wt. Of Sand Used (kg) D - E	3.453	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	1.9408	
I	Volume of Hole (m ³) H / B	0.001262	

	Wet Density (kg/m ³) C / I		2102.93
	Wet Weight of Soil (g)		651.4
	Dry Weight of Soil (g)		609.5
	% Moisture		6.9
	Dry Density (kg/m ³)		1967.19
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2067	
T	Compaction (%)	60.8*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	23-Aug-12	Time Sampled	8:38 AM
Sample Number	B 316	Material Type	3A Filter	Date Tested	23-Aug-12	Time Tested	8:43 AM
Material Description	3A Filter			Sampled By	JAG /AU		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column <input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Sample Location	5 layer, 2 Passes, Q-8 Q-4						
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial <div style="border: 1px solid black; padding: 2px; width: 100px; text-align: center;">N/A</div>		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial

N/A

Client instructions regarding abnormal sample

N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By



Checked By

ES

Report Issue Date

3-Sep-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	23-Aug-12
Sample No:	B 316	Elevation:	5 Layer 2 Passes	Time:	8:38 AM
Sand Cone ID:	FL	Calibrated Volume:	0.0038396 m3	Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.438	
D	Initial Wt. Of Sand & Jar (kg)	7.802	
E	Wt. Of Residue & Jar (kg)	3.8578	
F	Wt. Of Sand Used (kg) D - E	3.944	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.432	
I	Volume of Hole (m ³) H / B	0.001581	
	Wet Density (kg/m ³) C / I		2174.51
	Wet Weight of Soil (g)		775.9
	Dry Weight of Soil (g)		725.3
	% Moisture		7.0
	Dry Density (kg/m ³)		2032.25
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2067	
T	Compaction (%)	86.8*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	23-Aug-12	Time Sampled	2:11 PM
Sample Number	B 318	Material Type	3A Filter	Date Tested	23-Aug-12	Time Tested	2:20 PM
Material Description	3A Filter			Sampled By	AU		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	5 layer, 3 Passes, Q-7, 15cm profundidad				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By ES Report Issue Date 3-Sep-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	23-Aug-12
Sample No:	B 318	Elevation:	5 Layer 3 Passes	Time:	2:11 PM
Sand Cone ID:	3124	Calibrated Volume:	0.0038396 m3	Technician:	AU

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	2.9977	
D	Initial Wt. Of Sand & Jar (kg)	8.304	
E	Wt. Of Residue & Jar (kg)	4.6188	
F	Wt. Of Sand Used (kg) D - E	3.685	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.173	
I	Volume of Hole (m ³) H / B	0.001413	

	Wet Density (kg/m ³) C / I		2121.51
	Wet Weight of Soil (g)		625.1
	Dry Weight of Soil (g)		584
	% Moisture		7.0
	Dry Density (kg/m ³)		1982.72
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2054	
T	Compaction (%)	72.0*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	23-Aug-12	Time Sampled	2:16 PM
Sample Number	B 319	Material Type	3A Filter	Date Tested	23-Aug-12	Time Tested	2:26 PM
Material Description	3A Filter			Sampled By	AU		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	5 Layer, 3 Passes, Q-2 15cm profundidad				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				


Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By ES Report Issue Date 3-Sep-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	23-Aug-12
Sample No:	B 319	Elevation:	5 Layer 3 Passes	Time:	2:16 PM
Sand Cone ID:	H.D.P	Calibrated Volume:	0.0038396 m3	Technician:	AU

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.165	
D	Initial Wt. Of Sand & Jar (kg)	8.251	
E	Wt. Of Residue & Jar (kg)	4.3692	
F	Wt. Of Sand Used (kg) D - E	3.881	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.369	
I	Volume of Hole (m ³) H / B	0.001541	

	Wet Density (kg/m ³) C / I		2053.86
	Wet Weight of Soil (g)		657.2
	Dry Weight of Soil (g)		615.6
	% Moisture		6.8
	Dry Density (kg/m ³)		1923.09
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2054	
T	Compaction (%)	47.1*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	23-Aug-12	Time Sampled	2:38 PM
Sample Number	B 320	Material Type	3A Filter	Date Tested	23-Aug-12	Time Tested	2:45 PM
Material Description	3A Filter			Sampled By	AU		
Material Source	Test Fill 3A Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	5 layer, 3 Passes, Q1 -Q5				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				


Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By ES Report Issue Date 3-Sep-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F 100013 P	Date:	23-Aug-12
Sample No:	B 320	Elevation:	5 Layer 3 Passes	Time:	2:38 PM
Sand Cone ID:	3106	Calibrated Volume:	0.0038396 m3	Technician:	AU

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.3115	
D	Initial Wt. Of Sand & Jar (kg)	7.777	
E	Wt. Of Residue & Jar (kg)	3.933	
F	Wt. Of Sand Used (kg) D - E	3.844	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.332	
I	Volume of Hole (m ³) H / B	0.001516	
	Wet Density (kg/m ³) C / I		2184.37
	Wet Weight of Soil (g)		750.5
	Dry Weight of Soil (g)		709.4
	% Moisture		5.8
	Dry Density (kg/m ³)		2064.62
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2054	
T	Compaction (%)	104.0*	

*Reported as % Relative Density

Checked By: ES

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 515
Date Sampled:	23-Oct-12	Material Type:	Filter 3b
Time Sampled:	10:00 a.m.	Material Source:	Crushing Plant
Sampled By:	JAG,AU	Sample Location:	Borinquen Dam Test Fill Q-8
			Superficial, 1 pass

Date Tested:	23-Oct-12	Sand Cone ID:	CJ
		Calibrated Volume:	
Technician:	AU	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	8.0572
Weight of Sand & Jar, after (kg) [C]	3.9104
Weight of Sand Used (kg) (B-C) [D]	4.147
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.635
Volume of Hole (m ³) (F/A) [G]	0.001713
Weight of Material Excavated (kg) [H]	3.4785
Wet Density (kg/m ³) (H/G)	2030.5
Moisture Content (%)	6.1%
Dry Density (kg/m ³)	1913.8
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >95%

Reported
Issued By



Date

25-Oct-12


The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 516
Date Sampled:	23-Oct-12	Material Type:	Filter 3b
Time Sampled:	10:17 a.m.	Material Source:	Crushing Plant
Sampled By:	AU,JAG	Sample Location:	Borinquen Dam Test Fill Q-5
		Depth: 20 cm, 1 pass	

Date Tested:	23-Oct-12	Sand Cone ID:	3106
		Calibrated Volume:	
Technician:	AU	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.9005
Weight of Sand & Jar, after (kg) [C]	3.9335
Weight of Sand Used (kg) (B-C) [D]	3.967
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.455
Volume of Hole (m ³) (F/A) [G]	0.001596
Weight of Material Excavated (kg) [H]	3.2557
Wet Density (kg/m ³) (H/G)	2039.6
Moisture Content (%)	7.3%
Dry Density (kg/m ³)	1900.9
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >95%

Reported
Issued By



Date

25-Oct-12

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 522
Date Sampled:	24-Oct-12	Material Type:	Filter 3b
Time Sampled:	08:30 a.m.	Material Source:	Crushing Plant
Sampled By:	AU	Sample Location:	Borinquen Dam Test Fill Q-7
Depth: 20 cm, 2 pass, lift 1			

Date Tested:	24-Oct-12	Sand Cone ID:	FL
		Calibrated Volume:	
Technician:	AU	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.6776
Weight of Sand & Jar, after (kg) [C]	4.0139
Weight of Sand Used (kg) (B-C) [D]	3.664
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.152
Volume of Hole (m ³) (F/A) [G]	0.001399
Weight of Material Excavated (kg) [H]	2.9393
Wet Density (kg/m ³) (H/G)	2101.0
Moisture Content (%)	6.7%
Dry Density (kg/m ³)	1969.0
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >95%

Reported
Issued By



Date

25-Oct-12

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 523
Date Sampled:	24-Oct-12	Material Type:	Filter 3b
Time Sampled:	08:39 a.m.	Material Source:	Crushing Plant
Sampled By:	AU	Sample Location:	Borinquen Dam Test Fill Q-4
Superficial, 2 pass, lift 1			

Date Tested:	24-Oct-12	Sand Cone ID:	848
		Calibrated Volume:	
Technician:	AU	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.2509
Weight of Sand & Jar, after (kg) [C]	3.3582
Weight of Sand Used (kg) (B-C) [D]	3.893
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.381
Volume of Hole (m ³) (F/A) [G]	0.001548
Weight of Material Excavated (kg) [H]	3.2936
Wet Density (kg/m ³) (H/G)	2127.8
Moisture Content (%)	6.5%
Dry Density (kg/m ³)	1997.9
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >95%

Reported
Issued By



Date

25-Oct-12


The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 525
Date Sampled:	24-Oct-12	Material Type:	Filter 3b
Time Sampled:	10:02 a.m.	Material Source:	Crushing Plant
Sampled By:	AU	Sample Location:	Borinquen Dam Test Fill Q-6
Depth: 20 cm, 3 pass, lift 1			

Date Tested:	24-Oct-12	Sand Cone ID:	HDP
		Calibrated Volume:	
Technician:	AU	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.6748
Weight of Sand & Jar, after (kg) [C]	4.1013
Weight of Sand Used (kg) (B-C) [D]	3.574
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.062
Volume of Hole (m ³) (F/A) [G]	0.001340
Weight of Material Excavated (kg) [H]	2.8022
Wet Density (kg/m ³) (H/G)	2090.6
Moisture Content (%)	7.3%
Dry Density (kg/m ³)	1948.4
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >95%

Reported
Issued By



Date

25-Oct-12

The Panama Canal
 Third Set of Locks Project
 Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 527
Date Sampled:	24-Oct-12	Material Type:	Filter 3b
Time Sampled:	10:18 a.m.	Material Source:	Crushing Plant
Sampled By:	AU	Sample Location:	Borinquen Dam Test Fill Q-2
Superficial, 3 pass, lift 1			

Date Tested:	24-Oct-12	Sand Cone ID:	1013
		Calibrated Volume:	
Technician:	AU	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.8334
Weight of Sand & Jar, after (kg) [C]	4.0042
Weight of Sand Used (kg) (B-C) [D]	3.829
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.317
Volume of Hole (m ³) (F/A) [G]	0.001507
Weight of Material Excavated (kg) [H]	3.1092
Wet Density (kg/m ³) (H/G)	2063.7
Moisture Content (%)	6.1%
Dry Density (kg/m ³)	1945.0
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >95%

Reported Issued By		Date	25-Oct-12
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The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 534
Date Sampled:	24-Oct-12	Material Type:	Filter 3b
Time Sampled:	04:19 p.m.	Material Source:	Crushing Plant
Sampled By:	CG,JAG	Sample Location:	Borinquen Dam Test Fill Q-5
Superficial			

Date Tested:	24-Oct-12	Sand Cone ID:	KK
		Calibrated Volume:	
Technician:	JAG	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.8497
Weight of Sand & Jar, after (kg) [C]	4.1983
Weight of Sand Used (kg) (B-C) [D]	3.651
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.139
Volume of Hole (m ³) (F/A) [G]	0.001391
Weight of Material Excavated (kg) [H]	2.8122
Wet Density (kg/m ³) (H/G)	2021.7
Moisture Content (%)	4.5%
Dry Density (kg/m ³)	1934.6
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >95%

Reported
Issued By



Date

25-Oct-12



The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 535
Date Sampled:	24-Oct-12	Material Type:	Filter 3b
Time Sampled:	04:25 p.m.	Material Source:	Crushing Plant
Sampled By:	CG,JAG	Sample Location:	Borinquen Dam Test Fill Q-1

Date Tested:	24-Oct-12	Sand Cone ID:	7035
Technician:	JAG	Calibrated Volume:	
		Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.733
Weight of Sand & Jar, after (kg) [C]	4.057
Weight of Sand Used (kg) (B-C) [D]	3.676
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.164
Volume of Hole (m ³) (F/A) [G]	0.001407
Weight of Material Excavated (kg) [H]	2.843
Wet Density (kg/m ³) (H/G)	2020.6
Moisture Content (%)	6.7%
Dry Density (kg/m ³)	1893.7
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >95%

Reported
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Date

25-Oct-12

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 667</u>
Date Sampled: <u>22-Nov-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>8:10</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Second Layer 1 Pass Q5 Depth 25cm</u>	

Date Tested: <u>22-Nov-12</u>	Sand Cone ID: <u>3106</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>A U</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>6.25</u>
Weight of Sand & Jar, after (kg) [C]	<u>2.526</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.724</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.212</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001438</u>
Weight of Material Excavated (kg) [H]	<u>3.126</u>
Wet Density (kg/m ³) (H/G)	<u>2173.5</u>
Moisture Content (%)	<u>7.5%</u>
Dry Density (kg/m ³)	<u>2021.9</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 668
Date Sampled:	22-Nov-12	Material Type:	3b Filter
Time Sampled:	8:20	Material Source:	Crushing Plant
Sampled By:	AU	Sample Location:	Borinquen Dam Test Fill 3b
Second Layer 1 Pass Q8 Depth 25cm			

Date Tested:	22-Nov-12	Sand Cone ID:	848
		Calibrated Volume:	0.0038396
Technician:	A U	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	6.772
Weight of Sand & Jar, after (kg) [C]	2.851
Weight of Sand Used (kg) (B-C) [D]	3.921
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.409
Volume of Hole (m ³) (F/A) [G]	0.001566
Weight of Material Excavated (kg) [H]	3.443
Wet Density (kg/m ³) (H/G)	2198.1
Moisture Content (%)	7.7%
Dry Density (kg/m ³)	2041.0
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported
Issued By

Date



The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 669</u>
Date Sampled: <u>22-Nov-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>8:30</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Second Layer 1 Pass Q4 Surface</u>	

Date Tested: <u>22-Nov-12</u>	Sand Cone ID: <u>JAG</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>A U</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>7.093</u>
Weight of Sand & Jar, after (kg) [C]	<u>3.332</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.761</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.249</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001462</u>
Weight of Material Excavated (kg) [H]	<u>3.216</u>
Wet Density (kg/m ³) (H/G)	<u>2199.3</u>
Moisture Content (%)	<u>6.3%</u>
Dry Density (kg/m ³)	<u>2068.9</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported Issued By 	Date
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The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 671
Date Sampled:	22-Nov-12	Material Type:	3b Filter
Time Sampled:	9:10	Material Source:	Crushing Plant
Sampled By:	AU	Sample Location:	Borinquen Dam Test Fill 3b
Second Layer 2 Passes Q7 Depth 25cm			

Date Tested:	22-Nov-12	Sand Cone ID:	CJ
		Calibrated Volume:	0.0038396
Technician:	A U	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	6.984
Weight of Sand & Jar, after (kg) [C]	3.316
Weight of Sand Used (kg) (B-C) [D]	3.668
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.156
Volume of Hole (m ³) (F/A) [G]	0.001402
Weight of Material Excavated (kg) [H]	3.058
Wet Density (kg/m ³) (H/G)	2181.4
Moisture Content (%)	6.8%
Dry Density (kg/m ³)	2042.6
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 672</u>
Date Sampled: <u>22-Nov-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>9:20</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Second Layer 2 Passes Q1 Depth 25cm</u>	

Date Tested: <u>22-Nov-12</u>	Sand Cone ID: <u>FL</u>	
	Calibrated Volume: <u>0.0038396</u>	
Technician: <u>A U</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>	

Weight of Sand & Jar, before (kg) [B]	<u>6.151</u>
Weight of Sand & Jar, after (kg) [C]	<u>2.186</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.965</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.453</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001595</u>
Weight of Material Excavated (kg) [H]	<u>3.516</u>
Wet Density (kg/m ³) (H/G)	<u>2204.5</u>
Moisture Content (%)	<u>8.1%</u>
Dry Density (kg/m ³)	<u>2039.3</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date



The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 673</u>
Date Sampled: <u>22-Nov-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>9:37</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Second Layer 2 Passes Q6 Surface</u>	

Date Tested: <u>22-Nov-12</u>	Sand Cone ID: <u>FDN</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>A U</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>6.176</u>
Weight of Sand & Jar, after (kg) [C]	<u>2.477</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.699</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.187</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001422</u>
Weight of Material Excavated (kg) [H]	<u>3.075</u>
Wet Density (kg/m ³) (H/G)	<u>2162.5</u>
Moisture Content (%)	<u>6.1%</u>
Dry Density (kg/m ³)	<u>2038.2</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 675</u>
Date Sampled: <u>22-Nov-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>10:08</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Second Layer 3 Passes Q4 Depth 25cm</u>	

Date Tested: <u>22-Nov-12</u>	Sand Cone ID: <u>3259</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>A U</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>7.073</u>
Weight of Sand & Jar, after (kg) [C]	<u>2.87</u>
Weight of Sand Used (kg) (B-C) [D]	<u>4.203</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.691</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001750</u>
Weight of Material Excavated (kg) [H]	<u>3.799</u>
Wet Density (kg/m ³) (H/G)	<u>2171.3</u>
Moisture Content (%)	<u>7.3%</u>
Dry Density (kg/m ³)	<u>2023.5</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
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Date

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 676
Date Sampled:	22-Nov-12	Material Type:	3b Filter
Time Sampled:	10:18	Material Source:	Crushing Plant
Sampled By:	AU	Sample Location:	Borinquen Dam Test Fill 3b
Second Layer 3 Passes Q2 Depth 25cm			

Date Tested:	22-Nov-12	Sand Cone ID:	3124
		Calibrated Volume:	0.0038396
Technician:	A U	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.026
Weight of Sand & Jar, after (kg) [C]	3.25
Weight of Sand Used (kg) (B-C) [D]	3.776
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.264
Volume of Hole (m ³) (F/A) [G]	0.001472
Weight of Material Excavated (kg) [H]	3.17
Wet Density (kg/m ³) (H/G)	2153.5
Moisture Content (%)	6.9%
Dry Density (kg/m ³)	2014.5
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported
Issued By

Date



**The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)**

Project: <u>Pacific</u>	Sample Number: <u>B 677</u>
Date Sampled: <u>22-Nov-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>10:28</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Second Layer 3 Passes Q3 Surface</u>	

Date Tested: <u>22-Nov-12</u>	Sand Cone ID: <u>HDP</u>	
	Calibrated Volume: <u>0.0038396</u>	
Technician: <u>A U</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>	

Weight of Sand & Jar, before (kg) [B]	<u>7.679</u>
Weight of Sand & Jar, after (kg) [C]	<u>3.667</u>
Weight of Sand Used (kg) (B-C) [D]	<u>4.012</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.500</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001625</u>
Weight of Material Excavated (kg) [H]	<u>3.464</u>
Wet Density (kg/m ³) (H/G)	<u>2131.1</u>
Moisture Content (%)	<u>6.1%</u>
Dry Density (kg/m ³)	<u>2008.5</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported Issued By 	Date
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**The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)**

Project: <u>Pacific</u>	Sample Number: <u>B 686</u>
Date Sampled: <u>23-Nov-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>15:55</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>CG</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Third Layer 1 Pass Q1 Depth 25cm</u>	

Date Tested: <u>23-Nov-12</u>	Sand Cone ID: <u>JAG</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>JAG</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>7.987</u>
Weight of Sand & Jar, after (kg) [C]	<u>4.378</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.609</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.097</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001363</u>
Weight of Material Excavated (kg) [H]	<u>2.725</u>
Wet Density (kg/m ³) (H/G)	<u>1998.6</u>
Moisture Content (%)	<u>7.4%</u>
Dry Density (kg/m ³)	<u>1860.9</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported Issued By 	Date
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**The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)**

Project: <u>Pacific</u>	Sample Number: <u>B 687</u>
Date Sampled: <u>23-Nov-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>16:02</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>CG</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Third Layer 1 Pass Q7 Depth 25cm</u>	

Date Tested: <u>23-Nov-12</u>	Sand Cone ID: <u>FL</u>	
	Calibrated Volume: <u>0.0038396</u>	
Technician: <u>JAG</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>	

Weight of Sand & Jar, before (kg) [B]	<u>7.898</u>
Weight of Sand & Jar, after (kg) [C]	<u>4.159</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.739</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.227</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001448</u>
Weight of Material Excavated (kg) [H]	<u>3.022</u>
Wet Density (kg/m ³) (H/G)	<u>2087.0</u>
Moisture Content (%)	<u>7.4%</u>
Dry Density (kg/m ³)	<u>1943.2</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date



The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 691
Date Sampled:	23-Nov-12	Material Type:	3b Filter
Time Sampled:	17:20	Material Source:	Crushing Plant
Sampled By:	CG	Sample Location:	Borinquen Dam Test Fill 3b
Third Layer 2 Passes Q5 Surface			

Date Tested:	23-Nov-12	Sand Cone ID:	848
		Calibrated Volume:	0.0038396
Technician:	JAG	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.637
Weight of Sand & Jar, after (kg) [C]	3.49
Weight of Sand Used (kg) (B-C) [D]	4.147
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.635
Volume of Hole (m ³) (F/A) [G]	0.001713
Weight of Material Excavated (kg) [H]	3.581
Wet Density (kg/m ³) (H/G)	2090.2
Moisture Content (%)	6.6%
Dry Density (kg/m ³)	1960.8
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 691
Date Sampled:	23-Nov-12	Material Type:	3b Filter
Time Sampled:	17:20	Material Source:	Crushing Plant
Sampled By:	CG	Sample Location:	Borinquen Dam Test Fill 3b
Third Layer 2 Passes Q5 Surface			

Date Tested:	23-Nov-12	Sand Cone ID:	848
		Calibrated Volume:	0.0038396
Technician:	JAG	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.637
Weight of Sand & Jar, after (kg) [C]	3.49
Weight of Sand Used (kg) (B-C) [D]	4.147
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.635
Volume of Hole (m ³) (F/A) [G]	0.001713
Weight of Material Excavated (kg) [H]	3.581
Wet Density (kg/m ³) (H/G)	2090.2
Moisture Content (%)	6.6%
Dry Density (kg/m ³)	1960.8
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 691
Date Sampled:	23-Nov-12	Material Type:	3b Filter
Time Sampled:	17:20	Material Source:	Crushing Plant
Sampled By:	CG	Sample Location:	Borinquen Dam Test Fill 3b
Third Layer 2 Passes Q5 Surface			

Date Tested:	23-Nov-12	Sand Cone ID:	848
		Calibrated Volume:	0.0038396
Technician:	JAG	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.637
Weight of Sand & Jar, after (kg) [C]	3.49
Weight of Sand Used (kg) (B-C) [D]	4.147
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.635
Volume of Hole (m ³) (F/A) [G]	0.001713
Weight of Material Excavated (kg) [H]	3.581
Wet Density (kg/m ³) (H/G)	2090.2
Moisture Content (%)	6.6%
Dry Density (kg/m ³)	1960.8
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported
Issued By

Date



The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 694</u>
Date Sampled: <u>24-Nov-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>11:10</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Third Layer 3 Passes Q3 Surface (LCU)</u>	

Date Tested: <u>24-Nov-12</u>	Sand Cone ID: <u>3259</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>AU</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>7.636</u>
Weight of Sand & Jar, after (kg) [C]	<u>4.093</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.543</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.031</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001321</u>
Weight of Material Excavated (kg) [H]	<u>2.901</u>
Wet Density (kg/m ³) (H/G)	<u>2196.8</u>
Moisture Content (%)	<u>7.5%</u>
Dry Density (kg/m ³)	<u>2043.6</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 695</u>
Date Sampled: <u>24-Nov-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>11:20</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Third Layer 3 Passes Q4 Depth 25cm</u>	

Date Tested: <u>24-Nov-12</u>	Sand Cone ID: <u>7035</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>AU</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>7.556</u>
Weight of Sand & Jar, after (kg) [C]	<u>3.683</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.873</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.361</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001535</u>
Weight of Material Excavated (kg) [H]	<u>3.211</u>
Wet Density (kg/m ³) (H/G)	<u>2091.7</u>
Moisture Content (%)	<u>6.9%</u>
Dry Density (kg/m ³)	<u>1956.7</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date



The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 700</u>
Date Sampled: <u>27-Nov-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>11:30</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>JAG</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Fourth Layer 1 Pass Q4 Depth 25cm</u>	

Date Tested: <u>27-Nov-12</u>	Sand Cone ID: <u>FDN</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>JAG</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>7.48</u>
Weight of Sand & Jar, after (kg) [C]	<u>3.028</u>
Weight of Sand Used (kg) (B-C) [D]	<u>4.452</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.940</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001912</u>
Weight of Material Excavated (kg) [H]	<u>3.849</u>
Wet Density (kg/m ³) (H/G)	<u>2013.5</u>
Moisture Content (%)	<u>7.2%</u>
Dry Density (kg/m ³)	<u>1878.3</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date



The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)

Project:	<u>Pacific</u>	Sample Number:	<u>B 701</u>
Date Sampled:	<u>27-Nov-12</u>	Material Type:	<u>3b Filter</u>
Time Sampled:	<u>11:40</u>	Material Source:	<u>Crushing Plant</u>
Sampled By:	<u>JAG</u>	Sample Location:	<u>Borinquen Dam Test Fill 3b</u>

Fourth Layer 1 Pass Q5 Depth 25cm

Date Tested:	<u>27-Nov-12</u>	Sand Cone ID:	<u>1013</u>
		Calibrated Volume:	<u>0.0038396</u>
Technician:	<u>JAG</u>	Unit Wt. of Sand (kg/m ³)[A]:	<u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>6.799</u>
Weight of Sand & Jar, after (kg) [C]	<u>2.685</u>
Weight of Sand Used (kg) (B-C) [D]	<u>4.114</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.602</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001692</u>
Weight of Material Excavated (kg) [H]	<u>3.388</u>
Wet Density (kg/m ³) (H/G)	<u>2002.6</u>
Moisture Content (%)	<u>7.2%</u>
Dry Density (kg/m ³)	<u>1868.1</u>
Maximum Dry Density (kg/m ³)	<u></u>
Compaction (%)	<u>Specified >70%</u>

Reported
Issued By

Date



The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 703</u>
Date Sampled: <u>27-Nov-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>13:43</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>JAG</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Fourth Layer 2 Passes Q2 Surface</u>	

Date Tested: <u>27-Nov-12</u>	Sand Cone ID: <u>7035</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>JAG</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>7.133</u>
Weight of Sand & Jar, after (kg) [C]	<u>2.462</u>
Weight of Sand Used (kg) (B-C) [D]	<u>4.671</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>3.159</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.002054</u>
Weight of Material Excavated (kg) [H]	<u>4.439</u>
Wet Density (kg/m ³) (H/G)	<u>2161.2</u>
Moisture Content (%)	<u>5.6%</u>
Dry Density (kg/m ³)	<u>2046.6</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date



**The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)**

Project: <u>Pacific</u>	Sample Number: <u>B 707</u>
Date Sampled: <u>27-Nov-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>17:35</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Fourth Layer 3 Passes Q1 Depth 25cm</u>	

Date Tested: <u>27-Nov-12</u>	Sand Cone ID: <u>FL</u>	
	Calibrated Volume: <u>0.0038396</u>	
Technician: <u>AU</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>	

Weight of Sand & Jar, before (kg) [B]	<u>7.59</u>
Weight of Sand & Jar, after (kg) [C]	<u>3.93</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.660</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.148</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001397</u>
Weight of Material Excavated (kg) [H]	<u>2.936</u>
Wet Density (kg/m ³) (H/G)	<u>2102.2</u>
Moisture Content (%)	<u>7.7%</u>
Dry Density (kg/m ³)	<u>1951.9</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 708
Date Sampled:	27-Nov-12	Material Type:	3b Filter
Time Sampled:	17:45	Material Source:	Crushing Plant
Sampled By:	AU	Sample Location:	Borinquen Dam Test Fill 3b
Fourth Layer 3 Passes Q7 Surface			

Date Tested:	27-Nov-12	Sand Cone ID:	JAG
		Calibrated Volume:	0.0038396
Technician:	AU	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.067
Weight of Sand & Jar, after (kg) [C]	3.133
Weight of Sand Used (kg) (B-C) [D]	3.934
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.422
Volume of Hole (m ³) (F/A) [G]	0.001575
Weight of Material Excavated (kg) [H]	3.342
Wet Density (kg/m ³) (H/G)	2122.2
Moisture Content (%)	6.4%
Dry Density (kg/m ³)	1994.6
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported
Issued By

Date

APÉNDICE 8:

RESULTADOS DE
ENSAYOS DEL DENSÍMETRO NUCLEAR



The Panama Canal
Third Set of Locks Project
Density of Soil Aggregates In Place by the Nuclear Method (ASTM D6938-Method A)

Project Name:	Pacific	Project Number:	F100013	Date	12/1/2012	Technician	CG JAG
Gauge:	1505	Correction:					

Test No.	1	2	3	4	5	6	7	8		
Time	10:30 AM	10:43 AM	10:48 AM	10:51 AM	11:02 AM	11:08 AM	11:17 AM	11:19 AM		
Test Depth (mm)	300	300	300	300	300	300	300	300		
Structure	Test Fill	Test Fill	Test Fill	Test Fill	Test Fill	Test Fill	Test Fill	Test Fill		
Material	3b	3b	3b	3b	3b	3b	3b	3b		
Elevation	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer		
Station	Q6	Q1	Q2	Q3	Q7	Q8	Q4	Q5		
Offset										
Layer Thickness (cm)	50	50	50	50	50	50	50	50		
Maximum Density (kg/m³)										
Wet Density (kg/m³)	2053	2147	2111	2085	2069	2107	2123	2097		
Dry Density (kg/m³)	1971.5	2054.0	2026.8	1992.5	1989.4	2023.9	2036.0	2018.9		
Moisture (L/m³)	81.9	92.8	84.6	92.8	79.1	83.2	87.4	77.8		
% Moisture	4.2%	4.5%	4.2%	4.7%	4.0%	4.1%	4.3%	3.9%		
% Relative Compaction	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		
% Required Compaction	70%	70%	70%	70%	70%	70%	70%	70%		
Status(Pass or Fail)										
Retest of										

NOTES: Rev2 Sample No for series of tests is B800, Fifth Layer 1 pass

Checked By: IC



The Panama Canal
Third Set of Locks Project
Density of Soil Aggregates In Place by the Nuclear Method (ASTM D6938-Method A)

Project Name:	Pacific	Project Number:	F100013	Date	12/1/2012	Technician	CG JAG
Gauge:	1505	Correction:					

Test No.	1	2	3	4	5	6	7	8		
Time	10:30 AM	10:43 AM	10:48 AM	10:51 AM	11:02 AM	11:08 AM	11:17 AM	11:19 AM		
Test Depth (mm)	300	300	300	300	300	300	300	300		
Structure	Test Fill	Test Fill	Test Fill	Test Fill	Test Fill	Test Fill	Test Fill	Test Fill		
Material	3b	3b	3b	3b	3b	3b	3b	3b		
Elevation	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer		
Station	Q6	Q1	Q2	Q3	Q7	Q8	Q4	Q5		
Offset										
Layer Thickness (cm)	50	50	50	50	50	50	50	50		
Maximum Density (kg/m³)										
Wet Density (kg/m³)	2053	2147	2111	2085	2069	2107	2123	2097		
Dry Density (kg/m³)	1971.5	2054.0	2026.8	1992.5	1989.4	2023.9	2036.0	2018.9		
Moisture (L/m³)	81.9	92.8	84.6	92.8	79.1	83.2	87.4	77.8		
% Moisture	4.2%	4.5%	4.2%	4.7%	4.0%	4.1%	4.3%	3.9%		
% Relative Compaction	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		
% Required Compaction	70%	70%	70%	70%	70%	70%	70%	70%		
Status(Pass or Fail)										
Retest of										

NOTES: Rev2 Sample No for series of tests is B800, Fifth Layer 1 pass

Checked By: IC



The Panama Canal
Third Set of Locks Project
Density of Soil Aggregates In Place by the Nuclear Method (ASTM D6938-Method A)

Project Name:	Pacific	Project Number:	F100013	Date	12/1/2012	Technician	CG
Gauge:	1505	Correction:					

Test No.	1	2	3	4					
Time									
Test Depth (mm)	300	300	300	300					
Structure	Test Fill	Test Fill	Test Fill	Test Fill					
Material	3b	3b	3b	3b					
Elevation	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer					
Station	Q5	Q5	Q4	Q1					
Offset									
Layer Thickness (cm)	50	50	50	50					
Maximum Density (kg/m³)									
Wet Density (kg/m³)	2032	2071	2151	2119					
Dry Density (kg/m³)	1950.2	1966.0	2046.0	2019.7					
Moisture (L/m³)			105.2	99.7					
% Moisture	4.2%	5.3%	5.1%	4.9%					
% Relative Compaction	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					
% Required Compaction	70%	70%	70%	70%					
Status(Pass or Fail)									
Retest of									

NOTES: Rev2 Sample No for series of tests is B801, Fifth Layer 2 passes, Test number 2 was taken after the rain

Checked By: IC



The Panama Canal
Third Set of Locks Project
Density of Soil Aggregates In Place by the Nuclear Method (ASTM D6938-Method A)

Project Name:	Pacific	Project Number:	F100013	Date:	12/1/2012	Technician:	CG
Gauge:	1505	Correction:					

Test No.	1	2	3	4	5	6	7	8		
Time										
Test Depth (mm)	300	300	300	300	300	300	300	300		
Structure	Test Fill	Test Fill	Test Fill	Test Fill	Test Fill	Test Fill	Test Fill	Test Fill		
Material	3b	3b	3b	3b	3b	3b	3b	3b		
Elevation	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer	Fifth Layer		
Station	Q8	Q2	Q1	Q7	Q6	Q2	Q4	Q5		
Offset										
Layer Thickness (cm)	50	50	50	50	50	50	50	50		
Maximum Density (kg/m³)										
Wet Density (kg/m³)	2065	2155	2155	2082	2081	2138	2166	2099		
Dry Density (kg/m³)	1966.2	2050.9	2052.4	1992.2	1989.8	2039.2	2067.4	2001.9		
Moisture (L/m³)	98.3	103.8	102.4							
% Moisture	5.0%	5.1%	5.0%	4.5%	4.6%	4.8%	4.8%	4.8%		
% Relative Compaction	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!		
% Required Compaction	70%	70%	70%	70%	70%	70%	70%	70%		
Status(Pass or Fail)										
Retest of										

NOTES: Rev3 Sample No for series of tests is B802, Fifth Layer 3 passes, tests were performed after the rain

Checked By: IC

APÉNDICE 9:

RESULTADOS DE
ENSAYOS DE PERCOLACIÓN

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	20-Jul-12	Time Sampled	9:30 AM
Sample Number	B - 246	Material Type	3a Filter	Date Tested	01-Aug-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG		
Material Source	Test Fill Borinquen Dam 4 Pass			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift #2				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input type="checkbox"/> Calm		
Special Instructions	Percolation test			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Percolation Test (EM1110-2-2301)	

Report Issued By _____

Checked By _____

Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Percolation Test EM 1110-2-2301 - Open Trench Method 11-4

Project Name	Pacific	Project Number	F100013P	Date Tested	20/Jul/2012
Technician	CG	Material Type	3a Filter	Elevation	45 cm
Location	3a Filter Test Fill Borinquen Dam - 2nd Layer				

Material:

Specific Gravity	2.2	Absorption (%)	Not Determined	Moisture Before Test (%)	5.7
Density of Material (kg/m ³)	2183	Water Temp (°C)	Not Recorded	Moisture After Test (%)	12.5

Test:

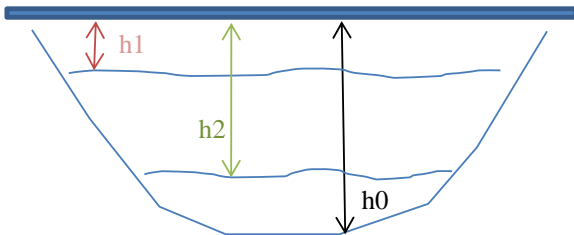
Time - t(s)	Height h (cm)	Δ h (cm)	Time - t(s)	Height h (cm)	Δ h (cm)
15	33		285	37.7	
30	34		305	37.7	
45	34		320	38	
60	34.4		335	38.4	
75	34.7		360	38.4	
90	34.8		480	46	
105	35				
120	35.5				
135	35.6				
150	35.9				
165	36				
180	36.3				
195	36.5				
210	36.5				
225	36.8				
240	36.8				
255	36.9				
270	37.3				

Pit Depth(cm) [h0]

Total Time Elapsed (s)

Initial Height of Water(cm) [h1]

Final Height of Water(cm) [h2]



Coefficient of Hydraulic Conductivity [K]

Comments:

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	20-Jul-12	Time Sampled	2:00 PM
Sample Number	B - 252	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG - EC		
Material Source	Test Fill Borinquen Dam 4 Pass			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift #2				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	Percolation test			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample: N/A

Tests to be performed:

Percolation Test (EM1110-2-2301)	

Report Issued By Robert J. Montalvo

Checked By RJMh Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Percolation Test EM 1110-2-2301 - Open Trench Method 11-4

Project Name	Pacific	Project Number	F100013P	Date Tested	20/Jul/2012
Technician	CG	B - 253	3a Filter	Elevation	45 cm
Location	3a Filter Test Fill Borinquen Dam - 2nd Layer				

Material:

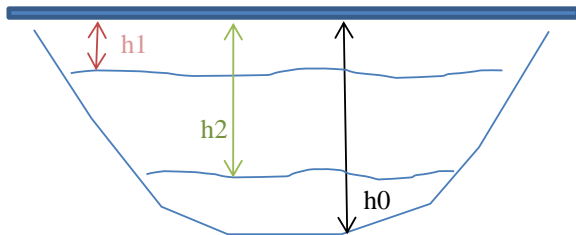
Specific Gravity	2.2	Absorption (%)	Not Determined	Moisture Before Test (%)	5.6
Density of Material (kg/m ³)	2183	Water Temp (°C)	Not Recorded	Moisture After Test (%)	12.5

Test:

Time - t(s)	Height h (cm)	Δ h (cm)	Time - t(s)	Height h (cm)	Δ h (cm)
15	33		285	37.1	
30	33		300	37.3	
45	33.5		315	37.4	
60	34		330	37.5	
75	34.5		345	37.7	
90	34.6		360	37.8	
105	35				
120	35.3				
135	35.5				
150	35.7				
165	35.7				
180	36				
195	36.3				
210	36.5				
225	36.5				
240	36.8				
255	36.9				
270	37				

Pit Depth(cm) [h0]	45	Total Time Elapsed (s)	480
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Initial Height of Water(cm) [h1]	33	Final Height of Water(cm) [h2]	37.8
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Coefficient of Hydraulic Conductivity [K]	1.63E-02
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Comments: Coefficient of hydraulic conductivity applies to top 7.2 cm of pit, water did not drain below that point

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	01-Aug-12	Time Sampled	11:17 AM
Sample Number	B - 280	Material Type	3a Filter - 3 Pass	Date Tested	01-Aug-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG CG		
Material Source	Test Fill Borinquen Dam 3 Pass			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift #3 / Next to Quadrant 1				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	Percolation test			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Percolation Test (EM1110-2-2301)	

Report Issued By

Checked By Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Percolation Test EM 1110-2-2301 - Open Trench Method 11-4

Project Name	Pacific	Project Number	F100013P	Date Tested	1/8/2012
Technician	JAG CG	Material Type	3a Filter	Elevation	
Location	3 Layer , 3a Filter, Test Fill Borinquen Dam				

Material:

Specific Gravity	2.764	Absorption (%)	N/R	Moisture Before Test (%)	6
Density of Material (kg/m ³)	1818.73	Water Temp (°C)	N/R	Moisture After Test (%)	12.8

Test:

Time - t(s)	Height h (cm)	Δ h (cm)	Time - t(s)	Height h (cm)	Δ h (cm)
15	23		285	29	
30	23.5		300	29.5	
45	24		315	29.5	
60	24.5		330	30	
75	25		345	30	
90	25.5		360	30	
105	25.5		11:15 AM	41.5	
120	26		11:40 AM	* end test	
135	26.0				
150	26.5				
165	26.5				
180	27				
195	27.5				
210	27.5				
225	28				
240	28				
255	28.5				
270	28.5				

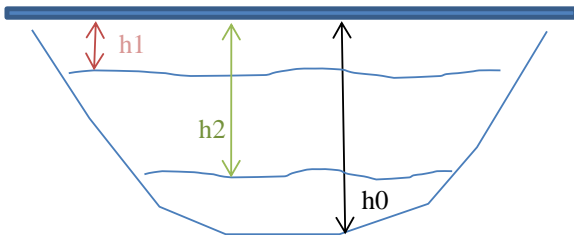
Pit Depth(cm) [h0] 44.1

Total Time Elapsed (s) 1260

Initial Height of Water(cm) [h1] 22

Final Height of Water(cm) [h2] 41.5

Coefficient of Hydraulic Conductivity [K] 1.20E-02



Comments:

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	01-Aug-12	Time Sampled	3:35 PM
Sample Number	B - 281	Material Type	3a Filter - 3 Pass	Date Tested	01-Aug-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG CG		
Material Source	Test Fill Borinquen Dam 3 Pass			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Lift #3 /Next to Quadrant 8				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	Percolation test			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Percolation Test (EM1110-2-2301)	

Report Issued By _____

Checked By _____ Report Issue Date 2-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Percolation Test EM 1110-2-2301 - Open Trench Method 11-4

Project Name	Pacific	Project Number	F100013P	Date Tested	1/8/2012
Technician	JAG CG	Material Type	3a Filter	Elevation	
Location	3 Layer , 3a Filter, Test Fill Borinquen Dam				

Material:

Specific Gravity	2.764	Absorption (%)	N/R	Moisture Before Test (%)	6.1
Density of Material (kg/m ³)	1902.69	Water Temp (°C)	N/R	Moisture After Test (%)	12.2

Test:

Time - t(s)	Height h (cm)	Δ h (cm)	Time - t(s)	Height h (cm)	Δ h (cm)
15	25.5		285	30	
30	25.5		300	30	
45	26		315	30	
60	26.5		330	30.5	
75	26.5		345	30.5	
90	27		360	30.5	
105	27		15 min	30.5	
120	27.5				
135	27.5				
150	28				
165	28				
180	28.5				
195	28.5				
210	29				
225	29				
240	29.5				
255	29.5				
270	30				

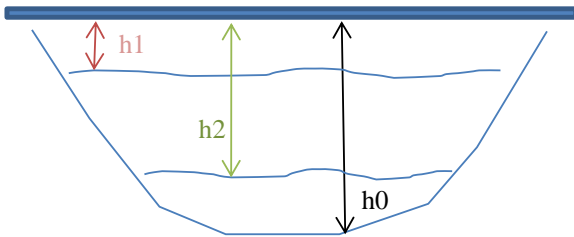
Pit Depth(cm) [h0] 45.8

Total Time Elapsed (s) 1260

Initial Height of Water(cm) [h1] 25

Final Height of Water(cm) [h2] 39.5

Coefficient of Hydraulic Conductivity [K] 8.50E-03



Comments:

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	15-Aug-12	Time Sampled	10:45 a.m.
Sample Number	B - 300	Material Type	Type 3a (Transition)	Date Tested	15-Aug-12	Time Tested	N/A
Material Description	Combination of basalt - 4 layer - Depth 45 cm			Sampled By	AU - CG		
Material Source	Test Fill			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Rain <input checked="" type="checkbox"/> Hot <input checked="" type="checkbox"/> Calm		
Sample Location	Borinquen Dam						
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial <div style="border: 1px solid black; padding: 2px; text-align: center;">N/A</div>		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial

N/A

Client instructions regarding abnormal sample

N/A

Tests to be performed:

Moisture Content (ASTM C566, D2216)	
Percolation Test (EM1110-2-2301)	

Report Issued By 

Checked By JN Report Issue Date 18-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Percolation Test EM 1110-2-2301 - Open Trench Method 11-4

Project Name	Pacific	Project Number	F100013P	Date Tested	15-ago-12
Technician	AU - CG		Type 3a (Transition)	Elevation	45 cm
Location	Test Fill Borinquen Dam - 4 Layer				

Material: Data Reference from Sample 246

Specific Gravity	2764	Absorption (%)	N/A	Moisture Before Test (%)	9.2
Density of Material (kg/m ³)	2215	Water Temp (°C)	N/A	Moisture After Test (%)	15.1

Test:

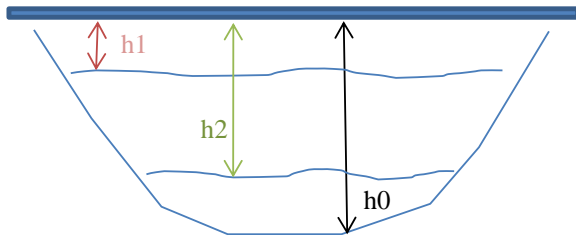
Time - t(s)	Height h (cm)	Δ h (cm)	Time - t(s)	Height h (cm)	Δ h (cm)
15	25.0		285	31.0	
30	25.5		300	31.5	
45	25.5		315	31.5	
60	26.0		330	32.0	
75	26.5		345	32.0	
90	27.0		360	32.5	
105	27.5				
120	28.0				
135	28.0				
150	28.5				
165	29.0				
180	29.0				
195	29.5				
210	30.0				
225	30.0				
240	30.5				
255	30.5				
270	31.0				

Pit Depth(cm) [h0] 47

Total Time Elapsed (s) 360

Initial Height of Water(cm) [h1] 25

Final Height of Water(cm) [h2] 32.5



Coefficient of Hydraulic Conductivity [K] 1.2×10^{-2}

Comments:



The Panama Canal Third Set of Locks Project

Moisture Contents (ASTM C566 and D2216)

Project Name	Pacific	Sample No	B - 300	Technician	JAG
Material Type	Type 3a (Transition)	Date Tested	15-Aug-12	Checked By	JN

Location: Beginning of the test

Wt. of Wet Sample (g) [A]	900.3	Scale ID	1453	<input checked="" type="checkbox"/> Scale
Wt. Of Dry Sample (g) [B]	824.5	Oven ID	Burner	
Moisture Content (%)	9.2			
$= ([A]-[B])/[B] * 100$				

Location: End of test

Wt. of Wet Sample (g) [A]	900.0	Scale ID	1453	<input checked="" type="checkbox"/> Scale
Wt. Of Dry Sample (g) [B]	782.0	Oven ID	Burner	
Moisture Content (%)	15.1			
$= ([A]-[B])/[B] * 100$				

Wt. of Wet Sample (g) [A]		Scale ID		<input type="checkbox"/> Scale
Wt. Of Dry Sample (g) [B]		Oven ID		
Moisture Content (%)				
$= ([A]-[B])/[B] * 100$				

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	15-Aug-12	Time Sampled	3:10 PM
Sample Number	B - 301	Material Type	Type 3a (Transition)	Date Tested	N/A	Time Tested	N/A
Material Description	Combination of basalt - 4 layer - 45 cm			Sampled By	AU - CG		
Material Source	Test Fill			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Borinquen Dam				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Moisture Content (ASTM C566, D2216)	
Percolation Test (EM1110-2-2301)	

Report Issued By 

Checked By JN Report Issue Date 18-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Percolation Test EM 1110-2-2301 - Open Trench Method 11-4

Project Name	Pacific	Project Number	F100013P	Date Tested	15-Aug-12
Technician	AU - CG		Type 3a (Transition)	Elevation	45 cm
Location	Test Fill Borinquen Dam - 4 Layer				

Material: Data Reference from Sample 246

Specific Gravity	2764	Absorption (%)	N/A	Moisture Before Test (%)	7.1
Density of Material (kg/m ³)	2190	Water Temp (°C)	N/A	Moisture After Test (%)	13.1

Test: B-301A

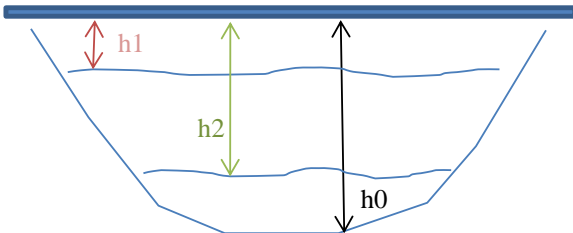
Time - t(s)	Height h (cm)	Δ h (cm)	Time - t(s)	Height h (cm)	Δ h (cm)
15	22.5		285	26.7	
30	23.0		300	27.0	
45	23.3		315	27.3	
60	23.5		330	27.5	
75	23.7		345	27.8	
90	24.0		360	28.0	
105	24.3				
120	24.5				
135	24.7				
150	25.0				
165	25.3				
180	25.5				
195	25.6				
210					
225	25.9				
240	26.0				
255	26.3				
270	26.5				

Pit Depth(cm) [h0] 42.7

Total Time Elapsed (s) 360

Initial Height of Water(cm) [h1] 22.5

Final Height of Water(cm) [h2] 28



Coefficient of Hydraulic Conductivity [K] 7.8×10^{-3}

Comments:

The Panama Canal Third Set of Locks Project

Percolation Test EM 1110-2-2301 - Open Trench Method 11-4

Project Name	Pacific	Project Number	F100013P	Date Tested	15-Aug-12
Technician	AU - CG		Type 3a (Transition)	Elevation	45 cm
Location	Test Fill Borinquen Dam - 4 Layer				

Material: Data Reference from Sample 246

Specific Gravity	2764	Absorption (%)	N/A	Moisture Before Test (%)	7.1
Density of Material (kg/m ³)	2190	Water Temp (°C)	N/A	Moisture After Test (%)	13.1

Test: B-301B

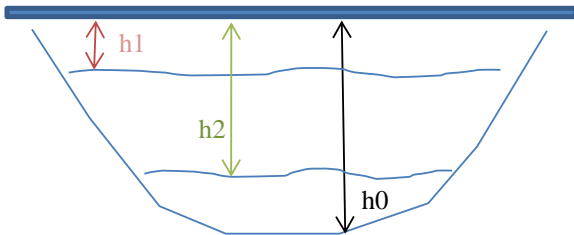
Time - t(s)	Height h (cm)	Δ h (cm)	Time - t(s)	Height h (cm)	Δ h (cm)
15	5.5		285	8.7	
30	5.8		300	8.8	
45	6.0		315	8.9	
60	6.1		330	9.2	
75	6.2		345	9.3	
90	6.5		360	9.4	
105	6.5				
120	6.8				
135	7.1				
150	7.5				
165	7.5				
180	7.6				
195	7.7				
210					
225	8.1				
240	8.2				
255	8.5				
270	8.6				

Pit Depth(cm) [h0] 42.7

Total Time Elapsed (s) 360

Initial Height of Water(cm) [h1] 5.5

Final Height of Water(cm) [h2] 9.4



Coefficient of Hydraulic Conductivity [K] 8.7×10^{-3}

Comments: Performed following 301-A fully saturated.



The Panama Canal Third Set of Locks Project

Moisture Contents (ASTM C566 and D2216)

Project Name	Pacific	Sample No	B - 301	Technician	AU
Material Type	Type 3a (Transition)	Date Tested	15-Aug-12	Checked By	JN

Location: Before of the test

Wt. of Wet Sample (g) [A]	861.3	Scale ID	1453	<input checked="" type="checkbox"/> Scale C1
Wt. Of Dry Sample (g) [B]	804.5	Oven ID	Burner	
Moisture Content (%)	7.1			
$= ([A]-[B])/[B] * 100$				

Location: After of test

Wt. of Wet Sample (g) [A]	1661.0	Scale ID	1879	<input type="checkbox"/> Scale C1
Wt. Of Dry Sample (g) [B]	1468.9	Oven ID	Burner	
Moisture Content (%)	13.1			
$= ([A]-[B])/[B] * 100$				

Wt. of Wet Sample (g) [A]		Scale ID		<input type="checkbox"/> Scale C1
Wt. Of Dry Sample (g) [B]		Oven ID		
Moisture Content (%)				
$= ([A]-[B])/[B] * 100$				

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	24-Aug-12	Time Sampled	8:50am
Sample Number	B - 322	Material Type	3a Filter	Date Tested	24-Aug-12	Time Tested	10:38am
Material Description	3a Filter			Sampled By	AU - CG		
Material Source	Borinquen Dam Test Fill			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Layer 5, 3 Pass Q8 30cm x 30cm				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Tests to be performed:

Moisture Content (ASTM C566, D2216)	
Percolation Test (EM1110-2-2301)	

Report Issued By 

Checked By JN Report Issue Date 18-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Percolation Test EM 1110-2-2301 - Open Trench Method 11-4

Project Name	Pacific	Project Number	F100013P	Date Tested	24-Aug-12
Technician	AU - CG		3a Filter	Elevation	Layer 5
Location	Test Fill Borinquen Dam - 5 Layer Q8				

Material:

Specific Gravity	2764	Absorption (%)	N/A	Moisture Before Test (%)	6.4
Density of Material (kg/m ³)	1989.7	Water Temp (°C)	N/A	Moisture After Test (%)	11.6

Test:

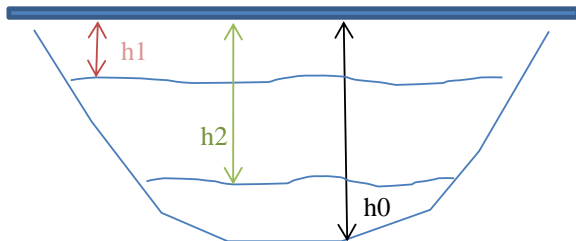
Time - t(s)	Height h (cm)	Δ h (cm)	Time - t(s)	Height h (cm)	Δ h (cm)
15	10.0		285	15.0	
30	10.5		300	15.5	
45	11.0		315	15.5	
60	11.5		330	16.0	
75	11.5		345	16.0	
90	12.0		360	16.5	
105	12.5				
120	12.5				
135	13.0				
150	13.0				
165	13.5				
180	13.5				
195	14.0				
210	14.0				
225	14.5				
240	14.5				
255	15.0				
270	15.0				

Pit Depth(cm) [h0] 30

Total Time Elapsed (s) 360

Initial Height of Water(cm) [h1] 10

Final Height of Water(cm) [h2] 32.5



Coefficient of Hydraulic Conductivity [K] 1.1×10^{-2}

Comments:



The Panama Canal Third Set of Locks Project

Moisture Contents (ASTM C566 and D2216)

Project Name	Pacific	Sample No	B - 322	Technician	JAG
Material Type	3a Filter	Date Tested	24-Aug-12	Checked By	JN

Location: Beginning Q8

Wt. of Wet Sample (g) [A]	965.5	Scale ID	1453	<input checked="" type="checkbox"/> Scale C1
Wt. Of Dry Sample (g) [B]	907.1	Oven ID	1878	
Moisture Content (%)	6.4			

= $([A]-[B])/[B] * 100$

Location: Final

Wt. of Wet Sample (g) [A]	986.4	Scale ID	1453	<input type="checkbox"/> Scale C1
Wt. Of Dry Sample (g) [B]	883.9	Oven ID	1878	
Moisture Content (%)	11.6			

= $([A]-[B])/[B] * 100$

Wt. of Wet Sample (g) [A]		Scale ID		<input type="checkbox"/> Scale C1
Wt. Of Dry Sample (g) [B]		Oven ID		
Moisture Content (%)				

= $([A]-[B])/[B] * 100$

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	24-Aug-12	Time Sampled	10:40am
Sample Number	B - 323	Material Type	3a Filter	Date Tested	24-Aug-12	Time Tested	12:02pm
Material Description	3a Filter			Sampled By	JAG AU		
Material Source	Borinquen Dam Test Fill			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column <input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Sample Location	Layer 5, 3 Pass Q1 30cm x 30cm						
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial <div style="border: 1px solid black; padding: 2px; text-align: center;">N/A</div>		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial

N/A

Client instructions regarding abnormal sample

N/A

Tests to be performed:

Moisture Content (ASTM C566, D2216)	
Percolation Test (EM1110-2-2301)	

Report Issued By 

Checked By

JN

 Report Issue Date

18-Aug-2012

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Percolation Test EM 1110-2-2301 - Open Trench Method 11-4

Project Name	Pacific	Project Number	F100013P	Date Tested	24-Aug-12
Technician	JAG AU		3a Filter	Elevation	Layer 5
Location	Test Fill Borinquen Dam - 5 Layer Q1				

Material:

Specific Gravity	2764	Absorption (%)	N/A	Moisture Before Test (%)	5.6
Density of Material (kg/m ³)	1989.7	Water Temp (°C)	N/A	Moisture After Test (%)	12.2

Test:

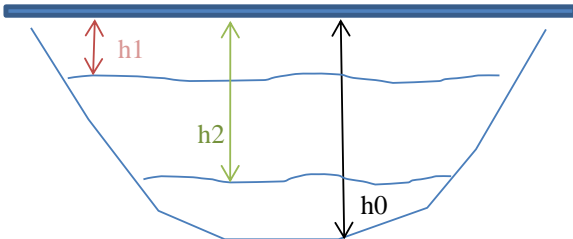
Time - t(s)	Height h (cm)	Δ h (cm)	Time - t(s)	Height h (cm)	Δ h (cm)
15	11.5		285	16.0	
30	12.0		300	16.5	
45	12.0		315	16.5	
60	12.5		330	16.5	
75	13.0		345	17.0	
90	13.0		360	17.0	
105	13.5				
120	13.5				
135	14.0				
150	14.0				
165	14.5				
180	14.5				
195	14.5				
210	15.0				
225	15.0				
240	15.5				
255	15.5				
270	16.0				

Pit Depth(cm) [h0] 30

Total Time Elapsed (s) 360

Initial Height of Water(cm) [h1] 11.5

Final Height of Water(cm) [h2] 17



Coefficient of Hydraulic Conductivity [K] 1.2×10^{-2}

Comments:



The Panama Canal Third Set of Locks Project

Moisture Contents (ASTM C566 and D2216)

Project Name	Pacific	Sample No	B - 323	Technician	JAG
Material Type	3a Filter	Date Tested	24-Aug-12	Checked By	JN

Location: Beginning Q8

Wt. of Wet Sample (g) [A]	938.6	Scale ID	1453	<input checked="" type="checkbox"/> Scale C1
Wt. Of Dry Sample (g) [B]	888.6	Oven ID	1878	
Moisture Content (%)	5.6			
$= ([A]-[B])/[B] * 100$				

Location: Final

Wt. of Wet Sample (g) [A]	932.2	Scale ID	1453	<input type="checkbox"/> Scale C1
Wt. Of Dry Sample (g) [B]	830.6	Oven ID	1878	
Moisture Content (%)	12.2			
$= ([A]-[B])/[B] * 100$				

Wt. of Wet Sample (g) [A]		Scale ID		<input type="checkbox"/> Scale C1
Wt. Of Dry Sample (g) [B]		Oven ID		
Moisture Content (%)				
$= ([A]-[B])/[B] * 100$				

The Panama Canal Third Set of Locks Project

Percolation Test EM 1110-2-2301 - Open Trench Method 11-4

Project Name	Pacific	Project Number	F100013	Date Tested	6-Dec-12
Technician	EE JAG	Material Type	3b Filter	Elevation	Fifth Layer
Location	Borinquen Dam Test Fill 3b Fifth Layer Q1				

Material:

Specific Gravity	3	Absorption (%)	2.7	Moisture Before Test (%)	6.1
Density of Material (kg/m ³)	2079.4	Water Temp (°C)	N/A	Moisture After Test (%)	11.9

Test:

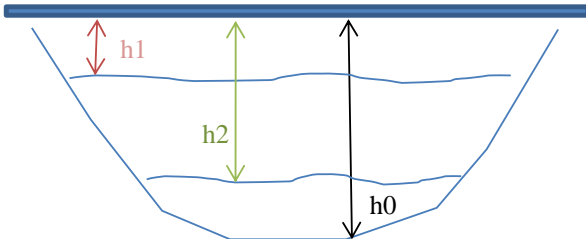
Time - t(s)	Height h (cm)	Δ h (cm)	Time - t(s)	Height h (cm)	Δ h (cm)
0	12.0	33.0	270	37.7	7.3
15	17.5	27.5	285	38.5	6.5
30	20.0	25.0	300	39.0	6.0
45	22.5	22.5	315	39.4	5.6
60	24.0	21.0	330	40.1	4.9
75	26.2	18.8	345	40.6	4.4
90	27.5	17.5	360	40.8	4.2
105	28.7	16.3			
120	30.0	15.0			
135	31.2	13.8			
150	32.0	13.0			
165	32.9	12.1			
180	34.0	11.0			
195	34.6	10.4			
210	35.4	9.6			
225	36.0	9.0			
240	36.6	8.4			
255	37.2	7.8			

Pit Depth(cm) [h0] 45

Total Time Elapsed (s) 360

Initial Height of Water(cm) [h1] 12

Final Height of Water(cm) [h2] 40.8



Coefficient of Hydraulic Conductivity [K] 5.8×10^{-2}

Comments: Sample Number B-825

The Panama Canal Third Set of Locks Project

Percolation Test EM 1110-2-2301 - Open Trench Method 11-4

Project Name	Pacific	Project Number	F100013	Date Tested	6-Dec-12
Technician	EE JAG	Material Type	3b Filter	Elevation	Fifth Layer
Location	Borinquen Dam Test Fill 3b Fifth Layer Q7				

Material:

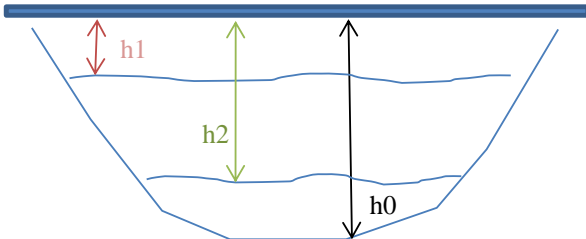
Specific Gravity	3	Absorption (%)	2.7	Moisture Before Test (%)	6
Density of Material (kg/m ³)	2119.48	Water Temp (°C)	N/A	Moisture After Test (%)	11.9

Test:

Time - t(s)	Height h (cm)	Δ h (cm)	Time - t(s)	Height h (cm)	Δ h (cm)
0	16.5	28.5	270	34.5	10.5
15	19.7	25.3	285	35.0	10.0
30	21.5	23.5	300	35.0	10.0
45	23.0	22.0	315	35.5	9.5
60	25.2	19.8	330	36.0	9.0
75	26.5	18.5	345	36.3	8.7
90	27.9	17.1	360	36.5	8.5
105	28.0	17.0			
120	29.3	15.7			
135	30.0	15.0			
150	30.5	14.5			
165	31.7	13.3			
180	32.0	13.0			
195	32.4	12.6			
210	33.0	12.0			
225	33.3	11.7			
240	33.7	11.3			
255	34.0	11.0			

Pit Depth(cm) [h0]	45	Total Time Elapsed (s)	360
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Initial Height of Water(cm) [h1]	16.5	Final Height of Water(cm) [h2]	36.5
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Coefficient of Hydraulic Conductivity [K]	4.3 x 10 ⁻²
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Comments: Sample Number B-826

APÉNDICE 10:

RESULTADOS DE
ENSAYOS DE PLACA DE CARGA



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE TEST
ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality
 LOCATION: Borinquen Dam Test Fill 3b Fourth Layer 3 Passes
 LAYER/CYCLE: Cycle 1 LAYER THICKNESS: 45 DESCRIPTION: 3b (Filter Material)
 DATE: 28-Nov-12 INITIAL HOUR: 11:45:00 am FINAL HOUR: 01:08 pm

Plate Diameter 0.3 m
 AREA 0.070686 m² SHEET: 1 OF 4
 Jack Weight 34.2 kg
 Plate Weight 1 12.3 kg COMBINED WEIGHT OF PLATE AND JACK PRESSURE 46.5 kg
 Plate Weight 2 Not used kg EFFORT BY PLATE AND JACK LOAD 0.0064512 MPa
 Plate Weight 3 Not used kg EFFECTIVE AREA OF JACK PRESSURE 0.00332 m²

TIME	VALUES ON PLATE	MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
		PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa	Bar	tonne-force						
0				142	156	193	164		
3	0.09	20	0.7	143	157	193	164	166	0.02
6				148	158	194	167		
9				149	158	194	167		
12				149	158	194	167		
15				149	155	194	166		
0	0.19	40	1.4	208	212	220	213	230	0.66
3				217	219	229	222		
6				221	222	231	225		
9				224	224	233	227		
12				226	225	235	229		
15				227	226	236	230		
0	0.31	66	2.2	365	379	366	370	398	2.34
3				383	385	382	383		
6				388	399	386	391		
9				391	402	389	394		
12				392	404	390	395		
15				394	406	393	398		
0	0.51	108	3.7	630	690	620	647	691	5.27
3				663	713	651	676		
6				670	719	657	682		
9				674	722	660	685		
12				677	724	664	688		
15				680	726	667	691		
0	0.68	144	4.9	855	885	863	868	895	7.31
3				884	885	870	880		
6				891	885	880	885		
9				898	885	887	890		
12				903	885	890	893		
15				907	885	892	895		

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:

Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT
 PLATE TEST
 ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality
 LOCATION: Borinquen Dam Test Fill 3b Fourth Layer 3 Passes
 LAYER/CYCLE: Cycle 1 LAYER THICKNESS: 45 DESCRIPTION: 3b (Filter Material)
 DATE: 28-Nov-12 START TIME: 01:15 pm FINISH TIME: 02:00 pm

Plate Diameter	<u>0.3 m</u>		
AREA	<u>0.070686 m²</u>	SHEET:	<u>2</u> OF <u>4</u>
Jack Weight	<u>34.2 kg</u>		
Plate Weight 1	<u>12.3 kg</u>	COMBINED WEIGHT OF PLATE AND JACK PRESSURE	<u>46.5 kg</u>
Plate Weight 2	<u>Not used</u>	EFFORT BY PLATE AND JACK LOAD	<u>0.006451 MPa</u>
Plate Weight 3	<u>Not used</u>	EFFECTIVE AREA OF JACK PRESSURE	<u>0.00332 m²</u>

TIME	VALUES ON PLATE		MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE		PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa		Bar	ton						
0	0.51	108	3.7	900	885	887	891	894	7.30	
3				900	885	888	891			
6				901	885	888	891			
9				902	885	890	892			
12				904	885	890	893			
15				905	885	891	894			
0	0.31	66	2.2	885	885	881	884	881	7.17	
3				885	885	880	883			
6				884	885	878	882			
9				884	885	874	881			
12				884	885	874	881			
15				884	885	874	881			
0	0.00	0	0.0	722	794	719	745	737	5.73	
3				716	788	712	739			
6				714	786	711	737			
9				714	786	711	737			
12				714	786	711	737			
15				713	786	711	737			

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:
Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE TEST
ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality
 LOCATION: Borinquen Dam Test Fill 3b Fourth Layer 3 Passes
 LAYER/CYCLE: Cycle 2 LAYER THICKNESS: 45 DESCRIPTION: 3b (Filter Material)
 DATE: 28-Nov-12 INITIAL HOUR: 2:25 pm FINAL HOUR: 3:50 pm

Plate Diameter	<u>0.3 m</u>	SHEET:	<u>3</u> OF <u>4</u>
AREA	<u>0.070686 m²</u>	COMBINED WEIGHT OF PLATE AND JACK PRESSURE	<u>46.5 kg</u>
Jack Weight	<u>34.2 kg</u>	EFFORT BY PLATE AND JACK LOAD	<u>0.006451 MPa</u>
Plate Weight 1	<u>12.3 kg</u>	EFFECTIVE AREA OF JACK PRESSURE	<u>0.00332 m²</u>
Plate Weight 2	<u>Not used kg</u>		
Plate Weight 3	<u>Not used kg</u>		

TIME	VALUES ON PLATE		MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE		PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa		Bar	ton						
0					84	90	70	81		
3					85	92	71	83		
6	0.09	20	0.7		86	93	72	84	85	5.77
9					86	94	73	84		
12					86	94	74	85		
15					86	94	75	85		
0							100	112		
3	0.19	40	1.4		103	116	92	104	105	5.96
6					103	116	92	104		
9					104	117	92	104		
12					104	117	93	105		
15					104	117	93	105		
0	0.31	66	2.2		134	154	124	137	141	6.33
3					137	158	127	141		
6					137	158	127	141		
9					138	159	127	141		
12					138	159	127	141		
15		138	159	127	141					
0	0.51	108	3.7		195	232	173	200	209	7.01
3					199	239	180	206		
6					201	241	181	208		
9					202	242	181	208		
12					202	242	181	208		
15		203	243	181	209					
0	0.68	144	4.9		248	312	220	260	290	7.81
3					266	338	235	280		
6					270	344	238	284		
9					272	346	240	286		
12					274	348	242	288		
15		276	350	243	290					

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:
Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE TEST
ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality
 LOCATION: Borinquen Dam Test Fill 3b Fourth Layer 3 Passes
 LAYER/CYCLE: Cycle 2 LAYER THICKNESS: 45 DESCRIPTION: 3b (Filter Material)
 DATE: 28-Nov-12 START TIME: 3:50 pm FINISH TIME: 4:40 pm

Plate Diameter 0.3 m
 AREA 0.070686 m² SHEET: 4 OF 4
 Jack Weight 34.2 kg
 Plate Weight 1 12.3 kg COMBINED WEIGHT OF PLATE AND JACK PRESSURE 46.5 kg
 Plate Weight 2 Not used kg EFFORT BY PLATE AND JACK LOAD 0.006451 MPa
 Plate Weight 3 Not used kg EFFECTIVE AREA OF JACK PRESSURE 0.00332 m²

TIME	VALUES ON PLATE	MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE	PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa	Bar	ton						
0	0.51	108	3.7	266	335	230	277	278	7.70
3				267	336	232	278		
6				267	336	232	278		
9				267	336	232	278		
12				267	336	232	278		
15				267	336	232	278		
0	0.31	66	2.2	250	312	219	260	260	7.52
3				249	314	218	260		
6				249	313	218	260		
9				249	313	218	260		
12				249	313	218	260		
15				249	313	218	260		
0	0.00	0	0.0	117	153	43	104	89	5.73
3				84	137	40	87		
6				82	136	65	94		
9				81	136	65	94		
12				79	130	61	90		
15				79	129	60	89		

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:
Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab

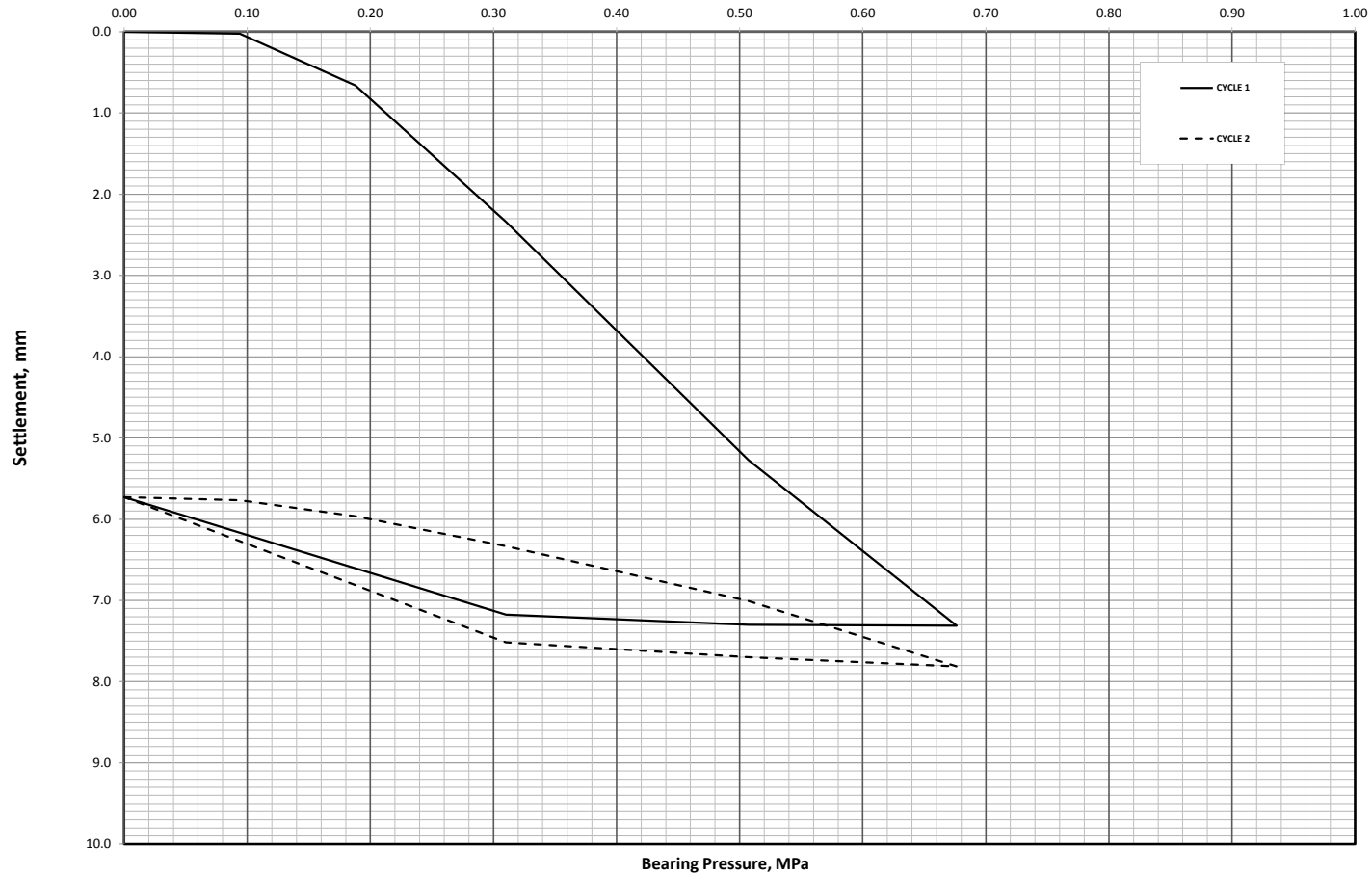


THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE BEARING TEST

ASTM D 1194

Laboratory	PACIFIC		
Sample no. B 798 Rev2	Sample By AU - MP	Date sampled	28-Nov-12
Location	Test Fill - Filter Material - Borinquen Dams Fourth Layer 3 Passes	Date tested	28-Nov-12
Material	3b Filter	Test method	ASTM D 1194



SETTLEMENT VS BEARING CAPACITY

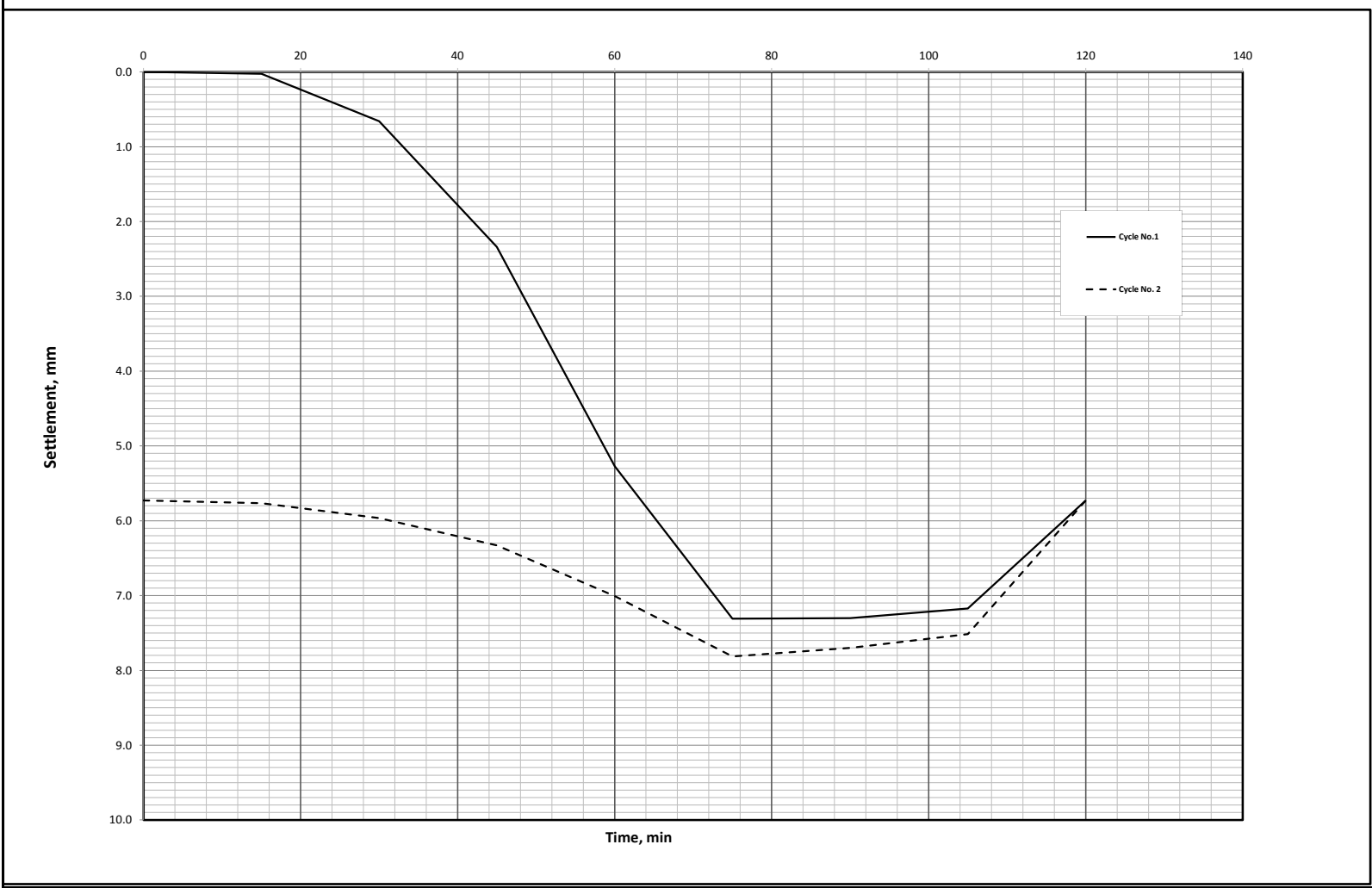
		CYCLE 1			CYCLE 2			
		BAR	mm	MPa	BAR	mm	mm	MPa
LOAD		0	0	0.00	0	5.73	5.73	0.00
		20	0.02	0.09	20	0.04	5.77	0.09
		40	0.66	0.19	40	0.23	5.96	0.19
		66	2.34	0.31	66	0.60	6.33	0.31
		108	5.27	0.51	108	1.28	7.01	0.51
UNLOAD		144	7.31	0.68	144	2.08	7.81	0.68
		108	7.30	0.51	108	1.97	7.70	0.51
		66	7.17	0.31	66	1.79	7.52	0.31
		0	5.73	0.00	0	0.00	5.73	0.00



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT
PLATE BEARING TEST

ASTM D 1194

Laboratory	PACIFIC		
Sample no. B 798 Rev2	Sample By AU - MP	Date sampled	28-Nov-12
Location	Test Fill - Filter Material - Borinquen Dams Fourth Layer 3 Passes	Date tested	28-Nov-12
Material	3b Filter	Test method	ASTM D 1194



TIME VS SETTLEMENT

		CYCLE 1			CYCLE 2				Time (min)	
		BAR	mm	MPa	BAR	mm	mm	MPa	1st cycle	2nd Cycle
		0	0	0.00	0	5.73	5.73	0.00		0.00
LOAD		20	0.02	0.09	20	0.04	5.77	0.09		15.00
		40	0.66	0.19	40	0.23	5.96	0.19		30.00
		66	2.34	0.31	66	0.60	6.33	0.31		45.00
		108	5.27	0.51	108	1.28	7.01	0.51		60.00
		144	7.31	0.68	144	2.08	7.81	0.68		75.00
UNLOAD		108	7.30	0.51	108	1.97	7.70	0.51		90.00
UNLOAD		66	7.17	0.31	66	1.79	7.52	0.31		105.00
UNLOAD		0	5.73	0.00	0	0.00	5.73	0.00		120.00

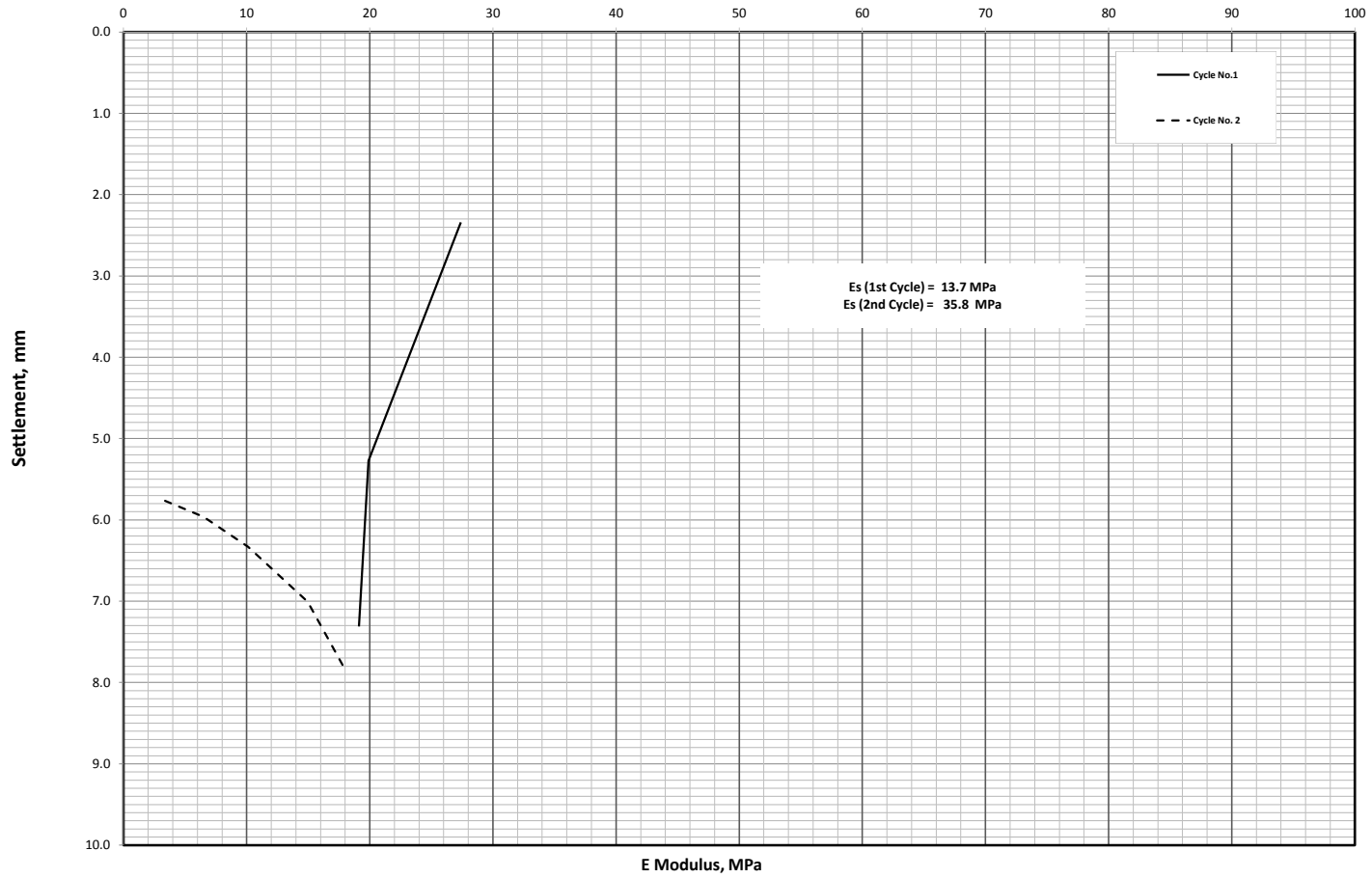


THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE BEARING TEST

ASTM D 1194

Laboratory	PACIFIC		
Sample no. B 798 Rev2	Sample By AU - MP	Date sampled	28-Nov-12
Location	Test Fill - Filter Material - Borinquen Dams Fourth Layer 3 Passes	Date tested	28-Nov-12
Material	3b Filter	Test method	ASTM D 1194



The Panama Canal Third Set of Locks Project

PLATE BEARING TESTS

Date Sampled

Sample Number	B 798 Rev2	Sample Location	Test Fill - Filter Material - Borinquen Dams				28-Nov-12			
Location/Layer	Poissons Ratio ν	Borinquen Dam Test Fill 3b Fourth Layer 3 Passes	Max Stress q	Settlement s	Secant Mod of Sub-Grade Reaction	Mod of Sub-Grade Reaction Full Size (30inch) k_s	$E=qB\pi(1-\nu^2)/4s$	$q_{ult} = ks/40$	Settlement /dia.	
		m	MPa	mm	MN/m ³	MN/m ³	MPa	kPa	%	
Cell 1 - 1st Cycle	0.35	0.3	94	0.02	4,026	1,589	832	39729	0.01%	
	0.35	0.3	188	0.66	285	112	59	2809	0.22%	
	0.35	0.3	310	2.34	132	52	27	1307	0.78%	
	0.35	0.3	507	5.27	96	38	20	949	1.76%	
	0.35	0.3	676	7.31	93	37	19	913	2.44%	
Cell 1 - 2nd Cycle	0.35	0.3	94	5.77	16	6	3	161	1.92%	
	0.35	0.3	188	5.96	32	12	7	311	1.99%	
	0.35	0.3	310	6.33	49	19	10	483	2.11%	
	0.35	0.3	507	7.01	72	29	15	714	2.34%	
	0.35	0.3	676	7.81	87	34	18	854	2.60%	

Cycle	k'_u (MPa/mm)	k_u (MPa/mm)	E_s (MPa)
1	0.074	0.066	13.7
2	0.264	0.173	35.8
Average	0.169	0.120	24.7



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE TEST
ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality Test No. B 799
 LOCATION: Borinquen Dam Test Fill 3b Fifth Layer 3 passes
 LAYER/CYCLE: Cycle 1 LAYER THICKNESS: 50 DESCRIPTION: 3b (Filter Material)
 DATE: 3-Dec-12 INITIAL HOUR: 9:55:00 am FINAL HOUR: 11:00 am

Plate Diameter 0.3 m
 AREA 0.070686 m²
 Jack Weight 34.2 kg
 Plate Weight 1 12.3 kg
 Plate Weight 2 Not used kg
 Plate Weight 3 Not used kg

SHEET: 1 OF 4

COMBINED WEIGHT OF PLATE AND JACK PRESSURE 46.5 kg
 EFFORT BY PLATE AND JACK LOAD 0.0064512 MPa
 EFFECTIVE AREA OF JACK PRESSURE 0.00332 m²

TIME	VALUES ON PLATE	MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
		PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa	Bar	tonne-force						
0				31	35	32	33		
3	0.09	20	0.7	44	37	33	38	39	0.06
6				44	37	33	38		
9				45	38	33	39		
12				45	38	33	39		
15				45	38	33	39		
0	0.19	40	1.4	71	60	56	62	65	0.32
3				73	60	57	63		
6				74	61	58	64		
9				75	61	58	65		
12				75	61	59	65		
15	75	61	59	65					
0	0.31	66	2.2	101	79	84	88	95	0.62
3				105	88	85	93		
6				106	89	86	94		
9				106	90	86	94		
12				107	90	87	95		
15	107	90	87	95					
0	0.51	108	3.7	167	148	140	152	164	1.31
3				176	158	145	160		
6				176	158	147	160		
9				176	163	149	163		
12				176	165	150	164		
15	176	165	151	164					
0	0.68	144	4.9	245	228	211	228	259	2.26
3				269	256	224	250		
6				269	261	228	253		
9				276	264	229	256		
12				277	265	232	258		
15	277	266	233	259					

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:

Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT
 PLATE TEST
 ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality Test No. B 799
 LOCATION: Borinquen Dam Test Fill 3b Fifth Layer 3 passes
 LAYER/CYCLE: Cycle 1 LAYER THICKNESS: 50 DESCRIPTION: 3b (Filter Material)
 DATE: 3-Dec-12 START TIME: 11:15 am FINISH TIME: 12:15 pm

Plate Diameter 0.3 m
 AREA 0.070686 m²
 Jack Weight 34.2 kg
 Plate Weight 1 12.3 kg
 Plate Weight 2 Not used kg
 Plate Weight 3 Not used kg

SHEET: 2 OF 4

COMBINED WEIGHT OF PLATE AND JACK PRESSURE 46.5 kg
 EFFORT BY PLATE AND JACK LOAD 0.006451 MPa
 EFFECTIVE AREA OF JACK PRESSURE 0.00332 m²

TIME	VALUES ON PLATE		MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE		PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa		Bar	ton						
0	0.51	108	3.7	277	270	232	260	257	2.24	
3				277	266	231	258			
6				277	265	231	258			
9				277	264	230	257			
12				277	263	230	257			
15				277	263	230	257			
0	0.31	66	2.2	262	249	214	242	236	2.03	
3				262	241	213	239			
6				258	239	212	236			
9				258	238	211	236			
12				258	238	211	236			
15				258	238	211	236			
0	0.00	0	0.0	87	87	74	83	79	0.46	
3				82	83	72	79			
6				82	83	72	79			
9				82	83	72	79			
12				82	83	72	79			
15				82	83	72	79			

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:
Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE TEST
ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality Test No. B 799
 LOCATION: Borinquen Dam Test Fill 3b Fifth Layer 3 passes
 LAYER/CYCLE: Cycle 2 LAYER THICKNESS: 50 DESCRIPTION: 3b (Filter Material)
 DATE: 3-Dec-12 INITIAL HOUR: 12:15 pm FINAL HOUR: 1:38 pm

Plate Diameter	<u>0.3 m</u>		
AREA	<u>0.070686 m²</u>	SHEET:	<u>3</u> OF <u>4</u>
Jack Weight	<u>34.2 kg</u>		
Plate Weight 1	<u>12.3 kg</u>	COMBINED WEIGHT OF PLATE AND JACK PRESSURE	<u>46.5 kg</u>
Plate Weight 2	<u>Not used kg</u>	EFFORT BY PLATE AND JACK LOAD	<u>0.006451 MPa</u>
Plate Weight 3	<u>Not used kg</u>	EFFECTIVE AREA OF JACK PRESSURE	<u>0.00332 m²</u>

TIME	VALUES ON PLATE		MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE		PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa		Bar	ton						
0					54	44	43	47		
3					57	44	45	49		
6	0.09	20	0.7		57	44	45	49	49	0.49
9					57	46	45	49		
12					57	46	45	49		
15					57	46	45	49		
0								89		
3	0.19	40	1.4		89	80	72	80	82	0.81
6					89	80	72	80		
9					89	81	72	81		
12					89	81	72	81		
15					89	83	73	82		
0								122		
3	0.31	66	2.2		133	122	107	121	122	1.21
6					134	12	107	84		
9					134	123	108	122		
12					134	123	109	122		
15					134	123	109	122		
0								174		
3	0.51	108	3.7		181	172	142	165	167	1.67
6					182	172	148	167		
9					182	172	148	167		
12					182	172	148	167		
15					182	172	148	167		
0								218		
3	0.68	144	4.9		222	213	184	206	208	2.08
6					222	215	185	207		
9					222	216	186	208		
12					223	216	186	208		
15					223	216	186	208		

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:
Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE TEST
ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality Test No. B 799

LOCATION: Borinquen Dam Test Fill 3b Fifth Layer 3 passes

LAYER/CYCLE: Cycle 2 LAYER THICKNESS: 50 DESCRIPTION: 3b (Filter Material)

DATE: 3-Dec-12 START TIME: 1:39 pm FINISH TIME: 2:26 pm

Plate Diameter 0.3 m
 AREA 0.070686 m²
 Jack Weight 34.2 kg
 Plate Weight 1 12.3 kg
 Plate Weight 2 Not used kg
 Plate Weight 3 Not used kg

SHEET: 4 OF 4

COMBINED WEIGHT OF PLATE AND JACK PRESSURE 46.5 kg
 EFFORT BY PLATE AND JACK LOAD 0.006451 MPa
 EFFECTIVE AREA OF JACK PRESSURE 0.00332 m²

TIME	VALUES ON PLATE	MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE	PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa	Bar	ton						
0	0.51	108	3.7	208	192	176	192	188	1.87
3				208	192	166	189		
6				208	192	166	189		
9				207	191	166	188		
12				207	191	166	188		
15				207	191	166	188		
0	0.31	66	2.2	192	175	155	174	168	1.67
3				192	173	152	172		
6				191	170	150	170		
9				191	164	149	168		
12				191	164	149	168		
15				191	163	149	168		
0	0.00	0	0.0	39	45	32	39	32	0.46
3				26	38	31	32		
6				26	38	31	32		
9				26	38	31	32		
12				26	38	31	32		
15				26	38	31	32		

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:

Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab

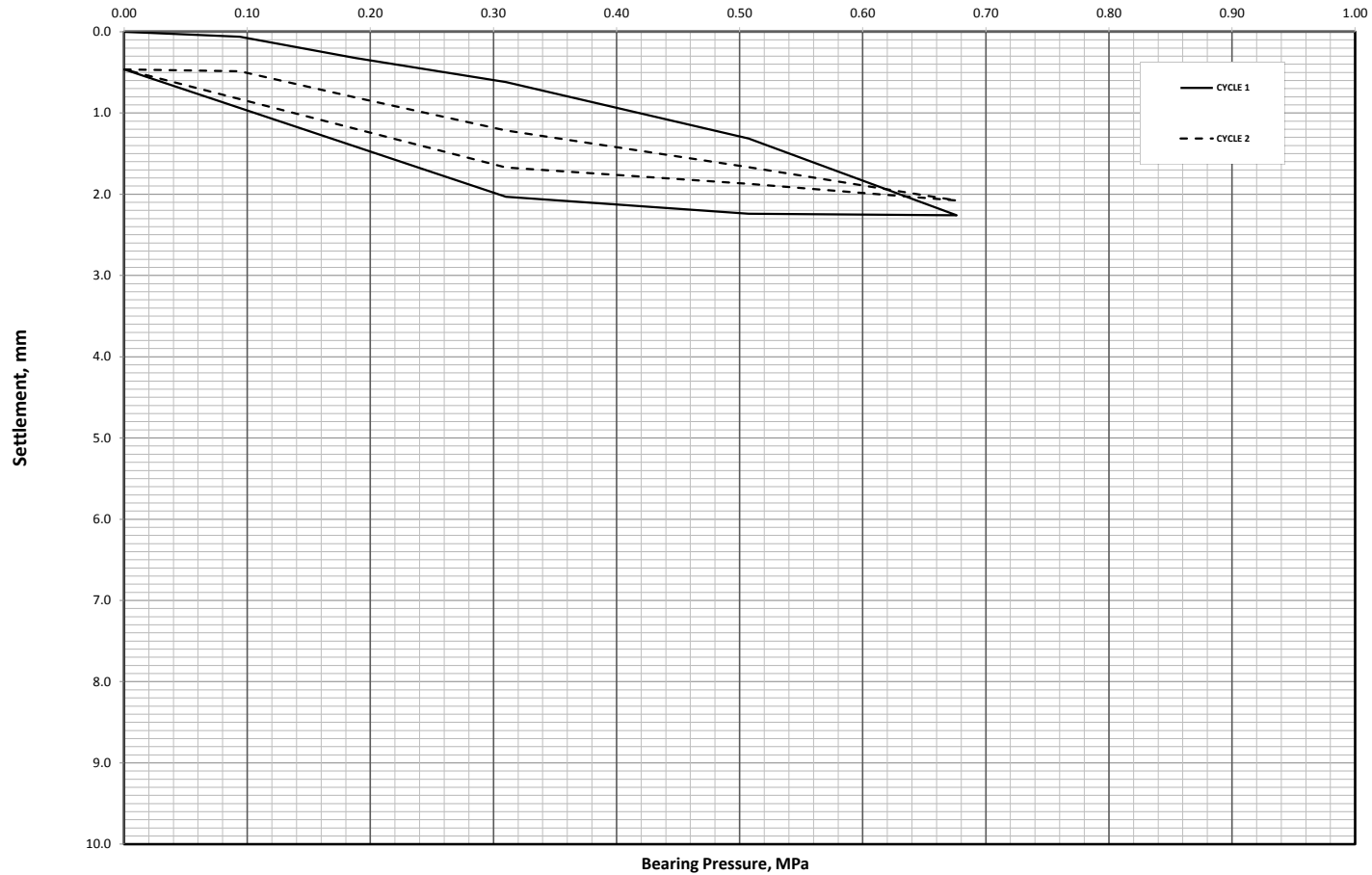


THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE BEARING TEST

ASTM D 1194

Laboratory	PACIFIC		
Sample no. B 799	Sample By CG - JAG	Date sampled	3-Dec-12
Location	Borinquen Dam Test Fill Fifth Layer 3 passes	Date tested	3-Dec-12
Material	3b Filter	Test method	ASTM D 1194



SETTLEMENT VS BEARING CAPACITY

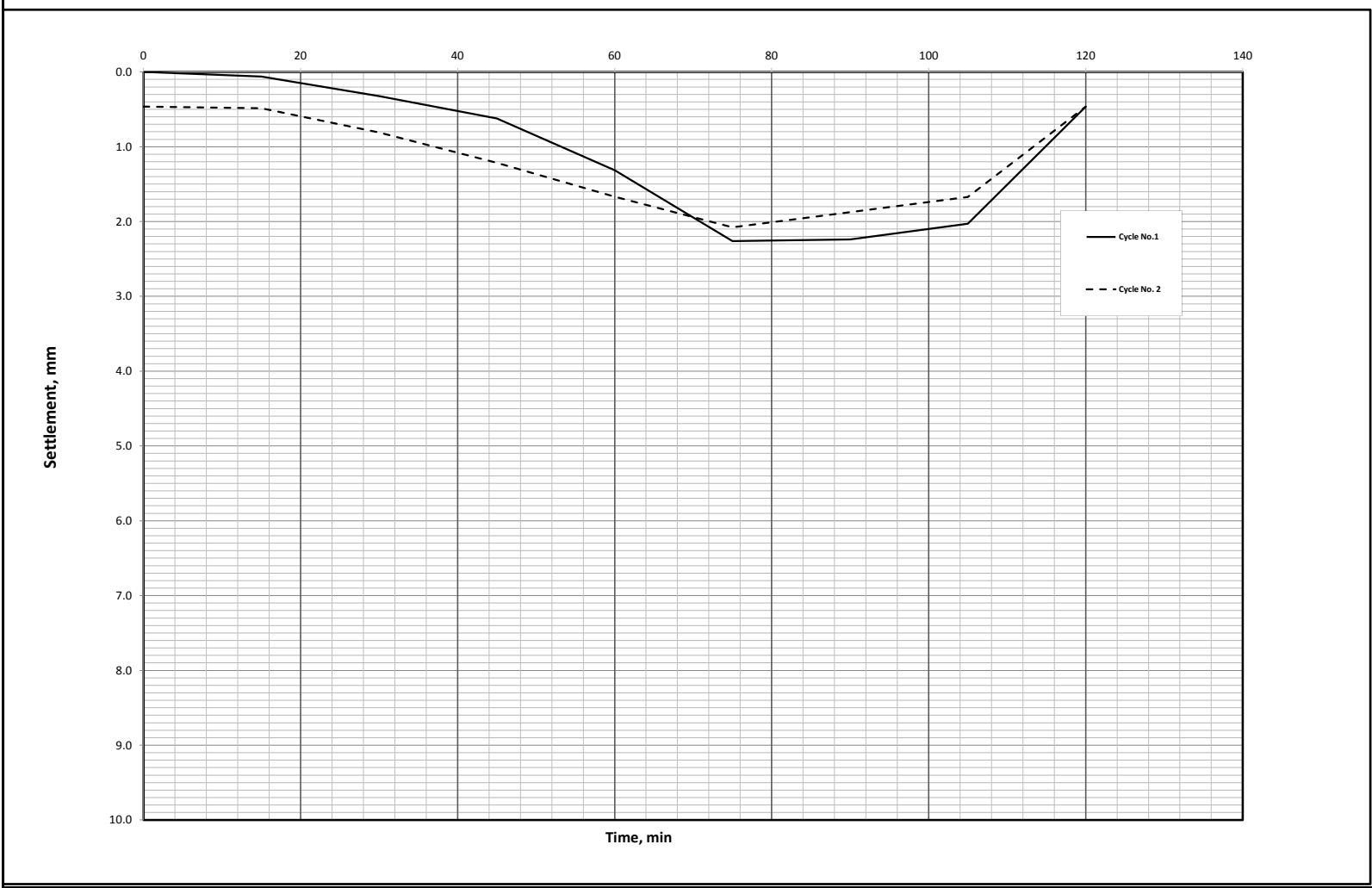
		CYCLE 1			CYCLE 2			
		BAR	mm	MPa	BAR	mm	mm	MPa
LOAD		0	0	0.00	0	0.46	0.46	0.00
		20	0.06	0.09	20	0.02	0.49	0.09
		40	0.32	0.19	40	0.35	0.81	0.19
		66	0.62	0.31	66	0.75	1.21	0.31
		108	1.31	0.51	108	1.20	1.67	0.51
UNLOAD		144	2.26	0.68	144	1.61	2.08	0.68
		108	2.24	0.51	108	1.41	1.87	0.51
		66	2.03	0.31	66	1.21	1.67	0.31
		0	0.46	0.00	0	0.00	0.46	0.00



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT
PLATE BEARING TEST

ASTM D 1194

Laboratory	PACIFIC		
Sample no. B 799	Sample By CG - JAG	Date sampled	3-Dec-12
Location	Borinquen Dam Test Fill Fifth Layer 3 passes	Date tested	3-Dec-12
Material	3b Filter	Test method	ASTM D 1194



TIME VS SETTLEMENT

		CYCLE 1			CYCLE 2				Time (min)	
		BAR	mm	MPa	BAR	mm	mm	MPa	1st cycle	2nd Cycle
		0	0	0.00	0	0.46	0.46	0.00		0.00
LOAD		20	0.06	0.09	20	0.02	0.49	0.09		15.00
		40	0.32	0.19	40	0.35	0.81	0.19		30.00
		66	0.62	0.31	66	0.75	1.21	0.31		45.00
		108	1.31	0.51	108	1.20	1.67	0.51		60.00
		144	2.26	0.68	144	1.61	2.08	0.68		75.00
UNLOAD		108	2.24	0.51	108	1.41	1.87	0.51		90.00
UNLOAD		66	2.03	0.31	66	1.21	1.67	0.31		105.00
UNLOAD		0	0.46	0.00	0	0.00	0.46	0.00		120.00

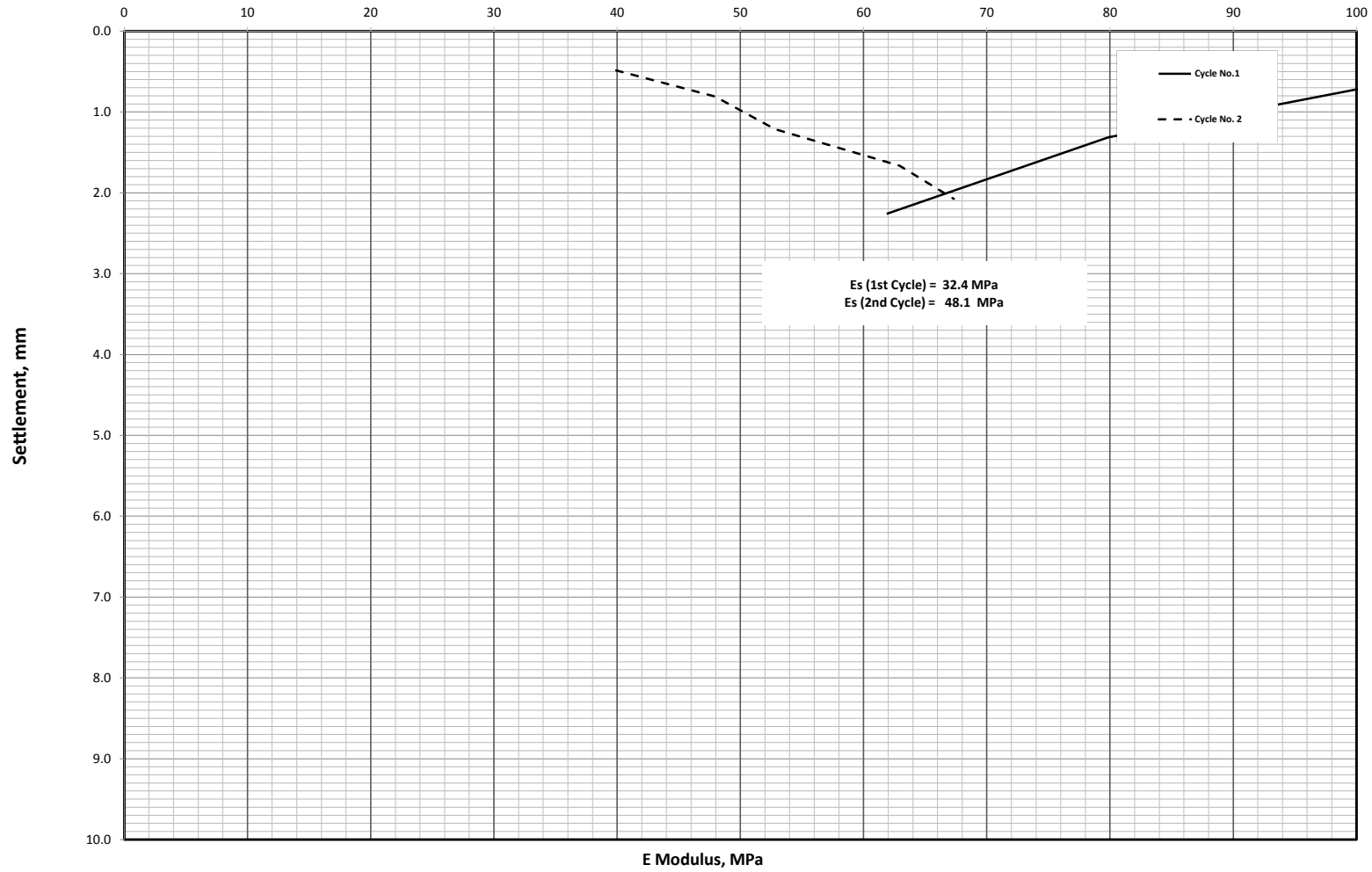
PLATE BEARING TEST

Labr

Sam

Loca

Mat



The Panama Canal Third Set of Locks Project

PLATE BEARING TESTS

Date Sampled

Sample Number	B 799	Sample Location	Borinquen Dam Test Fill Fifth Layer 3 passes	Date Sampled	3-Dec-12
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Location/Layer	Poissons Ratio ν	Plate Dia. b	Max Stress q	Settlement s	Secant Mod of Sub-Grade Reaction	Mod of Sub-Grade Reaction Full Size (30inch) k_s	$E=qB\pi(1-\nu^2)/4s$	$q_{ult} = ks/40$	Settlement /dia.
		m	MPa	mm	MN/m ³	MN/m ³	MPa	kPa	%
Cell 1 - 1st Cycle	0.35	0.3	94	0.06	1,566	618	324	15450	0.02%
	0.35	0.3	188	0.32	581	229	120	5734	0.11%
	0.35	0.3	310	0.62	500	197	103	4934	0.21%
	0.35	0.3	507	1.31	386	152	80	3812	0.44%
	0.35	0.3	676	2.26	299	118	62	2953	0.75%
Cell 1 - 2nd Cycle	0.35	0.3	94	0.49	193	76	40	1905	0.16%
	0.35	0.3	188	0.81	232	92	48	2289	0.27%
	0.35	0.3	310	1.21	255	101	53	2521	0.40%
	0.35	0.3	507	1.67	304	120	63	3004	0.56%
	0.35	0.3	676	2.08	326	129	67	3214	0.69%

Cycle	k'_u (MPa/mm)	k_u (MPa/mm)	Es (MPa)
1	0.223	0.157	32.4
2	0.386	0.233	48.1
Average	0.305	0.195	40.3

APÉNDICE 11:

RESULTADOS DE
ENSAYOS DE LA TRINCHERA



THIRD SET OF LOCKS PROJECT - PACIFIC LOCKS COMPLEX

**TEST PIT
GEOLOGY DEPARTMENT**

By: Ana Palomo	Date: 25-Aug-12	Shift: Day	Coordinates	Easting : 653967.63
Location: Test Fill 3A (Dam Hill)			Coordinates	Northing : 993973.62
Name: Trench	Depth: (m) 2.30	Water level: N/A	Equipment: CAT 324 #10 120	Elev. (mPLD) 33.384

Lithology	Depth (m)	Description
	0.00	Lift 5
	0.30	Lift 4
	0.75	Lift 3: Fine grains are observed at the upper contact with Lift 4.
	1.20	Lift 2: Fine grains are observed at the upper contact with Lift 3. Coarse grains can be observed at the base contact with Lift 1.
	1.65	Lift 1
	2.10	Leveling Lift
	2.30	



Observed Lifts

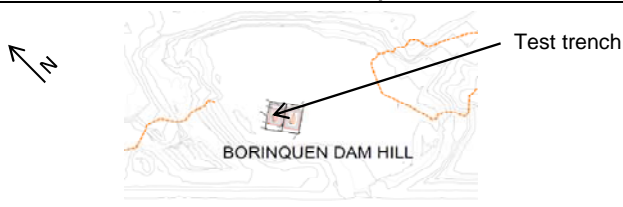


Contact between Lift 3 and 2.



Contact between Lift 2 and 1.

Location map



MATERIAL CHARACTERIZATION

Main characteristics	<input type="checkbox"/> Stratified	<input type="checkbox"/> Laminated	<input type="checkbox"/> Jointed	<input type="checkbox"/> Lenticular	Organic Matter	<input checked="" type="checkbox"/> Absent	<input type="checkbox"/> Trace	<input type="checkbox"/> Dominant
	<input type="checkbox"/> Fault zone	<input type="checkbox"/> Blocky	<input type="checkbox"/> Homogeneous	<input type="checkbox"/> Chaotic				
GRAIN SIZE DISTRIBUTION	Gravel	Coarse Sand	Medium Sand	Fine sand	Fines	SOURCE OF DEPOSITION		PRESENCE OF WATER
Percentage	84	64.7	31.7	12	5.9	<input type="checkbox"/> Residual	<input type="checkbox"/> Colluvial	<input checked="" type="checkbox"/> Dry
Grain size (mm)	>9.5	4.75	1.18	0.15	.0075	<input type="checkbox"/> Lacustrine	<input type="checkbox"/> Alluvial	<input type="checkbox"/> Dripping
Reference sieve	3/8"	#4	#16	#100	#200	<input type="checkbox"/> Eolian	<input type="checkbox"/> Other:	<input type="checkbox"/> Flow
								3A Transition Material

Unified Soil Classification System (USCS)

<input type="checkbox"/> Well graded gravel, mix of gravel and sand with few fines <5% (GW).	<input type="checkbox"/> Clayey gravel, poorly graded mixtures of gravel, sand and clay. Fines >12% (GC)	<input type="checkbox"/> Silty sand, silt-sand mixtures Fines >12% (SM)	<input type="checkbox"/> Inorganic clay with low to medium plasticity, gravelly clay, sandy clay, silty clay, lean clay (CL)	<input type="checkbox"/> Inorganic clay of high plasticity, fat clay (CH)
<input type="checkbox"/> Poorly graded gravel, mix of sand and gravel with few fines < 5% (GP)	<input type="checkbox"/> Well graded sand, fine to coarse sand with few fines < 5% (SW)	<input type="checkbox"/> Clayey sand, sand-clay mixtures. Fines >12% (SC)	<input type="checkbox"/> Organic silt and organic silty clay with low plasticity (OL)	<input type="checkbox"/> Organic clay of medium to high plasticity, organic silt (OH)
<input type="checkbox"/> Silty gravel, poorly graded mixtures of gravel, sand and silt. Fines >12% (GM)	<input type="checkbox"/> Poorly-graded sand. Sand with gravel, few or no fines < 5% (SP)	<input type="checkbox"/> Inorganic silt and very fine sand, silty or clayey fine sand with slight plasticity. (ML)	<input type="checkbox"/> Inorganic silt, fine sandy or silty soils of high plasticity, elastic silt (MH)	<input type="checkbox"/> Peat or other highly organic soils (PT)

Notes:

Samples taken at the upper half of Lift 2; lower half of Lift 3; a mixed sample of the upper half of lift 2 and lower half of lift 3. Mixed sample of excavated trench taken at pile. Gradation herein of mixture of upper half of Lift 2 and lower half of Lift 3.

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	25-Aug-12	Time Sampled	10:48 AM
Sample Number	B - 324	Material Type	3a Filter	Date Tested		Time Tested	
Material Description	3a Filter			Sampled By	AU/JAG/GUPC		
Material Source	Test Fill Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Trench - Layer 2				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
Issued By	N/A	Date Issued	N/A	<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		
				Special Instructions are Acknowledged and Understood by Tech		Initial	N/A

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial: N/A

Client instructions regarding abnormal sample: N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed: Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)	
Moisture Content (ASTM C566, D2216)	
#200 Wash (ASTM C117, D1140)	

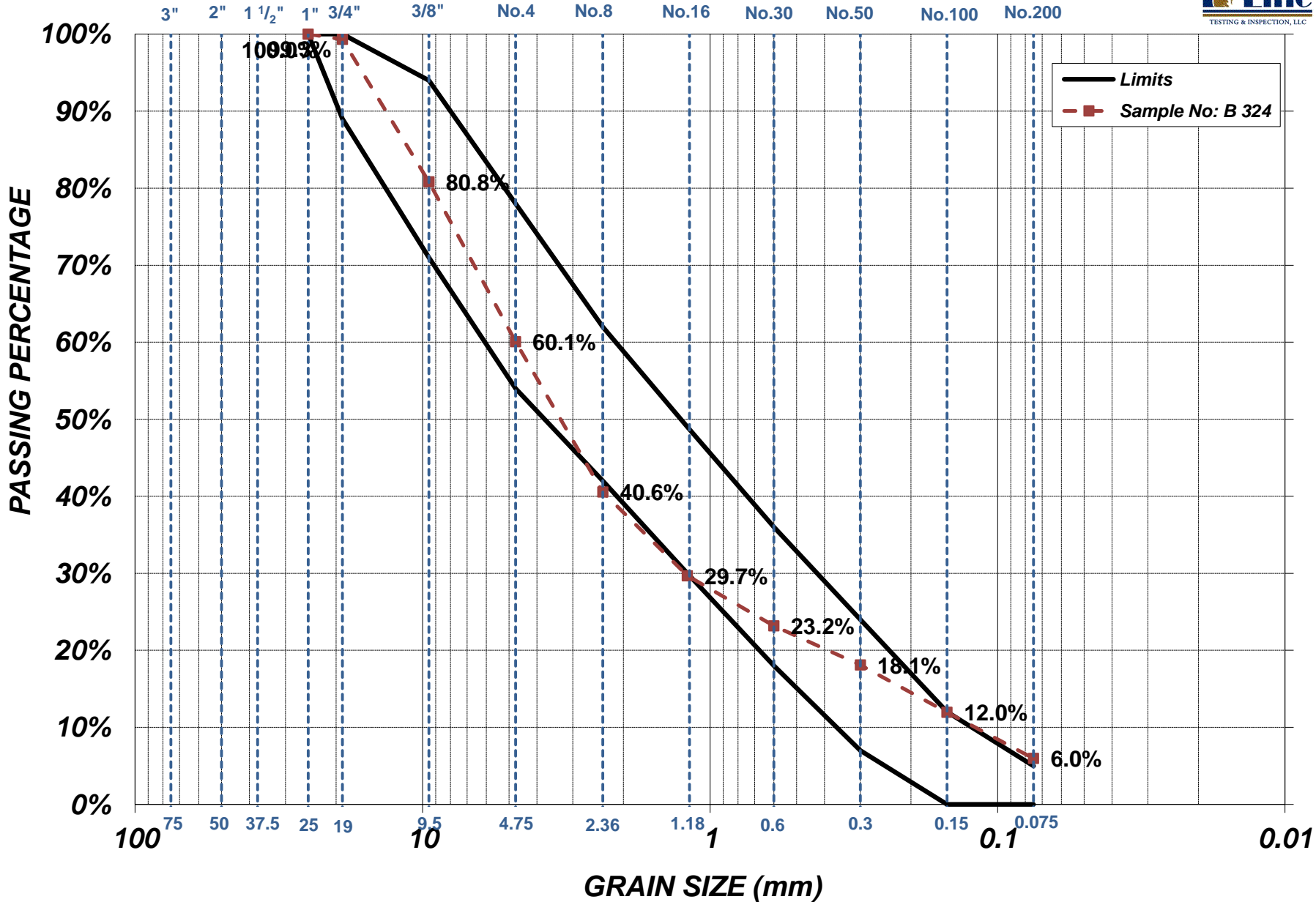
Report Issued By: []

Checked By: ES

Report Issue Date: 04-Sep-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation



The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	28-Aug-12	Time Sampled	10:58 AM
Sample Number	B - 325	Material Type	3a Filter	Date Tested		Time Tested	
Material Description	3a Filter			Sampled By	AU/JAG/GUPC		
Material Source	Test Fill Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Trench - Layer 3				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)

Moisture Content (ASTM C566, D2216)

#200 Wash (ASTM C117, D1140)

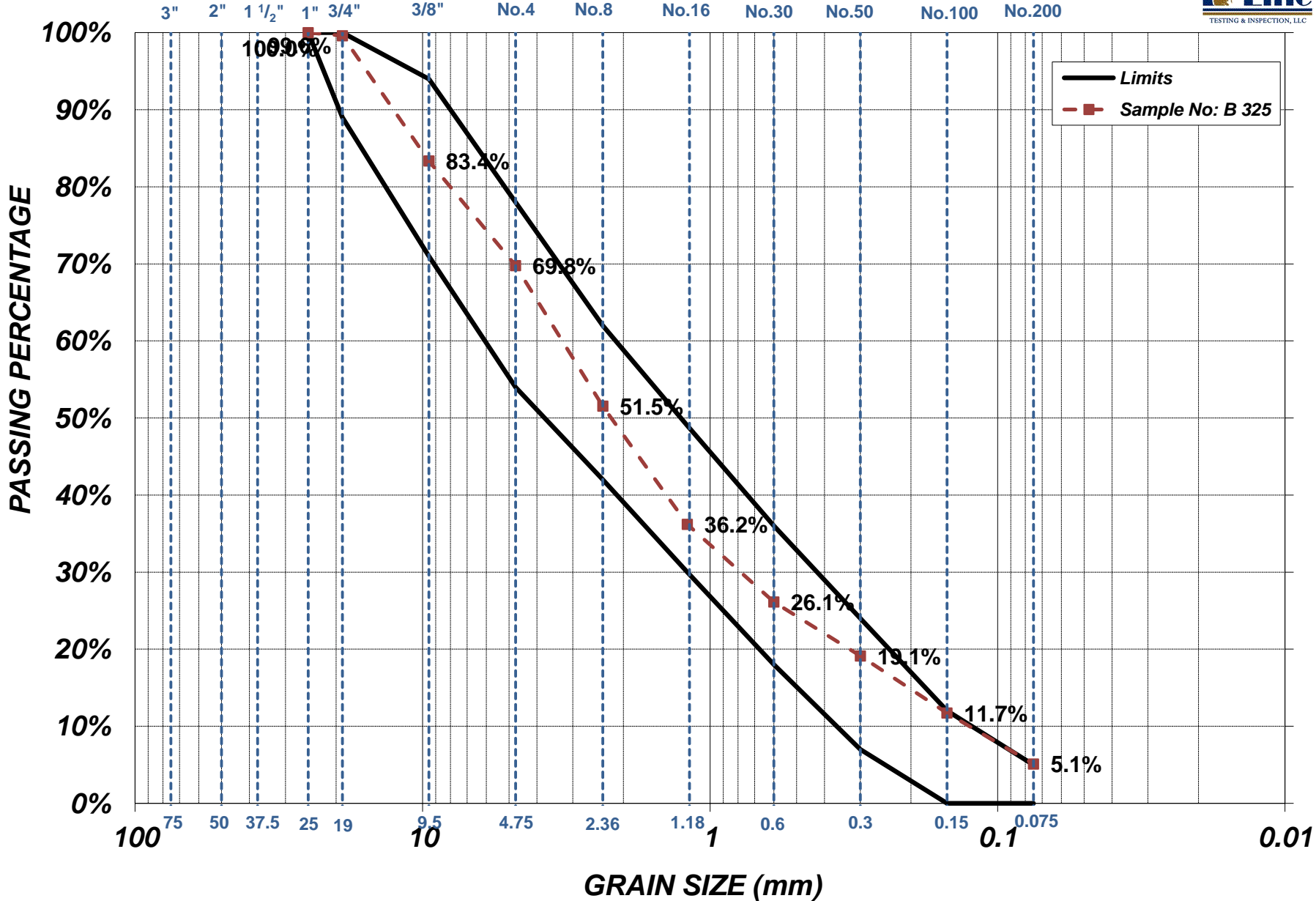
Report Issued By

Checked By

Report Issue Date

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Filter Material Type 3a Gradation



The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F 100013 P	Date Sampled	25-Aug-12	Time Sampled	11:12 AM
Sample Number	B - 326	Material Type	3a Filter	Date Tested		Time Tested	
Material Description	3a Filter			Sampled By	AU/JAG		
Material Source	Test Fill Borinquen			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Trench - Layer 2 and Layer 3				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)

Moisture Content (ASTM C566, D2216)

#200 Wash (ASTM C117, D1140)

Report Issued By

Checked By

Report Issue Date

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method



The Panama Canal Third Set of Locks Project

Gradation Analysis (ASTM C136, C117)

Project Name: PACIFIC

Project Number: F100013P

Sample No: B 326

Technician: JAG

Material Type: Filter 3a

Date Sampled: 25-Aug-12

	Wet Weight (g)	5177.1
Before Wash	Moisture (%)	6.7%
	Total Dry Weight (g)	4851.9
After Wash Dry Weight (g)		4591.4
Wash Loss (%)		5.4%

Scale Check Scale Check

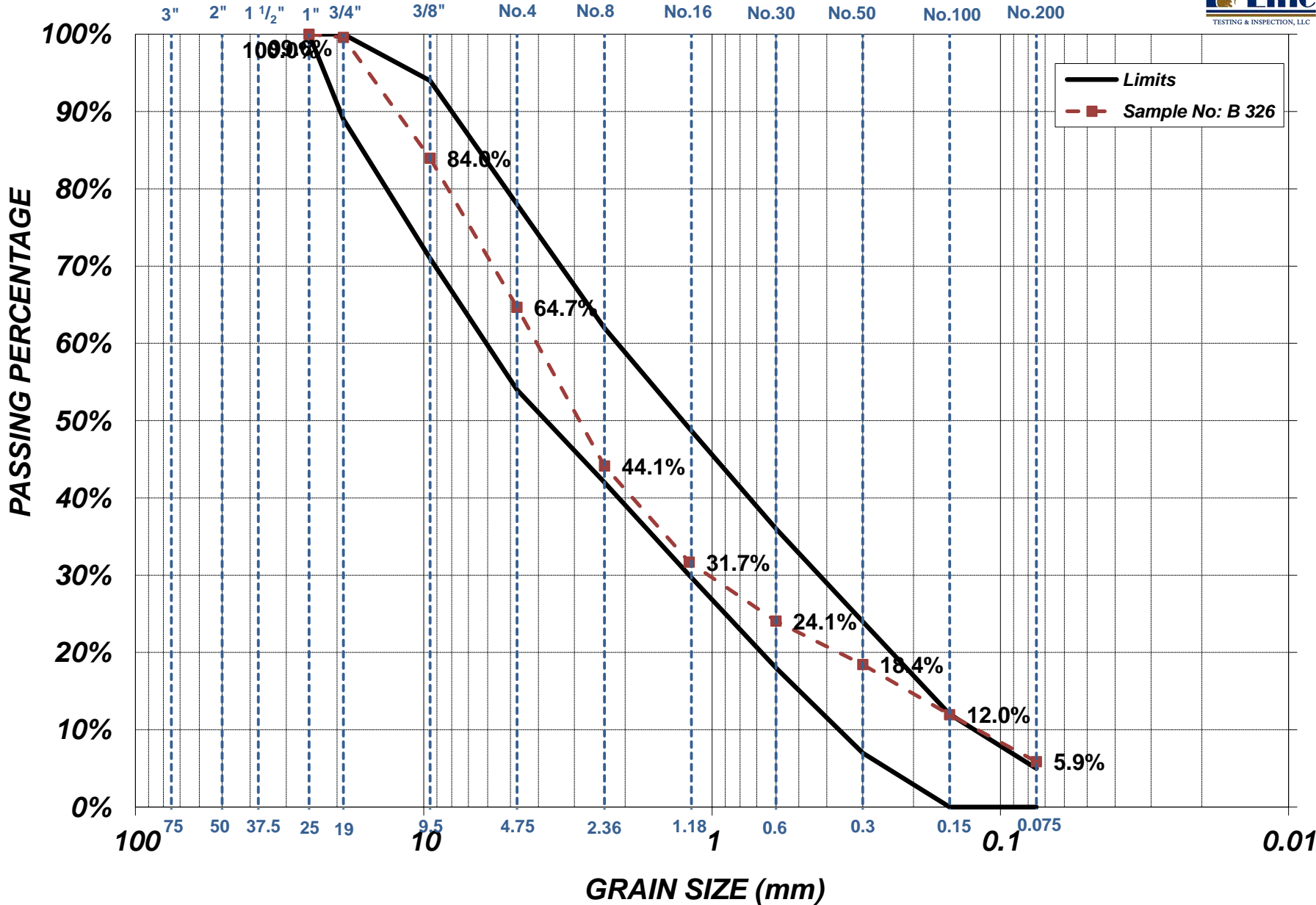
Coarse Scale ID:	N/A
Fine Scale ID:	1453
Oven ID:	Burner
Wash Sieve ID:	1780

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
25.0mm (1")	0			100.0%	100 to 100	9180
19mm (3/4")	19.9	19.9	0.4%	99.6%	89 to 100	9182
9.5mm (3/8")	758.4	778.3	16.0%	84.0%	71 to 94	9185
4.75mm (#4)	936.0	1714.3	35.3%	64.7%	54 to 78	9130
2.36mm (#8)	996.3	2710.6	55.9%	44.1%	42 to 62	9189
1.2mm (#16)	603.4	3314	68.3%	31.7%	30 to 49	9133
0.6mm (#30)	370.3	3684.3	75.9%	24.1%	18 to 36	9129
0.3mm (#50)	272.8	3957.1	81.6%	18.4%	7 to 24	9152
0.15mm (#100)	314.9	4272	88.0%	12.0%	0 to 12	9195
0.075mm #200	294.9	4566.9	94.1%	5.9%	0 to 5	1912
	24.5	4591.4				9171

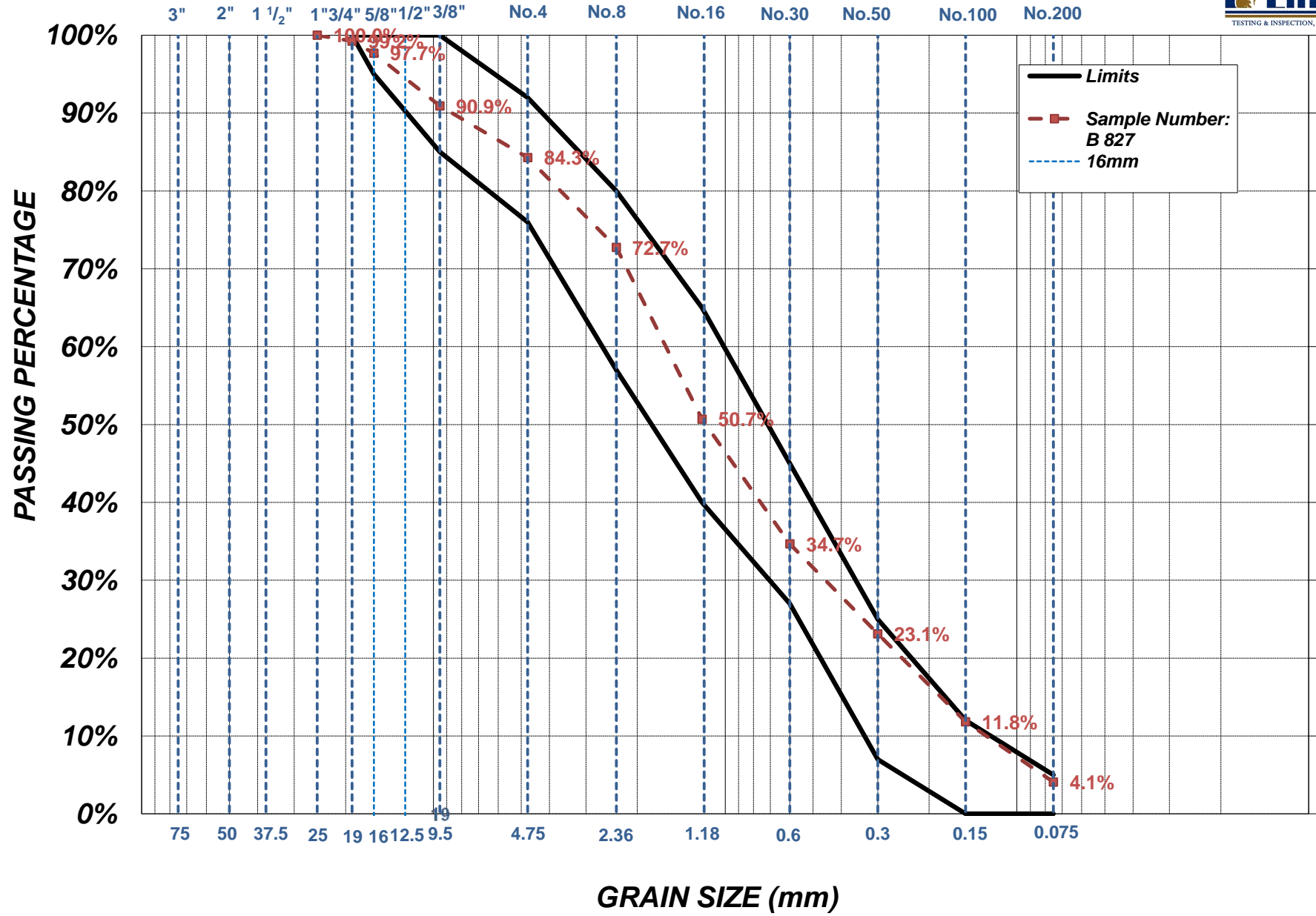
Checked By: ES

Fineness Modulus	4.05
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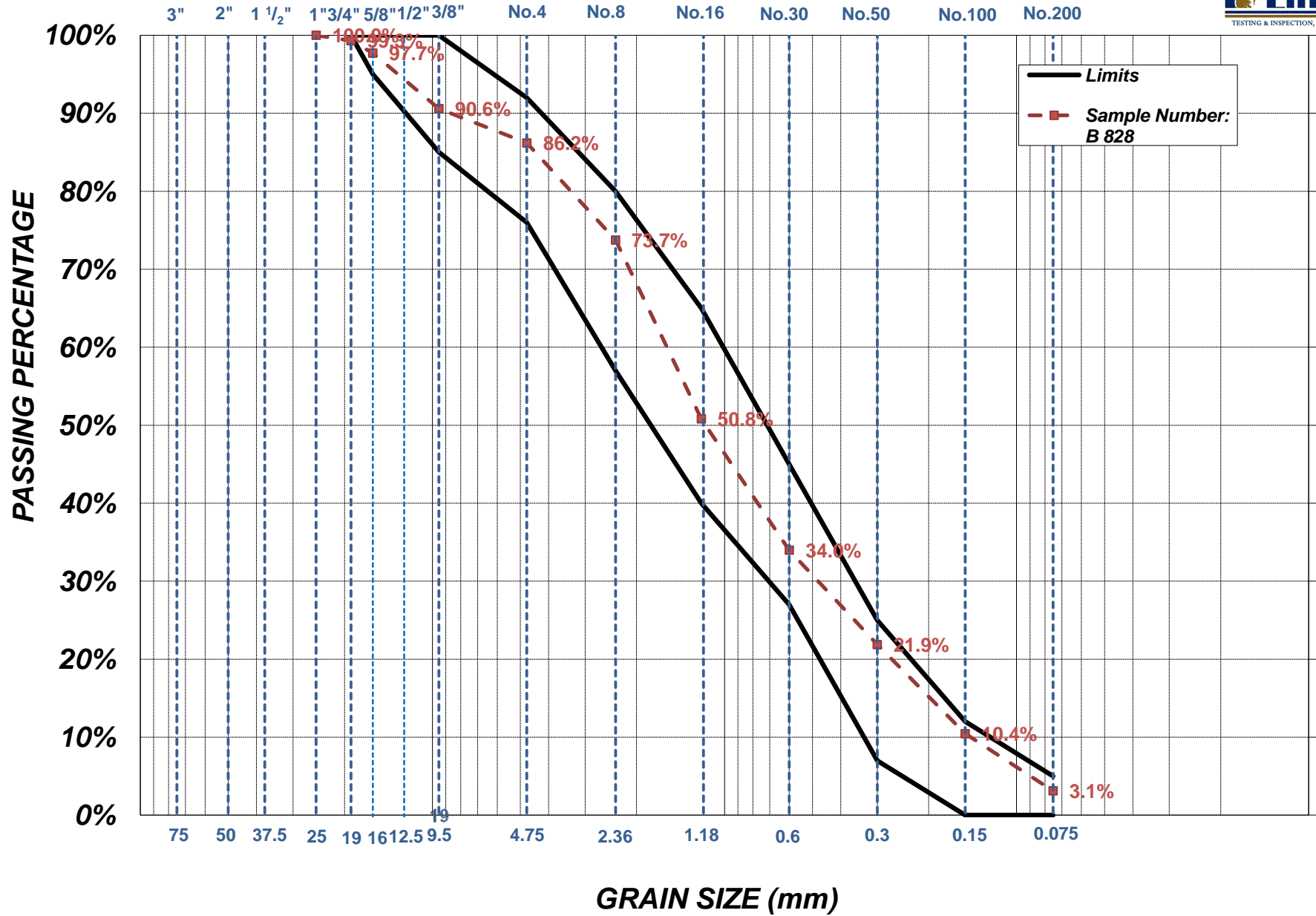
Filter Material Type 3a Gradation



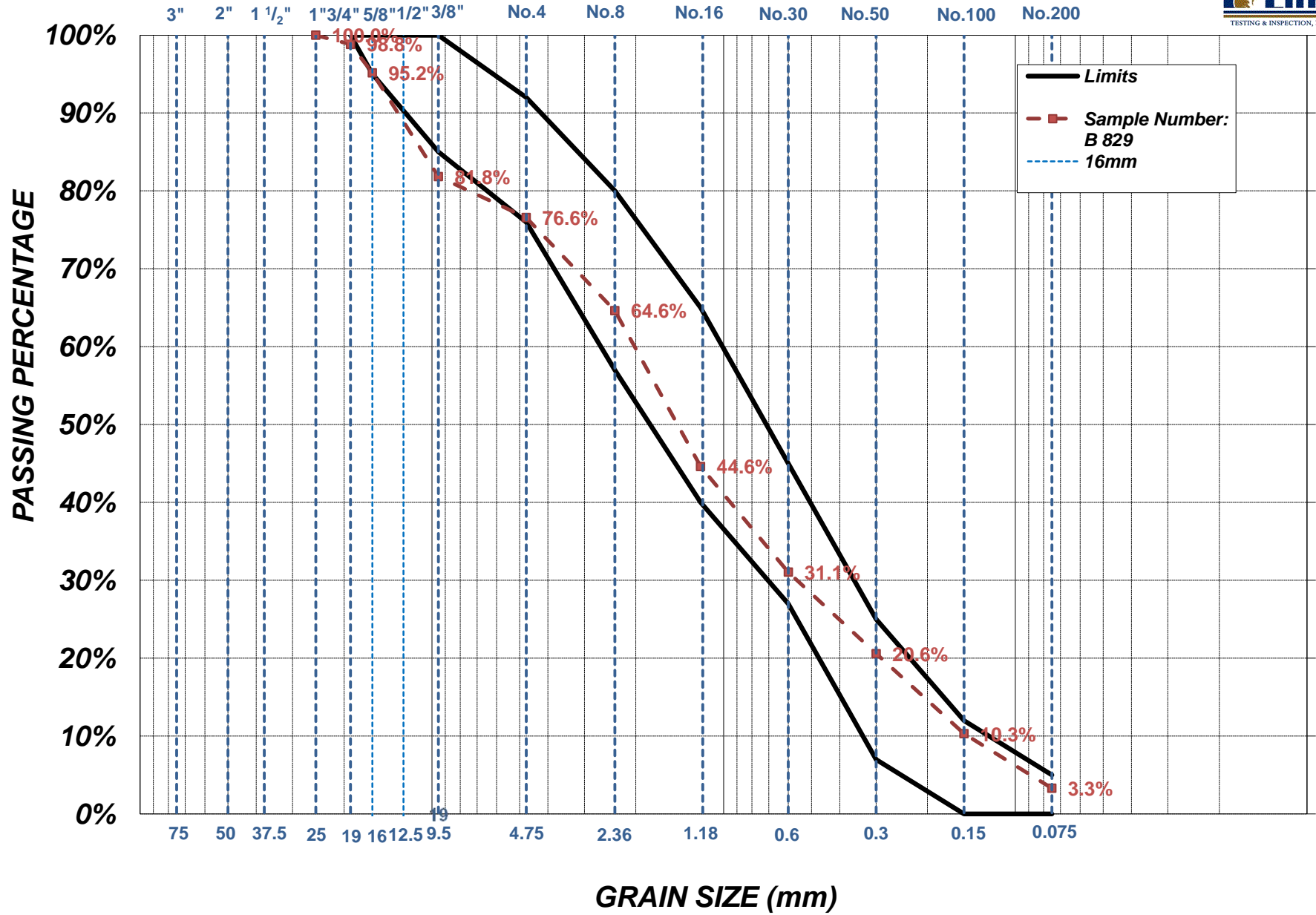
3b Filter Gradation



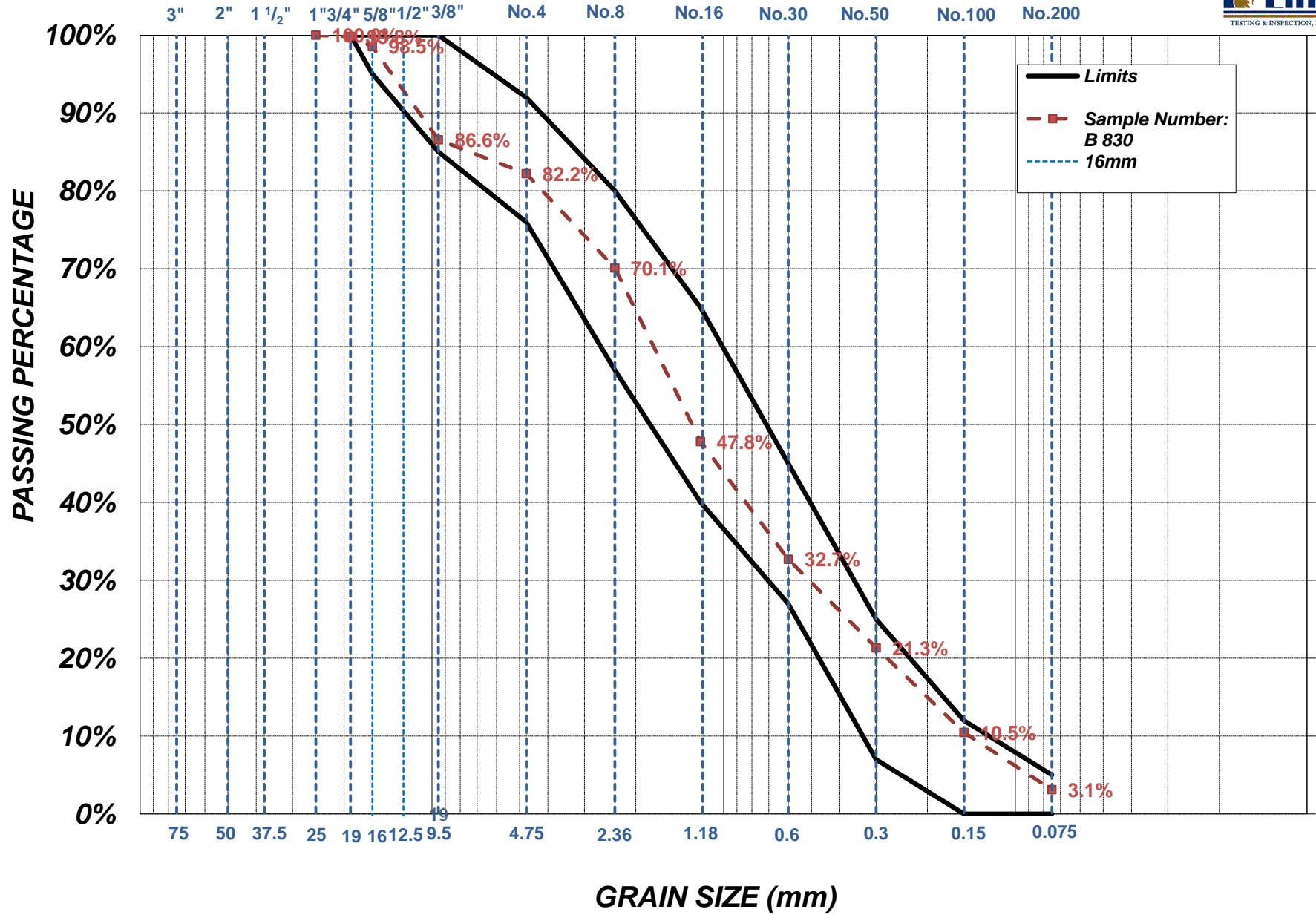
3b Filter Gradation



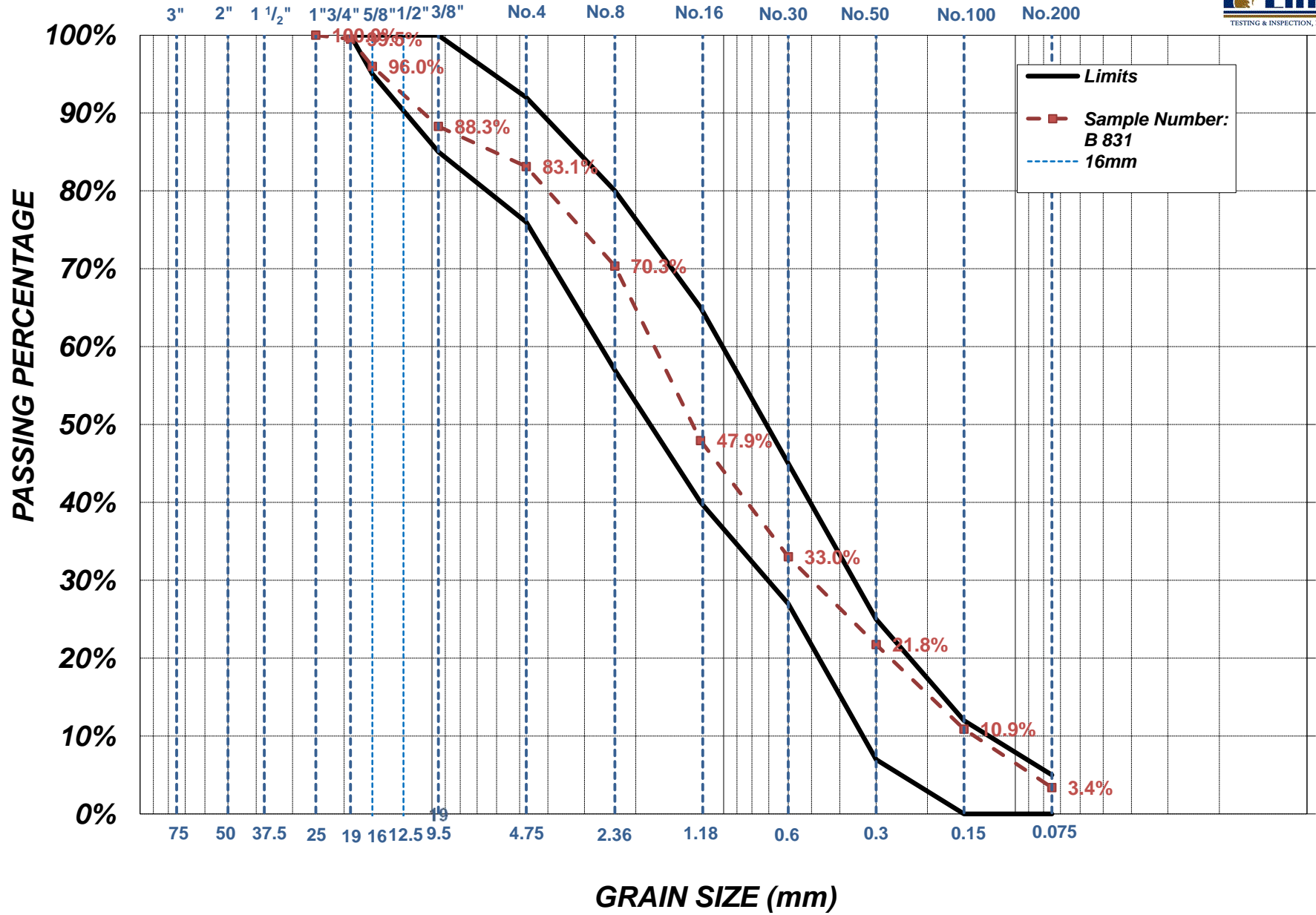
3b Filter Gradation



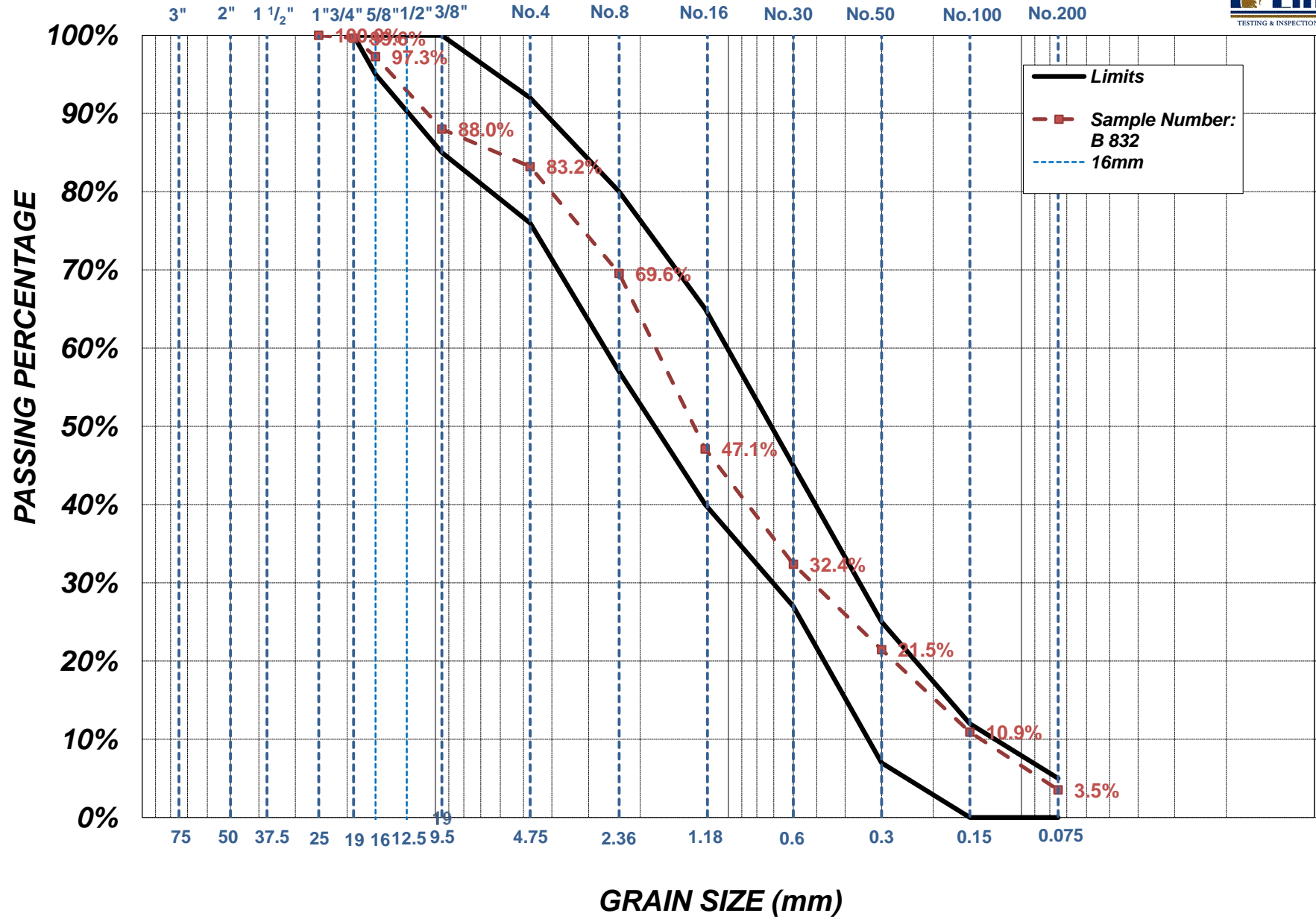
3b Filter Gradation



3b Filter Gradation



3b Filter Gradation



APÉNDICE 12:

RESULTADOS DE
ENSAYOS DE CAPAS ADICIONALES



The Panama Canal Third Set of Locks Project Gradation Analysis (ASTM C136)

Project: <u>Pacific</u>	Sample Number: <u>7178</u>
Date Sampled: <u>12-Nov-12</u>	Material Type: <u>3a Filter</u>
Time Sampled: <u>11:00 AM</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>ER RNM</u>	Sample Location: <u>Belt Conveyor</u>

Date Tested: <u>12-Nov-12</u>	Scale ID: <u>1130</u>
	Oven ID: <u>Burner</u>
Technician: <u>AM LF</u>	Wash Sieve ID: <u>1780</u>

Wet Weight (g) <u>5572.0</u>	Moisture Content <u>6.5%</u>
Dry Weight (g) <u>5230.0</u>	
After Wash Weight (g) <u>5090.0</u>	Wash Loss <u>2.7%</u>

Sieve Size	Cumulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
1.5" (37.5mm)				100	
1" (25mm)	0		100.0%	100	1232
3/4" (19mm)	28	0.5%	99.5%	89 to 100	9144
3/8" (9.5mm)	580	11.1%	88.9%	71 to 94	1225
#4 (4.75mm)	1395	26.7%	73.3%	54 to 78	9187
#8 (2.36mm)	2209	42.2%	57.8%	42 to 62	9173
#16 (1.2mm)	3197	61.1%	38.9%	30 to 49	9159
#30 (0.6mm)	3849	73.6%	26.4%	18 to 36	9156
#50 (0.3mm)	4335	82.9%	17.1%	7 to 24	1925
#100 (0.15mm)	4791	91.6%	8.4%	0 to 12	9153
#200 (0.075mm)	5081	97.2%	2.8%	0 to 5	1958
Pan	5090				9143

Checked By: PC

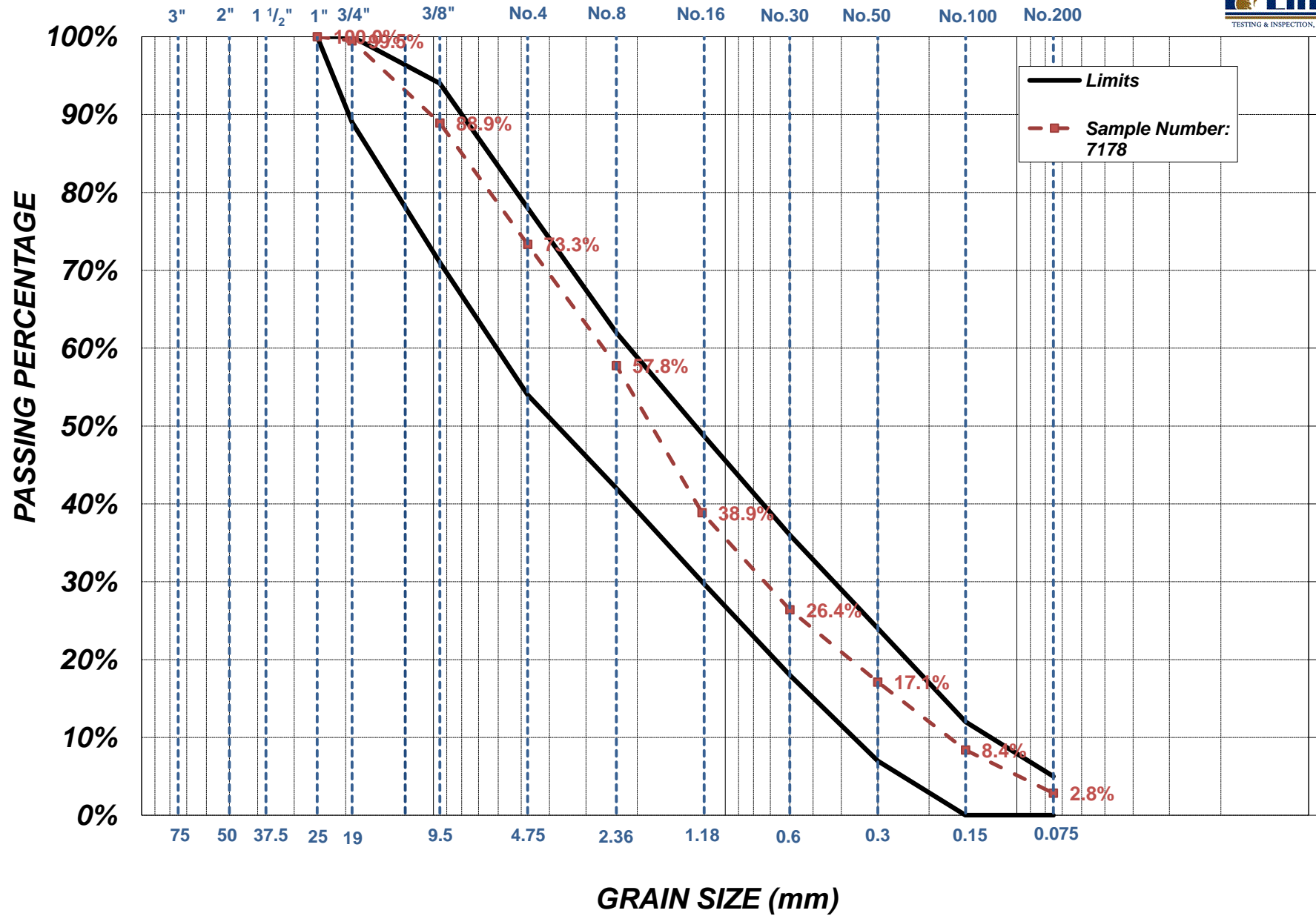
Fineness Modulus _____

Report Issued
By

Date

20-Nov-12

3a Filter Gradation





The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 646
Date Sampled:	15-Nov-12	Material Type:	3a Filter
Time Sampled:	10:01	Material Source:	Crushing Plant
Sampled By:	CG AU	Sample Location:	Borinquen Dam Test Fill 3a
Second Layer 1 Pass Q7 Surface			

Date Tested:	15-Nov-12	Sand Cone ID:	FL
		Calibrated Volume:	0.0038396
Technician:	CG AU	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.951
Weight of Sand & Jar, after (kg) [C]	4.372
Weight of Sand Used (kg) (B-C) [D]	3.579
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.067
Volume of Hole (m ³) (F/A) [G]	0.001344
Weight of Material Excavated (kg) [H]	2.897
Wet Density (kg/m ³) (H/G)	2155.6
Moisture Content (%)	6.0%
Dry Density (kg/m ³)	2033.6
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported Issued By		Date	
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The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 647</u>
Date Sampled: <u>15-Nov-12</u>	Material Type: <u>3a Filter</u>
Time Sampled: <u>10:15</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>CG AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3a</u>
<u>Second Layer 1 Pass Q6 Depth 35cm</u>	

Date Tested: <u>15-Nov-12</u>	Sand Cone ID: <u>JAG</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>CG AU</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>8.426</u>
Weight of Sand & Jar, after (kg) [C]	<u>5.059</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.367</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>1.855</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001206</u>
Weight of Material Excavated (kg) [H]	<u>2.73</u>
Wet Density (kg/m ³) (H/G)	<u>2263.5</u>
Moisture Content (%)	<u>7.4%</u>
Dry Density (kg/m ³)	<u>2107.5</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 648
Date Sampled:	15-Nov-12	Material Type:	3a Filter
Time Sampled:	10:20	Material Source:	Crushing Plant
Sampled By:	CG AU	Sample Location:	Borinquen Dam Test Fill 3a
Second Layer 1 Pass Q1 Depth 35cm			

Date Tested:	15-Nov-12	Sand Cone ID:	3124
		Calibrated Volume:	0.0038396
Technician:	CG AU	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.772
Weight of Sand & Jar, after (kg) [C]	4.235
Weight of Sand Used (kg) (B-C) [D]	3.537
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.025
Volume of Hole (m ³) (F/A) [G]	0.001317
Weight of Material Excavated (kg) [H]	2.981
Wet Density (kg/m ³) (H/G)	2264.1
Moisture Content (%)	7.2%
Dry Density (kg/m ³)	2112.0
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 650</u>
Date Sampled: <u>15-Nov-12</u>	Material Type: <u>3a Filter</u>
Time Sampled: <u>11:10</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>CG AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3a</u>
<u>Second Layer 2 Passes Q2 Surface</u>	

Date Tested: <u>15-Nov-12</u>	Sand Cone ID: <u>3259</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>CG AU</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>7.801</u>
Weight of Sand & Jar, after (kg) [C]	<u>4.02</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.781</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.269</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001475</u>
Weight of Material Excavated (kg) [H]	<u>3.194</u>
Wet Density (kg/m ³) (H/G)	<u>2165.0</u>
Moisture Content (%)	<u>6.0%</u>
Dry Density (kg/m ³)	<u>2042.4</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 652
Date Sampled:	15-Nov-12	Material Type:	3a Filter
Time Sampled:	11:40	Material Source:	Crushing Plant
Sampled By:	CG AU	Sample Location:	Borinquen Dam Test Fill 3a
Second Layer 2 Passes Q3 Depth 35cm			

Date Tested:	15-Nov-12	Sand Cone ID:	HDP
		Calibrated Volume:	0.0038396
Technician:	CG AU	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.883
Weight of Sand & Jar, after (kg) [C]	4.48
Weight of Sand Used (kg) (B-C) [D]	3.403
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	1.891
Volume of Hole (m ³) (F/A) [G]	0.001230
Weight of Material Excavated (kg) [H]	2.669
Wet Density (kg/m ³) (H/G)	2170.8
Moisture Content (%)	7.3%
Dry Density (kg/m ³)	2023.1
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name Project Number Date Sampled Time Sampled

Sample Number Material Type Date Tested Time Tested

Material Description Sampled By

Material Source Remarks & Weather Conditions (SAMPLING) Clear Cool Windy
 Overcast Warm
 Rain Hot Calm

Sample Location

Special Instructions Special Instructions are Acknowledged and Understood by Tech Initial

Issued By Date Issued

Are there any visual abnormalities in the sample? Yes No If yes who received the client instructions regarding handing the sample? Initial

Client instructions regarding abnormal sample

Follow up Actions as Directed by GUPC:

Tests to be performed:

Yellow means outside prescribed parameters

<input type="text" value="Plate Test (ASTM D1194)"/>	<input type="text"/>
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<input type="text"/>	<input type="text"/>
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Report Issued By

Checked By

Report Issue Date

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Fall Line Testing Inspection Panama S. de R.L.



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE TEST
ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality
 LOCATION: 3a Test Fill - Second Layer - Q2/Q1
 LAYER/CYCLE: Cycle 1 LAYER THICKNESS: - DESCRIPTION: 3a (Filter Material)
 DATE: 16-Nov-12 INITIAL HOUR: 09:14:00 am FINAL HOUR: -

Plate Diameter 0.45 m
 AREA 0.159043 m² SHEET: 1 OF 4
 Jack Weight 34.2 kg
 Plate Weight 1 25.8 kg COMBINED WEIGHT OF PLATE AND JACK PRESSURE 60 kg
 Plate Weight 2 Not used kg EFFORT BY PLATE AND JACK LOAD 0.0036996 MPa
 Plate Weight 3 Not used kg EFFECTIVE AREA OF JACK PRESSURE 0.00332 m²

TIME	VALUES ON PLATE	MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
		PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa	Bar	tonne-force						
0				86	61	73	73		
3	0.05	22	0.7	90	66	78	78	80	0.07
6				90	67	80	79		
9				91	68	81	80		
12				91	68	82	80		
15				91	68	82	80		
0	0.09	44	1.5	131	109	125	122	130	0.57
3				136	115	131	127		
6				137	116	133	129		
9				138	117	134	130		
12				138	117	134	130		
15	139	117	135	130					
0	0.18	88	3.0	202	198	210	203	211	1.38
3				208	199	218	208		
6				208	201	218	209		
9				209	202	220	210		
12				210	202	221	211		
15	211	202	221	211					
0	0.28	132	4.5	253	239	270	254	266	1.93
3				262	248	277	262		
6				263	250	279	264		
9				263	251	279	264		
12				264	252	282	266		
15	264	252	282	266					
0	0.37	176	6.0	296	269	319	295	311	2.38
3				306	283	330	306		
6				307	285	332	308		
9				308	286	333	309		
12				309	287	334	310		
15	309	289	335	311					

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:

Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT
 PLATE TEST
 ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality
 LOCATION: 3a Test Fill - Second Layer - Q2/Q1
 LAYER/CYCLE: Cycle 1 LAYER THICKNESS: - DESCRIPTION: 3a (Filter Material)
 DATE: 16-Nov-12 START TIME: - FINISH TIME: 11:30 a.m.

Plate Diameter	<u>0.45 m</u>		
AREA	<u>0.159043 m²</u>	SHEET:	<u>2</u> OF <u>4</u>
Jack Weight	<u>34.2 kg</u>	COMBINED WEIGHT OF PLATE AND JACK PRESSURE	<u>60 kg</u>
Plate Weight 1	<u>25.8 kg</u>	EFFORT BY PLATE AND JACK LOAD	<u>0.0037 MPa</u>
Plate Weight 2	<u>Not used kg</u>	EFFECTIVE AREA OF JACK PRESSURE	<u>0.00332 m²</u>
Plate Weight 3	<u>Not used kg</u>		

TIME	VALUES ON PLATE		MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE		PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa		Bar	ton						
0	0.23		110	3.7	299	280	325	301	299	2.25
3					298	279	325	301		
6					296	278	323	299		
9					296	278	322	299		
12					296	278	322	299		
15					296	278	322	299		
0	0.11		55	1.9	276	261	310	282	278	2.05
3					276	257	301	278		
6					276	257	301	278		
9					276	257	301	278		
12					276	257	301	278		
15					276	257	301	278		
0	0.00		0	0.0	119	181	239	180	177	1.04
3					118	180	236	178		
6					117	180	236	178		
9					116	180	236	177		
12					116	180	236	177		
15					116	180	236	177		

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:
Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE TEST
ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality
 LOCATION: 3a Test Fill - Second Layer - Q2/Q1
 LAYER/CYCLE: Cycle 2 LAYER THICKNESS: - DESCRIPTION: 3a (Filter Material)
 DATE: 16-Nov-12 INITIAL HOUR: 12:32 pm FINAL HOUR: -

Plate Diameter	<u>0.45 m</u>	SHEET:	<u>3</u> OF <u>4</u>
AREA	<u>0.159043 m²</u>	COMBINED WEIGHT OF PLATE AND JACK PRESSURE	<u>60 kg</u>
Jack Weight	<u>34.2 kg</u>	EFFORT BY PLATE AND JACK LOAD	<u>0.0037 MPa</u>
Plate Weight 1	<u>25.8 kg</u>	EFFECTIVE AREA OF JACK PRESSURE	<u>0.00332 m²</u>
Plate Weight 2	<u>Not used kg</u>		
Plate Weight 3	<u>Not used kg</u>		

TIME	VALUES ON PLATE	MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE	PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa	Bar	ton						
0				29	40	30	33		
3	0.05	22	0.7	34	42	31	36	38	1.09
6				36	43	34	38		
9				37	44	34	38		
12				37	44	34	38		
15				37	44	34	38		
0	0.09	44	1.5	52	70	50	57	59	1.30
3				53	70	52	58		
6				53	71	52	59		
9				54	71	53	59		
12				54	71	53	59		
15	54	71	53	59					
0	0.18	88	3.0	80	105	79	88	93	1.64
3				82	109	84	92		
6				82	109	84	92		
9				82	109	84	92		
12				83	110	85	93		
15	83	110	85	93					
0	0.28	132	4.5	101	125	102	109	114	1.85
3				103	129	106	113		
6				104	130	106	113		
9				104	130	107	114		
12				104	130	107	114		
15	105	131	107	114					
0	0.37	176	6.0	124	147	122	131	139	2.10
3				128	153	130	137		
6				128	154	131	138		
9				129	154	131	138		
12				129	155	132	139		
15	129	155	132	139					

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:
Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT
 PLATE TEST
 ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality
 LOCATION: 3a Test Fill - Second Layer - Q2/Q1
 LAYER/CYCLE: Cycle 2 LAYER THICKNESS: - DESCRIPTION: 3a (Filter Material)
 DATE: 16-Nov-12 START TIME: - FINISH TIME: 02:40 p.m.

Plate Diameter 0.45 m
 AREA 0.159043 m² SHEET: 4 OF 4
 Jack Weight 34.2 kg
 Plate Weight 1 25.8 kg COMBINED WEIGHT OF PLATE AND JACK PRESSURE 60 kg
 Plate Weight 2 Not used kg EFFORT BY PLATE AND JACK LOAD 0.0037 MPa
 Plate Weight 3 Not used kg EFFECTIVE AREA OF JACK PRESSURE 0.00332 m²

TIME	VALUES ON PLATE		MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE		PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa		Bar	ton						
0	0.23	110	3.7	110	140	111	120	121	1.92	
3				111	140	113	121			
6				111	140	113	121			
9				111	141	113	122			
12				111	141	113	122			
15				111	140	113	121			
0	0.11	55	1.9	96	123	100	106	104	1.75	
3				93	122	98	104			
6				93	122	97	104			
9				93	122	96	104			
12				93	122	96	104			
15				93	122	96	104			
0	0.00	0	0.0	40	44	37	40	35	1.04	
3				38	43	33	38			
6				36	42	31	36			
9				35	40	30	35			
12				35	40	30	35			
15				35	40	30	35			

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:
Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab

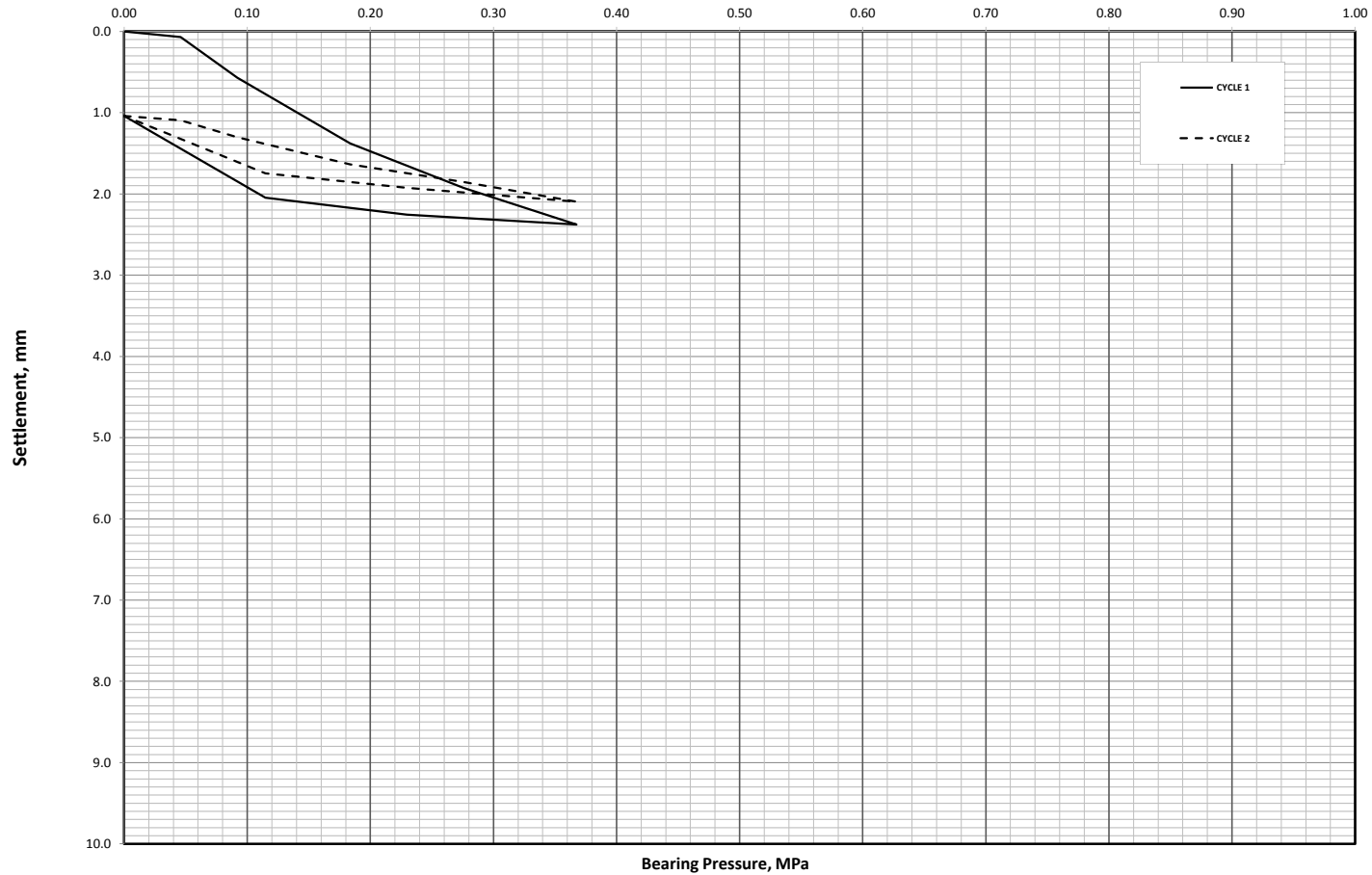


THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE BEARING TEST

ASTM D 1194

Laboratory	PACIFIC		
Sample no. B - 659_Rev4	Sample By AU - MP	Date sampled	16-Nov-12
Location	Test Fill - Filter Material - Borinquen Dams	Date tested	17-Nov-12
Material	3a Filter	Test method	ASTM D 1194



SETTLEMENT VS BEARING CAPACITY

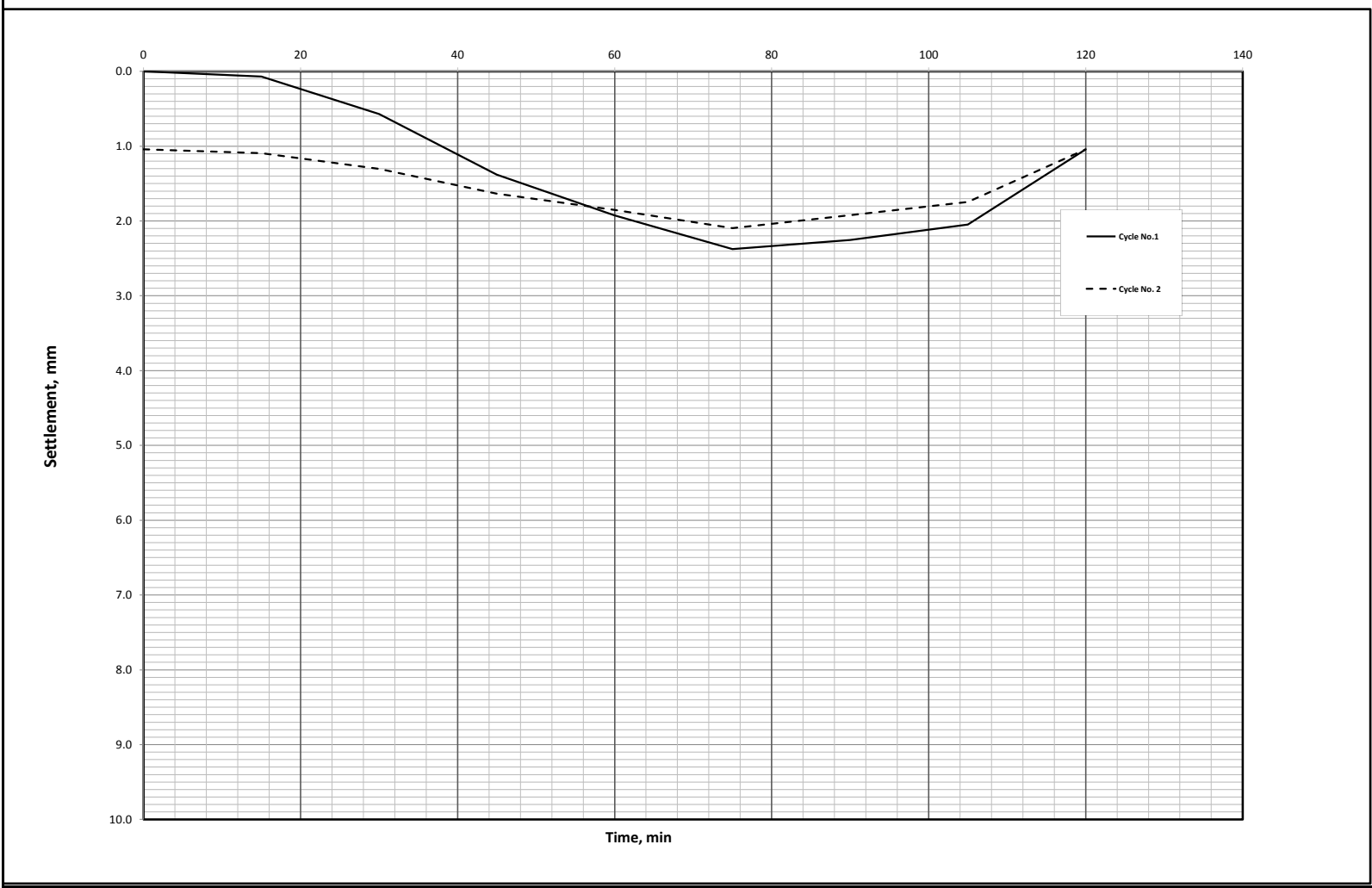
		CYCLE 1			CYCLE 2			
		BAR	mm	MPa	BAR	mm	mm	MPa
LOAD		0	0	0.00	0	1.04	1.04	0.00
		22	0.07	0.05	22	0.05	1.09	0.05
		44	0.57	0.09	44	0.26	1.30	0.09
		88	1.38	0.18	88	0.60	1.64	0.18
		132	1.93	0.28	132	0.81	1.85	0.28
UNLOAD		176	2.38	0.37	176	1.06	2.10	0.37
		110	2.25	0.23	110	0.88	1.92	0.23
		55	2.05	0.11	55	0.71	1.75	0.11
		0	1.04	0.00	0	0.00	1.04	0.00



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT
PLATE BEARING TEST

ASTM D 1194

Laboratory	PACIFIC		
Sample no. B - 659_Rev4	Sample By AU - MP	Date sampled	16-Nov-12
Location	Test Fill - Filter Material - Borinquen Dams		Date tested 17-Nov-12
Material	3a Filter		Test method ASTM D 1194



TIME VS SETTLEMENT

		CYCLE 1			CYCLE 2				Time (min)	
		BAR	mm	MPa	BAR	mm	mm	MPa	1st cycle	2nd Cycle
		0	0	0.00	0	1.04	1.04	0.00		0.00
LOAD		22	0.07	0.05	22	0.05	1.09	0.05		15.00
		44	0.57	0.09	44	0.26	1.30	0.09		30.00
		88	1.38	0.18	88	0.60	1.64	0.18		45.00
		132	1.93	0.28	132	0.81	1.85	0.28		60.00
		176	2.38	0.37	176	1.06	2.10	0.37		75.00
UNLOAD		110	2.25	0.23	110	0.88	1.92	0.23		90.00
UNLOAD		55	2.05	0.11	55	0.71	1.75	0.11		105.00
UNLOAD		0	1.04	0.00	0	0.00	1.04	0.00		120.00

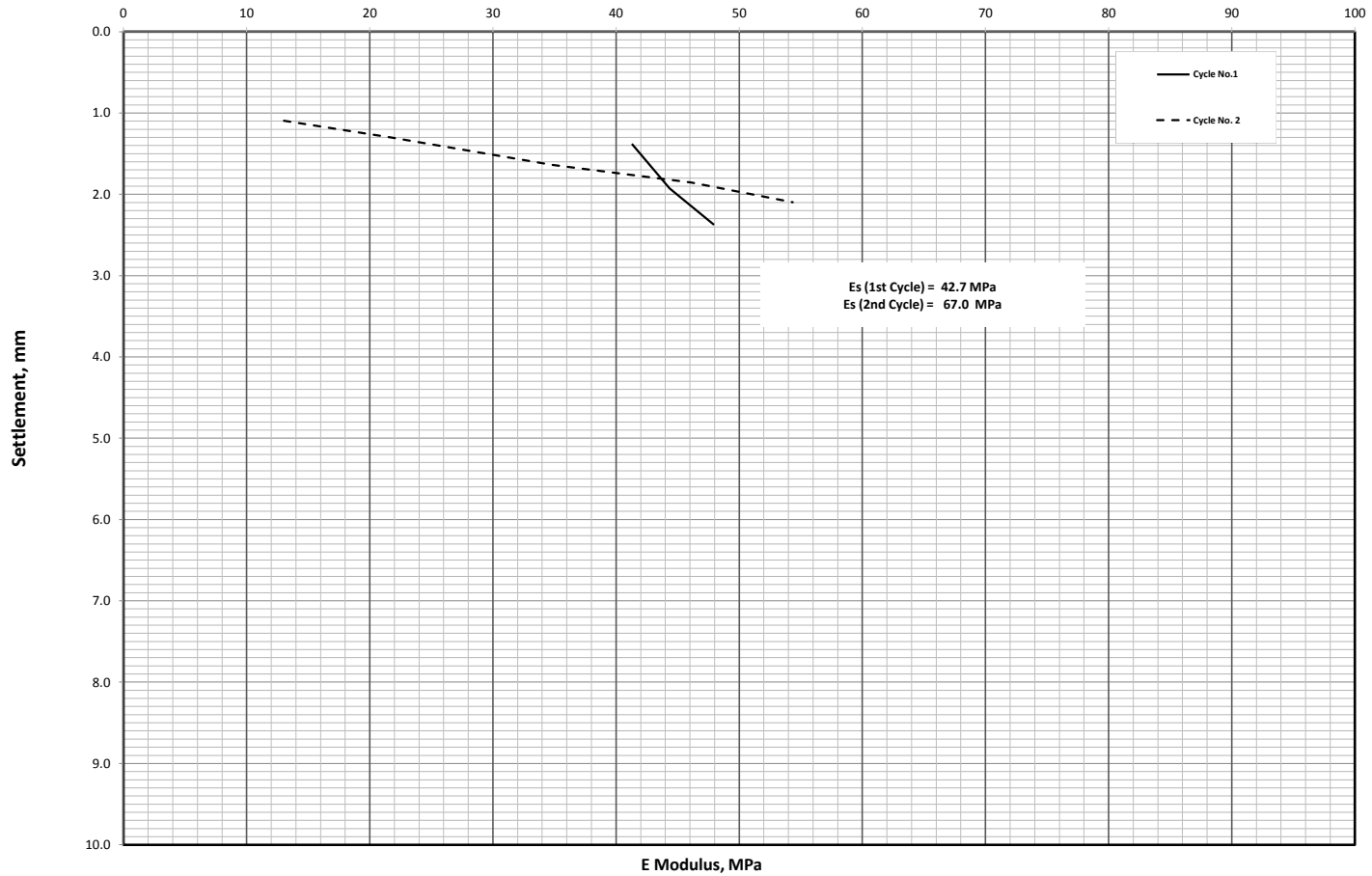


THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE BEARING TEST

ASTM D 1194

Laboratory	PACIFIC		
Sample no. B - 659_Rev4	Sample By AU - MP	Date sampled	16-Nov-12
Location	Test Fill - Filter Material - Borinquen Dams	Date tested	17-Nov-12
Material	3a Filter	Test method	ASTM D 1194



The Panama Canal Third Set of Locks Project

PLATE BEARING TESTS

Date Sampled

Sample Number	B - 659_Rev4	Sample Location	Test Fill - Filter Material - Borinquen Dams	Date Sampled	16-Nov-12
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Location/Layer	Poissons Ratio ν	Plate Dia. b	Max Stress q	Settlement s	Secant Mod of Sub-Grade Reaction	Mod of Sub-Grade Reaction Full Size (30inch) k_s	$E=qB\pi(1-\nu^2)/4s$	$q_{ult} = ks/40$	Settlement /dia.
		m	MPa	mm	MN/m ³	MN/m ³	MPa	kPa	%
Cell 1 - 1st Cycle	0.35	0.45	46	0.07	656	388	203	9712	0.02%
	0.35	0.45	92	0.57	161	95	50	2385	0.13%
	0.35	0.45	184	1.38	133	79	41	1970	0.31%
	0.35	0.45	276	1.93	143	85	44	2117	0.43%
	0.35	0.45	367	2.38	155	92	48	2288	0.53%
Cell 1 - 2nd Cycle	0.35	0.45	46	1.09	42	25	13	622	0.24%
	0.35	0.45	92	1.30	70	42	22	1043	0.29%
	0.35	0.45	184	1.64	112	66	35	1661	0.36%
	0.35	0.45	276	1.85	149	88	46	2201	0.41%
	0.35	0.45	367	2.10	175	104	54	2594	0.47%

Cycle	k'_u (MPa/mm)	k_u (MPa/mm)	E_s (MPa)
1	0.184	0.138	42.7
2	0.347	0.216	67.0
Average	0.266	0.177	54.8

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name Project Number Date Sampled Time Sampled

Sample Number Material Type Date Tested Time Tested

Material Description Sampled By

Material Source

Sample Location

Remarks & Weather Conditions (SAMPLING)

Pick One from Each Column

Clear Cool Windy
 Overcast Warm
 Rain Hot Calm

Special Instructions

Special Instructions are Acknowledged and Understood by Tech Initial

Issued By Date Issued

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial

Client instructions regarding abnormal sample

Follow up Actions as Directed by GUPC:

Tests to be performed:

Yellow means outside prescribed parameters

<input type="text" value="Plate Test (ASTM D1194)"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

Report Issued By

Checked By

Report Issue Date

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Fall Line Testing Inspection Panama S. de R.L.



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE TEST
ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality Test No. B - 662 Rev
 LOCATION: Test Fill 3a Filter - Q8/Q7
 LAYER/CYCLE: Cycle 1 LAYER THICKNESS: - DESCRIPTION: 3a (Filter Material)
 DATE: 17-Nov-12 INITIAL HOUR: 09:16 am FINAL HOUR: -

Plate Diameter 0.45 m
 AREA 0.159043 m² SHEET: 1 OF 4
 Jack Weight 34.2 kg
 Plate Weight 1 25.8 kg COMBINED WEIGHT OF PLATE AND JACK PRESSURE 60 kg
 Plate Weight 2 Not used kg EFFORT BY PLATE AND JACK LOAD 0.0036996 MPa
 Use new (uncalibrat Not used kg) EFFECTIVE AREA OF JACK PRESSURE 0.00332 m²

TIME	VALUES ON PLATE		MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	Ground Stress	Henar Bravo	PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
0					60	52	50	54		
3	0.05	22	0.7	63	56	53	57	60	0.06	
6				64	57	54	58			
9				64	57	54	58			
12				64	57	54	58			
15				68	57	56	60			
0	0.09	44	1.5	94	83	84	87	94	0.40	
3				99	87	88	91			
6				101	88	90	93			
9				101	89	90	93			
12				102	90	91	94			
15	102	90	91	94						
0	0.18	88	3.0	148	133	139	140	152	0.98	
3				156	141	148	148			
6				157	142	148	149			
9				159	143	149	150			
12				159	144	150	151			
15	160	145	151	152						
0	0.28	132	4.5	196	170	188	185	194	1.40	
3				202	174	194	190			
6				203	174	195	191			
9				205	176	196	192			
12				205	176	197	193			
15	208	177	198	194						
0	0.37	176	6.0	238	197	234	223	234	1.80	
3				247	205	241	231			
6				249	207	242	233			
9				249	207	242	233			
12				249	208	242	233			
15	250	208	243	234						

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:

Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab.



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT
 PLATE TEST
 ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality Test No. B - 662_Rev
 LOCATION: Test Fill 3a Filter - Q8/Q7
 LAYER/CYCLE: Cycle 1 LAYER THICKNESS: - DESCRIPTION: 3a (Filter Material)
 DATE: 17-Nov-12 START TIME: - FINISH TIME: 11:25 a.m.

Plate Diameter 0.45 m
 AREA 0.159043 m²
 Jack Weight 34.2 kg
 Plate Weight 1 25.8 kg
 Plate Weight 2 Not used kg
 Use new (uncalibrat Not used kg

SHEET: 2 OF 4

COMBINED WEIGHT OF PLATE AND JACK PRESSURE 60 kg
 EFFORT BY PLATE AND JACK LOAD 0.0037 MPa
 EFFECTIVE AREA OF JACK PRESSURE 0.00332 m²

TIME	VALUES ON PLATE		MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE	Henar Bravo	PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
0	0.23	Bar	110	3.7	249	204	242	232	230	1.76
3					247	202	242	230		
6					247	202	241	230		
9					247	202	241	230		
12					247	202	241	230		
15					247	202	240	230		
0	0.11	Bar	55	1.9	126	177	224	176	175	1.21
3					126	177	222	175		
6					126	177	222	175		
9					126	177	222	175		
12					126	177	222	175		
15					126	177	222	175		
0	0.00	Bar	0	0.0	81	110	160	117	112	0.58
3					81	110	156	116		
6					80	110	156	115		
9					80	110	156	115		
12					80	110	155	115		
15					73	110	154	112		

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:
Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab.



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE TEST
ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality Test No. B-662_Rev

LOCATION: Test Fill 3a Filter - Q8/Q7

LAYER/CYCLE: Cycle 2 LAYER THICKNESS: - DESCRIPTION: 3a (Filter Material)

DATE: 17-Nov-12 INITIAL HOUR: 11:32 pm FINAL HOUR: -

Plate Diameter 0.45 m
 AREA 0.159043 m²
 Jack Weight 34.2 kg
 Plate Weight 1 25.8 kg
 Plate Weight 2 Not used kg
 Use new (uncalibrat Not used kg

SHEET: 3 OF 4

COMBINED WEIGHT OF PLATE AND JACK PRESSURE 60 kg
 EFFORT BY PLATE AND JACK LOAD 0.0037 MPa
 EFFECTIVE AREA OF JACK PRESSURE 0.00332 m²

TIME	VALUES ON PLATE	MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE	PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	Henar Bravo	Bar							
0				18	29	23	23		
3	0.05	22	0.7	19	31	25	25	25	0.60
6				19	31	25	25		
9				19	31	25	25		
12				19	3	25	16		
15				19	32	25	25		
0	0.09	44	1.5	31	49	41	40	46	0.81
3				35	54	44	44		
6				35	54	45	45		
9				37	55	46	46		
12				37	55	46	46		
15	37	55	46	46					
0	0.18	88	3.0	59	83	70	71	74	1.09
3				62	85	74	74		
6				62	85	74	74		
9				62	86	74	74		
12				62	86	74	74		
15	62	86	74	74					
0	0.28	132	4.5	79	99	90	89	95	1.30
3				83	104	95	94		
6				84	104	95	94		
9				84	104	95	94		
12				84	104	95	94		
15	84	105	96	95					
0	0.37	176	6.0	92	117	108	106	115	1.50
3				102	123	116	114		
6				106	123	116	115		
9				106	123	116	115		
12				106	123	116	115		
15	106	123	116	115					

CONVERSION FACTORS

1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:

Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab.



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT
 PLATE TEST
 ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality Test No. B - 662_Rev
 LOCATION: Test Fill 3a Filter - Q8/Q7
 LAYER/CYCLE: Cycle 2 LAYER THICKNESS: - DESCRIPTION: 3a (Filter Material)
 DATE: 17-Nov-12 START TIME: - FINISH TIME: 02:40 p.m.

Plate Diameter 0.45 m
 AREA 0.159043 m² SHEET: 4 OF 4
 Jack Weight 34.2 kg
 Plate Weight 1 25.8 kg COMBINED WEIGHT OF PLATE AND JACK PRESSURE 60 kg
 Plate Weight 2 Not used kg EFFORT BY PLATE AND JACK LOAD 0.0037 MPa
 Use new (uncalibrat Not used kg EFFECTIVE AREA OF JACK PRESSURE 0.00332 m²

TIME	VALUES ON PLATE		MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE	Henar Bravo	PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min										
0	0.23	110	3.7	104	116	115	112	110	1.45	
3				102	116	115	111			
6				102	115	113	110			
9				102	115	113	110			
12				101	115	113	110			
15				101	115	113	110			
0	0.11	55	1.9	88	99	97	95	91	1.26	
3				85	92	96	91			
6				85	91	96	91			
9				85	91	96	91			
12				85	91	96	91			
15				85	91	96	91			
0	0.00	0	0.0	38	31	41	37	31	0.58	
3				35	29	35	33			
6				35	28	35	33			
9				35	27	34	32			
12				35	27	34	32			
15				35	26	33	31			

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:
Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab.

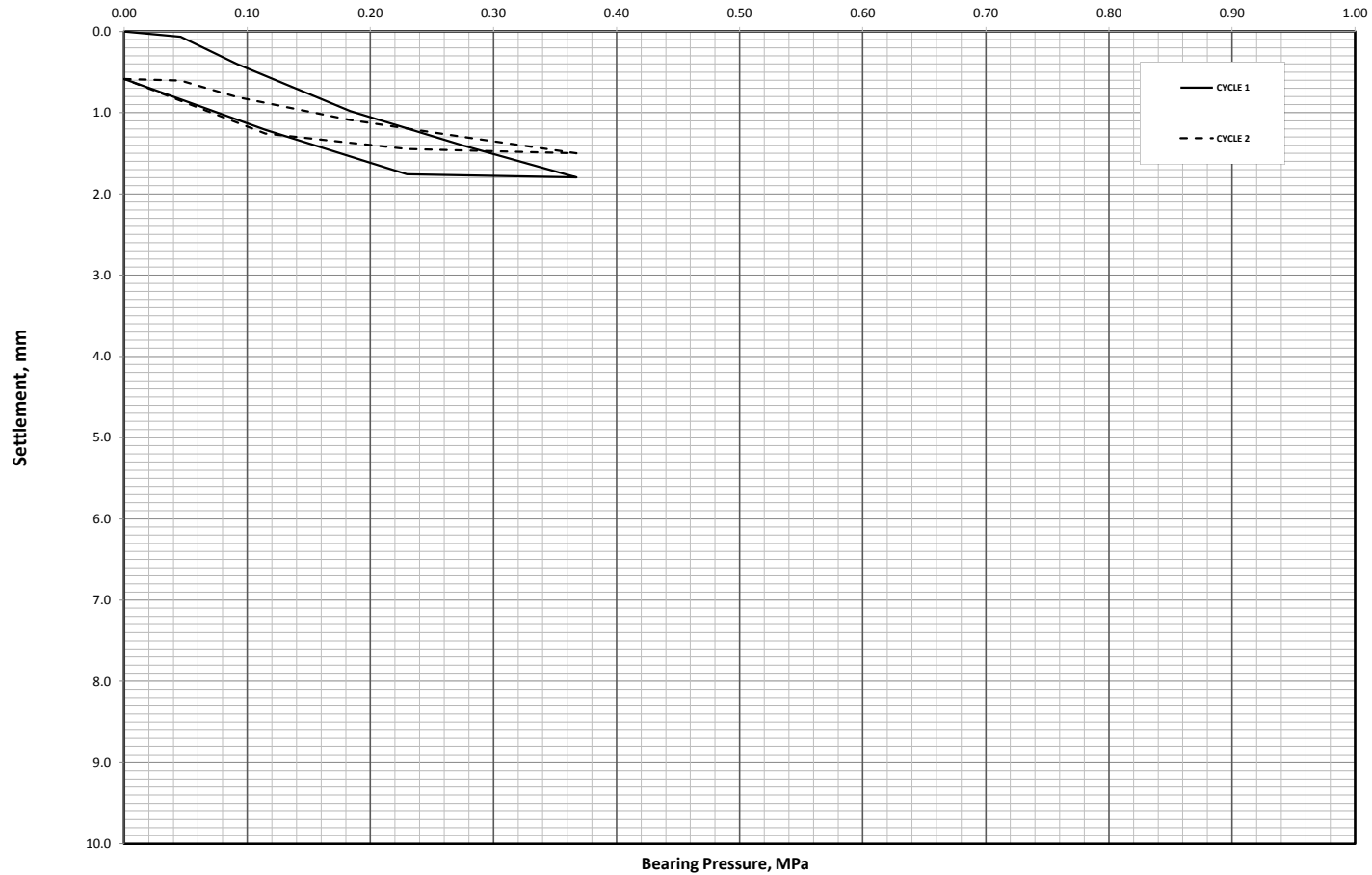


THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE BEARING TEST

ASTM D 1194

Laboratory	PACIFIC		
Sample no. B - 662_Rev4	Sample By AU - MP	Date sampled	17-Nov-12
Location	Test Fill - Filter Material - Borinquen Dams Q8/Q7	Date tested	19-Nov-12
Material	3a Filter	Test method	ASTM D 1194



SETTLEMENT VS BEARING CAPACITY

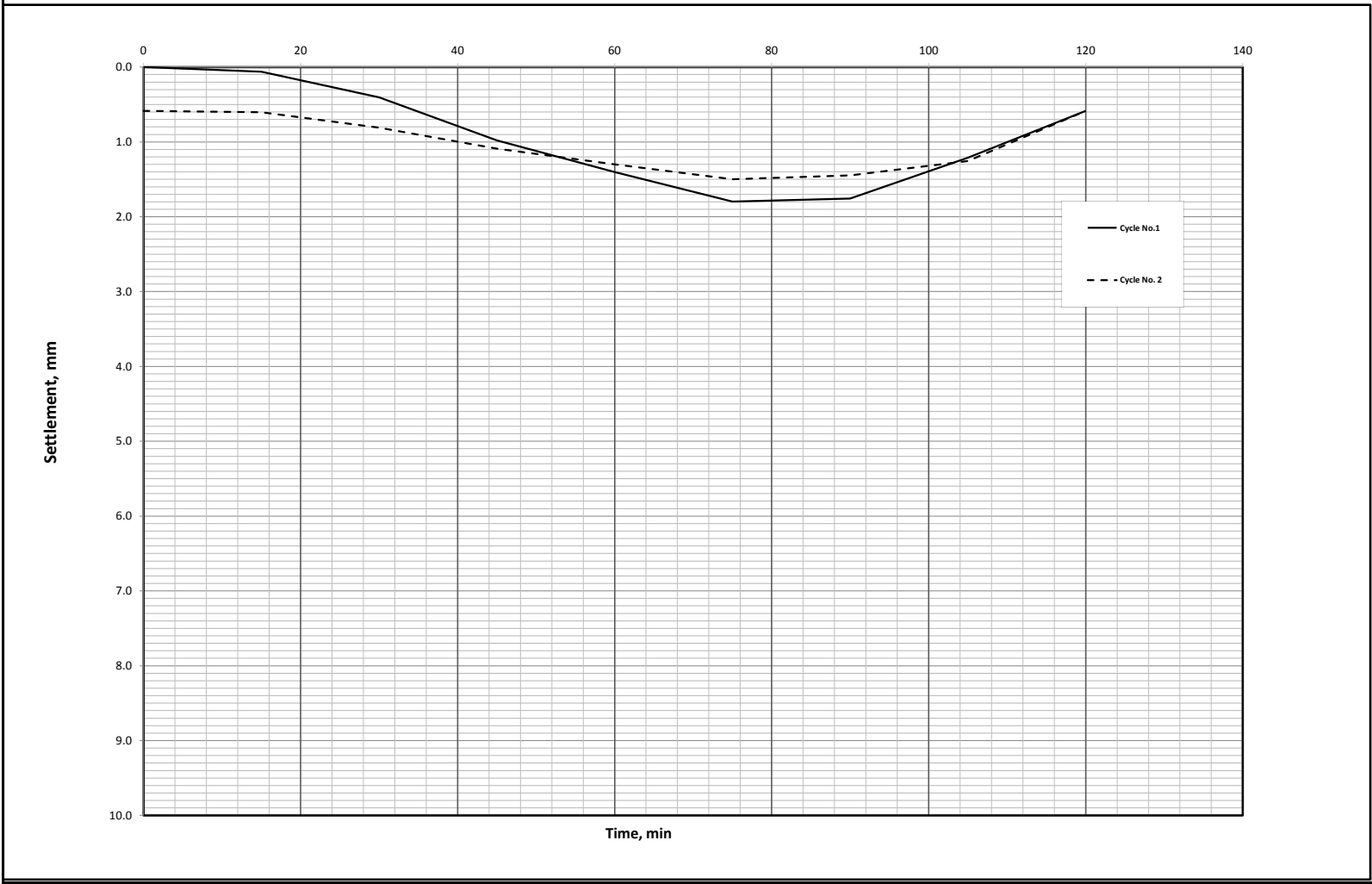
		CYCLE 1			CYCLE 2			
		BAR	mm	MPa	BAR	mm	mm	MPa
LOAD		0	0	0.00	0	0.58	0.58	0.00
		22	0.06	0.05	22	0.02	0.60	0.05
		44	0.40	0.09	44	0.23	0.81	0.09
		88	0.98	0.18	88	0.51	1.09	0.18
		132	1.40	0.28	132	0.72	1.30	0.28
UNLOAD		176	1.80	0.37	176	0.92	1.50	0.37
		110	1.76	0.23	110	0.86	1.45	0.23
		55	1.21	0.11	55	0.67	1.26	0.11
		0	0.58	0.00	0	0.00	0.58	0.00



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT
PLATE BEARING TEST

ASTM D 1194

Laboratory	PACIFIC		
Sample no.	B - 662_Rev4	Sample By	AU - MP
		Date sampled	17-Nov-12
Location	Test Fill - Filter Material - Borinquen Dams Q8/Q7		Date tested
			19-Nov-12
Material	3a Filter		Test method
			ASTM D 1194



TIME VS SETTLEMENT

		CYCLE 1			CYCLE 2				Time (min)	
		BAR	mm	MPa	BAR	mm	mm	MPa	1st cycle	2nd Cycle
LOAD		0	0	0.00	0	0.58	0.58	0.00		0.00
		22	0.06	0.05	22	0.02	0.60	0.05		15.00
		44	0.40	0.09	44	0.23	0.81	0.09		30.00
		88	0.98	0.18	88	0.51	1.09	0.18		45.00
		132	1.40	0.28	132	0.72	1.30	0.28		60.00
		176	1.80	0.37	176	0.92	1.50	0.37		75.00
		110	1.76	0.23	110	0.86	1.45	0.23		90.00
		55	1.21	0.11	55	0.67	1.26	0.11		105.00
		0	0.58	0.00	0	0.00	0.58	0.00		120.00
UNLOAD										

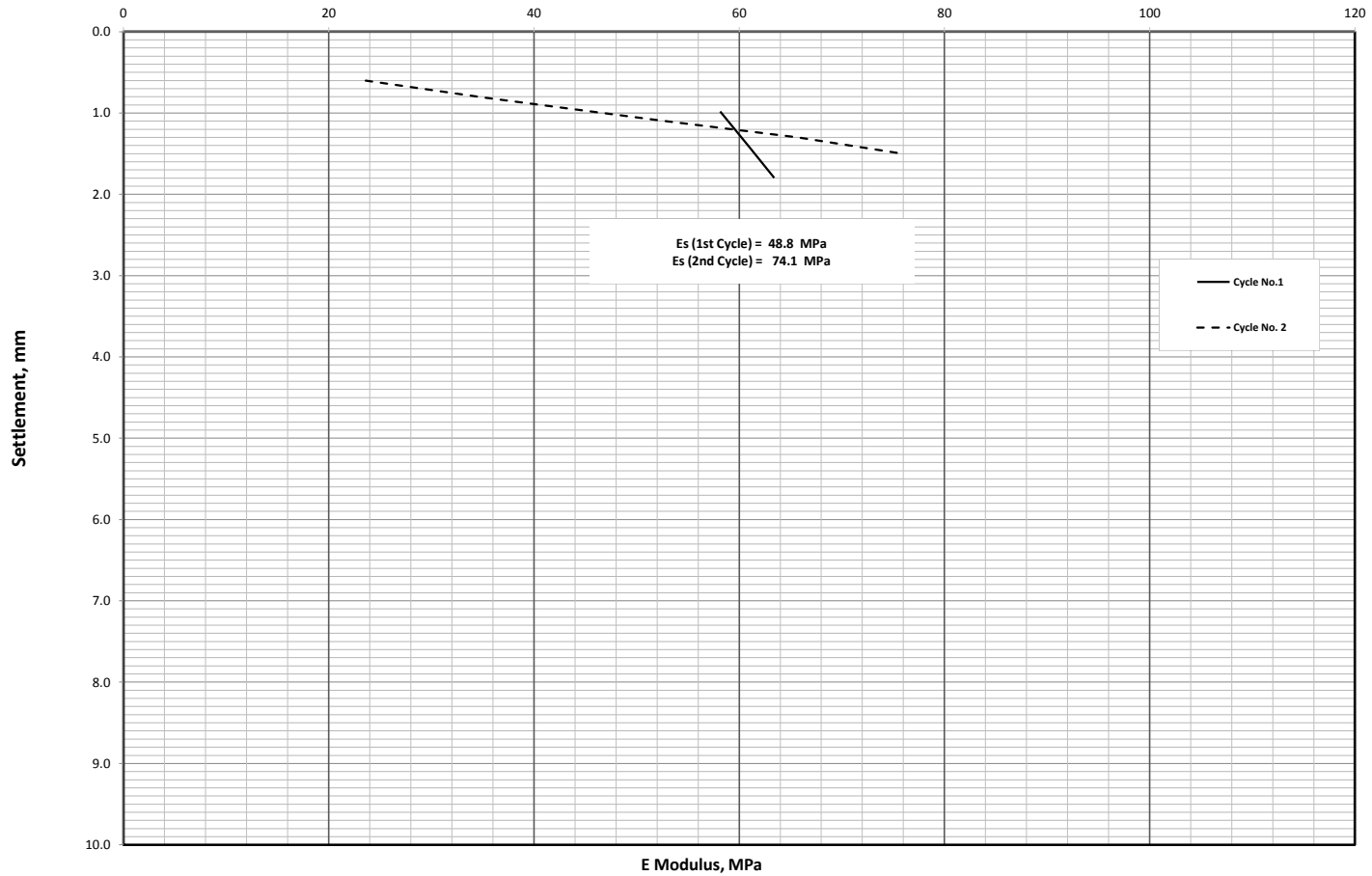


THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE BEARING TEST

ASTM D 1194

Laboratory	PACIFIC			
Sample no.	B - 662_Rev4	Sample By	AU - MP	
Date sampled			17-Nov-12	
Location	Test Fill - Filter Material - Borinquen Dams Q8/Q7		Date tested	19-Nov-12
Material	3a Filter		Test method	ASTM D 1194



The Panama Canal Third Set of Locks Project

PLATE BEARING TESTS

Date Sampled

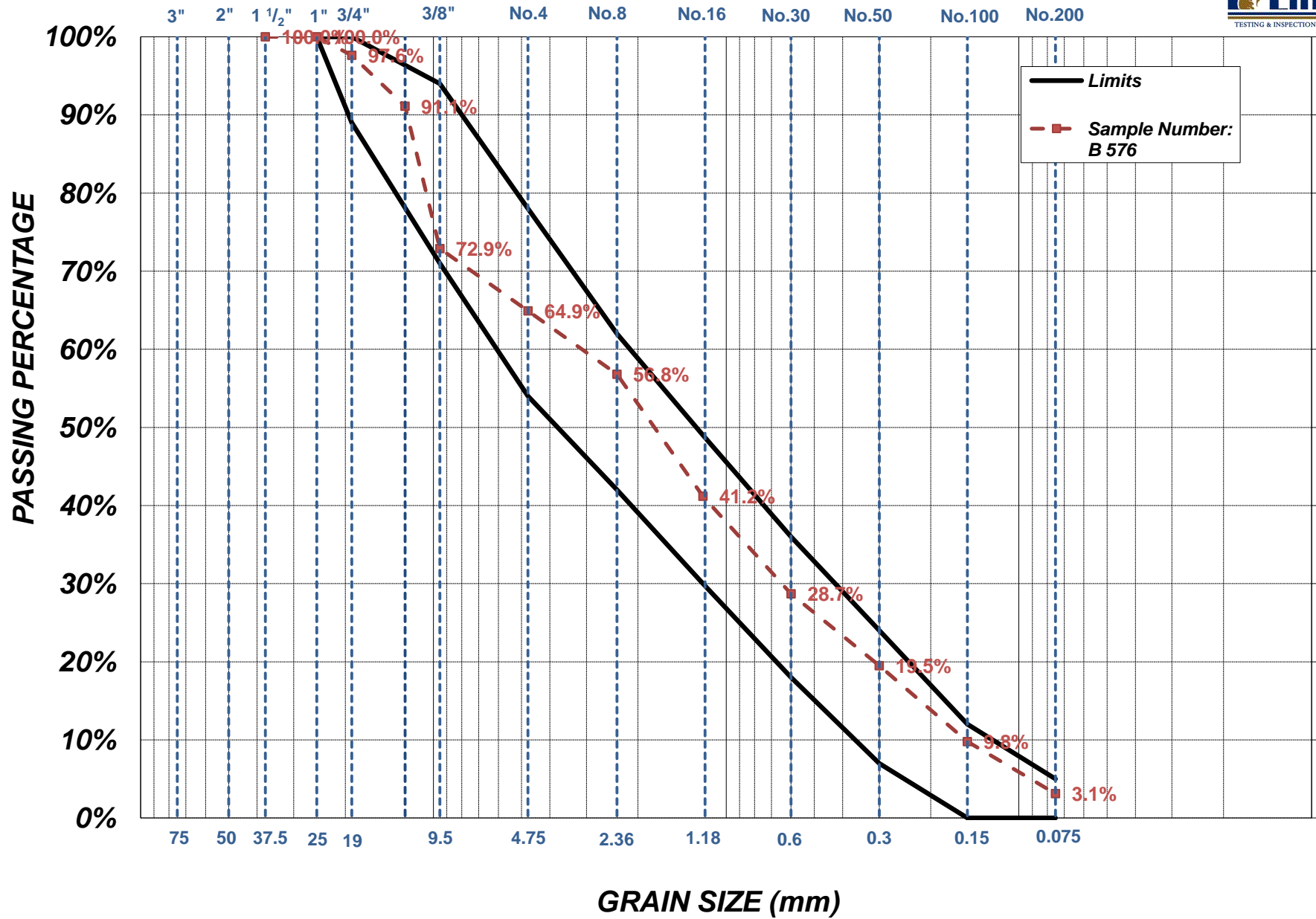
Sample Number	B - 662_Rev4	Sample Location	Test Fill - Filter Material - Borinquen Dams Q8/Q7	Date Sampled	17-Nov-12
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Location/Layer	Poissons Ratio ν	Plate Dia. b	Max Stress q	Settlement s	Secant Mod of Sub-Grade Reaction	Mod of Sub-Grade Reaction Full Size (30inch) k_s	$E=qB\pi(1-\nu^2)/4s$	$q_{ult} = ks/40$	Settlement /dia.
		m	MPa	mm	MN/m ³	MN/m ³	MPa	kPa	%
Cell 1 - 1st Cycle	0.35	0.45	46	0.06	725	429	225	10734	0.01%
	0.35	0.45	92	0.40	228	135	71	3371	0.09%
	0.35	0.45	184	0.98	187	111	58	2775	0.22%
	0.35	0.45	276	1.40	196	116	61	2907	0.31%
	0.35	0.45	367	1.80	204	121	63	3027	0.40%
Cell 1 - 2nd Cycle	0.35	0.45	46	0.60	76	45	24	1127	0.13%
	0.35	0.45	92	0.81	113	67	35	1679	0.18%
	0.35	0.45	184	1.09	169	100	52	2495	0.24%
	0.35	0.45	276	1.30	212	126	66	3138	0.29%
	0.35	0.45	367	1.50	245	145	76	3626	0.33%

Henar Bravo

Cycle	k'_u (MPa/mm)	k_u (MPa/mm)	E_s (MPa)
1	0.225	0.157	48.8
2	0.399	0.239	74.1
Average	0.312	0.198	61.4

3a Filter Gradation





The Panama Canal Third Set of Locks Project

Minimum Relative Density of Soils(ASTM D4254)

Project:

Pacific

Date:

01-Nov-12

Sample ID:

B 576

Sampled By:

CG

Technician

CG

Checked By:

ES

Method

 A B C

Mold Size

0.1001 FT³0.0028m³

Origin of Material

Borinquen Dam Test Fill 3a

Soil
Classification

N/A

Scale No.

2026

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8850	8900				
Mold Tare (g)	3630	3630				
Weight of Material (g)	5220	5270				
Volume of Mold (cm ³)	2800	2800.0				
Minimum Relative Density (g/cm ³)	1.864	1.882				

Result
Consistency

0.48%



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project:

Pacific

Date:

01-Nov-12

Sample ID:

B 576

Sampled By:

CG

Technician

CG

Checked By:

ES

Method



Dry 1A



Wet 1B

Mold Size

0.1001 FT³0.0028m³

Origin of Material

Borinquen Dam Test Fill 3a

Soil
Classification

N/A

Scale No.

2026

Mold ID

1443

Table ID

1443

Double Amplitude of Vertical Vibration
(if different from that specified)

N/A

Trial	1	2	3	4	5	6
Soil + Mold (g)	8850	8900				
Mold Tare (g)	3630	3630				
Weight of Material (g)	5220	5270				
Volume of Mold (cm ³)	2558	2623.0				
Wet Density (g/cm ³)	N/A	N/A				
Moisture Content (%)	N/A	N/A				
Maximum Index Dry Density (g/cm ³)	2.041	2.009				

Result
Consistency

0.78%



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project:

Pacific

Date:

01-Nov-12

Sample ID:

B 576

Sampled By:

CG

Technician

CG

Checked By:

ES

Method

Dry 1A

Wet 1B

Mold Size

0.1001 FT³0.0028m³

Origin of Material

Borinquen Dam Test Fill 3a

Soil
Classification

N/A

Scale No.

2026

Mold ID

1443

Table ID

1443

Double Amplitude of Vertical Vibration
(if different from that specified)

N/A

Trial	1	2	3	4	5	6
Soil + Mold (g)	10130	10110				
Mold Tare (g)	3630	3630				
Weight of Material (g)	6500	6480				
Volume of Mold (cm ³)	2838	2840				
Wet Density (g/cm ³)	2290	2282				
Moisture Content (%)	10.6%	10.4%				
Maximum Index Dry Density (g/cm ³)	2071	2067				

Result
Consistency

0.08%



The Panama Canal Third Set of Locks Project Gradation Analysis (ASTM C136)

Project: <u>Pacific</u>	Sample Number: <u>B 584</u>
Date Sampled: <u>2-Nov-12</u>	Material Type: <u>3a Filter</u>
Time Sampled: <u>2:25 AM</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Test Fill 1a First Lift</u>

Date Tested: <u>2-Nov-12</u>	Scale ID: <u>1453</u>
	Oven ID: <u>Burner</u>
Technician: <u>JAG</u>	Wash Sieve ID: <u>1780</u>

Wet Weight (g) <u>6546.0</u>	Moisture Content <u>6.3%</u>
Dry Weight (g) <u>6156.8</u>	
After Wash Weight (g) <u>5944.5</u>	Wash Loss <u>3.4%</u>

Sieve Size	Cumulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
1.5" (37.5mm)			100.0%	100	
1" (25mm)	0		100.0%	100	9180
3/4" (19mm)	114	1.9%	98.1%	89 to 100	9182
3/8" (9.5mm)	1189	19.3%	80.7%	71 to 94	9130
#4 (4.75mm)	1899.6	30.9%	69.1%	54 to 78	9189
#8 (2.36mm)	2637.3	42.8%	57.2%	42 to 62	9158
#16 (1.2mm)	3698.1	60.1%	39.9%	30 to 49	9133
#30 (0.6mm)	4448.1	72.2%	27.8%	18 to 36	9129
#50 (0.3mm)	4993.1	81.1%	18.9%	7 to 24	9152
#100 (0.15mm)	5552.3	90.2%	9.8%	0 to 12	9195
#200 (0.075mm)	5924.3	96.2%	3.8%	0 to 5	1912
Pan	5944.5				9171

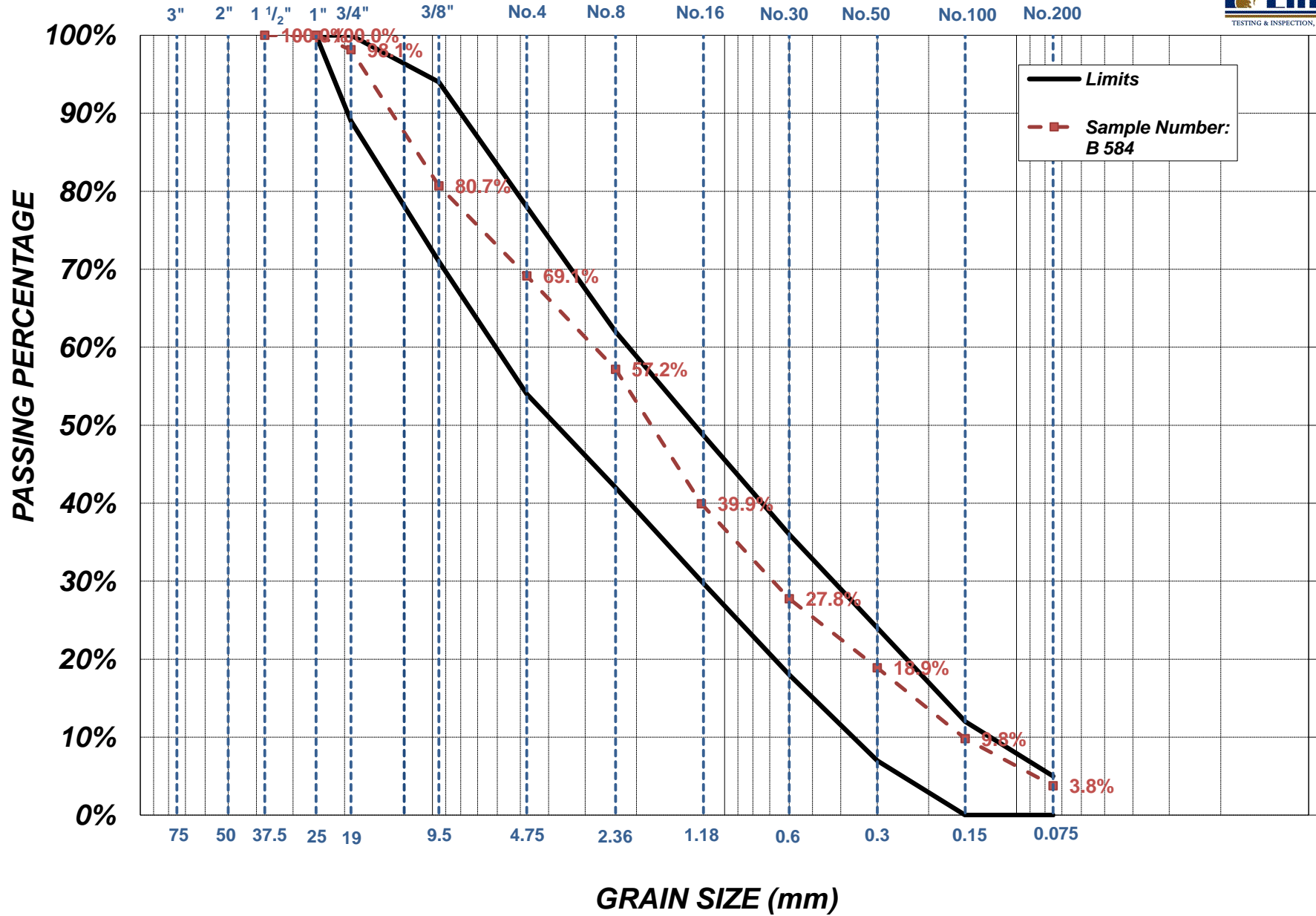
Checked By: ES Fineness Modulus

Report Issued
By

Date

6-Nov-12

3a Filter Gradation





The Panama Canal Third Set of Locks Project

Minimum Relative Density of Soils(ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8850	8850				
Mold Tare (g)	3630	3630				
Weight of Material (g)	5220	5220				
Volume of Mold (cm ³)	2800	2800.0				
Minimum Relative Density (g/cm ³)	1.864	1.864				

Result Consistency



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project:

Pacific

Date:

02-Nov-12

Sample ID:

B 584

Sampled By:

CG

Technician

JAG

Checked By:

ES

Method

Dry 1A

Wet 1B

Mold Size

0.1001 FT³0.0028m³

Origin of Material

Borinquen Dam Test Fill 3a

Soil
Classification

N/A

Scale No.

2026

Mold ID

1443

Table ID

1443

Double Amplitude of Vertical Vibration
(if different from that specified)

N/A

Trial	1	2	3	4	5	6
Soil + Mold (g)	8850	8850				
Mold Tare (g)	3630	3630				
Weight of Material (g)	5220	5220				
Volume of Mold (cm ³)	2556	2556.0				
Wet Density (g/cm ³)	N/A	N/A				
Moisture Content (%)	N/A	N/A				
Maximum Index Dry Density (g/cm ³)	2.042	2.042				

Result
Consistency

0.00%



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method Dry 1A Wet 1B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	10110	10100				
Mold Tare (g)	3630	3630				
Weight of Material (g)	6480	6470				
Volume of Mold (cm ³)	2827	2824.0				
Wet Density (g/cm ³)	2292	2291.0				
Moisture Content (%)	8.8%	9.0%				
Maximum Index Dry Density (g/cm ³)	2107	2102				

Result Consistency



**The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)**

Project: <u>Pacific</u>	Sample Number: <u>B 587</u>
Date Sampled: <u>8-Nov-12</u>	Material Type: <u>3a Filter</u>
Time Sampled: <u>9:12</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>CG</u>	Sample Location: <u>Borinquen Dam Test Fill 3a</u>
<u>First Layer 1 Pass Q4 Depth 10cm</u>	

Date Tested: <u>8-Nov-12</u>	Sand Cone ID: <u>7035</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>JAG</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>7.0645</u>
Weight of Sand & Jar, after (kg) [C]	<u>3.3192</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.745</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.233</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001452</u>
Weight of Material Excavated (kg) [H]	<u>3.1513</u>
Wet Density (kg/m ³) (H/G)	<u>2170.2</u>
Moisture Content (%)	<u>5.5%</u>
Dry Density (kg/m ³)	<u>2057.1</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date



**The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)**

Project: <u>Pacific</u>	Sample Number: <u>B 588</u>
Date Sampled: <u>8-Nov-12</u>	Material Type: <u>3a Filter</u>
Time Sampled: <u>9:24</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>CG</u>	Sample Location: <u>Borinquen Dam Test Fill 3a</u>
<u>First Layer 1 Pass Q7 Depth 20cm</u>	

Date Tested: <u>8-Nov-12</u>	Sand Cone ID: <u>1013</u>	
	Calibrated Volume: <u>0.0038396</u>	
Technician: <u>JAG</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>	

Weight of Sand & Jar, before (kg) [B]	<u>6.888</u>
Weight of Sand & Jar, after (kg) [C]	<u>2.9225</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.966</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.454</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001595</u>
Weight of Material Excavated (kg) [H]	<u>3.4342</u>
Wet Density (kg/m ³) (H/G)	<u>2152.8</u>
Moisture Content (%)	<u>6.0%</u>
Dry Density (kg/m ³)	<u>2030.9</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported Issued By 	Date
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**The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)**

Project: <u>Pacific</u>	Sample Number: <u>B 592</u>
Date Sampled: <u>8-Nov-12</u>	Material Type: <u>3a Filter</u>
Time Sampled: <u>10:11</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>CG</u>	Sample Location: <u>Borinquen Dam Test Fill 3a</u>
<u>First Layer 2 Passes Q3 Depth 15cm</u>	

Date Tested: <u>8-Nov-12</u>	Sand Cone ID: <u>3106</u>	
	Calibrated Volume: <u>0.0038396</u>	
Technician: <u>JAG</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>	

Weight of Sand & Jar, before (kg) [B]	<u>7.566</u>
Weight of Sand & Jar, after (kg) [C]	<u>3.89</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.676</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.164</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001407</u>
Weight of Material Excavated (kg) [H]	<u>3.17</u>
Wet Density (kg/m ³) (H/G)	<u>2253.0</u>
Moisture Content (%)	<u>6.4%</u>
Dry Density (kg/m ³)	<u>2117.5</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date



The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 593
Date Sampled:	8-Nov-12	Material Type:	3a Filter
Time Sampled:	10:27	Material Source:	Crushing Plant
Sampled By:	CG	Sample Location:	Borinquen Dam Test Fill 3a
First Layer 2 Passes Q2 Depth 20cm			

Date Tested:	8-Nov-12	Sand Cone ID:	848
		Calibrated Volume:	0.0038396
Technician:	JAG	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.115
Weight of Sand & Jar, after (kg) [C]	3.243
Weight of Sand Used (kg) (B-C) [D]	3.872
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.360
Volume of Hole (m ³) (F/A) [G]	0.001534
Weight of Material Excavated (kg) [H]	3.384
Wet Density (kg/m ³) (H/G)	2205.3
Moisture Content (%)	5.5%
Dry Density (kg/m ³)	2090.4
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 599
Date Sampled:	8-Nov-12	Material Type:	3a Filter
Time Sampled:	13:44	Material Source:	Crushing Plant
Sampled By:	CG	Sample Location:	Borinquen Dam Test Fill 3a
First Layer 3 Passes Q5 Surface			

Date Tested:	8-Nov-12	Sand Cone ID:	FDN
		Calibrated Volume:	0.0038396
Technician:	CG	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.333
Weight of Sand & Jar, after (kg) [C]	3.569
Weight of Sand Used (kg) (B-C) [D]	3.764
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.252
Volume of Hole (m ³) (F/A) [G]	0.001464
Weight of Material Excavated (kg) [H]	3.172
Wet Density (kg/m ³) (H/G)	2166.3
Moisture Content (%)	5.1%
Dry Density (kg/m ³)	2061.2
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported
Issued By

Date



The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)

Project:	<u>Pacific</u>	Sample Number:	<u>B 600</u>
Date Sampled:	<u>8-Nov-12</u>	Material Type:	<u>3a Filter</u>
Time Sampled:	<u>13:55</u>	Material Source:	<u>Crushing Plant</u>
Sampled By:	<u>CG</u>	Sample Location:	<u>Borinquen Dam Test Fill 3a</u>

First Layer 3 Passes Q6 Depth 20cm

Date Tested:	<u>8-Nov-12</u>	Sand Cone ID:	<u>HDP</u>
		Calibrated Volume:	<u>0.0038396</u>
Technician:	<u>CG</u>	Unit Wt. of Sand (kg/m ³)[A]:	<u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>6.808</u>
Weight of Sand & Jar, after (kg) [C]	<u>3.128</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.680</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.168</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001410</u>
Weight of Material Excavated (kg) [H]	<u>3.052</u>
Wet Density (kg/m ³) (H/G)	<u>2165.1</u>
Moisture Content (%)	<u>5.9%</u>
Dry Density (kg/m ³)	<u>2044.5</u>
Maximum Dry Density (kg/m ³)	<u></u>
Compaction (%)	<u>Specified >70%</u>

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 663 Rev2</u>
Date Sampled: <u>19-Nov-12</u>	Material Type: <u>3a Filter</u>
Time Sampled: <u>16:39</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>CG AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3a</u> <small>Depth 80cm through Second Layer into First Layer, Q7</small>

Date Tested: <u>19-Nov-12</u>	Sand Cone ID: <u>FL</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>AU</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>6.544</u>
Weight of Sand & Jar, after (kg) [C]	<u>2.798</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.746</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.234</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001453</u>
Weight of Material Excavated (kg) [H]	<u>3.152</u>
Wet Density (kg/m ³) (H/G)	<u>2170.0</u>
Moisture Content (%)	<u>6.4%</u>
Dry Density (kg/m ³)	<u>2039.5</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 664 Rev2</u>
Date Sampled: <u>19-Nov-12</u>	Material Type: <u>3a Filter</u>
Time Sampled: <u>4:45 PM</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>CG AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3a</u> <small>Depth 80cm through Second Layer into First Layer, Q2</small>

Date Tested: <u>19-Nov-12</u>	Sand Cone ID: <u>JAG</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>AU</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>7.39</u>
Weight of Sand & Jar, after (kg) [C]	<u>3.619</u>
Weight of Sand Used (kg) (B-C) [D]	<u>3.771</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.259</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001469</u>
Weight of Material Excavated (kg) [H]	<u>3.197</u>
Wet Density (kg/m ³) (H/G)	<u>2176.6</u>
Moisture Content (%)	<u>6.1%</u>
Dry Density (kg/m ³)	<u>2051.5</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	27-Sep-12	Time Sampled	10:35am
Sample Number	B 400	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter Material			Sampled By	CG JAG		
Material Source	Borinquen Dam Test Fill Before Leveling			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Borinquen Dam Test Fill 3a Layer #2				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:	Yellow means outside prescribed parameters
Gradation Analysis (ASTM C136)	
Minimum Relative Index Density (ASTM D4254)	
Maximum Relative Index Density (ASTM D4253)	

Report Issued By 

Checked By TC

Report Issue Date 22-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method



The Panama Canal Third Set of Locks Project Gradation Analysis (ASTM C136, C117)

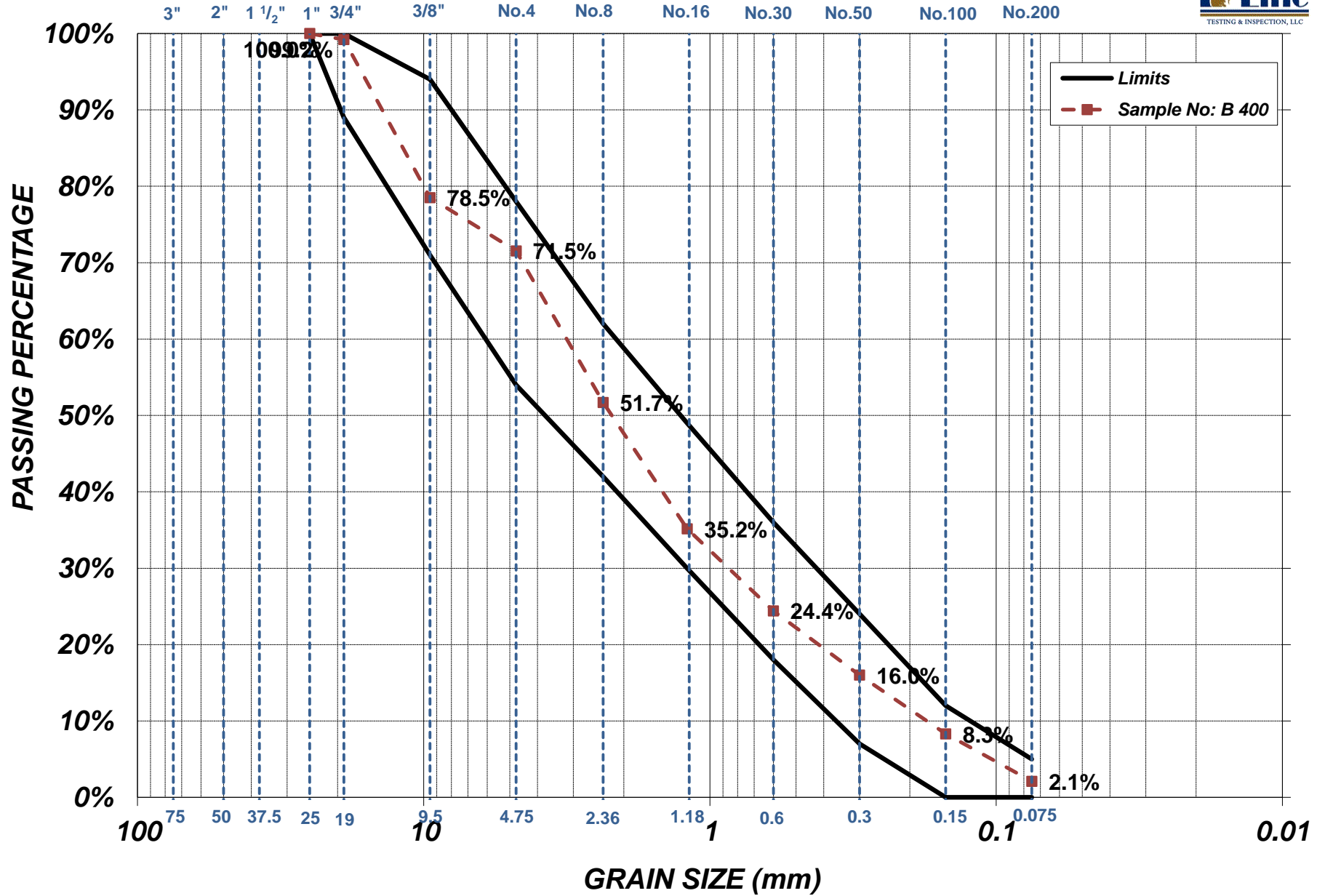
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 400	Technician:	DG
Material Type:	3a Filter	Date Sampled:	27-Sep-12

		<input type="checkbox"/> Scale Check	<input type="checkbox"/> Scale Check	
Before Wash	Wet Weight (g)	6257	Coarse Scale ID:	N/A
	Moisture (%)	5.9%	Fine Scale ID:	1130
	Total Dry Weight (g)	5908	Oven ID:	Burner
After Wash Dry Weight (g)		5795	Wash Sieve ID:	1780
Wash Loss (%)		1.9%		

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
25.0mm (1")	0			100.0%	100 to 100	1232
19mm (3/4")	47	47	0.8%	99.2%	89 to 100	9144
9.5mm (3/8")	1223	1270	21.5%	78.5%	71 to 94	1225
4.75mm (#4)	412	1682	28.5%	71.5%	54 to 78	9187
2.36mm (#8)	1172	2854	48.3%	51.7%	42 to 62	9173
1.2mm (#16)	977	3831	64.8%	35.2%	30 to 49	9159
0.6mm (#30)	635	4466	75.6%	24.4%	18 to 36	9156
0.3mm (#50)	496	4962	84.0%	16.0%	7 to 24	1925
0.15mm (#100)	455	5417	91.7%	8.3%	0 to 12	9153
0.075mm #200	367	5784	97.9%	2.1%	0 to 5	1914
	11	5795				9143

Checked By:	TC	Fineness Modulus	3.93
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Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Minimum Relative Density of Soils(ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Table ID

Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8850	8800	8800			
Mold Tare (g)	3650	3650	3650			
Weight of Material (g)	5200	5150	5150			
Volume of Mold (cm ³)	2800	2800	2800			
Minimum Relative Density (g/cm ³)	1.857	1.839	1.839			

Result Consistency



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method Dry 1A Wet 1B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8850	8800	8800			
Mold Tare (g)	3650	3650	3650			
Weight of Material (g)	5200	5150	5150			
Volume of Mold (cm ³)	2469	2471	2529			
Wet Density (g/cm ³)	N/A	N/A	N/A			
Moisture Content (%)	N/A	N/A	N/A			
Maximum Index Dry Density (g/cm ³)	2.106	2.084	2.036			

Result Consistency



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method Dry 1A Wet 1B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	9950	10250	10000			
Mold Tare (g)	3650	3650	3650			
Weight of Material (g)	6300	6600	6350			
Volume of Mold (cm ³)	2744	2907	2790			
Wet Density (g/cm ³)	2.296	2.270	2.276			
Moisture Content (%)	8.5	8.5	8.4			
Maximum Index Dry Density (g/cm ³)	2.116	2.093	2.100			

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	28-Sep-12	Time Sampled	10:30am
Sample Number	B 404	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter Material			Sampled By	CG		
Material Source	Borinquen Dam Test Fill After Leveling			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Borinquen Dam Test Fill 3a Layer #2				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:	Yellow means outside prescribed parameters
Gradation Analysis (ASTM C136)	
Minimum Relative Index Density (ASTM D4254)	
Maximum Relative Index Density (ASTM D4253)	

Report Issued By 

Checked By TC

Report Issue Date 22-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method



The Panama Canal Third Set of Locks Project Gradation Analysis (ASTM C136, C117)

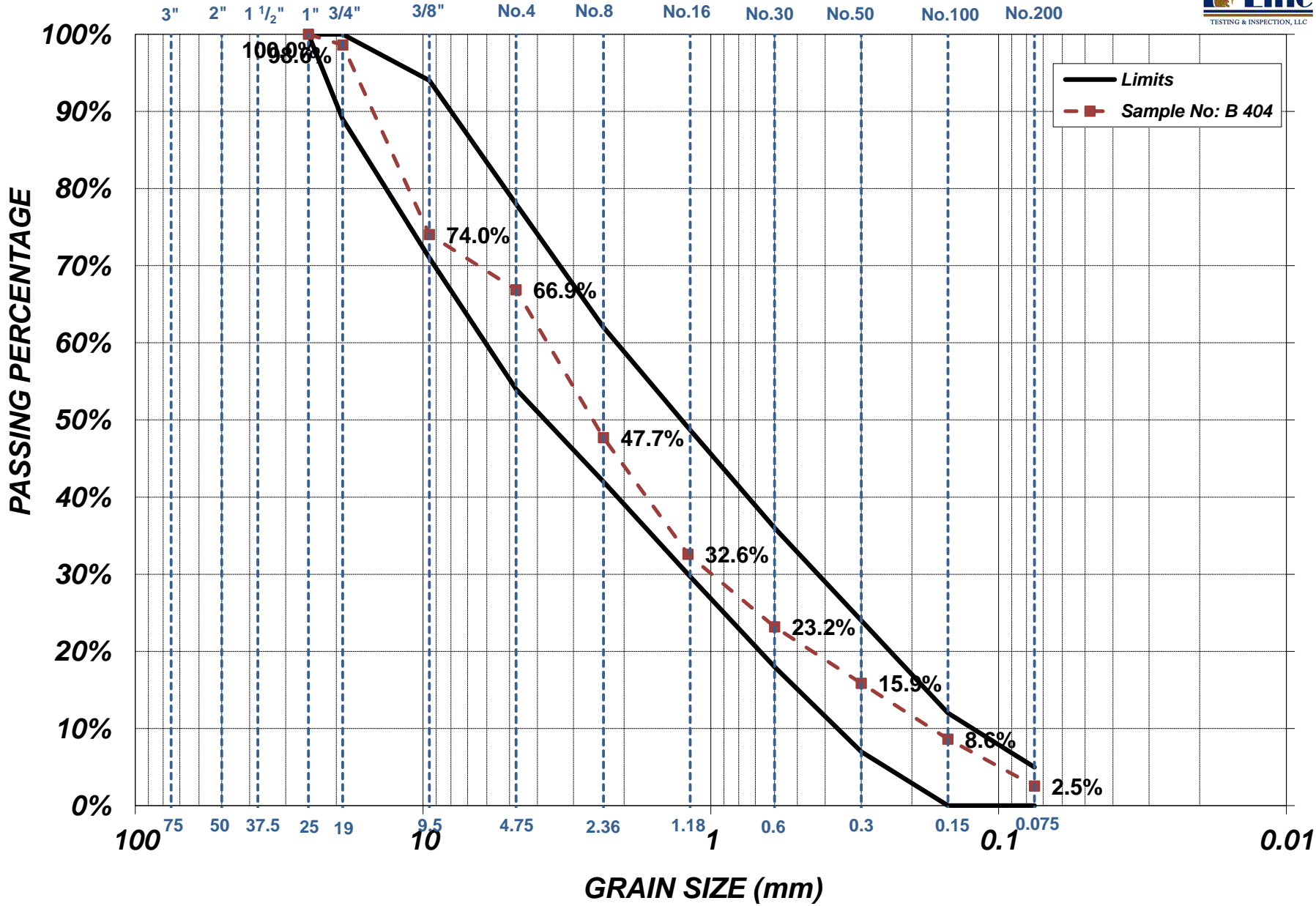
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 404	Technician:	DG
Material Type:	3a Filter	Date Sampled:	28-Sep-12

			<input type="checkbox"/> Scale Check	<input type="checkbox"/> Scale Check
Before Wash	Wet Weight (g)	6768	Coarse Scale ID:	N/A
	Moisture (%)	4.9%	Fine Scale ID:	1130
	Total Dry Weight (g)	6451	Oven ID:	Burner
After Wash Dry Weight (g)		6304	Wash Sieve ID:	1780
Wash Loss (%)		2.3%		

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
25.0mm (1")	0			100.0%	100 to 100	1232
19mm (3/4")	90	90	1.4%	98.6%	89 to 100	9144
9.5mm (3/8")	1585	1675	26.0%	74.0%	71 to 94	1225
4.75mm (#4)	462	2137	33.1%	66.9%	54 to 78	9187
2.36mm (#8)	1237	3374	52.3%	47.7%	42 to 62	9173
1.2mm (#16)	975	4349	67.4%	32.6%	30 to 49	9159
0.6mm (#30)	607	4956	76.8%	23.2%	18 to 36	9156
0.3mm (#50)	472	5428	84.1%	15.9%	7 to 24	1925
0.15mm (#100)	467	5895	91.4%	8.6%	0 to 12	9153
0.075mm #200	392	6287	97.5%	2.5%	0 to 5	1914
	17	6304				9143

Checked By:	TC		Fineness Modulus	4.05
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Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Minimum Relative Density of Soils (ASTM D4254)

Project:

Pacific

Date:

18-Jul-12

Sample ID:

B 404

Sampled By:

CG

B 404

CG

Checked By:

TC

Method

 A B C

Mold Size

0.1001 FT³0.0028m³

Origin of Material

Borinquen Dam Test Fill 3a

Soil
Classification

Mat. Filter 3a

Scale No.

1130

Table ID

1443

Mold ID

1443

 Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	9000	9000				
Mold Tare (g)	3650	3650				
Weight of Material (g)	5350	5350				
Volume of Mold (cm ³)	2800	2800.0				
Minimum Relative Density (g/cm ³)	1.911	1.911				

Result
Consistency

0.00%



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project: Date: Sample ID:

Sampled By: B 404 Checked By:

Method Dry 1A Wet 1B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	9000	9000				
Mold Tare (g)	3650	3650				
Weight of Material (g)	5350	5350				
Volume of Mold (cm ³)	2560	2560				
Wet Density (g/cm ³)	N/A	N/A				
Moisture Content (%)	N/A	N/A				
Maximum Index Dry Density (g/cm ³)	2.090	2.090				

Result Consistency



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method Dry 1A Wet 1B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	9810	9850				
Mold Tare (g)	3630	3630				
Weight of Material (g)	6180	6220				
Volume of Mold (cm ³)	2641	2641				
Wet Density (g/cm ³)	2.340	2.355				
Moisture Content (%)	10.2	10.8				
Maximum Index Dry Density (g/cm ³)	2.123	2.126				

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	29-Sep-12	Time Sampled	08:30 a.m.
Sample Number	B 412	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter Material			Sampled By	CG-JAG		
Material Source	Borinquen Dam Test Fill			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	II Capa 1 Pass				<input checked="" type="checkbox"/> Clear <input checked="" type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> <input type="checkbox"/> Rain <input type="checkbox"/> Hot <input checked="" type="checkbox"/> Calm		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)	
Minimum Relative Index Density (ASTM D4254)	
Maximum Relative Index Density (ASTM D4253)	

Report Issued By 

Checked By TC

Report Issue Date 22-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Gradation Analysis (ASTM C136, C117)

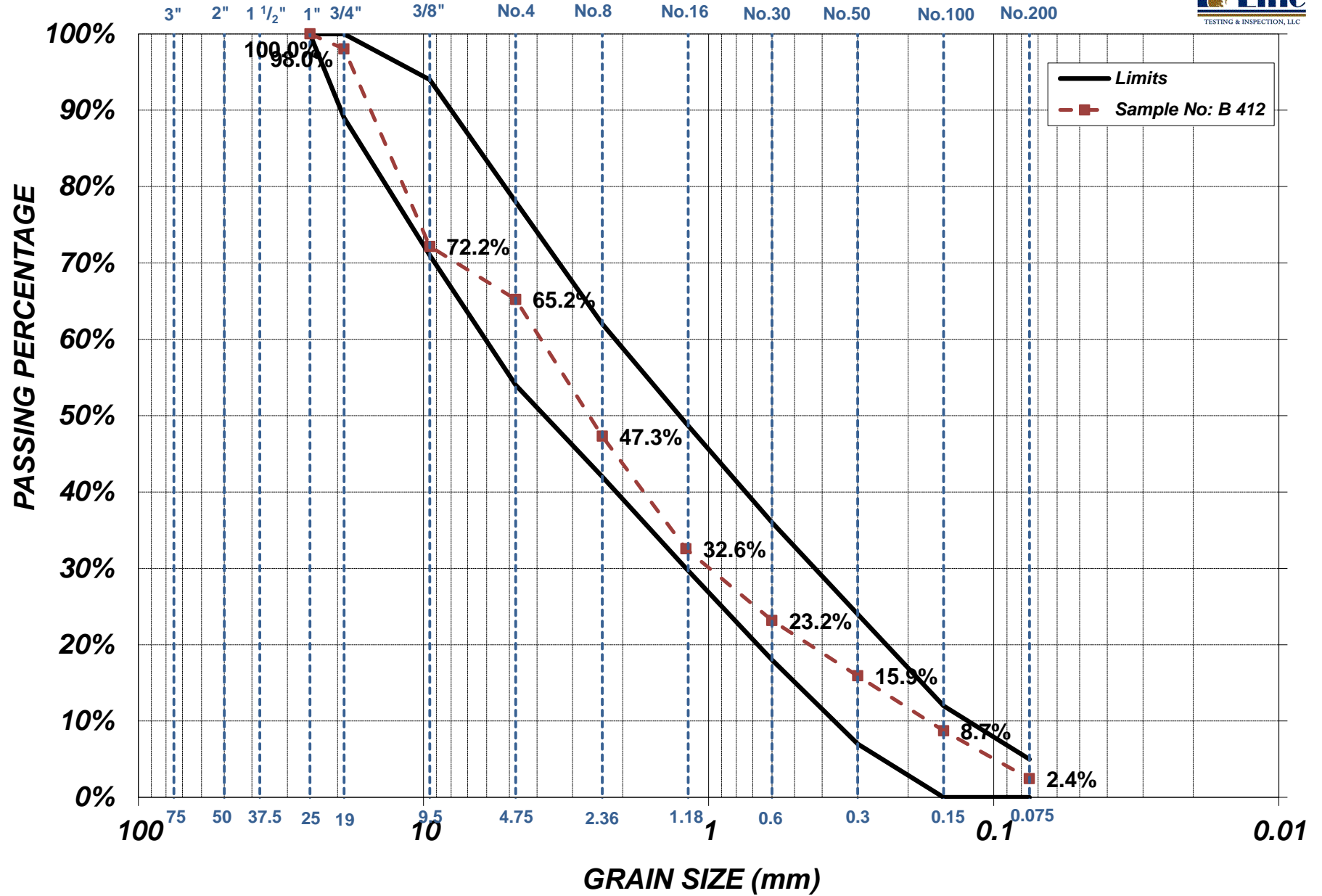
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 412	Technician:	DG
Material Type:	3a Filter	Date Sampled:	29-Sep-12

		<input type="checkbox"/> Scale Check	<input type="checkbox"/> Scale Check
Before Wash	Wet Weight (g)	8043	Coarse Scale ID: N/A
	Moisture (%)	5.4%	Fine Scale ID: 1130
	Total Dry Weight (g)	7633	Oven ID: Burner
After Wash Dry Weight (g)		7472	Wash Sieve ID: 1780
Wash Loss (%)		2.1%	

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
25.0mm (1")	0			100.0%	100 to 100	1232
19mm (3/4")	150	150	2.0%	98.0%	89 to 100	9144
9.5mm (3/8")	1975	2125	27.8%	72.2%	71 to 94	1225
4.75mm (#4)	529	2654	34.8%	65.2%	54 to 78	9187
2.36mm (#8)	1369	4023	52.7%	47.3%	42 to 62	9173
1.2mm (#16)	1125	5148	67.4%	32.6%	30 to 49	9159
0.6mm (#30)	716	5864	76.8%	23.2%	18 to 36	9156
0.3mm (#50)	554	6418	84.1%	15.9%	7 to 24	1925
0.15mm (#100)	549	6967	91.3%	8.7%	0 to 12	9153
0.075mm #200	479	7446	97.6%	2.4%	0 to 5	1914
	26	7472				9143

Checked By:	TC	Fineness Modulus	4.07
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Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Minimum Relative Density of Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: B 404 Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No. Table ID Mold ID

Scale Check

Trial	1	2	3	4	5	6
Soil + Mold (g)	8990	9120	9110			
Mold Tare (g)	3630	3630	3630			
Weight of Material (g)	5360	5490	5480			
Volume of Mold (cm ³)	2800	2800.0	2800			
Minimum Relative Density (g/cm ³)	1.914	1.961	1.957			

Result Consistency



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method Dry 1A Wet 1B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8990	9120	9110			
Mold Tare (g)	3630	3630	3630			
Weight of Material (g)	5360	5490	5480			
Volume of Mold (cm ³)	2551	2606	2577			
Wet Density (g/cm ³)	N/A	N/A	N/A			
Moisture Content (%)	N/A	N/A	N/A			
Maximum Index Dry Density (g/cm ³)	2.101	2.107	2.127			

Result Consistency



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method Dry 1A Wet 1B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	10100	10160				
Mold Tare (g)	3630	3630				
Weight of Material (g)	6470	6530				
Volume of Mold (cm ³)	2811	2791				
Wet Density (g/cm ³)	2.302	2.340				
Moisture Content (%)	8.7	9.1				
Maximum Index Dry Density (g/cm ³)	2.117	2.145				

Result Consistency

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	29-Sep-12	Time Sampled	8:43 AM
Sample Number	B 413 Rev2	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG-JAG		
Material Source	Crushing Plant - PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Borinquen Dam Test Fill 3a 2nd Layer, Q7 - 1 Pass, 20cm Depth				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
				<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		
Special Instructions are Acknowledged and Understood by Tech						Initial	N/A
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By RJMh

Report Issue Date 02-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	29-Sep-12
Sample No:	B 413 Rev2	Elevation:	Layer 2	Time:	8:43 AM
Sand Cone ID:	KK	Calibrated Volume:		Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.1	
C	Wt. Of Soil Excavated (kg)	3512.50	
D	Initial Wt. Of Sand & Jar (kg)	8211.30	
E	Wt. Of Residue & Jar (kg)	4147	
F	Wt. Of Sand Used (kg) D - E	4.06	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.55	
I	Volume of Hole (m ³) H / B	0.001659	
	Wet Density (kg/m ³) C / I	2117.24	
	Wet Weight of Soil (g)		447.9
	Dry Weight of Soil (g)		426.5
	% Moisture		5
	Dry Density (kg/m ³)	2016.42	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2048*	
T	Compaction (%)	86.6	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	29-Sep-12	Time Sampled	8:50 AM
Sample Number	B 414	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG-JAG		
Material Source	Crushing Plant - PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Borinquen Dam Test Fill 3a 2nd Layer, Q2 - 1 Pass, 20cm Depth				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
				<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		
Special Instructions are Acknowledged and Understood by Tech						Initial	N/A
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed: Yellow means outside prescribed parameters

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By RJMh

Report Issue Date 03-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	29-Sep-12
Sample No:	B 414	Elevation:	Layer 2	Time:	8:50 AM
Sand Cone ID:	1013	Calibrated Volume:		Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.1	
C	Wt. Of Soil Excavated (kg)	2957.60	
D	Initial Wt. Of Sand & Jar (kg)	7002.90	
E	Wt. Of Residue & Jar (kg)	3449.5	
F	Wt. Of Sand Used (kg) D - E	3.55	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.04	
I	Volume of Hole (m ³) H / B	0.001327	
	Wet Density (kg/m ³) C / I	2228.79	
	Wet Weight of Soil (g)		432.6
	Dry Weight of Soil (g)		407.7
	% Moisture		6.1
	Dry Density (kg/m ³)	2100.65	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2048*	
T	Compaction (%)	121.5	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	29-Sep-12	Time Sampled	9:14 AM
Sample Number	B 415	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG-JAG		
Material Source	Crushing Plant - PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Borinquen Dam Test Fill 3a 2nd Layer, Q4&6 - 1 Pass, Surface				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
				<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		
Special Instructions are Acknowledged and Understood by Tech						Initial	N/A
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed: Yellow means outside prescribed parameters

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By RJMh

Report Issue Date 03-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	29-Sep-12
Sample No:	B 415	Elevation:	Layer 2	Time:	9:14 AM
Sand Cone ID:	3124	Calibrated Volume:		Technician:	JAG

Crushing Plant - PAC

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3473.10	
D	Initial Wt. Of Sand & Jar (kg)	8170.00	
E	Wt. Of Residue & Jar (kg)	4116.1	
F	Wt. Of Sand Used (kg) D - E	4.05	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.54	
I	Volume of Hole (m ³) H / B	0.001653	
	Wet Density (kg/m ³) C / I	2101.09	
	Wet Weight of Soil (g)		465.5
	Dry Weight of Soil (g)		439.8
	% Moisture		5.8
	Dry Density (kg/m ³)	1985.91	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2048*	
T	Compaction (%)	73.2	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	01-Oct-12	Time Sampled	9:41 AM
Sample Number	B 416	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG-AU		
Material Source	Crushing Plant - PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Borinquen Dam Test Fill 3a 2nd Layer, Q4&6 - 2 Passes, Surface				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
				<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		
Special Instructions are Acknowledged and Understood by Tech						Initial	N/A
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed: Yellow means outside prescribed parameters

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By RJMh

Report Issue Date 03-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	1-Oct-12
Sample No:	B 416	Elevation:	Layer 2	Time:	9:41 AM
Sand Cone ID:	HDP	Calibrated Volume:		Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.1	
C	Wt. Of Soil Excavated (kg)	2.88	
D	Initial Wt. Of Sand & Jar (kg)	7287.60	
E	Wt. Of Residue & Jar (kg)	3.739.3	
F	Wt. Of Sand Used (kg) D - E	3.55	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.04	
I	Volume of Hole (m ³) H / B	0.001324	
	Wet Density (kg/m ³) C / I	2173.72	
	Wet Weight of Soil (g)		683.4
	Dry Weight of Soil (g)		652.2
	% Moisture		4.8
	Dry Density (kg/m ³)	2074.16	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2048*	
T	Compaction (%)	110.8	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	01-Oct-12	Time Sampled	10:00 AM
Sample Number	B 417	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG-AU		
Material Source	Crushing Plant - PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Borinquen Dam Test Fill 3a 2nd Layer, Q3 - 2 Passes, 20cm Depth				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
Issued By	N/A	Date Issued	N/A	<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		
				Special Instructions are Acknowledged and Understood by Tech	Initial		N/A

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed: Yellow means outside prescribed parameters

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By RJMh

Report Issue Date 03-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	1-Oct-12
Sample No:	B 417	Elevation:	Layer 2	Time:	10:00 AM
Sand Cone ID:	3259	Calibrated Volume:		Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	2.76	
D	Initial Wt. Of Sand & Jar (kg)	7114.70	
E	Wt. Of Residue & Jar (kg)	3.515.4	
F	Wt. Of Sand Used (kg) D - E	3.60	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.09	
I	Volume of Hole (m ³) H / B	0.001357	
	Wet Density (kg/m ³) C / I	2037.44	
	Wet Weight of Soil (g)		719.1
	Dry Weight of Soil (g)		680.4
	% Moisture		5.7
	Dry Density (kg/m ³)	1927.56	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2048*	
T	Compaction (%)	46.5	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	01-Oct-12	Time Sampled	10:23 AM
Sample Number	B 418	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG-AU		
Material Source	Crushing Plant - PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Borinquen Dam Test Fill 3a 2nd Layer, Q1 - 2 Passes, 20cm Depth				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
				<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		
Special Instructions are Acknowledged and Understood by Tech						Initial	N/A
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By RJMh

Report Issue Date 03-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	1-Oct-12
Sample No:	B 418	Elevation:	Layer 2	Time:	10:23 AM
Sand Cone ID:	848	Calibrated Volume:		Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538.1	
C	Wt. Of Soil Excavated (kg)	2.99	
D	Initial Wt. Of Sand & Jar (kg)	7151.90	
E	Wt. Of Residue & Jar (kg)	3.331.9	
F	Wt. Of Sand Used (kg) D - E	3.82	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.31	
I	Volume of Hole (m ³) H / B	0.001501	
	Wet Density (kg/m ³) C / I	1992.01	
	Wet Weight of Soil (g)		752.5
	Dry Weight of Soil (g)		710.3
	% Moisture		5.9
	Dry Density (kg/m ³)	1881.03	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2048*	
T	Compaction (%)	23.9	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name Project Number Date Sampled Time Sampled

Sample Number Material Type Date Tested Time Tested

Material Description Sampled By

Material Source Remarks & Weather Conditions (SAMPLING) Clear Cool Windy
 Overcast Warm
 Rain Hot Calm

Pick One from Each Column

Sample Location

Special Instructions Special Instructions are Acknowledged and Understood by Tech Initial

Issued By Date Issued

Are there any visual abnormalities in the sample? Yes No If yes who received the client instructions regarding handing the sample? Initial

Client instructions regarding abnormal sample

Follow up Actions as Directed by GUPC:

Tests to be performed: Yellow means outside prescribed parameters

<input type="text" value="Percolation Test (EM1110-2-2301)"/>	<input type="text"/>
<input type="text" value="Moisture Content (ASTM C566, D2216)"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

Report Issued By

Checked By Report Issue Date

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Percolation Test EM 1110-2-2301 - Open Trench Method 11-4

Project Name	Pacific	Project Number	F100013P	Date Tested	25-Sep-12
Technician	CG	B - 419_Rev2	3a Filter Material	Elevation	2 Layers
Location	Test Fill, 2nd Layer 2nd Pass- 3a Filter Material (Borinquen Dams)				

Material:

Specific Gravity	2.2	Absorption (%)	2.3	Moisture Before Test (%)	6.2
Density of Material (kg/m ³)	2752.0	Water Temp (°C)	N/A	Moisture After Test (%)	11.2

Test:

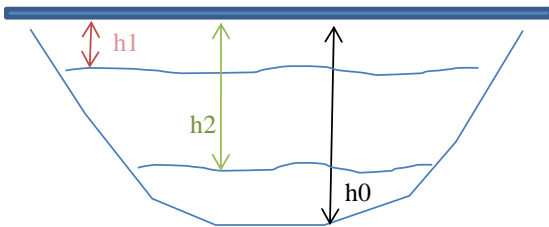
Time - t(s)	Height h (cm)	Δ h (cm)	Time - t(s)	Height h (cm)	Δ h (cm)
15	18.0		270	25.2	
30	18.5		285	25.8	
45	19.0		300	26.0	
60	19.7		315	26.3	
75	20.4		330	26.5	
90	20.5		345	27.0	
105	21.0		360	27.3	
120	21.5		885	41.0	
135	21.8				
150	22.3				
165	22.5				
180	23.3				
195	23.5				
210	23.8				
225	24.0				
240	24.7				
255	24.9				

Pit Depth(cm) [h0] 41

Total Time Elapsed (s) 360

Initial Height of Water(cm) [h1] 18

Final Height of Water(cm) [h2] 41



Coefficient of Hydraulic Conductivity [K] 2.39E-02 cm/s

Comments: Coefficient of Hydraulic Conductivity calculated for time range from 0 to 360 seconds

No specified acceptance criteria for Coefficient of Hydraulic Conductivity on 3a Transition material



The Panama Canal Third Set of Locks Project

Moisture Contents (ASTM C566 and D2216)

Project Name	Pacific	Sample No	B-419	Technician	CG-AU-AS
Material Type	B - 419_Rev2	Date Tested	01-Oct-12	Checked By	RJMH

Location: Before of the test

Wt. of Wet Sample (g) [A]	828.7	Scale ID	1453	<input checked="" type="checkbox"/> Scale Check
Wt. Of Dry Sample (g) [B]	780.2	Oven ID	Burner	
Moisture Content (%)	6.2			

= $([A]-[B])/[B] * 100$

Location: After of test

Wt. of Wet Sample (g) [A]	917.6	Scale ID	1453	<input type="checkbox"/> Scale Check
Wt. Of Dry Sample (g) [B]	825.0	Oven ID	Burner	
Moisture Content (%)	11.2			

= $([A]-[B])/[B] * 100$

Wt. of Wet Sample (g) [A]		Scale ID		<input type="checkbox"/> Scale Check
Wt. Of Dry Sample (g) [B]		Oven ID		
Moisture Content (%)				

= $([A]-[B])/[B] * 100$

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013P	Date Sampled	01-Oct-12	Time Sampled	10:30 AM
Sample Number	B 420	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG		
Material Source	Crushing Plant, PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Test Fill - Borinquen Dam 2nd Layer, 2 passes				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm
Issued By	N/A	Date Issued	N/A		<input type="checkbox"/> Rain	<input type="checkbox"/> Hot	

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample: N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:	Yellow means outside prescribed parameters
Gradation Analysis (ASTM C136)	

Report Issued By: 

Checked By: RJMh

Report Issue Date: 10-Sep-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project Gradation Analysis (ASTM C136, C117)

Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 420	Technician:	JAG
Material Type:	Filter 3a	Date Sampled:	01-Oct-12

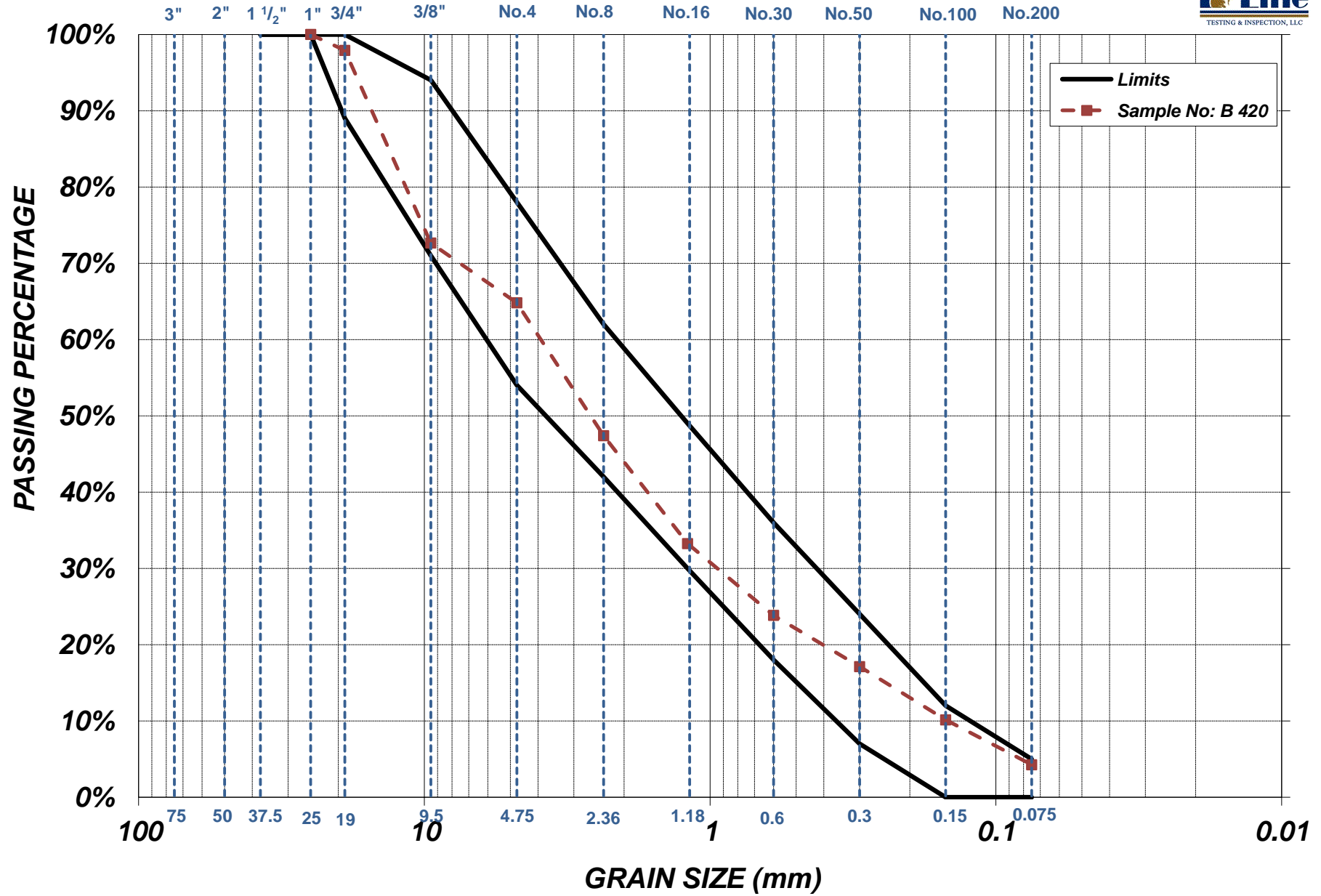
Scale Check Scale Check

Before Wash	Wet Weight (g)	8073.4	Coarse Scale ID:	N/A
	Moisture (%)	5.2%	Fine Scale ID:	1130
	Total Dry Weight (g)	7677.5	Oven ID:	Burner
After Wash Dry Weight (g)		7380	Wash Sieve ID:	1780
Wash Loss (%)		3.9%		

Sieve Size	Individual Weight (g)	Cumulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
25.0mm (1")	0			100.0%	100 to 100	9180
19mm (3/4")	160.8	160.8	2.1%	97.9%	90 to 100	9182
9.5mm (3/8")	1938.9	2099.7	27.3%	72.7%	70 to 94	9185
4.75mm (#4)	601.5	2701.2	35.2%	64.8%	55 to 80	9130
2.36mm (#8)	1338.1	4039.3	52.6%	47.4%	40 to 60	9189
1.2mm (#16)	1086.0	5125.3	66.8%	33.2%	30 to 50	9133
0.6mm (#30)	722.3	5847.6	76.2%	23.8%	18 to 35	9129
0.3mm (#50)	516.0	6363.6	82.9%	17.1%	7 to 25	9152
0.15mm (#100)	536.1	6899.7	89.9%	10.1%	0 to 12	9195
0.075mm #200	451.6	7351.3	95.8%	4.2%	0 to 5	1912
	28.7	7380				9171

Checked By:	RJMh	Fineness Modulus	4.03
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Filter Material Type 3a Gradation



The Panama Canal

Third Set of Locks Project

Sampling Sheet

Project Name Project Number Date Sampled Time Sampled

Sample Number Material Type Date Tested Time Tested

Material Description Sampled By

Material Source Remarks & Weather Conditions (SAMPLING) Clear Cool Windy
 Overcast Warm
 Rain Hot Calm

Sample Location

Special Instructions Special Instructions are Acknowledged and Understood by Tech Initial

Issued By Date Issued

Are there any visual abnormalities in the sample? Yes No If yes who received the client instructions regarding handing the sample? Initial

Client instructions regarding abnormal sample

Follow up Actions as Directed by GUPC:

Tests to be performed:

Yellow means outside prescribed parameters

<input type="text" value="Percolation Test (EM1110-2-2301)"/>	<input type="text"/>
<input type="text" value="Moisture Content (ASTM C566, D2216)"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

Report Issued By

Checked By

Report Issue Date

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Fall Line Testing Inspection Panama S. de R.L.

The Panama Canal Third Set of Locks Project

Percolation Test EM 1110-2-2301 - Open Trench Method 11-4

Project Name	Pacific	Project Number	F100013P	Date Tested	2-Oct-12
Technician	CG	Material Type	3a	Elevation	2nd Layer
Location	Test Fill, 2nd Layer - 3a Filter Material (Borinquen Dams)				

Material:

Specific Gravity	2.75	2nd layer - 2 pass	2.3	Moisture Before Test (%)	6.9
Density of Material (kg/m ³)	N/A	Water Temp (°C)	N/A	Moisture After Test (%)	11.4

Test:

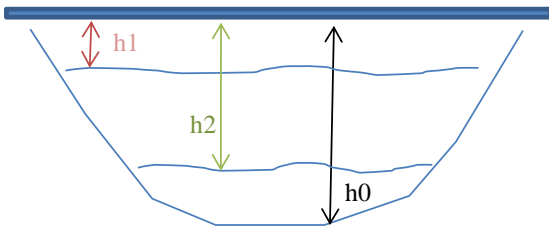
Time - t(s)	Height h (cm)	Δ h (cm)	Time - t(s)	Height h (cm)	Δ h (cm)
15	26.0		270	30.7	
30	26.0		285	31.0	
45	26.5		300	31.2	
60	27.0		315	31.3	
75	27.3		330	31.5	
90	27.5		345	31.8	
105	28.0		360	32.0	
120	28.3		840	40.0	
135	28.5				
150	28.7				
165	29.0				
180	29.2				
195	29.5				
210	29.7				
225	30.0				
240	30.3				
255	30.5				

Pit Depth(cm) [h0]

Total Time Elapsed (s)

Initial Height of Water(cm) [h1]

Final Height of Water(cm) [h2]



Coefficient of Hydraulic Conductivity [K]

Comments: Coefficient of Hydraulic Conductivity calculated for time range from 0 to 360 seconds

No specified acceptance criteria for Coefficient of Hydraulic Conductivity on 3a Transition material

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013P	Date Sampled	01-Oct-12	Time Sampled	2:00 PM
Sample Number	B - 421_Rev4	Material Type	3a	Date Tested	01-Oct-12	Time Tested	7:00 PM
Material Description	Filter Material		Sampled By	AU - CG - AS			
Material Source	Borinquen Dams		Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column			
Sample Location	Test Fill			<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy	<input type="checkbox"/> Overcast
Special Instructions	Use new (uncalibrated) plate load equipment, considering it has been verified		Special Instructions are Acknowledged and Understood by Tech	<input type="checkbox"/> Rain	<input type="checkbox"/> Hot	<input type="checkbox"/> Calm	Initial N/A
Issued By	Henar Bravo	Date Issued	1-Oct-2012				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample: N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Plate Test (ASTM D1194)	

Report Issued By: 

Checked By: RJM

Report Issue Date: 10-Dec-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

Fall Line Testing Inspection Panama S. de R.L.



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE TEST
ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality
 LOCATION: Test Fill Material 3a
 LAYER/CYCLE: B - 421_Rev4 LAYER THICKNESS: - DESCRIPTION: 3a (Filter Material)
 DATE: 1-Oct-12 INITIAL HOUR: 02:45:00 am FINAL HOUR: -

Plate Diameter 0.45 m
 AREA 0.159043 m² SHEET: 1 OF 4
 Jack Weight 34.2 kg
 Plate Weight 1 25.8 kg COMBINED WEIGHT OF PLATE AND JACK PRESSURE 60 kg
 Plate Weight 2 Not used kg EFFORT BY PLATE AND JACK LOAD 0.0036996 MPa
 Plate Weight 3 Not used kg EFFECTIVE AREA OF JACK PRESSURE 0.00332 m²

TIME	VALUES ON PLATE	MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	Ground Stress	PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa	Bar	tonne-force						
0				46	51	72	56		
3	0.05	22	0.7	46	51	72	56	58	0.01
6				47	52	72	57		
9				47	52	72	57		
12				48	52	73	58		
15				48	52	73	58		
0	0.09	44	1.5	142	150	161	151	162	1.05
3				142	156	162	153		
6				149	156	172	159		
9				151	159	173	161		
12				151	159	173	161		
15	152	159	174	162					
0	0.18	88	3.0	239	259	264	254	275	2.19
3				259	270	273	267		
6				266	278	277	274		
9				268	278	279	275		
12				268	278	280	275		
15	268	278	280	275					
0	0.28	132	4.5	351	370	355	359	382	3.26
3				376	397	375	383		
6				373	397	374	381		
9				372	399	374	382		
12				373	399	374	382		
15	373	399	374	382					
0	0.37	176	6.0	425	468	420	438	465	4.09
3				445	488	435	456		
6				446	499	443	463		
9				455	499	443	466		
12				461	501	448	470		
15	443	502	450	465					

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:

Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE TEST
ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality
 LOCATION: Test Fill Material 3a
 LAYER/CYCL B - 421_Rev4 LAYER THICKNESS: - DESCRIPTION: 3a (Filter Material)
 DATE: 1-Oct-12 START TIME: - FINISH TIME: 04:45 p.m.

Plate Diameter 0.45 m
 AREA 0.159043 m²
 Jack Weight 34.2 kg
 Plate Weight 1 25.8 kg
 Plate Weight 2 Not used kg
 Plate Weight 3 Not used kg

SHEET: 2 OF 4

COMBINED WEIGHT OF PLATE AND JACK PRESSURE 60 kg
 EFFORT BY PLATE AND JACK LOAD 0 MPa
 EFFECTIVE AREA OF JACK PRESSURE 0.00332 m²

TIME	VALUES ON PLATE		MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE		PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa		Bar	ton						
0	0.23	110	3.7	438	482	422	447	453	3.97	
3				442	483	431	452			
6				442	483	431	452			
9				443	484	432	453			
12				443	484	432	453			
15				443	484	432	453			
0	0.11	55	1.9	443	484	424	450	450	3.94	
3				442	484	426	451			
6				442	484	426	451			
9				442	484	426	451			
12				442	484	426	451			
15				441	484	426	450			
0	0.00	0	0.0	318	320	382	340	334	2.77	
3				318	327	362	336			
6				318	327	356	334			
9				318	327	356	334			
12				318	328	356	334			
15				317	328	356	334			

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:
Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE TEST
ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality
 LOCATION: Test Fill Material 3a
 LAYER/CYCL B - 421_Rev4 LAYER THICKNESS: - DESCRIPTION: 3a (Filter Material)
 DATE: 1-Oct-12 INITIAL HOUR: 05:00 pm FINAL HOUR: -

Plate Diameter	<u>0.45 m</u>	SHEET:	<u>3</u> OF <u>4</u>
AREA	<u>0.159043 m²</u>	COMBINED WEIGHT OF PLATE AND JACK PRESSURE	<u>60 kg</u>
Jack Weight	<u>34.2 kg</u>	EFFORT BY PLATE AND JACK LOAD	<u>0.0037 MPa</u>
Plate Weight 1	<u>25.8 kg</u>	EFFECTIVE AREA OF JACK PRESSURE	<u>0.00332 m²</u>
Plate Weight 2	<u>Not used kg</u>		
Plate Weight 3	<u>Not used kg</u>		

TIME	VALUES ON PLATE		MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE		PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa		Bar	ton						
0					13	16	27	19		
3					14	16	29	20		
6	0.05	22	0.7		16	16	32	21	21	2.80
9					16	16	32	21		
12					16	16	32	21		
15					16	16	32	21		
15					16	16	32	21		
0					34	45	60	46		
3	0.09	44	1.5		45	52	65	54	54	3.13
6					45	52	65	54		
9					45	525	65	212		
12					45	52	65	54		
15					45	52	65	54		
15					45	52	65	54		
0					70	79	90	80		
3	0.18	88	3.0		78	87	99	88	92	3.51
6					82	92	103	92		
9					82	92	103	92		
12					82	92	103	92		
15					82	92	103	92		
15					82	92	103	92		
0					100	112	123	112		
3	0.28	132	4.5		104	116	124	115	116	3.74
6					105	118	124	116		
9					105	118	124	116		
12					105	118	124	116		
15					105	118	124	116		
15					105	118	124	116		
0					130	149	177	152		
3	0.37	176	6.0		146	167	160	158	157	4.16
6					146	167	160	158		
9					146	166	160	157		
12					146	166	159	157		
15					146	166	159	157		
15					146	166	159	157		

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

Remarks:
Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT
 PLATE TEST
 ASTM D-1194

PROJECT No. F-100013 TEST REQUESTED BY: Department of Quality
 LOCATION: Test Fill Material 3a
 LAYER/CYCL B - 421_Rev4 LAYER THICKNESS: - DESCRIPTION: 3a (Filter Material)
 DATE: 1-Oct-12 START TIME: - FINISH TIME: 07:00 p.m.

Plate Diameter 0.45 m
 AREA 0.159043 m² SHEET: 4 OF 4
 Jack Weight 34.2 kg
 Plate Weight 1 25.8 kg COMBINED WEIGHT OF PLATE AND JACK PRESSURE 60 kg
 Plate Weight 2 Not used kg EFFORT BY PLATE AND JACK LOAD 0 MPa
 Plate Weight 3 Not used kg EFFECTIVE AREA OF JACK PRESSURE 0.00332 m²

TIME	VALUES ON PLATE		MANOMETER VALUES		DEFLECTION READINGS			Average Deflection	15 min Average	Deflection (mm)
	PRESSURE		PRESSURE	REAL LOAD	Dial Gauges 1	Dial Gauges 2	Dial Gauges 3			
min	MPa		Bar	ton						
0	0.23	110	3.7	146	166	159	157	157	4.16	
3				146	166	159	157			
6				146	166	159	157			
9				146	166	159	157			
12				146	166	159	157			
15				146	166	159	157			
0	0.11	55	1.9	146	166	159	157	150	4.09	
3				144	166	146	152			
6				143	166	143	151			
9				142	166	143	150			
12				142	166	142	150			
15				142	166	142	150			
0	0.00	0	0.0	84	102	70	85	76	2.77	
3				83	102	69	85			
6				81	102	68	84			
9				81	102	68	84			
12				81	92	63	79			
15				73	92	63	76			

CONVERSION FACTORS
 1Bar=100kPa=0.1MPa; 1MPa=10.1972kg/cm²

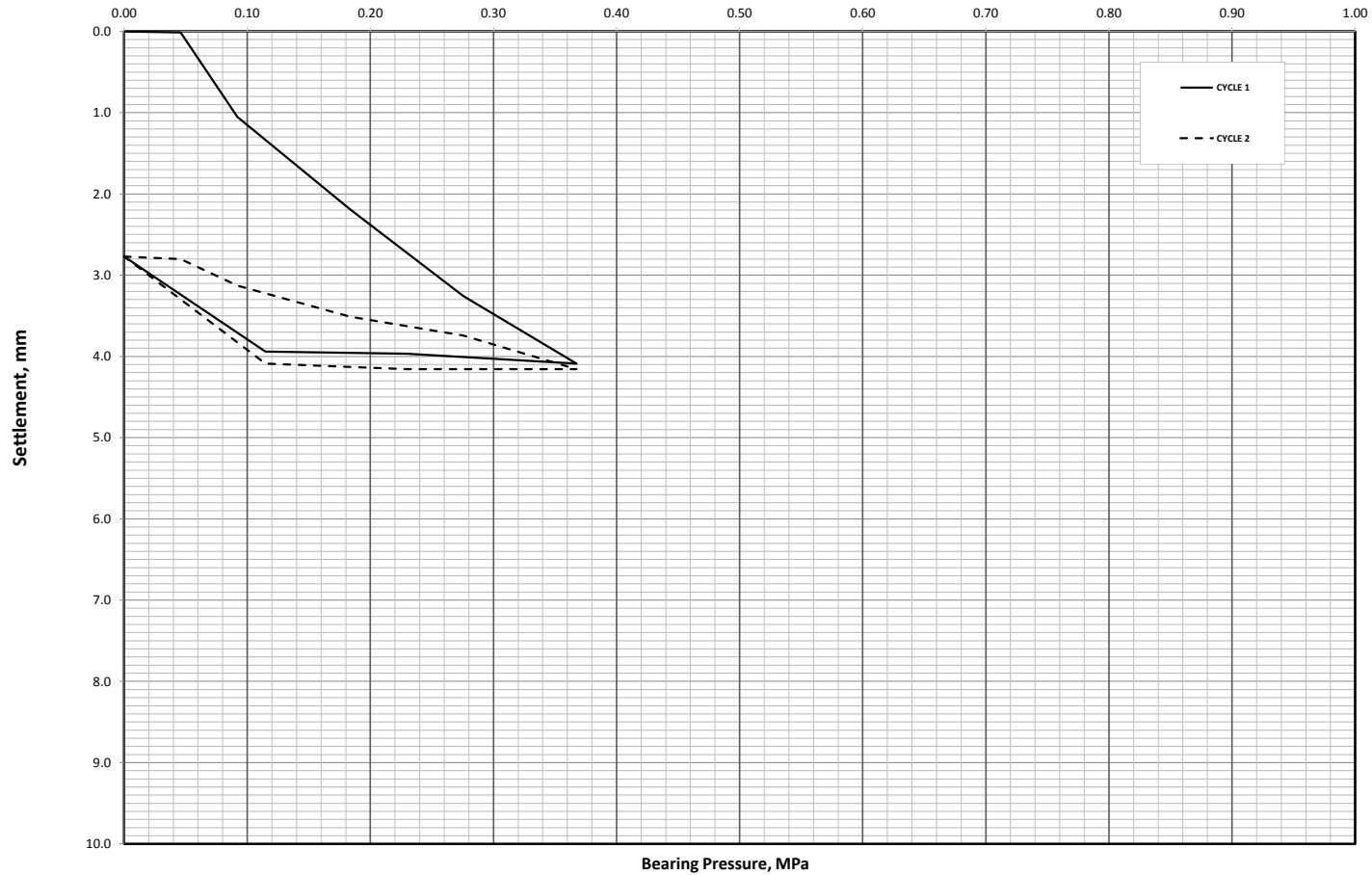
Remarks:
Jack and Ram are not calibrated, they have been verified using a calibrated compression machine at PAC lab



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT
PLATE BEARING TEST

ASTM D 1194

Laboratory	PACIFIC		
Sample no. B-421_Rev4	Sample By CG - AU - AS	Date sampled	1-Oct-12
Location	Test Fill - Filter Material - Borinquen Dams	Date tested	2-Oct-12
Material	3a	Test method	ASTM D 1194



SETTLEMENT VS BEARING CAPACITY

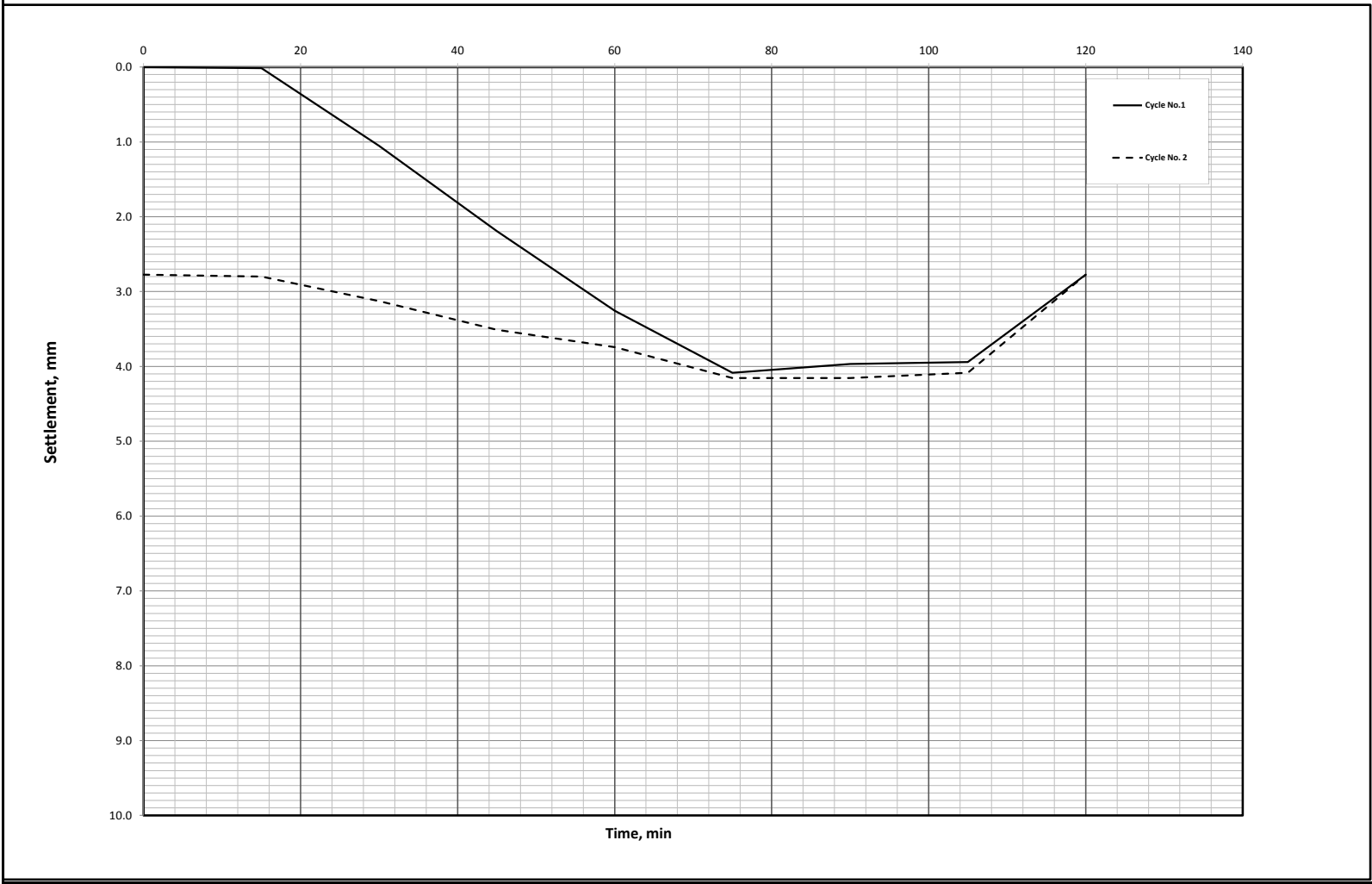
		CYCLE 1			CYCLE 2			
		BAR	mm	MPa	BAR	mm	mm	MPa
LOAD		0	0	0.00	0	2.77	2.77	0.00
		22	0.01	0.05	22	0.03	2.80	0.05
		44	1.05	0.09	44	0.35	3.13	0.09
		88	2.19	0.18	88	0.74	3.51	0.18
		132	3.26	0.28	132	0.97	3.74	0.28
		176	4.09	0.37	176	1.38	4.16	0.37
		110	3.97	0.23	110	1.38	4.16	0.23
		55	3.94	0.11	55	1.31	4.09	0.11
		0	2.77	0.00	0	0.00	2.77	0.00
UNLOAD								



THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT
PLATE BEARING TEST

ASTM D 1194

Laboratory	PACIFIC		
Sample no.	B-421_Rev4	Sample By	CG - AU - AS
Date sampled	1-Oct-12		
Location	Test Fill - Filter Material - Borinquen Dams		Date tested
Material	3a		2-Oct-12
Test method	ASTM D 1194		



TIME VS SETTLEMENT

		CYCLE 1			CYCLE 2				Time (min)	
		BAR	mm	MPa	BAR	mm	mm	MPa	1st cycle	2nd Cycle
LOAD		0	0	0.00	0	2.77	2.77	0.00		0.00
		22	0.01	0.05	22	0.03	2.80	0.05		15.00
		44	1.05	0.09	44	0.35	3.13	0.09		30.00
		88	2.19	0.18	88	0.74	3.51	0.18		45.00
		132	3.26	0.28	132	0.97	3.74	0.28		60.00
		176	4.09	0.37	176	1.38	4.16	0.37		75.00
		110	3.97	0.23	110	1.38	4.16	0.23		90.00
		55	3.94	0.11	55	1.31	4.09	0.11		105.00
		0	2.77	0.00	0	0.00	2.77	0.00		120.00
UNLOAD										

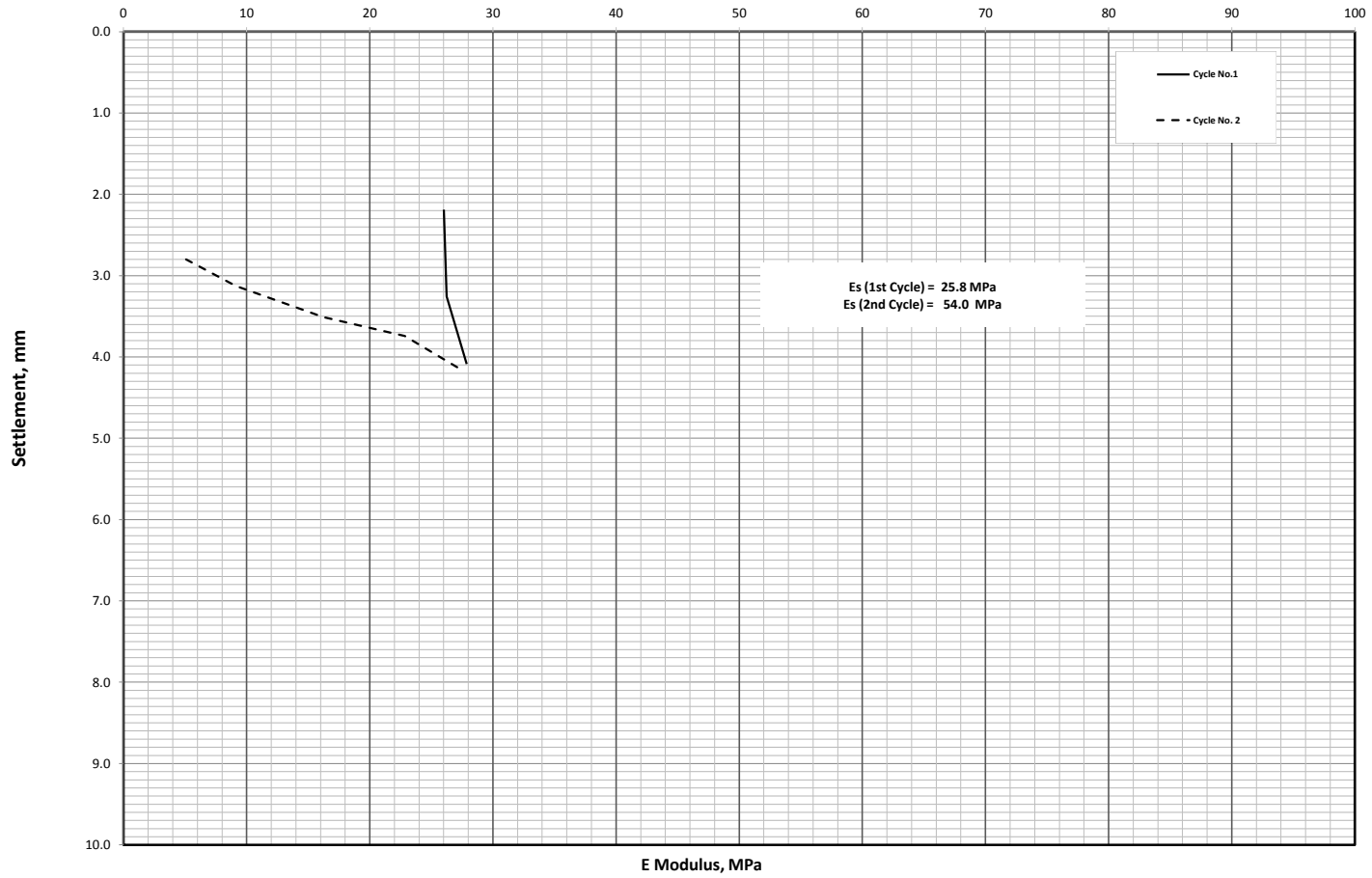


THE PANAMA CANAL - THIRD SET OF LOCKS PROJECT

PLATE BEARING TEST

ASTM D 1194

Laboratory		PACIFIC	
Sample no. B-421_Rev4	Sample By	CG - AU - AS	Date sampled
Location		Test Fill - Filter Material - Borinquen Dams	Date tested
Material	3a	Test method	ASTM D 1194



The Panama Canal Third Set of Locks Project

PLATE BEARING TESTS

Date Sampled

Sample Number	B - 421_Rev4	Sample Location	Test Fill - Filter Material - Borinquen Dams	Date Sampled	1-Oct-12
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Location/Layer	Poissons Ratio ν	Plate Dia. b	Max Stress q	Settlement s	Secant Mod of Sub-Grade Reaction	Mod of Sub-Grade Reaction Full Size (30inch) k_s	$E=qB\pi(1-\nu^2)/4s$	$q_{ult} = k_s/40$	Settlement /dia.
		m	MPa	mm	MN/m ³	MN/m ³	MPa	kPa	%
Cell 1 - 1st Cycle	0.35	0.45	46	0.01	3,444	2,039	1,068	50985	0.00%
	0.35	0.45	92	1.05	87	52	27	1291	0.23%
	0.35	0.45	184	2.19	84	50	26	1242	0.49%
	0.35	0.45	276	3.26	85	50	26	1252	0.72%
	0.35	0.45	367	4.09	90	53	28	1331	0.91%
Cell 1 - 2nd Cycle	0.35	0.45	46	2.80	16	10	5	243	0.62%
	0.35	0.45	92	3.13	29	17	9	435	0.69%
	0.35	0.45	184	3.51	52	31	16	775	0.78%
	0.35	0.45	276	3.74	74	44	23	1090	0.83%
	0.35	0.45	367	4.16	88	52	27	1308	0.92%

Cycle	k'_u (MPa/mm)	k_u (MPa/mm)	Es (MPa)
1	0.097	0.083	25.8
2	0.268	0.174	54.0
Average	0.182	0.129	39.9

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	25-Sep-12	Time Sampled	11:50 AM
Sample Number	B 381 Rev2	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG		
Material Source	Crushing Plant - PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Test Fill Layer 1 - Before Leveling				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No If yes who received the client instructions regarding handing the sample? Initial
N/A


Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)	
Maximum Index Density of Soils (ASTM D4253)	
Minimum Index Density for Soils (ASTM D4254)	
Moisture Content (ASTM C566, D2216)	

Report Issued By 

Checked By RJMh

Report Issue Date 03-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method



The Panama Canal Third Set of Locks Project Gradation Analysis (ASTM C136, C117)

Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B - 381	Technician:	DG-MF
Material Type:	3a Filter	Date Sampled:	25-Sep-12

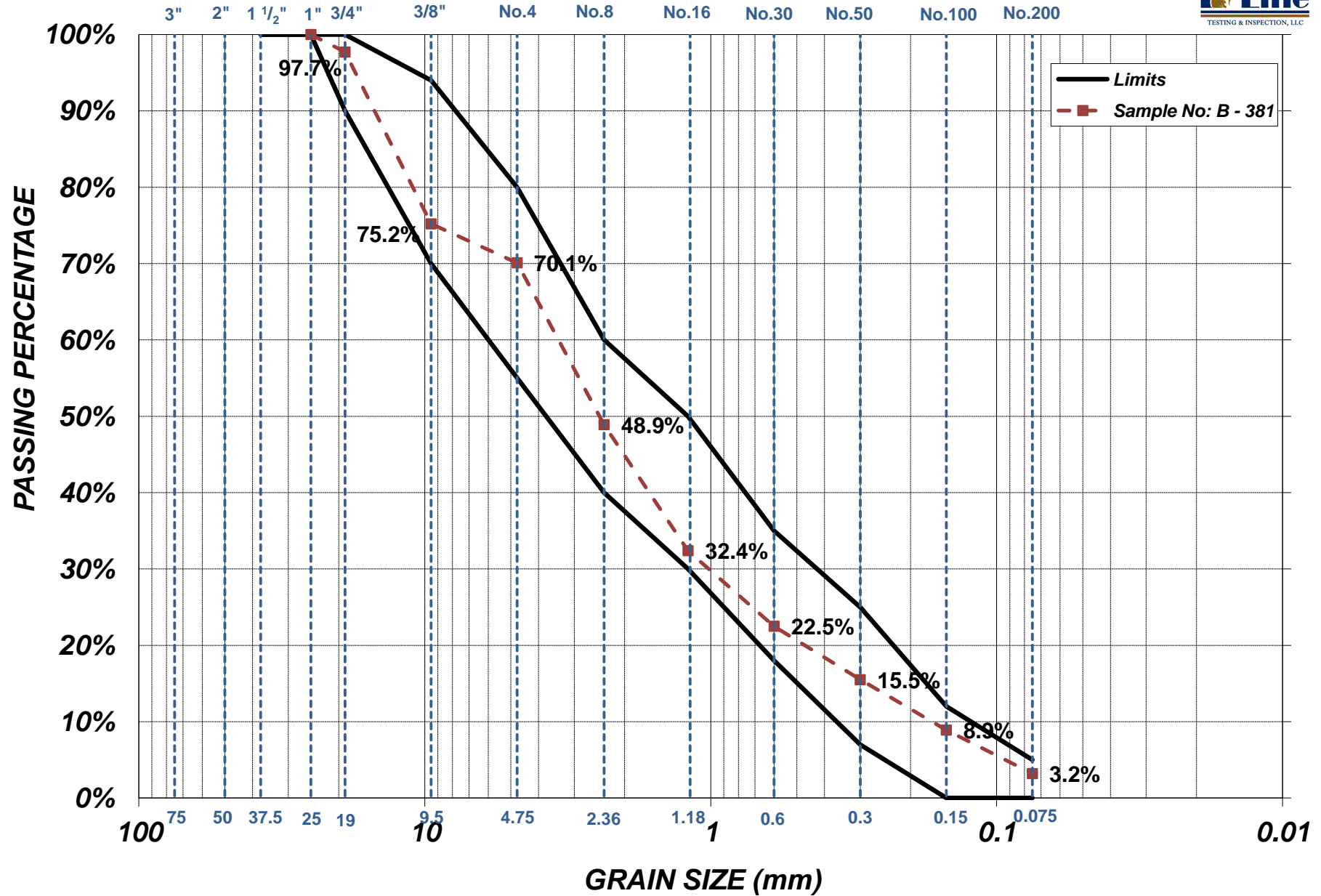
			<input type="checkbox"/> Scale Check	<input type="checkbox"/> Scale Check
Before Wash	Wet Weight (g)	6668	Coarse Scale ID:	N/A
	Moisture (%)	6.1%	Fine Scale ID:	1130
	Total Dry Weight (g)	6285	Oven ID:	Burner
After Wash Dry Weight (g)		6098	Wash Sieve ID:	1780
Wash Loss (%)		3.0%		

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
1	0			100.0		1232
3/4	145	145.00	2.3%	97.7%	90 to 100	9138
3/8	1414	1559.00	24.8%	75.2%	70 to 94	1225
4	319	1878.00	29.9%	70.1%	55 to 80	9188
8	1333	3211.00	51.1%	48.9%	40 to 60	1973
16	1039	4250.00	67.6%	32.4%	30 to 50	9159
30	620	4870.00	77.5%	22.5%	18 to 35	9156
50	438	5308.00	84.5%	15.5%	7 to 25	1925
100	419	5727.00	91.1%	8.9%	0 to 12	9153
200	359	6086.00	96.8%	3.2%	0 to 5	1914
Pan	12	6098.00				9143

Checked By: RJM

Fineness Modulus	4.02
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Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method Dry 1A Wet 1B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8791	8795	8721			
Mold Tare (g)	3634	3634	3634			
Weight of Material (g)	5157	5161	5087			
Volume of Mold (cm ³)	2511	2522	2490			
Wet Density (g/cm ³)	N/A	N/A	N/A			
Moisture Content (%)	N/A	N/A	N/A			
Maximum Index Dry Density (g/cm ³)	2.0538	2.0464	2.0430			

Result Consistency



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method A B C

Mold Size

Crushing Plant - PAC

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8791	8795	8721			
Mold Tare (g)	3634	3634	3634			
Weight of Material (g)	5157	5161	5087			
Volume of Material (cm ³)	2800	2800	2800.0			
Minimum Index Density (g/cm ³)	1.842	1.843	1.817			

Result Consistency



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method Dry 1A Wet 1B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	9862	9845	9900			
Mold Tare (g)	3634	3634	3634			
Weight of Material (g)	6228	6211	6266			
Volume of Mold (cm ³)	2754	2750	2742.0			
Wet Density (g/cm ³)	2.261	2.259	2.285			
Moisture Content (%)	7.8%	8.0%	8.1%			
Maximum Index Dry Density (g/cm ³)	2.098	2.091	2.114			

Result Consistency

The Panama Canal Third Set of Locks Project

Moisture Contents (ASTM C566 and D2216)

Project Name	Pacific	Sample No	B 381 Rev2	Technician	AU
Material Type	3a Filter	Date Tested	28-Sep-12	Checked By	RJM

Crushing Plant - PAC	1503.5	Scale ID	1533	<input checked="" type="checkbox"/>	Scale Check
Wt. Of Dry Sample (g) [B]	1394.4	Oven ID	1125		
Moisture Content (%)	7.8				
	$= ([A]-[B])/[B] * 100$				

Wt. of Wet Sample (g) [A]	1034	Scale ID	1453	<input type="checkbox"/>	Scale Check
Wt. Of Dry Sample (g) [B]	957.4	Oven ID	1125		
Moisture Content (%)	8.0				
	$= ([A]-[B])/[B] * 100$				

Wt. of Wet Sample (g) [A]	998.5	Scale ID	1453	<input type="checkbox"/>	Scale Check
Wt. Of Dry Sample (g) [B]	923.7	Oven ID	1125		
Moisture Content (%)	8.1				
	$= ([A]-[B])/[B] * 100$				

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	25-Sep-12	Time Sampled	2:00 PM
Sample Number	B 385 Rev2	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG		
Material Source	Crushing Plant - PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Test Fill Layer 1 - After Leveling				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Gradation Analysis (ASTM C136)	
Maximum Index Density of Soils (ASTM D4253)	
Minimum Index Density for Soils (ASTM D4254)	
Moisture Content (ASTM C566, D2216)	

Report Issued By 

Checked By RJMh

Report Issue Date 03-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method



The Panama Canal Third Set of Locks Project Gradation Analysis (ASTM C136, C117)

Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B - 385	Technician:	DG
Material Type:	3a Filter	Date Sampled:	25-Sep-12

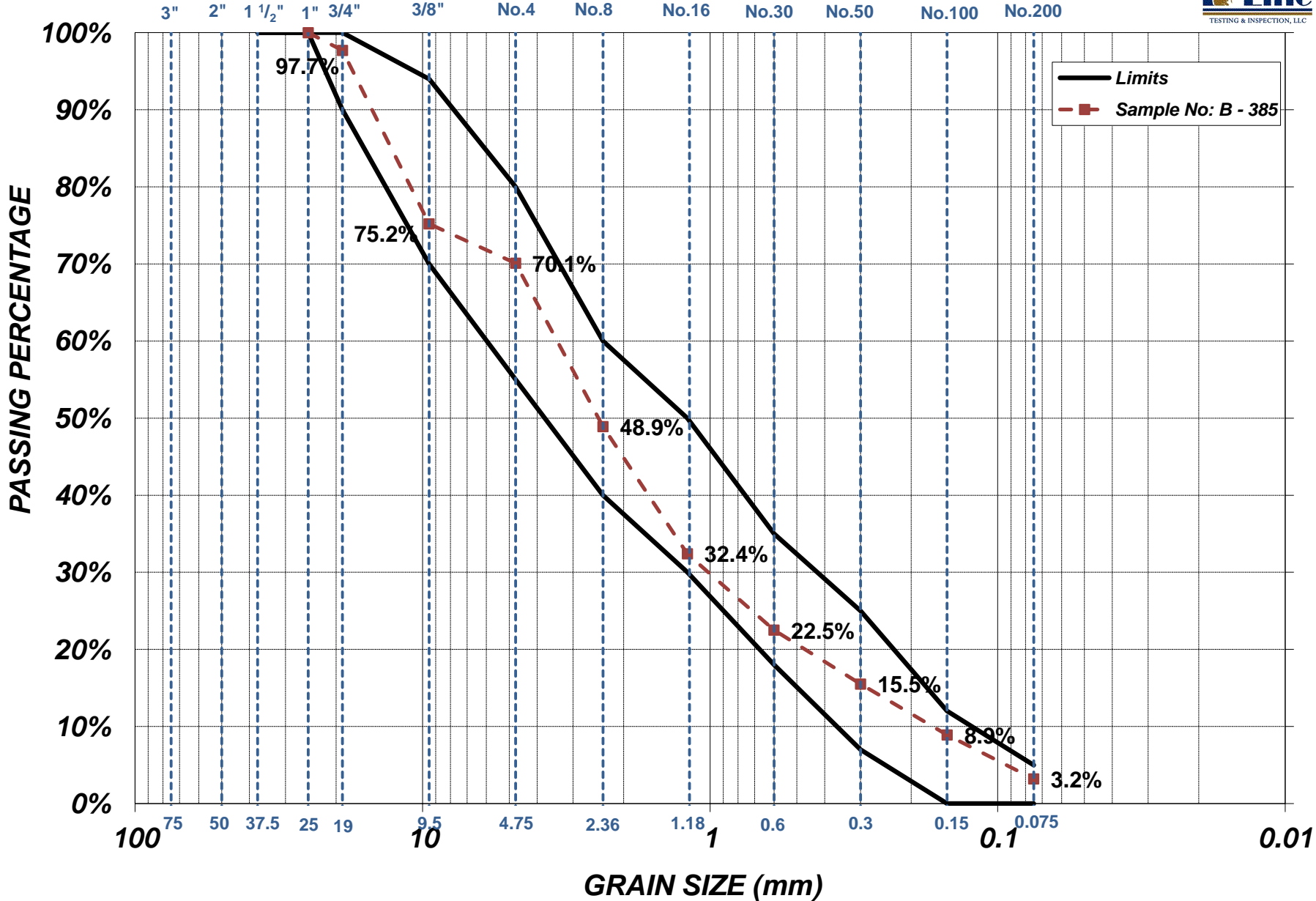
		<input type="checkbox"/> Scale Check	<input type="checkbox"/> Scale Check	
Before Wash	Wet Weight (g)	6722	Coarse Scale ID:	N/A
	Moisture (%)	5.9%	Fine Scale ID:	1130
	Total Dry Weight (g)	6345	Oven ID:	Burner
After Wash Dry Weight (g)		6105	Wash Sieve ID:	1780
Wash Loss (%)		3.8%		

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
1	0			100.0		1232
3/4	8	8.00	0.1%	99.9%	90 to 100	9138
3/8	1327	1335.00	21.0%	79.0%	70 to 94	1225
4	306	1641.00	25.9%	74.1%	55 to 80	9188
8	1237	2878.00	45.4%	54.6%	40 to 60	1973
16	1170	4048.00	63.8%	36.2%	30 to 50	9159
30	713	4761.00	75.0%	25.0%	18 to 35	9156
50	488	5249.00	82.7%	17.3%	7 to 25	1925
100	457	5706.00	89.9%	10.1%	0 to 12	9153
200	382	6088.00	95.9%	4.1%	0 to 5	1914
Pan	17	6105.00				9143

Checked By: RJM

Fineness Modulus	3.83
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Filter Material Type 3a Gradation





The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method Dry 1A Wet 1B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8713	8754	8722			
Mold Tare (g)	3634	3634	3634			
Weight of Material (g)	5079	5120	5088			
Volume of Mold (cm ³)	2503	2502.0	2494.0			
Wet Density (g/cm ³)	N/A	N/A	N/A			
Moisture Content (%)	N/A	N/A	N/A			
Maximum Index Dry Density (g/cm ³)	2.029	2.046	2.040			

Result Consistency



The Panama Canal Third Set of Locks Project

Minimum Index Density for Soils (ASTM D4254)

Project: Date: Sample ID:

Sampled By: Technician: Checked By:

Method A B C

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Scale Check

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	8713	8754	8721			
Mold Tare (g)	3634	3634	3634			
Weight of Material (g)	5079	5120	5087			
Volume of Material (cm ³)	2800	2800	2800.0			
Minimum Index Density (g/cm ³)	1.814	1.829	1.817			

Result Consistency



The Panama Canal Third Set of Locks Project

Maximum Index Density for Soils (ASTM D4253)

Project: Date: Sample ID:

Sampled By: Technician Checked By:

Method Dry 1A Wet 1B

Mold Size

Origin of Material

Soil Classification

Scale No.

Mold ID

Table ID

Double Amplitude of Vertical Vibration
(if different from that specified)

Trial	1	2	3	4	5	6
Soil + Mold (g)	9958	10002	9988			
Mold Tare (g)	3634	3634	3634			
Weight of Material (g)	6324	6368	6354			
Volume of Mold (cm ³)	2723	2750.0	2742.0			
Wet Density (g/cm ³)	2.322	2.316	2.317			
Moisture Content (%)	8.3%	8.0%	7.9%			
Maximum Index Dry Density (g/cm ³)	2.144	2.144	2.148			

Result Consistency

The Panama Canal Third Set of Locks Project

Moisture Contents (ASTM C566 and D2216)

Project Name	Pacific	Sample No	B 385 Rev2	Technician	AU
Material Type	3a Filter	Date Tested	28-Sep-12	Checked By	

Wt. of Wet Sample (g) [A]	1686.4	Scale ID	1453	<input checked="" type="checkbox"/>	Scale Check
Wt. Of Dry Sample (g) [B]	1556.9	Oven ID	1125		
Moisture Content (%)	8.3				
$= ([A]-[B])/[B] * 100$					

Wt. of Wet Sample (g) [A]	978.8	Scale ID	1453	<input type="checkbox"/>	Scale Check
Wt. Of Dry Sample (g) [B]	906.3	Oven ID	1125		
Moisture Content (%)	8.0				
$= ([A]-[B])/[B] * 100$					

Wt. of Wet Sample (g) [A]	1243.5	Scale ID	1453	<input type="checkbox"/>	Scale Check
Wt. Of Dry Sample (g) [B]	1152.5	Oven ID	1125		
Moisture Content (%)	7.9				
$= ([A]-[B])/[B] * 100$					

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013P	Date Sampled	25-Sep-12	Time Sampled	N/A
Sample Number	B 386	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG/CG		
Material Source	Crushing Plant, PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Test Fill - Borinquen Dam 1st Layer - 1 pass				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm
Issued By	N/A	Date Issued	N/A		<input type="checkbox"/> Rain	<input type="checkbox"/> Hot	Initial N/A

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample: N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:	Yellow means outside prescribed parameters
Gradation Analysis (ASTM C136)	

Report Issued By: 

Checked By: RJMh

Report Issue Date: 09-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method



The Panama Canal Third Set of Locks Project Gradation Analysis (ASTM C136, C117)

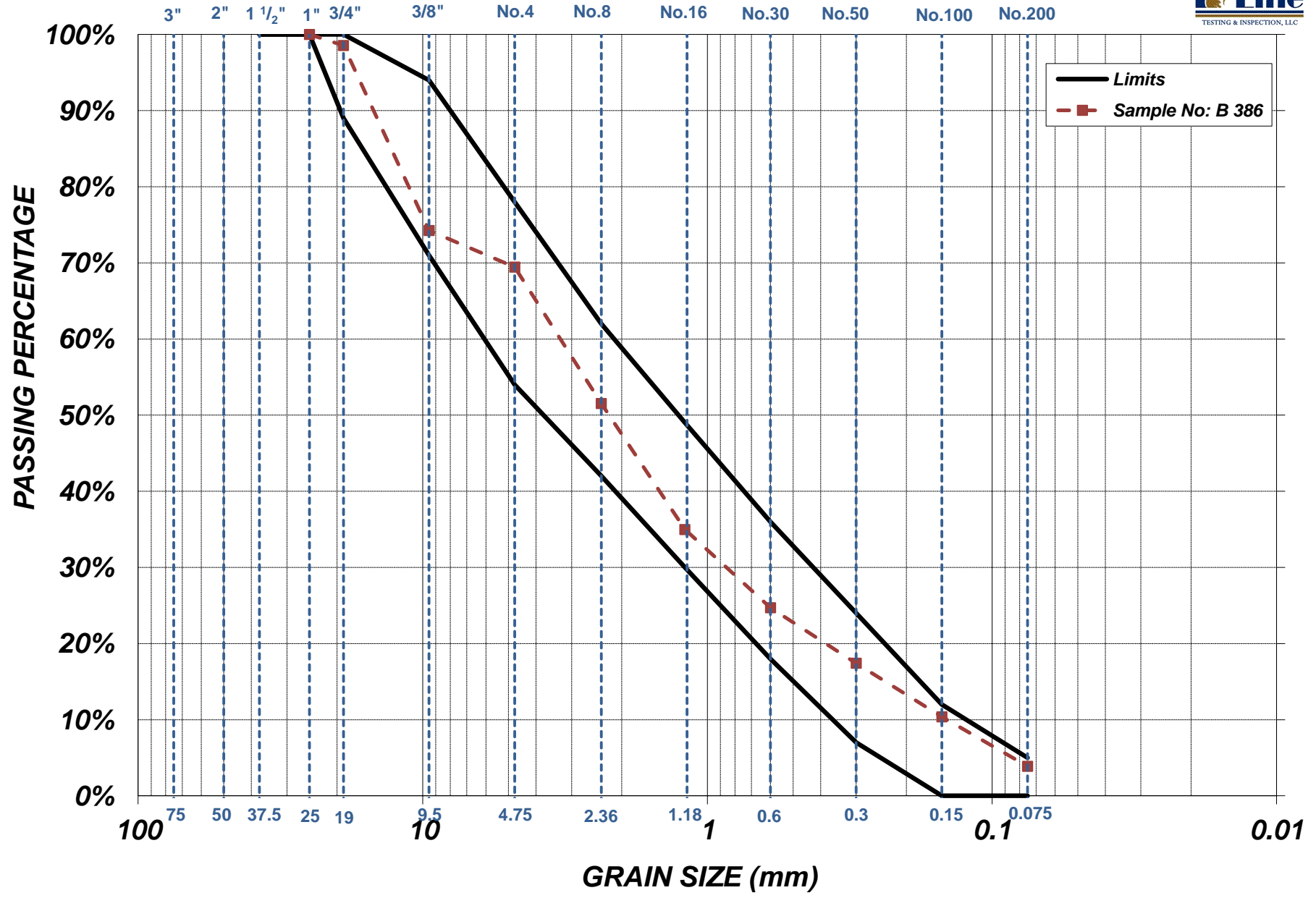
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 386	Technician:	DG
Material Type:	Filter 3a	Date Sampled:	25-Sep-12

		<input type="checkbox"/> Scale Check	<input type="checkbox"/> Scale Check
Before Wash	Wet Weight (g)	7344	Coarse Scale ID: N/A
	Moisture (%)	5.4%	Fine Scale ID: 1130
	Total Dry Weight (g)	6971	Oven ID: Burner
After Wash Dry Weight (g)		6722	Wash Sieve ID: 1780
Wash Loss (%)		3.6%	

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
25.0mm (1")	0			100.0%	100 to 100	1232
19mm (3/4")	101	101	1.4%	98.6%	90 to 100	9138
9.5mm (3/8")	1694	1795	25.7%	74.3%	70 to 94	1225
4.75mm (#4)	335	2130	30.6%	69.4%	55 to 80	9188
2.36mm (#8)	1249	3379	48.5%	51.5%	40 to 60	1973
1.2mm (#16)	1154	4533	65.0%	35.0%	30 to 50	9159
0.6mm (#30)	716	5249	75.3%	24.7%	18 to 35	9156
0.3mm (#50)	508	5757	82.6%	17.4%	7 to 25	1925
0.15mm (#100)	491	6248	89.6%	10.4%	0 to 12	9153
0.075mm #200	453	6701	96.1%	3.9%	0 to 5	1914
	21	6722				9143

Checked By:	RJMh		Fineness Modulus	3.92
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Filter Material Type 3a Gradation



The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	25-Sep-12	Time Sampled	3:43 PM
Sample Number	B 387	Material Type	3a Filter	Date Tested	25-Sep-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG-JAG		
Material Source	Crushing Plant - PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Test Fill Layer #1 Q5 1 Pass 20cm Depth				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
				<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		
Issued By	N/A	Date Issued	N/A	Special Instructions are Acknowledged and Understood by Tech			Initial N/A

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed: Yellow means outside prescribed parameters

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By RJMh

Report Issue Date 03-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	25-Sep-12
Sample No:	B 387	Elevation:	Layer #1	Time:	3:43 PM
Sand Cone ID:	FDN	Calibrated Volume:		Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	2.97	
D	Initial Wt. Of Sand & Jar (kg)	7957.90	
E	Wt. Of Residue & Jar (kg)	4.21	
F	Wt. Of Sand Used (kg) D - E	3.75	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.24	
I	Volume of Hole (m ³) H / B	0.001454	

	Wet Density (kg/m ³) C / I	2042.64	
	Wet Weight of Soil (g)		625.5
	Dry Weight of Soil (g)		591
	% Moisture		5.8
	Dry Density (kg/m ³)	1930.66	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2048*	
T	Compaction (%)	47.9	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	25-Sep-12	Time Sampled	3:46 PM
Sample Number	B 388	Material Type	3a Filter	Date Tested	25-Sep-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG-JAG		
Material Source	Crushing Plant - PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Test Fill Layer #1 Q2 1 Pass Surface				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By RJMh

Report Issue Date 03-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	25-Sep-12
Sample No:	B 388	Elevation:	Layer #1	Time:	3:46 PM
Sand Cone ID:	KK	Calibrated Volume:		Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.20	
D	Initial Wt. Of Sand & Jar (kg)	7876.70	
E	Wt. Of Residue & Jar (kg)	4.1434	
F	Wt. Of Sand Used (kg) D - E	3.73	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.22	
I	Volume of Hole (m ³) H / B	0.001444	

	Wet Density (kg/m ³) C / I	2219.25	
	Wet Weight of Soil (g)		675.3
	Dry Weight of Soil (g)		645.4
	% Moisture		4.6
	Dry Density (kg/m ³)	2121.65	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2048*	
T	Compaction (%)	129.7	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	25-Sep-12	Time Sampled	3:56 PM
Sample Number	B 389	Material Type	3a Filter	Date Tested	25-Sep-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG-JAG		
Material Source	Crushing Plant - PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Test Fill Layer #1 Q4 1 Pass 20cm Depth				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed: Yellow means outside prescribed parameters

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By RJMh

Report Issue Date 03-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	25-Sep-12
Sample No:	B 389	Elevation:	Layer #1	Time:	3:56 PM
Sand Cone ID:	HDP	Calibrated Volume:		Technician:	CG

Crushing Plant - PAC

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.56	
D	Initial Wt. Of Sand & Jar (kg)	7701.30	
E	Wt. Of Residue & Jar (kg)	3.6106	
F	Wt. Of Sand Used (kg) D - E	4.09	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.58	
I	Volume of Hole (m ³) H / B	0.001677	

	Wet Density (kg/m ³) C / I	2120.51	
	Wet Weight of Soil (g)		657.6
	Dry Weight of Soil (g)		627.8
	% Moisture		4.7
	Dry Density (kg/m ³)	2025.32	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2048*	
T	Compaction (%)	90.4	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013P	Date Sampled	25-Sep-12	Time Sampled	N/A
Sample Number	B 390	Material Type	3a Filter	Date Tested	N/A	Time Tested	N/A
Material Description	3a Filter			Sampled By	JAG/CG		
Material Source	Crushing Plant, PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Test Fill - Borinquen Dam 1st Layer, 2 passes				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm
Issued By	N/A	Date Issued	N/A		<input type="checkbox"/> Rain	<input type="checkbox"/> Hot	Initial
							N/A

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial

N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:	Yellow means outside prescribed parameters
Gradation Analysis (ASTM C136)	

Report Issued By 

Checked By RJMh

Report Issue Date 09-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Gradation Analysis (ASTM C136, C117)

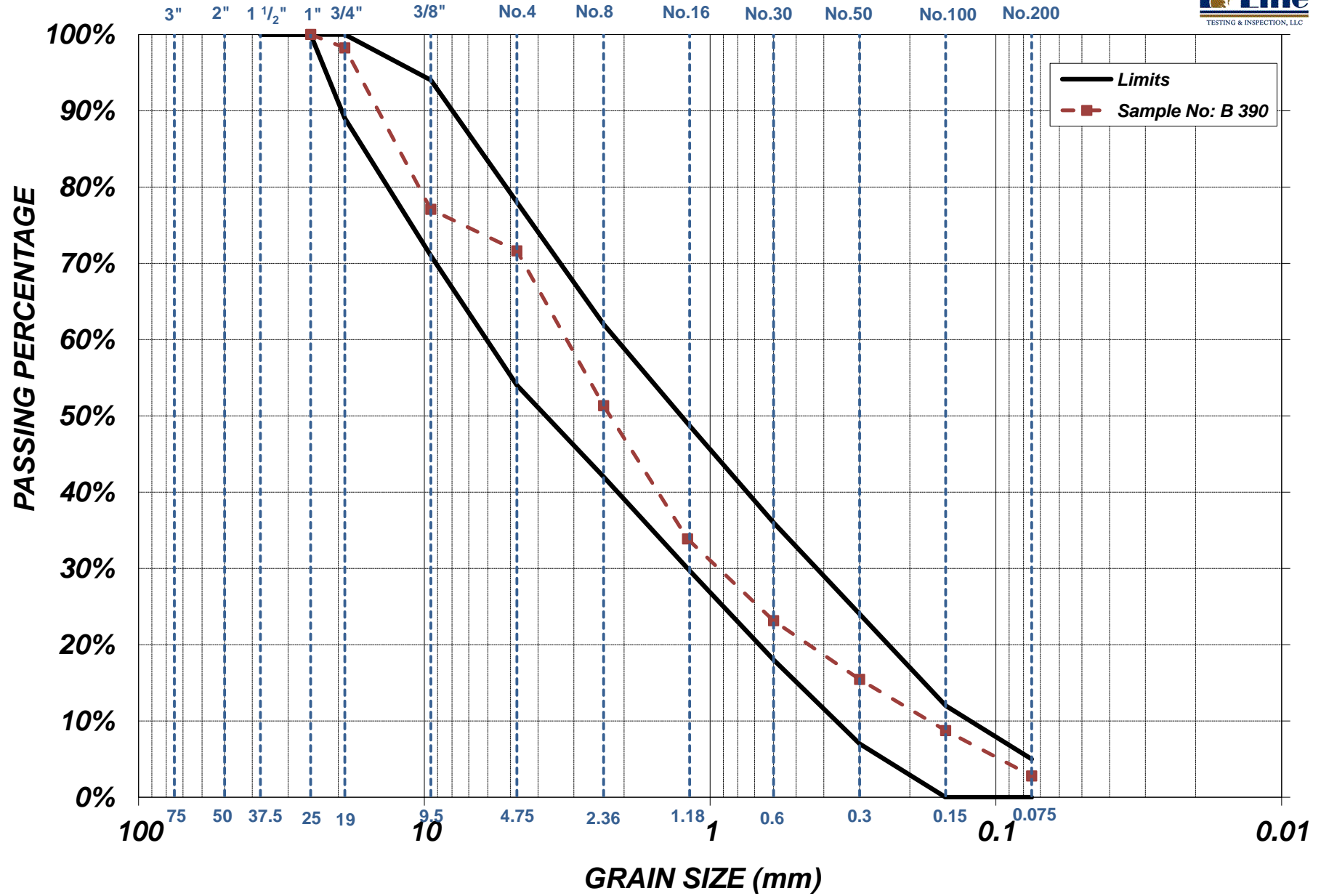
Project Name:	PACIFIC	Project Number:	F100013P
Sample No:	B 390	Technician:	DG/LF
Material Type:	Filter 3a	Date Sampled:	25-Sep-12

		<input type="checkbox"/> Scale Check	<input type="checkbox"/> Scale Check	
Before Wash	Wet Weight (g)	5514	Coarse Scale ID:	N/A
	Moisture (%)	5.8%	Fine Scale ID:	1130
	Total Dry Weight (g)	5212	Oven ID:	Burner
After Wash Dry Weight (g)		5081	Wash Sieve ID:	1780
Wash Loss (%)		2.5%		

Sieve Size	Individual Weight (g)	Cummulative Weight (g)	Percent Retained	Percent Passing	Required	Sieve ID
25.0mm (1")	0			100.0%	100 to 100	1232
19mm (3/4")	92	92	1.8%	98.2%	90 to 100	9144
9.5mm (3/8")	1103	1195	22.9%	77.1%	70 to 94	1225
4.75mm (#4)	284	1479	28.4%	71.6%	55 to 80	9187
2.36mm (#8)	1058	2537	48.7%	51.3%	40 to 60	1973
1.2mm (#16)	910	3447	66.1%	33.9%	30 to 50	9159
0.6mm (#30)	559	4006	76.9%	23.1%	18 to 35	9156
0.3mm (#50)	401	4407	84.6%	15.4%	7 to 25	1925
0.15mm (#100)	350	4757	91.3%	8.7%	0 to 12	9153
0.075mm #200	310	5067	97.2%	2.8%	0 to 5	1914
	14	5081				9143

Checked By:	RJMh	Fineness Modulus	3.96
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Filter Material Type 3a Gradation



The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	25-Sep-12	Time Sampled	4:13 PM
Sample Number	B 391	Material Type	3a Filter	Date Tested	25-Sep-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG-JAG		
Material Source	Crushing Plant - PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Test Fill Layer #1 Q7 2 Pass Surface				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed: Yellow means outside prescribed parameters

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By RJMh

Report Issue Date 03-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	25-Sep-12
Sample No:	B 391	Elevation:	Layer #1	Time:	4:13 PM
Sand Cone ID:	7035	Calibrated Volume:		Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.77	
D	Initial Wt. Of Sand & Jar (kg)	7499.60	
E	Wt. Of Residue & Jar (kg)	3.3636	
F	Wt. Of Sand Used (kg) D - E	4.14	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.62	
I	Volume of Hole (m ³) H / B	0.001706	
	Wet Density (kg/m ³) C / I	2208.73	
	Wet Weight of Soil (g)		715.7
	Dry Weight of Soil (g)		685.4
	% Moisture		8.4
	Dry Density (kg/m ³)	2037.57	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2048*	
T	Compaction (%)	95.6	

*Reported as % Relative Density

Checked By: RJM

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	25-Sep-12	Time Sampled	4:20 PM
Sample Number	B 392	Material Type	3a Filter	Date Tested	25-Sep-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG-JAG		
Material Source	Crushing Plant - PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Test Fill Layer #1 Q1 2 Pass Surface				<input type="checkbox"/> Clear <input type="checkbox"/> Cool <input type="checkbox"/> Windy <input type="checkbox"/> Overcast <input type="checkbox"/> Warm <input type="checkbox"/> Calm <input type="checkbox"/> Rain <input type="checkbox"/> Hot		
Special Instructions	N/A			Special Instructions are Acknowledged and Understood by Tech	Initial N/A		
Issued By	N/A	Date Issued	N/A				

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed: Yellow means outside prescribed parameters

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By RJMh

Report Issue Date 03-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	25-Sep-12
Sample No:	B 392	Elevation:	Layer #1	Time:	4:20 PM
Sand Cone ID:	CJ	Calibrated Volume:		Technician:	JAG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	2.96	
D	Initial Wt. Of Sand & Jar (kg)	7901.50	
E	Wt. Of Residue & Jar (kg)	4.167	
F	Wt. Of Sand Used (kg) D - E	3.73	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.22	
I	Volume of Hole (m ³) H / B	0.001445	
	Wet Density (kg/m ³) C / I	2045.81	
	Wet Weight of Soil (g)		616.1
	Dry Weight of Soil (g)		591.9
	% Moisture		4.8
	Dry Density (kg/m ³)	1952.11	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)	2048*	
T	Compaction (%)	57.9	

*Reported as % Relative Density

Checked By:

The Panama Canal Third Set of Locks Project

Sampling Sheet

Project Name	Pacific	Project Number	F100013	Date Sampled	25-Sep-12	Time Sampled	4:20 PM
Sample Number	B 393	Material Type	3a Filter	Date Tested	25-Sep-12	Time Tested	N/A
Material Description	3a Filter			Sampled By	CG-JAG		
Material Source	Crushing Plant - PAC			Remarks & Weather Conditions (SAMPLING)	Pick One from Each Column		
Sample Location	Test Fill Layer #1 Q8 2 Pass 20cm Depth				<input type="checkbox"/> Clear	<input type="checkbox"/> Cool	<input type="checkbox"/> Windy
Special Instructions	N/A			<input type="checkbox"/> Overcast	<input type="checkbox"/> Warm	<input type="checkbox"/> Calm	
Issued By	N/A	Date Issued	N/A	<input type="checkbox"/> Rain	<input type="checkbox"/> Hot		
				Special Instructions are Acknowledged and Understood by Tech			Initial N/A

Are there any visual abnormalities in the sample? Yes No

If yes who received the client instructions regarding handing the sample? Initial
N/A

Client instructions regarding abnormal sample N/A

Follow up Actions as Directed by GUPC: N/A

Tests to be performed:

Yellow means outside prescribed parameters

Sandcone (ASTM D1556, D491)	

Report Issued By 

Checked By RJMh

Report Issue Date 03-Oct-12

Sampling Reference - All sampling is performed by either D75, C172, or as specified by the applicable Test Method

The Panama Canal Third Set of Locks Project

Sandcone (ASTM D1556, D491)

Project Name:	Pacific	Project Number:	F100013	Date:	25-Sep-12
Sample No:	B 393	Elevation:	Layer #1	Time:	4:20 PM
Sand Cone ID:	FL	Calibrated Volume:		Technician:	CG

A	Sand Cone/Sand Replacement Methods	For Lab	For Field
B	Unit Wt. Of Sand (kg/m ³)	1538	
C	Wt. Of Soil Excavated (kg)	3.37	
D	Initial Wt. Of Sand & Jar (kg)	7840.40	
E	Wt. Of Residue & Jar (kg)	3.709	
F	Wt. Of Sand Used (kg) D - E	4.13	
G	Wt. Of Sand in Cone & Ring (kg)	1.512	
H	Wt. Of Sand in Hole (kg) F - G	2.62	
I	Volume of Hole (m ³) H / B	0.001703	

	Wet Density (kg/m ³) C / I	1977.69	
	Wet Weight of Soil (g)		583.3
	Dry Weight of Soil (g)		555.1
	% Moisture		5.1
	Dry Density (kg/m ³)	1881.72	
c	Wt. Of soil Excavated (kg)		
J	Wt. Of Oversize Rock (kg)		
K	% Oversize Rock Retained (J / C) x 100%		{Apply rock correction if over 5% rock retained.}
L	Wt. Of Minus Material C - J		
M	Specific Gravity		
N	Volume of Hole (m ³) from Line (K) above		
O	Volume of Oversize Mat. J/162.24		
P	Volume of Minus Mat. N - O		
Q	Rock Corrected Density L / P		
R	Rock Corrected Dry Density		
S	Maximum Density(kg/m ³)		
T	Compaction (%)	24.3	

*Reported as % Relative Density

Checked By: RJM

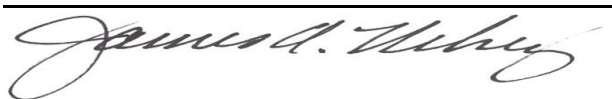
The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 845</u>
Date Sampled: <u>12-Dec-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>10:30</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Stockpile First Layer 1 Pass Q8 Depth 20cm</u>	

Date Tested: <u>12-Dec-12</u>	Sand Cone ID: <u>CJ</u>	
	Calibrated Volume: <u>0.003836</u>	
Technician: <u>AU</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>	

Weight of Sand & Jar, before (kg) [B]	<u>7.235</u>
Weight of Sand & Jar, after (kg) [C]	<u>3.122</u>
Weight of Sand Used (kg) (B-C) [D]	<u>4.113</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.601</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001691</u>
Weight of Material Excavated (kg) [H]	<u>3.695</u>
Wet Density (kg/m ³) (H/G)	<u>2184.9</u>
Moisture Content (%)	<u>6.0%</u>
Dry Density (kg/m ³)	<u>2061.2</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By



Date

15-Dec-12



**The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)**

Project: <u>Pacific</u>	Sample Number: <u>B 847</u>
Date Sampled: <u>12-Dec-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>10:45</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Stockpile First Layer 1 Pass Q5 Depth 20cm</u>	

Date Tested: <u>12-Dec-12</u>	Sand Cone ID: <u>FL</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>AU</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>7.296</u>
Weight of Sand & Jar, after (kg) [C]	<u>3.206</u>
Weight of Sand Used (kg) (B-C) [D]	<u>4.090</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.578</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001676</u>
Weight of Material Excavated (kg) [H]	<u>3.534</u>
Wet Density (kg/m ³) (H/G)	<u>2108.3</u>
Moisture Content (%)	<u>6.3%</u>
Dry Density (kg/m ³)	<u>1983.4</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date

15-Dec-12



**The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)**

Project: <u>Pacific</u>	Sample Number: <u>B 848</u>
Date Sampled: <u>12-Dec-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>11:20</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Borinquen Dam Test Fill 3b</u>
<u>Stockpile First Layer 1 Pass Q2 Depth 35cm</u>	

Date Tested: <u>12-Dec-12</u>	Sand Cone ID: <u>3124</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>AU</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>7.33</u>
Weight of Sand & Jar, after (kg) [C]	<u>3.311</u>
Weight of Sand Used (kg) (B-C) [D]	<u>4.019</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.507</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001630</u>
Weight of Material Excavated (kg) [H]	<u>3.496</u>
Wet Density (kg/m ³) (H/G)	<u>2144.7</u>
Moisture Content (%)	<u>6.2%</u>
Dry Density (kg/m ³)	<u>2019.5</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By

Date

15-Dec-12

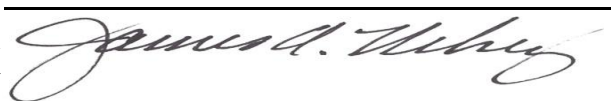
The Panama Canal
Third Set of Locks Project
Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 849
Date Sampled:	12-Dec-12	Material Type:	3b Filter
Time Sampled:	11:30	Material Source:	Crushing Plant
Sampled By:	AU	Sample Location:	Borinquen Dam Test Fill 3b
Stockpile First Layer 1 Pass Q3 Surface			

Date Tested:	12-Dec-12	Sand Cone ID:	HDP
Technician:	AU	Calibrated Volume:	0.0038396
		Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.493
Weight of Sand & Jar, after (kg) [C]	3.626
Weight of Sand Used (kg) (B-C) [D]	3.867
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.355
Volume of Hole (m ³) (F/A) [G]	0.001531
Weight of Material Excavated (kg) [H]	3.321
Wet Density (kg/m ³) (H/G)	2168.9
Moisture Content (%)	6.0%
Dry Density (kg/m ³)	2046.1
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported
Issued By



Date

15-Dec-12



The Panama Canal
Third Set of Locks Project

Density of Soil Aggregates In Place by the Nuclear Method (ASTM D6938-Method A)

Project: Pacific Structure: Test Fill Gauge ID: 1505 Maximum Density (kg/m³): _____ Sample Number: B 850
 Date: 12-Dec-12 Material: 3b Filter Technician: CG Required Compaction (%): 70%
 Layer Thickness (cm) 50 Additional Location Information: 3b Stockpile First Layer 1 Pass

Test #	1	2	3	4	5	6	7	8		
Time	10:24 AM	10:27 AM	10:29 AM	10:32 AM	10:34 AM	10:40 AM	11:30 AM	11:35 AM		
Test Duration (s)	60	60	60	60	60	60	60	60		
Test Depth (mm)	300	300	300	300	300	300	300	300		
Northing	Q8	Q8	Q5	Q5	Q2	Q2	Q3	Q3		
Easting										
Elevation										

Wet Density (kg/m ³)	2249.4	2183.4	2203.7	2188.4	2198.6	2198.8	2187.5	2172.3		
Moisture (L/m ³)	120.3	95.7	95.7	120.9	121	91.5	88.7	120.6		
% Moisture	5.6	4.6	4.5	5.8	5.8	4.3	4.2	5.9		
Dry Density (kg/m ³)	2129.1	2087.7	2107.9	2067.6	2077.6	2107.2	2098.8	2051.7		
% Compaction										

NOTES: _____

Checked By: IC

Report Issued By: *James D. White*

Date: 15-Dec-12

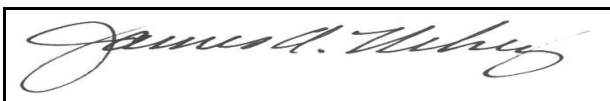
The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 852</u>
Date Sampled: <u>13-Dec-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>9:35</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Borinquen Dam 3b Stockpile</u>
<u>First Layer 2 Passes Q7 Depth 20cm</u>	

Date Tested: <u>13-Dec-12</u>	Sand Cone ID: <u>1013</u>
	Calibrated Volume: <u>0.0038396</u>
Technician: <u>AU</u>	Unit Wt. of Sand (kg/m ³)[A]: <u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>6.959</u>
Weight of Sand & Jar, after (kg) [C]	<u>2.841</u>
Weight of Sand Used (kg) (B-C) [D]	<u>4.118</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.606</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001694</u>
Weight of Material Excavated (kg) [H]	<u>3.608</u>
Wet Density (kg/m ³) (H/G)	<u>2129.4</u>
Moisture Content (%)	<u>6.4%</u>
Dry Density (kg/m ³)	<u>2001.3</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u> </u>
	<u>Specified >70%</u>

Reported
Issued By



Date

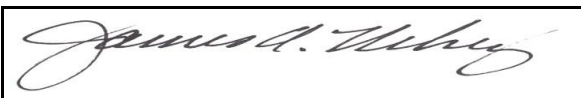
15-Dec-12

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project: <u>Pacific</u>	Sample Number: <u>B 853</u>
Date Sampled: <u>13-Dec-12</u>	Material Type: <u>3b Filter</u>
Time Sampled: <u>9:42</u>	Material Source: <u>Crushing Plant</u>
Sampled By: <u>AU</u>	Sample Location: <u>Borinquen Dam 3b Stockpile</u>
<u>First Layer 2 Passes Q6 Depth 35cm</u>	

Date Tested: <u>13-Dec-12</u>	Sand Cone ID: <u>9035</u>
Technician: <u>AU</u>	Calibrated Volume: <u>0.0038396</u>
Unit Wt. of Sand (kg/m ³)[A]:	<u>1538.0</u>

Weight of Sand & Jar, before (kg) [B]	<u>6.954</u>
Weight of Sand & Jar, after (kg) [C]	<u>2.943</u>
Weight of Sand Used (kg) (B-C) [D]	<u>4.011</u>
Weight of Sand in Cone & Ring (kg) [E]	<u>1.512</u>
Weight of Sand in Hole (kg) (D-E) [F]	<u>2.499</u>
Volume of Hole (m ³) (F/A) [G]	<u>0.001625</u>
Weight of Material Excavated (kg) [H]	<u>3.514</u>
Wet Density (kg/m ³) (H/G)	<u>2162.7</u>
Moisture Content (%)	<u>6.5%</u>
Dry Density (kg/m ³)	<u>2030.7</u>
Maximum Dry Density (kg/m ³)	<u> </u>
Compaction (%)	<u>Specified >70%</u>

Reported Issued		Date	<u>15-Dec-12</u>
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The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 854
Date Sampled:	13-Dec-12	Material Type:	3b Filter
Time Sampled:	10:09	Material Source:	Crushing Plant
Sampled By:	AU	Sample Location:	Borinquen Dam 3b Stockpile
First Layer 2 Passes Q4 Depth 20cm			

Date Tested:	13-Dec-12	Sand Cone ID:	848
		Calibrated Volume:	0.0038396
Technician:	AU	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.636
Weight of Sand & Jar, after (kg) [C]	3.574
Weight of Sand Used (kg) (B-C) [D]	4.062
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.550
Volume of Hole (m ³) (F/A) [G]	0.001658
Weight of Material Excavated (kg) [H]	3.534
Wet Density (kg/m ³) (H/G)	2131.5
Moisture Content (%)	7.1%
Dry Density (kg/m ³)	1990.2
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported
Issued By

James D. Murphy

Date

15-Dec-12

The Panama Canal Third Set of Locks Project Density by Sandcone (ASTM D1556)

Project:	Pacific	Sample Number:	B 855
Date Sampled:	13-Dec-12	Material Type:	3b Filter
Time Sampled:	10:19	Material Source:	Crushing Plant
Sampled By:	AU	Sample Location:	Borinquen Dam 3b Stockpile
First Layer 2 Passes Q1 Surface			

Date Tested:	13-Dec-12	Sand Cone ID:	KK
		Calibrated Volume:	0.0038396
Technician:	AU	Unit Wt. of Sand (kg/m ³)[A]:	1538.0

Weight of Sand & Jar, before (kg) [B]	7.863
Weight of Sand & Jar, after (kg) [C]	4.119
Weight of Sand Used (kg) (B-C) [D]	3.744
Weight of Sand in Cone & Ring (kg) [E]	1.512
Weight of Sand in Hole (kg) (D-E) [F]	2.232
Volume of Hole (m ³) (F/A) [G]	0.001451
Weight of Material Excavated (kg) [H]	3.161
Wet Density (kg/m ³) (H/G)	2178.1
Moisture Content (%)	6.7%
Dry Density (kg/m ³)	2041.4
Maximum Dry Density (kg/m ³)	
Compaction (%)	Specified >70%

Reported
Issued By

James D. Murphy

Date

15-Dec-12



The Panama Canal
Third Set of Locks Project

Density of Soil Aggregates In Place by the Nuclear Method (ASTM D6938-Method A)

Project: Pacific Structure: Test Fill Gauge ID: 1505 Maximum Density (kg/m³): _____ Sample Number: B 862
 Date: 13-Dec-12 Material: 3b Filter Technician: CG Required Compaction (%): 70%
 Layer Thickness (cm) 50 Additional Location Information: 3b Stockpile First Layer 2 Pass

Test #	1	2	3	4	5	6	7	8	9	
Time	8:17 AM	8:20 AM	8:22 AM	8:26 AM	8:28 AM	8:30 AM	8:40 AM	8:42 AM	8:44 AM	
Test Duration (s)	60	60	60	60	60	60	60	60	60	
Test Depth (mm)	300	300	300	300	300	300	300	300	300	
Northing	Q4	Q4	Q4	Q6	Q6	Q6	Q7	Q7	Q7	
Easting										
Elevation										

Wet Density (kg/m ³)	2233.5	2244.7	2210.3	2212.7	2226	2207.7	2194.9	2201.3	2191.2	
Moisture (L/m ³)	141.5	137	103.6	107.7	130.6	129.7	155.2	153.2	128.3	
% Moisture	6.8	6.5	4.9	5.1	6.2	6.2	7.2	7.5	6.2	
Dry Density (kg/m ³)	2092.1	2107.8	2106.6	2104.9	2095.4	2078.0	2039.6	2084.1	2063	
% Compaction										

NOTES: Moisture Correction applied to the following Test #'s; 1,2,5,6,7,and 8 - Test #'s 3,4,and 9 were performed without a correction

Checked By:

IC

Report Issued By:

Date:

15-Dec-12



The Panama Canal
Third Set of Locks Project

Density of Soil Aggregates In Place by the Nuclear Method (ASTM D6938-Method A)

Project: Pacific Structure: Test Fill Gauge ID: 1505 Maximum Density (kg/m³): _____ Sample Number: B 862
 Date: 13-Dec-12 Material: 3b Filter Technician: CG Required Compaction (%): 70%
 Layer Thickness (cm) 50 Additional Location Information: 3b Stockpile First Layer 2 Pass

Test #	10	11	12	13	14					
Time	8:53 AM	9:19 AM	9:21 AM	9:23 AM	9:27 AM					
Test Duration (s)	60	60	60	60	60					
Test Depth (mm)	300	300	300	300	300					
Northing	Q1	Q1	Q1	Q1	Q1					
Easting										
Elevation										

Wet Density (kg/m³)	2188	2189.3	2184.2	2194.3	2207					
Moisture (L/m³)	117.3	116	142.9	142.3	117.3					
% Moisture	5.7	5.6	7.0	6.9	5.6					
Dry Density (kg/m³)	2070.6	2073.3	2041.3	2051.9	2089.7					
% Compaction										

NOTES: Moisture Correction applied to the following Test #s; 11,12, and 13 - Test #'s 10 and 14 were performed without a correction

Checked By: IC

Report Issued By: *James D. Wilby*

Date: 15-Dec-12



The Panama Canal
Third Set of Locks Project

Density of Soil Aggregates In Place by the Nuclear Method (ASTM D6938-Method A)

Project: Pacific Structure: Test Fill Gauge ID: 1505 Maximum Density (kg/m³): _____ Sample Number: B 862
 Date: 13-Dec-12 Material: 3b Filter Technician: CG Required Compaction (%): 70%
 Layer Thickness (cm) 50 Additional Location Information: 3b Stockpile First Layer 2 Pass

Test #	1	5	7	8						
Time	8:17 AM	8:28 AM	8:40 AM	8:42 AM						
Test Duration (s)	60	60	60	60						
Test Depth (mm)	300	300	300	300						
Northing	Q4	Q6	Q7	Q7						
Easting										
Elevation										

Wet Density (kg/m³)	2233.5	2226	2194.9	2201.3						
Moisture (L/m³)	141.5	130.6	155.2	153.2						
% Moisture	6.8	6.2	7.2	7.5						
Dry Density (kg/m³)	2092.1	2095.4	2039.6	2084.1						
% Compaction										

NOTES: Moisture Correction of 13.5 applied on test #s; 1, 5, 8, 11, 13. Moisture Correction of 13.2 applied on Tests# 2, 6, 7, 12. No Moisture correction applied on tests #3, 4, 9, 10, 14

Removed tests # undertaken with Correction Factor of 13.2 and also tests # with no correction factor. They were done as part of exercise to determine appropriate moisture correction factor for gauge

Checked By: IC

Report Issued By: *James A. Wiley*

Date: 15-Dec-12

APÉNDICE 13:

FOTOGRAFÍAS



























